Trabajo Fin de Grado
Grado en Ingeniería de las Tecnologías de Telecomunicación

Simulador en Python de métodos de predicción de punto a zona para servicios terrenales en la gama de frecuencias de 30 a 3000 MHz

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El tribunal nombrado para juzgar el Proyecto arriba indicado, compuesto por los siguientes miembros:

Presidente:

Vocales:

Secretario:

Acuerdan otorgarle la calificación de:

Sevilla, 2019

El Secretario del Tribunal

A mi familia

Agradecimientos

Quiero aprovechar estas líneas para agradecer a todos aquellos que me han acompañado en este largo camino.

A mis profesores por todo lo que me han enseñado y me han hecho aprender; especialmente a mi tutora Susana por su ayuda durante este proyecto.

A todos mis compañeros de estudios; sin ellos el camino hubiera sido aún más arduo.

A mis amigos; que están siempre en las buenas y en las malas.

Pero sobre todo a mi familia; porque sin ellos, yo no sería nada.

Carlos Mejías Cruz

Sevilla, 2019

Resumen

Este proyecto está basado en la Recomendación de la ITU-R P.1546-5. En esta Recomendación se describe un método de predicción de propagación radioeléctrica punto a zona para servicios terrenales en la gama de frecuencias de 30 a 3000 MHz. El método será utilizado en los circuitos radioeléctricos troposféricos en trayectos terrestres y marítimos entre 1-1000 km de longitud para alturas de antena de transmisión efectivas menores de 3000 m y está basado en la interpolación/extrapolación de curvas de intensidad de campo deducidas empíricamente en función de: la distancia, la altura de la antena, la frecuencia y el porcentaje de tiempo. El procedimiento de cálculo incluye además correcciones de los resultados a fin de reflejar diferentes casuísticas.

A partir, de este método se elaborará un simulador en *Python* que implementará lo explicado anteriormente. Este programa partirá de una serie de parámetros introducidos por el usuario y se encargará de desarrollar el método descrito en la recomendación. Utilizando la *API Open-Elevation (open-source),* se obtienen otros datos relevantes para la aplicación y se muestran por pantalla ciertas gráficas del terreno estudiado. Finalmente, se realizan una serie de correcciones sobre los valores obtenidos.

Para comprobar la correcta implementación de nuestro código, se han realizado una serie de pruebas que permiten verificar su funcionamiento.

Abstract

This Project is based on the Recommendation of ITU-R P.1546-5. This Recommendation describes a point-to-area radio propagation method for terrestrial services in the frequency range from 30 to 3000 MHz. The method will be used in tropospheric radio circuits on land sea routes between 1-1000 km length for effective transmisision antennas smaller tan 3000 m and is based in the interpolation/extrapolation of field strength curves deduced empirically as a function of: the distance, the height of the antenna, the frequency and the percentage of time. The calculation procedure also includes corrections of the results in order to reflect different casuistry.

From this method a Python simulator will be developed that will implement what was explained above. This program is available in a series of parameters entered by the user and will be responsable for developing the method described in the Recommendation. Using Open-Elevation API (open-source), other relevant data to the application is displayed and certain graphs on the studied terrain are displayed on the screen. Finally, a serie f corrections is made on the nominal values.

A serie of test has been carried out to verify its operation.

Índice

ÍNDICE DE TABLAS

ÍNDICE DE FIGURAS

Notación

log	Logaritmo
ln	Logaritmo neperiano
haversin	Función haverseno
sen	Función seno
tg	Función tangente
arctg	Función arco tangente
sen	Función seno
$\sin^x y$	Función seno de *x* elevado a *y*
$\cos^x y$	Función coseno de *x* elevado a *y*
cos	Función coseno
<	Menor o igual
>	Mayor o igual

1 INTRODUCCIÓN

Un viaje de mil millas comienza con un solo paso.

- Lao Tse -

El mundo está cambiando. Y con él el mundo de las tecnologías y las telecomunicaciones. Estamos tan inmersos en este cambio que no nos damos cuenta del nivel de desarrollo en el que estamos involucrados. La radio, la televisión y la telefonía móvil han cambiado radicalmente en los últimos veinte años y van a seguir haciéndolo sin parar. Si queremos acompañar y comprender esta revolución, tenemos que empezar por comprender la base teórica que las sustenta, la propagación de las ondas radioeléctricas.

Al mismo tiempo, hoy surgen voces expertas que dicen que debemos enseñar programación a los más jóvenes, puesto que este tipo de conocimientos, además de ser muy útiles, favorecen un desarrollo cognitivo y una forma de ver el mundo que les puede ayudar significativamente en su futuro. En este sentido, *Python* es un lenguaje que se caracteriza por su simplicidad y su amplia comunidad de desarrolladores. Además, es de código abierto porque permite acceder a él a cualquiera que tenga ganas de aprender.

Es de esta unión de ideas de donde nace este proyecto.

1.1 Motivación

El simulador creado en este Proyecto ha sido diseñado con el objetivo de ser parte de una herramienta de mayor envergadura que recoja diferentes simuladores relacionados con la propagación de las ondas radioeléctricas.

Poder aunar en un único Proyecto de Fin de Grado, ramas tan variadas, pero a la vez de las Telecomunicaciones (propagación de ondas, programación, normas técnicas) ha sido poner el broche de oro a una etapa de estudio y aprendizaje. Poder añadir mi grano de arena a una aplicación desarrollada por compañeros de distintas generaciones de una misma Carrera y que dicho programa sirva de ayuda en su formación como ingenieros ha sido un gran empuje durante el Desarrollo de este trabajo.

Además, el enfrentarme a este proyecto y compaginarlo con mi actividad laboral y el estudio del máster de Ciberseguridad, ha supuesto un reto perfecto para poder demostrar una vez más mi perseverancia y constancia.

1.2 Objetivos

Los principales objetivos de este Trabajo de Fin de Grado serán mencionados a continuación:

- Comprender y analizar una recomendación técnica como la ITU-R P-1546.
- Aprender los conocimientos de programación en Python necesarios para poder implementar el método explicado en dicha recomendación de forma correcta y crear un simulador que utilice dicho método.
- Aprender a utilizar una *API open-source* e integrarla en el código creado para dicho simulador.
- Realizar una serie de pruebas sobre dicho simulador para comprobar que funciona correctamente.

2 CONCEPTOS BÁSICOS

No es nada sencillo entender lo simple.

-Eric Hoffer-

La recomendación en la cual está basada principalmente este proyecto [1] da por sobreentendidos una serie de conceptos básicos e ideas sobre los cuales se asienta nuestro simulador. Es por ello imprescindible, explicar con mayor detalle dichos conceptos para poder entender posteriormente cómo funciona nuestra herramienta.

Se detallarán a continuación aspectos puramente teóricos como diferentes gráficos utilizados en este proyecto.

2.1. Espectro electromagnético

Podemos definir el espectro electromagnético como la distribución energética del conjunto de las ondas electromagnéticas [2], siendo dichas ondas una combinación de campos eléctricos y magnéticos oscilantes, que se propagan a través del espacio transportando energía de un lugar a otro [3].

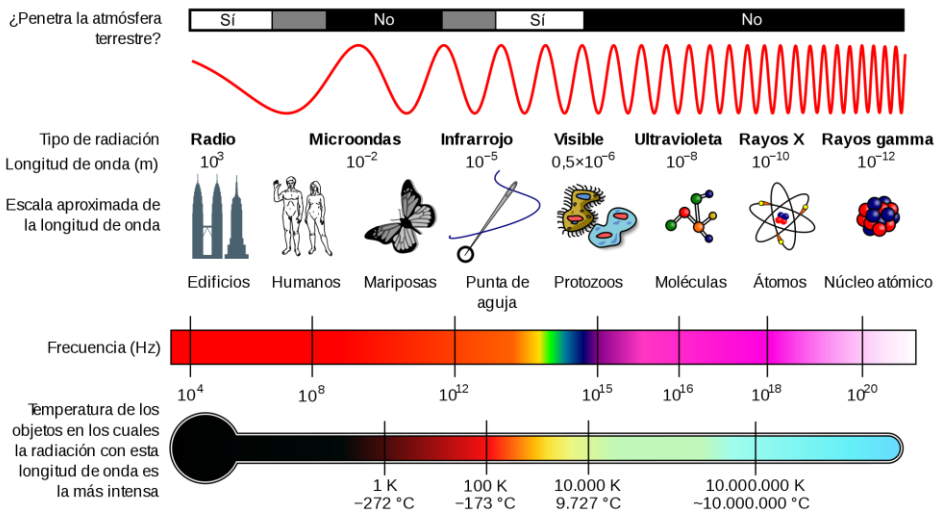


Figura 2-1. Propiedades del espectro electromagnético [4]

El citado espectro electromagnético se expande desde las ondas de radio (de menor frecuencia) a los rayos gamma (de mayor frecuencia). Para nuestro estudio, nos centraremos en el espectro radioeléctrico.

2.1.1 Espectro radioeléctrico

Se suele definir el espectro radioeléctrico como el conjunto de ondas electromagnéticas cuya frecuencia se fija convencionalmente por debajo de los 300 GHz y que se propagan por el medio sin vía artificial. [5]

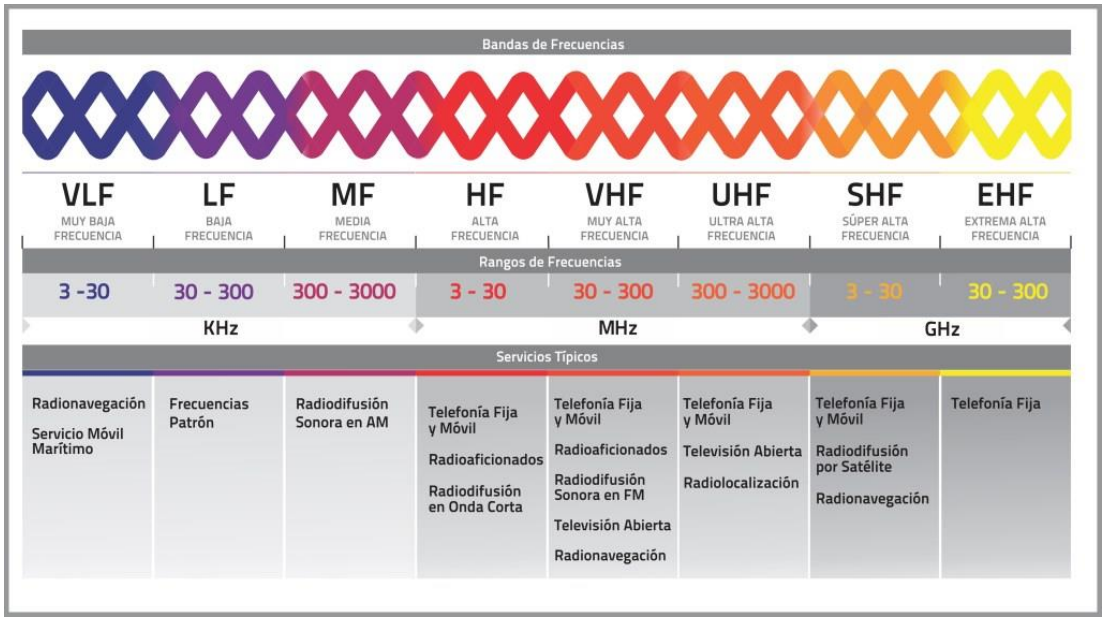


Figura 2-2. Bandas de frecuencias del espectro radioeléctrico [6]

En el caso particular de nuestro simulador, únicamente serán aceptados valores de frecuencia comprendidos entre los 30 y los 3000 MHz. Dicha banda comprendería, dos rangos muy conocidos en las radiocomunicaciones como son el rango *VHF* y *UHF*.

El rango *VHF (Very High Frequencies)* va de los 30 a los 300 MHz. Es un rango muy popular puesto que usa para telefonía, comunicaciones marinas y aeronáuticas, televisión e incluso existen varias bandas para radioaficionados dentro de este rango.

El rango *UHF (Ultra High Frequencies)* va de los 300 a los 3000 MHz. Se usa también en telefonía móvil, en televisión y en radiolocalización.

Es muy importante, saber qué tipo de servicios están permitidos y en uso dentro del espectro, puesto que este es limitado y está regido por leyes que delimitan su uso. Conociendo dichas particularidades, nos será posible entender mejor el funcionamiento de nuestro simulador y los resultados y conclusiones que se extraigan de él

2.2 Sistemas geodésicos de referencia

La forma real de la Tierra es el geoide. [7] El geoide es la superficie de nivel de altitud cero, que coincide con la superficie media de los océanos en equilibrio prologando por debajo de los continentes. Esta definición se podría resumir en que nuestro planeta tiene una forma irregular, que no se adecua fácilmente a ninguna de las formas geométricas conocidas.

Como la definición matemática del geoide presenta gran complejidad, la superficie de la Tierra puede representarse con bastante aproximación mediante un elipsoide de revolución. [8] Es por ello por lo que para asignar coordenadas a cualquier punto sobre la superficie terrestre utilizaremos un recurso matemático llamado sistema geodésico de referencia, que hará uso de un elipsoide determinado.

Entre los sistemas geodésicos más utilizados podemos encontrar:

- WGS84: Sistema geodésico mundial que data de 1984.
- ED50: Datum europeo de 1950.
- ETS89: Sistema de referencia terrestre europeo de 1989 muy similar al WGS84.
- NAD83: Datum estadounidense de 1983 el cual es también muy similar al WGS84.
- PSAD56: Datum provisional sudamericano de 1956.
- SIRGAS: Sistema de Referencia Geocéntrico para las Américas.

A continuación, explicaremos brevemente algunos de estos sistemas geodésicos.

2.2.1 WGS84

Es el sistema geodésico de referencia que utiliza simulador, ya que este hace uso de la *API Open-Elevation* y utilizamos también *Google Maps* para conseguir muestras para nuestras simulaciones y ambos hacen uso de él.

WGS84 es un sistema de coordenadas geográficas mundial que permite localizar cualquier punto de la Tierra (sin necesitar otro de referencia) por medio de tres unidades (x,y,z). [9] Consiste en un patrón matemático de tres dimensiones que representa la tierra por medio de un elipsoide y se le estima un error de cálculo de menos de dos centímetros y es por ello por lo que es en el que se basa el Sistema de Posicionamiento Global *(GPS).* Este sistema agrega el meridiano de *Greenwich* como el punto de inicio para la longitud y establece las unidades en grados. [10]

2.2.2 ED50

El sistema de referencia geodésico *European Datum* 1950 (ED50) es un antiguo sistema de referencia europeo que posteriormente fue sustituido por el ETRS89. El elipsoide de referencia es el Internacional de *Hayford* [11] cuyo semieje mayor es de 6.378.388 m y su aplanamiento es $\alpha = 1/297$.

En España se utilizó como el sistema oficial de la cartografía hasta 2008.

2.2.3 ETRS89

Es un sistema de referencia ligado a la parte estable de la placa continental europea. Es compatible con los sistemas de navegación por satélite como *GPS*. Está basado en el elipsoide SGR80 [12]

2.3 Distancia de Haversine

La fórmula del semiverseno es una importante ecuación que permite el cálculo de la distancia de círculo máximo entre dos puntos de un globo sabiendo su longitud y su latitud. Mediante dicha ecuación, nos será muy fácil calcular la distancia entre dos puntos diferentes de la Tierra, dato que necesitaremos en numerosas ocasiones en nuestra aplicación.

Para cualquier par de puntos sobre una esfera:

$$haversin\left(\frac{d}{R}\right) = haversin(\alpha_1 - \alpha_2) + \cos(\alpha_1)\cos(\alpha_1)haversin(\Delta\lambda) \quad (1)$$

donde haversin es la función haversine:

$$haversin(\theta) = sen^2\left(\frac{\theta}{2}\right) = \frac{1 - \cos(\theta)}{2} \quad (2)$$

d es la distancia entre dos puntos

R es el radio de la esfera

α_1 es la latitud del punto 1

α_2 es la latitud del punto 2

$\Delta\lambda$ es la diferencia de longitudes

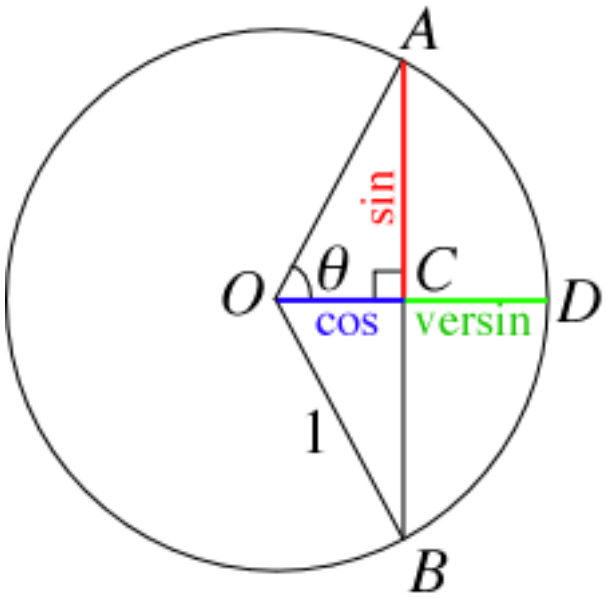


Figura 2-3. Seno, coseno y verseno de θ sobre la base de la circunferencia goniométrica [13]

2.4 Zonas de propagación

Tanto las curvas de intensidad como las tablas tabuladas de intensidad que se utilizarán en nuestro método de predicción de radiodifusión fueron calculadas sobre diferentes zonas de propagación. La elección y definición de dichas zonas [14] se decidió en base a las muy significativas diferencias que se encontraron en las condiciones de propagación entre dichas áreas.

La única referencia a las diferentes zonas se ha podido encontrar en las Actas Finales de la Conferencia Regional de Radiocomunicación que se dio lugar en Génova en 2006 y que versaba sobre la planificación de los servicios de radiodifusión terrestre digital en las bandas de frecuencia de 174-230 MHz y 470-862 MHz en las regiones 1 y 3 (que se definirán a continuación). En dichas actas finales, se explica que la acotación exacta de dichas zonas de propagación puede encontrarse en el Mapa Mundial Digitalizado de la ITU (*IDWM*) pero no se ha podido acceder a dicho mapa durante la elaboración de este trabajo por ser un material de pago. Se presupone que dicho mapa podrá encontrarse de forma detallada las fronteras de cada una de las regiones especificadas.

Por este motivo, se hará uso de la definición de las zonas de propagación, que, si son de libre consulta, lo cual nos permitirá utilizar dicha información en nuestro simulador.

Principalmente, podemos dividir nuestras zonas de propagación en zonas terrestres y zonas marítimas.

Dentro de las zonas terrestres, se encuentran la zona 1, la zona 2, la zona 3 y la zona D.

La zona 1 son regiones de tierra templada y subtropicales.

La zona 2 son regiones que muestran condiciones de propagación caracterizadas por la baja humedad, baja

precipitación y pocas variaciones anuales en el clima.

La zona 3 son regiones ecuatoriales, que muestran condiciones de propagación caracterizadas por climas calientes y húmedos.

La zona D es una franja de tierra de una profundidad máxima de 100 km que rodea la zona C y la región occidental de África.

Dentro de las zonas marítimas, se encuentran la zona 4, la zona 5, la zona A, la zona B y la zona C.

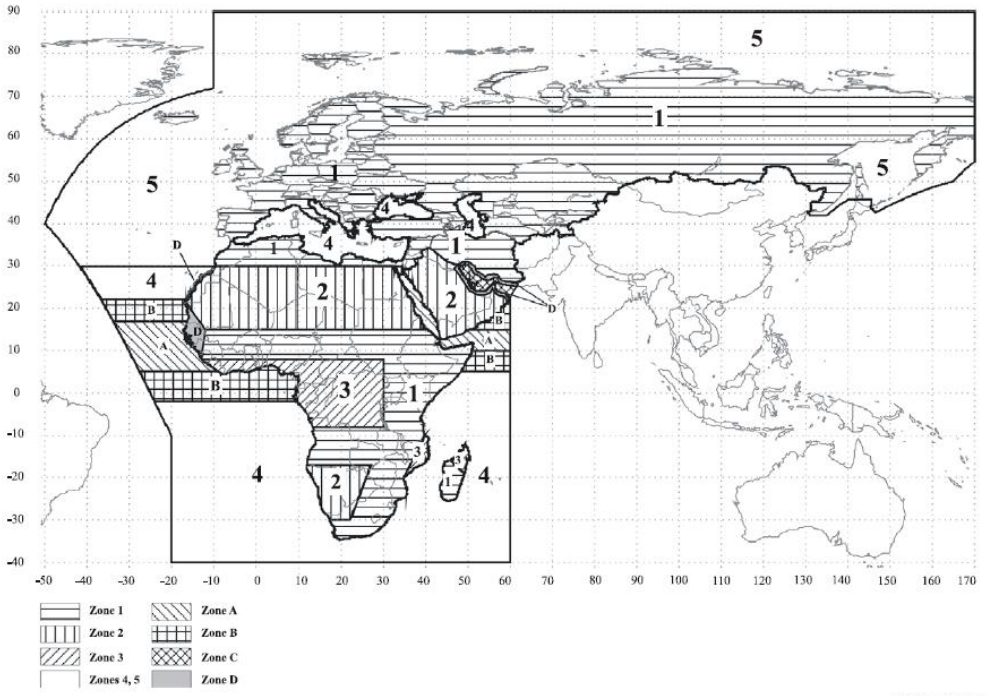
La zona 4 son regiones marítimas que muestran condiciones de propagación encontradas en mares templados donde las condiciones de superrefracción ocurren ocasionalmente. (Mar Caspio, Mar Negro y todos los mares alrededor del continente africano pertenecen a esta zona, excepto los pertenecientes a las zonas A y B.)

La zona 5 son regiones marítimas que muestran condiciones de propagación encontradas en mares fríos.

La zona A son regiones marítimas en bajas latitudes que frecuentemente muestran superrefracción.

La zona B son regiones marítimas en bajas latitudes, que muestran superrefracción, pero en menor medida que la zona A.

La zona C representa los mares más cálidos, superando a los de la zona A. Es el punto de intersección de la línea costera de Irán con su frontera con Pakistán.



Note – Islands in the Mediterranean sea are in Zone 1.

Figura 2-4. Mapa de zonas de propagación [15]

2.5 Unión Internacional de Telecomunicaciones

La Unión Internacional de Telecomunicaciones (ITU) es el organismo especializado de las Naciones Unidas para las tecnologías de la información y la comunicación (TIC). [16] Dicho organismo fue fundado a mediados del siglo XIX y ,desde entonces, se centra en facilitar la conectividad internacional de las redes de telecomunicaciones. La ITU está formada por miembros de 193 países y casi 1000 entidades del sector privado e instituciones académicas.

La ITU está compuesta a su vez por tres sectores:

- ITU-R: Sector de Radiocomunicaciones
- ITU-T: Sector de Normalización de las Telecomunicaciones
- ITU-D: Sector de Desarrollo de las Telecomunicaciones

Entre sus atribuciones se encuentran actividades tan diversas como el reparto mundial de las frecuencias radioeléctricas y las órbitas de los satélites, la elaboración de normativa técnica o la regulación de las telecomunicaciones a nivel internacional entre las distintas empresas operadoras y administraciones.

De forma general, la normativa técnica elaborada por la ITU está recogida en un conjunto de documentos denominados Recomendaciones, agrupados por Series. Cada serie se compone de las recomendaciones relacionadas a un mismo tema. Como su nombre indica, dichas Recomendaciones no son obligatorias, sin embargo, su contenido suele utilizarse de este modo por las administraciones y operadoras internacionales.

En este trabajo, utilizaremos la norma P.1546-5 de la ITU-R. Esto quiere decir que la norma se encuentra localizada en la serie P, que enmarca todas aquellas normas relacionadas con la propagación de las ondas radioeléctricas

.

3 MÉTODO DE PREDICCIÓN (ITU-R P.1546-5)

Nunca se puede predecir un acontecimiento físico con una precisión absoluta.

-Max Planck-

A partir de los conceptos anteriores, podemos pasar a explicar a grandes rasgos el método de predicción de propagación radioeléctrica de la Recomendación.

El procedimiento paso a paso que se indica a continuación se ha de aplicar a los valores obtenidos de los cuadros de intensidad de campo en función de la distancia de que dispone la Oficina de Radiocomunicaciones (*BR*)

La Oficina de Radiocomunicaciones es el órgano ejecutivo del Sector de Radiocomunicaciones de la ITU. [17] Entre las labores principales de dicha Oficina se encuentran:

- Proporcionar apoyo técnico y administrativo a las Conferencias, Asambleas y Comisiones de Estudio de Radiocomunicaciones.
- Aplicar las disposiciones del Reglamento de Radiocomunicaciones.
- Registrar las asignaciones de frecuencia para todos los servicios y mantener actualizado el Registro Internacional de Frecuencias.
- Coordinar la preparación, edición y envío de circulares, documentos y envío de circulares, documentos y publicaciones elaborados en el marco del Sector.

En el siguiente cuadro, se presenta una lista mínima de los parámetros de entrada (y sus límites) que puede servir como referencia para obtener los valores a partir de los cuadros de intensidad de campo en función de la distancia.

Parámetro	Unidades	Definición	Límites
f	MHz	Frecuencia de funcionamiento	30-3.000 MHz
d	Km	Longitud del trayecto horizontal	No mayor de 1.000 km
p	%	Porcentaje de tiempo	1-50%
h_1	m	Altura de la antena transmisora/de base según las referencias en las curvas	Terrestre – Sin límite inferior; límite superior de 3.000 m Marítimo – como mínimo 1 m; límite superior de 3.000 m
h_a	m	Altura de la antena transmisora por encima del terreno	Mayor que 1

h_b	m	Altura de la antena de base por encima del nivel medio del terreno entre 0.2 d y d km, donde d es menor que 15 km y se dispone de la información del terreno	Ninguno – pero obsérvese que este parámetro sólo existe en trayectos terrestres donde d < 15 km
h_2	m	Altura de la antena receptora/móvil por encima del terreno	Terrestre – como mínimo 1 m y menor de 3.000 m Marítimo – como mínimo 3 m y menor de 3.000 m
R_1	m	Altura representativa del obstáculo (en torno al transmisor)	Ninguno
R_2	m	Altura representativa del obstáculo (en torno al receptor)	Ninguno
θ_{tca}	grados	Ángulo libre de obstáculos del terreno	0.55 a 40 grados
θ_{eff} θ_{eff1} θ_{eff2}	grados	Ángulos efectivos de despejamiento del terreno de la estación transmisora/de base	Han de ser positivos

Tabla 3-1. Lista de los parámetros de entrada y de sus límites

En primer lugar, debemos determinar el tipo de trayecto de propagación, es decir, si estamos sobre un trayecto terrestre o marítimo. No tendremos en cuenta en nuestro proyecto los trayectos mixtos. Puesto que no disponemos del mapa mundial digitalizado de la ITU, que nos permitiría relacionar de forma rápida y cómoda un punto geográfico con una zona de propagación, el estudio de los trayectos mixtos implicaría el desarrollo de una funcionalidad que estimara o intentara aproximar las fronteras de las diversas zonas de propagación. Durante el análisis de este proyecto, se llegó a la conclusión que la inserción manual de los datos fronterizos requeriría un trabajo extenuante y de poca utilidad para este simulador; y la aproximación automática de zonas daría lugar a unos datos poco fiables. Es por ello, que se prefirió realizar un simulador que, aunque no tuviera en cuenta los trayectos mixtos, realizara unos cálculos objetivos y realistas y dejar para futuros trabajos de investigación la creación de esta mejora. Para ello deberemos comprobar visualmente la ubicación de nuestros puntos transmisor y receptor sobre el mapa de zonas de propagación.

A continuación, para cualquier porcentaje de tiempo (comprendido en la gama del 1% al 50%), determinaremos los dos porcentajes de tiempo nominales como sigue:

- Si el porcentaje de tiempo deseado es mayor que 1 y menor que 10, el porcentaje inferior se fijará a 1 y el porcentaje superior a 10.
- Si el porcentaje de tiempo deseado es mayor que 10 y menor que 50, el porcentaje inferior se fijará a 10 y el porcentaje superior a 50.
- Si el porcentaje de tiempo deseado es igual a 1%,10% o 50%, este valor se considerará como porcentaje inferior y no se fijará el superior.

Para cualquier frecuencia (comprendida en la gama de 30 a 3000 MHz), determinaremos las dos frecuencias nominales como sigue:

- Si la frecuencia deseada es menor a 600 MHz, la frecuencia inferior se fijará a 100 MHz y la superior a 600 MHz.

- Si la frecuencia deseada es mayor a 600 MHz, la frecuencia inferior se fijará a 600 MHz y la superior a 2000 MHz.
- Si la frecuencia deseada es igual a 100,600 o 2000 MHz este valor se considerará como frecuencia inferior y no se fijará la superior.

Las distancias nominales inferior y superior se determinarán a partir del siguiente cuadro, eligiendo las más próximas a la distancia requerida. Si la distancia requerida coincide con un valor concreto del cuadro, este valor se considerará como distancia nominal inferior y no se fijará la superior.

1	14	55	140	375	700
2	15	60	150	400	725
3	16	65	160	425	750
4	17	70	170	450	775
5	18	75	180	475	800
6	19	80	190	500	825
7	20	85	200	525	850
8	25	90	225	550	875
9	30	95	250	575	900
10	35	100	275	600	925
11	40	110	300	625	950
12	45	120	325	650	975
13	50	130	350	675	1 000

Tabla 3-2. Valores de distancia(km) utilizados en las tablas de intensidades de campo

Tras esto, pasaremos a obtener la intensidad de campo rebasada en el 50% de las ubicaciones para una antena receptora/móvil a la altura representativa de los obstáculos circundantes, R_2, por encima del suelo para una distancia y la altura de antena transmisora/d e base requeridas.

Determinaremos en primer lugar, la altura de la antena transmisora de base, h_1;

Para trayectos terrestres inferiores a 15 km, aplicaremos dos métodos diferentes dependiendo si tenemos o no información relativa al terreno.

Cuando no se dispone de información sobre el terreno para efectuar las predicciones de propagación, el valor de $h_1$se calcula de acuerdo con la longitud del trayecto, d, como sigue:

$$h_1 = h_a \quad m \quad para\ d \leq 3\ km \qquad (3)$$

$$h_1 = h_a + (h_{eff} - h_a)(d-3)/12 \quad m \quad para\ 3km < d < 15\ km \qquad (4)$$

donde h_a es la altura de la antena sobre el suelo (por ejemplo, la altura del mástil) y h_{eff} es la altura por encima del nivel medio del terreno para las distancias comprendidas entre 3 y 15 km desde dicha antena en la dirección de la antena receptora/móvil.

Por otro lado, cuando si se dispone de información sobre el terreno para efectuar las predicciones de propagación se utilizará la siguiente ecuación:

$$h_1 = h_b \qquad m \qquad (5)$$

donde h_b es la altura de la antena por encima del nivel del terreno promediado entre 0.2 d y d km.

Para trayectos terrestres de 15 km o superiores:

$$h_1 = h_{eff} \qquad m \qquad (6)$$

En el caso de trayectos marítimos, h_1 representa la altura física de la antena por encima de la superficie del mar.

Si el valor de h_1 coincide con una de las ocho alturas para las que se dan las curvas, a saber, 10,20, 37.5, 75,150,300,600 o 1200 m, la intensidad de campo requerida puede obtenerse directamente de las curvas trazadas o de las tabulaciones asociadas, en caso contrario habrá que interpolar o extrapolar a partir de las intensidades de campo obtenidas de dos curvas utilizando la siguiente ecuación:

$$E = E_{inf} + \frac{\left(E_{sup} - E_{inf}\right)\log\left(\frac{h_1}{h_{inf}}\right)}{\log\left(\frac{h_{sup}}{h_{inf}}\right)} \qquad dB\ (\mu\frac{V}{m}) \qquad (7)$$

donde:

h_{inf} : 600 m si h_1 > 1200 m, de no ser así, la altura efectiva nominal más cercana por debajo de h_1.

h_{sup} : 1200 m si h_1 > 1200 m, de no ser así, la altura efectiva nominal más cercana por encima de h_1.

E_{inf} : valor de la intensidad de campo para h_{inf} a la distancia requerida.

E_{sup} : valor de la intensidad de campo para h_{sup} a la distancia requerida.

Si la distancia requerida no coincide con la distancia nominal, habrá que interpolar para la distancia usando la siguiente ecuación:

$$E = E_{inf} + \frac{\left(E_{sup} - E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)} \qquad dB\ (\mu\frac{V}{m}) \qquad (8)$$

donde:

d: distancia para la que se requiere la predicción

d_{inf} : distancia de la tabulación más cercana inferior a d.

d_{sup}: distancia de la tabulación más cercana superior a d

E_{inf}: valor de la intensidad de campo para d_{inf}.

E_{sup}: valor de la intensidad de campo para d_{sup}.

Si la frecuencia requerida no coincide con la frecuencia inferior nominal, habrá que interpolar para la frecuencia usando la siguiente ecuación:

$$E = E_{inf} + \frac{(E_{sup} - E_{inf}) \log\left(\frac{f}{f_{inf}}\right)}{\log\left(\frac{f_{sup}}{f_{inf}}\right)} \qquad dB\ (\mu\frac{V}{m}) \qquad (9)$$

donde:

f: frecuencia para la que se requiere la predicción (MHz)

f_{inf} : frecuencia nominal inferior (100 MHz si f < 600 MHz, si no 600 MHz)

f_{sup}: frecuencia nominal superior (600 MHz si f < 600 MHz, si no 2000 MHz)

E_{inf}: valor de la intensidad de campo para f_{inf}.

E_{sup}: valor de la intensidad de campo para f_{sup}.

Si el porcentaje de tiempo requerido no coincide con el porcentaje de tiempo nominal, habrá que interpolar para el porcentaje de tiempo usando la siguiente ecuación:

$$E = \frac{E_{sup}(Q_{inf} - Q_t)}{Q_{inf} - Q_{sup}} + \frac{E_{inf}(Q_t - Q_{sup})}{Q_{inf} - Q_{sup}} \qquad dB\ (\mu\frac{V}{m}) \qquad (10)$$

donde:

t: porcentaje de tiempo para el que se requiere la predicción.

t_{inf} : porcentaje de tiempo nominal inferior.

t_{sup} : porcentaje de tiempo nominal superior.

$Q_t : Q_i\left(\frac{t}{100}\right)$

$Q_{inf} : Q_i\left(\frac{t_{inf}}{100}\right)$

$Q_{sup} : Q_i\left(\frac{t_{sup}}{100}\right)$

E_{inf} : valor de la intensidad de campo para el porcentaje de tiempo t_{inf}.

E_{sup} : valor de la intensidad de campo para el porcentaje de tiempo t_{sup}.

siendo $Q_i(x)$ la función de distribución normal acumulativa complementaria inversa.

La siguiente aproximación a la función de distribución normal acumulativa complementaria inversa, $Q_i(x)$, es válida para 0,01 ≤ x ≤ 0,99:

$$Q_i(x) = T(x) - \xi(x) \qquad si\ x \leq 0{,}5 \qquad (11)$$

$$Q_i(x) = -\{T(1-x) - \xi(1-x)\} \qquad si\ x > 0{,}5 \qquad (12)$$

donde:

$$T(x) = \sqrt{[-2\ln(x)]} \qquad (13)$$

$$\xi(x) = \frac{[(C_2\ T(x) + C_1)T(x)] + C_0}{[(D_3 T(x) + D_2)T(x) + D_1]T(x) + 1} \qquad (14)$$

$$C_0 = 2{,}515517$$
$$C_1 = 0{,}802853$$
$$C_2 = 0{,}010328$$
$$D_1 = 1{,}432788$$
$$D_2 = 0{,}189269$$
$$D_3 = 0{,}001308$$

El siguiente cuadro se indican los valores dados por las fórmulas anteriores.

q%	Q_i (q/100)	q%	Q_i (q/100)	q%	Q_i (q/100)	q%	Q_i (q/100)
1	2,327	26	0,643	51	–0,025	76	–0,706
2	2,054	27	0,612	52	–0,050	77	–0,739
3	1,881	28	0,582	53	–0,075	78	–0,772
4	1,751	29	0,553	54	–0,100	79	–0,806
5	1,645	30	0,524	55	–0,125	80	–0,841
6	1,555	31	0,495	56	–0,151	81	–0,878
7	1,476	32	0,467	57	–0,176	82	–0,915
8	1,405	33	0,439	58	–0,202	83	–0,954
9	1,341	34	0,412	59	–0,227	84	–0,994
10	1,282	35	0,385	60	–0,253	85	–1,036
11	1,227	36	0,358	61	–0,279	86	–1,080
12	1,175	37	0,331	62	–0,305	87	–1,126
13	1,126	38	0,305	63	–0,331	88	–1,175
14	1,080	39	0,279	64	–0,358	89	–1,227
15	1,036	40	0,253	65	–0,385	90	–1,282
16	0,994	41	0,227	66	–0,412	91	–1,341
17	0,954	42	0,202	67	–0,439	92	–1,405

q%	Q_i (q/100)	q%	Q_i (q/100)	q%	Q_i (q/100)	q%	Q_i (q/100)
18	0,915	43	0,176	68	–0,467	93	–1,476
19	0,878	44	0,151	69	–0,495	94	–1,555
20	0,841	45	0,125	70	–0,524	95	–1,645
21	0,806	46	0,100	71	–0,553	96	–1,751
22	0,772	47	0,075	72	–0,582	97	–1,881
23	0,739	48	0,050	73	–0,612	98	–2,054
24	0,706	49	0,025	74	–0,643	99	–2,327
25	0,674	50	0,000	75	–0,674		

Tabla 3-3. Valores aproximados de la distribución normal acumulativa complementaria inversa

A continuación, si se dispone de información sobre el ángulo de despejamiento del terreno para una antena receptora/móvil situada junto al terreno, pasaremos a corregir la intensidad de campo calculada para el ángulo de despejamiento del terreno en dicha antena.

Dicha corrección se efectuará en el caso de trayectos terrestres si se ha de predecir con mayor precisión la intensidad de campo para condiciones de recepción en zonas específicas, por ejemplo, en una zona de recepción pequeña, se puede efectuar una corrección basada en el ángulo de despejamiento del terreno.

El ángulo libre de obstáculos del terreno θ_{tca} viene dado por:

$$\theta_{tca} = \theta \qquad grados \tag{15}$$

donde θ es el ángulo de elevación de la línea que, con origen en la antena receptora/móvil, es rasante a todos los obstáculos hasta una distancia de 16 k, pero sin ir más allá, de la antena transmisora de base.

Cuando no se dispone de la información pertinente sobre el ángulo libre de obstáculos del terreno, la corrección de la intensidad de ampo se calcula aplicando la fórmula siguiente:

$$Corrección = J(v') - J(v) \tag{16}$$

$$v' = 0{,}036\sqrt{f} \tag{17}$$

$$v = 0{,}065\ \theta_{tca}\sqrt{f} \tag{18}$$

$$J(v) = [6{,}9 + 20\log\left(\sqrt{1 + (v - 0{,}1)^2} + v - 0{,}1\right)] \tag{19}$$

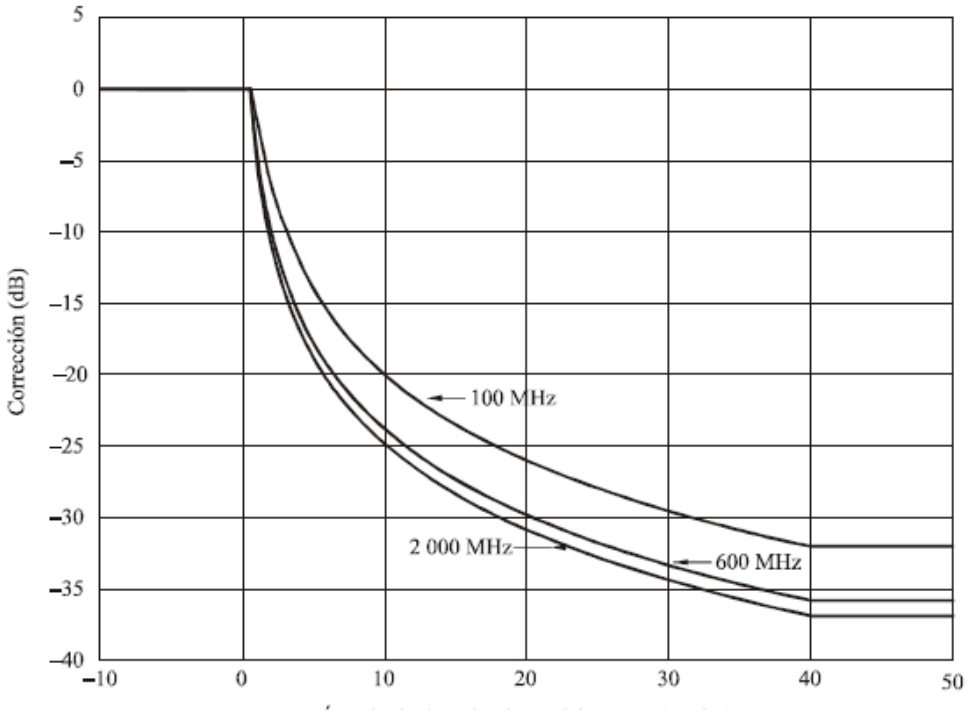


Figura 3-1. Ángulo de despejamiento del terreno (grados)

Tras esta corrección existe la posibilidad de que la intensidad de campo calculada esté infravalorada, al no haber tenido en cuenta adecuadamente la dispersión troposférica, podemos pasar a aplicar otra corrección a la intensidad de campo debida a dicha dispersión troposférica.

Se determina el ángulo de dispersión del trayecto en grados, θ_s , mediante:

$$\theta_s = \frac{180d}{\pi ka} + \theta_{eff} + \theta \qquad grados \tag{20}$$

donde:

$$\theta_{eff} : \text{ángulo de despejamiento del terreno del terminal } h_1, \text{en grados}$$

$$\theta : \text{ángulo de despejamiento del terminal } h_2, \text{en grados}$$

$$d : \text{longitud del trayecto, en km}$$

$$a : 6370 \text{ km, radio de la Tierra}$$

$$k : \frac{4}{3}, \text{coeficiente del radio ficticio de la Tierra para unas condiciones de refractividad medianas}$$

Posteriormente, se aplicará una corrección cuando el terminal transmisor/de base se encuentra en un terreno con obstáculos o adyacente al mismo. La corrección debe utilizarse en todos los casos, incluso cuando la antena se halla por encima de la altura del obstáculo.

$$Corrección = -J(v) \tag{21}$$

$$v = K_{nu}\sqrt{h_{dif1}\theta_{clut1}} \qquad para\ R_1 \geq h_a \qquad (22)$$

$$v = -K_{nu}\sqrt{h_{dif1}\theta_{clut1}} \qquad en\ cualquier\ otro\ caso \qquad (23)$$

$$h_{dif1} = h_a - R_1 \qquad m \qquad (24)$$

$$\theta_{clut1} = \arctan\left(\frac{h_{dif1}}{27}\right)\ grados \qquad (25)$$

$$K_{nu} = 0{,}0108\sqrt{f} \qquad (26)$$

donde:

$f : frecuencia\ (MHz)$

R_1: $altura\ del\ obstáculo, m\ sobre\ el\ suelo, en\ las\ proximidades\ del\ terminal\ transmisor\ (de\ base)$

Finalmente, aplicaremos una corrección del trayecto oblicuo, para tener en cuenta la diferencia de altura entre las dos antenas. Esta corrección se determina como sigue:

$$Corrección = 20\log\left(\frac{d}{d_{slope}}\right) \qquad (27)$$

Donde d es la distancia horizontal y la pendiente, d_{slope}, se calcula así:

Cuando se dispone de información sobre el terreno:

$$d_{slope} = \sqrt{d^2 + 10^{-6}[(h_a + h_{tter}) - (h_a + h_{rter})]^2} \qquad km \qquad (28)$$

Cuando no se dispone de información sobre el terreno:

$$d_{slope} = \sqrt{d^2 + 10^{-6}(h_a - h_2)^2} \qquad (29)$$

y h_{tter} y h_{rter} son las alturas del terreno en metros sobre el nivel del mar en los terminales transmisor/estación de base y receptor/móvil, respectivamente.

4 RESOLUCIÓN ANALÍTICA

Los datos son una cosa preciosa y durarán más tiempo que los propios sistemas.

- Tim Berners-Lee -

En el siguiente apartado, vamos a concentrarnos en la resolución analítica, paso por paso, del método que este trabajo se encarga de realizar automáticamente mediante un programa en *Python*.

Este apartado será muy importante por varios motivos. En primer lugar, nos permitirá observar lo tedioso y complicado que resulta realizar de forma manual los cálculos necesarios para la resolución de nuestro problema. Al mismo tiempo, podremos comparar con los datos obtenidos en apartados posteriores mediante nuestra aplicación.

No hay que olvidar, que vamos a redondear los valores obtenidos con el objetivo de simplificar las operaciones matemáticas y que se utilizará un caso sencillo que permita entender el procedimiento general, pero al mismo tiempo sea fácil de seguir y comprender.

4.1 Resolución manual del Caso 1

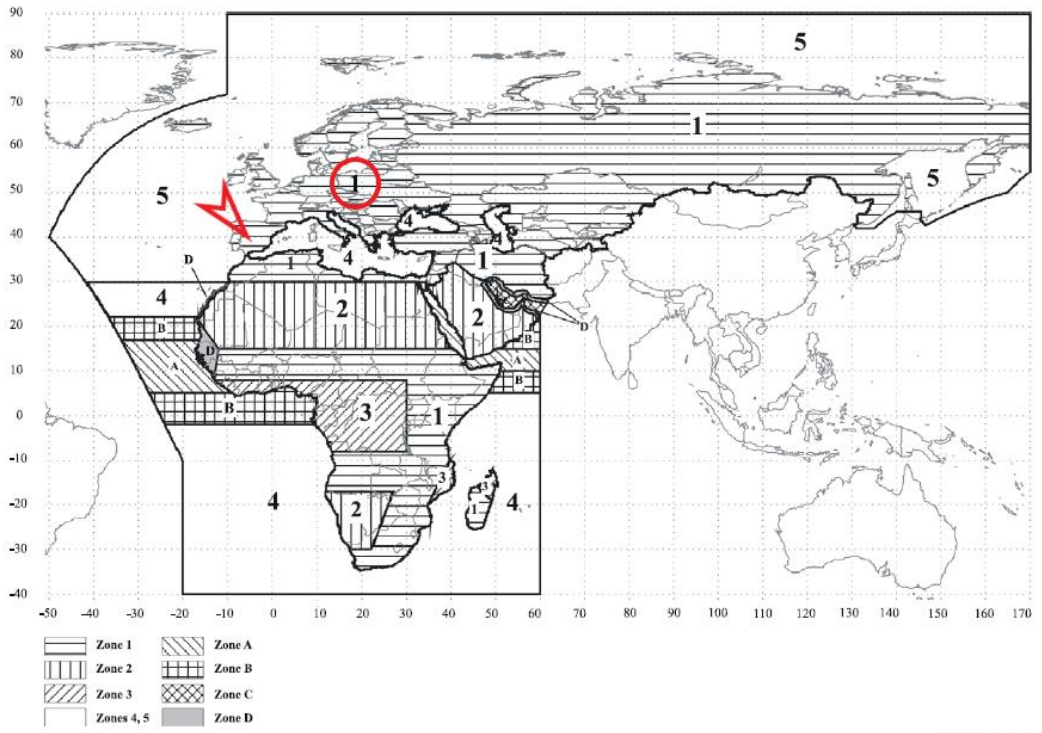
Hemos elegido para llevar a cabo este ejemplo, una ubicación que nos es conocida por encontrarse dentro del área metropolitana de Sevilla. Se ha ubicado la antena transmisora entre los municipios de Valencina de la Concepción (España) y Castilleja de Guzmán (España), porque allí se ubican algunas antenas de telecomunicaciones que dan cobertura a la ciudad de Sevilla (España). La antena receptora la hemos ubicado en el Rectorado de la Universidad de Sevilla, como localización simbólica, puesto que nuestro simulador nos indicará el valor de intensidad de campo rebasado en el 50% de las ubicaciones dentro de un área cualquiera normalmente de 500 m por 500 m.

En concreto como valores conocidos de localización tendremos:

- Latitud del Transmisor: 37,41º
- Longitud del Transmisor: -6,06º
- Latitud del Receptor: 37,38º
- Longitud del Receptor: -5,99º

Figura 4-1. Enlace del caso 1 analítico en Google Maps

Nuestro primer objetivo será determinar el tipo de trayecto de propagación que estamos estudiando. Para resolver esta cuestión, acudiremos al mapa de zonas de propagación de la Conferencia Regional de Radiocomunicación, para darnos cuenta de que nos encontramos dentro de la Zona 1 (Tierra Templada) al estar toda ubicación terrestre de Europa dentro de dicha zona.



Note – Islands in the Mediterranean sea are in Zone 1.

Figura 4-2. Localización del caso 1 analítico sobre el mapa de zonas de propagación

Hay que elegir ciertos valores para realizar nuestro estudio, como son:

- Frecuencia de funcionamiento: 120 MHz
- Porcentaje de tiempo: 45%

Una vez tenemos todos estos valores procedemos a calcular la intensidad de campo para dichos datos. Puesto que hemos elegido un porcentaje de tiempo igual al 45%, determinaremos que el porcentaje de tiempo inferior será del 10% y el porcentaje de tiempo superior será del 50%. Del mismo modo, puesto que hemos elegido una frecuencia de funcionamiento de 120 MHz, determinaremos que la frecuencia nominal inferior será de 100 MHz y la frecuencia nominal superior será de 600 MHz.

A partir de los valores de latitud y longitud de nuestro transmisor y nuestro receptor, nuestra siguiente tarea será calcular la distancia que separa a dichos puntos. Para ello, utilizaremos la fórmula de Haversine:

$$distancia = 2R \cdot arcsen(\sqrt{a}) \quad (30)$$

$$a = (sen(rad \cdot \frac{dlat}{2}))^2 + \cos(rad \cdot lat1) \cdot \cos(rad \cdot lat2) \cdot (sen(rad \cdot \frac{dlon}{2}))^2 \quad (31)$$

siendo:

$$rad = {}^{\pi}/_{180}$$

$$dlat = lat2 - lat1 = 0.029$$

$$dlon = lon2 - lon1 = 0.069$$

$$lat1 : Latitud\ del\ Transmisor = 37{,}41º$$

$$lat2 : Latitud\ del\ Receptor = 37{,}38º$$

$$lon1 : Longitud\ del\ Transmisor = -6{,}06º$$

$$lon2 : Longitud\ del\ Receptor = -5{,}99º$$

$$R: Radio\ de\ la\ Tierra = 6371\ km$$

y, por lo tanto:

$$a = (sen({}^{\pi}/_{180} \cdot \frac{0.029}{2}))^2 + \cos({}^{\pi}/_{180} \cdot 37.41º) \cdot \cos({}^{\pi}/_{180} \cdot 37.38º) \cdot (sen({}^{\pi}/_{180} \cdot \frac{0.069}{2}))^2$$

$$a = 6{,}40 \cdot 10^{-8} + 0{,}794 \cdot 0{,}794 \cdot 3.62 \cdot 10^{-7} = 2.922^{-7}$$

$$distancia = 2 \cdot 6371 \cdot arcsen\left(\sqrt{2.922^{-7}}\right) = 6.88\ km$$

La distancia obtenida es 6.88 km que difiere de la observada en Google Maps, debido al redondeo realizado. Utilizaremos ahora el cuadro de valores de distancia utilizados en los cuadros de intensidades de campo. De esta forma, podremos determinar que la distancia nominal inferior será de 6 km y la distancia nominal superior será de 7 km.

A continuación, requerimos conocer la altura de la antena transmisora y receptora por encima del terreno, h_1 y h_2, y decidiremos que estas antenas tienen una altura de 10 metros. Dichas alturas elegidas nos facilitarán enormemente los cálculos posteriores, puesto que las podemos encontrarlas directamente en las tablas tabuladas

de intensidad de campo. Como estamos suponiendo que el terreno es completamente llano, trabajaremos directamente sobre estas alturas.

Puesto que la mayoría de los valores que hemos elegido no se encuentran directamente calculados en las tablas tabuladas de intensidad de campo, entramos ahora en un proceso largo y tedioso de interpolaciones de intensidad dependiendo de diferentes parámetros hasta conseguir el valor final de intensidad de campo. Para dicho proceso, nos apoyaremos siempre en dichas tablas tabuladas.

Empezamos:

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal inferior y la distancia nominal inferior:

$$Intensidad\left(f_{inf,}p_{inf},d_{inf}\right)=62{,}436$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal inferior y la distancia nominal superior:

$$Intensidad\left(f_{inf,}p_{inf},d_{sup}\right)=59{,}580$$

Si interpolamos ambas intensidades en distancia:

$$E=E_{inf}+\frac{\left(E_{sup}-E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)}\qquad dB\ (\mu\frac{V}{m}) \tag{32}$$

$$E=62.436+\frac{(59.58-62.436)\log\left(\frac{6.88}{6}\right)}{\log\left(\frac{7}{6}\right)}=62{,}900\qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal inferior y la distancia nominal inferior:

$$Intensidad\left(f_{sup,}p_{inf},d_{inf}\right)=61{,}111$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal inferior y la distancia nominal superior:

$$Intensidad\left(f_{sup,}p_{inf},d_{sup}\right)=57{,}905$$

Si interpolamos ambas intensidades en distancia:

$$E=E_{inf}+\frac{\left(E_{sup}-E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)}\qquad dB\ (\mu\frac{V}{m}) \tag{33}$$

$$E=61.111+\frac{(57.905-61.111)\log\left(\frac{6.88}{6}\right)}{\log\left(\frac{7}{6}\right)}=58{,}264\qquad dB\ (\mu\frac{V}{m})$$

Si interpolamos en ambas intensidades en frecuencia:

$$E=E_{inf}+\frac{\left(E_{sup}-E_{inf}\right)\log\left(\frac{f}{f_{inf}}\right)}{\log\left(\frac{f_{sup}}{f_{inf}}\right)}\qquad dB\ \left(\mu\frac{V}{m}\right) \tag{34}$$

$$E=62.9+\frac{(58.264-62.9)\log\left(\frac{120}{100}\right)}{\log\left(\frac{600}{100}\right)}=62{,}428\qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal superior y la distancia nominal inferior:

$$Intensidad\left(f_{inf,}p_{sup},d_{inf}\right)=62{,}436$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal superior y la distancia nominal superior:

$$Intensidad\left(f_{inf,}p_{sup},d_{sup}\right)=59{,}580$$

Si interpolamos ambas intensidades en distancia:

$$E=E_{inf}+\frac{\left(E_{sup}-E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)}\qquad dB\ (\mu\frac{V}{m}) \tag{35}$$

$$E=62.436+\frac{(59.58-62.436)\log\left(\frac{6.88}{6}\right)}{\log\left(\frac{7}{6}\right)}=62{,}900\qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal superior y la distancia nominal inferior:

$$Intensidad\left(f_{sup,}p_{sup},d_{inf}\right)=59{,}229$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal superior y la distancia nominal superior:

$$Intensidad\left(f_{sup,}p_{sup},d_{sup}\right)=55{,}965$$

Si interpolamos ambas intensidades en distancia:

$$E=E_{inf}+\frac{\left(E_{sup}-E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)}\qquad dB\ (\mu\frac{V}{m}) \tag{36}$$

$$E=59{,}229+\frac{(55{,}965-59{,}229)\log\left(\frac{6.88}{6}\right)}{\log\left(\frac{7}{6}\right)}=56{,}331\qquad dB\ (\mu\frac{V}{m})$$

Si interpolamos en ambas intensidades en frecuencia:

$$E=E_{inf}+\frac{\left(E_{sup}-E_{inf}\right)\log\left(\frac{f}{f_{inf}}\right)}{\log\left(\frac{f_{sup}}{f_{inf}}\right)}\qquad dB\ \left(\mu\frac{V}{m}\right) \tag{37}$$

$$E=62.9+\frac{(56.331-62.9)\log\left(\frac{120}{100}\right)}{\log\left(\frac{600}{100}\right)}=62.231\qquad dB\ (\mu\frac{V}{m})$$

Y si recogemos ambas intensidades interpoladas en frecuencia y las interpolamos en tiempo:

$$E = \frac{E_{sup}(Q_{inf} - Q_t)}{Q_{inf} - Q_{sup}} + \frac{E_{inf}(Q_t - Q_{sup})}{Q_{inf} - Q_{sup}} \qquad dB\ (\mu\frac{V}{m}) \tag{38}$$

siendo:

$$Q_i(x) = T(x) - \xi(x) \qquad si\ x \leq 0{,}5 \tag{39}$$

$$T(x) = \sqrt{[-2\ln(x)]} \tag{40}$$

$$\xi(x) = \frac{[(C_2 \cdot T(x) + C_1) \cdot T(x)] + C_0}{[(D_3 \cdot T(x) + D_2) \cdot T(x) + D_1] \cdot T(x) + 1} \tag{41}$$

$$C_0 = 2{,}515517$$
$$C_1 = 0{,}802853$$
$$C_2 = 0{,}010328$$
$$D_1 = 1{,}432788$$
$$D_2 = 0{,}189269$$
$$D_3 = 0{,}001308$$

$$Q_t : Q_i\left(\frac{t}{100}\right) = Q_i\left(\frac{45}{100}\right) = Q_i(0.45) = T(0.45) - \xi(0.45) = \sqrt{[-2\ln(0.45)]} - \xi(0.45) =$$
$$= 1{,}263 - \xi(0{,}45) = 0{,}125$$

$$Q_{inf} : Q_i\left(\frac{t_{inf}}{100}\right) = Q_i\left(\frac{10}{100}\right) = Q_i(0.1) = T(0.1) - \xi(0.1) = \sqrt{[-2\ln(0.1)]} - \xi(0.1) =$$
$$= 2{,}14 - \xi(0{,}1) = 1{,}28$$

$$Q_{sup} : Q_i\left(\frac{t_{sup}}{100}\right) = Q_i\left(\frac{50}{100}\right) = Q_i(0.5) = T(0.5) - \xi(0.5) = \sqrt{[-2\ln(0.5)]} - \xi(0.5) =$$
$$= 1.177 - \xi(0{,}5) = -1.01 \cdot 10^{-7} \approx 0$$

$$E = \frac{62{,}231 \cdot (1{,}28 - 0{,}125)}{1{,}28 - 0} + \frac{62{,}428 \cdot (0{,}125 - 0)}{1{,}28 - 0} = 62{,}25 \qquad dB\ (\mu\frac{V}{m})$$

Tras todos estos cálculos, concluimos que el valor rebasado en el 50% de las ubicaciones para los parámetros introducidos sería de 62,25 $dB\ \left(\mu\frac{V}{m}\right)$

4.2 Resolución manual del Caso 2

En este segundo caso, hemos elegido una ubicación completamente diferente a la anterior, para poder comparar los resultados obtenidos en situaciones geográficas y climáticas tan diferentes. Dicha elección ha recaído en una zona marítima paralela a la costa de la isla de Madagascar.

En concreto como valores conocidos de localización tendremos:

- Latitud del Transmisor: -22,19º
- Longitud del Transmisor: 48,13º
- Latitud del Receptor: -23,52º
- Longitud del Receptor: 47,82º

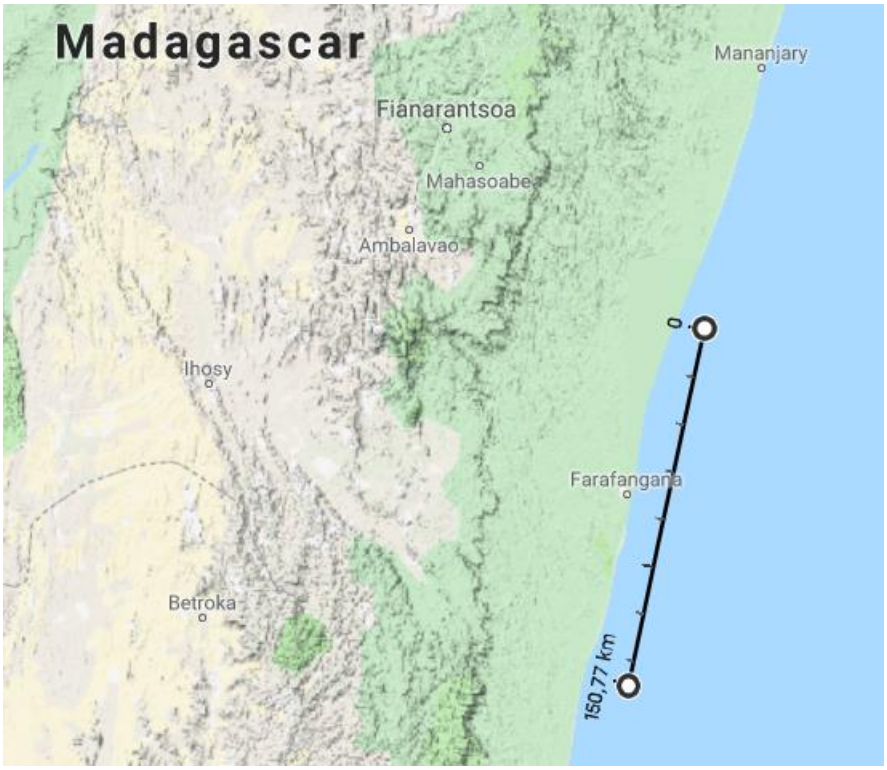
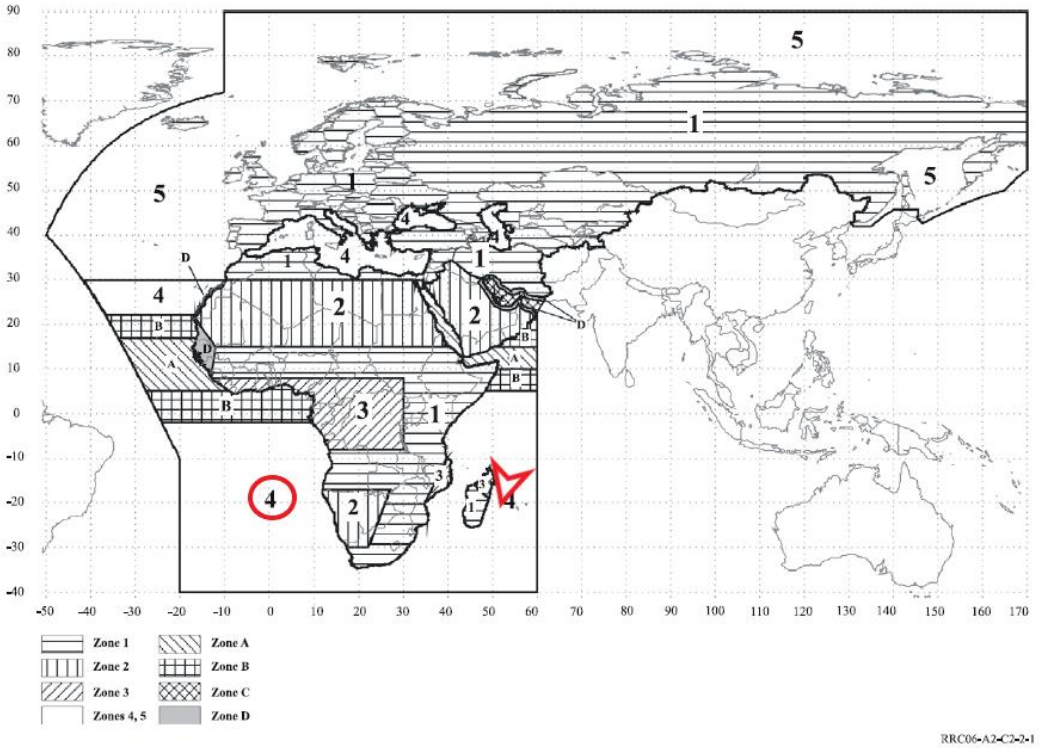


Figura 4-3. Enlace del caso 2 analítico en Google Maps

Nuestro primer objetivo será determinar el tipo de trayecto de propagación que estamos estudiando. Para resolver esta cuestión, acudiremos al mapa de zonas de propagación de la Conferencia Regional de Radiocomunicación, para darnos cuenta de que nos encontramos dentro de la Zona 4 (Mar Templado) al pertenecer la gran mayoría de mares alrededor del continente africano a dicha zona.



Note – Islands in the Mediterranean sea are in Zone 1.

Figura 4-4. . Localización del caso 2 analítico sobre el mapa de zonas de propagación

Hay que elegir ciertos valores para realizar nuestro estudio, como son:

- Frecuencia de funcionamiento: 1500 MHz
- Porcentaje de tiempo: 20%

Una vez tenemos todos estos valores procedemos a calcular la intensidad de campo para dichos datos. Puesto que hemos elegido un porcentaje de tiempo igual al 20%, determinaremos que el porcentaje de tiempo inferior será del 10% y el porcentaje de tiempo superior será del 50%. Del mismo modo, puesto que hemos elegido una frecuencia de funcionamiento de 1500 MHz, determinaremos que la frecuencia nominal inferior será de 600 MHz y la frecuencia nominal superior será de 2000 MHz.

A partir de los valores de latitud y longitud de nuestro transmisor y nuestro receptor, nuestra siguiente tarea será calcular la distancia que separa a dichos puntos. Para ello, utilizaremos la fórmula de Haversine:

$$distancia = 2R \cdot arcsen(\sqrt{a}) \quad (42)$$

$$a = (sen(rad \cdot \frac{dlat}{2}))^2 + \cos(rad \cdot lat1) \cdot \cos(rad \cdot lat2) \cdot (sen(rad \cdot \frac{dlon}{2}))^2 \quad (43)$$

siendo:

$$rad = {}^{\pi}/_{180}$$

$$dlat = lat2 - lat1 = 1.33$$

$$dlon = lon2 - lon1 = 0.31$$

$$lat1 : Latitud\ del\ Transmisor = -22{,}19º$$

$$lat2 : Latitud\ del\ Receptor = -23{,}52º$$

$$lon1: Longitud\ del\ Transmisor = 48{,}13º$$

$$lon2: Longitud\ del\ Receptor = 47{,}82º$$

$$R: Radio\ de\ la\ Tierra = 6371\ km$$

y, por lo tanto:

$$a = (sen(^{\pi}/_{180} \cdot \frac{1.33}{2}))^2 + \cos(^{\pi}/_{180} \cdot -22.19º) \cdot \cos(^{\pi}/_{180} \cdot -23.52º) \cdot (sen(^{\pi}/_{180} \cdot \frac{0.31}{2}))^2$$

$$a = 1{,}34 \cdot 10^{-4} + 0{,}925 \cdot 0{,}916 \cdot 7{,}31 \cdot 10^{-6} = 1.4^{-4}$$

$$distancia = 2 \cdot 6371 \cdot arcsen\left(\sqrt{1.4^{-4}}\right) = 150{,}76\ km$$

La distancia obtenida es 150,76 km que difiere mínimamente de la observada en Google Maps, debido al redondeo realizado. Utilizaremos ahora el cuadro de valores de distancia utilizados en los cuadros de intensidades de campo. De esta forma, podremos determinar que la distancia nominal inferior será de 150 km y la distancia nominal superior será de 160 km.

A continuación, requerimos conocer la altura de la antena transmisora y receptora por encima del terreno, h_1 y h_2, y decidiremos que la antena transmisora tendrá una altura de 50 m y la antena receptora tendrá una altura de 100 m. Dichas alturas elegidas nos facilitarán enormemente los cálculos posteriores, puesto que las podemos encontrarlas directamente en las tablas tabuladas de intensidad de campo. Como estamos suponiendo que el terreno es completamente llano, trabajaremos directamente sobre estas alturas.

Puesto que la mayoría de los valores que hemos elegido no se encuentran directamente calculados en las tablas tabuladas de intensidad de campo, entramos ahora en un proceso largo y tedioso de interpolaciones de intensidad dependiendo de diferentes parámetros hasta conseguir el valor final de intensidad de campo. Para dicho proceso, nos apoyaremos siempre en dichas tablas tabuladas.

Empezamos:

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal inferior, la distancia nominal inferior y la altura nominal inferior:

$$Intensidad(f_{inf}, p_{inf}, d_{inf}, h_{inf}) = 35{,}803$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal inferior, la distancia nominal superior y la altura nominal inferior:

$$Intensidad(f_{inf}, p_{inf}, d_{sup}, h_{inf}) = 34{,}926$$

Si interpolamos ambas intensidades en distancia:

$$E = E_{inf} + \frac{(E_{sup} - E_{inf}) \log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)} \qquad dB\ (\mu\frac{V}{m}) \qquad (44)$$

$$E = 35{,}803 + \frac{(34{,}926 - 35{,}803) \log\left(\frac{150{,}76}{150}\right)}{\log\left(\frac{160}{150}\right)} = 35{,}734 \qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal inferior, la distancia nominal inferior y la altura nominal superior:

$$Intensidad\left(f_{inf,}p_{inf},d_{inf},h_{sup}\right)=39{,}352$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal inferior, la distancia nominal superior y la altura nominal superior:

$$Intensidad\left(f_{inf},p_{inf},d_{sup},h_{sup}\right)=38{,}392$$

Si interpolamos ambas intensidades en distancia:

$$E=E_{inf}+\frac{\left(E_{sup}-E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)}\qquad dB\ (\mu\frac{V}{m}) \tag{45}$$

$$E=39{,}352+\frac{(38{,}392-39{,}352)\log\left(\frac{150{,}76}{150}\right)}{\log\left(\frac{160}{150}\right)}=39{,}276\qquad dB\ (\mu\frac{V}{m})$$

Si interpolamos en ambas intensidades en altura:

$$E=E_{inf}+\frac{\left(E_{sup}-E_{inf}\right)\log\left(\frac{h_1}{h_{inf}}\right)}{\log\left(\frac{h_{sup}}{h_{inf}}\right)}\qquad dB\ \left(\mu\frac{V}{m}\right) \tag{46}$$

$$E=35{,}734+\frac{(39{,}276-35{,}734)\log\left(\frac{50}{37{,}5}\right)}{\log\left(\frac{75}{37{,}5}\right)}=37{,}204\qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal inferior, la distancia nominal inferior y la altura nominal inferior:

$$Intensidad\left(f_{sup,}p_{inf},d_{inf},h_{inf}\right)=48{,}828$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal inferior, la distancia nominal superior y la altura nominal inferior:

$$Intensidad\left(f_{sup,}p_{inf},d_{sup},h_{inf}\right)=47{,}512$$

Si interpolamos ambas intensidades en distancia:

$$E=E_{inf}+\frac{\left(E_{sup}-E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)}\qquad dB\ (\mu\frac{V}{m}) \tag{47}$$

$$E=48{,}828+\frac{(47{,}512-48{,}828)\log\left(\frac{150{,}76}{150}\right)}{\log\left(\frac{160}{150}\right)}=48{,}724\qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal inferior, la distancia nominal inferior y la altura nominal superior:

$$Intensidad\left(f_{sup,}p_{inf},d_{inf},h_{sup}\right)=51{,}835$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal inferior, la distancia nominal superior y la altura nominal superior:

$$Intensidad\left(f_{sup}, p_{inf}, d_{sup}, h_{sup}\right) = 50{,}458$$

Si interpolamos ambas intensidades en distancia:

$$E = E_{inf} + \frac{\left(E_{sup} - E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)} \qquad dB\ (\mu\frac{V}{m}) \qquad (48)$$

$$E = 51{,}835 + \frac{(50{,}458 - 51{,}835)\log\left(\frac{150{,}76}{150}\right)}{\log\left(\frac{160}{150}\right)} = 51{,}727 \qquad dB\ (\mu\frac{V}{m})$$

Si interpolamos en ambas intensidades en altura:

$$E = E_{inf} + \frac{\left(E_{sup} - E_{inf}\right)\log\left(\frac{h_1}{h_{inf}}\right)}{\log\left(\frac{h_{sup}}{h_{inf}}\right)} \qquad dB\ \left(\mu\frac{V}{m}\right) \qquad (49)$$

$$E = 48{,}724 + \frac{(51{,}727 - 48{,}724)\log\left(\frac{50}{37{,}5}\right)}{\log\left(\frac{75}{37{,}5}\right)} = 49{,}970 \qquad dB\ (\mu\frac{V}{m})$$

Si interpolamos en ambas intensidades en frecuencia:

$$E = E_{inf} + \frac{\left(E_{sup} - E_{inf}\right)\log\left(\frac{f}{f_{inf}}\right)}{\log\left(\frac{f_{sup}}{f_{inf}}\right)} \qquad dB\ \left(\mu\frac{V}{m}\right) \qquad (50)$$

$$E = 37{,}204 + \frac{(49{,}970 - 37{,}204)\log\left(\frac{1500}{600}\right)}{\log\left(\frac{2000}{600}\right)} = 46{,}919 \qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal superior, la distancia nominal inferior y la altura nominal inferior:

$$Intensidad\left(f_{inf}, p_{sup}, d_{inf}, h_{inf}\right) = 0{,}98$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal inferior, la distancia nominal superior y la altura nominal inferior:

$$Intensidad\left(f_{inf}, p_{sup}, d_{sup}, h_{inf}\right) = -0{,}648$$

Si interpolamos ambas intensidades en distancia:

$$E = E_{inf} + \frac{\left(E_{sup} - E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)} \qquad dB\ (\mu\frac{V}{m}) \qquad (51)$$

$$E = 0{,}98 + \frac{(-0{,}648 - 0{,}98)\log\left(\frac{150{,}76}{150}\right)}{\log\left(\frac{160}{150}\right)} = 0{,}852 \qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal superior, la distancia nominal inferior y la altura nominal superior:

$$Intensidad\left(f_{inf}, p_{sup}, d_{inf}, h_{sup}\right) = 3{,}329$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal superior, la distancia nominal superior y la altura nominal superior:

$$Intensidad\left(f_{inf}, p_{sup}, d_{sup}, h_{sup}\right) = 1{,}548$$

Si interpolamos ambas intensidades en distancia:

$$E = E_{inf} + \frac{\left(E_{sup} - E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)} \qquad dB\ (\mu\frac{V}{m}) \qquad (52)$$

$$E = 3{,}329 + \frac{(1{,}548 - 3{,}329)\log\left(\frac{150{,}76}{150}\right)}{\log\left(\frac{160}{150}\right)} = 3{,}189 \qquad dB\ (\mu\frac{V}{m})$$

Si interpolamos en ambas intensidades en altura:

$$E = E_{inf} + \frac{\left(E_{sup} - E_{inf}\right)\log\left(\frac{h_1}{h_{inf}}\right)}{\log\left(\frac{h_{sup}}{h_{inf}}\right)} \qquad dB\ \left(\mu\frac{V}{m}\right) \qquad (53)$$

$$E = 0{,}852 + \frac{(3{,}189 - 0{,}852)\log\left(\frac{50}{37{,}5}\right)}{\log\left(\frac{75}{37{,}5}\right)} = 1{,}821 \qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal superior, la distancia nominal inferior y la altura nominal inferior:

$$Intensidad\left(f_{sup}, p_{sup}, d_{inf}, h_{inf}\right) = -2{,}338$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal superior, la distancia nominal superior y la altura nominal inferior:

$$Intensidad\left(f_{sup}, p_{sup}, d_{sup}, h_{inf}\right) = -3{,}674$$

Si interpolamos ambas intensidades en distancia:

$$E = E_{inf} + \frac{\left(E_{sup} - E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)} \qquad dB\ (\mu\frac{V}{m}) \qquad (54)$$

$$E = -2{,}338 + \frac{(-3{,}674 + 2.338)\log\left(\frac{150{,}76}{150}\right)}{\log\left(\frac{160}{150}\right)} = -2{,}442 \qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal superior, la distancia nominal inferior y la altura nominal superior:

$$Intensidad\left(f_{sup}, p_{sup}, d_{inf}, h_{sup}\right) = -0{,}794$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal superior, la distancia nominal superior y la altura nominal superior:

$$Intensidad\left(f_{sup}, p_{sup}, d_{sup}, h_{sup}\right) = -2{,}219$$

Si interpolamos ambas intensidades en distancia:

$$E = E_{inf} + \frac{\left(E_{sup} - E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)} \qquad dB\ (\mu\frac{V}{m}) \qquad (55)$$

$$E = -0{,}794 + \frac{(-2{,}219 + 0{,}794)\log\left(\frac{150{,}76}{150}\right)}{\log\left(\frac{160}{150}\right)} = -0{,}905 \qquad dB\ (\mu\frac{V}{m})$$

Si interpolamos en ambas intensidades en altura:

$$E = E_{inf} + \frac{\left(E_{sup} - E_{inf}\right)\log\left(\frac{h_1}{h_{inf}}\right)}{\log\left(\frac{h_{sup}}{h_{inf}}\right)} \qquad dB\ \left(\mu\frac{V}{m}\right) \qquad (56)$$

$$E = -2{,}442 + \frac{(-0{,}905 + 2{,}442)\log\left(\frac{50}{37{,}5}\right)}{\log\left(\frac{75}{37{,}5}\right)} = -1{,}804 \qquad dB\ (\mu\frac{V}{m})$$

Si interpolamos en ambas intensidades en frecuencia:

$$E = E_{inf} + \frac{\left(E_{sup} - E_{inf}\right)\log\left(\frac{f}{f_{inf}}\right)}{\log\left(\frac{f_{sup}}{f_{inf}}\right)} \qquad dB\ \left(\mu\frac{V}{m}\right) \qquad (57)$$

$$E = 1{,}821 + \frac{(-1{,}804 - 1{,}821)\log\left(\frac{1500}{600}\right)}{\log\left(\frac{2000}{600}\right)} = -0{,}937 \qquad dB\ (\mu\frac{V}{m})$$

Y si recogemos ambas intensidades interpoladas en frecuencia y las interpolamos en tiempo:

$$E = \frac{E_{sup}\left(Q_{inf} - Q_t\right)}{Q_{inf} - Q_{sup}} + \frac{E_{inf}\left(Q_t - Q_{sup}\right)}{Q_{inf} - Q_{sup}} \qquad dB\ (\mu\frac{V}{m}) \qquad (58)$$

siendo:

$$Q_i(x) = T(x) - \xi(x) \qquad si\ x \leq 0{,}5 \tag{59}$$

$$T(x) = \sqrt{[-2\ln(x)]} \tag{60}$$

$$\xi(x) = \frac{[(C_2 \cdot T(x) + C_1) \cdot T(x)] + C_0}{[(D_3 \cdot T(x) + D_2) \cdot T(x) + D_1] \cdot T(x) + 1} \tag{61}$$

$$C_0 = 2{,}515517$$
$$C_1 = 0{,}802853$$
$$C_2 = 0{,}010328$$
$$D_1 = 1{,}432788$$
$$D_2 = 0{,}189269$$
$$D_3 = 0{,}001308$$

$$Q_t : Q_i\left(\frac{t}{100}\right) = Q_i\left(\frac{20}{100}\right) = Q_i(0.20) = T(0.20) - \xi(0.20) = \sqrt{[-2\ln(0.20)]} - \xi(0.20) =$$
$$= 1{,}794 - \xi(0{,}20) = 0{,}841$$

$$Q_{inf} : Q_i\left(\frac{t_{inf}}{100}\right) = Q_i\left(\frac{10}{100}\right) = Q_i(0.1) = T(0.1) - \xi(0.1) = \sqrt{[-2\ln(0.1)]} - \xi(0.1) =$$
$$= 2{,}14 - \xi(0{,}1) = 1{,}28$$

$$Q_{sup} : Q_i\left(\frac{t_{sup}}{100}\right) = Q_i\left(\frac{50}{100}\right) = Q_i(0.5) = T(0.5) - \xi(0.5) = \sqrt{[-2\ln(0.5)]} - \xi(0.5) =$$
$$= 1.177 - \xi(0{,}5) = -1.01 \cdot 10^{-7} \approx 0$$

$$E = \frac{-0{,}937 \cdot (1{,}28 - 0{,}841)}{1{,}28 - 0} + \frac{46{,}919 \cdot (0{,}841 - 0)}{1{,}28 - 0} = 30{,}50 \qquad dB\ (\mu\frac{V}{m})$$

Tras todos estos cálculos, concluimos que el valor rebasado en el 50% de las ubicaciones para los parámetros introducidos sería de 30,5 $dB\ \left(\mu\frac{V}{m}\right)$

4.3 Resolución manual del Caso 3

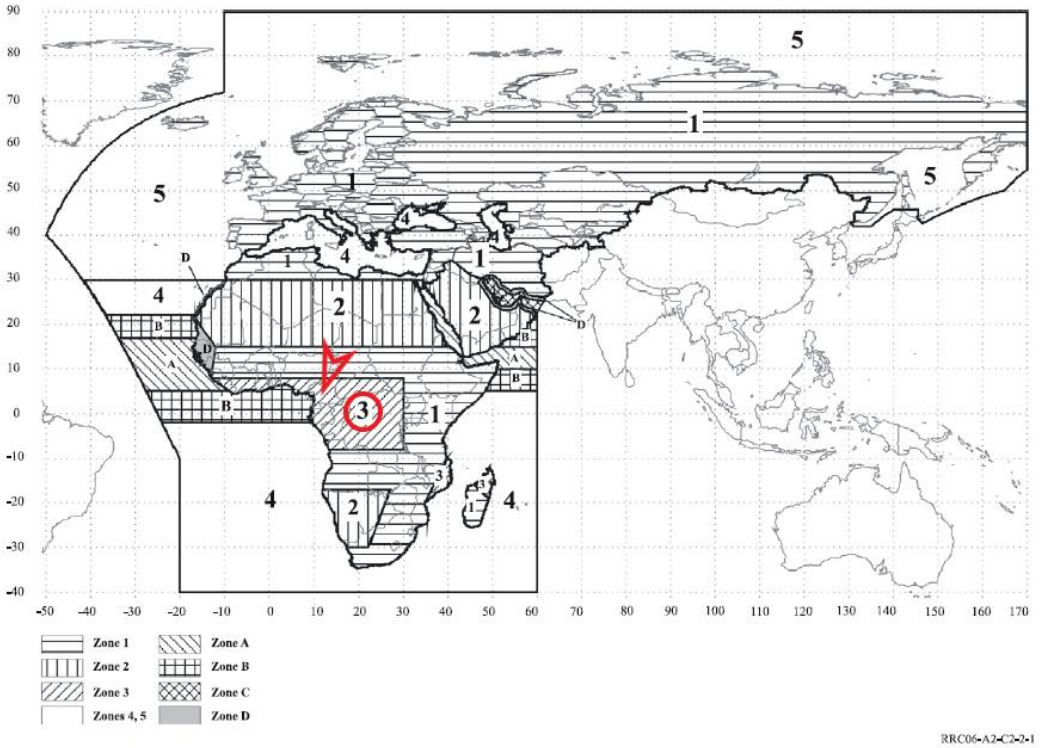
En este último caso de estudio, volvemos a elegir una localización terrestre pero ubicada en una zona diferente de la del Caso 1. En este caso, nos hemos centrado en la reserva natural de Manoka, ubicada muy cerca del litoral de Camerún.

En concreto como valores conocidos de localización tendremos:

- Latitud del Transmisor: 3,56º
- Longitud del Transmisor: 10,03º
- Latitud del Receptor: 3,50º
- Longitud del Receptor: 9,92º

Figura 4-5. Enlace del caso 3 analítico en Google Maps

Nuestro primer objetivo será determinar el tipo de trayecto de propagación que estamos estudiando. Para resolver esta cuestión, acudiremos al mapa de zonas de propagación de la Conferencia Regional de Radiocomunicación, para darnos cuenta de que nos encontramos dentro de la Zona 3 (Región ecuatorial con clima caliente y húmedo).



Note – Islands in the Mediterranean sea are in Zone 1.

Figura 4-6. Localización del caso 3 analítico sobre el mapa de zonas de propagación

Hay que elegir ciertos valores para realizar nuestro estudio, como son:

- Frecuencia de funcionamiento: 800 MHz
- Porcentaje de tiempo: 35%

Una vez tenemos todos estos valores procedemos a calcular la intensidad de campo para dichos datos. Puesto que hemos elegido un porcentaje de tiempo igual al 35%, determinaremos que el porcentaje de tiempo inferior será del 10% y el porcentaje de tiempo superior será del 50%. Del mismo modo, puesto que hemos elegido una frecuencia de funcionamiento de 800 MHz, determinaremos que la frecuencia nominal inferior será de 600 MHz y la frecuencia nominal superior será de 2000 MHz.

A partir de los valores de latitud y longitud de nuestro transmisor y nuestro receptor, nuestra siguiente tarea será calcular la distancia que separa a dichos puntos. Para ello, utilizaremos la fórmula de Haversine:

$$distancia = 2R \cdot arcsen(\sqrt{a}) \quad (62)$$

$$a = (sen(rad \cdot \frac{dlat}{2}))^2 + \cos(rad \cdot lat1) \cdot \cos(rad \cdot lat2) \cdot (sen(rad \cdot \frac{dlon}{2}))^2 \quad (63)$$

siendo:

$$rad = {}^{\pi}/_{180}$$

$$dlat = lat2 - lat1 = 0{,}06$$

$$dlon = lon2 - lon1 = 0{,}11$$

$$lat1 : Latitud\ del\ Transmisor = 3{,}56º$$

$$lat2 : Latitud\ del\ Receptor = 3{,}50º$$

$$lon1: Longitud\ del\ Transmisor = 10{,}03º$$

$$lon2: Longitud\ del\ Receptor = 9{,}92º$$

$$R: Radio\ de\ la\ Tierra = 6371\ km$$

y, por lo tanto:

$$a = (sen(^{\pi}/_{180} \cdot \frac{0{,}06}{2}))^2 + \cos(^{\pi}/_{180} \cdot 3{,}56º) \cdot \cos(^{\pi}/_{180} \cdot 3{,}50º) \cdot (sen(^{\pi}/_{180} \cdot \frac{0{,}11}{2}))^2$$

$$a = 2{,}74 \cdot 10^{-7} + 0{,}998 \cdot 0{,}998 \cdot 9{,}21 \cdot 10^{-7} = 1{,}19^{-6}$$

$$distancia = 2 \cdot 6371 \cdot arcsen\left(\sqrt{1{,}19^{-6}}\right) = 13{,}89\ km$$

La distancia obtenida es 13,89 km que difiere mínimamente de la observada en Google Maps, debido al redondeo realizado. Utilizaremos ahora el cuadro de valores de distancia utilizados en los cuadros de intensidades de campo. De esta forma, podremos determinar que la distancia nominal inferior será de 13 km y la distancia nominal superior será de 14 km.

A continuación, requerimos conocer la altura de la antena transmisora y receptora por encima del terreno, h_1 y h_2, y decidiremos que la antena transmisora tendrá una altura de 100 m y la antena receptora tendrá una altura de 15 m. Dichas alturas elegidas nos facilitarán enormemente los cálculos posteriores, puesto que las podemos encontrarlas directamente en las tablas tabuladas de intensidad de campo. Como estamos suponiendo que el terreno es completamente llano, trabajaremos directamente sobre estas alturas.

Puesto que la mayoría de los valores que hemos elegido no se encuentran directamente calculados en las tablas tabuladas de intensidad de campo, entramos ahora en un proceso largo y tedioso de interpolaciones de intensidad dependiendo de diferentes parámetros hasta conseguir el valor final de intensidad de campo. Para dicho proceso, nos apoyaremos siempre en dichas tablas tabuladas.

Empezamos:

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal inferior, la distancia nominal inferior y la altura nominal inferior:

$$Intensidad(f_{inf}, p_{inf}, d_{inf}, h_{inf}) = 62{,}275$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal inferior, la distancia nominal superior y la altura nominal inferior:

$$Intensidad(f_{inf}, p_{inf}, d_{sup}, h_{inf}) = 60{,}851$$

Si interpolamos ambas intensidades en distancia:

$$E = E_{inf} + \frac{(E_{sup} - E_{inf}) \log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)} \qquad dB\ (\mu\frac{V}{m}) \qquad (64)$$

$$E = 62{,}275 + \frac{(60{,}851 - 62{,}275) \log\left(\frac{13{,}89}{13}\right)}{\log\left(\frac{14}{13}\right)} = 61 \qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal inferior, la distancia nominal inferior y la altura nominal superior:

$$Intensidad\left(f_{inf,}p_{inf},d_{inf},h_{sup}\right)=68{,}585$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal inferior, la distancia nominal superior y la altura nominal superior:

$$Intensidad\left(f_{inf},p_{inf},d_{sup},h_{sup}\right)=67{,}3$$

Si interpolamos ambas intensidades en distancia:

$$E=E_{inf}+\frac{\left(E_{sup}-E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)}\qquad dB\ (\mu\frac{V}{m}) \tag{65}$$

$$E=68{,}585+\frac{(67{,}3-68{,}585)\log\left(\frac{13{,}89}{13}\right)}{\log\left(\frac{14}{13}\right)}=67{,}43\qquad dB\ (\mu\frac{V}{m})$$

Si interpolamos en ambas intensidades en altura:

$$E=E_{inf}+\frac{\left(E_{sup}-E_{inf}\right)\log\left(\frac{h_1}{h_{inf}}\right)}{\log\left(\frac{h_{sup}}{h_{inf}}\right)}\qquad dB\ \left(\mu\frac{V}{m}\right) \tag{66}$$

$$E=61+\frac{(67{,}436-61)\log\left(\frac{100}{75}\right)}{\log\left(\frac{150}{75}\right)}=63{,}671\qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal inferior, la distancia nominal inferior y la altura nominal inferior:

$$Intensidad\left(f_{sup,}p_{inf},d_{inf},h_{inf}\right)=61{,}684$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal inferior, la distancia nominal superior y la altura nominal inferior:

$$Intensidad\left(f_{sup,}p_{inf},d_{sup},h_{inf}\right)=60{,}073$$

Si interpolamos ambas intensidades en distancia:

$$E=E_{inf}+\frac{\left(E_{sup}-E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)}\qquad dB\ (\mu\frac{V}{m}) \tag{67}$$

$$E=61{,}684+\frac{(60{,}073-61{,}684)\log\left(\frac{13{,}89}{13}\right)}{\log\left(\frac{14}{13}\right)}=60{,}244\qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal inferior, la distancia nominal inferior y la

altura nominal superior:

$$Intensidad\left(f_{sup,}p_{inf},d_{inf},h_{sup}\right)=68{,}877$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal inferior, la distancia nominal superior y la altura nominal superior:

$$Intensidad\left(f_{sup},p_{inf},d_{sup},h_{sup}\right)=67{,}472$$

Si interpolamos ambas intensidades en distancia:

$$E=E_{inf}+\frac{\left(E_{sup}-E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)}\qquad dB\ (\mu\frac{V}{m}) \tag{68}$$

$$E=68{,}877+\frac{(67{,}472-68{,}877)\log\left(\frac{13{,}89}{13}\right)}{\log\left(\frac{14}{13}\right)}=67{,}621\qquad dB\ (\mu\frac{V}{m})$$

Si interpolamos en ambas intensidades en altura:

$$E=E_{inf}+\frac{\left(E_{sup}-E_{inf}\right)\log\left(\frac{h_1}{h_{inf}}\right)}{\log\left(\frac{h_{sup}}{h_{inf}}\right)}\qquad dB\ \left(\mu\frac{V}{m}\right) \tag{69}$$

$$E=60{,}244+\frac{(67{,}621-60{,}244)\log\left(\frac{100}{75}\right)}{\log\left(\frac{150}{75}\right)}=63{,}305\qquad dB\ (\mu\frac{V}{m})$$

Si interpolamos en ambas intensidades en frecuencia:

$$E=E_{inf}+\frac{\left(E_{sup}-E_{inf}\right)\log\left(\frac{f}{f_{inf}}\right)}{\log\left(\frac{f_{sup}}{f_{inf}}\right)}\qquad dB\ \left(\mu\frac{V}{m}\right) \tag{70}$$

$$E=63{,}671+\frac{(63{,}305-63{,}671)\log\left(\frac{800}{600}\right)}{\log\left(\frac{2000}{600}\right)}=63{,}583\qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal superior, la distancia nominal inferior y la altura nominal inferior:

$$Intensidad\left(f_{inf,}p_{sup},d_{inf},h_{inf}\right)=61{,}6$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal inferior, la distancia nominal superior y la altura nominal inferior:

$$Intensidad\left(f_{inf,}p_{sup},d_{sup},h_{inf}\right)=60{,}189$$

Si interpolamos ambas intensidades en distancia:

$$E = E_{inf} + \frac{(E_{sup} - E_{inf}) \log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)} \qquad dB\ (\mu\frac{V}{m}) \qquad (71)$$

$$E = 61{,}6 + \frac{(60{,}189 - 61{,}6) \log\left(\frac{13{,}89}{13}\right)}{\log\left(\frac{14}{13}\right)} = 60{,}339 \qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal superior, la distancia nominal inferior y la altura nominal superior:

$$Intensidad\left(f_{inf}, p_{sup}, d_{inf}, h_{sup}\right) = 67{,}998$$

Para la frecuencia nominal inferior, el porcentaje de tiempo nominal superior, la distancia nominal superior y la altura nominal superior:

$$Intensidad\left(f_{inf}, p_{sup}, d_{sup}, h_{sup}\right) = 66{,}754$$

Si interpolamos ambas intensidades en distancia:

$$E = E_{inf} + \frac{(E_{sup} - E_{inf}) \log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)} \qquad dB\ (\mu\frac{V}{m}) \qquad (72)$$

$$E = 67{,}998 + \frac{(66{,}754 - 67{,}998) \log\left(\frac{13{,}89}{13}\right)}{\log\left(\frac{14}{13}\right)} = 66{,}886 \qquad dB\ (\mu\frac{V}{m})$$

Si interpolamos en ambas intensidades en altura:

$$E = E_{inf} + \frac{(E_{sup} - E_{inf}) \log\left(\frac{h_1}{h_{inf}}\right)}{\log\left(\frac{h_{sup}}{h_{inf}}\right)} \qquad dB\ \left(\mu\frac{V}{m}\right) \qquad (73)$$

$$E = 60{,}339 + \frac{(66{,}886 - 60{,}339) \log\left(\frac{100}{75}\right)}{\log\left(\frac{150}{75}\right)} = 63{,}116 \qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal superior, la distancia nominal inferior y la altura nominal inferior:

$$Intensidad\left(f_{sup}, p_{sup}, d_{inf}, h_{inf}\right) = 61{,}768$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal superior, la distancia nominal superior y la altura nominal inferior:

$$Intensidad\left(f_{sup}, p_{sup}, d_{sup}, h_{inf}\right) = 60{,}164$$

Si interpolamos ambas intensidades en distancia:

$$E = E_{inf} + \frac{(E_{sup} - E_{inf}) \log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)} \qquad dB\ (\mu\frac{V}{m}) \qquad (74)$$

$$E = 61{,}768 + \frac{(60{,}164 - 61{,}768)\log\left(\frac{13{,}89}{13}\right)}{\log\left(\frac{14}{13}\right)} = 60.334 \qquad dB\ (\mu\frac{V}{m})$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal superior, la distancia nominal inferior y la altura nominal superior:

$$Intensidad\left(f_{sup}, p_{sup}, d_{inf}, h_{sup}\right) = 68{,}934$$

Para la frecuencia nominal superior, el porcentaje de tiempo nominal superior, la distancia nominal superior y la altura nominal superior:

$$Intensidad\left(f_{sup}, p_{sup}, d_{sup}, h_{sup}\right) = 67{,}535$$

Si interpolamos ambas intensidades en distancia:

$$E = E_{inf} + \frac{\left(E_{sup} - E_{inf}\right)\log\left(\frac{d}{d_{inf}}\right)}{\log\left(\frac{d_{sup}}{d_{inf}}\right)} \qquad dB\ (\mu\frac{V}{m}) \qquad (75)$$

$$E = 68{,}934 + \frac{(67{,}535 - 68{,}934)\log\left(\frac{13{,}89}{13}\right)}{\log\left(\frac{14}{13}\right)} = 63{,}683 \qquad dB\ (\mu\frac{V}{m})$$

Si interpolamos en ambas intensidades en altura:

$$E = E_{inf} + \frac{\left(E_{sup} - E_{inf}\right)\log\left(\frac{h_1}{h_{inf}}\right)}{\log\left(\frac{h_{sup}}{h_{inf}}\right)} \qquad dB\ \left(\mu\frac{V}{m}\right) \qquad (76)$$

$$E = 60{,}334 + \frac{(67{,}683 - 60{,}334)\log\left(\frac{100}{75}\right)}{\log\left(\frac{150}{75}\right)} = 63{,}384 \qquad dB\ (\mu\frac{V}{m})$$

Si interpolamos en ambas intensidades en frecuencia:

$$E = E_{inf} + \frac{\left(E_{sup} - E_{inf}\right)\log\left(\frac{f}{f_{inf}}\right)}{\log\left(\frac{f_{sup}}{f_{inf}}\right)} \qquad dB\ \left(\mu\frac{V}{m}\right) \qquad (77)$$

$$E = 63{,}116 + \frac{(63{,}384 - 63{,}116)\log\left(\frac{800}{600}\right)}{\log\left(\frac{2000}{600}\right)} = 63{,}180 \qquad dB\ (\mu\frac{V}{m})$$

Y si recogemos ambas intensidades interpoladas en frecuencia y las interpolamos en tiempo:

$$E = \frac{E_{sup}(Q_{inf} - Q_t)}{Q_{inf} - Q_{sup}} + \frac{E_{inf}(Q_t - Q_{sup})}{Q_{inf} - Q_{sup}} \qquad dB\ (\mu\frac{V}{m}) \tag{78}$$

siendo:

$$Q_i(x) = T(x) - \xi(x) \qquad si\ x \leq 0{,}5 \tag{79}$$

$$T(x) = \sqrt{[-2\ln(x)]} \tag{80}$$

$$\xi(x) = \frac{[(C_2 \cdot T(x) + C_1) \cdot T(x)] + C_0}{[(D_3 \cdot T(x) + D_2) \cdot T(x) + D_1] \cdot T(x) + 1} \tag{81}$$

$$C_0 = 2{,}515517$$
$$C_1 = 0{,}802853$$
$$C_2 = 0{,}010328$$
$$D_1 = 1{,}432788$$
$$D_2 = 0{,}189269$$
$$D_3 = 0{,}001308$$

$$Q_t : Q_i\left(\frac{t}{100}\right) = Q_i\left(\frac{35}{100}\right) = Q_i(0.35) = T(0.35) - \xi(0.35) = \sqrt{[-2\ln(0.35)]} - \xi(0.35) =$$
$$= 1{,}449 - \xi(0{,}35) = 0{,}384$$

$$Q_{inf} : Q_i\left(\frac{t_{inf}}{100}\right) = Q_i\left(\frac{10}{100}\right) = Q_i(0.1) = T(0.1) - \xi(0.1) = \sqrt{[-2\ln(0.1)]} - \xi(0.1) =$$
$$= 2{,}14 - \xi(0{,}1) = 1{,}28$$

$$Q_{sup} : Q_i\left(\frac{t_{sup}}{100}\right) = Q_i\left(\frac{50}{100}\right) = Q_i(0.5) = T(0.5) - \xi(0.5) = \sqrt{[-2\ln(0.5)]} - \xi(0.5) =$$
$$= 1.177 - \xi(0{,}5) = -1.01 \cdot 10^{-7} \approx 0$$

$$E = \frac{63{,}18 \cdot (1{,}28 - 0{,}384)}{1{,}28 - 0} + \frac{63{,}586 \cdot (0{,}384 - 0)}{1{,}28 - 0} = 63{,}301 \qquad dB\ (\mu\frac{V}{m})$$

Tras todos estos cálculos, concluimos que el valor rebasado en el 50% de las ubicaciones para los parámetros introducidos sería de 63,301 $dB\ \left(\mu\frac{V}{m}\right)$

5 PROGRAMA EN PYTHON

Primero resuelve el problema. Entonces, escribe el código.

- John Johnson -

Python es un lenguaje de programación interpretado cuya sintaxis favorece un código legible. Es multiparadigma, ya que soporta orientación a objetos, programación imperativa y programación funcional. Además, es multiplataforma y posee una licencia de código abierto. [18] Hay que añadir también como uno de sus valores añadidos, la gran cantidad de librerías que contiene que facilitan enormemente la elaboración de programas nuevos. Todas estas características son las que nos han llevado a elegir *Python* como lenguaje de programación a partir del cual realizar este trabajo.

Hay que resaltar que este trabajo está encuadrado en un proyecto a gran escala de simuladores en Python que varios alumnos de la Escuela de Ingenieros estamos realizando y que, finalmente, deberían quedar englobados en un único simulador. Es por ello necesario, utilizar un lenguaje *Open Source* que no bloquee dicho desarrollo en el futuro. *Python* es, además, un lenguaje con un gran crecimiento a nivel mundial (y se espera que siga esta misma línea durante muchos años más) por lo que queda asegurado el uso de un lenguaje del cual puede encontrarse mucha información a través de la red.

5.1 Programa principal: Principal.py

En este fichero se encuentra la función principal del programa. Desde esta función se irán realizando llamadas a funciones de los ficheros auxiliares (estos a su vez pueden hacer uso de otras funciones) para llevar a cabo la ejecución de nuestro código. A continuación, vamos a explicar el funcionamiento completo de nuestro programa.

En primer lugar, nuestro simulador escribe algunos mensajes por pantalla para dar la bienvenida al usuario de la aplicación.

Una vez hecho esto, le irá solicitando al usuario que introduzca por teclado aquellos valores necesarios para el correcto funcionamiento de nuestra aplicación como son la frecuencia de funcionamiento, las latitudes y longitudes de los puntos transmisor y receptor, el porcentaje de tiempo, el tipo de trayecto y la zona en la cual se realiza la simulación. Una vez recibidos estos valores de forma correcta, se muestran por pantalla para que el usuario pueda ver de forma resumida estos primeros datos introducidos.

A continuación, también se pide al usuario que introduzca la altura de la antenas transmisora y receptora por encima del terreno. A partir de estas dos últimas variables, el programa hace uso de la *Api* de *Open-Elevation.* Con los datos obtenidos a través de esta Api, se obtendrán nuevos parámetros útiles para nuestro programa y se mostrarán por pantalla diversas gráficas referentes al terreno que separa nuestros puntos transmisor y receptor.

Tras esto, pasaremos a calcular los porcentajes de tiempo nominales inferior y superior a partir del porcentaje de tiempo introducido, las frecuencias de funcionamiento nominales inferior y superior a partir de la frecuencia de funcionamiento introducida, las distancias nominales inferior y superior a partir de la distancia calculada entre los puntos transmisor y receptor y las alturas h1 nominales inferior y superior a partir de la altura h1 calculada previamente.

Tras conseguir todos estos valores, la aplicación pasará en este momento a calcular la intensidad de campo (que es el verdadero objetivo de nuestro simulador). Para ello realizará el siguiente proceso:

Para la frecuencia inferior nominal, el porcentaje de tiempo inferior nominal y la altura h1 inferior nominal, se obtienen las intensidades de campo para las distancias inferior y superior nominales y se interpola en distancia si fuera necesario.

Para la frecuencia inferior nominal, el porcentaje de tiempo inferior nominal y la altura h1 superior nominal, se obtienen las intensidades de campo para las distancias inferior y superior nominales y se interpola en distancia si fuera necesario.

Con estas dos intensidades de campo se interpola en altura si fuera necesario.

Para la frecuencia superior nominal, el porcentaje de tiempo inferior nominal y la altura h1 inferior nominal, se obtienen las intensidades de campo para las distancias inferior y superior nominales y se interpola en distancia si fuera necesario.

Para la frecuencia superior nominal, el porcentaje de tiempo inferior nominal y la altura h1 superior nominal, se obtienen las intensidades de campo para las distancias inferior y superior nominales y se interpola en distancia si fuera necesario.

Con estas dos intensidades de campo se interpola en altura si fuera necesario.

Tras esto, con estas dos intensidades obtenidas, se interpola en frecuencia si fuera necesario.

Posteriormente, se realiza el mismo proceso anterior, pero para el porcentaje de tiempo nominal superior y una vez hecho esto, tendremos que interpolar en tiempo si fuera necesario.

Finalmente, para concluir la ejecución de nuestro programa, se mostrarán por pantallas los resultados finales. Entre estos valores se incluyen la intensidad de campo calculada durante la ejecución de nuestro programa y dicha intensidad tras someterse a varias correcciones, que incluyen una corrección para el ángulo de despejamiento del terreno en la antena receptora, una corrección debida a la dispersión troposférica, una corrección debida a la altura de la antena receptora, una corrección debida a la posible existencia de obstáculos alrededor del transmisor y una corrección debida al posible trayecto oblicuo.

Para la elaboración de este programa al complete, además del fichero Principal.py que incluye el código base de nuestro simulador, se han utilizado cinco ficheros y más de treinta funciones diferentes, cuyo funcionamiento pasaremos a explicar a continuación.

5.2 Funciones utilizadas: Funciones.py

Este fichero incluye una gran diversidad de funciones distintas que son necesarias para el funcionamiento del programa pero que no pueden ser agrupadas en ficheros propios por su gran diversidad. Se han separado del fichero Principal.py para una mayor facilidad de ejecución, comprensión y desarrollo del código implementado.

5.2.1 porcentajes_tiempo_nominales(p)

Esta función recibe como parámetro de entrada el porcentaje de tiempo nominal introducido por el usuario del programa y a partir de dicho dato, calcula los porcentajes de tiempo nominales inferior y superior.

5.2.2 frecuencias_funcionamiento_nominales(f)

Esta función recibe como parámetro de entrada la frecuencia de funcionamiento nominal introducido por el usuario del programa y a partir de dicho dato, calcula las frecuencias nominales inferior y superior.

5.2.3 buscar_distancias()

Esta función se encarga de buscar en el Excel de intensidades de campo tabuladas, las distancias válidas según la norma y de devolver una lista con todas ellas.

5.2.4 buscar_alturas()

Esta función se encarga de buscar en el Excel de intensidades de campo tabuladas, las alturas válidas según la norma y de devolver una lista con todas ellas.

5.2.5 distancias_nominales(d)

Esta función recibe como parámetro de entrada la distancia introducido por el usuario del programa y a partir de dicho dato, calcula las distancias nominales inferior y superior.

5.2.6 alturas_nominales(h1)

Esta función recibe como parámetro de entrada la altura h1 introducido por el usuario del programa y a partir de dicho dato, calcula las alturas h1 nominales inferior y superior.

5.2.7 obtener_intensidad(numerohoja,h1inf,dinf,trayecto,f,d,p)

La función obtener_intensidad da como resultado la intensidad de campo tabulada asociada a los parámetros número de hoja del *Excel*, la altura h1, la distancia, el tipo de trayecto, la frecuencia y el porcentaje de tiempo que se le han introducido como parámetros de entrada.

5.2.8 interpolacion_distancia(d,dinf,dsup,Einf,Esup)

En la siguiente función obtendremos la intensidad de campo interpolada, a partir de la distancia entre puntos, las distancias nominales superior e inferior y las intensidades de campo inferior y superior para dichas distancias respectivamente.

5.2.9 interpolacion_altura(h1,h1inf,h1sup,Einf,Esup)

En la siguiente función obtendremos la intensidad de campo interpolada, a partir de la altura h1 nominal, las alturas h1 nominales superior e inferior y las intensidades de campo inferior y superior para dichas alturas respectivamente.

5.2.10 interpolacion_frecuencia(f,finf,fsup,Einf,Esup)

En la siguiente función obtendremos la intensidad de campo interpolada, a partir de la frecuencia de funcionamiento nominal, las frecuencias nominales superior e inferior y las intensidades de campo inferior y superior para dichas frecuencias respectivamente.

5.2.11 distribucion_normal_inversa(x)

Esta función se encarga de calcular los valores de la distribución normal acumulativa complementaria inversa.

5.2.12 interpolacion_tiempo(p,pinf,psup,Einf,Esup)

En la siguiente función obtendremos la intensidad de campo interpolada, a partir del porcentaje de tiempo nominal, los porcentajes de tiempo nominales superior e inferior y las intensidades de campo inferior y superior para dichos porcentajes de tiempo respectivamente, haciendo uso de la distribución normal inversa.

5.2.13 dispersion_troposferica(d,f,p,thetatca,thetaeff)

Esta función realiza el cálculo de la intensidad de campo teniendo en cuenta los efectos de la dispersión troposférica. Para ello utiliza como variables de entra la distancia entre puntos, la frecuencia de funcionamiento, el porcentaje de tiempo nominal y los ángulos θ_{tca} y θ_{eff}.

5.2.14 haversine(lat1, lon1, lat2, lon2)

La función haversine se encarga de calcular la distancia de Haversine mediante las latitudes y longitudes de los puntos transmisor y receptor de nuestro programa.

5.3 Funciones utilizadas: Comprobaciones.py

El fichero Comprobaciones.py incluye aquellas funciones que realizan validaciones sobre parámetros de entrada o variables utilizadas en el transcurso del programa, para comprobar que se encuentran dentro de los límites o márgenes válidos o coherentes de funcionamiento.

5.3.1 comprob_frecuencia()

Esta función pide al usuario que introduzca una frecuencia de funcionamiento en el programa y comprueba que se encuentra entre los 30 y los 3000 MHz. En el caso de que se inserta una frecuencia errónea, la función vuelve a preguntar por una nueva frecuencia hasta que se introduzca una que sea correcta.

5.3.2 comprob_distancia()

En dicha función se realizan varias operaciones distintas. Por un lado, se solicitan y se validan las latitudes y longitudes del transmisor y del receptor. Las latitudes serán valores entre los -90º y los 90º y las longitudes serán valores entre los -180º y 180º. En caso de introducir valores erróneos, la función pregunta de nueva hasta que los valores correctos son introducidos. Posteriormente a esta operación, está función llama a la función que calcula la distancia de Haversine entre ambos puntos. Si dicha distancia es menor de 0 km o superior a 1000 km, se volverán a solicitar todos los datos.

5.3.3 comprob_tiempo()

La función comprob_tiempo() se encarga de solicitar un porcentaje de tiempo válido para el programa, el cual deberá ser mayor de 1% o inferior al 50%. En caso contrario, se reiterará la solicitud de dicho parámetro.

5.3.4 comprob_progapacion()

Esta función solicita al usuario la información sobre si el trayecto sobre el cual se realiza la simulación es único (si se compone de un único tipo de zonas) o si es mixto (si está compuesto de varios tipos distintos de zonas). En caso de ser de trayecto único, el usuario deberá introducir un valor de 1. Por el contrario, si el trayecto es mixto el valor a introducir será de 2. La función solicitará un valor hasta que se introduzca una de estas dos posibilidades.

5.3.5 comprob_zona()

En dicha función se pide al usuario que introduzca una de las zonas válidas (Zona 1, Zona 2, Zona 3, Zona 4, Zona 5, Zona A, Zona B, Zona C, Zona D). Esta solicitud no acabará hasta que la zona introducida sea una de las anteriormente mencionadas.

5.3.6 comprob_trayecto(zona)

Esta función recibe como parámetro una zona válida. A partir de esta zona, la función da como salida si dicha zona es una zona terrestre o una zona marítima.

5.3.7 calcular_heff(ha)

Dicha función sirve para calcular de forma simulada una altura efectiva, a partir de una altura ha que se le introduce por parámetro.

5.3.8 comprob_h1(d,trayecto,LatTx,LonTx,LatRx,LonRx,h2)

Esta función recibe como parámetros la distancia, el trayecto, las longitudes y longitudes de los puntos transmisor y receptor y la altura h2.

A partir de estos valores de entrada devolverá la altura h1 y los ángulos θ_{tca} y θ_{eff}, siempre que sea posible. Dichos cálculos tendrán en cuenta el tipo de trayecto (terrestre o marítimo), la distancia entre los puntos transmisor y receptor.

Esta función también será la encargada de realiza la llamada a la función elevacion_api.

5.3.9 comprob_h2(trayecto)

Esta función valida la altura h2, tras recibir como parámetro de entrada la variable trayecto.

Si el trayecto es terrestre, la función solicitará un valor para h2 que deberá ser superior a 1 m e inferior a 3000 m. En caso de ser un trayecto marítimo, la función solicitará un valor para h2 que deberá ser superior a 3 m e inferior a 3000 m. Dicha función seguirá ejecutándose, mientras no se introduzca el valor correcto para la altura h2.

5.4 Funciones utilizadas: eleccionhojaexcel.py

Este fichero contiene solo una función llamada elegir_hoja_excel.

5.4.1 elegir_hoja_excel(zona, frecuencia, tiempo)

Esta función recibe como parámetros de entrada la zona, la frecuencia y el porcentaje de tiempo de funcionamiento. A partir de estos parámetros, es capaz de indicar que hoja del Excel 'FS_curves_RRC_04.xls', que contiene los valores de intensidad de campo tabulados por la Oficina de Radiocomunicaciones (BR) , hay que utilizar en nuestro programa.

Esta función utiliza dicho Excel de forma estática, por lo que cualquier cambio en la estructura de dicho documento Excel conllevaría un error en la ejecución de nuestro programa.

5.5 Funciones utilizadas: Correcciones.py

El fichero Correcciones.py contiene aquellas funciones que sirve para calcular diferentes tipos de correcciones sobre el resultado final de intensidad de campo. Mediante estas funciones, el usuario puede ver la diferencia entre el valor obtenido finalmente y los que resultarían de aplicar dichas correcciones.

5.5.1 correc_libre(f,trayecto,thetatca)

Esta función recibe como parámetros de entrada la frecuencia de funcionamiento, el tipo de trayecto y el ángulo θ_{tca}.

En el caso de trayectos terrestres, esta función es capaz de calcular la corrección debida al ángulo libre de obstáculos en el terreno.

5.5.2 correc_altura(d,trayecto,h1,f,h2)

Dicha función recibe como entrada las variables distancia, tipo de trayecto, la altura h1, la frecuencia de funcionamiento y la altura h2.

Los valores de intensidad de campo dados por las tablas tabuladas corresponden a una antena receptora de referencia. Si queremos realizar una corrección sobre esta intensidad calculada utilizaremos esta función.

En ella podremos diferenciar entre trayecto terrestre o marítimo. Incluso dentro de los terrestres podremos hacer una distinción entre zona urbana y zona no urbana. Llegando a una cantidad de detalle máximo en la zona urbana, que permitirá incluso la diferenciación entre zona urbana, zona urbana densa y suburbana.

5.5.3 correc_transmisor(f,ha)

Esta función recibe únicamente como parámetro la frecuencia de funcionamiento. Dicha corrección se aplicará cuando el terminal transmisor se encuentre en un terreno con obstáculos o adyacente al mismo. Esta corrección se aplicará en todos los casos, incluso cuando la antena se halle por encima de la altura del obstáculo.

5.5.4 correc_oblicuo(d,ha,h2)

Esta última función del fichero Correcciones.py recibe como parámetro la distancia entre los puntos transmisor y receptor.

Se utiliza dicha corrección para tener en cuenta la diferencia de altura entre ambas antenas.

5.6 Funciones utilizadas: ApiElevation.py

En este fichero se utilizará la *Api* de *Open-Elevation* [19], además se implementa funciones adicionales que reciben los datos de la Api, obtienen datos nuevos de interés y realizan diversas gráficas asociadas. [20]Las funciones de este fichero son las únicas que pertenecen a un tercero y no han sido elaboradas por el autor de este proyecto.

5.6.1 inicializacion_api(LatTx,LonTx,LatRx,LonRx)

Esta función recibe como parámetros de entrada las latitudes y longitudes de los puntos transmisor y receptor. A partir de estos datos, es capaz de generar (mediante una llamada a la función que calcula la distancia de Haversine) tres listas del mismo tamaño que contienen las latitudes y longitudes de los puntos intermedios entre el transmisor y el receptor y la distancia de esos puntos al transmisor.

5.6.2 llamada_api(lat_list,lon_list)

A esta función se le pasa como variables de entrada las listas de latitudes y longitudes obtenidas en la función inicializacióon_api. Posteriormente, con esta información construye un objeto *JSON* que será el que se le pasará la API *de Open-Elevation*. Dicha Api devolverá otro *JSON* de resultados con la elevación de cada uno de los puntos formados por dichas latitudes y longitudes. Tras esto, se transformará esta información en una lista de alturas, de forma que sea más sencillo trabajar en Python con dicha información.

5.6.3 resultados_api(elev_list,d_list_rev,ha,h2)

La función resultados_api recibe la lista de alturas obtenidas mediante llamada_api, la lista de distancias al transmisor desde los puntos intermedios entre transmisor y receptor y las alturas ha y h2.

Básicamente se encarga de obtener nuevos datos, a partir de dicha información. Entre estas nuevas variables se encuentran la altura mínima, máxima y media del terreno, la altura heff, la altura hb y los ángulos θ_{tca} y θ_{eff}.

5.6.4 grafica_api(d_list_rev,elev_list,distance,mean_elev,min_elev,max_elev,mean_elev_hb,hb,mean_elev_heff,heff)

En esta función utilizaremos todos los datos obtenidos anteriormente para dibujar gráficamente por pantalla los valores obtenidos y que podamos tener una idea visual de la información conseguida.

5.6.5 elevacion_api(LatTx,LonTx,LatRx,LonRx,ha,h2)

Esta función es la encarga de administrar el correcto funcionamiento del fichero ApiElevation.py. Es llamada desde la función comprob_h1 en Comprobaciones.py. Ella llama de forma consecutiva a inicializacion_api, llamada_api, resultados_api y grafica_api y devuelve otros valores que serán utilizados en otros lugares de nuestro programa.

5.7 Open-Elevation

Open-Elevation es una alternativa gratuita y de libre acceso a otras *APIs* como *Google Elevation.* La aplicación utiliza el conjunto de datos de la Misión Topográfica *Shuttle Radar* (SRTM).

SRTM es un proyecto internacional cuyo objetivo es conseguir un modelo digital de elevación del planeta Tierra entre las latitudes de 56º S a 60º N. Las áreas sin datos se han resuelto con el uso de datos provenientes de otras fuentes o mediante interpolación de datos vecinos. La *API* provee este perfil de elevación como pares de longitud/latitud en formatos JSON y XML, aunque en nuestro proyecto hemos utilizado el formato JSON.

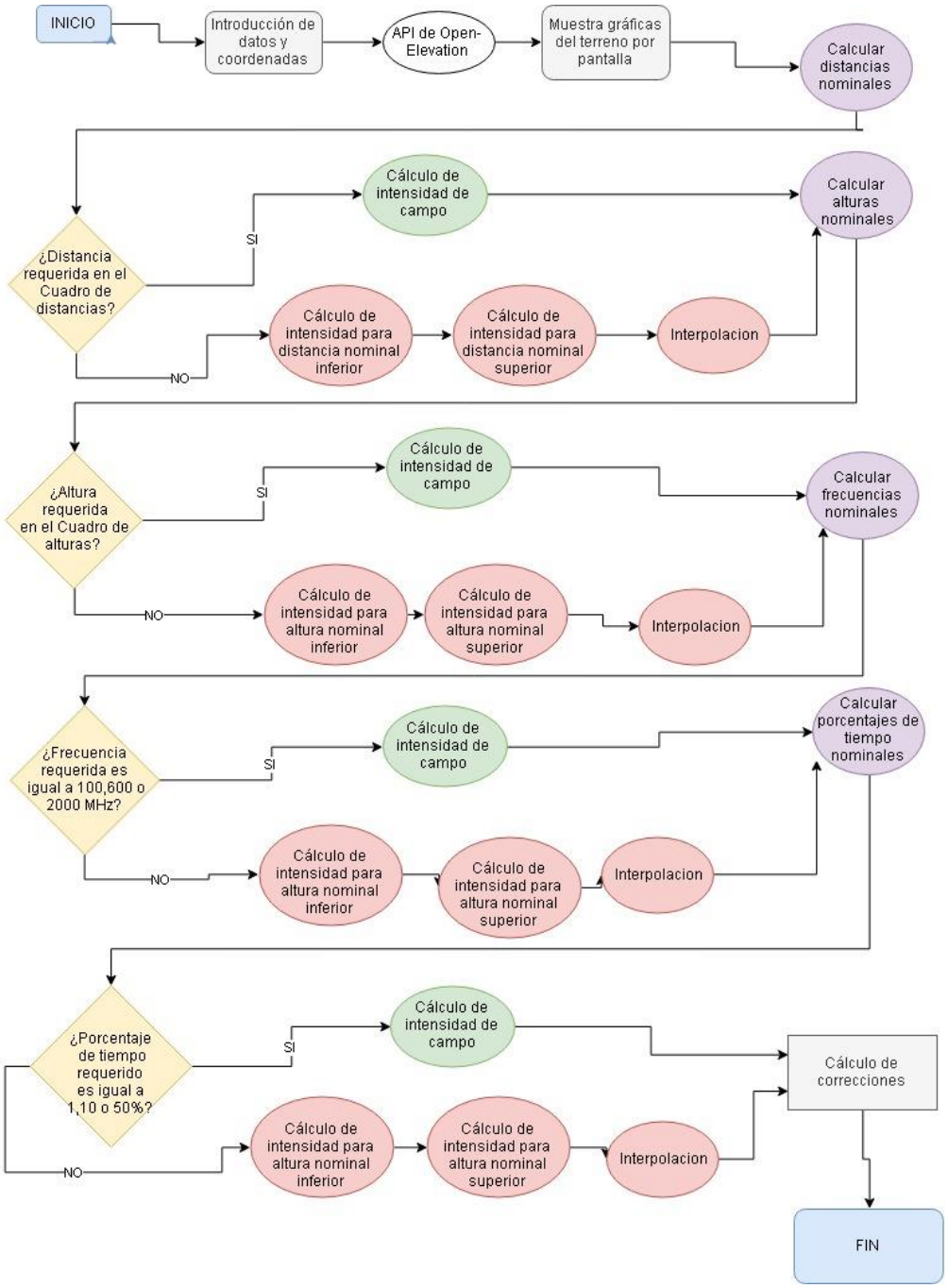


Figura 5-1. Diagrama de flujo básico del programa

6 COMPARACIÓN DE RESULTADOS

La formulación de un problema es más importante que su solución.

- Albert Einstein -

Tras terminar la elaboración del código de nuestro programa, se han realizado diferentes pruebas con el fin de comprobar su correcto funcionamiento frente a diferentes situaciones. El fin último de este apartado es verificar que no existen anomalías en nuestra aplicación, que puede utilizarse con facilidad y que los resultados obtenidos son coherentes. Se han elegido ubicaciones aleatorias por toda la superficie del planeta, intentando que sean lo más variadas posibles.

6.1 Caso 1

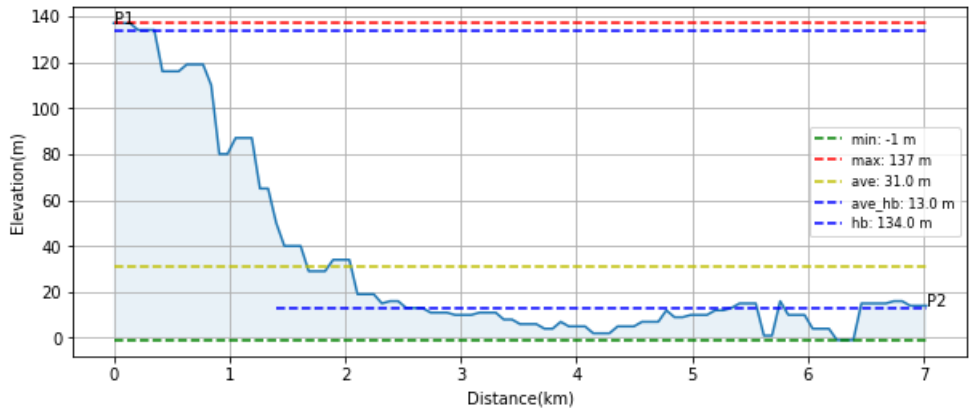
En este primer caso, hemos utilizado la misma localización del ejemplo resuelto analíticamente.

```
Simulador en Python
Métodos de predicción de punto a zona para servicios terrenales
en la gama de frecuencias de 30 a 3000 MHz
Introduzca los datos de entrada del simulador:

Frecuencia de funcionamiento en MHz: 120

Latitud geografica de la antena transmisora: 37.41

Longitud geografica de la antena transmisora: -6.06

Latitud geografica de la antena receptora: 37.38

Longitud geografica de la antena receptora:-5.99

Porcentaje de tiempo: 45

Trayecto unico(1) o mixto(2) : 1

Tipo de zona (Zone 1-5 o Zone A-D): Zone 1
La frecuencia de funcionamiento elegida es 120.0 Mhz
La distancia calculada es 7.02623116876 km
El porcentaje de tiempo elegido es 45.0 %
La Zone 1 es de tipo Terrestre

Altura de la antena receptora sobre el suelo: 10
Distancia menor de 15 km
Info Terreno Disponible

Altura de la antena transmisora sobre el suelo : 10
```

Figura 6-1. Parámetros del caso 1

Figura 6-2.Enlace del caso 1 en Google Maps

El perfil de nuestro caso lo podemos observar en la siguiente gráfica:



La altura calculada de la antena transmisora es de 134.0 metros

Figura 6-3. Perfil de elevación del caso 1

```
RESULTADOS FINALES
La intensidad de campo calculada es 77.3755199415 dB uV/m
El angulo de despejamiento thetatca es 1.5086972374 º
La intensidad de campo corregida para el angulo de despejamiento en la antena receptora
es 82.3506426715 dB uV/m
El angulo de despejamiento thetaeff es 0 º
La intensidad de campo corregida debido a la dispersión troposférica es 82.3506426715
dB uV/m

Tipo de zona (Urbana o No urbana): Urbana

Tipo de zona (Urbana o Urbana Densa o Suburbana): Urbana
La intensidad de campo corregida debido a la altura de la antena receptora es
81.2257009475 dB uV/m
La intensidad de campo corregida debido a obstaculos en de la antena transmisora es
80.3762989937 dB uV/m
La intensidad de campo corregida debido al trayecto oblicuo es 80.3731849057 dB uV/m
FIN DEL PROGRAMA
```

Figura 6-4. Resultados finales del caso 1

Tras la ejecución del código se verifica que con los datos introducidos y con el perfil del terreno obtenido a través de la *API* de *Open-Elevation* los resultados conseguidos son similares a los alcanzados mediante la resolución analítica de dicho caso de estudio.

Además, cabe resaltar que a medida que se van realizando las correcciones pertinentes a la intensad de campo calculada, esta se va incrementando para hacer frente a todas las adversidades tanto climáticas como geográficas a las que se va encontrando. No obstante, como se observa claramente en el perfil del terreno, la geografía del terreno no es especialmente desfavorable, por lo que no es necesario aumentar en gran medida esta intensidad de campo para obtener los mismos resultados.

6.2 Caso 2

En este caso, hemos elegido una zona marítima para mostrar un caso completamente diferente.

```
Simulador en Python
Métodos de predicción de punto a zona para servicios terrenales
en la gama de frecuencias de 30 a 3000 MHz
Introduzca los datos de entrada del simulador:

Frecuencia de funcionamiento en MHz: 1500

Latitud geografica de la antena transmisora: -22.19

Longitud geografica de la antena transmisora: 48.13

Latitud geografica de la antena receptora: -23.52

Longitud geografica de la antena receptora:47.82

Porcentaje de tiempo: 20

Trayecto unico(1) o mixto(2) : 1

Tipo de zona (Zone 1-5 o Zone A-D): Zone 4
La frecuencia de funcionamiento elegida es 1500.0 Mhz
La distancia calculada es 151.261773954 km
El porcentaje de tiempo elegido es 20.0 %
La Zone 4 es de tipo Maritimo

Altura de la antena receptora sobre el suelo: 100
Trayecto Maritimo
```

Figura 6-5. Parámetros del caso 2

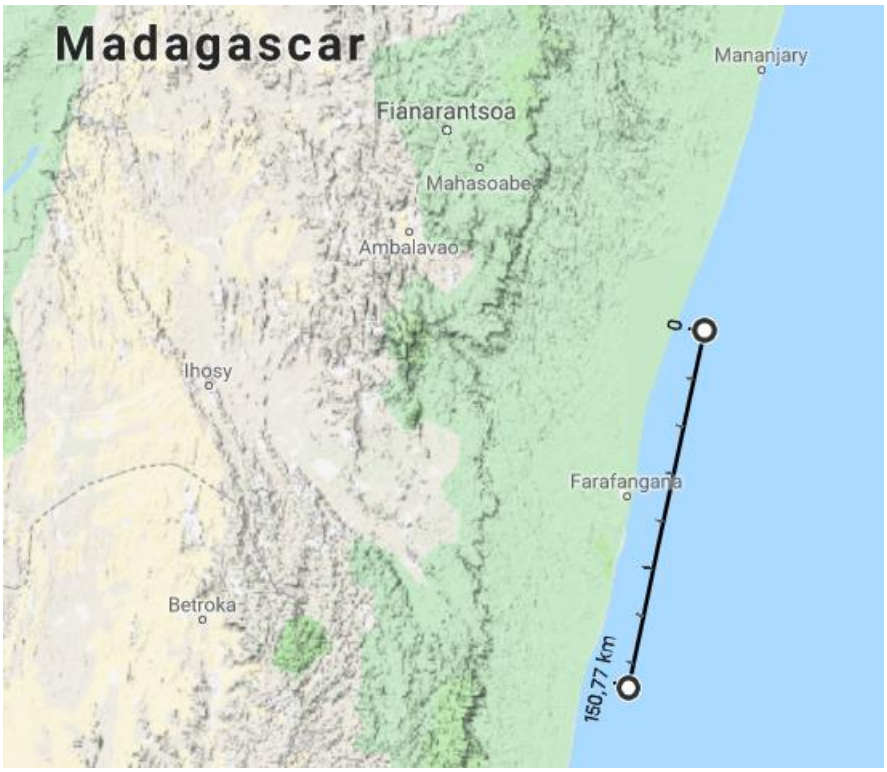


Figura 6-6. Enlace del caso 2 en Google Maps

```
RESULTADOS FINALES
La intensidad de campo calculada es 31.0773974027 dB uV/m
La intensidad de campo corregida para el angulo de despejamiento en la antena receptora
es 31.0773974027 dB uV/m
El angulo de despejamiento thetaeff es 0.0 º
La intensidad de campo corregida debido a la dispersión troposférica es 31.0773974027
dB uV/m
La intensidad de campo corregida debido a la altura de la antena receptora es
31.0773974027 dB uV/m
La intensidad de campo corregida debido a obstaculos en de la antena transmisora es
8.47212277107 dB uV/m
La intensidad de campo corregida debido al trayecto oblicuo es 8.47212167842 dB uV/m
FIN DEL PROGRAMA
```

Figura 6-7. Resultados finales del caso 2

En este caso, al haber elegido una situación marítima, no tiene mucho sentido presentar el perfil del terreno, puesto que todo aparecería al mismo nivel del mar. Se observa claramente en los resultados que la intensidad de campo necesaria disminuye en gran medida. Esto se debe tanto a la geografía del terreno, como a los requerimientos pedidos para este caso, en el que se ha pedido que el porcentaje de tiempo sea inferior que en el caso anterior.

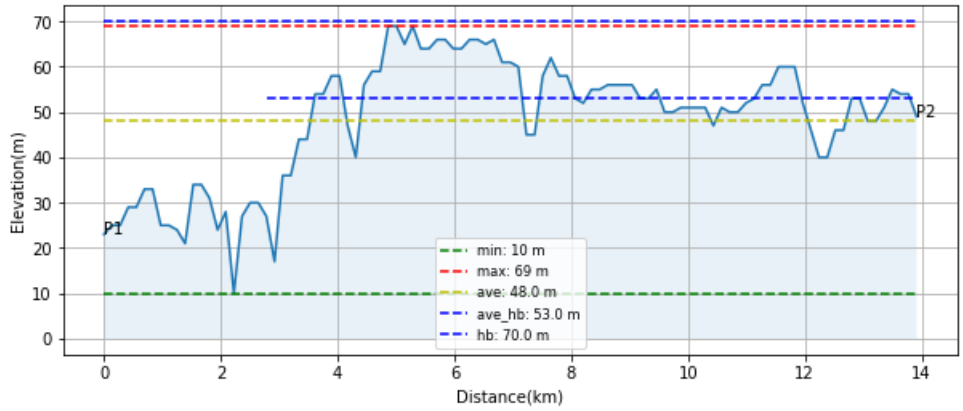
Hay que resaltar lo influyente que resulta en este caso la ausencia de obstáculos; la corrección que se realiza por este motivo disminuye en más de 20 dB el valor de la intensidad de campo.

6.3 Caso 3

```
Simulador en Python
Métodos de predicción de punto a zona para servicios terrenales
en la gama de frecuencias de 30 a 3000 MHz
Introduzca los datos de entrada del simulador:

Frecuencia de funcionamiento en MHz: 800

Latitud geografica de la antena transmisora: 3.56

Longitud geografica de la antena transmisora: 10.03

Latitud geografica de la antena receptora: 3.50

Longitud geografica de la antena receptora:9.92

Porcentaje de tiempo: 35

Trayecto unico(1) o mixto(2) : 1

Tipo de zona (Zone 1-5 o Zone A-D): Zone 3
La frecuencia de funcionamiento elegida es 800.0 Mhz
La distancia calculada es 13.912315203 km
El porcentaje de tiempo elegido es 35.0 %
La Zone 3 es de tipo Terrestre

Altura de la antena receptora sobre el suelo: 15
Distancia menor de 15 km
Info Terreno Disponible
```

Figura 6-8. Parámetros del caso 3

Figura 6-9. Enlace del caso 3 en Google Maps




```
La altura calculada de la antena transmisora es de 70.0 metros
```

Figura 6-10. Perfil de elevación del caso 3

```
RESULTADOS FINALES
La intensidad de campo calculada es 59.7743370002 dB uV/m
El angulo de despejamiento thetatca es 0.55 º
La intensidad de campo corregida para el angulo de despejamiento en la antena receptora
es 59.7290176592 dB uV/m
El angulo de despejamiento thetaeff es -0.202548443793 º
La intensidad de campo corregida debido a la dispersión troposférica es 59.7290176592
dB uV/m

Tipo de zona (Urbana o No urbana): No urbana
La intensidad de campo corregida debido a la altura de la antena receptora es
77.8308422694 dB uV/m
La intensidad de campo corregida debido a obstaculos en de la antena transmisora es
60.8880839527 dB uV/m
La intensidad de campo corregida debido al trayecto oblicuo es 60.8879276656 dB uV/m
FIN DEL PROGRAMA
```

Figura 6-11. Resultados finales del caso 3

En este último caso de estudio, volvemos a utilizar una ubicación terrestre para nuestro estudio. Vuelve a observarse un aumento en la intensidad de campo calculada. Es destacable que los valores de intensidad de campo se asemejan a los encontrados en el Caso 1; aún a pesar de presentar a simple vista un terreno más accidentado, dichos obstáculos no son lo suficientemente importantes como para afectar a nuestra señal de radiocomunicaciones. Por otro lado, la disminución de la distancia entre el receptor y el emisor y el encontrarnos en un entorno no urbano, favorece la transmisión de nuestra señal.

7 CONCLUSIONES

Durante el largo y duro proceso que ha conllevado la realización de este Proyecto de Fin de Grado, he conseguido varios objetivos. Entre ellos obviamente se encuentran todos los objetivos técnicos y teóricos que son necesarios para elaborarlo, pero además he conseguido aunar en él varias ramas del Grado en Ingeniería de Telecomunicaciones, como son Señales y Telemática, lo cual es una de las metas que me fije en su comienzo. He mejorado de forma muy notable mis conocimientos del lenguaje de programación Python y he reforzado ciertas nociones básicas de radiodifusión.

Me gustaría recalcar en estas conclusiones, la ilusión que despierta en mí la idea de que este simulador junto a otros que ya se han elaborado y se seguirán desarrollando, permita en un futuro crear una herramienta de acceso libre para todos aquellos con interés en las Telecomunicaciones. Ojalá algún estudiante pueda beneficiarse de ello en sus primeros encuentros con las señales electromagnéticas. Además, sería de gran valor poder incluir una interfaz de usuario gráfica que endulzará el uso de este simulador y confío en que se llevará a cabo con éxito.

Tres han sido los principales problemas que he encontrado en mi camino. La ausencia de material de libre acceso primordial para este simulador, como es el mapa mundial digitalizado de la ITU, la *API Open-Elevation* y la falta de tiempo para realizarlo. El primero de estos problemas, fue posible solucionarlo haciendo que el usuario de este simulador tuviera que elegir manualmente ciertos parámetros que espero que en el futuro puedan ser añadidos automáticamente por futuras versiones de este programa. El segundo, la API utilizada conllevo muchas semanas de trabajo. Otros simuladores anteriores habían utilizado *Google Maps* pero durante la realización de este proyecto, se convirtió en una herramienta de pago y no pudo ser utilizada. La *API* de *Open-Elevation* es lenta y, en ciertas ocasiones, falla y no da los resultados esperados, por lo que se podría implementar en el futuro una API propia para no tener recurrir a software de terceros. El tercero, aunque parezca mentira, ha resultado el más difícil de los obstáculos que he vencido y me permite cerrar esta etapa con aquello que siempre ha requerido esta carrera: Esfuerzo.

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ANEXO I

100 MHz – Zone 1 – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	89,976	92,181	94,636	97,385	100,318	103,120	105,243	106,357	106,900
	2	80,275	83,091	86,001	89,208	92,674	96,120	98,858	100,285	100,879
	3	74,166	77,530	80,823	84,350	88,143	91,969	95,096	96,731	97,358
	4	69,518	73,355	77,015	80,831	84,885	88,993	92,412	94,208	94,859
	5	65,699	69,921	73,925	78,021	82,314	86,660	90,320	92,250	92,921
	6	62,436	66,958	71,272	75,641	80,163	84,727	88,600	90,649	91,337
	7	59,580	64,332	68,916	73,542	78,292	83,063	87,135	89,294	89,998
	8	57,041	61,967	66,778	71,642	76,613	81,589	85,853	88,119	88,838
	9	54,756	59,814	64,813	69,890	75,073	80,252	84,707	87,080	87,815
	10	52,680	57,838	62,990	68,255	73,638	79,018	83,666	86,148	86,900
	11	50,778	56,013	61,289	66,716	72,284	77,859	82,704	85,301	86,072
	12	49,026	54,318	59,694	65,259	70,996	76,760	81,805	84,525	85,316
	13	47,401	52,739	58,195	63,876	69,763	75,706	80,954	83,807	84,621
	14	45,887	51,260	56,782	62,559	68,578	74,690	80,141	83,136	83,977
	15	44,472	49,870	55,445	61,303	67,437	73,703	79,358	82,506	83,378
	16	43,142	48,561	54,178	60,104	66,336	72,744	78,597	81,910	82,818
	17	41,890	47,324	52,975	58,956	65,273	71,808	77,855	81,343	82,291
	18	40,707	46,152	51,829	57,856	64,245	70,894	77,126	80,801	81,795
	19	39,587	45,039	50,738	56,801	63,252	70,001	76,410	80,279	81,325
	20	38,524	43,981	49,695	55,789	62,291	69,129	75,703	79,774	80,879
	25	33,907	39,353	45,097	51,268	57,923	65,057	72,290	77,430	78,941
	30	30,181	35,575	41,290	47,459	54,161	61,436	69,082	75,247	77,358
	35	27,102	32,409	38,053	44,171	50,859	58,194	66,099	73,138	76,019
	40	24,518	29,704	35,239	41,268	47,902	55,251	63,332	71,082	74,859
	45	22,324	27,356	32,748	38,653	45,199	52,533	60,747	69,083	73,836
	50	20,446	25,292	30,508	36,256	42,685	49,978	58,301	67,139	72,921
	55	18,824	23,456	28,468	34,030	40,314	47,543	55,958	65,243	72,093
	60	17,414	21,808	26,591	31,942	38,055	45,196	53,684	63,382	71,337
	65	16,178	20,316	24,851	29,972	35,891	42,920	51,458	61,540	70,642
	70	15,085	18,958	23,232	28,106	33,813	40,704	49,267	59,705	69,998
	75	14,110	17,713	21,721	26,340	31,820	38,550	47,106	57,866	69,399
	80	13,233	16,567	20,309	24,670	29,913	36,461	44,974	56,017	68,838
	85	12,436	15,509	18,990	23,095	28,095	34,444	42,877	54,155	68,312
	90	11,704	14,527	17,757	21,612	26,370	32,504	40,823	52,283	67,815
	95	11,025	13,612	16,604	20,219	24,739	30,650	38,820	50,403	67,346
	100	10,389	12,755	15,524	18,913	23,201	28,884	36,877	48,523	66,900
	110	9,211	11,189	13,560	16,539	20,397	25,625	33,195	44,791	66,072
	120	8,121	9,775	11,814	14,444	17,923	22,720	29,817	41,153	65,316
	130	7,082	8,472	10,237	12,578	15,733	20,139	26,751	37,666	64,621
	140	6,070	7,246	8,790	10,892	13,775	17,837	23,982	34,370	63,977
	150	5,072	6,075	7,438	9,346	12,002	15,769	21,481	31,288	63,378
	160	4,076	4,939	6,157	7,907	10,376	13,890	19,214	28,427	62,818
	170	3,079	3,828	4,927	6,548	8,862	12,164	17,146	25,779	62,291
	180	2,077	2,732	3,736	5,251	7,437	10,561	15,244	23,330	61,795
	190	1,070	1,648	2,572	4,001	6,082	9,055	13,482	21,064	61,325
	200	0,058	0,572	1,431	2,788	4,781	7,629	11,834	18,959	60,879
	225	-2,486	-2,089	-1,349	-0,123	1,709	4,322	8,101	14,287	59,856
	250	-5,026	-4,708	-4,045	-2,904	-1,177	1,279	4,767	10,263	58,941
	275	-7,539	-7,273	-6,662	-5,578	-3,922	-1,572	1,713	6,706	58,113
	300	-10,003	-9,775	-9,199	-8,154	-6,548	-4,273	-1,130	3,496	57,358
	325	-12,407	-12,205	-11,654	-10,638	-9,066	-6,844	-3,805	0,549	56,662
	350	-14,743	-14,561	-14,029	-13,032	-11,486	-9,303	-6,340	-2,189	56,019
	375	-17,013	-16,844	-16,326	-15,344	-13,817	-11,663	-8,757	-4,759	55,419
	400	-19,217	-19,060	-18,552	-17,582	-16,069	-13,937	-11,075	-7,195	54,859
	425	-21,365	-21,215	-20,715	-19,754	-18,252	-16,137	-13,308	-9,521	54,332
	450	-23,462	-23,319	-22,825	-21,871	-20,378	-18,276	-15,474	-11,758	53,836
	475	-25,520	-25,382	-24,893	-23,944	-22,458	-20,366	-17,585	-13,927	53,366
	500	-27,547	-27,413	-26,928	-25,983	-24,503	-22,420	-19,655	-16,044	52,921
	525	-29,554	-29,424	-28,942	-28,000	-26,524	-24,448	-21,697	-18,124	52,497
	550	-31,551	-31,423	-30,944	-30,005	-28,533	-26,462	-23,722	-20,180	52,093
	575	-33,546	-33,420	-32,943	-32,007	-30,538	-28,471	-25,741	-22,224	51,707
	600	-35,548	-35,424	-34,948	-34,014	-32,547	-30,485	-27,762	-24,267	51,337
	625	-37,564	-37,441	-36,967	-36,034	-34,569	-32,510	-29,794	-26,317	50,982
	650	-39,598	-39,477	-39,004	-38,072	-36,610	-34,553	-31,842	-28,380	50,642
	675	-41,655	-41,535	-41,063	-40,133	-38,672	-36,618	-33,911	-30,463	50,314
	700	-43,738	-43,618	-43,147	-42,218	-40,758	-38,706	-36,004	-32,566	49,998
	725	-45,846	-45,727	-45,257	-44,329	-42,870	-40,819	-38,120	-34,692	49,693
	750	-47,977	-47,859	-47,390	-46,462	-45,004	-42,955	-40,259	-36,839	49,399
	775	-50,129	-50,011	-49,542	-48,615	-47,158	-45,111	-42,417	-39,004	49,114
	800	-52,294	-52,177	-51,709	-50,782	-49,326	-47,279	-44,588	-41,182	48,838
	825	-54,466	-54,349	-53,881	-52,956	-51,500	-49,454	-46,765	-43,364	48,571
	850	-56,634	-56,518	-56,050	-55,125	-53,670	-51,625	-48,937	-45,541	48,312
	875	-58,789	-58,672	-58,205	-57,280	-55,825	-53,782	-51,095	-47,704	48,060
	900	-60,916	-60,800	-60,333	-59,409	-57,954	-55,911	-53,226	-49,838	47,815
	925	-63,004	-62,888	-62,421	-61,497	-60,043	-58,000	-55,317	-51,932	47,577
	950	-65,038	-64,922	-64,456	-63,532	-62,078	-60,036	-57,354	-53,972	47,346
	975	-67,005	-66,890	-66,424	-65,500	-64,047	-62,005	-59,323	-55,945	47,120
	1000	-68,893	-68,778	-68,312	-67,389	-65,936	-63,895	-61,214	-57,837	46,900

100 MHz – Zone 1 – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	89,976	92,181	94,636	97,385	100,318	103,120	105,243	106,357	106,900
	2	80,275	83,091	86,001	89,208	92,674	96,120	98,858	100,285	100,879
	3	74,166	77,530	80,823	84,350	88,143	91,969	95,096	96,731	97,358
	4	69,518	73,355	77,015	80,831	84,885	88,993	92,412	94,208	94,859
	5	65,699	69,921	73,925	78,021	82,314	86,660	90,320	92,250	92,921
	6	62,436	66,958	71,272	75,641	80,163	84,727	88,600	90,649	91,337
	7	59,580	64,332	68,916	73,542	78,292	83,063	87,135	89,294	89,998
	8	57,041	61,967	66,778	71,642	76,613	81,589	85,853	88,119	88,838
	9	54,756	59,814	64,813	69,890	75,073	80,252	84,707	87,080	87,815
	10	52,680	57,838	62,990	68,255	73,638	79,018	83,666	86,148	86,900
	11	50,778	56,013	61,289	66,716	72,284	77,859	82,704	85,301	86,072
	12	49,180	54,364	59,746	65,286	70,996	76,760	81,805	84,525	85,316
	13	47,759	52,947	58,367	63,988	69,789	75,706	80,954	83,807	84,621
	14	46,447	51,630	57,074	62,759	68,664	74,690	80,141	83,136	83,977
	15	45,231	50,401	55,857	61,591	67,584	73,727	79,358	82,506	83,378
	16	44,100	49,251	54,708	60,477	66,544	72,807	78,597	81,910	82,818
	17	43,044	48,170	53,621	59,412	65,541	71,912	77,861	81,343	82,291
	18	42,057	47,152	52,589	58,393	64,569	71,038	77,159	80,801	81,795
	19	41,130	46,191	51,608	57,415	63,628	70,183	76,469	80,289	81,325
	20	40,259	45,283	50,674	56,475	62,715	69,345	75,791	79,796	80,879
	25	36,594	41,383	46,584	52,272	58,520	65,373	72,496	77,546	78,941
	30	33,803	38,310	43,255	48,733	54,852	61,735	69,304	75,494	77,358
	35	31,635	35,836	40,493	45,712	51,624	58,418	66,224	73,502	76,019
	40	29,923	33,812	38,169	43,107	48,774	55,405	63,332	71,501	74,859
	45	28,551	32,133	36,192	40,844	46,248	52,676	60,747	69,469	73,836
	50	27,432	30,721	34,494	38,865	44,002	50,206	58,301	67,414	72,921
	55	26,500	29,516	33,018	37,122	41,999	47,967	55,958	65,360	72,093
	60	25,707	28,470	31,722	35,575	40,203	45,934	53,684	63,382	71,337
	65	25,015	27,547	30,570	34,191	38,584	44,083	51,458	61,540	70,642
	70	24,394	26,718	29,533	32,941	37,115	42,390	49,441	59,705	69,998
	75	23,823	25,960	28,587	31,800	35,773	40,835	47,670	57,866	69,399
	80	23,285	25,255	27,712	30,749	34,537	39,398	46,017	56,017	68,838
	85	22,768	24,588	26,892	29,771	33,389	38,062	44,469	54,155	68,312
	90	22,263	23,949	26,116	28,851	32,314	36,812	43,014	52,391	67,815
	95	21,762	23,329	25,373	27,978	31,300	35,637	41,641	50,805	67,346
	100	21,262	22,721	24,655	27,142	30,337	34,524	40,340	49,282	66,900
	110	20,249	21,527	23,270	25,555	28,527	32,450	37,919	46,410	66,072
	120	19,211	20,340	21,927	24,046	26,834	30,533	35,696	43,745	65,316
	130	18,142	19,149	20,605	22,587	25,222	28,732	33,627	41,260	64,621
	140	17,044	17,947	19,295	21,162	23,668	27,019	31,680	38,929	63,977
	150	15,919	16,734	17,991	19,762	22,160	25,375	29,834	36,732	63,378
	160	14,773	15,513	16,691	18,381	20,689	23,788	28,070	34,653	62,818
	170	13,611	14,286	15,398	17,019	19,249	22,249	26,378	32,677	62,291
	180	12,437	13,057	14,112	15,674	17,838	20,752	24,748	30,792	61,795
	190	11,259	11,831	12,836	14,347	16,455	19,295	23,174	28,991	61,325
	200	10,079	10,609	11,572	13,040	15,098	17,874	21,651	27,264	60,879
	225	7,150	7,599	8,478	9,861	11,822	14,470	18,041	23,232	59,856
	250	4,285	4,676	5,496	6,817	8,708	11,263	14,680	19,550	58,941
	275	1,511	1,861	2,637	3,912	5,751	8,236	11,537	16,156	58,113
	300	-1,162	-0,844	-0,101	1,140	2,939	5,370	8,581	13,004	57,358
	325	-3,736	-3,442	-2,724	-1,510	0,258	2,647	5,787	10,054	56,662
	350	-6,218	-5,944	-5,246	-4,053	-2,310	0,046	3,130	7,271	56,019
	375	-8,622	-8,363	-7,681	-6,505	-4,782	-2,452	0,586	4,624	55,419
	400	-10,961	-10,714	-10,045	-8,882	-7,175	-4,868	-1,867	2,086	54,859
	425	-13,249	-13,012	-12,353	-11,202	-9,509	-7,220	-4,250	-0,367	54,332
	450	-15,500	-15,271	-14,622	-13,480	-11,798	-9,524	-6,580	-2,757	53,836
	475	-17,726	-17,505	-16,863	-15,729	-14,056	-11,795	-8,873	-5,101	53,366
	500	-19,941	-19,726	-19,090	-17,963	-16,298	-14,048	-11,144	-7,415	52,921
	525	-22,152	-21,942	-21,312	-20,191	-18,533	-16,292	-13,404	-9,712	52,497
	550	-24,369	-24,164	-23,538	-22,422	-20,769	-18,537	-15,663	-12,003	52,093
	575	-26,597	-26,396	-25,774	-24,662	-23,015	-20,789	-17,927	-14,295	51,707
	600	-28,840	-28,642	-28,024	-26,916	-25,273	-23,053	-20,202	-16,595	51,337
	625	-31,100	-30,905	-30,290	-29,185	-27,546	-25,332	-22,490	-18,904	50,982
	650	-33,377	-33,185	-32,572	-31,471	-29,835	-27,626	-24,792	-21,225	50,642
	675	-35,669	-35,479	-34,869	-33,770	-32,137	-29,932	-27,106	-23,555	50,314
	700	-37,971	-37,783	-37,175	-36,078	-34,448	-32,247	-29,427	-25,892	49,998
	725	-40,277	-40,091	-39,485	-38,390	-36,763	-34,565	-31,751	-28,229	49,693
	750	-42,580	-42,395	-41,791	-40,698	-39,073	-36,878	-34,069	-30,560	49,399
	775	-44,870	-44,687	-44,084	-42,993	-41,370	-39,178	-36,374	-32,875	49,114
	800	-47,137	-46,956	-46,355	-45,265	-43,644	-41,454	-38,654	-35,166	48,838
	825	-49,371	-49,191	-48,591	-47,503	-45,883	-43,695	-40,899	-37,420	48,571
	850	-51,560	-51,380	-50,782	-49,695	-48,077	-45,891	-43,098	-39,628	48,312
	875	-53,691	-53,513	-52,915	-51,829	-50,212	-48,029	-45,239	-41,776	48,060
	900	-55,754	-55,577	-54,980	-53,895	-52,280	-50,097	-47,311	-43,855	47,815
	925	-57,738	-57,561	-56,965	-55,882	-54,267	-52,087	-49,303	-45,853	47,577
	950	-59,632	-59,457	-58,862	-57,779	-56,165	-53,986	-51,205	-47,761	47,346
	975	-61,430	-61,255	-60,660	-59,578	-57,966	-55,788	-53,009	-49,570	47,120
	1000	-63,123	-62,948	-62,355	-61,274	-59,662	-57,485	-54,709	-51,275	46,900

100 MHz – Zone 1 – 1%

Transmitting / base antenna height (m)	Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
	1	89,976	92,181	94,636	97,385	100,318	103,120	105,243	106,357	106,900
	2	80,275	83,091	86,080	89,407	92,913	96,331	98,981	100,326	100,879
	3	74,166	77,530	80,898	84,623	88,495	92,298	95,296	96,797	97,358
	4	69,518	73,355	77,049	81,110	85,279	89,384	92,660	94,289	94,859
	5	65,699	69,921	73,942	78,287	82,714	87,077	90,596	92,340	92,921
	6	62,436	66,958	71,318	75,901	80,555	85,147	88,888	90,743	91,337
	7	59,648	64,332	69,040	73,818	78,672	83,473	87,424	89,390	89,998
	8	57,462	62,166	67,024	71,961	76,990	81,983	86,135	88,212	88,838
	9	55,541	60,276	65,216	70,280	75,462	80,630	84,977	87,170	87,815
	10	53,831	58,580	63,577	68,742	74,055	79,383	83,920	86,232	86,900
	11	52,292	57,043	62,078	67,322	72,747	78,221	82,942	85,380	86,072
	12	50,898	55,641	60,699	66,002	71,522	77,128	82,029	84,597	85,316
	13	49,627	54,353	59,421	64,768	70,367	76,093	81,168	83,871	84,621
	14	48,461	53,165	58,232	63,609	69,273	75,106	80,350	83,195	83,977
	15	47,388	52,062	57,120	62,516	68,232	74,161	79,568	82,560	83,378
	16	46,396	51,037	56,077	61,482	67,238	73,252	78,817	81,962	82,818
	17	45,476	50,078	55,096	60,500	66,286	72,376	78,093	81,394	82,291
	18	44,620	49,181	54,169	59,565	65,373	71,528	77,391	80,854	81,795
	19	43,824	48,338	53,292	58,674	64,494	70,706	76,708	80,339	81,325
	20	43,080	47,545	52,461	57,821	63,646	69,907	76,042	79,844	80,879
	25	40,004	44,183	48,853	54,039	59,802	66,201	72,907	77,620	78,941
	30	37,729	41,577	45,946	50,878	56,472	62,874	69,995	75,675	77,358
	35	36,004	39,504	43,545	48,183	53,544	59,850	67,239	73,887	76,019
	40	34,667	37,822	41,534	45,863	50,957	57,096	64,619	72,176	74,859
	45	33,609	36,437	39,833	43,857	48,669	54,596	62,136	70,489	73,836
	50	32,751	35,278	38,381	42,117	46,649	52,335	59,801	68,796	72,921
	55	32,037	34,294	37,133	40,602	44,866	50,299	57,618	67,087	72,093
	60	31,426	33,444	36,047	39,275	43,290	48,468	55,592	65,366	71,337
	65	30,888	32,695	35,092	38,106	41,892	46,823	53,718	63,647	70,642
	70	30,399	32,023	34,240	37,065	40,643	45,341	51,990	61,947	69,998
	75	29,944	31,408	33,470	36,128	39,521	44,000	50,396	60,281	69,399
	80	29,509	30,836	32,762	35,274	38,503	42,780	48,925	58,662	68,838
	85	29,085	30,294	32,103	34,488	37,570	41,663	47,565	57,098	68,312
	90	28,666	29,773	31,482	33,755	36,706	40,633	46,302	55,595	67,815
	95	28,247	29,267	30,888	33,063	35,899	39,675	45,125	54,155	67,346
	100	27,826	28,770	30,315	32,404	35,138	38,778	44,023	52,777	66,900
	110	26,967	27,790	29,209	31,156	33,719	37,126	42,005	50,201	66,072
	120	26,083	26,814	28,135	29,970	32,396	35,615	40,184	47,843	65,316
	130	25,173	25,831	27,073	28,818	31,137	34,202	38,509	45,674	64,621
	140	24,238	24,838	26,015	27,688	29,918	32,858	36,945	43,666	63,977
	150	23,282	23,834	24,955	26,569	28,727	31,564	35,467	41,794	63,378
	160	22,307	22,818	23,893	25,457	27,556	30,307	34,055	40,036	62,818
	170	21,316	21,793	22,828	24,351	26,401	29,080	32,697	38,374	62,291
	180	20,312	20,761	21,761	23,249	25,258	27,878	31,383	36,794	61,795
	190	19,299	19,724	20,695	22,153	24,127	26,696	30,106	35,285	61,325
	200	18,279	18,684	19,630	21,063	23,008	25,534	28,861	33,837	60,879
	225	15,719	16,089	16,987	18,372	20,260	22,703	25,871	30,439	59,856
	250	13,173	13,522	14,386	15,738	17,586	19,971	23,026	27,296	58,941
	275	10,667	11,000	11,841	13,170	14,990	17,332	20,304	24,352	58,113
	300	8,211	8,533	9,358	10,669	12,469	14,780	17,690	21,568	57,358
	325	5,809	6,122	6,935	8,234	10,017	12,304	15,167	18,915	56,662
	350	3,457	3,763	4,567	5,856	7,627	9,896	12,722	16,367	56,019
	375	1,150	1,449	2,247	3,528	5,290	7,544	10,341	13,904	55,419
	400	-1,122	-0,827	-0,035	1,240	2,994	5,237	8,010	11,508	54,859
	425	-3,366	-3,076	-2,288	-1,018	0,730	2,963	5,718	9,161	54,332
	450	-5,593	-5,306	-4,521	-3,255	-1,512	0,713	3,452	6,851	53,836
	475	-7,810	-7,526	-6,744	-5,482	-3,743	-1,524	1,202	4,563	53,366
	500	-10,026	-9,744	-8,965	-7,705	-5,970	-3,757	-1,041	2,289	52,921
	525	-12,248	-11,967	-11,190	-9,933	-8,201	-5,992	-3,286	0,018	52,497
	550	-14,480	-14,202	-13,426	-12,171	-10,441	-8,236	-5,538	-2,257	52,093
	575	-16,728	-16,451	-15,677	-14,423	-12,695	-10,494	-7,803	-4,541	51,707
	600	-18,993	-18,717	-17,945	-16,693	-14,967	-12,768	-10,083	-6,838	51,337
	625	-21,278	-21,004	-20,232	-18,981	-17,257	-15,061	-12,381	-9,150	50,982
	650	-23,582	-23,309	-22,538	-21,288	-19,566	-17,372	-14,696	-11,479	50,642
	675	-25,904	-25,631	-24,861	-23,612	-21,891	-19,699	-17,027	-13,821	50,314
	700	-28,239	-27,967	-27,198	-25,950	-24,230	-22,040	-19,371	-16,175	49,998
	725	-30,584	-30,313	-29,545	-28,297	-26,578	-24,389	-21,724	-18,536	49,693
	750	-32,933	-32,662	-31,894	-30,648	-28,929	-26,742	-24,079	-20,899	49,399
	775	-35,277	-35,007	-34,240	-32,994	-31,276	-29,090	-26,430	-23,257	49,114
	800	-37,610	-37,340	-36,573	-35,328	-33,611	-31,426	-28,768	-25,602	48,838
	825	-39,922	-39,652	-38,886	-37,641	-35,925	-33,740	-31,084	-27,924	48,571
	850	-42,203	-41,933	-41,168	-39,923	-38,207	-36,024	-33,370	-30,215	48,312
	875	-44,443	-44,174	-43,409	-42,165	-40,450	-38,267	-35,614	-32,464	48,060
	900	-46,633	-46,365	-45,600	-44,356	-42,641	-40,459	-37,808	-34,662	47,815
	925	-48,763	-48,494	-47,730	-46,486	-44,772	-42,591	-39,941	-36,798	47,577
	950	-50,822	-50,554	-49,790	-48,547	-46,833	-44,652	-42,003	-38,864	47,346
	975	-52,803	-52,535	-51,771	-50,528	-48,815	-46,635	-43,987	-40,851	47,120
	1000	-54,698	-54,430	-53,666	-52,424	-50,710	-48,531	-45,884	-42,751	46,900

100 MHz – Zone 2 – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	89,955	92,163	94,620	97,373	100,310	103,116	105,241	106,356	106,900
	2	80,233	83,055	85,971	89,184	92,658	96,110	98,854	100,283	100,879
	3	74,104	77,477	80,779	84,316	88,118	91,954	95,090	96,729	97,358
	4	69,437	73,285	76,957	80,786	84,853	88,974	92,405	94,206	94,859
	5	65,598	69,835	73,854	77,966	82,274	86,637	90,311	92,247	92,921
	6	62,316	66,856	71,189	75,575	80,117	84,700	88,589	90,646	91,337
	7	59,441	64,215	68,820	73,467	78,238	83,032	87,122	89,291	89,998
	8	56,884	61,835	66,669	71,557	76,552	81,553	85,838	88,115	88,838
	9	54,581	59,666	64,691	69,795	75,006	80,212	84,691	87,076	87,815
	10	52,487	57,674	62,855	68,150	73,564	78,973	83,647	86,143	86,900
	11	50,568	55,834	61,141	66,601	72,202	77,811	82,684	85,297	86,072
	12	48,799	54,125	59,535	65,134	70,906	76,706	81,783	84,520	85,316
	13	47,158	52,530	58,023	63,741	69,665	75,648	80,930	83,801	84,621
	14	45,628	51,037	56,597	62,414	68,473	74,626	80,115	83,130	83,977
	15	44,196	49,633	55,247	61,147	67,324	73,635	79,329	82,500	83,378
	16	42,852	48,310	53,968	59,937	66,215	72,670	78,566	81,904	82,818
	17	41,584	47,060	52,753	58,779	65,144	71,729	77,821	81,336	82,291
	18	40,387	45,874	51,596	57,669	64,108	70,809	77,090	80,793	81,795
	19	39,252	44,748	50,492	56,604	63,107	69,910	76,370	80,270	81,325
	20	38,174	43,676	49,438	55,582	62,138	69,032	75,660	79,765	80,879
	25	33,490	38,987	44,784	51,011	57,729	64,929	72,229	77,416	78,941
	30	29,703	35,152	40,925	47,157	53,926	61,275	68,998	75,226	77,358
	35	26,570	31,935	37,639	43,824	50,585	58,000	65,991	73,106	76,019
	40	23,936	29,182	34,781	40,879	47,590	55,024	63,199	71,039	74,859
	45	21,698	26,791	32,248	38,225	44,851	52,273	60,587	69,025	73,836
	50	19,779	24,686	29,969	35,790	42,301	49,687	58,115	67,066	72,921
	55	18,121	22,814	27,892	33,528	39,895	47,219	55,744	65,153	72,093
	60	16,678	21,132	25,980	31,405	37,601	44,840	53,443	63,273	71,337
	65	15,412	19,609	24,207	29,400	35,402	42,530	51,189	61,412	70,642
	70	14,292	18,221	22,557	27,502	33,291	40,282	48,968	59,557	69,998
	75	13,294	16,950	21,017	25,704	31,265	38,095	46,777	57,696	69,399
	80	12,395	15,780	19,578	24,005	29,326	35,973	44,615	55,824	68,838
	85	11,579	14,699	18,233	22,401	27,478	33,924	42,487	53,938	68,312
	90	10,829	13,696	16,976	20,892	25,724	31,954	40,402	52,040	67,815
	95	10,134	12,762	15,801	19,474	24,065	30,069	38,369	50,135	67,346
	100	9,484	11,888	14,701	18,144	22,502	28,275	36,396	48,228	66,900
	110	8,283	10,292	12,702	15,730	19,651	24,964	32,658	44,444	66,072
	120	7,173	8,854	10,927	13,601	17,138	22,014	29,229	40,753	65,316
	130	6,118	7,531	9,326	11,706	14,914	19,394	26,116	37,215	64,621
	140	5,094	6,290	7,859	9,997	12,929	17,059	23,307	33,871	63,977
	150	4,086	5,106	6,492	8,433	11,134	14,964	20,772	30,746	63,378
	160	3,083	3,960	5,198	6,978	9,488	13,062	18,476	27,845	62,818
	170	2,079	2,841	3,959	5,607	7,960	11,318	16,384	25,162	62,291
	180	1,073	1,739	2,759	4,300	6,523	9,699	14,461	22,683	61,795
	190	0,062	0,650	1,590	3,042	5,158	8,181	12,681	20,390	61,325
	200	-0,952	-0,429	0,444	1,823	3,850	6,744	11,019	18,263	60,879
	225	-3,499	-3,096	-2,344	-1,098	0,764	3,419	7,260	13,546	59,856
	250	-6,040	-5,716	-5,043	-3,884	-2,129	0,365	3,909	9,492	58,941
	275	-8,551	-8,281	-7,661	-6,560	-4,878	-2,493	0,844	5,914	58,113
	300	-11,013	-10,781	-10,197	-9,136	-7,506	-5,196	-2,007	2,688	57,358
	325	-13,413	-13,208	-12,650	-11,618	-10,024	-7,769	-4,686	-0,268	56,662
	350	-15,746	-15,561	-15,021	-14,011	-12,443	-10,229	-7,224	-3,013	56,019
	375	-18,012	-17,841	-17,315	-16,320	-14,772	-12,588	-9,642	-5,589	55,419
	400	-20,213	-20,053	-19,538	-18,555	-17,022	-14,861	-11,960	-8,028	54,859
	425	-22,356	-22,204	-21,698	-20,724	-19,203	-17,060	-14,194	-10,357	54,332
	450	-24,449	-24,305	-23,804	-22,837	-21,326	-19,197	-16,359	-12,596	53,836
	475	-26,503	-26,363	-25,868	-24,907	-23,403	-21,285	-18,469	-14,766	53,366
	500	-28,526	-28,391	-27,899	-26,943	-25,445	-23,336	-20,538	-16,883	52,921
	525	-30,529	-30,397	-29,909	-28,957	-27,463	-25,362	-22,578	-18,963	52,497
	550	-32,522	-32,392	-31,907	-30,958	-29,468	-27,374	-24,602	-21,019	52,093
	575	-34,513	-34,386	-33,903	-32,956	-31,470	-29,381	-26,619	-23,063	51,707
	600	-36,511	-36,385	-35,904	-34,960	-33,477	-31,392	-28,639	-25,105	51,337
	625	-38,522	-38,398	-37,919	-36,976	-35,496	-33,414	-30,668	-27,154	50,982
	650	-40,553	-40,430	-39,952	-39,011	-37,533	-35,455	-32,715	-29,217	50,642
	675	-42,606	-42,484	-42,008	-41,068	-39,592	-37,516	-34,782	-31,298	50,314
	700	-44,685	-44,564	-44,088	-43,150	-41,675	-39,602	-36,872	-33,400	49,998
	725	-46,789	-46,669	-46,194	-45,257	-43,783	-41,713	-38,987	-35,525	49,693
	750	-48,916	-48,797	-48,323	-47,387	-45,914	-43,846	-41,124	-37,671	49,399
	775	-51,064	-50,945	-50,472	-49,536	-48,065	-45,998	-43,279	-39,835	49,114
	800	-53,225	-53,107	-52,634	-51,700	-50,230	-48,164	-45,448	-42,011	48,838
	825	-55,393	-55,275	-54,803	-53,869	-52,400	-50,336	-47,623	-44,191	48,571
	850	-57,558	-57,440	-56,969	-56,035	-54,567	-52,505	-49,793	-46,367	48,312
	875	-59,708	-59,591	-59,120	-58,187	-56,720	-54,658	-51,949	-48,528	48,060
	900	-61,832	-61,715	-61,244	-60,312	-58,845	-56,785	-54,077	-50,661	47,815
	925	-63,916	-63,799	-63,329	-62,397	-60,931	-58,871	-56,165	-52,753	47,577
	950	-65,946	-65,830	-65,360	-64,428	-62,963	-60,904	-58,200	-54,791	47,346
	975	-67,910	-67,794	-67,324	-66,393	-64,928	-62,870	-60,167	-56,761	47,120
	1000	-69,794	-69,678	-69,208	-68,278	-66,813	-64,756	-62,055	-58,652	46,900

100 MHz – Zone 2 – 10%

Distance (km)										
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	89,925	92,137	94,599	97,356	100,298	103,109	105,238	106,355	106,900
	2	80,175	83,004	85,929	89,151	92,634	96,097	98,848	100,282	100,879
	3	74,018	77,403	80,718	84,267	88,084	91,934	95,081	96,727	97,358
	4	69,322	73,188	76,877	80,723	84,808	88,948	92,394	94,203	94,859
	5	65,457	69,716	73,756	77,889	82,219	86,604	90,297	92,244	92,921
	6	62,148	66,715	71,072	75,484	80,052	84,661	88,573	90,642	91,337
	7	59,247	64,051	68,685	73,362	78,163	82,987	87,104	89,286	89,998
	8	56,664	61,649	66,517	71,439	76,468	81,503	85,818	88,110	88,838
	9	54,336	59,458	64,521	69,663	74,912	80,156	84,668	87,070	87,815
	10	52,218	57,445	62,667	68,003	73,459	78,911	83,622	86,138	86,900
	11	50,275	55,584	60,935	66,440	72,088	77,742	82,656	85,290	86,072
	12	48,637	53,898	59,361	64,985	70,780	76,631	81,752	84,513	85,316
	13	47,176	52,446	57,951	63,662	69,554	75,565	80,896	83,794	84,621
	14	45,825	51,094	56,628	62,408	68,410	74,536	80,077	83,122	83,977
	15	44,571	49,831	55,381	61,214	67,311	73,560	79,288	82,491	83,378
	16	43,403	48,647	54,202	60,075	66,251	72,627	78,521	81,894	82,818
	17	42,311	47,532	53,085	58,985	65,227	71,718	77,779	81,325	82,291
	18	41,287	46,482	52,024	57,940	64,236	70,830	77,069	80,782	81,795
	19	40,326	45,488	51,014	56,936	63,274	69,960	76,372	80,268	81,325
	20	39,421	44,548	50,050	55,972	62,340	69,107	75,686	79,774	80,879
	25	35,594	40,496	45,820	51,642	58,038	65,052	72,344	77,513	78,941
	30	32,658	37,283	42,358	47,980	54,260	61,324	69,092	75,445	77,358
	35	30,357	34,679	39,470	44,840	50,922	57,911	65,942	73,430	76,019
	40	28,527	32,537	37,029	42,121	47,963	54,801	62,974	71,397	74,859
	45	27,048	30,749	34,943	39,749	45,332	51,974	60,312	69,324	73,836
	50	25,832	29,237	33,142	37,667	42,985	49,407	57,787	67,221	72,921
	55	24,813	27,940	31,572	35,828	40,885	47,074	55,360	65,110	72,093
	60	23,942	26,811	30,190	34,191	38,998	44,951	53,001	63,074	71,337
	65	23,179	25,813	28,957	32,724	37,294	43,014	50,686	61,174	70,642
	70	22,494	24,915	27,847	31,396	35,745	41,240	48,584	59,276	69,998
	75	21,865	24,094	26,833	30,185	34,328	39,608	46,737	57,371	69,399
	80	21,276	23,332	25,897	29,069	33,023	38,099	45,010	55,451	68,838
	85	20,712	22,613	25,022	28,031	31,812	36,696	43,393	53,516	68,312
	90	20,164	21,928	24,195	27,056	30,679	35,384	41,872	51,680	67,815
	95	19,626	21,266	23,406	26,133	29,611	34,151	40,436	50,030	67,346
	100	19,092	20,621	22,646	25,252	28,598	32,984	39,077	48,444	66,900
	110	18,021	19,361	21,189	23,585	26,702	30,816	36,550	45,454	66,072
	120	16,937	18,122	19,786	22,010	24,935	28,817	34,234	42,681	65,316
	130	15,830	16,887	18,416	20,497	23,262	26,947	32,085	40,098	64,621
	140	14,702	15,650	17,066	19,026	21,657	25,175	30,069	37,679	63,977
	150	13,554	14,410	15,729	17,588	20,106	23,481	28,162	35,404	63,378
	160	12,389	13,166	14,403	16,177	18,599	21,852	26,347	33,256	62,818
	170	11,213	11,922	13,088	14,789	17,129	20,276	24,609	31,218	62,291
	180	10,029	10,679	11,784	13,423	15,693	18,749	22,940	29,279	61,795
	190	8,842	9,441	10,495	12,079	14,289	17,266	21,332	27,430	61,325
	200	7,656	8,211	9,220	10,758	12,915	15,823	19,780	25,660	60,879
	225	4,719	5,189	6,108	7,555	9,607	12,377	16,112	21,543	59,856
	250	1,854	2,263	3,119	4,499	6,474	9,142	12,712	17,797	58,941
	275	-0,916	-0,552	0,257	1,587	3,505	6,096	9,539	14,357	58,113
	300	-3,583	-3,252	-2,479	-1,186	0,687	3,219	6,563	11,169	57,358
	325	-6,150	-5,844	-5,098	-3,835	-1,997	0,488	3,754	8,192	56,662
	350	-8,624	-8,338	-7,614	-6,374	-4,564	-2,117	1,086	5,387	56,019
	375	-11,018	-10,749	-10,042	-8,821	-7,034	-4,618	-1,465	2,724	55,419
	400	-13,347	-13,092	-12,398	-11,194	-9,425	-7,034	-3,924	0,173	54,859
	425	-15,626	-15,381	-14,699	-13,507	-11,754	-9,385	-6,310	-2,291	54,332
	450	-17,867	-17,631	-16,959	-15,778	-14,038	-11,687	-8,642	-4,689	53,836
	475	-20,084	-19,855	-19,192	-18,021	-16,292	-13,956	-10,937	-7,039	53,366
	500	-22,289	-22,067	-21,410	-20,247	-18,528	-16,206	-13,208	-9,359	52,921
	525	-24,490	-24,274	-23,624	-22,468	-20,757	-18,446	-15,468	-11,660	52,497
	550	-26,697	-26,486	-25,841	-24,691	-22,988	-20,687	-17,726	-13,955	52,093
	575	-28,916	-28,708	-28,068	-26,924	-25,227	-22,936	-19,989	-16,250	51,707
	600	-31,149	-30,945	-30,309	-29,170	-27,479	-25,196	-22,263	-18,551	51,337
	625	-33,400	-33,199	-32,567	-31,431	-29,746	-27,470	-24,549	-20,862	50,982
	650	-35,667	-35,469	-34,840	-33,709	-32,029	-29,759	-26,848	-23,184	50,642
	675	-37,949	-37,754	-37,128	-36,000	-34,324	-32,060	-29,159	-25,515	50,314
	700	-40,242	-40,049	-39,425	-38,300	-36,628	-34,370	-31,477	-27,851	49,998
	725	-42,538	-42,347	-41,726	-40,604	-38,936	-36,683	-33,798	-30,188	49,693
	750	-44,832	-44,643	-44,024	-42,904	-41,239	-38,990	-36,113	-32,518	49,399
	775	-47,113	-46,925	-46,308	-45,191	-43,529	-41,285	-38,414	-34,832	49,114
	800	-49,371	-49,185	-48,570	-47,455	-45,796	-43,555	-40,690	-37,121	48,838
	825	-51,595	-51,411	-50,797	-49,684	-48,028	-45,791	-42,931	-39,373	48,571
	850	-53,775	-53,591	-52,979	-51,868	-50,214	-47,980	-45,126	-41,578	48,312
	875	-55,897	-55,715	-55,104	-53,995	-52,343	-50,112	-47,262	-43,724	48,060
	900	-57,950	-57,769	-57,160	-56,052	-54,402	-52,174	-49,329	-45,799	47,815
	925	-59,925	-59,745	-59,137	-58,030	-56,382	-54,157	-51,315	-47,793	47,577
	950	-61,811	-61,631	-61,024	-59,919	-58,273	-56,050	-53,212	-49,697	47,346
	975	-63,599	-63,420	-62,814	-61,711	-60,066	-57,845	-55,010	-51,502	47,120
	1000	-65,283	-65,105	-64,500	-63,397	-61,754	-59,535	-56,704	-53,202	46,900

100 MHz – Zone 2 – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	89,815	92,042	94,519	97,294	100,256	103,085	105,227	106,351	106,900
	2	79,957	82,817	85,852	89,230	92,790	96,261	98,952	100,318	100,879
	3	73,695	77,126	80,563	84,364	88,314	92,195	95,254	96,785	97,358
	4	68,896	72,826	76,612	80,772	85,044	89,250	92,606	94,275	94,859
	5	64,929	69,270	73,405	77,873	82,425	86,911	90,530	92,323	92,921
	6	61,520	66,186	70,684	75,412	80,213	84,951	88,811	90,725	91,337
	7	58,590	63,438	68,310	73,254	78,277	83,246	87,335	89,368	89,998
	8	56,266	61,149	66,193	71,317	76,539	81,721	86,032	88,189	88,838
	9	54,208	59,139	64,283	69,556	74,952	80,333	84,860	87,143	87,815
	10	52,364	57,324	62,543	67,937	73,486	79,050	83,787	86,203	86,900
	11	50,695	55,670	60,944	66,435	72,117	77,850	82,794	85,347	86,072
	12	49,173	54,153	59,464	65,033	70,830	76,718	81,864	84,561	85,316
	13	47,776	52,752	58,088	63,717	69,613	75,641	80,985	83,832	84,621
	14	46,487	51,452	56,800	62,476	68,455	74,613	80,148	83,151	83,977
	15	45,293	50,239	55,591	61,301	67,350	73,624	79,347	82,513	83,378
	16	44,182	49,105	54,452	60,185	66,291	72,671	78,574	81,910	82,818
	17	43,146	48,040	53,375	59,121	65,274	71,749	77,827	81,338	82,291
	18	42,178	47,038	52,354	58,105	64,294	70,853	77,101	80,793	81,795
	19	41,270	46,092	51,383	57,131	63,348	69,983	76,393	80,271	81,325
	20	40,417	45,196	50,459	56,196	62,432	69,134	75,701	79,771	80,879
	25	36,829	41,348	46,400	52,008	58,241	65,162	72,415	77,512	78,941
	30	34,091	38,292	43,062	48,447	54,555	61,544	69,319	75,521	77,358
	35	31,948	35,802	40,254	45,362	51,266	58,211	66,349	73,671	76,019
	40	30,234	33,737	37,858	42,665	48,320	55,137	63,489	71,880	74,859
	45	28,836	31,999	35,798	40,300	45,683	52,313	60,748	70,091	73,836
	50	27,671	30,518	34,013	38,221	43,327	49,732	58,141	68,274	72,921
	55	26,680	29,239	32,457	36,390	41,225	47,384	55,683	66,417	72,093
	60	25,820	28,120	31,089	34,771	39,350	45,256	53,380	64,527	71,337
	65	25,056	27,128	29,877	33,333	37,674	43,329	51,236	62,621	70,642
	70	24,365	26,236	28,791	32,046	36,170	41,583	49,245	60,720	69,998
	75	23,726	25,422	27,808	30,884	34,813	39,997	47,402	58,844	69,399
	80	23,126	24,669	26,908	29,828	33,580	38,552	45,694	57,010	68,838
	85	22,554	23,965	26,076	28,857	32,452	37,227	44,111	55,232	68,312
	90	22,002	23,298	25,297	27,957	31,411	36,006	42,640	53,515	67,815
	95	21,464	22,660	24,562	27,115	30,443	34,874	41,270	51,866	67,346
	100	20,934	22,045	23,862	26,320	29,536	33,818	39,988	50,286	66,900
	110	19,892	20,864	22,540	24,839	27,865	31,889	37,651	47,329	66,072
	120	18,860	19,726	21,289	23,462	26,336	30,147	35,557	44,626	65,316
	130	17,831	18,613	20,085	22,156	24,905	28,541	33,650	42,148	64,621
	140	16,802	17,515	18,912	20,897	23,545	27,035	31,888	39,866	63,977
	150	15,771	16,427	17,758	19,674	22,237	25,605	30,239	37,751	63,378
	160	14,738	15,344	16,620	18,476	20,968	24,233	28,681	35,779	62,818
	170	13,701	14,267	15,494	17,300	19,731	22,909	27,197	33,929	62,291
	180	12,663	13,194	14,379	16,141	18,520	21,623	25,775	32,183	61,795
	190	11,623	12,125	13,274	14,999	17,333	20,372	24,404	30,528	61,325
	200	10,584	11,063	12,179	13,872	16,167	19,149	23,078	28,952	60,879
	225	8,000	8,435	9,489	11,117	13,335	16,205	19,927	25,294	59,856
	250	5,453	5,860	6,870	8,450	10,610	13,397	16,967	21,957	58,941
	275	2,958	3,345	4,323	5,867	7,983	10,706	14,161	18,866	58,113
	300	0,522	0,893	1,848	3,364	5,445	8,118	11,483	15,968	57,358
	325	-1,856	-1,496	-0,560	0,934	2,986	5,618	8,912	13,225	56,662
	350	-4,181	-3,831	-2,909	-1,433	0,595	3,194	6,431	10,605	56,019
	375	-6,459	-6,118	-5,208	-3,747	-1,738	0,832	4,021	8,084	55,419
	400	-8,701	-8,366	-7,466	-6,019	-4,027	-1,481	1,668	5,639	54,859
	425	-10,915	-10,586	-9,695	-8,259	-6,282	-3,757	-0,642	3,252	54,332
	450	-13,110	-12,787	-11,903	-10,477	-8,513	-6,007	-2,921	0,907	53,836
	475	-15,297	-14,978	-14,100	-12,683	-10,732	-8,241	-5,182	-1,409	53,366
	500	-17,482	-17,166	-16,295	-14,886	-12,945	-10,470	-7,433	-3,708	52,921
	525	-19,673	-19,360	-18,494	-17,092	-15,161	-12,699	-9,683	-6,000	52,497
	550	-21,874	-21,565	-20,703	-19,308	-17,386	-14,937	-11,939	-8,293	52,093
	575	-24,091	-23,784	-22,927	-21,538	-19,625	-17,186	-14,206	-10,593	51,707
	600	-26,326	-26,021	-25,169	-23,786	-21,880	-19,452	-16,487	-12,904	51,337
	625	-28,581	-28,278	-27,429	-26,051	-24,153	-21,735	-18,784	-15,227	50,982
	650	-30,854	-30,554	-29,708	-28,336	-26,444	-24,035	-21,097	-17,565	50,642
	675	-33,146	-32,847	-32,004	-30,636	-28,751	-26,351	-23,425	-19,915	50,314
	700	-35,451	-35,154	-34,314	-32,951	-31,072	-28,680	-25,765	-22,275	49,998
	725	-37,766	-37,470	-36,633	-35,274	-33,401	-31,017	-28,113	-24,640	49,693
	750	-40,084	-39,790	-38,956	-37,601	-35,733	-33,356	-30,462	-27,006	49,399
	775	-42,399	-42,106	-41,274	-39,923	-38,060	-35,690	-32,805	-29,365	49,114
	800	-44,702	-44,410	-43,581	-42,233	-40,375	-38,011	-35,135	-31,709	48,838
	825	-46,984	-46,693	-45,866	-44,522	-42,668	-40,310	-37,442	-34,029	48,571
	850	-49,236	-48,946	-48,121	-46,780	-44,931	-42,578	-39,717	-36,317	48,312
	875	-51,448	-51,158	-50,335	-48,997	-47,152	-44,804	-41,950	-38,561	48,060
	900	-53,608	-53,320	-52,499	-51,163	-49,321	-46,978	-44,131	-40,753	47,815
	925	-55,709	-55,421	-54,602	-53,268	-51,430	-49,092	-46,251	-42,882	47,577
	950	-57,740	-57,453	-56,635	-55,304	-53,469	-51,135	-48,299	-44,939	47,346
	975	-59,692	-59,405	-58,589	-57,260	-55,428	-53,098	-50,268	-46,916	47,120
	1000	-61,558	-61,272	-60,457	-59,130	-57,301	-54,974	-52,149	-48,804	46,900

100 MHz – Zone 3 – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	89,971	92,177	94,632	97,382	100,316	103,119	105,242	106,356	106,900
	2	80,265	83,082	85,994	89,202	92,670	96,117	98,857	100,284	100,879
	3	74,151	77,516	80,812	84,342	88,137	91,965	95,094	96,730	97,358
	4	69,498	73,338	77,001	80,820	84,877	88,989	92,411	94,207	94,859
	5	65,674	69,899	73,907	78,008	82,304	86,654	90,318	92,249	92,921
	6	62,406	66,933	71,252	75,624	80,152	84,720	88,598	90,648	91,337
	7	59,546	64,303	68,892	73,524	78,278	83,055	87,132	89,293	89,998
	8	57,002	61,934	66,751	71,621	76,598	81,580	85,849	88,118	88,838
	9	54,713	59,777	64,782	69,867	75,057	80,242	84,703	87,079	87,815
	10	52,632	57,797	62,956	68,229	73,620	79,007	83,661	86,147	86,900
	11	50,726	55,968	61,252	66,687	72,264	77,847	82,699	85,300	86,072
	12	48,969	54,270	59,655	65,228	70,974	76,747	81,799	84,524	85,316
	13	47,340	52,687	58,153	63,843	69,738	75,692	80,948	83,805	84,621
	14	45,823	51,204	56,736	62,523	68,552	74,674	80,135	83,135	83,977
	15	44,403	49,812	55,396	61,265	67,409	73,686	79,351	82,505	83,378
	16	43,070	48,499	54,126	60,062	66,306	72,725	78,589	81,909	82,818
	17	41,814	47,259	52,919	58,912	65,241	71,788	77,846	81,341	82,291
	18	40,628	46,083	51,771	57,810	64,211	70,873	77,117	80,799	81,795
	19	39,504	44,967	50,677	56,752	63,216	69,979	76,400	80,277	81,325
	20	38,437	43,905	49,631	55,738	62,253	69,104	75,692	79,772	80,879
	25	33,803	39,262	45,019	51,204	57,875	65,026	72,275	77,427	78,941
	30	30,063	35,470	41,199	47,384	54,103	61,396	69,061	75,242	77,358
	35	26,970	32,291	37,950	44,085	50,791	58,146	66,072	73,130	76,019
	40	24,373	29,574	35,125	41,171	47,824	55,195	63,299	71,071	74,859
	45	22,169	27,216	32,624	38,546	45,113	52,468	60,707	69,069	73,836
	50	20,280	25,141	30,374	36,141	42,590	49,906	58,255	67,121	72,921
	55	18,650	23,297	28,325	33,906	40,210	47,463	55,905	65,221	72,093
	60	17,231	21,640	26,439	31,809	37,943	45,108	53,624	63,355	71,337
	65	15,988	20,141	24,691	29,830	35,770	42,823	51,391	61,509	70,642
	70	14,888	18,775	23,065	27,956	33,683	40,600	49,193	59,668	69,998
	75	13,908	17,523	21,546	26,182	31,682	38,437	47,024	57,824	69,399
	80	13,025	16,372	20,128	24,505	29,767	36,340	44,885	55,969	68,838
	85	12,223	15,308	18,802	22,923	27,942	34,315	42,781	54,101	68,312
	90	11,487	14,321	17,563	21,433	26,210	32,368	40,719	52,222	67,815
	95	10,804	13,401	16,405	20,034	24,572	30,506	38,708	50,336	67,346
	100	10,164	12,540	15,320	18,722	23,028	28,733	36,757	48,450	66,900
	110	8,981	10,966	13,347	16,338	20,212	25,461	33,062	44,705	66,072
	120	7,886	9,547	11,593	14,235	17,729	22,545	29,671	41,054	65,316
	130	6,843	8,238	10,011	12,362	15,530	19,954	26,593	37,554	64,621
	140	5,828	7,009	8,559	10,670	13,565	17,644	23,814	34,246	63,977
	150	4,827	5,834	7,203	9,120	11,787	15,569	21,305	31,154	63,378
	160	3,830	4,696	5,919	7,676	10,155	13,685	19,031	28,282	62,818
	170	2,831	3,583	4,687	6,315	8,638	11,954	16,957	25,626	62,291
	180	1,828	2,486	3,493	5,015	7,211	10,347	15,050	23,170	61,795
	190	0,820	1,401	2,328	3,763	5,853	8,839	13,283	20,896	61,325
	200	-0,193	0,324	1,186	2,549	4,550	7,410	11,632	18,786	60,879
	225	-2,737	-2,339	-1,596	-0,365	1,475	4,098	7,892	14,103	59,856
	250	-5,278	-4,958	-4,292	-3,147	-1,413	1,053	4,554	10,072	58,941
	275	-7,790	-7,523	-6,910	-5,821	-4,159	-1,801	1,497	6,510	58,113
	300	-10,254	-10,024	-9,447	-8,398	-6,785	-4,502	-1,348	3,295	57,358
	325	-12,657	-12,454	-11,901	-10,881	-9,304	-7,074	-4,024	0,347	56,662
	350	-14,992	-14,809	-14,275	-13,275	-11,724	-9,533	-6,560	-2,393	56,019
	375	-17,260	-17,091	-16,571	-15,586	-14,054	-11,893	-8,977	-4,965	55,419
	400	-19,464	-19,306	-18,796	-17,823	-16,306	-14,166	-11,294	-7,402	54,859
	425	-21,611	-21,461	-20,959	-19,994	-18,488	-16,366	-13,528	-9,728	54,332
	450	-23,707	-23,564	-23,068	-22,111	-20,613	-18,504	-15,693	-11,966	53,836
	475	-25,764	-25,625	-25,135	-24,183	-22,692	-20,594	-17,804	-14,135	53,366
	500	-27,790	-27,656	-27,169	-26,221	-24,737	-22,647	-19,874	-16,252	52,921
	525	-29,796	-29,665	-29,182	-28,238	-26,757	-24,675	-21,916	-18,332	52,497
	550	-31,792	-31,664	-31,183	-30,241	-28,765	-26,688	-23,940	-20,388	52,093
	575	-33,786	-33,660	-33,181	-32,242	-30,769	-28,697	-25,959	-22,433	51,707
	600	-35,787	-35,663	-35,186	-34,249	-32,778	-30,710	-27,980	-24,475	51,337
	625	-37,802	-37,678	-37,203	-36,268	-34,799	-32,735	-30,011	-26,525	50,982
	650	-39,835	-39,713	-39,239	-38,305	-36,839	-34,777	-32,058	-28,588	50,642
	675	-41,891	-41,771	-41,297	-40,365	-38,900	-36,841	-34,127	-30,670	50,314
	700	-43,973	-43,853	-43,381	-42,450	-40,986	-38,929	-36,219	-32,773	49,998
	725	-46,080	-45,961	-45,489	-44,559	-43,096	-41,041	-38,335	-34,899	49,693
	750	-48,210	-48,092	-47,621	-46,692	-45,230	-43,176	-40,474	-37,046	49,399
	775	-50,361	-50,243	-49,773	-48,844	-47,383	-45,331	-42,631	-39,210	49,114
	800	-52,525	-52,408	-51,938	-51,010	-49,550	-47,499	-44,801	-41,387	48,838
	825	-54,696	-54,579	-54,110	-53,182	-51,723	-49,673	-46,977	-43,569	48,571
	850	-56,864	-56,747	-56,278	-55,351	-53,892	-51,843	-49,150	-45,746	48,312
	875	-59,017	-58,900	-58,432	-57,505	-56,047	-53,999	-51,307	-47,908	48,060
	900	-61,143	-61,027	-60,559	-59,633	-58,175	-56,128	-53,437	-50,042	47,815
	925	-63,230	-63,114	-62,646	-61,720	-60,263	-58,217	-55,527	-52,136	47,577
	950	-65,263	-65,148	-64,680	-63,754	-62,298	-60,252	-57,564	-54,175	47,346
	975	-67,230	-67,114	-66,647	-65,722	-64,265	-62,220	-59,533	-56,147	47,120
	1000	-69,117	-69,002	-68,535	-67,609	-66,154	-64,108	-61,422	-58,039	46,900

100 MHz – Zone 3 – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	89,957	92,165	94,622	97,374	100,311	103,116	105,241	106,356	106,900
	2	80,238	83,059	85,974	89,186	92,659	96,111	98,854	100,284	100,879
	3	74,111	77,482	80,784	84,319	88,121	91,956	95,090	96,729	97,358
	4	69,445	73,293	76,963	80,791	84,856	88,976	92,405	94,206	94,859
	5	65,609	69,844	73,862	77,972	82,278	86,639	90,312	92,248	92,921
	6	62,328	66,867	71,198	75,582	80,122	84,703	88,590	90,646	91,337
	7	59,456	64,227	68,830	73,475	78,244	83,035	87,123	89,291	89,998
	8	56,901	61,848	66,681	71,566	76,559	81,557	85,840	88,115	88,838
	9	54,599	59,681	64,704	69,805	75,013	80,217	84,693	87,076	87,815
	10	52,507	57,691	62,869	68,161	73,571	78,978	83,649	86,144	86,900
	11	50,591	55,853	61,157	66,613	72,211	77,816	82,686	85,297	86,072
	12	48,978	54,190	59,602	65,173	70,915	76,712	81,785	84,521	85,316
	13	47,541	52,760	58,212	63,867	69,701	75,654	80,932	83,802	84,621
	14	46,215	51,430	56,908	62,628	68,569	74,632	80,117	83,131	83,977
	15	44,985	50,189	55,680	61,450	67,482	73,665	79,332	82,500	83,378
	16	43,840	49,025	54,520	60,327	66,435	72,740	78,569	81,904	82,818
	17	42,771	47,932	53,421	59,253	65,424	71,840	77,830	81,337	82,291
	18	41,770	46,902	52,378	58,224	64,445	70,961	77,125	80,794	81,795
	19	40,830	45,929	51,386	57,236	63,496	70,100	76,433	80,281	81,325
	20	39,947	45,008	50,441	56,287	62,575	69,256	75,752	79,788	80,879
	25	36,221	41,052	46,299	52,037	58,340	65,253	72,439	77,534	78,941
	30	33,376	37,927	42,920	48,452	54,631	61,582	69,225	75,476	77,358
	35	31,158	35,404	40,111	45,387	51,362	58,229	66,119	73,475	76,019
	40	29,402	33,336	37,744	42,739	48,471	55,180	63,198	71,462	74,859
	45	27,990	31,617	35,726	40,435	45,906	52,414	60,584	69,415	73,836
	50	26,835	30,167	33,990	38,418	43,623	49,908	58,110	67,342	72,921
	55	25,871	28,928	32,479	36,639	41,583	47,634	55,735	65,267	72,093
	60	25,049	27,851	31,151	35,059	39,754	45,567	53,429	63,267	71,337
	65	24,330	26,900	29,969	33,643	38,103	43,684	51,170	61,404	70,642
	70	23,685	26,045	28,904	32,365	36,604	41,961	49,121	59,545	69,998
	75	23,093	25,264	27,932	31,198	35,234	40,377	47,322	57,681	69,399
	80	22,536	24,537	27,035	30,122	33,972	38,913	45,642	55,806	68,838
	85	22,001	23,851	26,195	29,122	32,800	37,552	44,068	53,917	68,312
	90	21,480	23,195	25,399	28,181	31,704	36,280	42,588	52,126	67,815
	95	20,965	22,559	24,639	27,290	30,670	35,082	41,192	50,516	67,346
	100	20,452	21,938	23,905	26,437	29,688	33,950	39,868	48,969	66,900
	110	19,418	20,719	22,494	24,821	27,846	31,841	37,409	46,053	66,072
	120	18,363	19,513	21,128	23,287	26,126	29,893	35,151	43,348	65,316
	130	17,280	18,305	19,789	21,807	24,491	28,066	33,052	40,826	64,621
	140	16,170	17,090	18,463	20,365	22,918	26,331	31,079	38,463	63,977
	150	15,037	15,867	17,147	18,951	21,394	24,669	29,210	36,237	63,378
	160	13,884	14,638	15,837	17,559	19,909	23,066	27,427	34,132	62,818
	170	12,716	13,404	14,536	16,187	18,458	21,513	25,718	32,132	62,291
	180	11,539	12,170	13,243	14,834	17,038	20,005	24,074	30,228	61,795
	190	10,357	10,939	11,962	13,501	15,647	18,538	22,487	28,408	61,325
	200	9,175	9,715	10,694	12,189	14,284	17,109	20,953	26,665	60,879
	225	6,243	6,700	7,594	9,001	10,996	13,690	17,321	22,602	59,856
	250	3,378	3,776	4,609	5,952	7,875	10,472	13,946	18,896	58,941
	275	0,606	0,961	1,749	3,045	4,913	7,438	10,792	15,485	58,113
	300	-2,065	-1,742	-0,988	0,272	2,099	4,567	7,828	12,320	57,358
	325	-4,636	-4,338	-3,610	-2,377	-0,583	1,842	5,029	9,359	56,662
	350	-7,116	-6,837	-6,129	-4,919	-3,151	-0,761	2,368	6,568	56,019
	375	-9,516	-9,253	-8,562	-7,369	-5,622	-3,260	-0,179	3,915	55,419
	400	-11,851	-11,601	-10,923	-9,745	-8,014	-5,676	-2,634	1,372	54,859
	425	-14,135	-13,895	-13,228	-12,062	-10,346	-8,027	-5,018	-1,085	54,332
	450	-16,383	-16,151	-15,494	-14,337	-12,633	-10,331	-7,349	-3,477	53,836
	475	-18,606	-18,382	-17,732	-16,584	-14,890	-12,601	-9,643	-5,824	53,366
	500	-20,817	-20,599	-19,955	-18,815	-17,130	-14,853	-11,914	-8,140	52,921
	525	-23,025	-22,812	-22,174	-21,040	-19,362	-17,096	-14,174	-10,439	52,497
	550	-25,238	-25,030	-24,397	-23,268	-21,597	-19,339	-16,433	-12,731	52,093
	575	-27,462	-27,258	-26,630	-25,506	-23,840	-21,590	-18,697	-15,024	51,707
	600	-29,702	-29,501	-28,876	-27,757	-26,096	-23,853	-20,971	-17,324	51,337
	625	-31,958	-31,761	-31,139	-30,023	-28,367	-26,130	-23,258	-19,635	50,982
	650	-34,231	-34,037	-33,418	-32,306	-30,653	-28,422	-25,559	-21,956	50,642
	675	-36,519	-36,327	-35,711	-34,601	-32,953	-30,726	-27,872	-24,286	50,314
	700	-38,818	-38,628	-38,014	-36,907	-35,262	-33,039	-30,192	-26,623	49,998
	725	-41,120	-40,932	-40,321	-39,216	-37,573	-35,355	-32,514	-28,960	49,693
	750	-43,420	-43,233	-42,624	-41,521	-39,881	-37,666	-34,831	-31,290	49,399
	775	-45,706	-45,522	-44,914	-43,813	-42,176	-39,964	-37,135	-33,605	49,114
	800	-47,971	-47,787	-47,181	-46,082	-44,447	-42,238	-39,413	-35,895	48,838
	825	-50,201	-50,019	-49,414	-48,317	-46,683	-44,477	-41,657	-38,149	48,571
	850	-52,386	-52,205	-51,601	-50,506	-48,874	-46,670	-43,855	-40,355	48,312
	875	-54,514	-54,334	-53,732	-52,637	-51,007	-48,806	-45,994	-42,503	48,060
	900	-56,573	-56,395	-55,793	-54,700	-53,071	-50,872	-48,064	-44,580	47,815
	925	-58,554	-58,376	-57,775	-56,683	-55,056	-52,859	-50,053	-46,577	47,577
	950	-60,445	-60,268	-59,668	-58,577	-56,952	-54,756	-51,954	-48,483	47,346
	975	-62,239	-62,063	-61,464	-60,374	-58,749	-56,555	-53,756	-50,291	47,120
	1000	-63,929	-63,753	-63,155	-62,066	-60,442	-58,250	-55,453	-51,994	46,900

100 MHz – Zone 3 – 1%

Distance (km)									
Transmitting / base antenna height (m)	10	20	37,5	75	150	300	600	1200	Emax
1	89,895	92,110	94,577	97,339	100,286	103,102	105,235	106,354	106,900
2	80,114	82,952	85,965	89,317	92,851	96,295	98,967	100,322	100,879
3	73,927	77,325	80,729	84,492	88,403	92,246	95,275	96,791	97,358
4	69,203	73,087	76,828	80,939	85,160	89,316	92,633	94,282	94,859
5	65,309	69,591	73,670	78,077	82,568	86,993	90,562	92,331	92,921
6	61,972	66,567	70,997	75,653	80,382	85,048	88,849	90,734	91,337
7	59,112	63,879	68,670	73,532	78,472	83,358	87,379	89,379	89,998
8	56,856	61,651	66,603	71,635	76,762	81,850	86,083	88,200	88,838
9	54,866	59,700	64,744	69,914	75,204	80,479	84,917	87,156	87,815
10	53,088	57,944	63,053	68,334	73,767	79,214	83,853	86,217	86,900
11	51,483	56,348	61,504	66,873	72,428	78,033	82,867	85,363	86,072
12	50,025	54,887	60,074	65,511	71,172	76,920	81,945	84,578	85,316
13	48,690	53,542	58,746	64,236	69,985	75,864	81,075	83,851	84,621
14	47,461	52,297	57,507	63,035	68,859	74,856	80,248	83,173	83,977
15	46,327	51,139	56,346	61,901	67,785	73,889	79,456	82,536	83,378
16	45,275	50,059	55,254	60,825	66,758	72,958	78,694	81,935	82,818
17	44,296	49,046	54,225	59,802	65,773	72,058	77,958	81,366	82,291
18	43,383	48,096	53,250	58,826	64,826	71,186	77,244	80,823	81,795
19	42,530	47,200	52,326	57,892	63,913	70,340	76,549	80,305	81,325
20	41,731	46,356	51,447	56,998	63,032	69,516	75,870	79,807	80,879
25	38,396	42,747	47,611	53,010	59,011	65,675	72,658	77,566	78,941
30	35,887	39,913	44,485	49,647	55,501	62,201	69,653	75,597	77,358
35	33,950	37,629	41,878	46,754	52,391	59,020	66,788	73,778	76,019
40	32,422	35,753	39,673	44,244	49,622	56,104	64,047	72,026	74,859
45	31,192	34,190	37,789	42,056	47,157	53,440	61,433	70,288	73,836
50	30,178	32,868	36,169	40,144	44,967	51,017	58,960	68,532	72,921
55	29,324	31,734	34,765	38,469	43,022	48,823	56,638	66,748	72,093
60	28,587	30,748	33,536	36,994	41,295	46,842	54,472	64,941	71,337
65	27,935	29,876	32,451	35,689	39,756	45,054	52,461	63,127	70,642
70	27,343	29,092	31,480	34,523	38,378	43,438	50,600	61,325	69,998
75	26,795	28,377	30,602	33,472	37,137	41,973	48,880	59,553	69,399
80	26,277	27,713	29,797	32,516	36,010	40,639	47,289	57,825	68,838
85	25,778	27,089	29,051	31,637	34,978	39,417	45,816	56,153	68,312
90	25,291	26,494	28,350	30,819	34,025	38,290	44,448	54,542	67,815
95	24,812	25,921	27,684	30,051	33,136	37,244	43,173	52,996	67,346
100	24,336	25,364	27,047	29,323	32,301	36,266	41,980	51,516	66,900
110	23,384	24,283	25,832	27,957	30,755	34,474	39,800	48,747	66,072
120	22,425	23,224	24,668	26,674	29,327	32,846	37,840	46,214	65,316
130	21,455	22,176	23,534	25,444	27,981	31,335	36,048	43,889	64,621
140	20,472	21,130	22,418	24,249	26,690	29,909	34,384	41,742	63,977
150	19,478	20,083	21,311	23,077	25,440	28,546	32,820	39,747	63,378
160	18,473	19,033	20,210	21,922	24,220	27,231	31,334	37,880	62,818
170	17,460	17,982	19,114	20,780	23,023	25,955	29,912	36,123	62,291
180	16,439	16,929	18,023	19,650	21,846	24,711	28,543	34,459	61,795
190	15,412	15,876	16,937	18,530	20,687	23,493	27,218	32,876	61,325
200	14,382	14,825	15,857	17,421	19,544	22,301	25,933	31,363	60,879
225	11,810	12,213	13,190	14,698	16,753	19,412	22,861	27,834	59,856
250	9,263	9,641	10,580	12,047	14,053	16,642	19,958	24,592	58,941
275	6,763	7,123	8,034	9,472	11,442	13,977	17,193	21,574	58,113
300	4,317	4,664	5,555	6,970	8,912	11,406	14,547	18,732	57,358
325	1,927	2,264	3,139	4,537	6,456	8,918	12,000	16,033	56,662
350	-0,411	-0,083	0,781	2,165	4,066	6,502	9,536	13,449	56,019
375	-2,703	-2,383	-1,528	-0,156	1,731	4,145	7,140	10,956	55,419
400	-4,960	-4,645	-3,798	-2,436	-0,561	1,835	4,798	8,535	54,859
425	-7,189	-6,879	-6,039	-4,685	-2,821	-0,440	2,497	6,169	54,332
450	-9,400	-9,094	-8,259	-6,912	-5,058	-2,690	0,224	3,841	53,836
475	-11,602	-11,300	-10,470	-9,129	-7,282	-4,926	-2,031	1,539	53,366
500	-13,802	-13,503	-12,677	-11,342	-9,502	-7,156	-4,278	-0,748	52,921
525	-16,008	-15,711	-14,889	-13,558	-11,726	-9,389	-6,526	-3,030	52,497
550	-18,225	-17,930	-17,111	-15,785	-13,958	-11,629	-8,780	-5,314	52,093
575	-20,457	-20,164	-19,349	-18,026	-16,205	-13,883	-11,045	-7,606	51,707
600	-22,707	-22,416	-21,603	-20,285	-18,468	-16,153	-13,326	-9,910	51,337
625	-24,976	-24,688	-23,877	-22,562	-20,749	-18,441	-15,623	-12,228	50,982
650	-27,265	-26,978	-26,169	-24,857	-23,049	-20,746	-17,938	-14,561	50,642
675	-29,571	-29,285	-28,479	-27,170	-25,365	-23,068	-20,267	-16,907	50,314
700	-31,891	-31,606	-30,802	-29,496	-27,695	-25,402	-22,609	-19,264	49,998
725	-34,221	-33,937	-33,135	-31,831	-30,033	-27,745	-24,959	-21,628	49,693
750	-36,554	-36,271	-35,470	-34,169	-32,375	-30,091	-27,311	-23,992	49,399
775	-38,884	-38,602	-37,802	-36,503	-34,712	-32,432	-29,658	-26,350	49,114
800	-41,202	-40,920	-40,122	-38,825	-37,037	-34,760	-31,992	-28,694	48,838
825	-43,498	-43,218	-42,421	-41,126	-39,340	-37,067	-34,304	-31,016	48,571
850	-45,765	-45,485	-44,689	-43,395	-41,612	-39,343	-36,584	-33,305	48,312
875	-47,990	-47,711	-46,917	-45,625	-43,844	-41,577	-38,823	-35,551	48,060
900	-50,166	-49,887	-49,093	-47,803	-46,024	-43,761	-41,010	-37,746	47,815
925	-52,280	-52,002	-51,210	-49,921	-48,144	-45,883	-43,136	-39,879	47,577
950	-54,325	-54,048	-53,256	-51,969	-50,193	-47,935	-45,192	-41,941	47,346
975	-56,292	-56,014	-55,224	-53,938	-52,164	-49,908	-47,168	-43,923	47,120
1000	-58,172	-57,895	-57,105	-55,820	-54,048	-51,794	-49,057	-45,817	46,900

100 MHz – Zone 4 – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	97,931	102,263	105,611	106,740	106,889	106,900	106,900	106,900	106,900
	2	88,379	92,572	96,980	99,991	100,790	100,874	100,879	100,879	100,879
	3	82,648	86,625	91,136	95,249	97,062	97,338	97,357	97,358	97,358
	4	78,482	82,298	86,746	91,348	94,193	94,805	94,856	94,859	94,859
	5	75,167	78,869	83,234	88,032	91,719	92,805	92,915	92,920	92,921
	6	72,384	76,007	80,300	85,168	89,471	91,124	91,325	91,337	91,337
	7	69,962	73,534	77,773	82,658	87,384	89,645	89,977	89,997	89,998
	8	67,801	71,343	75,545	80,429	85,436	88,296	88,803	88,837	88,838
	9	65,838	69,367	73,547	78,425	83,619	87,035	87,759	87,813	87,815
	10	64,030	67,560	71,730	76,604	81,923	85,833	86,816	86,897	86,900
	11	62,344	65,888	70,060	74,933	80,337	84,675	85,951	86,067	86,072
	12	60,761	64,327	68,511	73,389	78,853	83,551	85,149	85,309	85,316
	13	59,263	62,860	67,063	71,952	77,460	82,457	84,395	84,610	84,621
	14	57,838	61,473	65,702	70,606	76,150	81,391	83,679	83,962	83,977
	15	56,477	60,155	64,416	69,339	74,912	80,354	82,994	83,357	83,378
	16	55,171	58,897	63,196	68,142	73,740	79,345	82,332	82,789	82,818
	17	53,916	57,694	62,033	67,005	72,628	78,365	81,689	82,253	82,291
	18	52,706	56,539	60,921	65,923	71,567	77,413	81,060	81,745	81,795
	19	51,537	55,428	59,856	64,888	70,555	76,489	80,440	81,262	81,325
	20	50,408	54,357	58,832	63,897	69,585	75,593	79,829	80,801	80,879
	25	45,287	49,527	54,238	59,471	65,263	71,492	76,841	78,730	78,941
	30	40,877	45,365	50,281	55,664	61,548	67,887	73,918	76,896	77,358
	35	37,108	41,759	46,810	52,295	58,246	64,653	71,086	75,152	76,019
	40	33,912	38,619	43,719	49,245	55,230	61,683	68,371	73,415	74,859
	45	31,200	35,863	40,930	46,436	52,417	58,900	65,767	71,643	73,836
	50	28,941	33,460	38,410	43,832	49,770	56,264	63,272	69,838	72,921
	55	27,042	31,343	36,111	41,395	47,252	53,737	60,864	68,000	72,093
	60	25,433	29,465	34,002	39,105	44,846	51,301	58,526	66,139	71,337
	65	24,052	27,784	32,056	36,944	42,540	48,941	56,246	64,264	70,642
	70	22,844	26,263	30,251	34,902	40,327	46,652	54,017	62,381	69,998
	75	21,767	24,873	28,570	32,968	38,203	44,431	51,834	60,496	69,399
	80	20,784	23,588	26,996	31,135	36,165	42,275	49,695	58,614	68,838
	85	19,869	22,389	25,515	29,395	34,211	40,186	47,600	56,739	68,312
	90	19,003	21,258	24,117	27,742	32,338	38,164	45,550	54,875	67,815
	95	18,172	20,185	22,792	26,169	30,543	36,209	43,547	53,027	67,346
	100	17,365	19,158	21,531	24,671	28,825	34,322	41,594	51,200	66,900
	110	15,800	17,220	19,178	21,879	25,606	30,748	37,843	47,624	66,072
	120	14,280	15,402	17,014	19,330	22,658	27,439	34,308	44,175	65,316
	130	12,791	13,681	15,009	16,994	19,958	24,386	30,999	40,875	64,621
	140	11,332	12,042	13,142	14,846	17,486	21,577	27,915	37,736	63,977
	150	9,903	10,476	11,394	12,865	15,222	19,001	25,057	34,763	63,378
	160	8,508	8,978	9,753	11,033	13,149	16,644	22,418	31,957	62,818
	170	7,150	7,542	8,207	9,335	11,247	14,490	19,989	29,316	62,291
	180	5,831	6,167	6,748	7,755	9,500	12,522	17,760	26,833	61,795
	190	4,553	4,847	5,366	6,280	7,890	10,724	15,714	24,502	61,325
	200	3,315	3,581	4,055	4,898	6,400	9,075	13,837	22,315	60,879
	225	0,387	0,618	1,033	1,775	3,105	5,488	9,760	17,415	59,856
	250	-2,335	-2,106	-1,704	-0,995	0,256	2,462	6,351	13,209	58,941
	275	-4,898	-4,656	-4,240	-3,527	-2,305	-0,208	3,388	9,555	58,113
	300	-7,344	-7,079	-6,639	-5,906	-4,688	-2,661	0,711	6,321	57,358
	325	-9,701	-9,411	-8,943	-8,186	-6,961	-4,981	-1,779	3,400	56,662
	350	-11,989	-11,675	-11,180	-10,399	-9,166	-7,218	-4,143	0,712	56,019
	375	-14,220	-13,885	-13,367	-12,565	-11,322	-9,398	-6,419	-1,806	55,419
	400	-16,403	-16,050	-15,512	-14,692	-13,442	-11,535	-8,628	-4,194	54,859
	425	-18,544	-18,176	-17,623	-16,788	-15,531	-13,637	-10,783	-6,484	54,332
	450	-20,649	-20,269	-19,702	-18,856	-17,594	-15,709	-12,896	-8,698	53,836
	475	-22,724	-22,334	-21,757	-20,902	-19,634	-17,757	-14,975	-10,853	53,366
	500	-24,774	-24,377	-23,791	-22,928	-21,657	-19,785	-17,027	-12,964	52,921
	525	-26,807	-26,403	-25,811	-24,942	-23,668	-21,799	-19,060	-15,042	52,497
	550	-28,828	-28,419	-27,821	-26,947	-25,671	-23,805	-21,080	-17,098	52,093
	575	-30,844	-30,430	-29,828	-28,950	-27,671	-25,808	-23,094	-19,140	51,707
	600	-32,859	-32,442	-31,836	-30,955	-29,674	-27,813	-25,108	-21,175	51,337
	625	-34,879	-34,459	-33,850	-32,966	-31,684	-29,824	-27,126	-23,211	50,982
	650	-36,907	-36,485	-35,873	-34,988	-33,704	-31,846	-29,153	-25,253	50,642
	675	-38,947	-38,523	-37,909	-37,021	-35,737	-33,879	-31,191	-27,302	50,314
	700	-40,999	-40,573	-39,958	-39,069	-37,784	-35,926	-33,242	-29,363	49,998
	725	-43,065	-42,638	-42,021	-41,131	-39,845	-37,988	-35,307	-31,435	49,693
	750	-45,143	-44,715	-44,097	-43,206	-41,919	-40,063	-37,384	-33,519	49,399
	775	-47,233	-46,804	-46,185	-45,292	-44,005	-42,149	-39,472	-35,613	49,114
	800	-49,330	-48,900	-48,281	-47,387	-46,100	-44,244	-41,569	-37,714	48,838
	825	-51,432	-51,002	-50,381	-49,487	-48,199	-46,344	-43,670	-39,819	48,571
	850	-53,534	-53,103	-52,482	-51,587	-50,299	-48,443	-45,771	-41,923	48,312
	875	-55,630	-55,198	-54,577	-53,681	-52,393	-50,538	-47,867	-44,021	48,060
	900	-57,714	-57,282	-56,660	-55,764	-54,475	-52,620	-49,950	-46,107	47,815
	925	-59,779	-59,347	-58,724	-57,829	-56,539	-54,685	-52,015	-48,174	47,577
	950	-61,819	-61,386	-60,764	-59,868	-58,578	-56,723	-54,055	-50,215	47,346
	975	-63,827	-63,393	-62,770	-61,874	-60,585	-58,730	-56,062	-52,224	47,120
	1000	-65,794	-65,360	-64,737	-63,841	-62,551	-60,696	-58,029	-54,192	46,900

100 MHz – Zone 4 – 10%

Transmitting / base antenna height (m)	Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
	1	97,935	102,299	105,726	106,905	107,062	107,074	107,074	107,074	107,076
	2	88,379	92,582	97,061	100,207	101,065	101,156	101,161	101,161	101,213
	3	82,648	86,625	91,196	95,487	97,471	97,780	97,802	97,803	97,832
	4	78,482	82,298	86,789	91,566	94,680	95,385	95,445	95,448	95,459
	5	75,167	78,869	83,265	88,227	92,231	93,495	93,625	93,632	93,633
	6	72,384	76,007	80,323	85,349	89,974	91,894	92,137	92,150	92,150
	7	69,962	73,534	77,789	82,835	87,867	90,470	90,874	90,900	90,901
	8	67,801	71,343	75,557	80,609	85,903	89,156	89,772	89,815	89,822
	9	65,838	69,367	73,556	78,612	84,076	87,912	88,789	88,856	88,871
	10	64,030	67,560	71,738	76,802	82,380	86,716	87,897	87,997	88,020
	11	62,344	65,888	70,067	75,144	80,802	85,557	87,075	87,217	87,250
	12	60,761	64,327	68,518	73,615	79,332	84,431	86,307	86,502	86,545
	13	59,263	62,860	67,072	72,194	77,959	83,337	85,582	85,843	85,896
	14	57,838	61,473	65,714	70,865	76,670	82,275	84,891	85,229	85,294
	15	56,477	60,155	64,432	69,617	75,458	81,245	84,226	84,654	84,731
	16	55,171	58,897	63,218	68,438	74,312	80,248	83,582	84,113	84,203
	17	53,916	57,694	62,062	67,322	73,227	79,284	82,953	83,602	83,706
	18	52,706	56,539	60,960	66,260	72,196	78,352	82,338	83,116	83,236
	19	51,537	55,428	59,951	65,280	71,224	77,459	81,740	82,654	82,790
	20	50,408	54,357	58,896	64,278	70,273	76,582	81,137	82,209	82,365
	25	45,287	49,527	54,407	59,972	66,099	72,632	78,245	80,211	80,503
	30	40,877	45,505	50,635	56,347	62,569	69,218	75,482	78,452	78,963
	35	37,447	42,233	47,437	53,235	59,497	66,204	72,863	76,820	77,649
	40	34,847	39,579	44,764	50,533	56,772	63,489	70,390	75,246	76,503
	45	32,884	37,442	42,535	48,179	54,328	61,008	68,055	73,693	75,488
	50	31,428	35,760	40,691	46,129	52,125	58,724	65,852	72,149	74,578
	55	30,402	34,531	39,155	44,333	50,130	56,614	63,773	70,609	73,753
	60	29,710	33,490	37,792	42,690	48,265	54,604	61,755	69,027	72,998
	65	29,169	32,607	36,588	41,198	46,537	52,717	59,829	67,436	72,304
	70	28,679	31,799	35,476	39,807	44,910	50,919	57,969	65,824	71,661
	75	28,196	31,030	34,425	38,492	43,364	49,198	56,167	64,198	71,062
	80	27,699	30,278	33,417	37,238	41,887	47,546	54,420	62,564	70,502
	85	27,182	29,535	32,442	36,035	40,474	45,958	52,725	60,932	69,975
	90	26,642	28,796	31,496	34,879	39,118	44,431	51,082	59,311	69,479
	95	26,083	28,062	30,575	33,766	37,818	42,963	49,493	57,711	69,009
	100	25,508	27,333	29,679	32,695	36,572	41,555	47,958	56,137	68,564
	110	24,333	25,903	27,965	30,674	34,233	38,909	45,051	53,095	67,736
	120	23,151	24,521	26,353	28,806	32,089	36,482	42,360	50,214	66,980
	130	21,984	23,195	24,842	27,081	30,123	34,257	39,877	47,508	66,285
	140	20,846	21,931	23,425	25,483	28,316	32,216	37,586	44,976	65,641
	150	19,742	20,726	22,094	23,998	26,648	30,336	35,469	42,610	65,042
	160	18,668	19,570	20,836	22,611	25,101	28,594	33,493	40,364	64,481
	170	17,603	18,448	19,636	21,308	23,659	26,966	31,618	38,161	63,955
	180	16,591	17,384	18,503	20,082	22,312	25,460	29,904	36,178	63,458
	190	15,621	16,367	17,424	18,921	21,044	24,051	28,311	34,348	62,988
	200	14,683	15,388	16,391	17,816	19,842	22,722	26,817	32,637	62,543
	225	12,450	13,076	13,971	15,250	17,078	19,689	23,421	28,753	61,520
	250	10,344	10,917	11,736	12,907	14,583	16,979	20,406	25,307	60,605
	275	8,340	8,876	9,641	10,733	12,290	14,511	17,681	22,202	59,777
	300	6,423	6,935	7,661	8,692	10,155	12,233	15,184	19,372	59,021
	325	4,582	5,077	5,775	6,760	8,148	10,107	12,871	16,769	58,326
	350	2,809	3,293	3,970	4,919	6,247	8,106	10,709	14,353	57,682
	375	1,098	1,575	2,237	3,157	4,434	6,209	8,674	12,097	57,083
	400	-0,558	-0,085	0,566	1,463	2,699	4,402	6,747	9,977	56,522
	425	-2,161	-1,690	-1,047	-0,168	1,032	2,672	4,913	7,974	55,996
	450	-3,716	-3,246	-2,608	-1,744	-0,574	1,012	3,161	6,074	55,499
	475	-5,226	-4,754	-4,121	-3,269	-2,125	-0,586	1,483	4,264	55,030
	500	-6,692	-6,219	-5,588	-4,747	-3,624	-2,127	-0,129	2,536	54,584
	525	-8,116	-7,642	-7,013	-6,180	-5,077	-3,616	-1,681	0,881	54,160
	550	-9,501	-9,024	-8,396	-7,570	-6,485	-5,056	-3,178	-0,708	53,756
	575	-10,848	-10,368	-9,741	-8,921	-7,850	-6,451	-4,623	-2,235	53,370
	600	-12,158	-11,675	-11,048	-10,233	-9,176	-7,803	-6,020	-3,705	53,001
	625	-13,432	-12,946	-12,318	-11,508	-10,462	-9,113	-7,371	-5,122	52,646
	650	-14,670	-14,181	-13,553	-12,747	-11,712	-10,384	-8,679	-6,490	52,305
	675	-15,875	-15,382	-14,754	-13,951	-12,926	-11,617	-9,945	-7,810	51,977
	700	-17,046	-16,550	-15,921	-15,121	-14,105	-12,813	-11,172	-9,086	51,662
	725	-18,184	-17,686	-17,055	-16,258	-15,249	-13,974	-12,360	-10,319	51,357
	750	-19,290	-18,789	-18,157	-17,362	-16,361	-15,100	-13,512	-11,511	51,062
	775	-20,364	-19,860	-19,228	-18,435	-17,440	-16,193	-14,628	-12,665	50,778
	800	-21,408	-20,901	-20,268	-19,477	-18,488	-17,253	-15,709	-13,780	50,502
	825	-22,421	-21,912	-21,277	-20,488	-19,505	-18,281	-16,757	-14,860	50,234
	850	-23,405	-22,893	-22,257	-21,469	-20,491	-19,278	-17,772	-15,904	49,975
	875	-24,359	-23,845	-23,208	-22,421	-21,448	-20,244	-18,755	-16,914	49,723
	900	-25,285	-24,768	-24,131	-23,345	-22,376	-21,181	-19,708	-17,891	49,479
	925	-26,183	-25,663	-25,025	-24,240	-23,275	-22,089	-20,630	-18,837	49,241
	950	-27,053	-26,532	-25,892	-25,108	-24,147	-22,969	-21,524	-19,751	49,009
	975	-27,896	-27,373	-26,733	-25,950	-24,992	-23,821	-22,388	-20,636	48,783
	1000	-28,714	-28,188	-27,547	-26,765	-25,810	-24,646	-23,225	-21,491	48,564

100 MHz – Zone 4 – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	101,483	103,915	106,062	107,086	107,254	107,266	107,266	107,266	107,328
	2	90,908	93,933	97,480	100,526	101,501	101,607	101,612	101,613	101,690
	3	84,475	87,628	91,529	95,787	98,095	98,480	98,506	98,507	98,510
	4	79,875	83,064	87,047	91,786	95,368	96,283	96,317	96,317	96,317
	5	76,277	79,479	83,473	88,380	92,881	94,537	94,653	94,653	94,653
	6	73,298	76,510	80,501	85,460	90,535	93,028	93,314	93,314	93,314
	7	70,736	73,963	77,951	82,924	88,333	91,640	92,194	92,194	92,194
	8	68,474	71,720	75,712	80,690	86,290	90,315	91,229	91,229	91,229
	9	66,436	69,710	73,712	78,696	84,407	89,030	90,337	90,381	90,381
	10	64,574	67,881	71,901	76,897	82,673	87,769	89,513	89,622	89,622
	11	62,856	66,202	70,245	75,260	81,076	86,534	88,741	88,934	88,934
	12	61,259	64,647	68,718	73,758	79,600	85,330	88,006	88,303	88,304
	13	59,767	63,200	67,303	72,372	78,232	84,163	87,296	87,705	87,720
	14	58,369	61,848	65,984	71,087	76,959	83,037	86,601	87,146	87,176
	15	57,057	60,582	64,751	69,891	75,771	81,955	85,915	86,620	86,666
	16	55,832	59,400	63,598	68,774	74,659	80,916	85,233	86,122	86,186
	17	54,686	58,292	62,517	67,730	73,613	79,920	84,560	85,647	85,731
	18	53,619	57,257	61,591	66,785	72,643	78,976	83,904	85,193	85,298
	19	52,746	56,378	60,611	65,833	71,698	78,051	83,231	84,758	84,886
	20	51,721	55,399	59,750	64,971	70,818	77,173	82,571	84,332	84,491
	25	48,389	51,952	56,312	61,378	67,040	73,278	79,339	82,357	82,738
	30	46,275	49,645	53,866	58,629	63,998	70,001	76,278	80,454	81,260
	35	45,095	48,201	52,056	56,465	61,504	67,234	73,502	78,553	79,982
	40	44,308	47,106	50,613	54,683	59,401	64,856	71,012	76,673	78,856
	45	43,705	46,202	49,405	53,170	57,597	62,789	68,784	74,809	77,853
	50	43,187	45,414	48,358	51,860	56,026	60,973	66,785	72,989	76,949
	55	42,706	44,699	47,429	50,707	54,644	59,366	64,985	71,235	76,128
	60	42,234	44,033	46,588	49,679	53,416	57,932	63,356	69,561	75,376
	65	41,757	43,400	45,815	48,750	52,316	56,645	61,876	67,975	74,682
	70	41,267	42,791	45,096	47,903	51,321	55,480	60,524	66,478	74,040
	75	40,763	42,202	44,419	47,121	50,412	54,419	59,285	65,071	73,441
	80	40,246	41,631	43,778	46,392	49,574	53,444	58,142	63,751	72,881
	85	39,721	41,077	43,168	45,708	48,793	52,540	57,081	62,513	72,355
	90	39,193	40,539	42,582	45,059	48,059	51,695	56,091	61,353	71,859
	95	38,665	40,019	42,020	44,439	47,364	50,897	55,162	60,263	71,389
	100	38,144	39,515	41,477	43,844	46,699	50,140	54,284	59,238	70,943
	110	37,124	38,551	40,441	42,712	45,441	48,720	52,654	57,352	70,116
	120	36,138	37,638	39,458	41,640	44,258	47,396	51,157	55,645	69,360
	130	35,305	36,765	38,515	40,614	43,130	46,146	49,759	54,074	68,665
	140	34,518	35,921	37,604	39,624	42,047	44,954	48,439	52,608	68,021
	150	33,752	35,100	36,719	38,665	41,002	43,810	47,182	51,224	67,422
	160	33,001	34,297	35,856	37,732	39,990	42,708	45,977	49,904	66,861
	170	32,260	33,508	35,011	36,824	39,008	41,642	44,815	48,634	66,335
	180	31,537	32,736	34,186	35,937	38,053	40,609	43,696	47,422	65,838
	190	30,825	31,980	33,378	35,071	37,122	39,607	42,615	46,256	65,368
	200	30,125	31,237	32,586	34,225	36,216	38,633	41,568	45,129	64,923
	225	28,422	29,436	30,677	32,193	34,046	36,312	39,081	42,464	63,900
	250	26,785	27,717	28,862	30,272	32,006	34,139	36,763	39,990	62,985
	275	25,217	26,076	27,138	28,454	30,082	32,098	34,593	37,681	62,157
	300	23,717	24,511	25,500	26,732	28,266	30,176	32,556	35,518	61,401
	325	22,272	23,016	23,947	25,111	26,565	28,385	30,660	33,504	60,706
	350	20,909	21,594	22,458	23,547	24,919	26,648	28,827	31,573	60,062
	375	19,597	20,236	21,045	22,072	23,373	25,023	27,115	29,767	59,463
	400	18,343	18,939	19,699	20,668	21,905	23,481	25,493	28,057	58,902
	425	17,144	17,701	18,415	19,332	20,508	22,018	23,954	26,438	58,376
	450	15,998	16,519	17,191	18,060	19,180	20,626	22,493	24,902	57,879
	475	14,897	15,391	16,031	16,860	17,934	19,326	21,129	23,464	57,410
	500	13,857	14,315	14,912	15,693	16,713	18,045	19,786	22,059	56,964
	525	12,859	13,289	13,852	14,594	15,568	16,848	18,531	20,743	56,540
	550	11,908	12,311	12,843	13,547	14,479	15,710	17,339	19,492	56,136
	575	11,002	11,380	11,883	12,552	13,442	14,628	16,205	18,304	55,750
	600	10,139	10,494	10,969	11,605	12,457	13,599	15,127	17,174	55,381
	625	9,319	9,652	10,100	10,706	11,521	12,621	14,103	16,101	55,026
	650	8,539	8,851	9,276	9,851	10,632	11,692	13,130	15,082	54,685
	675	7,798	8,092	8,493	9,040	9,788	10,810	12,206	14,114	54,357
	700	7,096	7,371	7,750	8,271	8,987	9,973	11,329	13,194	54,042
	725	6,430	6,688	7,046	7,541	8,228	9,179	10,496	12,321	53,737
	750	5,799	6,041	6,378	6,850	7,507	8,425	9,706	11,492	53,442
	775	5,201	5,428	5,746	6,195	6,825	7,710	8,955	10,706	53,158
	800	4,635	4,847	5,148	5,574	6,178	7,033	8,243	9,958	52,882
	825	4,099	4,298	4,581	4,986	5,564	6,390	7,568	9,249	52,614
	850	3,592	3,777	4,045	4,430	4,983	5,780	6,926	8,575	52,355
	875	3,112	3,285	3,537	3,902	4,432	5,201	6,317	7,935	52,103
	900	2,657	2,819	3,056	3,403	3,910	4,653	5,738	7,327	51,859
	925	2,227	2,378	2,601	2,929	3,415	4,131	5,189	6,749	51,621
	950	1,819	1,959	2,169	2,481	2,945	3,636	4,666	6,198	51,389
	975	1,432	1,563	1,759	2,055	2,498	3,165	4,168	5,674	51,163
	1000	1,065	1,187	1,371	1,650	2,074	2,717	3,694	5,175	50,944

100 MHz – Zone 5 – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	97,931	102,263	105,611	106,740	106,889	106,900	106,900	106,900	106,900
	2	88,379	92,572	96,980	99,991	100,790	100,874	100,879	100,879	100,879
	3	82,648	86,625	91,136	95,249	97,062	97,338	97,357	97,358	97,358
	4	78,482	82,298	86,746	91,348	94,193	94,805	94,856	94,859	94,859
	5	75,167	78,869	83,234	88,032	91,719	92,805	92,915	92,920	92,921
	6	72,384	76,007	80,300	85,168	89,471	91,124	91,325	91,337	91,337
	7	69,962	73,534	77,773	82,658	87,384	89,645	89,977	89,997	89,998
	8	67,801	71,343	75,545	80,429	85,436	88,296	88,803	88,837	88,838
	9	65,838	69,367	73,547	78,425	83,619	87,035	87,759	87,813	87,815
	10	64,030	67,560	71,730	76,604	81,923	85,833	86,816	86,897	86,900
	11	62,344	65,888	70,060	74,933	80,337	84,675	85,951	86,067	86,072
	12	60,761	64,327	68,511	73,389	78,853	83,551	85,149	85,309	85,316
	13	59,263	62,860	67,063	71,952	77,460	82,457	84,395	84,610	84,621
	14	57,838	61,473	65,702	70,606	76,150	81,391	83,679	83,962	83,977
	15	56,477	60,155	64,416	69,339	74,912	80,354	82,994	83,357	83,378
	16	55,171	58,897	63,196	68,142	73,740	79,345	82,332	82,789	82,818
	17	53,916	57,694	62,033	67,005	72,628	78,365	81,689	82,253	82,291
	18	52,706	56,539	60,921	65,923	71,567	77,413	81,060	81,745	81,795
	19	51,537	55,428	59,856	64,888	70,555	76,489	80,440	81,262	81,325
	20	50,408	54,357	58,832	63,897	69,585	75,593	79,829	80,801	80,879
	25	45,287	49,527	54,238	59,471	65,263	71,492	76,841	78,730	78,941
	30	40,877	45,365	50,281	55,664	61,548	67,887	73,918	76,896	77,358
	35	37,108	41,759	46,810	52,295	58,246	64,653	71,086	75,152	76,019
	40	33,912	38,619	43,719	49,245	55,230	61,683	68,371	73,415	74,859
	45	31,200	35,863	40,930	46,436	52,417	58,900	65,767	71,643	73,836
	50	28,941	33,460	38,410	43,832	49,770	56,264	63,272	69,838	72,921
	55	27,042	31,343	36,111	41,395	47,252	53,737	60,864	68,000	72,093
	60	25,433	29,465	34,002	39,105	44,846	51,301	58,526	66,139	71,337
	65	24,052	27,784	32,056	36,944	42,540	48,941	56,246	64,264	70,642
	70	22,844	26,263	30,251	34,902	40,327	46,652	54,017	62,381	69,998
	75	21,767	24,873	28,570	32,968	38,203	44,431	51,834	60,496	69,399
	80	20,784	23,588	26,996	31,135	36,165	42,275	49,695	58,614	68,838
	85	19,869	22,389	25,515	29,395	34,211	40,186	47,600	56,739	68,312
	90	19,003	21,258	24,117	27,742	32,338	38,164	45,550	54,875	67,815
	95	18,172	20,185	22,792	26,169	30,543	36,209	43,547	53,027	67,346
	100	17,365	19,158	21,531	24,671	28,825	34,322	41,594	51,200	66,900
	110	15,800	17,220	19,178	21,879	25,606	30,748	37,843	47,624	66,072
	120	14,280	15,402	17,014	19,330	22,658	27,439	34,308	44,175	65,316
	130	12,791	13,681	15,009	16,994	19,958	24,386	30,999	40,875	64,621
	140	11,332	12,042	13,142	14,846	17,486	21,577	27,915	37,736	63,977
	150	9,903	10,476	11,394	12,865	15,222	19,001	25,057	34,763	63,378
	160	8,508	8,978	9,753	11,033	13,149	16,644	22,418	31,957	62,818
	170	7,150	7,542	8,207	9,335	11,247	14,490	19,989	29,316	62,291
	180	5,831	6,167	6,748	7,755	9,500	12,522	17,760	26,833	61,795
	190	4,553	4,847	5,366	6,280	7,890	10,724	15,714	24,502	61,325
	200	3,315	3,581	4,055	4,898	6,400	9,075	13,837	22,315	60,879
	225	0,387	0,618	1,033	1,775	3,105	5,488	9,760	17,415	59,856
	250	-2,335	-2,106	-1,704	-0,995	0,256	2,462	6,351	13,209	58,941
	275	-4,898	-4,656	-4,240	-3,527	-2,305	-0,208	3,388	9,555	58,113
	300	-7,344	-7,079	-6,639	-5,906	-4,688	-2,661	0,711	6,321	57,358
	325	-9,701	-9,411	-8,943	-8,186	-6,961	-4,981	-1,779	3,400	56,662
	350	-11,989	-11,675	-11,180	-10,399	-9,166	-7,218	-4,143	0,712	56,019
	375	-14,220	-13,885	-13,367	-12,565	-11,322	-9,398	-6,419	-1,806	55,419
	400	-16,403	-16,050	-15,512	-14,692	-13,442	-11,535	-8,628	-4,194	54,859
	425	-18,544	-18,176	-17,623	-16,788	-15,531	-13,637	-10,783	-6,484	54,332
	450	-20,649	-20,269	-19,702	-18,856	-17,594	-15,709	-12,896	-8,698	53,836
	475	-22,724	-22,334	-21,757	-20,902	-19,634	-17,757	-14,975	-10,853	53,366
	500	-24,774	-24,377	-23,791	-22,928	-21,657	-19,785	-17,027	-12,964	52,921
	525	-26,807	-26,403	-25,811	-24,942	-23,668	-21,799	-19,060	-15,042	52,497
	550	-28,828	-28,419	-27,821	-26,947	-25,671	-23,805	-21,080	-17,098	52,093
	575	-30,844	-30,430	-29,828	-28,950	-27,671	-25,808	-23,094	-19,140	51,707
	600	-32,859	-32,442	-31,836	-30,955	-29,674	-27,813	-25,108	-21,175	51,337
	625	-34,879	-34,459	-33,850	-32,966	-31,684	-29,824	-27,126	-23,211	50,982
	650	-36,907	-36,485	-35,873	-34,988	-33,704	-31,846	-29,153	-25,253	50,642
	675	-38,947	-38,523	-37,909	-37,021	-35,737	-33,879	-31,191	-27,302	50,314
	700	-40,999	-40,573	-39,958	-39,069	-37,784	-35,926	-33,242	-29,363	49,998
	725	-43,065	-42,638	-42,021	-41,131	-39,845	-37,988	-35,307	-31,435	49,693
	750	-45,143	-44,715	-44,097	-43,206	-41,919	-40,063	-37,384	-33,519	49,399
	775	-47,233	-46,804	-46,185	-45,292	-44,005	-42,149	-39,472	-35,613	49,114
	800	-49,330	-48,900	-48,281	-47,387	-46,100	-44,244	-41,569	-37,714	48,838
	825	-51,432	-51,002	-50,381	-49,487	-48,199	-46,344	-43,670	-39,819	48,571
	850	-53,534	-53,103	-52,482	-51,587	-50,299	-48,443	-45,771	-41,923	48,312
	875	-55,630	-55,198	-54,577	-53,681	-52,393	-50,538	-47,867	-44,021	48,060
	900	-57,714	-57,282	-56,660	-55,764	-54,475	-52,620	-49,950	-46,107	47,815
	925	-59,779	-59,347	-58,724	-57,829	-56,539	-54,685	-52,015	-48,174	47,577
	950	-61,819	-61,386	-60,764	-59,868	-58,578	-56,723	-54,055	-50,215	47,346
	975	-63,827	-63,393	-62,770	-61,874	-60,585	-58,730	-56,062	-52,224	47,120
	1000	-65,794	-65,360	-64,737	-63,841	-62,551	-60,696	-58,029	-54,192	46,900

100 MHz – Zone 5 – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	97,935	102,299	105,725	106,905	107,062	107,074	107,074	107,074	107,076
	2	88,379	92,582	97,059	100,203	101,064	101,156	101,161	101,161	101,213
	3	82,648	86,625	91,195	95,477	97,468	97,780	97,802	97,803	97,832
	4	78,482	82,298	86,789	91,549	94,670	95,384	95,445	95,448	95,459
	5	75,167	78,869	83,265	88,202	92,211	93,492	93,625	93,632	93,633
	6	72,384	76,007	80,323	85,317	89,939	91,887	92,137	92,150	92,150
	7	69,962	73,534	77,789	82,796	87,816	90,457	90,874	90,899	90,901
	8	67,801	71,343	75,557	80,563	85,836	89,133	89,771	89,815	89,822
	9	65,838	69,367	73,556	78,560	83,994	87,876	88,786	88,856	88,871
	10	64,030	67,560	71,738	76,744	82,282	86,664	87,892	87,996	88,020
	11	62,344	65,888	70,067	75,082	80,692	85,488	87,067	87,217	87,250
	12	60,761	64,327	68,518	73,547	79,210	84,343	86,295	86,502	86,545
	13	59,263	62,860	67,072	72,122	77,825	83,229	85,565	85,842	85,896
	14	57,838	61,473	65,714	70,789	76,526	82,148	84,867	85,228	85,294
	15	56,477	60,155	64,432	69,536	75,304	81,100	84,194	84,653	84,731
	16	55,171	58,897	63,218	68,354	74,151	80,086	83,540	84,111	84,203
	17	53,916	57,694	62,062	67,234	73,058	79,106	82,902	83,599	83,706
	18	52,706	56,539	60,960	66,169	72,020	78,161	82,275	83,112	83,236
	19	51,537	55,428	59,906	65,153	71,031	77,247	81,657	82,647	82,790
	20	50,408	54,357	58,896	64,182	70,086	76,366	81,047	82,201	82,365
	25	45,287	49,527	54,407	59,876	65,898	72,379	78,087	80,192	80,503
	30	40,877	45,505	50,635	56,237	62,347	68,930	75,252	78,409	78,963
	35	37,447	42,233	47,437	53,094	59,240	65,871	72,557	76,734	77,649
	40	34,847	39,579	44,736	50,353	56,470	63,104	70,011	75,103	76,503
	45	32,884	37,442	42,445	47,936	53,962	60,559	67,600	73,478	75,488
	50	31,428	35,723	40,494	45,791	51,673	58,194	65,310	71,839	74,578
	55	30,340	34,325	38,814	43,872	49,570	55,983	63,128	70,181	73,753
	60	29,502	33,159	37,346	42,139	47,628	53,907	61,045	68,504	72,998
	65	28,922	32,231	36,092	40,595	45,849	51,974	59,085	66,866	72,304
	70	28,226	31,263	34,857	39,113	44,151	50,113	57,148	65,124	71,661
	75	27,678	30,443	33,769	37,771	42,584	48,374	55,323	63,439	71,062
	80	27,147	29,670	32,752	36,517	41,115	46,729	53,576	61,769	70,502
	85	26,615	28,927	31,791	35,338	39,730	45,171	51,902	60,122	69,975
	90	26,074	28,202	30,871	34,220	38,421	43,691	50,297	58,503	69,479
	95	25,518	27,487	29,985	33,155	37,178	42,283	48,758	56,918	69,009
	100	24,947	26,778	29,125	32,134	35,992	40,939	47,279	55,369	68,564
	110	23,760	25,367	27,463	30,198	33,765	38,419	44,488	52,386	67,736
	120	22,525	23,961	25,859	28,371	31,691	36,082	41,889	49,557	66,980
	130	21,254	22,556	24,298	26,625	29,736	33,894	39,451	46,875	66,285
	140	19,959	21,155	22,768	24,942	27,873	31,824	37,150	44,327	65,641
	150	18,649	19,759	21,266	23,312	26,087	29,854	34,966	41,901	65,042
	160	17,318	18,362	19,785	21,723	24,364	27,962	32,865	39,544	64,481
	170	15,945	16,948	18,313	20,170	22,696	26,131	30,804	37,160	63,955
	180	14,602	15,566	16,876	18,659	21,084	24,383	28,870	34,974	63,458
	190	13,282	14,208	15,468	17,184	19,520	22,700	27,029	32,922	62,988
	200	11,974	12,881	14,113	15,788	18,063	21,155	25,356	31,065	62,543
	225	8,807	9,632	10,757	12,292	14,385	17,239	21,132	26,441	61,520
	250	5,767	6,546	7,606	9,050	11,018	13,698	17,350	22,324	60,605
	275	2,876	3,622	4,635	6,012	7,882	10,422	13,874	18,564	59,777
	300	0,136	0,859	1,838	3,162	4,955	7,382	10,667	15,113	59,021
	325	-2,463	-1,756	-0,803	0,482	2,213	4,546	7,690	11,929	58,326
	350	-4,935	-4,239	-3,306	-2,053	-0,373	1,882	4,908	8,968	57,682
	375	-7,301	-6,613	-5,695	-4,468	-2,829	-0,639	2,286	6,192	57,083
	400	-9,580	-8,899	-7,992	-6,785	-5,181	-3,047	-0,209	3,565	56,522
	425	-11,793	-11,115	-10,217	-9,028	-7,453	-5,367	-2,604	1,056	55,996
	450	-13,957	-13,282	-12,391	-11,216	-9,666	-7,621	-4,923	-1,363	55,499
	475	-16,086	-15,413	-14,529	-13,366	-11,837	-9,827	-7,185	-3,713	55,030
	500	-18,194	-17,522	-16,642	-15,490	-13,979	-12,001	-9,409	-6,013	54,584
	525	-20,289	-19,619	-18,743	-17,599	-16,104	-14,153	-11,605	-8,277	54,160
	550	-22,380	-21,709	-20,837	-19,700	-18,220	-16,293	-13,783	-10,515	53,756
	575	-24,470	-23,800	-22,930	-21,800	-20,332	-18,426	-15,951	-12,736	53,370
	600	-26,562	-25,892	-25,024	-23,900	-22,443	-20,556	-18,112	-14,945	53,001
	625	-28,657	-27,987	-27,121	-26,002	-24,555	-22,685	-20,268	-17,144	52,646
	650	-30,755	-30,085	-29,220	-28,106	-26,668	-24,813	-22,421	-19,335	52,305
	675	-32,853	-32,183	-31,320	-30,209	-28,779	-26,938	-24,568	-21,517	51,977
	700	-34,949	-34,279	-33,417	-32,310	-30,887	-29,059	-26,709	-23,689	51,662
	725	-37,040	-36,369	-35,508	-34,404	-32,988	-31,171	-28,839	-25,848	51,357
	750	-39,120	-38,449	-37,589	-36,488	-35,078	-33,271	-30,956	-27,991	51,062
	775	-41,186	-40,515	-39,656	-38,557	-37,152	-35,355	-33,055	-30,114	50,778
	800	-43,233	-42,561	-41,703	-40,607	-39,207	-37,418	-35,132	-32,213	50,502
	825	-45,256	-44,584	-43,726	-42,632	-41,236	-39,455	-37,183	-34,283	50,234
	850	-47,250	-46,577	-45,720	-44,628	-43,236	-41,462	-39,202	-36,321	49,975
	875	-49,209	-48,537	-47,680	-46,590	-45,202	-43,434	-41,185	-38,321	49,723
	900	-51,131	-50,458	-49,602	-48,513	-47,128	-45,367	-43,128	-40,280	49,479
	925	-53,009	-52,336	-51,480	-50,393	-49,012	-47,256	-45,026	-42,193	49,241
	950	-54,841	-54,168	-53,312	-52,227	-50,848	-49,098	-46,877	-44,056	49,009
	975	-56,623	-55,949	-55,094	-54,009	-52,634	-50,889	-48,675	-45,868	48,783
	1000	-58,351	-57,677	-56,822	-55,738	-54,365	-52,625	-50,419	-47,623	48,564

100 MHz – Zone 5 – 1%

Transmitting / base antenna height (m) \ Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
1	101,483	103,915	106,062	107,060	107,251	107,266	107,266	107,266	107,328
2	90,908	93,933	97,480	100,441	101,485	101,607	101,612	101,613	101,690
3	84,475	87,628	91,529	95,670	98,054	98,480	98,506	98,507	98,510
4	79,875	83,064	87,047	91,664	95,299	96,283	96,317	96,317	96,317
5	76,277	79,479	83,473	88,263	92,785	94,537	94,653	94,653	94,653
6	73,298	76,510	80,501	85,347	90,415	93,028	93,314	93,314	93,314
7	70,736	73,963	77,951	82,811	88,193	91,640	92,194	92,194	92,194
8	68,474	71,720	75,712	80,574	86,130	90,312	91,229	91,229	91,229
9	66,436	69,710	73,712	78,573	84,226	89,011	90,337	90,381	90,381
10	64,574	67,881	71,901	76,765	82,471	87,729	89,513	89,622	89,622
11	62,856	66,202	70,245	75,115	80,851	86,466	88,741	88,934	88,934
12	61,259	64,647	68,718	73,599	79,351	85,230	88,006	88,303	88,304
13	59,767	63,200	67,303	72,196	77,957	84,027	87,296	87,705	87,720
14	58,369	61,848	65,984	70,891	76,657	82,864	86,601	87,146	87,176
15	57,057	60,582	64,751	69,674	75,441	81,743	85,915	86,620	86,666
16	55,832	59,400	63,598	68,533	74,298	80,665	85,233	86,122	86,186
17	54,686	58,292	62,517	67,462	73,222	79,630	84,551	85,647	85,731
18	53,619	57,257	61,503	66,455	72,205	78,637	83,869	85,193	85,298
19	52,746	56,378	60,611	65,542	71,265	77,702	83,199	84,758	84,886
20	51,721	55,399	59,665	64,611	70,328	76,767	82,499	84,332	84,491
25	48,389	51,952	56,077	60,853	66,375	72,683	79,118	82,357	82,738
30	46,275	49,568	53,414	57,903	63,139	69,210	75,859	80,454	81,260
35	45,095	48,005	51,464	55,576	60,463	66,249	72,891	78,548	79,982
40	44,308	46,843	49,920	53,656	58,190	63,682	70,213	76,614	78,856
45	43,705	45,908	48,640	52,029	56,231	61,434	67,805	74,676	77,853
50	43,187	45,110	47,544	50,624	54,522	59,451	65,636	72,766	76,949
55	42,706	44,399	46,581	49,394	53,020	57,691	63,676	70,915	76,128
60	42,234	43,743	45,718	48,305	51,692	56,124	61,903	69,139	75,376
65	41,757	43,121	44,930	47,329	50,510	54,724	60,295	67,449	74,682
70	41,267	42,521	44,200	46,446	49,451	53,470	58,836	65,850	74,040
75	40,763	41,935	43,513	45,636	48,495	52,341	57,509	64,344	73,441
80	40,246	41,358	42,860	44,887	47,624	51,318	56,298	62,930	72,881
85	39,721	40,790	42,235	44,186	46,822	50,382	55,186	61,606	72,355
90	39,193	40,231	41,632	43,524	46,075	49,518	54,159	60,368	71,859
95	38,665	39,682	41,050	42,892	45,373	48,712	53,203	59,209	71,389
100	38,144	39,143	40,484	42,285	44,704	47,951	52,308	58,124	70,943
110	37,124	38,096	39,393	41,127	43,441	46,531	50,655	56,140	70,116
120	36,138	37,085	38,344	40,019	42,245	45,205	49,140	54,355	69,360
130	35,180	36,101	37,323	38,944	41,093	43,942	47,719	52,716	68,665
140	34,240	35,135	36,320	37,890	39,969	42,722	46,366	51,183	68,021
150	33,311	34,180	35,330	36,852	38,867	41,534	45,063	49,728	67,422
160	32,387	33,230	34,347	35,825	37,782	40,371	43,798	48,328	66,861
170	31,462	32,284	33,371	34,809	36,712	39,230	42,562	46,966	66,335
180	30,547	31,345	32,402	33,801	35,655	38,108	41,357	45,655	65,838
190	29,636	30,412	31,440	32,803	34,609	37,004	40,177	44,382	65,368
200	28,730	29,484	30,485	31,813	33,576	35,916	39,021	43,140	64,923
225	26,487	27,193	28,133	29,384	31,050	33,268	36,221	40,151	63,900
250	24,285	24,950	25,838	27,023	28,606	30,719	33,541	37,310	62,985
275	22,133	22,762	23,604	24,732	26,243	28,265	30,974	34,601	62,157
300	20,034	20,632	21,434	22,512	23,959	25,901	28,510	32,011	61,401
325	17,989	18,559	19,326	20,359	21,750	23,621	26,140	29,530	60,706
350	15,994	16,547	17,292	18,294	19,644	21,459	23,903	27,192	60,062
375	14,057	14,581	15,288	16,245	17,538	19,287	21,653	24,851	59,463
400	12,168	12,671	13,352	14,276	15,528	17,224	19,523	22,638	58,902
425	10,327	10,811	11,469	12,363	13,576	15,224	17,461	20,500	58,376
450	8,534	9,001	9,637	10,503	11,681	13,284	15,466	18,434	57,879
475	6,788	7,240	7,856	8,696	9,842	11,403	13,532	16,435	57,410
500	5,089	5,526	6,124	6,940	8,056	9,579	11,660	14,502	56,964
525	3,437	3,861	4,442	5,236	6,323	7,810	9,846	12,631	56,540
550	1,832	2,244	2,809	3,582	4,643	6,097	8,090	10,822	56,136
575	0,276	0,676	1,225	1,980	3,015	4,438	6,391	9,074	55,750
600	-1,232	-0,843	-0,308	0,428	1,441	2,834	4,749	7,385	55,381
625	-2,691	-2,313	-1,791	-1,072	-0,081	1,284	3,164	5,755	55,026
650	-4,102	-3,733	-3,223	-2,520	-1,551	-0,212	1,635	4,184	54,685
675	-5,462	-5,102	-4,605	-3,917	-2,967	-1,654	0,162	2,671	54,357
700	-6,773	-6,422	-5,936	-5,263	-4,331	-3,041	-1,256	1,216	54,042
725	-8,034	-7,691	-7,215	-6,556	-5,642	-4,375	-2,619	-0,183	53,737
750	-9,245	-8,910	-8,445	-7,799	-6,902	-5,656	-3,927	-1,525	53,442
775	-10,407	-10,079	-9,624	-8,990	-8,109	-6,884	-5,181	-2,812	53,158
800	-11,520	-11,199	-10,753	-10,131	-9,266	-8,060	-6,382	-4,044	52,882
825	-12,584	-12,270	-11,833	-11,222	-10,372	-9,185	-7,530	-5,223	52,614
850	-13,601	-13,293	-12,864	-12,265	-11,428	-10,260	-8,628	-6,349	52,355
875	-14,570	-14,269	-13,848	-13,259	-12,436	-11,285	-9,675	-7,424	52,103
900	-15,494	-15,199	-14,786	-14,207	-13,397	-12,262	-10,673	-8,449	51,859
925	-16,373	-16,084	-15,678	-15,109	-14,311	-13,192	-11,624	-9,425	51,621
950	-17,209	-16,925	-16,526	-15,966	-15,181	-14,077	-12,528	-10,354	51,389
975	-18,002	-17,723	-17,332	-16,781	-16,007	-14,918	-13,388	-11,237	51,163
1000	-18,755	-18,481	-18,096	-17,554	-16,791	-15,717	-14,205	-12,077	50,944

100 MHz – Zone A – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	98,138	102,398	105,690	106,800	106,947	106,958	106,958	106,958	106,958
	2	88,789	92,883	97,187	100,127	100,907	100,989	100,994	100,994	100,994
	3	83,257	87,116	91,492	95,482	97,242	97,509	97,527	97,528	97,528
	4	79,287	82,968	87,258	91,698	94,441	95,032	95,082	95,084	95,084
	5	76,163	79,715	83,904	88,508	92,047	93,089	93,194	93,199	93,199
	6	73,566	77,027	81,127	85,776	89,885	91,465	91,657	91,668	91,668
	7	71,328	74,725	78,755	83,401	87,894	90,044	90,360	90,380	90,380
	8	69,347	72,702	76,681	81,307	86,049	88,758	89,237	89,270	89,271
	9	67,560	70,890	74,834	79,437	84,338	87,561	88,244	88,295	88,297
	10	65,924	69,244	73,165	77,748	82,750	86,427	87,352	87,427	87,430
	11	64,408	67,729	71,640	76,209	81,274	85,340	86,537	86,645	86,650
	12	62,991	66,323	70,233	74,793	79,900	84,290	85,784	85,933	85,940
	13	61,655	65,007	68,925	73,482	78,616	83,273	85,079	85,280	85,291
	14	60,389	63,768	67,701	72,259	77,414	82,287	84,414	84,677	84,692
	15	59,183	62,595	66,548	71,114	76,283	81,331	83,779	84,116	84,136
	16	58,031	61,479	65,458	70,035	75,217	80,404	83,169	83,591	83,618
	17	56,925	60,415	64,422	69,015	74,208	79,507	82,577	83,098	83,133
	18	55,861	59,395	63,435	68,046	73,250	78,639	82,000	82,633	82,678
	19	54,837	58,417	62,492	67,123	72,338	77,798	81,435	82,191	82,249
	20	53,848	57,476	61,587	66,241	71,467	76,985	80,877	81,770	81,842
	25	49,390	53,257	57,555	62,328	67,612	73,294	78,174	79,897	80,090
	30	45,577	49,649	54,109	58,992	64,330	70,082	75,552	78,254	78,673
	35	42,348	46,547	51,109	56,062	61,436	67,222	73,031	76,702	77,486
	40	39,639	43,872	48,458	53,428	58,810	64,613	70,628	75,164	76,462
	45	37,366	41,543	46,083	51,015	56,374	62,182	68,334	73,598	75,562
	50	35,504	39,537	43,955	48,795	54,094	59,891	66,146	72,006	74,758
	55	33,963	37,788	42,029	46,728	51,937	57,705	64,043	70,390	74,030
	60	32,676	36,250	40,271	44,795	49,883	55,605	62,009	68,757	73,365
	65	31,586	34,883	38,658	42,977	47,921	53,577	60,032	67,116	72,751
	70	30,640	33,652	37,165	41,263	46,042	51,614	58,102	65,470	72,181
	75	29,799	32,528	35,776	39,641	44,239	49,711	56,216	63,826	71,647
	80	29,029	31,487	34,473	38,101	42,510	47,865	54,368	62,185	71,146
	85	28,306	30,509	33,243	36,637	40,849	46,075	52,559	60,552	70,673
	90	27,612	29,580	32,076	35,241	39,253	44,339	50,787	58,928	70,225
	95	26,935	28,690	30,962	33,906	37,719	42,658	49,054	57,318	69,799
	100	26,268	27,829	29,895	32,628	36,245	41,030	47,361	55,724	69,392
	110	24,940	26,174	27,876	30,223	33,463	37,932	44,097	52,598	68,631
	120	23,611	24,585	25,985	27,996	30,886	35,038	41,003	49,571	67,929
	130	22,275	23,047	24,201	25,924	28,498	32,342	38,084	46,659	67,276
	140	20,938	21,554	22,510	23,990	26,283	29,837	35,343	43,872	66,667
	150	19,606	20,104	20,901	22,180	24,230	27,515	32,780	41,218	66,094
	160	18,287	18,695	19,370	20,484	22,325	25,367	30,393	38,696	65,555
	170	16,987	17,329	17,908	18,891	20,558	23,384	28,177	36,306	65,045
	180	15,713	16,006	16,514	17,393	18,915	21,554	26,125	34,045	64,561
	190	14,469	14,726	15,180	15,979	17,386	19,864	24,227	31,909	64,101
	200	13,255	13,488	13,903	14,642	15,957	18,299	22,469	29,893	63,662
	225	10,359	10,562	10,927	11,579	12,749	14,844	18,600	25,331	62,648
	250	7,640	7,841	8,196	8,823	9,927	11,874	15,308	21,362	61,734
	275	5,061	5,276	5,644	6,276	7,359	9,217	12,404	17,869	60,902
	300	2,590	2,826	3,217	3,869	4,953	6,755	9,755	14,744	60,139
	325	0,202	0,460	0,878	1,554	2,647	4,414	7,272	11,895	59,435
	350	-2,122	-1,841	-1,398	-0,698	0,406	2,150	4,904	9,252	58,781
	375	-4,390	-4,090	-3,624	-2,903	-1,787	-0,059	2,618	6,762	58,171
	400	-6,612	-6,294	-5,810	-5,071	-3,944	-2,226	0,394	4,389	57,600
	425	-8,793	-8,460	-7,960	-7,206	-6,070	-4,358	-1,780	2,105	57,062
	450	-10,938	-10,593	-10,080	-9,313	-8,169	-6,461	-3,913	-0,108	56,555
	475	-13,052	-12,698	-12,174	-11,397	-10,245	-8,540	-6,012	-2,268	56,074
	500	-15,143	-14,781	-14,247	-13,461	-12,304	-10,599	-8,087	-4,387	55,617
	525	-17,215	-16,846	-16,306	-15,512	-14,349	-12,644	-10,143	-6,475	55,182
	550	-19,276	-18,902	-18,354	-17,555	-16,387	-14,680	-12,186	-8,543	54,767
	575	-21,331	-20,952	-20,400	-19,595	-18,422	-16,714	-14,225	-10,598	54,370
	600	-23,386	-23,003	-22,446	-21,636	-20,459	-18,749	-16,263	-12,649	53,989
	625	-25,445	-25,059	-24,498	-23,684	-22,504	-20,791	-18,306	-14,701	53,623
	650	-27,513	-27,123	-26,559	-25,742	-24,558	-22,842	-20,358	-16,759	53,272
	675	-29,592	-29,199	-28,632	-27,811	-26,624	-24,906	-22,421	-18,826	52,933
	700	-31,683	-31,288	-30,719	-29,895	-28,704	-26,984	-24,498	-20,904	52,606
	725	-33,787	-33,391	-32,819	-31,992	-30,799	-29,076	-26,588	-22,995	52,291
	750	-35,904	-35,506	-34,932	-34,103	-32,907	-31,181	-28,691	-25,098	51,985
	775	-38,032	-37,633	-37,056	-36,225	-35,026	-33,298	-30,805	-27,211	51,690
	800	-40,168	-39,767	-39,189	-38,356	-37,155	-35,423	-32,928	-29,332	51,403
	825	-42,308	-41,906	-41,326	-40,491	-39,287	-37,554	-35,056	-31,457	51,125
	850	-44,448	-44,044	-43,463	-42,626	-41,420	-39,684	-37,184	-33,583	50,855
	875	-46,581	-46,177	-45,594	-44,755	-43,548	-41,809	-39,306	-35,702	50,593
	900	-48,703	-48,297	-47,713	-46,873	-45,664	-43,923	-41,417	-37,810	50,338
	925	-50,806	-50,399	-49,814	-48,972	-47,761	-46,018	-43,509	-39,899	50,089
	950	-52,883	-52,476	-51,890	-51,046	-49,833	-48,088	-45,576	-41,963	49,847
	975	-54,928	-54,519	-53,932	-53,088	-51,873	-50,125	-47,611	-43,995	49,611
	1000	-56,932	-56,523	-55,935	-55,089	-53,873	-52,123	-49,607	-45,987	49,381

100 MHz – Zone A – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	98,177	102,472	105,844	107,005	107,159	107,170	107,171	107,171	107,173
	2	88,858	92,968	97,345	100,421	101,260	101,349	101,354	101,354	101,405
	3	83,360	87,225	91,668	95,837	97,766	98,066	98,087	98,088	98,116
	4	79,422	83,112	87,453	92,071	95,082	95,764	95,822	95,824	95,835
	5	76,331	79,893	84,122	88,896	92,749	93,965	94,090	94,097	94,098
	6	73,766	77,237	81,372	86,187	90,617	92,458	92,690	92,703	92,703
	7	71,558	74,967	79,028	83,843	88,644	91,128	91,514	91,538	91,540
	8	69,608	72,975	76,982	81,785	86,818	89,911	90,497	90,537	90,544
	9	67,851	71,195	75,164	79,955	85,132	88,767	89,598	89,661	89,675
	10	66,243	69,578	73,525	78,308	83,577	87,673	88,789	88,883	88,905
	11	64,756	68,093	72,029	76,812	82,141	86,620	88,049	88,183	88,214
	12	63,366	66,716	70,653	75,441	80,811	85,601	87,363	87,547	87,587
	13	62,058	65,428	69,375	74,174	79,576	84,616	86,719	86,963	87,013
	14	60,819	64,217	68,182	72,997	78,424	83,663	86,109	86,425	86,485
	15	59,640	63,070	67,061	71,897	77,345	82,743	85,524	85,924	85,995
	16	58,512	61,981	66,003	70,863	76,331	81,857	84,960	85,455	85,539
	17	57,432	60,943	65,001	69,888	75,375	81,003	84,413	85,015	85,112
	18	56,393	59,949	64,049	68,965	74,471	80,181	83,878	84,599	84,710
	19	55,393	58,995	63,183	68,118	73,622	79,395	83,359	84,205	84,331
	20	54,427	58,079	62,275	67,251	72,793	78,626	82,837	83,827	83,972
	25	50,081	53,974	58,455	63,566	69,192	75,191	80,346	82,152	82,420
	30	46,369	50,597	55,282	60,500	66,183	72,257	77,979	80,692	81,159
	35	43,570	47,918	52,647	57,914	63,604	69,698	75,748	79,343	80,097
	40	41,539	45,815	50,500	55,712	61,350	67,419	73,655	78,043	79,179
	45	40,090	44,185	48,761	53,832	59,357	65,359	71,690	76,756	78,369
	50	39,097	42,967	47,371	52,229	57,586	63,482	69,849	75,474	77,644
	55	38,489	42,156	46,262	50,860	56,008	61,766	68,124	74,194	76,986
	60	38,173	41,510	45,308	49,631	54,551	60,147	66,458	72,877	76,382
	65	37,972	40,989	44,483	48,528	53,213	58,636	64,877	71,552	75,824
	70	37,788	40,512	43,721	47,501	51,955	57,200	63,353	70,209	75,303
	75	37,581	40,043	42,992	46,525	50,756	55,824	61,877	68,852	74,814
	80	37,334	39,564	42,279	45,583	49,605	54,499	60,444	67,488	74,353
	85	37,040	39,068	41,573	44,669	48,494	53,220	59,051	66,123	73,916
	90	36,701	38,552	40,871	43,777	47,419	51,983	57,697	64,766	73,500
	95	36,323	38,019	40,172	42,906	46,378	50,787	56,381	63,422	73,103
	100	35,911	37,472	39,477	42,056	45,370	49,631	55,105	62,099	72,723
	110	35,014	36,351	38,109	40,418	43,451	47,437	52,671	59,527	72,006
	120	34,054	35,220	36,779	38,865	41,658	45,395	50,395	57,077	71,339
	130	33,066	34,096	35,495	37,397	39,983	43,497	48,272	54,758	70,715
	140	32,070	32,992	34,262	36,010	38,417	41,730	46,293	52,571	70,129
	150	31,080	31,915	33,078	34,696	36,948	40,082	44,444	50,512	69,574
	160	30,094	30,861	31,937	33,447	35,564	38,534	42,700	48,542	69,049
	170	29,098	29,817	30,828	32,251	34,252	37,068	41,027	46,596	68,550
	180	28,139	28,814	29,768	31,114	33,014	35,696	39,483	44,829	68,075
	190	27,208	27,844	28,746	30,024	31,834	34,400	38,035	43,186	67,621
	200	26,298	26,901	27,758	28,975	30,706	33,167	36,665	41,637	67,187
	225	24,102	24,639	25,407	26,504	28,071	30,310	33,510	38,081	66,178
	250	21,999	22,492	23,197	24,206	25,648	27,711	30,661	34,879	65,264
	275	19,978	20,441	21,102	22,046	23,391	25,311	28,050	31,957	64,430
	300	18,031	18,475	19,105	19,999	21,269	23,072	25,631	29,265	63,662
	325	16,153	16,584	17,192	18,049	19,259	20,964	23,371	26,765	62,952
	350	14,339	14,762	15,354	16,183	17,343	18,968	21,242	24,427	62,292
	375	12,584	13,002	13,583	14,389	15,509	17,065	19,227	22,229	61,675
	400	10,883	11,299	11,872	12,661	13,748	15,246	17,309	20,150	61,096
	425	9,233	9,649	10,217	10,992	12,051	13,499	15,476	18,177	60,551
	450	7,632	8,048	8,613	9,377	10,413	11,817	13,719	16,296	60,036
	475	6,076	6,494	7,056	7,812	8,828	10,194	12,029	14,497	59,548
	500	4,563	4,984	5,545	6,294	7,292	8,625	10,402	12,773	59,084
	525	3,092	3,515	4,076	4,819	5,803	7,106	8,832	11,117	58,641
	550	1,660	2,087	2,649	3,387	4,358	5,635	7,314	9,523	58,219
	575	0,267	0,698	1,260	1,994	2,954	4,208	5,846	7,986	57,814
	600	-1,089	-0,655	-0,091	0,640	1,590	2,823	4,424	6,502	57,426
	625	-2,408	-1,971	-1,406	-0,677	0,264	1,478	3,046	5,069	57,053
	650	-3,693	-3,252	-2,686	-1,959	-1,026	0,172	1,709	3,683	56,694
	675	-4,943	-4,498	-3,930	-3,205	-2,279	-1,097	0,414	2,342	56,348
	700	-6,159	-5,711	-5,141	-4,418	-3,498	-2,329	-0,844	1,044	56,014
	725	-7,343	-6,891	-6,320	-5,597	-4,683	-3,526	-2,064	-0,214	55,691
	750	-8,494	-8,039	-7,466	-6,744	-5,835	-4,690	-3,248	-1,432	55,379
	775	-9,613	-9,155	-8,580	-7,859	-6,954	-5,820	-4,397	-2,612	55,076
	800	-10,702	-10,240	-9,663	-8,943	-8,042	-6,917	-5,512	-3,756	54,782
	825	-11,759	-11,295	-10,716	-9,996	-9,100	-7,983	-6,594	-4,864	54,497
	850	-12,787	-12,320	-11,739	-11,020	-10,126	-9,018	-7,644	-5,938	54,220
	875	-13,786	-13,315	-12,733	-12,014	-11,124	-10,023	-8,662	-6,978	53,951
	900	-14,755	-14,282	-13,699	-12,979	-12,092	-10,998	-9,650	-7,987	53,688
	925	-15,697	-15,221	-14,636	-13,917	-13,032	-11,945	-10,608	-8,964	53,433
	950	-16,611	-16,132	-15,546	-14,827	-13,945	-12,863	-11,537	-9,911	53,184
	975	-17,498	-17,017	-16,429	-15,710	-14,830	-13,754	-12,438	-10,828	52,941
	1000	-18,358	-17,875	-17,285	-16,566	-15,688	-14,618	-13,311	-11,717	52,704

100 MHz – Zone A – 1%

Transmitting / base antenna height (m)	Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
	1	101,723	104,104	106,206	107,209	107,373	107,385	107,385	107,385	107,446
	2	91,385	94,341	97,807	100,785	101,738	101,842	101,847	101,847	101,923
	3	85,183	88,254	92,055	96,203	98,451	98,827	98,852	98,853	98,856
	4	80,809	83,905	87,772	92,374	95,852	96,741	96,774	96,774	96,774
	5	77,432	80,532	84,397	89,146	93,503	95,106	95,218	95,218	95,218
	6	74,671	77,771	81,621	86,406	91,303	93,709	93,985	93,985	93,985
	7	72,322	75,427	79,264	84,049	89,254	92,437	92,969	92,969	92,969
	8	70,268	73,384	77,215	81,992	87,367	91,229	92,107	92,107	92,107
	9	68,435	71,569	75,400	80,172	85,639	90,064	91,316	91,358	91,358
	10	66,773	69,932	73,772	78,544	84,060	88,927	90,593	90,697	90,697
	11	65,252	68,440	72,294	77,073	82,616	87,818	89,921	90,105	90,105
	12	63,847	67,069	70,941	75,734	81,291	86,741	89,286	89,569	89,569
	13	62,543	65,802	69,696	74,508	80,071	85,701	88,675	89,063	89,077
	14	61,330	64,627	68,545	73,380	78,944	84,702	88,079	88,595	88,624
	15	60,199	63,533	67,476	72,337	77,898	83,746	87,492	88,158	88,202
	16	59,151	62,519	66,483	71,370	76,925	82,833	86,909	87,748	87,808
	17	58,179	61,577	65,559	70,473	76,018	81,962	86,334	87,360	87,438
	18	57,282	60,705	64,783	69,670	75,182	81,140	85,777	86,990	87,089
	19	56,576	59,987	63,962	68,866	74,374	80,340	85,204	86,638	86,758
	20	55,714	59,163	63,244	68,139	73,622	79,581	84,643	86,294	86,443
	25	53,151	56,461	60,512	65,219	70,480	76,277	81,908	84,711	85,066
	30	51,731	54,833	58,717	63,100	68,041	73,566	79,342	83,185	83,927
	35	51,177	54,006	57,518	61,535	66,124	71,343	77,053	81,653	82,955
	40	50,956	53,478	56,641	60,310	64,565	69,483	75,033	80,138	82,106
	45	50,863	53,093	55,952	59,314	63,266	67,902	73,255	78,635	81,352
	50	50,805	52,776	55,380	58,478	62,163	66,540	71,682	77,170	80,673
	55	50,739	52,488	54,882	57,758	61,211	65,352	70,281	75,763	80,055
	60	50,642	52,207	54,431	57,121	60,374	64,304	69,025	74,425	79,486
	65	50,503	51,922	54,010	56,546	59,628	63,369	67,890	73,161	78,958
	70	50,317	51,626	53,605	56,016	58,952	62,524	66,856	71,970	78,464
	75	50,087	51,316	53,210	55,518	58,329	61,752	65,908	70,850	77,999
	80	49,817	50,994	52,820	55,042	57,746	61,037	65,030	69,798	77,560
	85	49,514	50,662	52,432	54,582	57,195	60,367	64,211	68,810	77,142
	90	49,186	50,322	52,045	54,134	56,666	59,733	63,442	67,881	76,744
	95	48,838	49,977	51,660	53,695	56,154	59,127	62,713	67,004	76,362
	100	48,478	49,628	51,275	53,261	55,655	58,543	62,019	66,175	75,995
	110	47,734	48,927	50,506	52,404	54,684	57,424	60,711	64,637	75,302
	120	46,970	48,220	49,736	51,555	53,736	56,352	59,486	63,226	74,655
	130	46,314	47,528	48,983	50,728	52,819	55,326	58,330	61,917	74,046
	140	45,668	46,833	48,230	49,906	51,917	54,329	57,221	60,681	73,472
	150	45,015	46,132	47,475	49,087	51,025	53,353	56,148	59,499	72,927
	160	44,352	45,426	46,717	48,272	50,143	52,395	55,104	58,358	72,410
	170	43,679	44,713	45,959	47,461	49,272	51,454	54,084	57,248	71,917
	180	43,008	44,003	45,204	46,656	48,410	50,530	53,089	56,178	71,446
	190	42,336	43,294	44,454	45,859	47,560	49,622	52,118	55,138	70,995
	200	41,665	42,587	43,708	45,069	46,722	48,730	51,167	54,125	70,564
	225	39,997	40,843	41,876	43,140	44,684	46,572	48,879	51,698	69,559
	250	38,364	39,143	40,101	41,280	42,731	44,515	46,710	49,409	68,645
	275	36,778	37,499	38,392	39,497	40,865	42,558	44,654	47,248	67,808
	300	35,248	35,918	36,753	37,792	39,086	40,698	42,705	45,204	67,038
	325	33,767	34,398	35,186	36,171	37,404	38,945	40,872	43,282	66,325
	350	32,363	32,946	33,680	34,606	35,773	37,243	39,097	41,433	65,661
	375	31,008	31,553	32,244	33,120	34,231	35,639	37,425	39,689	65,041
	400	29,708	30,219	30,870	31,701	32,760	34,111	35,834	38,031	64,458
	425	28,463	28,942	29,556	30,345	31,356	32,653	34,318	36,453	63,909
	450	27,271	27,720	28,301	29,049	30,016	31,263	32,873	34,950	63,390
	475	26,124	26,551	27,105	27,822	28,751	29,955	31,515	33,535	62,898
	500	25,038	25,435	25,953	26,630	27,515	28,671	30,180	32,152	62,430
	525	23,994	24,367	24,858	25,502	26,349	27,463	28,927	30,850	61,983
	550	22,996	23,347	23,812	24,426	25,237	26,311	27,731	29,609	61,557
	575	22,044	22,374	22,814	23,399	24,177	25,212	26,591	28,425	61,148
	600	21,136	21,446	21,862	22,419	23,166	24,165	25,504	27,297	60,756
	625	20,269	20,561	20,955	21,486	22,202	23,167	24,468	26,221	60,379
	650	19,444	19,719	20,092	20,598	21,284	22,216	23,481	25,197	60,016
	675	18,658	18,917	19,270	19,752	20,411	21,311	22,541	24,221	59,666
	700	17,911	18,154	18,488	18,947	19,579	20,449	21,645	23,291	59,328
	725	17,200	17,428	17,744	18,182	18,788	19,628	20,793	22,405	59,002
	750	16,524	16,738	17,037	17,454	18,036	18,848	19,981	21,562	58,685
	775	15,881	16,082	16,365	16,762	17,320	18,105	19,208	20,759	58,379
	800	15,271	15,459	15,726	16,104	16,640	17,398	18,473	19,995	58,081
	825	14,691	14,867	15,119	15,479	15,993	16,726	17,772	19,266	57,792
	850	14,139	14,305	14,542	14,885	15,377	16,086	17,105	18,572	57,511
	875	13,615	13,770	13,994	14,320	14,792	15,476	16,470	17,911	57,238
	900	13,117	13,262	13,473	13,782	14,234	14,896	15,864	17,280	56,972
	925	12,643	12,778	12,977	13,270	13,703	14,343	15,286	16,678	56,713
	950	12,192	12,318	12,505	12,783	13,198	13,815	14,734	16,103	56,460
	975	11,762	11,879	12,055	12,319	12,715	13,312	14,207	15,554	56,213
	1000	11,352	11,461	11,626	11,876	12,255	12,831	13,704	15,029	55,972

100 MHz – Zone B – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	98,030	102,315	105,627	106,744	106,892	106,902	106,903	106,903	106,903
	2	88,576	92,704	97,045	100,010	100,797	100,880	100,884	100,885	100,885
	3	82,940	86,840	91,264	95,297	97,076	97,346	97,364	97,365	97,365
	4	78,868	82,597	86,942	91,439	94,218	94,816	94,867	94,869	94,869
	5	75,645	79,250	83,500	88,172	91,763	92,821	92,928	92,933	92,933
	6	72,951	76,469	80,637	85,362	89,540	91,145	91,341	91,351	91,352
	7	70,617	74,075	78,179	82,909	87,484	89,673	89,995	90,014	90,015
	8	68,543	71,963	76,021	80,737	85,573	88,334	88,823	88,856	88,858
	9	66,664	70,064	74,091	78,790	83,794	87,085	87,783	87,835	87,837
	10	64,938	68,332	72,341	77,026	82,139	85,898	86,843	86,920	86,924
	11	63,334	66,734	70,736	75,412	80,596	84,757	85,982	86,093	86,098
	12	61,831	65,245	69,251	73,923	79,155	83,654	85,184	85,337	85,344
	13	60,411	63,849	67,867	72,540	77,806	82,582	84,434	84,640	84,651
	14	59,062	62,531	66,567	71,247	76,538	81,541	83,725	83,994	84,009
	15	57,775	61,280	65,342	70,033	75,344	80,530	83,046	83,392	83,412
	16	56,543	60,089	64,180	68,887	74,215	79,549	82,392	82,826	82,853
	17	55,359	58,950	63,074	67,800	73,144	78,597	81,756	82,293	82,329
	18	54,220	57,859	62,019	66,767	72,125	77,675	81,136	81,787	81,834
	19	53,120	56,809	61,008	65,780	71,154	76,781	80,527	81,307	81,366
	20	52,058	55,799	60,038	64,836	70,224	75,914	79,927	80,848	80,922
	25	47,255	51,253	55,696	60,631	66,093	71,967	77,012	78,794	78,992
	30	43,131	47,350	51,970	57,029	62,558	68,516	74,183	76,982	77,416
	35	39,621	43,979	48,713	53,853	59,429	65,433	71,462	75,272	76,084
	40	36,659	41,059	45,826	50,991	56,584	62,615	68,867	73,581	74,930
	45	34,158	38,506	43,230	48,364	53,942	59,986	66,389	71,869	73,913
	50	32,089	36,293	40,898	45,942	51,466	57,507	64,027	70,135	73,003
	55	30,362	34,355	38,780	43,685	49,121	55,141	61,756	68,380	72,179
	60	28,908	32,643	36,845	41,572	46,889	52,868	59,561	66,613	71,428
	65	27,666	31,116	35,065	39,584	44,757	50,675	57,428	64,840	70,736
	70	26,584	29,739	33,419	37,711	42,716	48,553	55,349	63,067	70,096
	75	25,620	28,481	31,887	35,939	40,761	46,498	53,318	61,298	69,499
	80	24,739	27,319	30,453	34,261	38,887	44,508	51,333	59,537	68,941
	85	23,916	26,231	29,103	32,667	37,091	42,580	49,390	57,786	68,417
	90	23,133	25,202	27,825	31,151	35,368	40,715	47,492	56,049	67,923
	95	22,376	24,221	26,611	29,707	33,717	38,911	45,638	54,329	67,455
	100	21,636	23,278	25,452	28,328	32,134	37,169	43,830	52,630	67,011
	110	20,185	21,484	23,275	25,747	29,158	33,863	40,355	49,305	66,186
	120	18,756	19,782	21,256	23,375	26,418	30,791	37,074	46,098	65,433
	130	17,340	18,154	19,369	21,184	23,895	27,944	33,992	43,024	64,740
	140	15,940	16,589	17,595	19,154	21,569	25,312	31,110	40,093	64,098
	150	14,558	15,082	15,922	17,268	19,426	22,884	28,427	37,310	63,499
	160	13,199	13,629	14,339	15,511	17,449	20,650	25,939	34,676	62,940
	170	11,869	12,229	12,838	13,872	15,624	18,597	23,638	32,188	62,414
	180	10,572	10,880	11,413	12,337	13,938	16,711	21,516	29,841	61,918
	190	9,309	9,580	10,057	10,896	12,374	14,977	19,560	27,631	61,449
	200	8,083	8,328	8,764	9,539	10,920	13,379	17,756	25,551	61,004
	225	5,171	5,384	5,766	6,450	7,676	9,872	13,809	20,864	59,981
	250	2,450	2,661	3,033	3,688	4,844	6,882	10,476	16,812	59,066
	275	-0,121	0,104	0,489	1,149	2,281	4,223	7,553	13,265	58,238
	300	-2,578	-2,333	-1,924	-1,244	-0,113	1,769	4,899	10,106	57,482
	325	-4,951	-4,681	-4,246	-3,541	-2,402	-0,560	2,419	7,237	56,786
	350	-7,255	-6,963	-6,502	-5,774	-4,624	-2,808	0,058	4,584	56,142
	375	-9,504	-9,192	-8,708	-7,958	-6,798	-5,001	-2,218	2,091	55,542
	400	-11,706	-11,376	-10,873	-10,105	-8,935	-7,151	-4,430	-0,281	54,981
	425	-13,866	-13,522	-13,002	-12,220	-11,041	-9,266	-6,591	-2,560	54,454
	450	-15,990	-15,634	-15,101	-14,307	-13,121	-11,351	-8,710	-4,767	53,957
	475	-18,084	-17,718	-17,175	-16,370	-15,178	-13,412	-10,795	-6,919	53,487
	500	-20,154	-19,779	-19,228	-18,415	-17,217	-15,454	-12,855	-9,028	53,041
	525	-22,206	-21,825	-21,266	-20,446	-19,244	-17,481	-14,896	-11,106	52,617
	550	-24,246	-23,859	-23,294	-22,469	-21,262	-19,500	-16,925	-13,162	52,212
	575	-26,280	-25,889	-25,319	-24,489	-23,279	-21,516	-18,948	-15,207	51,826
	600	-28,315	-27,920	-27,345	-26,511	-25,298	-23,534	-20,971	-17,245	51,455
	625	-30,353	-29,955	-29,377	-28,539	-27,323	-25,559	-22,999	-19,285	51,100
	650	-32,401	-32,000	-31,419	-30,577	-29,358	-27,593	-25,035	-21,330	50,759
	675	-34,459	-34,056	-33,472	-32,628	-31,406	-29,639	-27,083	-23,385	50,431
	700	-36,530	-36,125	-35,539	-34,692	-33,468	-31,700	-29,144	-25,450	50,115
	725	-38,614	-38,207	-37,619	-36,770	-35,545	-33,775	-31,219	-27,528	49,809
	750	-40,711	-40,303	-39,713	-38,862	-37,634	-35,863	-33,306	-29,617	49,514
	775	-42,819	-42,409	-41,818	-40,965	-39,736	-37,962	-35,405	-31,717	49,229
	800	-44,935	-44,524	-43,931	-43,077	-41,845	-40,071	-37,512	-33,825	48,953
	825	-47,055	-46,643	-46,049	-45,193	-43,960	-42,184	-39,624	-35,937	48,685
	850	-49,175	-48,762	-48,167	-47,309	-46,075	-44,297	-41,736	-38,048	48,425
	875	-51,289	-50,875	-50,279	-49,420	-48,184	-46,405	-43,842	-40,154	48,173
	900	-53,391	-52,976	-52,379	-51,519	-50,282	-48,501	-45,937	-42,247	47,928
	925	-55,475	-55,059	-54,461	-53,600	-52,361	-50,579	-48,014	-44,322	47,689
	950	-57,533	-57,116	-56,517	-55,655	-54,415	-52,632	-50,065	-46,372	47,457
	975	-59,558	-59,141	-58,541	-57,678	-56,437	-54,652	-52,084	-48,390	47,231
	1000	-61,543	-61,125	-60,525	-59,661	-58,419	-56,632	-54,063	-50,367	47,011

100 MHz – Zone B – 10%

Transmitting / base antenna height (m)	Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
	1	98,059	102,378	105,768	106,934	107,090	107,101	107,102	107,102	107,104
	2	88,626	92,766	97,177	100,276	101,122	101,211	101,217	101,217	101,267
	3	83,015	86,917	91,402	95,612	97,559	97,862	97,883	97,884	97,913
	4	78,967	82,698	87,088	91,760	94,804	95,494	95,553	95,555	95,566
	5	75,767	79,375	83,659	88,496	92,399	93,630	93,758	93,764	93,765
	6	73,096	76,617	80,812	85,697	90,192	92,059	92,295	92,307	92,307
	7	70,784	74,247	78,372	83,264	88,141	90,665	91,057	91,081	91,083
	8	68,732	72,158	76,233	81,118	86,237	89,383	89,979	90,020	90,027
	9	66,875	70,281	74,322	79,201	84,473	88,174	89,021	89,085	89,100
	10	65,170	68,570	72,593	77,469	82,840	87,016	88,153	88,249	88,272
	11	63,587	66,993	71,009	75,889	81,327	85,897	87,356	87,492	87,524
	12	62,104	65,525	69,546	74,436	79,921	84,813	86,613	86,800	86,842
	13	60,703	64,149	68,183	73,089	78,611	83,763	85,913	86,163	86,214
	14	59,374	62,850	66,907	71,833	77,385	82,745	85,247	85,570	85,632
	15	58,107	61,619	65,705	70,656	76,234	81,761	84,608	85,017	85,091
	16	56,893	60,447	64,568	69,547	75,150	80,811	83,990	84,497	84,583
	17	55,728	59,327	63,488	68,498	74,124	79,893	83,389	84,007	84,106
	18	54,606	58,253	62,460	67,502	73,151	79,009	82,801	83,541	83,655
	19	53,524	57,222	61,521	66,586	72,236	78,161	82,231	83,099	83,228
	20	52,479	56,229	60,539	65,649	71,341	77,331	81,656	82,673	82,822
	25	47,758	51,765	56,378	61,639	67,431	73,607	78,913	80,772	81,048
	30	43,707	48,067	52,900	58,281	64,143	70,407	76,308	79,106	79,588
	35	40,602	45,096	49,981	55,424	61,304	67,600	73,852	77,566	78,345
	40	38,295	42,722	47,573	52,969	58,806	65,089	71,545	76,088	77,264
	45	36,597	40,846	45,593	50,853	56,585	62,811	69,379	74,635	76,308
	50	35,380	39,403	43,981	49,031	54,599	60,728	67,347	73,194	75,450
	55	34,569	38,389	42,667	47,457	52,820	58,817	65,440	71,764	74,672
	60	34,071	37,554	41,519	46,032	51,169	57,011	63,600	70,301	73,961
	65	33,705	36,861	40,516	44,749	49,651	55,323	61,853	68,836	73,305
	70	33,373	36,228	39,592	43,554	48,223	53,720	60,170	67,357	72,697
	75	33,032	35,617	38,714	42,423	46,867	52,188	58,544	65,868	72,129
	80	32,664	35,010	37,865	41,340	45,570	50,717	56,969	64,377	71,597
	85	32,262	34,397	37,036	40,296	44,324	49,301	55,442	62,889	71,096
	90	31,826	33,777	36,222	39,286	43,125	47,937	53,961	61,414	70,622
	95	31,360	33,149	35,421	38,307	41,971	46,623	52,527	59,957	70,173
	100	30,869	32,517	34,635	37,358	40,859	45,359	51,140	58,526	69,746
	110	29,837	31,252	33,110	35,551	38,759	42,972	48,507	55,756	68,950
	120	28,770	30,003	31,652	33,860	36,815	40,769	46,060	53,129	68,220
	130	27,695	28,785	30,266	32,279	35,016	38,735	43,790	50,654	67,545
	140	26,630	27,606	28,950	30,800	33,348	36,856	41,685	48,331	66,917
	150	25,585	26,469	27,700	29,413	31,797	35,114	39,730	46,153	66,331
	160	24,556	25,368	26,507	28,104	30,345	33,488	37,896	44,079	65,780
	170	23,526	24,287	25,357	26,862	28,979	31,957	36,146	42,037	65,261
	180	22,542	23,256	24,264	25,687	27,697	30,533	34,538	40,190	64,771
	190	21,592	22,264	23,218	24,568	26,482	29,193	33,036	38,479	64,306
	200	20,668	21,305	22,210	23,496	25,325	27,924	31,620	36,872	63,864
	225	18,455	19,021	19,831	20,988	22,641	25,004	28,379	33,203	62,845
	250	16,350	16,869	17,612	18,675	20,194	22,367	25,475	29,919	61,930
	275	14,337	14,825	15,520	16,512	17,928	19,948	22,829	26,940	61,100
	300	12,405	12,871	13,533	14,472	15,806	17,700	20,389	24,206	60,341
	325	10,545	10,997	11,635	12,534	13,803	15,592	18,117	21,678	59,641
	350	8,751	9,194	9,814	10,682	11,898	13,600	15,984	19,321	58,993
	375	7,017	7,454	8,062	8,906	10,078	11,707	13,968	17,110	58,389
	400	5,338	5,773	6,372	7,196	8,333	9,898	12,054	15,024	57,823
	425	3,711	4,145	4,737	5,547	6,653	8,164	10,228	13,048	57,291
	450	2,132	2,566	3,154	3,952	5,032	6,496	8,480	11,168	56,790
	475	0,598	1,034	1,620	2,407	3,466	4,889	6,802	9,373	56,315
	500	-0,892	-0,454	0,130	0,910	1,949	3,336	5,187	7,655	55,864
	525	-2,341	-1,900	-1,316	-0,544	0,480	1,835	3,629	6,006	55,435
	550	-3,750	-3,306	-2,723	-1,955	-0,946	0,381	2,126	4,421	55,025
	575	-5,120	-4,673	-4,090	-3,327	-2,331	-1,029	0,672	2,895	54,634
	600	-6,454	-6,004	-5,419	-4,660	-3,675	-2,395	-0,734	1,423	54,259
	625	-7,751	-7,298	-6,712	-5,956	-4,981	-3,722	-2,096	0,002	53,899
	650	-9,013	-8,556	-7,970	-7,217	-6,250	-5,009	-3,416	-1,371	53,553
	675	-10,241	-9,781	-9,193	-8,442	-7,483	-6,259	-4,695	-2,699	53,220
	700	-11,436	-10,972	-10,382	-9,633	-8,682	-7,472	-5,935	-3,982	52,899
	725	-12,597	-12,130	-11,539	-10,792	-9,846	-8,651	-7,138	-5,225	52,589
	750	-13,726	-13,256	-12,664	-11,918	-10,978	-9,795	-8,304	-6,427	52,290
	775	-14,824	-14,351	-13,757	-13,012	-12,077	-10,905	-9,435	-7,592	52,000
	800	-15,891	-15,414	-14,819	-14,075	-13,145	-11,984	-10,532	-8,719	51,719
	825	-16,927	-16,447	-15,851	-15,107	-14,182	-13,030	-11,596	-9,811	51,447
	850	-17,933	-17,451	-16,853	-16,110	-15,189	-14,046	-12,628	-10,868	51,182
	875	-18,910	-18,425	-17,825	-17,084	-16,166	-15,031	-13,628	-11,892	50,926
	900	-19,859	-19,371	-18,770	-18,028	-17,114	-15,987	-14,597	-12,884	50,676
	925	-20,779	-20,289	-19,686	-18,945	-18,034	-16,914	-15,537	-13,844	50,433
	950	-21,672	-21,179	-20,575	-19,835	-18,926	-17,813	-16,447	-14,773	50,196
	975	-22,538	-22,043	-21,437	-20,697	-19,792	-18,684	-17,329	-15,673	49,966
	1000	-23,377	-22,880	-22,273	-21,533	-20,630	-19,528	-18,184	-16,544	49,741

100 MHz – Zone B – 1%

Transmitting / base antenna height (m) \ Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
1	101,614	104,013	106,131	107,142	107,307	107,319	107,319	107,319	107,380
2	91,168	94,148	97,644	100,646	101,608	101,712	101,718	101,718	101,794
3	84,860	87,961	91,799	95,986	98,256	98,635	98,660	98,661	98,665
4	80,383	83,513	87,422	92,073	95,590	96,487	96,521	96,521	96,521
5	76,906	80,042	83,954	88,760	93,170	94,791	94,905	94,905	94,905
6	74,045	77,186	81,087	85,935	90,897	93,334	93,613	93,613	93,613
7	71,599	74,748	78,640	83,493	88,772	92,000	92,539	92,539	92,539
8	69,450	72,614	76,502	81,352	86,809	90,730	91,621	91,621	91,621
9	67,524	70,708	74,602	79,450	85,005	89,502	90,774	90,817	90,817
10	65,771	68,984	72,888	77,742	83,352	88,301	89,996	90,102	90,102
11	64,160	67,405	71,328	76,192	81,834	87,128	89,269	89,457	89,457
12	62,667	65,950	69,894	74,776	80,436	85,987	88,580	88,868	88,868
13	61,278	64,600	68,570	73,475	79,145	84,884	87,915	88,311	88,326
14	59,980	63,343	67,340	72,272	77,948	83,822	87,266	87,792	87,822
15	58,767	62,170	66,195	71,157	76,834	82,803	86,627	87,307	87,352
16	57,639	61,079	65,127	70,119	75,794	81,828	85,991	86,848	86,910
17	56,587	60,061	64,130	69,153	74,820	80,895	85,364	86,412	86,493
18	55,613	59,114	63,284	68,282	73,919	80,013	84,756	85,996	86,097
19	54,831	58,322	62,390	67,409	73,046	79,152	84,131	85,598	85,721
20	53,894	57,426	61,605	66,618	72,233	78,335	83,518	85,210	85,362
25	50,981	54,382	58,545	63,382	68,789	74,745	80,531	83,413	83,777
30	49,244	52,443	56,450	60,970	66,066	71,764	77,721	81,685	82,450
35	48,405	51,335	54,971	59,129	63,881	69,286	75,197	79,961	81,308
40	47,926	50,548	53,836	57,650	62,072	67,185	72,954	78,260	80,306
45	47,601	49,928	52,911	56,419	60,543	65,380	70,965	76,579	79,414
50	47,334	49,397	52,124	55,368	59,228	63,811	69,195	74,942	78,611
55	47,078	48,915	51,431	54,452	58,081	62,432	67,611	73,371	77,880
60	46,810	48,460	50,804	53,639	57,067	61,209	66,184	71,876	77,210
65	46,517	48,017	50,224	52,904	56,161	60,115	64,893	70,463	76,590
70	46,193	47,580	49,677	52,231	55,341	59,126	63,716	69,133	76,014
75	45,838	47,143	49,154	51,604	54,589	58,223	62,636	67,884	75,475
80	45,456	46,708	48,650	51,014	53,891	57,391	61,639	66,712	74,969
85	45,051	46,274	48,160	50,452	53,236	56,616	60,712	65,613	74,491
90	44,632	45,844	47,683	49,912	52,614	55,886	59,844	64,581	74,038
95	44,202	45,419	47,217	49,391	52,019	55,194	59,026	63,610	73,608
100	43,768	44,999	46,759	48,883	51,444	54,532	58,250	62,695	73,198
110	42,899	44,176	45,868	47,901	50,344	53,278	56,800	61,005	72,430
120	42,034	43,374	45,000	46,951	49,290	52,095	55,455	59,466	71,723
130	41,297	42,600	44,162	46,035	48,280	50,971	54,195	58,046	71,066
140	40,587	41,838	43,338	45,139	47,299	49,890	52,997	56,713	70,453
150	39,882	41,083	42,525	44,259	46,341	48,843	51,847	55,448	69,878
160	39,179	40,333	41,722	43,393	45,404	47,824	50,736	54,234	69,337
170	38,476	39,586	40,926	42,540	44,486	46,832	49,658	53,060	68,825
180	37,780	38,849	40,140	41,701	43,586	45,863	48,614	51,933	68,340
190	37,090	38,119	39,365	40,875	42,703	44,917	47,599	50,844	67,879
200	36,406	37,397	38,601	40,062	41,837	43,993	46,611	49,787	67,440
225	34,722	35,629	36,737	38,092	39,748	41,773	44,247	47,270	66,425
250	33,087	33,921	34,948	36,210	37,763	39,674	42,024	44,914	65,510
275	31,510	32,281	33,235	34,416	35,878	37,688	39,929	42,701	64,679
300	29,993	30,708	31,598	32,707	34,088	35,808	37,950	40,617	63,916
325	28,529	29,200	30,040	31,090	32,403	34,045	36,098	38,665	63,213
350	27,143	27,763	28,544	29,529	30,770	32,334	34,306	36,790	62,561
375	25,808	26,387	27,121	28,051	29,231	30,727	32,623	35,028	61,952
400	24,529	25,070	25,761	26,642	27,765	29,198	31,025	33,355	61,381
425	23,305	23,812	24,462	25,297	26,368	27,742	29,505	31,767	60,845
450	22,133	22,609	23,223	24,015	25,037	26,356	28,059	30,256	60,338
475	21,007	21,459	22,044	22,802	23,783	25,055	26,703	28,837	59,859
500	19,943	20,361	20,908	21,623	22,557	23,776	25,369	27,450	59,403
525	18,920	19,313	19,830	20,510	21,403	22,577	24,120	26,148	58,969
550	17,943	18,313	18,802	19,448	20,303	21,434	22,930	24,907	58,555
575	17,012	17,359	17,822	18,437	19,256	20,346	21,796	23,726	58,159
600	16,124	16,451	16,888	17,474	18,259	19,309	20,717	22,602	57,779
625	15,279	15,586	16,000	16,557	17,309	18,323	19,689	21,532	57,415
650	14,474	14,763	15,154	15,685	16,406	17,384	18,712	20,513	57,064
675	13,709	13,980	14,351	14,856	15,548	16,492	17,782	19,544	56,726
700	12,982	13,237	13,587	14,069	14,731	15,643	16,897	18,622	56,401
725	12,292	12,531	12,862	13,320	13,956	14,836	16,056	17,746	56,086
750	11,636	11,860	12,173	12,610	13,219	14,070	15,256	16,912	55,782
775	11,014	11,224	11,520	11,936	12,520	13,341	14,496	16,119	55,487
800	10,424	10,621	10,900	11,295	11,856	12,649	13,773	15,365	55,202
825	9,864	10,048	10,312	10,688	11,225	11,991	13,086	14,647	54,925
850	9,333	9,505	9,754	10,111	10,626	11,366	12,432	13,965	54,656
875	8,829	8,990	9,224	9,564	10,057	10,772	11,810	13,315	54,395
900	8,350	8,501	8,722	9,044	9,517	10,207	11,218	12,697	54,140
925	7,896	8,037	8,244	8,551	9,003	9,670	10,654	12,107	53,893
950	7,465	7,596	7,791	8,081	8,514	9,158	10,117	11,545	53,652
975	7,055	7,176	7,360	7,635	8,049	8,670	9,605	11,009	53,417
1000	6,664	6,778	6,949	7,210	7,605	8,205	9,116	10,498	53,187

100 MHz – Zone C – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	98,003	102,300	105,621	106,741	106,889	106,900	106,900	106,900	106,900
	2	88,522	92,667	97,024	100,001	100,791	100,875	100,879	100,879	100,879
	3	82,861	86,780	91,226	95,279	97,067	97,338	97,357	97,358	97,358
	4	78,763	82,514	86,885	91,409	94,204	94,806	94,856	94,859	94,859
	5	75,515	79,145	83,424	88,128	91,743	92,808	92,915	92,920	92,921
	6	72,797	76,341	80,541	85,302	89,511	91,129	91,326	91,337	91,337
	7	70,439	73,926	78,064	82,833	87,446	89,653	89,977	89,997	89,998
	8	68,342	71,793	75,886	80,645	85,524	88,310	88,804	88,837	88,838
	9	66,440	69,873	73,937	78,682	83,734	87,056	87,761	87,813	87,815
	10	64,692	68,120	72,169	76,902	82,067	85,864	86,819	86,897	86,900
	11	63,066	66,501	70,546	75,272	80,512	84,717	85,955	86,067	86,072
	12	61,540	64,993	69,044	73,767	79,058	83,607	85,154	85,309	85,316
	13	60,099	63,577	67,642	72,369	77,696	82,528	84,402	84,610	84,621
	14	58,730	62,240	66,326	71,062	76,417	81,480	83,689	83,962	83,977
	15	57,423	60,971	65,083	69,833	75,210	80,461	83,007	83,357	83,378
	16	56,170	59,762	63,905	68,672	74,068	79,471	82,350	82,790	82,818
	17	54,967	58,606	62,784	67,572	72,986	78,510	81,711	82,255	82,291
	18	53,808	57,496	61,713	66,524	71,955	77,579	81,087	81,747	81,795
	19	52,690	56,430	60,687	65,525	70,972	76,676	80,475	81,265	81,325
	20	51,610	55,403	59,702	64,567	70,031	75,801	79,870	80,804	80,879
	25	46,721	50,780	55,290	60,300	65,845	71,809	76,931	78,739	78,941
	30	42,519	46,806	51,500	56,641	62,260	68,314	74,072	76,916	77,358
	35	38,939	43,371	48,184	53,411	59,082	65,187	71,318	75,192	76,019
	40	35,913	40,390	45,241	50,497	56,189	62,327	68,688	73,486	74,859
	45	33,355	37,782	42,593	47,821	53,500	59,655	66,175	71,754	73,836
	50	31,234	35,518	40,210	45,349	50,977	57,132	63,775	69,998	72,921
	55	29,460	33,531	38,043	43,043	48,585	54,723	61,466	68,219	72,093
	60	27,964	31,774	36,060	40,882	46,306	52,406	59,232	66,425	71,337
	65	26,684	30,206	34,236	38,849	44,128	50,168	57,060	64,624	70,642
	70	25,569	28,790	32,547	36,930	42,041	48,001	54,941	62,821	69,998
	75	24,573	27,497	30,976	35,115	40,041	45,902	52,869	61,021	69,399
	80	23,665	26,301	29,504	33,396	38,124	43,868	50,843	59,227	68,838
	85	22,817	25,183	28,120	31,764	36,286	41,898	48,860	57,443	68,312
	90	22,011	24,127	26,810	30,212	34,524	39,991	46,922	55,672	67,815
	95	21,234	23,122	25,566	28,733	32,835	38,148	45,029	53,919	67,346
	100	20,476	22,157	24,381	27,323	31,216	36,368	43,183	52,186	66,900
	110	18,994	20,323	22,157	24,687	28,177	32,993	39,636	48,796	66,072
	120	17,540	18,591	20,100	22,268	25,383	29,859	36,289	45,526	65,316
	130	16,105	16,938	18,182	20,039	22,814	26,958	33,149	42,393	64,621
	140	14,688	15,353	16,383	17,978	20,450	24,281	30,215	39,409	63,977
	150	13,294	13,830	14,690	16,067	18,276	21,815	27,487	36,577	63,378
	160	11,925	12,365	13,091	14,291	16,274	19,549	24,960	33,899	62,818
	170	10,588	10,955	11,579	12,636	14,429	17,470	22,626	31,372	62,291
	180	9,284	9,599	10,145	11,089	12,727	15,563	20,477	28,991	61,795
	190	8,018	8,294	8,782	9,640	11,151	13,812	18,498	26,750	61,325
	200	6,788	7,038	7,484	8,276	9,688	12,201	16,675	24,642	60,879
	225	3,872	4,089	4,479	5,178	6,430	8,674	12,695	19,902	59,856
	250	1,151	1,366	1,745	2,415	3,594	5,675	9,343	15,811	58,941
	275	-1,418	-1,189	-0,796	-0,123	1,032	3,013	6,410	12,237	58,113
	300	-3,872	-3,622	-3,205	-2,512	-1,359	0,559	3,750	9,059	57,358
	325	-6,240	-5,966	-5,522	-4,805	-3,644	-1,767	1,268	6,178	56,662
	350	-8,541	-8,243	-7,773	-7,032	-5,861	-4,012	-1,093	3,516	56,019
	375	-10,785	-10,467	-9,974	-9,211	-8,030	-6,201	-3,369	1,017	55,419
	400	-12,981	-12,646	-12,134	-11,353	-10,163	-8,348	-5,580	-1,359	54,859
	425	-15,136	-14,786	-14,258	-13,463	-12,264	-10,459	-7,739	-3,640	54,332
	450	-17,255	-16,893	-16,352	-15,544	-14,339	-12,541	-9,856	-5,849	53,836
	475	-19,344	-18,972	-18,420	-17,603	-16,392	-14,598	-11,939	-8,001	53,366
	500	-21,409	-21,028	-20,468	-19,643	-18,427	-16,635	-13,997	-10,110	52,921
	525	-23,455	-23,068	-22,501	-21,669	-20,449	-18,659	-16,035	-12,188	52,497
	550	-25,490	-25,098	-24,525	-23,687	-22,463	-20,675	-18,062	-14,244	52,093
	575	-27,520	-27,123	-26,544	-25,702	-24,475	-22,687	-20,082	-16,287	51,707
	600	-29,549	-29,148	-28,566	-27,719	-26,489	-24,701	-22,102	-18,325	51,337
	625	-31,582	-31,179	-30,593	-29,743	-28,510	-26,722	-24,127	-20,363	50,982
	650	-33,624	-33,218	-32,629	-31,777	-30,542	-28,753	-26,161	-22,407	50,642
	675	-35,678	-35,269	-34,678	-33,823	-32,586	-30,796	-28,206	-24,460	50,314
	700	-37,744	-37,333	-36,740	-35,882	-34,643	-32,852	-30,264	-26,523	49,998
	725	-39,823	-39,411	-38,816	-37,956	-36,715	-34,923	-32,336	-28,599	49,693
	750	-41,915	-41,501	-40,905	-40,043	-38,801	-37,008	-34,420	-30,687	49,399
	775	-44,018	-43,603	-43,005	-42,142	-40,898	-39,104	-36,516	-32,785	49,114
	800	-46,129	-45,713	-45,113	-44,249	-43,003	-41,208	-38,621	-34,891	48,838
	825	-48,244	-47,827	-47,226	-46,361	-45,114	-43,318	-40,729	-37,001	48,571
	850	-50,359	-49,941	-49,339	-48,473	-47,225	-45,427	-42,838	-39,110	48,312
	875	-52,468	-52,049	-51,447	-50,579	-49,330	-47,531	-44,941	-41,213	48,060
	900	-54,565	-54,146	-53,542	-52,674	-51,423	-49,623	-47,033	-43,304	47,815
	925	-56,644	-56,224	-55,619	-54,750	-53,498	-51,698	-49,106	-45,377	47,577
	950	-58,697	-58,276	-57,671	-56,801	-55,548	-53,747	-51,154	-47,425	47,346
	975	-60,717	-60,296	-59,690	-58,819	-57,566	-55,763	-53,170	-49,439	47,120
	1000	-62,697	-62,276	-61,669	-60,797	-59,543	-57,740	-55,145	-51,414	46,900

100 MHz – Zone C – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	98,149	102,448	105,822	106,984	107,139	107,150	107,150	107,150	107,152
	2	88,802	92,917	97,299	100,378	101,219	101,308	101,313	101,313	101,363
	3	83,277	87,148	91,597	95,773	97,704	98,005	98,026	98,027	98,055
	4	79,313	83,008	87,357	91,984	95,000	95,683	95,741	95,744	95,754
	5	76,195	79,764	84,002	88,786	92,647	93,865	93,991	93,997	93,998
	6	73,604	77,084	81,227	86,054	90,494	92,338	92,572	92,584	92,584
	7	71,372	74,789	78,860	83,687	88,500	90,990	91,377	91,401	91,402
	8	69,397	72,774	76,791	81,606	86,653	89,754	90,342	90,382	90,389
	9	67,616	70,969	74,950	79,754	84,946	88,591	89,425	89,489	89,503
	10	65,985	69,330	73,288	78,086	83,371	87,480	88,599	88,693	88,715
	11	64,475	67,822	71,771	76,569	81,915	86,408	87,842	87,976	88,007
	12	63,062	66,423	70,373	75,177	80,565	85,371	87,139	87,323	87,363
	13	61,732	65,114	69,074	73,890	79,310	84,367	86,479	86,723	86,774
	14	60,471	63,881	67,860	72,693	78,139	83,397	85,852	86,169	86,229
	15	59,271	62,714	66,719	71,573	77,042	82,460	85,251	85,652	85,724
	16	58,123	61,605	65,642	70,520	76,010	81,556	84,671	85,168	85,252
	17	57,022	60,546	64,621	69,527	75,035	80,685	84,108	84,713	84,810
	18	55,963	59,533	63,650	68,585	74,113	79,846	83,558	84,282	84,394
	19	54,943	58,560	62,766	67,720	73,247	79,043	83,024	83,874	84,000
	20	53,958	57,625	61,839	66,836	72,401	78,258	82,487	83,482	83,627
	25	49,522	53,433	57,934	63,068	68,720	74,747	79,925	81,739	82,008
	30	45,728	49,976	54,685	59,928	65,639	71,743	77,492	80,219	80,687
	35	42,855	47,227	51,979	57,274	62,993	69,119	75,200	78,814	79,571
	40	40,758	45,058	49,768	55,009	60,678	66,780	73,050	77,462	78,604
	45	39,249	43,368	47,970	53,071	58,628	64,665	71,033	76,129	77,751
	50	38,202	42,096	46,527	51,415	56,804	62,736	69,143	74,803	76,986
	55	37,545	41,236	45,369	49,997	55,178	60,973	67,372	73,482	76,292
	60	37,186	40,545	44,369	48,721	53,675	59,309	65,664	72,126	75,656
	65	36,945	39,983	43,502	47,577	52,296	57,757	64,043	70,766	75,068
	70	36,725	39,470	42,702	46,511	50,998	56,282	62,482	69,389	74,521
	75	36,486	38,967	41,939	45,499	49,764	54,871	60,971	68,000	74,009
	80	36,210	38,458	41,195	44,525	48,579	53,513	59,506	66,606	73,526
	85	35,890	37,934	40,460	43,582	47,438	52,203	58,082	65,213	73,070
	90	35,528	37,394	39,732	42,663	46,336	50,938	56,700	63,829	72,637
	95	35,128	36,838	39,010	41,768	45,270	49,716	55,359	62,460	72,224
	100	34,698	36,271	38,295	40,895	44,239	48,536	54,059	61,113	71,830
	110	33,768	35,117	36,890	39,220	42,280	46,301	51,582	58,499	71,089
	120	32,782	33,958	35,531	37,637	40,454	44,225	49,271	56,012	70,403
	130	31,773	32,812	34,224	36,144	38,753	42,298	47,117	53,661	69,764
	140	30,761	31,691	32,972	34,736	37,165	40,509	45,112	51,448	69,165
	150	29,757	30,600	31,773	33,406	35,679	38,841	43,242	49,366	68,601
	160	28,761	29,535	30,621	32,144	34,281	37,277	41,481	47,376	68,069
	170	27,757	28,482	29,503	30,938	32,958	35,798	39,793	45,412	67,564
	180	26,791	27,473	28,435	29,793	31,710	34,416	38,237	43,630	67,084
	190	25,856	26,498	27,408	28,697	30,523	33,112	36,779	41,975	66,626
	200	24,943	25,551	26,415	27,643	29,389	31,872	35,400	40,416	66,190
	225	22,743	23,284	24,059	25,165	26,745	29,003	32,230	36,841	65,178
	250	20,639	21,136	21,847	22,864	24,318	26,398	29,373	33,627	64,264
	275	18,620	19,087	19,753	20,704	22,061	23,996	26,757	30,696	63,431
	300	16,677	17,124	17,759	18,660	19,940	21,757	24,337	27,999	62,666
	325	14,803	15,237	15,850	16,714	17,932	19,651	22,076	25,496	61,959
	350	12,994	13,420	14,016	14,851	16,020	17,657	19,948	23,157	61,302
	375	11,244	11,665	12,250	13,062	14,190	15,758	17,935	20,958	60,689
	400	9,548	9,967	10,544	11,339	12,433	13,941	16,019	18,880	60,114
	425	7,904	8,322	8,894	9,675	10,741	12,198	14,189	16,908	59,573
	450	6,308	6,727	7,295	8,065	9,107	10,520	12,435	15,030	59,062
	475	4,757	5,178	5,744	6,505	7,527	8,902	10,750	13,234	58,578
	500	3,250	3,673	4,238	4,991	5,997	7,337	9,126	11,513	58,118
	525	1,784	2,210	2,775	3,522	4,512	5,823	7,560	9,859	57,679
	550	0,358	0,787	1,352	2,095	3,072	4,357	6,046	8,268	57,261
	575	-1,030	-0,597	-0,031	0,708	1,673	2,934	4,582	6,735	56,860
	600	-2,380	-1,944	-1,377	-0,642	0,314	1,554	3,164	5,255	56,476
	625	-3,695	-3,255	-2,687	-1,954	-1,007	0,214	1,791	3,826	56,107
	650	-4,974	-4,530	-3,961	-3,230	-2,292	-1,087	0,459	2,444	55,752
	675	-6,218	-5,771	-5,200	-4,471	-3,540	-2,351	-0,833	1,106	55,410
	700	-7,430	-6,979	-6,406	-5,678	-4,754	-3,579	-2,085	-0,188	55,080
	725	-8,608	-8,154	-7,579	-6,853	-5,934	-4,771	-3,301	-1,441	54,761
	750	-9,754	-9,296	-8,720	-7,994	-7,080	-5,930	-4,480	-2,655	54,452
	775	-10,868	-10,407	-9,829	-9,104	-8,195	-7,055	-5,624	-3,831	54,153
	800	-11,951	-11,487	-10,907	-10,183	-9,278	-8,148	-6,735	-4,970	53,863
	825	-13,003	-12,536	-11,955	-11,231	-10,330	-9,209	-7,812	-6,074	53,582
	850	-14,026	-13,556	-12,973	-12,250	-11,352	-10,239	-8,857	-7,143	53,309
	875	-15,019	-14,547	-13,962	-13,239	-12,345	-11,239	-9,871	-8,179	53,043
	900	-15,984	-15,509	-14,922	-14,199	-13,308	-12,209	-10,854	-9,183	52,785
	925	-16,920	-16,442	-15,855	-15,132	-14,243	-13,151	-11,808	-10,156	52,533
	950	-17,829	-17,349	-16,759	-16,037	-15,151	-14,064	-12,732	-11,098	52,288
	975	-18,711	-18,228	-17,637	-16,915	-16,031	-14,950	-13,628	-12,011	52,048
	1000	-19,566	-19,081	-18,489	-17,766	-16,885	-15,809	-14,497	-12,895	51,815

100 MHz – Zone C – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	101,737	104,117	106,218	107,220	107,384	107,396	107,396	107,396	107,457
	2	91,411	94,366	97,832	100,808	101,761	101,865	101,870	101,870	101,946
	3	85,222	88,292	92,092	96,238	98,485	98,861	98,886	98,886	98,890
	4	80,860	83,956	87,821	92,420	95,897	96,785	96,819	96,819	96,819
	5	77,496	80,594	84,458	89,204	93,559	95,161	95,273	95,273	95,273
	6	74,746	77,845	81,693	86,476	91,371	93,775	94,051	94,051	94,051
	7	72,410	75,512	79,348	84,130	89,332	92,513	93,045	93,045	93,045
	8	70,367	73,481	77,309	82,084	87,455	91,316	92,192	92,192	92,192
	9	68,545	71,677	75,506	80,275	85,738	90,161	91,412	91,454	91,454
	10	66,895	70,051	73,888	78,657	84,170	89,033	90,698	90,803	90,803
	11	65,384	68,570	72,421	77,197	82,736	87,934	90,036	90,220	90,220
	12	63,989	67,210	71,079	75,868	81,421	86,866	89,410	89,692	89,692
	13	62,696	65,953	69,844	74,652	80,211	85,836	88,808	89,195	89,210
	14	61,493	64,787	68,702	73,533	79,093	84,847	88,221	88,736	88,765
	15	60,372	63,704	67,643	72,500	78,057	83,900	87,643	88,308	88,353
	16	59,334	62,700	66,660	71,543	77,093	82,996	87,068	87,907	87,967
	17	58,371	61,767	65,746	70,655	76,195	82,134	86,502	87,527	87,605
	18	57,484	60,905	64,979	69,861	75,367	81,320	85,954	87,165	87,264
	19	56,788	60,195	64,167	69,066	74,569	80,529	85,389	86,821	86,941
	20	55,935	59,380	63,457	68,347	73,825	79,779	84,835	86,485	86,634
	25	53,414	56,720	60,767	65,469	70,724	76,514	82,139	84,940	85,293
	30	52,032	55,130	59,010	63,387	68,322	73,840	79,609	83,447	84,188
	35	51,513	54,338	57,845	61,856	66,438	71,651	77,352	81,946	83,246
	40	51,323	53,841	56,999	60,662	64,910	69,821	75,362	80,459	82,424
	45	51,258	53,484	56,338	59,694	63,640	68,268	73,611	78,982	81,694
	50	51,226	53,192	55,792	58,884	62,563	66,931	72,063	77,541	81,038
	55	51,183	52,928	55,317	58,187	61,633	65,766	70,685	76,156	80,439
	60	51,106	52,668	54,887	57,571	60,817	64,739	69,449	74,838	79,888
	65	50,985	52,402	54,485	57,015	60,090	63,822	68,333	73,592	79,376
	70	50,817	52,122	54,097	56,502	59,431	62,995	67,316	72,418	78,897
	75	50,602	51,828	53,717	56,019	58,823	62,238	66,383	71,314	78,445
	80	50,346	51,520	53,340	55,557	58,255	61,536	65,519	70,276	78,017
	85	50,055	51,200	52,965	55,110	57,715	60,879	64,713	69,300	77,610
	90	49,737	50,870	52,589	54,673	57,198	60,256	63,955	68,382	77,221
	95	49,400	50,535	52,214	54,243	56,696	59,660	63,237	67,516	76,848
	100	49,049	50,196	51,838	53,818	56,206	59,085	62,552	66,696	76,490
	110	48,320	49,509	51,084	52,976	55,250	57,982	61,260	65,175	75,810
	120	47,568	48,814	50,326	52,140	54,315	56,923	60,047	63,777	75,173
	130	46,922	48,132	49,583	51,322	53,408	55,908	58,902	62,479	74,573
	140	46,284	47,445	48,838	50,509	52,514	54,919	57,803	61,252	74,005
	150	45,637	46,751	48,089	49,697	51,629	53,950	56,737	60,078	73,466
	160	44,979	46,049	47,337	48,887	50,753	52,998	55,699	58,943	72,953
	170	44,310	45,340	46,583	48,080	49,885	52,061	54,683	57,838	72,463
	180	43,641	44,633	45,831	47,279	49,028	51,140	53,692	56,772	71,994
	190	42,972	43,926	45,083	46,484	48,180	50,235	52,724	55,735	71,546
	200	42,302	43,222	44,339	45,696	47,345	49,346	51,776	54,725	71,116
	225	40,636	41,479	42,510	43,769	45,309	47,192	49,492	52,303	70,112
	250	39,003	39,780	40,735	41,911	43,358	45,137	47,326	50,017	69,198
	275	37,416	38,136	39,026	40,128	41,492	43,181	45,271	47,857	68,361
	300	35,885	36,553	37,385	38,421	39,712	41,320	43,321	45,814	67,590
	325	34,402	35,030	35,817	36,800	38,029	39,566	41,488	43,891	66,875
	350	32,995	33,577	34,309	35,233	36,396	37,863	39,712	42,042	66,209
	375	31,637	32,181	32,871	33,745	34,853	36,258	38,039	40,297	65,586
	400	30,336	30,845	31,495	32,323	33,380	34,728	36,446	38,638	65,002
	425	29,088	29,566	30,179	30,965	31,974	33,268	34,929	37,059	64,450
	450	27,893	28,342	28,921	29,668	30,632	31,876	33,482	35,555	63,929
	475	26,744	27,170	27,722	28,438	29,365	30,566	32,122	34,138	63,435
	500	25,655	26,051	26,568	27,244	28,127	29,280	30,786	32,754	62,964
	525	24,608	24,981	25,470	26,114	26,959	28,070	29,531	31,450	62,516
	550	23,609	23,959	24,422	25,035	25,845	26,916	28,333	30,207	62,087
	575	22,654	22,983	23,422	24,005	24,782	25,815	27,191	29,021	61,676
	600	21,743	22,053	22,468	23,024	23,768	24,766	26,102	27,891	61,282
	625	20,874	21,165	21,558	22,088	22,803	23,766	25,064	26,814	60,903
	650	20,046	20,320	20,692	21,197	21,883	22,813	24,075	25,787	60,538
	675	19,258	19,516	19,868	20,349	21,007	21,905	23,132	24,809	60,185
	700	18,508	18,750	19,083	19,542	20,173	21,041	22,235	23,877	59,845
	725	17,794	18,022	18,337	18,774	19,380	20,218	21,380	22,990	59,516
	750	17,116	17,329	17,628	18,044	18,625	19,435	20,566	22,145	59,198
	775	16,471	16,671	16,953	17,350	17,907	18,690	19,792	21,340	58,889
	800	15,858	16,046	16,312	16,690	17,224	17,981	19,054	20,573	58,590
	825	15,275	15,451	15,703	16,062	16,575	17,307	18,351	19,842	58,299
	850	14,722	14,887	15,124	15,466	15,957	16,664	17,682	19,146	58,016
	875	14,195	14,350	14,573	14,898	15,369	16,053	17,044	18,483	57,740
	900	13,695	13,839	14,050	14,358	14,810	15,470	16,436	17,850	57,472
	925	13,218	13,353	13,551	13,844	14,277	14,915	15,856	17,246	57,211
	950	12,765	12,890	13,077	13,355	13,769	14,385	15,303	16,669	56,956
	975	12,333	12,449	12,624	12,888	13,284	13,879	14,773	16,118	56,707
	1000	11,920	12,029	12,193	12,443	12,821	13,396	14,268	15,590	56,464

100 MHz – Zone D – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	90,005	92,207	94,657	97,401	100,330	103,127	105,246	106,358	106,900
	2	80,334	83,141	86,044	89,241	92,698	96,133	98,863	100,286	100,879
	3	74,253	77,604	80,886	84,399	88,177	91,989	95,104	96,733	97,358
	4	69,633	73,452	77,096	80,895	84,930	89,020	92,424	94,211	94,859
	5	65,842	70,041	74,024	78,099	82,369	86,693	90,334	92,253	92,921
	6	62,605	67,100	71,390	75,732	80,229	84,766	88,616	90,653	91,337
	7	59,775	64,497	69,051	73,648	78,367	83,108	87,154	89,298	89,998
	8	57,262	62,154	66,932	71,762	76,698	81,639	85,874	88,124	88,838
	9	55,002	60,022	64,984	70,024	75,168	80,309	84,731	87,085	87,815
	10	52,950	58,068	63,179	68,402	73,743	79,080	83,691	86,154	86,900
	11	51,073	56,264	61,496	66,877	72,399	77,928	82,732	85,308	86,072
	12	49,344	54,590	59,919	65,435	71,121	76,835	81,835	84,532	85,316
	13	47,742	53,031	58,438	64,067	69,899	75,788	80,988	83,814	84,621
	14	46,252	51,573	57,042	62,764	68,725	74,778	80,178	83,144	83,977
	15	44,858	50,203	55,722	61,523	67,595	73,800	79,398	82,515	83,378
	16	43,551	48,914	54,473	60,337	66,505	72,848	78,641	81,920	82,818
	17	42,320	47,696	53,286	59,204	65,454	71,919	77,902	81,353	82,291
	18	41,158	46,543	52,158	58,119	64,438	71,014	77,178	80,811	81,795
	19	40,058	45,449	51,083	57,078	63,456	70,129	76,465	80,290	81,325
	20	39,015	44,409	50,057	56,080	62,507	69,265	75,763	79,787	80,879
	25	34,493	39,868	45,537	51,628	58,197	65,238	72,377	77,450	78,941
	30	30,852	36,170	41,803	47,885	54,491	61,663	69,200	75,277	77,358
	35	27,851	33,077	38,634	44,659	51,244	58,467	66,251	73,182	76,019
	40	25,336	30,438	35,883	41,814	48,340	55,570	63,519	71,144	74,859
	45	23,205	28,151	33,451	39,254	45,689	52,897	60,970	69,164	73,836
	50	21,383	26,143	31,266	36,911	43,225	50,388	58,562	67,242	72,921
	55	19,813	24,359	29,278	34,737	40,904	47,999	56,257	65,370	72,093
	60	18,448	22,758	27,449	32,698	38,694	45,698	54,023	63,534	71,337
	65	17,254	21,311	25,756	30,775	36,578	43,467	51,837	61,720	70,642
	70	16,198	19,993	24,180	28,956	34,547	41,298	49,688	59,914	69,998
	75	15,258	18,785	22,710	27,234	32,599	39,190	47,569	58,106	69,399
	80	14,411	17,675	21,337	25,606	30,737	37,147	45,480	56,289	68,838
	85	13,641	16,648	20,054	24,070	28,963	35,174	43,426	54,461	68,312
	90	12,934	15,695	18,854	22,625	27,278	33,278	41,415	52,623	67,815
	95	12,277	14,806	17,732	21,267	25,686	31,465	39,454	50,779	67,346
	100	11,660	13,974	16,680	19,993	24,185	29,739	37,552	48,936	66,900
	110	10,517	12,449	14,766	17,676	21,446	26,554	33,950	45,280	66,072
	120	9,454	11,069	13,060	15,630	19,028	23,713	30,645	41,717	65,316
	130	8,437	9,794	11,518	13,803	16,884	21,186	27,643	38,301	64,621
	140	7,443	8,591	10,097	12,150	14,965	18,931	24,929	35,072	63,977
	150	6,458	7,437	8,768	10,631	13,224	16,900	22,477	32,051	63,378
	160	5,473	6,315	7,504	9,213	11,623	15,054	20,251	29,244	62,818
	170	4,484	5,215	6,289	7,871	10,130	13,354	18,217	26,645	62,291
	180	3,489	4,129	5,108	6,587	8,722	11,772	16,345	24,239	61,795
	190	2,486	3,051	3,953	5,348	7,380	10,284	14,606	22,010	61,325
	200	1,478	1,980	2,819	4,144	6,091	8,872	12,979	19,938	60,879
	225	-1,061	-0,673	0,050	1,248	3,038	5,591	9,284	15,328	59,856
	250	-3,602	-3,290	-2,642	-1,526	0,162	2,564	5,974	11,347	58,941
	275	-6,116	-5,856	-5,258	-4,198	-2,578	-0,279	2,935	7,820	58,113
	300	-8,584	-8,360	-7,797	-6,774	-5,202	-2,974	0,102	4,630	57,358
	325	-10,992	-10,794	-10,255	-9,259	-7,720	-5,543	-2,567	1,699	56,662
	350	-13,334	-13,155	-12,634	-11,657	-10,142	-8,002	-5,098	-1,029	56,019
	375	-15,608	-15,443	-14,935	-13,972	-12,475	-10,363	-7,513	-3,593	55,419
	400	-17,819	-17,664	-17,166	-16,214	-14,730	-12,638	-9,830	-6,023	54,859
	425	-19,972	-19,825	-19,334	-18,390	-16,917	-14,840	-12,064	-8,346	54,332
	450	-22,075	-21,935	-21,450	-20,512	-19,046	-16,982	-14,230	-10,581	53,836
	475	-24,138	-24,003	-23,522	-22,590	-21,130	-19,075	-16,342	-12,749	53,366
	500	-26,171	-26,040	-25,563	-24,634	-23,179	-21,132	-18,414	-14,865	52,921
	525	-28,184	-28,056	-27,582	-26,656	-25,205	-23,163	-20,458	-16,945	52,497
	550	-30,187	-30,061	-29,589	-28,666	-27,217	-25,181	-22,485	-19,001	52,093
	575	-32,188	-32,064	-31,594	-30,673	-29,227	-27,194	-24,506	-21,046	51,707
	600	-34,195	-34,073	-33,605	-32,685	-31,241	-29,211	-26,530	-23,090	51,337
	625	-36,216	-36,095	-35,628	-34,710	-33,267	-31,240	-28,564	-25,141	50,982
	650	-38,256	-38,136	-37,670	-36,753	-35,312	-33,286	-30,615	-27,205	50,642
	675	-40,319	-40,200	-39,735	-38,819	-37,379	-35,354	-32,687	-29,289	50,314
	700	-42,407	-42,289	-41,825	-40,909	-39,470	-37,447	-34,783	-31,394	49,998
	725	-44,521	-44,403	-43,940	-43,024	-41,586	-39,564	-36,902	-33,522	49,693
	750	-46,658	-46,541	-46,078	-45,163	-43,725	-41,704	-39,044	-35,671	49,399
	775	-48,814	-48,698	-48,236	-47,321	-45,883	-43,863	-41,205	-37,837	49,114
	800	-50,985	-50,870	-50,407	-49,493	-48,055	-46,035	-43,379	-40,017	48,838
	825	-53,163	-53,047	-52,585	-51,671	-50,234	-48,214	-45,559	-42,201	48,571
	850	-55,336	-55,221	-54,760	-53,846	-52,409	-50,389	-47,735	-44,381	48,312
	875	-57,496	-57,381	-56,920	-56,006	-54,569	-52,550	-49,896	-46,545	48,060
	900	-59,629	-59,514	-59,053	-58,139	-56,702	-54,683	-52,030	-48,682	47,815
	925	-61,722	-61,608	-61,146	-60,233	-58,796	-56,777	-54,124	-50,779	47,577
	950	-63,761	-63,647	-63,186	-62,273	-60,836	-58,817	-56,164	-52,821	47,346
	975	-65,734	-65,620	-65,159	-64,246	-62,809	-60,790	-58,138	-54,797	47,120
	1000	-67,627	-67,514	-67,053	-66,139	-64,702	-62,683	-60,032	-56,692	46,900

100 MHz – Zone D – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	90,067	92,262	94,705	97,441	100,361	103,151	105,263	106,372	106,913
	2	80,455	83,250	86,139	89,321	92,761	96,181	98,898	100,314	100,905
	3	74,434	77,764	81,025	84,517	88,272	92,060	95,156	96,774	97,395
	4	69,872	73,662	77,278	81,049	85,054	89,113	92,491	94,265	94,908
	5	66,137	70,300	74,249	78,288	82,521	86,808	90,417	92,320	92,982
	6	62,956	67,408	71,655	75,956	80,409	84,902	88,715	90,732	91,409
	7	60,181	64,852	69,358	73,906	78,574	83,265	87,268	89,390	90,082
	8	57,721	62,556	67,279	72,053	76,932	81,817	86,003	88,227	88,933
	9	55,513	60,471	65,371	70,349	75,430	80,507	84,874	87,200	87,921
	10	53,512	58,562	63,606	68,761	74,032	79,299	83,849	86,280	87,016
	11	51,685	56,804	61,963	67,270	72,716	78,167	82,905	85,445	86,199
	12	50,160	55,222	60,479	65,890	71,466	77,096	82,023	84,680	85,453
	13	48,810	53,870	59,157	64,641	70,299	76,072	81,191	83,973	84,768
	14	47,568	52,618	57,922	63,461	69,214	75,085	80,396	83,314	84,134
	15	46,420	51,452	56,761	62,341	68,174	74,152	79,631	82,695	83,544
	16	45,356	50,364	55,669	61,276	67,174	73,262	78,890	82,111	82,993
	17	44,367	49,344	54,637	60,260	66,211	72,398	78,174	81,555	82,476
	18	43,443	48,386	53,660	59,289	65,280	71,555	77,491	81,024	81,988
	19	42,580	47,484	52,733	58,359	64,380	70,731	76,822	80,523	81,527
	20	41,771	46,633	51,852	57,468	63,508	69,925	76,165	80,042	81,090
	25	38,397	43,010	48,020	53,500	59,519	66,121	72,984	77,849	79,193
	30	35,869	40,191	44,935	50,189	56,058	62,661	69,920	75,858	77,646
	35	33,937	37,951	42,400	47,386	53,034	59,525	66,982	73,936	76,340
	40	32,440	36,141	40,288	44,988	50,382	56,694	64,239	72,014	75,210
	45	31,261	34,658	38,509	42,921	48,046	54,144	61,799	70,072	74,214
	50	30,316	33,425	36,992	41,125	45,982	51,847	59,501	68,117	73,323
	55	29,542	32,384	35,685	39,553	44,151	49,776	57,308	66,170	72,517
	60	28,890	31,487	34,544	38,166	42,516	47,903	55,188	64,303	71,781
	65	28,326	30,700	33,534	36,929	41,048	46,203	53,118	62,571	71,104
	70	27,820	29,994	32,627	35,814	39,719	44,653	51,247	60,849	70,476
	75	27,353	29,347	31,799	34,798	38,506	43,231	49,611	59,127	69,891
	80	26,909	28,743	31,032	33,862	37,390	41,918	48,085	57,400	69,344
	85	26,476	28,168	30,311	32,988	36,352	40,698	46,657	55,664	68,829
	90	26,046	27,611	29,624	32,163	35,379	39,556	45,314	54,021	68,343
	95	25,613	27,066	28,961	31,377	34,458	38,479	44,047	52,545	67,883
	100	25,174	26,526	28,317	30,621	33,579	37,458	42,845	51,127	67,446
	110	24,266	25,447	27,059	29,172	31,920	35,547	40,603	48,453	66,633
	120	23,312	24,354	25,820	27,777	30,351	33,767	38,535	45,968	65,888
	130	22,310	23,239	24,583	26,412	28,843	32,083	36,600	43,644	65,203
	140	21,265	22,098	23,342	25,065	27,377	30,468	34,769	41,456	64,566
	150	20,183	20,935	22,094	23,728	25,942	28,908	33,022	39,387	63,973
	160	19,070	19,753	20,840	22,400	24,531	27,391	31,344	37,420	63,417
	170	17,933	18,557	19,584	21,081	23,141	25,912	29,726	35,543	62,894
	180	16,780	17,353	18,328	19,772	21,772	24,466	28,159	33,745	62,400
	190	15,616	16,145	17,075	18,474	20,423	23,051	26,639	32,020	61,933
	200	14,447	14,938	15,829	17,189	19,095	21,666	25,163	30,360	61,489
	225	11,532	11,949	12,765	14,049	15,870	18,329	21,644	26,464	60,468
	250	8,668	9,033	9,796	11,026	12,786	15,165	18,346	22,880	59,553
	275	5,888	6,214	6,938	8,129	9,845	12,165	15,246	19,558	58,724
	300	3,204	3,501	4,196	5,358	7,041	9,316	12,321	16,460	57,967
	325	0,616	0,891	1,564	2,704	4,362	6,603	9,549	13,551	57,269
	350	-1,882	-1,624	-0,968	0,153	1,792	4,007	6,906	10,798	56,624
	375	-4,303	-4,058	-3,416	-2,308	-0,685	1,509	4,371	8,175	56,022
	400	-6,658	-6,425	-5,794	-4,697	-3,086	-0,908	1,924	5,655	55,459
	425	-8,964	-8,740	-8,117	-7,029	-5,428	-3,264	-0,455	3,215	54,930
	450	-11,232	-11,016	-10,400	-9,319	-7,726	-5,573	-2,784	0,836	54,431
	475	-13,476	-13,266	-12,657	-11,582	-9,995	-7,850	-5,078	-1,500	53,959
	500	-15,708	-15,504	-14,900	-13,829	-12,247	-10,110	-7,351	-3,808	53,511
	525	-17,937	-17,738	-17,138	-16,071	-14,493	-12,361	-9,614	-6,101	53,085
	550	-20,171	-19,976	-19,379	-18,316	-16,742	-14,615	-11,877	-8,389	52,678
	575	-22,417	-22,225	-21,631	-20,571	-18,999	-16,876	-14,145	-10,680	52,290
	600	-24,677	-24,488	-23,897	-22,839	-21,270	-19,149	-16,425	-12,979	51,918
	625	-26,955	-26,768	-26,180	-25,123	-23,555	-21,437	-18,719	-15,289	51,561
	650	-29,249	-29,065	-28,478	-27,423	-25,857	-23,741	-21,027	-17,611	51,218
	675	-31,558	-31,375	-30,790	-29,737	-28,171	-26,057	-23,347	-19,943	50,888
	700	-33,877	-33,696	-33,112	-32,060	-30,495	-28,382	-25,675	-22,282	50,569
	725	-36,200	-36,021	-35,438	-34,387	-32,823	-30,710	-28,006	-24,622	50,262
	750	-38,519	-38,342	-37,761	-36,709	-35,146	-33,034	-30,332	-26,956	49,965
	775	-40,827	-40,650	-40,070	-39,019	-37,456	-35,345	-32,645	-29,276	49,678
	800	-43,111	-42,936	-42,356	-41,306	-39,743	-37,633	-34,934	-31,572	49,400
	825	-45,362	-45,188	-44,609	-43,559	-41,996	-39,886	-37,188	-33,832	49,130
	850	-47,567	-47,394	-46,815	-45,766	-44,203	-42,093	-39,397	-36,045	48,869
	875	-49,715	-49,542	-48,965	-47,916	-46,353	-44,243	-41,547	-38,200	48,615
	900	-51,794	-51,623	-51,045	-49,997	-48,434	-46,324	-43,629	-40,286	48,368
	925	-53,794	-53,623	-53,047	-51,998	-50,436	-48,325	-45,631	-42,292	48,127
	950	-55,705	-55,535	-54,959	-53,910	-52,348	-50,238	-47,544	-44,209	47,893
	975	-57,519	-57,349	-56,774	-55,725	-54,163	-52,052	-49,360	-46,027	47,666
	1000	-59,228	-59,059	-58,484	-57,436	-55,873	-53,763	-51,070	-47,741	47,443

100 MHz – Zone D – 1%

Distance (km)										
Transmitting / base antenna height (m)	10	20	37,5	75	150	300	600	1200	Emax
1	90,111	92,306	94,748	97,484	100,404	103,193	105,305	106,414	106,954
2	80,543	83,336	86,303	89,604	93,082	96,474	99,104	100,439	100,987
3	74,563	77,892	81,227	84,913	88,745	92,510	95,477	96,962	97,518
4	70,043	73,832	77,480	81,491	85,609	89,663	92,899	94,507	95,070
5	66,348	70,509	74,473	78,757	83,121	87,421	90,890	92,609	93,182
6	63,207	67,656	71,947	76,457	81,037	85,556	89,238	91,063	91,648
7	60,538	65,140	69,766	74,460	79,229	83,946	87,828	89,759	90,357
8	58,470	63,083	67,849	72,690	77,624	82,520	86,593	88,630	89,244
9	56,663	61,300	66,138	71,096	76,171	81,231	85,488	87,635	88,267
10	55,065	59,708	64,595	69,644	74,839	80,048	84,484	86,745	87,397
11	53,637	58,275	63,191	68,309	73,606	78,949	83,558	85,938	86,614
12	52,351	56,974	61,904	67,074	72,455	77,920	82,697	85,200	85,902
13	51,186	55,786	60,719	65,924	71,374	76,947	81,887	84,519	85,249
14	50,124	54,695	59,621	64,848	70,353	76,024	81,121	83,887	84,647
15	49,152	53,690	58,599	63,837	69,385	75,141	80,391	83,295	84,089
16	48,259	52,758	57,645	62,884	68,464	74,295	79,690	82,739	83,568
17	47,437	51,893	56,751	61,983	67,585	73,481	79,016	82,213	83,081
18	46,677	51,087	55,910	61,128	66,744	72,696	78,365	81,714	82,623
19	45,974	50,334	55,118	60,315	65,936	71,936	77,732	81,239	82,191
20	45,321	49,628	54,370	59,540	65,160	71,199	77,117	80,784	81,783
25	42,677	46,684	51,164	56,137	61,663	67,801	74,231	78,751	80,018
30	40,792	44,462	48,629	53,334	58,670	64,777	71,569	76,987	78,592
35	39,418	42,740	46,575	50,977	56,065	62,050	69,062	75,371	77,394
40	38,399	41,379	44,885	48,974	53,786	59,585	66,690	73,828	76,362
45	37,627	40,287	43,480	47,264	51,789	57,362	64,453	72,307	75,455
50	37,028	39,394	42,300	45,798	50,043	55,367	62,358	70,781	74,644
55	36,547	38,652	41,300	44,536	48,514	53,581	60,409	69,241	73,910
60	36,147	38,021	40,441	43,441	47,172	51,985	58,606	67,690	73,239
65	35,798	37,471	39,691	42,483	45,990	50,558	56,944	66,141	72,620
70	35,480	36,979	39,026	41,634	44,939	49,276	55,416	64,611	72,045
75	35,178	36,527	38,424	40,872	43,997	48,121	54,010	63,112	71,508
80	34,881	36,100	37,870	40,177	43,142	47,070	52,714	61,657	71,003
85	34,582	35,690	37,348	39,534	42,357	46,108	51,516	60,252	70,527
90	34,276	35,288	36,851	38,929	41,628	45,219	50,403	58,901	70,076
95	33,958	34,889	36,368	38,354	40,943	44,389	49,364	57,606	69,647
100	33,627	34,488	35,896	37,800	40,291	43,609	48,389	56,367	69,238
110	32,924	33,671	34,962	36,731	39,061	42,159	46,594	54,044	68,472
120	32,164	32,827	34,025	35,691	37,893	40,814	44,959	51,910	67,766
130	31,353	31,950	33,076	34,658	36,759	39,538	43,442	49,937	67,111
140	30,498	31,042	32,107	33,623	35,643	38,307	42,010	48,099	66,500
150	29,604	30,104	31,120	32,582	34,537	37,107	40,642	46,374	65,926
160	28,679	29,142	30,116	31,533	33,435	35,928	39,324	44,743	65,385
170	27,726	28,159	29,097	30,478	32,336	34,766	38,044	43,191	64,874
180	26,752	27,159	28,067	29,417	31,239	33,616	36,796	41,706	64,389
190	25,761	26,147	27,029	28,353	30,146	32,479	35,576	40,279	63,929
200	24,757	25,125	25,985	27,288	29,056	31,353	34,378	38,902	63,489
225	22,217	22,555	23,373	24,637	26,359	28,587	31,477	35,643	62,475
250	19,673	19,992	20,783	22,020	23,712	25,894	28,690	32,598	61,560
275	17,157	17,463	18,236	19,455	21,127	23,278	26,007	29,724	60,728
300	14,685	14,981	15,741	16,950	18,607	20,736	23,418	26,991	59,966
325	12,262	12,551	13,303	14,503	16,151	18,265	20,911	24,375	59,262
350	9,887	10,170	10,916	12,111	13,753	15,856	18,475	21,854	58,609
375	7,555	7,834	8,575	9,766	11,404	13,499	16,099	19,411	58,000
400	5,258	5,533	6,272	7,460	9,094	11,184	13,769	17,028	57,430
425	2,988	3,260	3,996	5,182	6,816	8,902	11,475	14,692	56,893
450	0,736	1,005	1,739	2,925	4,557	6,641	9,205	12,388	56,386
475	-1,508	-1,241	-0,507	0,678	2,310	4,392	6,950	10,105	55,906
500	-3,750	-3,484	-2,752	-1,567	0,065	2,147	4,700	7,832	55,450
525	-5,997	-5,733	-5,001	-3,816	-2,183	-0,102	2,448	5,561	55,015
550	-8,255	-7,992	-7,260	-6,075	-4,442	-2,360	0,187	3,285	54,601
575	-10,529	-10,267	-9,535	-8,349	-6,715	-4,632	-2,087	0,999	54,204
600	-12,820	-12,559	-11,827	-10,640	-9,005	-6,922	-4,377	-1,302	53,824
625	-15,131	-14,870	-14,138	-12,950	-11,314	-9,229	-6,685	-3,619	53,459
650	-17,461	-17,200	-16,468	-15,279	-13,642	-11,556	-9,012	-5,953	53,108
675	-19,807	-19,548	-18,815	-17,625	-15,986	-13,899	-11,355	-8,302	52,770
700	-22,168	-21,909	-21,176	-19,985	-18,345	-16,256	-13,711	-10,663	52,444
725	-24,539	-24,279	-23,546	-22,354	-20,712	-18,622	-16,076	-13,032	52,129
750	-26,912	-26,653	-25,919	-24,727	-23,083	-20,991	-18,445	-15,404	51,825
775	-29,282	-29,023	-28,288	-27,095	-25,450	-23,357	-20,809	-17,771	51,530
800	-31,639	-31,380	-30,646	-29,451	-27,805	-25,710	-23,162	-20,126	51,244
825	-33,976	-33,717	-32,982	-31,787	-30,139	-28,042	-25,493	-22,459	50,967
850	-36,281	-36,023	-35,287	-34,091	-32,442	-30,344	-27,794	-24,762	50,697
875	-38,547	-38,288	-37,552	-36,355	-34,705	-32,606	-30,054	-27,023	50,436
900	-40,761	-40,503	-39,766	-38,568	-36,917	-34,816	-32,264	-29,234	50,181
925	-42,915	-42,656	-41,920	-40,721	-39,069	-36,967	-34,413	-31,384	49,933
950	-44,999	-44,740	-44,003	-42,804	-41,151	-39,047	-36,492	-33,465	49,692
975	-47,004	-46,746	-46,008	-44,808	-43,154	-41,049	-38,493	-35,466	49,457
1000	-48,923	-48,664	-47,926	-46,726	-45,071	-42,965	-40,408	-37,382	49,227

600 MHz – Zone 1 – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	92,681	94,868	97,072	99,699	102,345	104,591	106,007	106,629	106,900
	2	81,108	84,291	87,092	90,356	93,803	97,071	99,417	100,484	100,879
	3	73,480	77,690	81,046	84,741	88,624	92,462	95,443	96,866	97,358
	4	67,693	72,675	76,575	80,667	84,877	89,107	92,562	94,285	94,859
	5	63,064	68,556	72,942	77,421	81,920	86,457	90,290	92,275	92,921
	6	59,229	65,047	69,834	74,687	79,459	84,256	88,406	90,626	91,337
	7	55,965	61,992	67,096	72,296	77,333	82,365	86,792	89,227	89,998
	8	53,130	59,293	64,640	70,152	75,447	80,700	85,376	88,010	88,838
	9	50,628	56,879	62,410	68,195	73,739	79,204	84,110	86,933	87,815
	10	48,393	54,701	60,370	66,387	72,167	77,839	82,961	85,965	86,900
	11	46,377	52,719	58,489	64,702	70,703	76,576	81,907	85,085	86,072
	12	44,542	50,904	56,748	63,122	69,327	75,396	80,928	84,279	85,316
	13	42,862	49,230	55,127	61,633	68,022	74,282	80,013	83,533	84,621
	14	41,315	47,680	53,613	60,224	66,780	73,223	79,148	82,838	83,977
	15	39,883	46,237	52,192	58,888	65,590	72,209	78,327	82,187	83,378
	16	38,553	44,890	50,856	57,617	64,447	71,233	77,541	81,574	82,818
	17	37,312	43,626	49,594	56,404	63,345	70,289	76,786	80,993	82,291
	18	36,151	42,437	48,399	55,244	62,280	69,373	76,056	80,441	81,795
	19	35,062	41,315	47,265	54,133	61,250	68,480	75,346	79,914	81,325
	20	34,038	40,254	46,185	53,066	60,250	67,607	74,655	79,408	80,879
	25	29,704	35,679	41,448	48,276	55,634	63,479	71,375	77,129	78,941
	30	26,339	31,999	37,521	44,162	51,501	59,617	68,237	75,108	77,358
	35	23,638	28,930	34,148	40,517	47,713	55,935	65,125	73,200	76,019
	40	21,411	26,304	31,182	37,224	44,194	52,395	61,999	71,296	74,859
	45	19,531	24,013	28,535	34,219	40,906	48,992	58,862	69,318	73,836
	50	17,910	21,986	26,151	31,464	37,834	45,734	55,739	67,213	72,921
	55	16,485	20,173	23,991	28,936	34,972	42,632	52,661	64,966	72,093
	60	15,211	18,536	22,027	26,616	32,314	39,698	49,656	62,591	71,337
	65	14,051	17,044	20,233	24,486	29,852	36,938	46,748	60,122	70,642
	70	12,982	15,675	18,588	22,530	27,578	34,354	43,955	57,601	69,998
	75	11,982	14,407	17,071	20,730	25,477	31,941	41,287	55,065	69,399
	80	11,037	13,223	15,666	19,068	23,536	29,694	38,752	52,542	68,838
	85	10,136	12,111	14,357	17,527	21,739	27,602	36,351	50,056	68,312
	90	9,269	11,059	13,129	16,093	20,070	25,654	34,083	47,624	67,815
	95	8,429	10,056	11,972	14,751	18,515	23,837	31,944	45,257	67,346
	100	7,612	9,095	10,874	13,489	17,061	22,138	29,928	42,964	66,900
	110	6,030	7,273	8,825	11,164	14,407	19,050	26,235	38,617	66,072
	120	4,498	5,556	6,929	9,049	12,026	16,304	22,941	34,601	65,316
	130	3,004	3,915	5,147	7,093	9,855	13,830	19,982	30,910	64,621
	140	1,541	2,336	3,455	5,261	7,848	11,571	17,302	27,523	63,977
	150	0,103	0,805	1,834	3,528	5,972	9,484	14,854	24,413	63,378
	160	-1,311	-0,684	0,272	1,873	4,200	7,538	12,597	21,550	62,818
	170	-2,702	-2,137	-1,241	0,285	2,516	5,707	10,500	18,905	62,291
	180	-4,070	-3,557	-2,710	-1,246	0,904	3,972	8,537	16,452	61,795
	190	-5,417	-4,945	-4,140	-2,728	-0,646	2,319	6,689	14,166	61,325
	200	-6,741	-6,305	-5,534	-4,166	-2,141	0,736	4,938	12,027	60,879
	225	-9,955	-9,585	-8,880	-7,594	-5,677	-2,969	0,905	7,208	59,856
	250	-13,033	-12,709	-12,047	-10,819	-8,976	-6,385	-2,743	2,977	58,941
	275	-15,981	-15,689	-15,059	-13,871	-12,081	-9,573	-6,099	-0,816	58,113
	300	-18,809	-18,541	-17,934	-16,774	-15,023	-12,577	-9,227	-4,275	57,358
	325	-21,529	-21,277	-20,688	-19,550	-17,827	-15,427	-12,172	-7,473	56,662
	350	-24,151	-23,913	-23,336	-22,214	-20,514	-18,150	-14,966	-10,466	56,019
	375	-26,687	-26,459	-25,893	-24,784	-23,101	-20,764	-17,637	-13,294	55,419
	400	-29,150	-28,930	-28,371	-27,273	-25,603	-23,288	-20,207	-15,988	54,859
	425	-31,550	-31,336	-30,784	-29,694	-28,035	-25,737	-22,692	-18,575	54,332
	450	-33,896	-33,688	-33,141	-32,057	-30,407	-28,124	-25,108	-21,074	53,836
	475	-36,198	-35,995	-35,452	-34,374	-32,730	-30,459	-27,467	-23,501	53,366
	500	-38,464	-38,264	-37,724	-36,651	-35,013	-32,752	-29,780	-25,872	52,921
	525	-40,700	-40,503	-39,966	-38,896	-37,264	-35,010	-32,055	-28,195	52,497
	550	-42,911	-42,717	-42,183	-41,116	-39,488	-37,241	-34,301	-30,481	52,093
	575	-45,104	-44,912	-44,379	-43,315	-41,691	-39,450	-36,522	-32,737	51,707
	600	-47,281	-47,090	-46,560	-45,498	-43,877	-41,641	-38,723	-34,968	51,337
	625	-49,445	-49,256	-48,727	-47,667	-46,049	-43,817	-40,908	-37,178	50,982
	650	-51,598	-51,411	-50,883	-49,825	-48,209	-45,981	-43,080	-39,373	50,642
	675	-53,743	-53,556	-53,030	-51,974	-50,359	-48,135	-45,240	-41,552	50,314
	700	-55,878	-55,693	-55,168	-54,113	-52,500	-50,278	-47,390	-43,719	49,998
	725	-58,005	-57,821	-57,297	-56,243	-54,632	-52,412	-49,529	-45,873	49,693
	750	-60,123	-59,939	-59,416	-58,363	-56,753	-54,536	-51,657	-48,015	49,399
	775	-62,230	-62,047	-61,524	-60,472	-58,864	-56,649	-53,774	-50,144	49,114
	800	-64,325	-64,143	-63,620	-62,569	-60,962	-58,748	-55,877	-52,258	48,838
	825	-66,405	-66,224	-65,702	-64,652	-63,045	-60,834	-57,966	-54,355	48,571
	850	-68,469	-68,288	-67,767	-66,717	-65,112	-62,901	-60,037	-56,435	48,312
	875	-70,514	-70,334	-69,813	-68,764	-67,159	-64,950	-62,088	-58,493	48,060
	900	-72,537	-72,356	-71,836	-70,787	-69,183	-66,975	-64,116	-60,528	47,815
	925	-74,534	-74,354	-73,834	-72,786	-71,182	-68,975	-66,118	-62,537	47,577
	950	-76,502	-76,323	-75,803	-74,755	-73,152	-70,946	-68,091	-64,515	47,346
	975	-78,439	-78,259	-77,740	-76,693	-75,090	-72,885	-70,031	-66,461	47,120
	1000	-80,340	-80,161	-79,642	-78,595	-76,993	-74,789	-71,937	-68,371	46,900

600 MHz – Zone 1 – 10%

Transmitting / base antenna height (m)	Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
	1	92,788	94,892	97,076	99,699	102,345	104,591	106,007	106,629	106,900
	2	81,956	84,747	87,449	90,672	94,076	97,267	99,511	100,511	100,879
	3	74,848	78,446	81,617	85,246	89,076	92,812	95,623	96,917	97,358
	4	69,340	73,650	77,292	81,294	85,451	89,574	92,819	94,359	94,859
	5	64,860	69,686	73,762	78,128	82,577	87,011	90,613	92,369	92,921
	6	61,111	66,285	70,727	75,443	80,171	84,877	88,786	90,738	91,337
	7	57,905	63,306	68,041	73,080	78,076	83,033	87,219	89,356	89,998
	8	55,112	60,663	65,622	70,947	76,202	81,398	85,842	88,154	88,838
	9	52,644	58,294	63,421	68,991	74,491	79,917	84,607	87,090	87,815
	10	50,438	56,151	61,403	67,177	72,904	78,553	83,481	86,134	86,900
	11	48,448	54,200	59,543	65,484	71,416	77,279	82,440	85,265	86,072
	12	46,638	52,411	57,819	63,895	70,010	76,077	81,467	84,466	85,316
	13	44,982	50,764	56,216	62,397	68,673	74,932	80,549	83,727	84,621
	14	43,459	49,238	54,719	60,982	67,395	73,835	79,675	83,037	83,977
	15	42,051	47,820	53,316	59,642	66,172	72,778	78,835	82,388	83,378
	16	40,746	46,497	51,998	58,369	64,997	71,755	78,025	81,775	82,818
	17	39,531	45,259	50,757	57,158	63,866	70,762	77,239	81,193	82,291
	18	38,398	44,096	49,583	56,003	62,777	69,796	76,473	80,637	81,795
	19	37,338	43,002	48,472	54,899	61,725	68,854	75,723	80,104	81,325
	20	36,344	41,970	47,417	53,843	60,708	67,934	74,987	79,591	80,879
	25	32,186	37,563	42,829	49,148	56,071	63,622	71,455	77,239	78,941
	30	29,036	34,091	39,096	45,192	52,015	59,690	68,237	75,108	77,358
	35	26,584	31,269	35,962	41,762	48,386	56,051	65,125	73,200	76,019
	40	24,632	28,922	33,274	38,735	45,095	52,651	61,999	71,296	74,859
	45	23,045	26,935	30,938	36,040	42,094	49,468	58,862	69,318	73,836
	50	21,725	25,230	28,891	33,629	39,356	46,495	55,739	67,213	72,921
	55	20,605	23,747	27,083	31,469	36,864	43,729	52,782	64,966	72,093
	60	19,631	22,442	25,478	29,532	34,600	41,168	50,059	62,591	71,337
	65	18,766	21,279	24,043	27,791	32,545	38,808	47,476	60,122	70,642
	70	17,980	20,228	22,749	26,219	30,680	36,638	45,042	57,601	69,998
	75	17,252	19,267	21,572	24,792	28,984	34,645	42,757	55,065	69,399
	80	16,564	18,376	20,490	23,489	27,434	32,814	40,618	52,611	68,838
	85	15,905	17,539	19,487	22,288	26,012	31,127	38,619	50,394	68,312
	90	15,265	16,745	18,546	21,174	24,698	29,567	36,751	48,253	67,815
	95	14,638	15,982	17,656	20,130	23,476	28,120	35,005	46,196	67,346
	100	14,017	15,244	16,806	19,145	22,332	26,771	33,370	44,226	66,900
	110	12,784	13,818	15,196	17,311	20,231	24,313	30,390	40,542	66,072
	120	11,547	12,434	13,669	15,609	18,317	22,107	27,731	37,185	65,316
	130	10,300	11,070	12,194	13,997	16,535	20,088	25,326	34,123	64,621
	140	9,039	9,719	10,754	12,448	14,851	18,210	23,122	31,320	63,977
	150	7,768	8,374	9,339	10,945	13,239	16,440	21,077	28,741	63,378
	160	6,488	7,036	7,943	9,478	11,683	14,753	19,161	26,352	62,818
	170	5,204	5,704	6,564	8,041	10,173	13,136	17,349	24,127	62,291
	180	3,919	4,380	5,201	6,631	8,703	11,575	15,624	22,042	61,795
	190	2,638	3,066	3,855	5,246	7,267	10,064	13,974	20,078	61,325
	200	1,364	1,764	2,527	3,884	5,863	8,597	12,388	18,218	60,879
	225	-1,774	-1,424	-0,711	0,583	2,483	5,096	8,660	13,949	59,856
	250	-4,816	-4,500	-3,822	-2,569	-0,723	1,806	5,211	10,111	58,941
	275	-7,743	-7,452	-6,797	-5,575	-3,767	-1,296	1,995	6,610	58,113
	300	-10,550	-10,276	-9,638	-8,437	-6,657	-4,230	-1,021	3,380	57,358
	325	-13,237	-12,976	-12,351	-11,166	-9,407	-7,011	-3,865	0,375	56,662
	350	-15,812	-15,561	-14,945	-13,772	-12,029	-9,657	-6,560	-2,444	56,019
	375	-18,284	-18,041	-17,433	-16,269	-14,538	-12,186	-9,125	-5,108	55,419
	400	-20,668	-20,431	-19,828	-18,672	-16,950	-14,613	-11,582	-7,642	54,859
	425	-22,976	-22,743	-22,146	-20,995	-19,281	-16,956	-13,949	-10,072	54,332
	450	-25,222	-24,993	-24,400	-23,254	-21,546	-19,231	-16,243	-12,416	53,836
	475	-27,420	-27,194	-26,604	-25,462	-23,759	-21,452	-18,479	-14,695	53,366
	500	-29,583	-29,360	-28,772	-27,633	-25,935	-23,634	-20,675	-16,925	52,921
	525	-31,723	-31,502	-30,916	-29,780	-28,085	-25,790	-22,841	-19,121	52,497
	550	-33,851	-33,632	-33,048	-31,914	-30,222	-27,931	-24,992	-21,296	52,093
	575	-35,977	-35,760	-35,177	-34,045	-32,356	-30,069	-27,138	-23,463	51,707
	600	-38,110	-37,894	-37,313	-36,183	-34,495	-32,212	-29,287	-25,630	51,337
	625	-40,256	-40,041	-39,461	-38,333	-36,647	-34,367	-31,448	-27,806	50,982
	650	-42,421	-42,207	-41,628	-40,501	-38,817	-36,539	-33,625	-29,997	50,642
	675	-44,608	-44,395	-43,817	-42,691	-41,008	-38,733	-35,823	-32,207	50,314
	700	-46,819	-46,607	-46,029	-44,904	-43,223	-40,949	-38,043	-34,437	49,998
	725	-49,052	-48,840	-48,263	-47,139	-45,459	-43,186	-40,284	-36,687	49,693
	750	-51,305	-51,094	-50,517	-49,394	-47,714	-45,444	-42,544	-38,955	49,399
	775	-53,572	-53,362	-52,786	-51,663	-49,985	-47,715	-44,818	-41,236	49,114
	800	-55,848	-55,638	-55,063	-53,940	-52,262	-49,994	-47,100	-43,524	48,838
	825	-58,123	-57,913	-57,338	-56,216	-54,539	-52,272	-49,380	-45,810	48,571
	850	-60,386	-60,177	-59,603	-58,481	-56,805	-54,538	-51,648	-48,083	48,312
	875	-62,627	-62,418	-61,844	-60,723	-59,047	-56,781	-53,893	-50,332	48,060
	900	-64,832	-64,623	-64,049	-62,928	-61,253	-58,988	-56,101	-52,545	47,815
	925	-66,987	-66,779	-66,205	-65,085	-63,410	-61,146	-58,260	-54,707	47,577
	950	-69,080	-68,872	-68,298	-67,178	-65,504	-63,240	-60,356	-56,806	47,346
	975	-71,097	-70,889	-70,316	-69,196	-67,522	-65,259	-62,375	-58,829	47,120
	1000	-73,026	-72,818	-72,245	-71,125	-69,452	-67,189	-64,307	-60,763	46,900

600 MHz – Zone 1 – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	92,788	94,892	97,076	99,699	102,345	104,591	106,007	106,629	106,900
	2	82,390	85,130	87,816	91,033	94,401	97,503	99,622	100,542	100,879
	3	76,031	79,199	82,230	85,816	89,602	93,221	95,829	96,974	97,358
	4	71,287	74,801	78,119	82,004	86,105	90,104	93,101	94,437	94,859
	5	67,459	71,245	74,808	78,950	83,315	87,625	90,956	92,465	92,921
	6	64,233	68,233	72,001	76,367	80,963	85,543	89,173	90,848	91,337
	7	61,442	65,608	69,545	74,107	78,907	83,727	87,637	89,475	89,998
	8	58,981	63,277	67,353	72,083	77,064	82,101	86,274	88,279	88,838
	9	56,781	61,178	65,368	70,241	75,382	80,614	85,040	87,217	87,815
	10	54,794	59,270	63,553	68,547	73,827	79,235	83,902	86,259	86,900
	11	52,982	57,520	61,879	66,974	72,376	77,942	82,838	85,382	86,072
	12	51,320	55,907	60,326	65,506	71,013	76,718	81,832	84,572	85,316
	13	49,785	54,410	58,878	64,129	69,726	75,555	80,872	83,816	84,621
	14	48,361	53,016	57,523	62,833	68,505	74,443	79,950	83,103	83,977
	15	47,035	51,712	56,251	61,608	67,345	73,377	79,059	82,428	83,378
	16	45,794	50,488	55,052	60,449	66,240	72,354	78,196	81,783	82,818
	17	44,630	49,336	53,919	59,348	65,184	71,369	77,358	81,193	82,291
	18	43,535	48,249	52,846	58,300	64,174	70,420	76,542	80,637	81,795
	19	42,502	47,220	51,828	57,302	63,207	69,506	75,747	80,104	81,325
	20	41,527	46,246	50,860	56,349	62,279	68,623	74,987	79,591	80,879
	25	37,346	42,033	46,640	52,150	58,144	64,629	71,455	77,239	78,941
	30	34,052	38,661	43,212	48,682	54,670	61,210	68,237	75,108	77,358
	35	31,393	35,890	40,350	45,739	51,677	58,225	65,349	73,200	76,019
	40	29,207	33,564	37,907	43,185	49,043	55,568	62,793	71,296	74,859
	45	27,383	31,579	35,785	40,927	46,680	53,158	60,456	69,318	73,836
	50	25,843	29,860	33,912	38,900	44,527	50,940	58,287	67,213	72,921
	55	24,524	28,352	32,239	37,057	42,543	48,871	56,248	64,966	72,093
	60	23,382	27,014	30,728	35,366	40,697	46,924	54,311	62,835	71,337
	65	22,380	25,814	29,351	33,803	38,970	45,081	52,456	61,203	70,642
	70	21,491	24,729	28,089	32,352	37,348	43,329	50,672	59,607	69,998
	75	20,692	23,738	26,924	30,999	35,819	41,661	48,950	58,041	69,399
	80	19,965	22,826	25,843	29,733	34,377	40,071	47,286	56,497	68,838
	85	19,295	21,981	24,836	28,546	33,016	38,554	45,677	54,975	68,312
	90	18,671	21,192	23,893	27,430	31,728	37,108	44,122	53,471	67,815
	95	18,085	20,450	23,005	26,378	30,510	35,730	42,620	51,988	67,346
	100	17,527	19,748	22,167	25,384	29,356	34,416	41,172	50,527	66,900
	110	16,476	18,440	20,613	23,546	27,220	31,969	38,431	47,675	66,072
	120	15,482	17,228	19,189	21,876	25,284	29,739	35,891	44,932	65,316
	130	14,522	16,084	17,865	20,338	23,512	27,699	33,539	42,310	64,621
	140	13,581	14,987	16,614	18,906	21,876	25,820	31,358	39,815	63,977
	150	12,649	13,922	15,419	17,555	20,349	24,076	29,331	37,449	63,378
	160	11,721	12,880	14,265	16,269	18,911	22,447	27,438	35,210	62,818
	170	10,792	11,853	13,143	15,033	17,544	20,911	25,663	33,091	62,291
	180	9,862	10,837	12,045	13,837	16,235	19,455	23,989	31,086	61,795
	190	8,930	9,828	10,965	12,674	14,974	18,065	22,404	29,185	61,325
	200	7,994	8,825	9,901	11,538	13,753	16,731	20,895	27,380	60,879
	225	5,644	6,338	7,292	8,788	10,837	13,589	17,392	23,230	59,856
	250	3,288	3,878	4,744	6,139	8,069	10,656	14,188	19,503	58,941
	275	0,937	1,448	2,250	3,572	5,415	7,880	11,207	16,105	58,113
	300	-1,396	-0,946	-0,192	1,075	2,853	5,227	8,396	12,965	57,358
	325	-3,705	-3,301	-2,583	-1,357	0,372	2,676	5,723	10,029	56,662
	350	-5,985	-5,616	-4,926	-3,731	-2,040	0,209	3,160	7,256	56,019
	375	-8,235	-7,892	-7,224	-6,054	-4,393	-2,187	0,688	4,614	55,419
	400	-10,456	-10,134	-9,483	-8,332	-6,695	-4,523	-1,709	2,079	54,859
	425	-12,651	-12,345	-11,708	-10,572	-8,954	-6,810	-4,046	-0,372	54,332
	450	-14,825	-14,532	-13,905	-12,782	-11,180	-9,059	-6,335	-2,755	53,836
	475	-16,983	-16,700	-16,082	-14,970	-13,380	-11,278	-8,588	-5,086	53,366
	500	-19,130	-18,856	-18,245	-17,141	-15,562	-13,476	-10,814	-7,378	52,921
	525	-21,273	-21,005	-20,400	-19,304	-17,734	-15,660	-13,022	-9,642	52,497
	550	-23,415	-23,153	-22,553	-21,463	-19,900	-17,838	-15,220	-11,888	52,093
	575	-25,562	-25,304	-24,708	-23,623	-22,068	-20,015	-17,414	-14,122	51,707
	600	-27,716	-27,463	-26,871	-25,790	-24,240	-22,195	-19,610	-16,353	51,337
	625	-29,882	-29,632	-29,043	-27,966	-26,420	-24,383	-21,810	-18,584	50,982
	650	-32,059	-31,812	-31,226	-30,152	-28,611	-26,579	-24,018	-20,818	50,642
	675	-34,249	-34,004	-33,420	-32,350	-30,812	-28,786	-26,234	-23,057	50,314
	700	-36,450	-36,208	-35,626	-34,558	-33,023	-31,002	-28,459	-25,302	49,998
	725	-38,661	-38,420	-37,840	-36,774	-35,243	-33,225	-30,690	-27,551	49,693
	750	-40,877	-40,638	-40,059	-38,995	-37,466	-35,452	-32,924	-29,801	49,399
	775	-43,093	-42,856	-42,279	-41,217	-39,690	-37,679	-35,157	-32,049	49,114
	800	-45,305	-45,069	-44,493	-43,433	-41,908	-39,900	-37,383	-34,287	48,838
	825	-47,505	-47,270	-46,695	-45,636	-44,113	-42,108	-39,595	-36,511	48,571
	850	-49,684	-49,450	-48,877	-47,819	-46,297	-44,294	-41,786	-38,712	48,312
	875	-51,835	-51,602	-51,029	-49,973	-48,452	-46,452	-43,947	-40,883	48,060
	900	-53,948	-53,716	-53,144	-52,089	-50,570	-48,571	-46,070	-43,014	47,815
	925	-56,015	-55,784	-55,213	-54,158	-52,640	-50,643	-48,145	-45,097	47,577
	950	-58,026	-57,795	-57,225	-56,171	-54,654	-52,658	-50,163	-47,122	47,346
	975	-59,971	-59,742	-59,172	-58,119	-56,603	-54,609	-52,116	-49,081	47,120
	1000	-61,844	-61,615	-61,045	-59,993	-58,478	-56,485	-53,995	-50,966	46,900

600 MHz – Zone 2 – 50%

Transmitting / base antenna height (m)	Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
	1	92,660	94,850	97,057	99,689	102,338	104,587	106,006	106,628	106,900
	2	81,066	84,256	87,063	90,334	93,788	97,063	99,414	100,483	100,879
	3	73,418	77,639	81,004	84,709	88,601	92,450	95,438	96,864	97,358
	4	67,611	72,608	76,520	80,624	84,847	89,090	92,555	94,284	94,859
	5	62,963	68,473	72,874	77,369	81,883	86,435	90,281	92,273	92,921
	6	59,109	64,948	69,754	74,624	79,414	84,229	88,395	90,624	91,337
	7	55,826	61,878	67,003	72,224	77,281	82,334	86,779	89,224	89,998
	8	52,973	59,163	64,533	70,069	75,388	80,664	85,360	88,006	88,838
	9	50,453	56,734	62,291	68,102	73,672	79,163	84,092	86,928	87,815
	10	48,201	54,540	60,237	66,284	72,093	77,793	82,942	85,960	86,900
	11	46,167	52,543	58,344	64,589	70,622	76,526	81,885	85,080	86,072
	12	44,316	50,712	56,589	62,998	69,238	75,341	80,904	84,273	85,316
	13	42,619	49,024	54,955	61,499	67,926	74,222	79,986	83,526	84,621
	14	41,056	47,460	53,428	60,080	66,675	73,157	79,119	82,831	83,977
	15	39,608	46,003	51,995	58,733	65,477	72,138	78,295	82,180	83,378
	16	38,262	44,641	50,646	57,451	64,326	71,157	77,507	81,566	82,818
	17	37,006	43,363	49,372	56,228	63,216	70,207	76,748	80,984	82,291
	18	35,831	42,160	48,165	55,058	62,143	69,285	76,015	80,431	81,795
	19	34,727	41,025	47,018	53,936	61,104	68,387	75,303	79,903	81,325
	20	33,689	39,951	45,926	52,859	60,096	67,508	74,609	79,397	80,879
	25	29,287	35,313	41,130	48,016	55,436	63,348	71,311	77,113	78,941
	30	25,861	31,574	37,148	43,851	51,259	59,451	68,151	75,087	77,358
	35	23,105	28,451	33,722	40,156	47,425	55,730	65,014	73,171	76,019
	40	20,829	25,775	30,706	36,815	43,860	52,150	61,859	71,258	74,859
	45	18,904	23,438	28,012	33,762	40,526	48,706	58,689	69,266	73,836
	50	17,243	21,369	25,583	30,961	37,409	45,404	55,531	67,144	72,921
	55	15,782	19,517	23,383	28,390	34,502	42,260	52,415	64,876	72,093
	60	14,474	17,843	21,380	26,029	31,802	39,283	49,372	62,476	71,337
	65	13,286	16,319	19,551	23,862	29,301	36,482	46,425	59,980	70,642
	70	12,189	14,920	17,873	21,871	26,989	33,858	43,593	57,429	69,998
	75	11,166	13,625	16,327	20,038	24,853	31,409	40,887	54,861	69,399
	80	10,199	12,417	14,895	18,346	22,880	29,127	38,316	52,306	68,838
	85	9,278	11,283	13,562	16,779	21,053	27,002	35,880	49,787	68,312
	90	8,394	10,211	12,312	15,320	19,357	25,024	33,579	47,322	67,815
	95	7,539	9,190	11,135	13,956	17,777	23,179	31,409	44,923	67,346
	100	6,708	8,213	10,019	12,674	16,301	21,455	29,364	42,598	66,900
	110	5,101	6,364	7,939	10,314	13,608	18,323	25,619	38,192	66,072
	120	3,550	4,624	6,018	8,171	11,195	15,540	22,280	34,123	65,316
	130	2,040	2,966	4,217	6,193	8,998	13,035	19,284	30,383	64,621
	140	0,564	1,372	2,509	4,343	6,971	10,751	16,573	26,953	63,977
	150	-0,883	-0,170	0,875	2,595	5,077	8,645	14,098	23,806	63,378
	160	-2,304	-1,669	-0,698	0,929	3,292	6,682	11,819	20,910	62,818
	170	-3,701	-3,128	-2,218	-0,669	1,596	4,837	9,703	18,238	62,291
	180	-5,075	-4,553	-3,694	-2,207	-0,025	3,091	7,725	15,760	61,795
	190	-6,424	-5,946	-5,128	-3,695	-1,582	1,428	5,864	13,454	61,325
	200	-7,751	-7,309	-6,526	-5,138	-3,082	-0,162	4,102	11,297	60,879
	225	-10,968	-10,593	-9,877	-8,573	-6,628	-3,881	0,049	6,443	59,856
	250	-14,046	-13,718	-13,047	-11,801	-9,932	-7,305	-3,611	2,188	58,941
	275	-16,993	-16,697	-16,059	-14,854	-13,039	-10,498	-6,976	-1,621	58,113
	300	-19,819	-19,547	-18,932	-17,757	-15,982	-13,504	-10,110	-5,092	57,358
	325	-22,535	-22,281	-21,683	-20,531	-18,786	-16,355	-13,058	-8,299	56,662
	350	-25,153	-24,912	-24,328	-23,193	-21,471	-19,077	-15,854	-11,298	56,019
	375	-27,686	-27,456	-26,882	-25,760	-24,056	-21,691	-18,526	-14,130	55,419
	400	-30,145	-29,923	-29,357	-28,246	-26,556	-24,214	-21,096	-16,827	54,859
	425	-32,541	-32,325	-31,766	-30,663	-28,985	-26,661	-23,581	-19,416	54,332
	450	-34,883	-34,673	-34,119	-33,024	-31,355	-29,046	-25,996	-21,916	53,836
	475	-37,181	-36,975	-36,426	-35,336	-33,675	-31,379	-28,354	-24,345	53,366
	500	-39,443	-39,241	-38,695	-37,610	-35,955	-33,669	-30,666	-26,716	52,921
	525	-41,675	-41,476	-40,933	-39,852	-38,203	-35,926	-32,940	-29,039	52,497
	550	-43,882	-43,686	-43,146	-42,069	-40,424	-38,154	-35,184	-31,325	52,093
	575	-46,071	-45,876	-45,339	-44,264	-42,624	-40,360	-37,403	-33,580	51,707
	600	-48,243	-48,051	-47,516	-46,444	-44,806	-42,549	-39,602	-35,810	51,337
	625	-50,404	-50,213	-49,679	-48,609	-46,975	-44,722	-41,785	-38,020	50,982
	650	-52,553	-52,364	-51,831	-50,764	-49,132	-46,884	-43,955	-40,213	50,642
	675	-54,693	-54,506	-53,974	-52,908	-51,279	-49,034	-46,113	-42,392	50,314
	700	-56,825	-56,638	-56,108	-55,044	-53,417	-51,175	-48,261	-44,557	49,998
	725	-58,948	-58,762	-58,233	-57,170	-55,545	-53,306	-50,398	-46,710	49,693
	750	-61,062	-60,877	-60,349	-59,287	-57,663	-55,427	-52,524	-48,850	49,399
	775	-63,165	-62,981	-62,453	-61,393	-59,771	-57,537	-54,638	-50,977	49,114
	800	-65,256	-65,072	-64,546	-63,486	-61,865	-59,634	-56,739	-53,090	48,838
	825	-67,333	-67,150	-66,624	-65,565	-63,946	-61,716	-58,825	-55,186	48,571
	850	-69,393	-69,210	-68,685	-67,627	-66,009	-63,781	-60,893	-57,263	48,312
	875	-71,434	-71,252	-70,727	-69,670	-68,052	-65,826	-62,942	-59,320	48,060
	900	-73,452	-73,271	-72,747	-71,690	-70,074	-67,849	-64,967	-61,353	47,815
	925	-75,446	-75,264	-74,741	-73,685	-72,069	-69,846	-66,967	-63,359	47,577
	950	-77,410	-77,229	-76,706	-75,651	-74,036	-71,814	-68,937	-65,336	47,346
	975	-79,343	-79,163	-78,639	-77,585	-75,971	-73,750	-70,875	-67,279	47,120
	1000	-81,241	-81,061	-80,538	-79,483	-77,870	-75,650	-72,778	-69,187	46,900

600 MHz – Zone 2 – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	92,737	94,849	97,041	99,674	102,329	104,583	106,004	106,628	106,900
	2	81,855	84,661	87,378	90,618	94,040	97,248	99,503	100,509	100,879
	3	74,700	78,321	81,513	85,166	89,021	92,782	95,612	96,914	97,358
	4	69,144	73,487	77,157	81,189	85,378	89,533	92,803	94,355	94,859
	5	64,617	69,485	73,596	78,000	82,488	86,960	90,593	92,364	92,921
	6	60,823	66,046	70,531	75,292	80,064	84,815	88,761	90,733	91,337
	7	57,572	63,029	67,813	72,904	77,952	82,961	87,191	89,349	89,998
	8	54,735	60,349	65,363	70,747	76,061	81,315	85,809	88,146	88,838
	9	52,225	57,942	63,130	68,766	74,332	79,823	84,569	87,081	87,815
	10	49,976	55,762	61,080	66,928	72,727	78,447	83,437	86,124	86,900
	11	47,945	53,774	59,188	65,209	71,220	77,162	82,392	85,254	86,072
	12	46,095	51,949	57,433	63,594	69,795	75,947	81,413	84,454	85,316
	13	44,399	50,266	55,798	62,070	68,438	74,790	80,489	83,714	84,621
	14	42,837	48,705	54,270	60,630	67,141	73,679	79,609	83,022	83,977
	15	41,391	47,252	52,836	59,263	65,897	72,609	78,763	82,372	83,378
	16	40,049	45,895	51,488	57,964	64,702	71,571	77,946	81,758	82,818
	17	38,798	44,623	50,216	56,727	63,550	70,564	77,153	81,174	82,291
	18	37,629	43,428	49,012	55,546	62,440	69,583	76,378	80,617	81,795
	19	36,534	42,301	47,871	54,416	61,366	68,626	75,620	80,082	81,325
	20	35,506	41,237	46,787	53,334	60,328	67,691	74,876	79,566	80,879
	25	31,186	36,678	42,056	48,510	55,582	63,294	71,295	77,202	78,941
	30	27,890	33,065	38,189	44,429	51,414	59,271	68,020	75,055	77,358
	35	25,307	30,112	34,927	40,877	47,672	55,535	64,843	73,127	76,019
	40	23,236	27,645	32,118	37,731	44,268	52,034	61,641	71,197	74,859
	45	21,542	25,547	29,669	34,921	41,155	48,747	58,419	69,184	73,836
	50	20,126	23,739	27,515	32,401	38,307	45,669	55,202	67,035	72,921
	55	18,918	22,163	25,608	30,138	35,709	42,799	52,150	64,732	72,093
	60	17,865	20,772	23,912	28,105	33,345	40,138	49,332	62,292	71,337
	65	16,929	19,531	22,393	26,274	31,196	37,681	46,656	59,750	70,642
	70	16,080	18,410	21,022	24,619	29,244	35,420	44,130	57,149	69,998
	75	15,294	17,385	19,776	23,117	27,466	33,340	41,756	54,527	69,399
	80	14,554	16,436	18,631	21,745	25,842	31,429	39,533	51,988	68,838
	85	13,849	15,547	17,571	20,482	24,352	29,667	37,454	49,690	68,312
	90	13,167	14,705	16,579	19,311	22,976	28,040	35,511	47,472	67,815
	95	12,502	13,901	15,642	18,217	21,698	26,531	33,695	45,339	67,346
	100	11,847	13,124	14,750	17,186	20,504	25,124	31,994	43,295	66,900
	110	10,556	11,634	13,069	15,273	18,314	22,567	28,898	39,475	66,072
	120	9,273	10,196	11,484	13,506	16,328	20,279	26,141	35,995	65,316
	130	7,988	8,791	9,963	11,842	14,489	18,193	23,654	32,825	64,621
	140	6,698	7,406	8,485	10,251	12,757	16,260	21,381	29,928	63,977
	150	5,403	6,035	7,040	8,715	11,106	14,443	19,278	27,268	63,378
	160	4,104	4,675	5,621	7,221	9,519	12,720	17,313	24,809	62,818
	170	2,806	3,327	4,223	5,763	7,984	11,071	15,461	22,524	62,291
	180	1,510	1,990	2,846	4,335	6,493	9,485	13,703	20,387	61,795
	190	0,221	0,666	1,488	2,936	5,041	7,953	12,024	18,379	61,325
	200	-1,060	-0,643	0,151	1,563	3,623	6,468	10,414	16,481	60,879
	225	-4,205	-3,841	-3,100	-1,755	0,220	2,936	6,641	12,138	59,856
	250	-7,247	-6,920	-6,215	-4,915	-2,999	-0,373	3,162	8,249	58,941
	275	-10,171	-9,869	-9,190	-7,922	-6,048	-3,486	-0,073	4,711	58,113
	300	-12,971	-12,688	-12,027	-10,783	-8,940	-6,426	-3,103	1,455	57,358
	325	-15,651	-15,381	-14,734	-13,508	-11,688	-9,210	-5,956	-1,569	56,662
	350	-18,217	-17,957	-17,321	-16,109	-14,307	-11,857	-8,655	-4,402	56,019
	375	-20,680	-20,429	-19,801	-18,600	-16,812	-14,384	-11,224	-7,075	55,419
	400	-23,055	-22,810	-22,189	-20,996	-19,220	-16,808	-13,682	-9,617	54,859
	425	-25,353	-25,113	-24,497	-23,311	-21,545	-19,148	-16,048	-12,052	54,332
	450	-27,589	-27,354	-26,742	-25,562	-23,803	-21,419	-18,341	-14,400	53,836
	475	-29,778	-29,545	-28,938	-27,762	-26,010	-23,635	-20,576	-16,681	53,366
	500	-31,931	-31,701	-31,097	-29,926	-28,179	-25,812	-22,769	-18,913	52,921
	525	-34,061	-33,834	-33,232	-32,064	-30,322	-27,963	-24,933	-21,109	52,497
	550	-36,179	-35,954	-35,354	-34,190	-32,452	-30,099	-27,081	-23,285	52,093
	575	-38,296	-38,073	-37,475	-36,313	-34,579	-32,232	-29,223	-25,451	51,707
	600	-40,419	-40,197	-39,601	-38,442	-36,711	-34,369	-31,369	-27,617	51,337
	625	-42,556	-42,336	-41,741	-40,584	-38,856	-36,518	-33,525	-29,792	50,982
	650	-44,711	-44,492	-43,899	-42,744	-41,018	-38,684	-35,699	-31,982	50,642
	675	-46,889	-46,671	-46,079	-44,925	-43,202	-40,872	-37,892	-34,189	50,314
	700	-49,090	-48,873	-48,281	-47,130	-45,409	-43,082	-40,108	-36,417	49,998
	725	-51,313	-51,097	-50,507	-49,357	-47,638	-45,314	-42,345	-38,665	49,693
	750	-53,557	-53,341	-52,752	-51,603	-49,886	-47,565	-44,600	-40,931	49,399
	775	-55,815	-55,600	-55,012	-53,864	-52,149	-49,830	-46,870	-43,210	49,114
	800	-58,081	-57,867	-57,279	-56,133	-54,419	-52,103	-49,147	-45,495	48,838
	825	-60,347	-60,133	-59,546	-58,401	-56,689	-54,374	-51,422	-47,777	48,571
	850	-62,601	-62,388	-61,802	-60,657	-58,947	-56,634	-53,685	-50,047	48,312
	875	-64,833	-64,620	-64,034	-62,890	-61,181	-58,871	-55,924	-52,293	48,060
	900	-67,028	-66,816	-66,230	-65,088	-63,380	-61,071	-58,127	-54,502	47,815
	925	-69,174	-68,962	-68,377	-67,236	-65,529	-63,222	-60,281	-56,660	47,577
	950	-71,258	-71,046	-70,462	-69,321	-67,615	-65,309	-62,371	-58,755	47,346
	975	-73,266	-73,054	-72,470	-71,330	-69,625	-67,321	-64,384	-60,773	47,120
	1000	-75,186	-74,975	-74,391	-73,251	-71,547	-69,244	-66,310	-62,703	46,900

600 MHz – Zone 2 – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	92,628	94,755	96,964	99,618	102,293	104,565	105,997	106,626	106,900
	2	82,072	84,859	87,592	90,863	94,290	97,445	99,600	100,537	100,879
	3	75,559	78,798	81,895	85,560	89,431	93,129	95,795	96,966	97,358
	4	70,665	74,271	77,677	81,664	85,874	89,979	93,055	94,426	94,859
	5	66,688	70,589	74,260	78,527	83,024	87,465	90,896	92,451	92,921
	6	63,317	67,453	71,348	75,862	80,612	85,347	89,100	90,831	91,337
	7	60,384	64,705	68,788	73,519	78,496	83,495	87,549	89,456	89,998
	8	57,784	62,252	66,492	71,412	76,592	81,831	86,172	88,257	88,838
	9	55,448	60,034	64,404	69,487	74,848	80,305	84,921	87,192	87,815
	10	53,327	58,008	62,486	67,708	73,230	78,885	83,765	86,229	86,900
	11	51,385	56,142	60,711	66,052	71,715	77,549	82,682	85,349	86,072
	12	49,594	54,414	59,057	64,501	70,287	76,282	81,655	84,534	85,316
	13	47,934	52,805	57,510	63,040	68,934	75,073	80,672	83,773	84,621
	14	46,387	51,299	56,057	61,661	67,648	73,914	79,726	83,055	83,977
	15	44,939	49,886	54,687	60,353	66,421	72,801	78,810	82,373	83,378
	16	43,580	48,555	53,392	59,111	65,249	71,728	77,920	81,721	82,818
	17	42,301	47,298	52,164	57,929	64,126	70,693	77,053	81,125	82,291
	18	41,092	46,107	50,998	56,800	63,049	69,694	76,207	80,563	81,795
	19	39,949	44,977	49,888	55,721	62,015	68,728	75,380	80,024	81,325
	20	38,864	43,902	48,829	54,689	61,021	67,793	74,588	79,503	80,879
	25	34,171	39,216	44,174	50,105	56,556	63,536	70,884	77,109	78,941
	30	30,414	35,410	40,343	46,273	52,764	59,853	67,470	74,919	77,358
	35	27,337	32,242	37,108	42,987	49,465	56,608	64,379	72,943	76,019
	40	24,774	29,554	34,319	40,110	46,536	53,694	61,621	70,951	74,859
	45	22,610	27,237	31,875	37,546	43,890	51,034	59,081	68,854	73,836
	50	20,762	25,213	29,703	35,228	41,464	48,568	56,708	66,597	72,921
	55	19,167	23,426	27,750	33,111	39,215	46,255	54,463	64,163	72,093
	60	17,775	21,832	25,980	31,160	37,115	44,070	52,320	61,841	71,337
	65	16,548	20,397	24,362	29,352	35,143	41,992	50,259	60,062	70,642
	70	15,456	19,097	22,875	27,669	33,286	40,012	48,268	58,315	69,998
	75	14,474	17,909	21,502	26,097	31,533	38,120	46,340	56,591	69,399
	80	13,582	16,817	20,229	24,627	29,877	36,314	44,472	54,886	68,838
	85	12,765	15,808	19,044	23,248	28,313	34,590	42,661	53,198	68,312
	90	12,008	14,870	17,937	21,954	26,835	32,944	40,909	51,526	67,815
	95	11,301	13,992	16,899	20,736	25,437	31,376	39,216	49,873	67,346
	100	10,635	13,166	15,923	19,589	24,115	29,882	37,581	48,241	66,900
	110	9,401	11,645	14,128	17,479	21,677	27,104	34,488	45,051	66,072
	120	8,259	10,258	12,504	15,579	19,481	24,583	31,626	41,978	65,316
	130	7,181	8,971	11,013	13,849	17,489	22,289	28,984	39,041	64,621
	140	6,145	7,758	9,626	12,256	15,664	20,190	26,545	36,250	63,977
	150	5,139	6,600	8,319	10,771	13,979	18,258	24,290	33,611	63,378
	160	4,152	5,482	7,073	9,373	12,406	16,466	22,197	31,120	62,818
	170	3,178	4,395	5,876	8,045	10,927	14,793	20,247	28,774	62,291
	180	2,213	3,330	4,717	6,773	9,524	13,219	18,420	26,563	61,795
	190	1,254	2,284	3,588	5,547	8,184	11,728	16,702	24,477	61,325
	200	0,299	1,251	2,484	4,359	6,896	10,307	15,077	22,506	60,879
	225	-2,075	-1,282	-0,192	1,516	3,857	7,001	11,346	18,015	59,856
	250	-4,433	-3,761	-2,775	-1,186	1,011	3,958	7,980	14,032	58,941
	275	-6,772	-6,192	-5,282	-3,782	-1,691	1,107	4,882	10,441	58,113
	300	-9,086	-8,576	-7,724	-6,291	-4,280	-1,596	1,988	7,155	57,358
	325	-11,370	-10,914	-10,106	-8,724	-6,776	-4,179	-0,745	4,107	56,662
	350	-13,623	-13,208	-12,433	-11,091	-9,192	-6,666	-3,351	1,249	56,019
	375	-15,844	-15,460	-14,712	-13,402	-11,543	-9,073	-5,854	-1,459	55,419
	400	-18,035	-17,676	-16,949	-15,664	-13,837	-11,413	-8,273	-4,046	54,859
	425	-20,199	-19,859	-19,150	-17,886	-16,086	-13,700	-10,625	-6,537	54,332
	450	-22,342	-22,018	-21,322	-20,076	-18,299	-15,945	-12,923	-8,951	53,836
	475	-24,469	-24,157	-23,473	-22,242	-20,483	-18,157	-15,181	-11,307	53,366
	500	-26,586	-26,283	-25,609	-24,391	-22,649	-20,346	-17,409	-13,618	52,921
	525	-28,697	-28,403	-27,737	-26,530	-24,802	-22,520	-19,617	-15,896	52,497
	550	-30,809	-30,521	-29,862	-28,665	-26,950	-24,686	-21,812	-18,153	52,093
	575	-32,925	-32,643	-31,991	-30,802	-29,098	-26,849	-24,001	-20,396	51,707
	600	-35,049	-34,772	-34,125	-32,944	-31,250	-29,016	-26,191	-22,632	51,337
	625	-37,184	-36,911	-36,269	-35,095	-33,410	-31,188	-28,383	-24,866	50,982
	650	-39,331	-39,062	-38,424	-37,256	-35,580	-33,369	-30,583	-27,101	50,642
	675	-41,491	-41,225	-40,591	-39,429	-37,760	-35,560	-32,790	-29,341	50,314
	700	-43,662	-43,399	-42,769	-41,612	-39,949	-37,759	-35,004	-31,584	49,998
	725	-45,842	-45,582	-44,955	-43,802	-42,146	-39,965	-37,223	-33,830	49,693
	750	-48,028	-47,771	-47,146	-45,998	-44,348	-42,174	-39,445	-36,076	49,399
	775	-50,215	-49,960	-49,338	-48,194	-46,549	-44,383	-41,666	-38,318	49,114
	800	-52,397	-52,144	-51,524	-50,384	-48,744	-46,585	-43,878	-40,550	48,838
	825	-54,567	-54,315	-53,698	-52,561	-50,926	-48,774	-46,076	-42,766	48,571
	850	-56,718	-56,467	-55,852	-54,718	-53,088	-50,941	-48,253	-44,958	48,312
	875	-58,839	-58,590	-57,977	-56,846	-55,220	-53,079	-50,398	-47,119	48,060
	900	-60,924	-60,676	-60,064	-58,936	-57,313	-55,178	-52,505	-49,240	47,815
	925	-62,961	-62,714	-62,105	-60,979	-59,360	-57,229	-54,564	-51,311	47,577
	950	-64,943	-64,697	-64,089	-62,966	-61,350	-59,223	-56,565	-53,324	47,346
	975	-66,860	-66,615	-66,009	-64,888	-63,275	-61,152	-58,500	-55,269	47,120
	1000	-68,704	-68,460	-67,855	-66,736	-65,126	-63,007	-60,360	-57,140	46,900

600 MHz – Zone 3 – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	92,676	94,863	97,068	99,697	102,343	104,590	106,007	106,629	106,900
	2	81,097	84,283	87,084	90,351	93,799	97,069	99,416	100,483	100,879
	3	73,464	77,677	81,035	84,733	88,618	92,459	95,442	96,865	97,358
	4	67,672	72,658	76,561	80,656	84,870	89,103	92,560	94,285	94,859
	5	63,039	68,535	72,925	77,408	81,911	86,451	90,287	92,275	92,921
	6	59,199	65,022	69,814	74,671	79,448	84,249	88,403	90,626	91,337
	7	55,930	61,963	67,073	72,278	77,320	82,357	86,789	89,226	89,998
	8	53,091	59,260	64,614	70,131	75,432	80,691	85,372	88,009	88,838
	9	50,585	56,843	62,381	68,172	73,722	79,194	84,105	86,932	87,815
	10	48,345	54,661	60,337	66,361	72,149	77,827	82,956	85,964	86,900
	11	46,325	52,676	58,453	64,674	70,683	76,564	81,901	85,084	86,072
	12	44,486	50,856	56,708	63,091	69,305	75,382	80,922	84,277	85,316
	13	42,802	49,179	55,084	61,600	67,998	74,267	80,006	83,531	84,621
	14	41,251	47,625	53,567	60,189	66,754	73,207	79,141	82,836	83,977
	15	39,815	46,179	52,144	58,850	65,562	72,191	78,319	82,185	83,378
	16	38,481	44,828	50,804	57,576	64,417	71,214	77,533	81,572	82,818
	17	37,236	43,561	49,539	56,360	63,313	70,269	76,776	80,991	82,291
	18	36,072	42,368	48,341	55,198	62,246	69,351	76,046	80,439	81,795
	19	34,979	41,243	47,204	54,084	61,214	68,457	75,336	79,911	81,325
	20	33,952	40,179	46,121	53,015	60,212	67,583	74,644	79,406	80,879
	25	29,601	35,588	41,369	48,212	55,585	63,446	71,359	77,125	78,941
	30	26,220	31,893	37,428	44,085	51,441	59,576	68,215	75,103	77,358
	35	23,506	28,811	34,042	40,427	47,641	55,884	65,097	73,193	76,019
	40	21,266	26,173	31,064	37,123	44,111	52,334	61,964	71,287	74,859
	45	19,375	23,870	28,405	34,106	40,812	48,921	58,819	69,305	73,836
	50	17,745	21,833	26,010	31,339	37,729	45,652	55,688	67,196	72,921
	55	16,311	20,010	23,840	28,800	34,855	42,540	52,600	64,943	72,093
	60	15,028	18,364	21,866	26,470	32,187	39,595	49,586	62,562	71,337
	65	13,861	16,865	20,064	24,331	29,715	36,825	46,668	60,087	70,642
	70	12,785	15,487	18,410	22,367	27,432	34,231	43,865	57,559	69,998
	75	11,779	14,213	16,887	20,558	25,323	31,809	41,188	55,014	69,399
	80	10,829	13,023	15,475	18,889	23,373	29,553	38,644	52,483	68,838
	85	9,923	11,906	14,159	17,342	21,569	27,453	36,234	49,989	68,312
	90	9,052	10,848	12,926	15,901	19,893	25,498	33,958	47,549	67,815
	95	8,208	9,841	11,764	14,553	18,332	23,673	31,812	45,174	67,346
	100	7,388	8,876	10,662	13,287	16,873	21,969	29,788	42,873	66,900
	110	5,799	7,048	8,605	10,953	14,209	18,870	26,083	38,512	66,072
	120	4,263	5,324	6,703	8,831	11,819	16,115	22,777	34,483	65,316
	130	2,765	3,680	4,917	6,870	9,642	13,633	19,809	30,780	64,621
	140	1,298	2,096	3,220	5,034	7,630	11,367	17,121	27,382	63,977
	150	-0,142	0,563	1,596	3,296	5,750	9,276	14,666	24,262	63,378
	160	-1,557	-0,929	0,031	1,639	3,975	7,326	12,404	21,391	62,818
	170	-2,950	-2,383	-1,483	0,049	2,287	5,491	10,302	18,740	62,291
	180	-4,319	-3,804	-2,954	-1,485	0,673	3,754	8,336	16,280	61,795
	190	-5,667	-5,193	-4,385	-2,968	-0,878	2,098	6,484	13,990	61,325
	200	-6,991	-6,554	-5,780	-4,407	-2,374	0,513	4,730	11,846	60,879
	225	-10,206	-9,835	-9,127	-7,837	-5,913	-3,195	0,693	7,018	59,856
	250	-13,284	-12,959	-12,295	-11,062	-9,213	-6,613	-2,958	2,781	58,941
	275	-16,232	-15,939	-15,307	-14,115	-12,318	-9,803	-6,317	-1,016	58,113
	300	-19,060	-18,791	-18,182	-17,018	-15,261	-12,807	-9,446	-4,478	57,358
	325	-21,778	-21,526	-20,935	-19,793	-18,065	-15,658	-12,392	-7,678	56,662
	350	-24,399	-24,161	-23,582	-22,457	-20,751	-18,380	-15,187	-10,672	56,019
	375	-26,935	-26,707	-26,138	-25,026	-23,338	-20,994	-17,858	-13,501	55,419
	400	-29,397	-29,177	-28,616	-27,514	-25,839	-23,518	-20,427	-16,196	54,859
	425	-31,795	-31,582	-31,028	-29,934	-28,270	-25,967	-22,912	-18,783	54,332
	450	-34,141	-33,933	-33,384	-32,297	-30,642	-28,353	-25,328	-21,283	53,836
	475	-36,442	-36,238	-35,693	-34,612	-32,965	-30,687	-27,687	-23,711	53,366
	500	-38,707	-38,506	-37,965	-36,889	-35,247	-32,979	-30,000	-26,081	52,921
	525	-40,942	-40,744	-40,206	-39,133	-37,497	-35,238	-32,275	-28,404	52,497
	550	-43,152	-42,957	-42,422	-41,352	-39,720	-37,468	-34,520	-30,690	52,093
	575	-45,344	-45,151	-44,617	-43,551	-41,922	-39,676	-36,740	-32,946	51,707
	600	-47,520	-47,329	-46,797	-45,733	-44,108	-41,866	-38,941	-35,177	51,337
	625	-49,683	-49,493	-48,963	-47,901	-46,279	-44,042	-41,126	-37,387	50,982
	650	-51,835	-51,647	-51,119	-50,058	-48,438	-46,205	-43,297	-39,581	50,642
	675	-53,979	-53,792	-53,264	-52,206	-50,588	-48,358	-45,457	-41,761	50,314
	700	-56,113	-55,928	-55,401	-54,344	-52,728	-50,501	-47,606	-43,927	49,998
	725	-58,239	-58,055	-57,529	-56,473	-54,858	-52,634	-49,744	-46,081	49,693
	750	-60,356	-60,172	-59,647	-58,592	-56,979	-54,757	-51,872	-48,222	49,399
	775	-62,462	-62,279	-61,755	-60,701	-59,089	-56,869	-53,988	-50,350	49,114
	800	-64,556	-64,373	-63,850	-62,797	-61,186	-58,968	-56,091	-52,464	48,838
	825	-66,636	-66,454	-65,931	-64,878	-63,269	-61,052	-58,179	-54,561	48,571
	850	-68,699	-68,517	-67,995	-66,943	-65,334	-63,120	-60,249	-56,640	48,312
	875	-70,742	-70,561	-70,040	-68,988	-67,381	-65,167	-62,299	-58,698	48,060
	900	-72,764	-72,583	-72,062	-71,011	-69,404	-67,192	-64,327	-60,733	47,815
	925	-74,760	-74,580	-74,059	-73,009	-71,402	-69,191	-66,328	-62,741	47,577
	950	-76,727	-76,548	-76,027	-74,977	-73,372	-71,162	-68,301	-64,719	47,346
	975	-78,663	-78,484	-77,963	-76,914	-75,309	-73,100	-70,241	-66,664	47,120
	1000	-80,563	-80,384	-79,864	-78,815	-77,211	-75,003	-72,145	-68,574	46,900

600 MHz – Zone 3 – 10%

Transmitting / base antenna height (m)	Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
	1	92,769	94,876	97,063	99,690	102,339	104,588	106,006	106,628	106,900
	2	81,918	84,715	87,422	90,652	94,063	97,260	99,508	100,510	100,879
	3	74,793	78,400	81,578	85,216	89,055	92,801	95,619	96,916	97,358
	4	69,267	73,589	77,242	81,255	85,424	89,558	92,813	94,357	94,859
	5	64,769	69,611	73,700	78,080	82,544	86,992	90,605	92,367	92,921
	6	61,004	66,195	70,654	75,387	80,131	84,854	88,776	90,736	91,337
	7	57,781	63,203	67,956	73,014	78,030	83,006	87,209	89,353	89,998
	8	54,971	60,546	65,525	70,872	76,150	81,367	85,830	88,151	88,838
	9	52,488	58,162	63,313	68,907	74,432	79,882	84,593	87,087	87,815
	10	50,266	56,006	61,283	67,084	72,838	78,513	83,465	86,130	86,900
	11	48,260	54,041	59,410	65,381	71,343	77,235	82,422	85,261	86,072
	12	46,435	52,239	57,675	63,782	69,930	76,028	81,447	84,462	85,316
	13	44,764	50,578	56,060	62,275	68,585	74,879	80,527	83,722	84,621
	14	43,227	49,039	54,551	60,851	67,300	73,777	79,650	83,031	83,977
	15	41,805	47,608	53,137	59,501	66,069	72,715	78,808	82,382	83,378
	16	40,486	46,273	51,808	58,218	64,887	71,686	77,996	81,769	82,818
	17	39,258	45,022	50,555	56,997	63,748	70,688	77,207	81,186	82,291
	18	38,111	43,847	49,370	55,832	62,651	69,716	76,438	80,630	81,795
	19	37,038	42,741	48,248	54,719	61,591	68,769	75,684	80,096	81,325
	20	36,032	41,697	47,182	53,653	60,566	67,844	74,945	79,582	80,879
	25	31,813	37,232	42,540	48,910	55,888	63,500	71,396	77,225	78,941
	30	28,609	33,708	38,757	44,907	51,791	59,534	68,156	75,088	77,358
	35	26,108	30,837	35,576	41,432	48,120	55,858	65,020	73,172	76,019
	40	24,112	28,445	32,843	38,361	44,787	52,421	61,865	71,259	74,859
	45	22,484	26,417	30,465	35,622	41,744	49,199	58,697	69,268	73,836
	50	21,129	24,674	28,377	33,171	38,965	46,187	55,539	67,147	72,921
	55	19,975	23,156	26,533	30,973	36,433	43,382	52,546	64,879	72,093
	60	18,972	21,819	24,894	29,000	34,132	40,784	49,788	62,479	71,337
	65	18,081	20,627	23,427	27,225	32,042	38,388	47,171	59,983	70,642
	70	17,271	19,550	22,105	25,622	30,144	36,184	44,702	57,432	69,998
	75	16,521	18,565	20,902	24,167	28,418	34,159	42,383	54,864	69,399
	80	15,815	17,652	19,797	22,838	26,840	32,297	40,213	52,379	68,838
	85	15,138	16,796	18,772	21,614	25,393	30,582	38,184	50,131	68,312
	90	14,483	15,984	17,812	20,479	24,056	28,998	36,289	47,962	67,815
	95	13,841	15,206	16,905	19,416	22,813	27,527	34,516	45,877	67,346
	100	13,208	14,454	16,039	18,414	21,650	26,157	32,857	43,879	66,900
	110	11,953	13,003	14,403	16,551	19,516	23,662	29,833	40,144	66,072
	120	10,699	11,599	12,854	14,825	17,575	21,425	27,138	36,741	65,316
	130	9,437	10,220	11,361	13,193	15,772	19,381	24,702	33,639	64,621
	140	8,166	8,856	9,908	11,628	14,070	17,483	22,472	30,801	63,977
	150	6,885	7,502	8,481	10,113	12,443	15,695	20,406	28,191	63,378
	160	5,599	6,155	7,076	8,636	10,876	13,995	18,472	25,777	62,818
	170	4,309	4,817	5,691	7,191	9,357	12,365	16,645	23,529	62,291
	180	3,020	3,488	4,322	5,774	7,879	10,795	14,908	21,425	61,795
	190	1,736	2,171	2,972	4,384	6,437	9,276	13,247	19,444	61,325
	200	0,460	0,866	1,641	3,018	5,028	7,803	11,652	17,570	60,879
	225	-2,681	-2,326	-1,603	-0,289	1,639	4,290	7,907	13,273	59,856
	250	-5,723	-5,403	-4,715	-3,444	-1,572	0,993	4,447	9,416	58,941
	275	-8,649	-8,354	-7,690	-6,450	-4,618	-2,113	1,224	5,901	58,113
	300	-11,453	-11,176	-10,530	-9,312	-7,509	-5,049	-1,798	2,662	57,358
	325	-14,137	-13,873	-13,240	-12,040	-10,258	-7,831	-4,645	-0,350	56,662
	350	-16,709	-16,455	-15,832	-14,644	-12,879	-10,478	-7,341	-3,174	56,019
	375	-19,178	-18,932	-18,317	-17,139	-15,386	-13,006	-9,908	-5,842	55,419
	400	-21,558	-21,318	-20,709	-19,539	-17,797	-15,432	-12,365	-8,379	54,859
	425	-23,863	-23,627	-23,023	-21,859	-20,126	-17,774	-14,732	-10,810	54,332
	450	-26,105	-25,874	-25,274	-24,115	-22,388	-20,047	-17,025	-13,156	53,836
	475	-28,299	-28,071	-27,474	-26,320	-24,599	-22,266	-19,262	-15,436	53,366
	500	-30,459	-30,233	-29,639	-28,488	-26,772	-24,447	-21,456	-17,666	52,921
	525	-32,595	-32,372	-31,780	-30,632	-28,920	-26,601	-23,622	-19,863	52,497
	550	-34,719	-34,498	-33,908	-32,763	-31,054	-28,740	-25,771	-22,038	52,093
	575	-36,842	-36,622	-36,034	-34,891	-33,185	-30,876	-27,916	-24,204	51,707
	600	-38,971	-38,753	-38,166	-37,025	-35,322	-33,016	-30,064	-26,372	51,337
	625	-41,114	-40,897	-40,312	-39,172	-37,471	-35,169	-32,223	-28,547	50,982
	650	-43,276	-43,060	-42,475	-41,338	-39,638	-37,339	-34,399	-30,737	50,642
	675	-45,459	-45,244	-44,661	-43,524	-41,827	-39,531	-36,595	-32,946	50,314
	700	-47,666	-47,452	-46,869	-45,734	-44,038	-41,744	-38,813	-35,176	49,998
	725	-49,896	-49,682	-49,100	-47,966	-46,272	-43,980	-41,053	-37,425	49,693
	750	-52,145	-51,932	-51,351	-50,218	-48,525	-46,235	-43,311	-39,692	49,399
	775	-54,409	-54,197	-53,616	-52,484	-50,792	-48,504	-45,584	-41,972	49,114
	800	-56,681	-56,469	-55,889	-54,758	-53,067	-50,781	-47,863	-44,259	48,838
	825	-58,953	-58,741	-58,162	-57,031	-55,341	-53,056	-50,141	-46,544	48,571
	850	-61,213	-61,002	-60,423	-59,293	-57,604	-55,320	-52,408	-48,816	48,312
	875	-63,450	-63,239	-62,661	-61,531	-59,843	-57,561	-54,650	-51,064	48,060
	900	-65,651	-65,441	-64,863	-63,734	-62,046	-59,765	-56,857	-53,275	47,815
	925	-67,803	-67,593	-67,015	-65,887	-64,200	-61,920	-59,014	-55,436	47,577
	950	-69,892	-69,683	-69,105	-67,977	-66,291	-64,012	-61,107	-57,533	47,346
	975	-71,906	-71,697	-71,119	-69,992	-68,306	-66,028	-63,125	-59,554	47,120
	1000	-73,832	-73,623	-73,046	-71,918	-70,233	-67,956	-65,054	-61,487	46,900

600 MHz – Zone 3 – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	92,707	94,822	97,019	99,658	102,319	104,578	106,002	106,627	106,900
	2	82,229	84,993	87,703	90,947	94,345	97,474	99,611	100,539	100,879
	3	75,792	78,996	82,061	85,686	89,515	93,174	95,812	96,970	97,358
	4	70,972	74,532	77,896	81,832	85,988	90,041	93,078	94,432	94,859
	5	67,068	70,913	74,530	78,735	83,167	87,544	90,925	92,458	92,921
	6	63,769	67,838	71,670	76,111	80,785	85,444	89,136	90,840	91,337
	7	60,906	65,151	69,162	73,809	78,699	83,609	87,592	89,465	89,998
	8	58,375	62,758	66,917	71,743	76,825	81,964	86,222	88,268	88,838
	9	56,106	60,599	64,880	69,859	75,112	80,458	84,980	87,204	87,815
	10	54,051	58,631	63,013	68,122	73,525	79,058	83,833	86,244	86,900
	11	52,173	56,822	61,287	66,507	72,041	77,743	82,759	85,365	86,072
	12	50,446	55,151	59,683	64,997	70,645	76,497	81,742	84,553	85,316
	13	48,848	53,597	58,186	63,578	69,325	75,311	80,771	83,794	84,621
	14	47,361	52,147	56,781	62,239	68,071	74,175	79,836	83,079	83,977
	15	45,973	50,787	55,459	60,973	66,877	73,085	78,933	82,400	83,378
	16	44,673	49,509	54,211	59,771	65,738	72,037	78,056	81,752	82,818
	17	43,450	48,304	53,030	58,629	64,648	71,027	77,204	81,159	82,291
	18	42,298	47,164	51,910	57,540	63,605	70,053	76,372	80,600	81,795
	19	41,209	46,084	50,845	56,501	62,604	69,112	75,561	80,063	81,325
	20	40,178	45,059	49,831	55,508	61,642	68,203	74,785	79,547	80,879
	25	35,738	40,606	45,391	51,114	57,340	64,075	71,166	77,173	78,941
	30	32,210	37,015	41,759	47,462	53,704	60,523	67,849	75,012	77,358
	35	29,339	34,043	38,708	44,345	50,557	57,406	64,858	73,070	76,019
	40	26,962	31,533	36,090	41,628	47,774	54,619	62,199	71,121	74,859
	45	24,966	29,380	33,805	39,215	45,267	52,082	59,759	69,083	73,836
	50	23,270	27,507	31,780	37,040	42,976	49,738	57,487	66,901	72,921
	55	21,811	25,858	29,966	35,058	40,858	47,546	55,344	64,559	72,093
	60	20,543	24,390	28,323	33,236	38,883	45,479	53,303	62,332	71,337
	65	19,427	23,071	26,825	31,549	37,032	43,517	51,344	60,625	70,642
	70	18,435	21,876	25,449	29,980	35,291	41,649	49,455	58,953	69,998
	75	17,543	20,786	24,178	28,517	33,649	39,868	47,628	57,307	69,399
	80	16,733	19,783	23,000	27,147	32,098	38,168	45,861	55,681	68,838
	85	15,988	18,855	21,903	25,863	30,634	36,546	44,150	54,075	68,312
	90	15,297	17,990	20,876	24,657	29,250	35,000	42,495	52,486	67,815
	95	14,649	17,179	19,913	23,521	27,941	33,525	40,896	50,917	67,346
	100	14,037	16,415	19,005	22,449	26,702	32,120	39,353	49,369	66,900
	110	12,893	14,999	17,328	20,474	24,413	29,505	36,434	46,346	66,072
	120	11,824	13,698	15,804	18,687	22,345	27,128	33,731	43,436	65,316
	130	10,804	12,482	14,395	17,052	20,462	24,959	31,232	40,654	64,621
	140	9,815	11,326	13,075	15,538	18,730	22,969	28,921	38,010	63,977
	150	8,846	10,214	11,823	14,119	17,123	21,130	26,778	35,505	63,378
	160	7,888	9,133	10,623	12,777	15,617	19,418	24,784	33,139	62,818
	170	6,936	8,076	9,463	11,494	14,193	17,813	22,920	30,905	62,291
	180	5,988	7,035	8,334	10,260	12,836	16,297	21,169	28,795	61,795
	190	5,042	6,007	7,229	9,065	11,535	14,856	19,516	26,801	61,325
	200	4,097	4,990	6,145	7,902	10,281	13,478	17,948	24,912	60,879
	225	1,735	2,479	3,502	5,105	7,302	10,252	14,330	20,589	59,856
	250	-0,622	0,009	0,936	2,429	4,495	7,264	11,044	16,732	58,941
	275	-2,967	-2,421	-1,565	-0,152	1,816	4,450	8,004	13,237	58,113
	300	-5,290	-4,810	-4,006	-2,655	-0,759	1,772	5,151	10,023	57,358
	325	-7,587	-7,156	-6,393	-5,088	-3,248	-0,796	2,447	7,030	56,662
	350	-9,853	-9,461	-8,728	-7,458	-5,662	-3,273	-0,137	4,214	56,019
	375	-12,088	-11,725	-11,016	-9,775	-8,014	-5,674	-2,625	1,539	55,419
	400	-14,294	-13,953	-13,264	-12,045	-10,312	-8,012	-5,033	-1,023	54,859
	425	-16,474	-16,151	-15,476	-14,276	-12,566	-10,300	-7,378	-3,494	54,332
	450	-18,632	-18,323	-17,661	-16,476	-14,785	-12,546	-9,672	-5,893	53,836
	475	-20,774	-20,476	-19,825	-18,653	-16,977	-14,762	-11,927	-8,236	53,366
	500	-22,906	-22,617	-21,974	-20,813	-19,151	-16,955	-14,154	-10,538	52,921
	525	-25,033	-24,751	-24,115	-22,963	-21,313	-19,134	-16,362	-12,809	52,497
	550	-27,159	-26,884	-26,255	-25,110	-23,471	-21,306	-18,558	-15,060	52,093
	575	-29,290	-29,021	-28,396	-27,259	-25,628	-23,476	-20,750	-17,299	51,707
	600	-31,430	-31,165	-30,545	-29,413	-27,790	-25,649	-22,942	-19,532	51,337
	625	-33,580	-33,318	-32,702	-31,576	-29,960	-27,829	-25,139	-21,765	50,982
	650	-35,742	-35,484	-34,871	-33,750	-32,140	-30,018	-27,342	-24,000	50,642
	675	-37,916	-37,661	-37,052	-35,935	-34,330	-32,216	-29,554	-26,239	50,314
	700	-40,102	-39,850	-39,243	-38,130	-36,531	-34,424	-31,773	-28,484	49,998
	725	-42,298	-42,047	-41,443	-40,333	-38,739	-36,638	-33,998	-30,731	49,693
	750	-44,498	-44,250	-43,648	-42,542	-40,951	-38,857	-36,226	-32,979	49,399
	775	-46,700	-46,454	-45,854	-44,750	-43,164	-41,074	-38,453	-35,223	49,114
	800	-48,897	-48,652	-48,054	-46,953	-45,370	-43,286	-40,672	-37,459	48,838
	825	-51,081	-50,838	-50,242	-49,143	-47,563	-45,483	-42,877	-39,679	48,571
	850	-53,246	-53,004	-52,409	-51,313	-49,736	-47,660	-45,061	-41,875	48,312
	875	-55,382	-55,141	-54,548	-53,454	-51,879	-49,808	-47,214	-44,041	48,060
	900	-57,481	-57,241	-56,649	-55,557	-53,985	-51,917	-49,329	-46,167	47,815
	925	-59,533	-59,294	-58,703	-57,612	-56,043	-53,978	-51,396	-48,244	47,577
	950	-61,529	-61,290	-60,701	-59,612	-58,045	-55,983	-53,405	-50,263	47,346
	975	-63,460	-63,222	-62,634	-61,547	-59,982	-57,922	-55,349	-52,215	47,120
	1000	-65,318	-65,081	-64,494	-63,408	-61,845	-59,788	-57,219	-54,093	46,900

600 MHz – Zone 4 – 50%

Distance (km) / Transmitting / base antenna height (m)	10	20	37,5	75	150	300	600	1200	Emax
1	106,891	106,893	106,900	106,900	106,900	106,900	106,900	106,900	106,900
2	100,292	100,769	100,875	100,878	100,879	100,879	100,879	100,879	100,879
3	94,553	96,847	97,317	97,352	97,357	97,358	97,358	97,358	97,358
4	89,791	93,521	94,673	94,842	94,858	94,859	94,859	94,859	94,859
5	86,015	90,437	92,410	92,879	92,918	92,920	92,921	92,921	92,921
6	82,917	87,598	90,371	91,252	91,332	91,337	91,337	91,337	91,337
7	80,294	85,029	88,492	89,844	89,988	89,997	89,998	89,998	89,998
8	78,020	82,718	86,719	88,580	88,820	88,837	88,838	88,838	88,838
9	76,012	80,636	85,027	87,410	87,784	87,813	87,815	87,815	87,815
10	74,214	78,746	83,407	86,299	86,850	86,897	86,900	86,900	86,900
11	72,583	77,018	81,857	85,221	85,995	86,067	86,072	86,072	86,072
12	71,089	75,427	80,375	84,158	85,203	85,308	85,316	85,316	85,316
13	69,709	73,949	78,959	83,097	84,459	84,609	84,620	84,621	84,621
14	68,423	72,567	77,605	82,033	83,753	83,960	83,976	83,977	83,977
15	67,215	71,265	76,309	80,963	83,074	83,354	83,376	83,378	83,378
16	66,073	70,032	75,067	79,887	82,415	82,784	82,815	82,817	82,818
17	64,986	68,857	73,873	78,808	81,768	82,246	82,288	82,291	82,291
18	63,944	67,731	72,722	77,731	81,126	81,734	81,790	81,794	81,795
19	62,940	66,647	71,611	76,659	80,486	81,246	81,319	81,325	81,325
20	61,967	65,599	70,535	75,595	79,841	80,778	80,872	80,879	80,879
25	57,403	60,761	65,559	70,504	76,457	78,641	78,916	78,939	78,941
30	53,168	56,424	61,029	65,866	72,741	76,642	77,290	77,352	77,358
35	49,251	52,512	56,763	61,612	68,827	74,568	75,867	76,006	76,019
40	45,145	48,561	52,694	57,611	64,893	72,283	74,553	74,831	74,859
45	41,133	44,695	48,804	53,765	61,031	69,736	73,273	73,782	73,836
50	37,432	41,035	45,098	50,031	57,260	66,951	71,959	72,824	72,921
55	34,071	37,617	41,580	46,417	53,572	63,988	70,556	71,928	72,093
60	30,982	34,420	38,249	42,945	49,962	60,901	69,017	71,069	71,337
65	28,088	31,410	35,101	39,635	46,440	57,720	67,316	70,224	70,642
70	25,337	28,558	32,127	36,496	43,023	54,458	65,443	69,370	69,998
75	22,694	25,842	29,314	33,530	39,731	51,126	63,402	68,487	69,399
80	20,136	23,247	26,653	30,733	36,578	47,752	61,197	67,552	68,838
85	17,776	20,812	24,132	28,099	33,574	44,370	58,826	66,548	68,312
90	15,529	18,498	21,744	25,622	30,726	41,025	56,275	65,460	67,815
95	13,368	16,289	19,482	23,298	28,038	37,755	53,529	64,276	67,346
100	11,297	14,186	17,345	21,120	25,511	34,591	50,585	62,988	66,900
110	7,516	10,362	13,473	17,192	20,947	28,669	44,242	60,068	66,072
120	4,498	7,207	10,210	13,799	17,023	23,396	37,694	56,587	65,316
130	3,004	4,751	7,543	10,880	13,692	18,855	31,387	52,282	64,621
140	1,541	2,748	5,301	8,352	10,866	15,065	25,617	46,965	63,977
150	0,103	0,980	3,329	6,138	8,444	11,962	20,580	40,928	63,378
160	-1,311	-0,648	1,548	4,173	6,335	9,415	16,395	34,736	62,818
170	-2,702	-2,137	-0,081	2,407	4,468	7,279	13,055	28,850	62,291
180	-4,070	-3,557	-1,588	0,797	2,787	5,435	10,422	23,581	61,795
190	-5,417	-4,923	-2,996	-0,693	1,242	3,790	8,295	19,132	61,325
200	-6,741	-6,205	-4,334	-2,097	-0,205	2,277	6,494	15,557	60,879
225	-9,955	-9,274	-7,514	-5,411	-3,598	-1,212	2,673	9,498	59,856
250	-13,033	-12,311	-10,642	-8,646	-6,893	-4,566	-0,827	5,292	58,941
275	-15,981	-15,355	-13,766	-11,867	-10,166	-7,887	-4,247	1,553	58,113
300	-18,809	-18,342	-16,824	-15,009	-13,353	-11,115	-7,554	-1,927	57,358
325	-21,529	-21,201	-19,747	-18,009	-16,394	-14,194	-10,702	-5,214	56,662
350	-24,151	-23,902	-22,507	-20,841	-19,263	-17,097	-13,669	-8,307	56,019
375	-26,687	-26,453	-25,115	-23,515	-21,971	-19,838	-16,470	-11,223	55,419
400	-29,150	-28,884	-27,597	-26,060	-24,548	-22,445	-19,133	-13,995	54,859
425	-31,550	-31,224	-29,987	-28,508	-27,027	-24,952	-21,692	-16,656	54,332
450	-33,896	-33,501	-32,310	-30,886	-29,434	-27,386	-24,175	-19,236	53,836
475	-36,198	-35,736	-34,588	-33,216	-31,791	-29,768	-26,604	-21,756	53,366
500	-38,464	-37,943	-36,836	-35,514	-34,114	-32,115	-28,996	-24,234	52,921
525	-40,700	-40,132	-39,065	-37,789	-36,414	-34,438	-31,361	-26,682	52,497
550	-42,911	-42,310	-41,280	-40,050	-38,698	-36,744	-33,707	-29,106	52,093
575	-45,104	-44,482	-43,488	-42,300	-40,970	-39,037	-36,039	-31,513	51,707
600	-47,281	-46,650	-45,690	-44,543	-43,235	-41,322	-38,360	-33,907	51,337
625	-49,445	-48,815	-47,889	-46,781	-45,493	-43,599	-40,673	-36,288	50,982
650	-51,598	-50,978	-50,083	-49,013	-47,745	-45,869	-42,977	-38,659	50,642
675	-53,743	-53,137	-52,273	-51,239	-49,990	-48,132	-45,240	-41,018	50,314
700	-55,878	-55,291	-54,455	-53,457	-52,226	-50,278	-47,390	-43,364	49,998
725	-58,005	-57,436	-56,629	-55,665	-54,451	-52,412	-49,529	-45,695	49,693
750	-60,123	-59,570	-58,790	-57,859	-56,662	-54,536	-51,657	-48,009	49,399
775	-62,230	-61,689	-60,936	-60,035	-58,855	-56,649	-53,774	-50,144	49,114
800	-64,325	-63,788	-63,061	-62,191	-60,962	-58,748	-55,877	-52,258	48,838
825	-66,405	-65,863	-65,161	-64,321	-63,045	-60,834	-57,966	-54,355	48,571
850	-68,469	-67,910	-67,231	-66,420	-65,112	-62,901	-60,037	-56,435	48,312
875	-70,514	-69,923	-69,268	-68,485	-67,159	-64,950	-62,088	-58,493	48,060
900	-72,460	-71,891	-71,265	-70,509	-69,183	-66,975	-64,116	-60,528	47,815
925	-74,355	-73,816	-73,219	-72,489	-71,182	-68,975	-66,118	-62,537	47,577
950	-76,205	-75,693	-75,124	-74,420	-73,152	-70,946	-68,091	-64,515	47,346
975	-78,004	-77,519	-76,977	-76,298	-75,090	-72,885	-70,031	-66,461	47,120
1000	-79,748	-79,290	-78,773	-78,119	-76,993	-74,789	-71,937	-68,371	46,900

600 MHz – Zone 4 – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,039	107,069	107,073	107,074	107,074	107,074	107,074	107,074	107,076
	2	100,292	101,062	101,149	101,161	101,161	101,161	101,161	101,161	101,213
	3	94,553	97,266	97,742	97,802	97,803	97,803	97,803	97,803	97,832
	4	89,791	93,922	95,258	95,445	95,448	95,448	95,448	95,448	95,459
	5	86,015	90,721	93,184	93,623	93,632	93,632	93,632	93,632	93,633
	6	82,917	87,760	91,283	92,128	92,150	92,150	92,150	92,150	92,150
	7	80,294	85,096	89,444	90,847	90,900	90,900	90,900	90,900	90,901
	8	78,020	82,718	87,636	89,707	89,814	89,816	89,816	89,816	89,822
	9	76,012	80,636	85,866	88,658	88,855	88,859	88,859	88,859	88,871
	10	74,214	78,746	84,152	87,657	87,993	88,001	88,001	88,001	88,020
	11	72,583	77,018	82,510	86,670	87,209	87,223	87,224	87,224	87,250
	12	71,089	75,427	80,947	85,672	86,488	86,512	86,512	86,512	86,545
	13	69,709	73,949	79,464	84,646	85,815	85,856	85,857	85,857	85,896
	14	68,423	72,567	78,058	83,584	85,183	85,247	85,248	85,248	85,294
	15	67,215	71,265	76,724	82,487	84,580	84,678	84,680	84,680	84,731
	16	66,073	70,032	75,456	81,363	83,998	84,144	84,148	84,148	84,203
	17	64,986	68,857	74,249	80,225	83,429	83,641	83,646	83,646	83,706
	18	63,944	67,731	73,097	79,084	82,865	83,165	83,172	83,172	83,236
	19	62,940	66,647	71,994	77,953	82,299	82,712	82,723	82,723	82,790
	20	61,967	65,599	70,936	76,841	81,724	82,280	82,295	82,295	82,365
	25	57,403	60,761	66,191	71,755	78,551	80,348	80,422	80,423	80,503
	30	53,168	56,971	62,164	67,563	74,882	78,612	78,870	78,876	78,963
	35	49,392	53,728	58,754	64,141	71,189	76,829	77,533	77,554	77,649
	40	46,739	51,192	55,943	61,317	67,864	74,804	76,337	76,396	76,503
	45	44,651	49,017	53,676	58,957	65,007	72,488	75,219	75,364	75,488
	50	43,082	47,316	51,835	56,964	62,576	70,004	74,113	74,430	74,578
	55	41,831	45,924	50,293	55,256	60,493	67,530	72,948	73,572	73,753
	60	40,755	44,719	48,951	53,760	58,690	65,190	71,658	72,772	72,998
	65	39,780	43,633	47,746	52,422	57,106	63,043	70,203	72,012	72,304
	70	38,874	42,631	46,642	51,202	55,695	61,105	68,584	71,274	71,661
	75	38,024	41,697	45,618	50,078	54,419	59,377	66,841	70,537	71,062
	80	37,225	40,823	44,663	49,033	53,253	57,844	65,035	69,778	70,502
	85	36,472	40,002	43,770	48,058	52,177	56,486	63,222	68,972	69,975
	90	35,764	39,231	42,932	47,144	51,176	55,275	61,454	68,096	69,479
	95	35,098	38,507	42,145	46,286	50,242	54,183	59,773	67,130	69,009
	100	34,472	37,826	41,405	45,479	49,365	53,186	58,219	66,067	68,564
	110	33,328	36,579	40,050	44,001	47,762	51,411	55,583	63,657	67,736
	120	32,307	35,465	38,837	42,676	46,325	49,849	53,532	60,955	66,980
	130	31,387	34,460	37,740	41,475	45,023	48,444	51,871	58,123	66,285
	140	30,546	33,540	36,735	40,374	43,828	47,158	50,440	55,485	65,641
	150	29,766	32,686	35,803	39,352	42,718	45,965	49,149	53,356	65,042
	160	29,032	31,883	34,926	38,392	41,675	44,844	47,951	51,707	64,481
	170	28,332	31,118	34,091	37,478	40,684	43,779	46,819	50,352	63,955
	180	27,656	30,380	33,288	36,600	39,732	42,759	45,738	49,153	63,458
	190	26,996	29,662	32,508	35,750	38,812	41,773	44,695	48,038	62,988
	200	26,346	28,957	31,744	34,919	37,916	40,815	43,682	46,974	62,543
	225	24,742	27,228	29,880	32,902	35,749	38,503	41,244	44,439	61,520
	250	23,142	25,515	28,048	30,934	33,646	36,272	38,898	42,007	60,605
	275	21,531	23,803	26,229	28,993	31,584	34,094	36,614	39,641	59,777
	300	19,908	22,089	24,418	27,071	29,553	31,957	34,379	37,327	59,021
	325	18,278	20,376	22,616	25,169	27,550	29,857	32,188	35,058	58,326
	350	16,647	18,669	20,828	23,288	25,578	27,795	30,041	32,834	57,682
	375	15,022	16,974	19,058	21,433	23,638	25,772	27,938	30,657	57,083
	400	13,407	15,295	17,309	19,605	21,732	23,789	25,881	28,527	56,522
	425	11,809	13,636	15,587	17,809	19,863	21,848	23,869	26,446	55,996
	450	10,231	12,002	13,893	16,047	18,033	19,950	21,905	24,414	55,499
	475	8,677	10,395	12,230	14,320	16,242	18,096	19,988	22,433	55,030
	500	7,149	8,818	10,600	12,630	14,492	16,287	18,119	20,502	54,584
	525	5,649	7,272	9,004	10,978	12,784	14,522	16,299	18,622	54,160
	550	4,180	5,759	7,444	9,365	11,118	12,803	14,526	16,792	53,756
	575	2,741	4,279	5,921	7,791	9,494	11,129	12,801	15,012	53,370
	600	1,335	2,834	4,434	6,257	7,912	9,499	11,124	13,282	53,001
	625	-0,037	1,424	2,984	4,762	6,372	7,914	9,493	11,601	52,646
	650	-1,377	0,050	1,572	3,307	4,874	6,373	7,908	9,968	52,305
	675	-2,682	-1,289	0,197	1,891	3,417	4,876	6,369	8,382	51,977
	700	-3,953	-2,593	-1,140	0,515	2,002	3,421	4,875	6,843	51,662
	725	-5,190	-3,860	-2,440	-0,822	0,627	2,009	3,424	5,350	51,357
	750	-6,393	-5,092	-3,704	-2,121	-0,708	0,639	2,017	3,901	51,062
	775	-7,562	-6,289	-4,931	-3,382	-2,003	-0,691	0,653	2,497	50,778
	800	-8,697	-7,451	-6,121	-4,606	-3,259	-1,979	-0,669	1,136	50,502
	825	-9,799	-8,579	-7,277	-5,792	-4,477	-3,229	-1,951	-0,182	50,234
	850	-10,868	-9,672	-8,396	-6,942	-5,657	-4,439	-3,192	-1,460	49,975
	875	-11,904	-10,732	-9,482	-8,057	-6,800	-5,612	-4,395	-2,696	49,723
	900	-12,908	-11,759	-10,533	-9,136	-7,907	-6,747	-5,559	-3,894	49,479
	925	-13,880	-12,753	-11,551	-10,181	-8,979	-7,845	-6,685	-5,052	49,241
	950	-14,821	-13,716	-12,536	-11,192	-10,016	-8,908	-7,775	-6,173	49,009
	975	-15,731	-14,647	-13,489	-12,170	-11,019	-9,937	-8,829	-7,258	48,783
	1000	-16,612	-15,547	-14,410	-13,115	-11,989	-10,931	-9,848	-8,306	48,564

600 MHz – Zone 4 – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,073	107,208	107,262	107,266	107,266	107,266	107,266	107,266	107,328
	2	100,311	101,201	101,593	101,612	101,613	101,613	101,613	101,613	101,690
	3	95,293	97,276	98,437	98,506	98,507	98,507	98,507	98,507	98,510
	4	91,161	93,962	96,157	96,317	96,317	96,317	96,317	96,317	96,317
	5	87,749	91,040	94,236	94,653	94,653	94,653	94,653	94,653	94,653
	6	84,887	88,465	92,437	93,314	93,314	93,314	93,314	93,314	93,314
	7	82,437	86,195	90,673	92,194	92,194	92,194	92,194	92,194	92,194
	8	80,301	84,181	88,941	91,229	91,229	91,229	91,229	91,229	91,229
	9	78,410	82,378	87,271	90,344	90,381	90,381	90,381	90,381	90,381
	10	76,715	80,752	85,691	89,502	89,622	89,622	89,622	89,622	89,622
	11	75,180	79,272	84,215	88,691	88,934	88,934	88,934	88,934	88,934
	12	73,777	77,915	82,846	87,887	88,304	88,304	88,304	88,304	88,304
	13	72,486	76,664	81,579	87,076	87,718	87,720	87,720	87,720	87,720
	14	71,290	75,504	80,407	86,249	87,164	87,170	87,170	87,170	87,176
	15	70,176	74,422	79,321	85,407	86,644	86,654	86,654	86,654	86,666
	16	69,134	73,408	78,313	84,555	86,154	86,170	86,170	86,170	86,186
	17	68,154	72,456	77,374	83,703	85,687	85,712	85,712	85,712	85,731
	18	67,231	71,557	76,499	82,861	85,241	85,279	85,279	85,279	85,298
	19	66,419	70,744	75,680	82,036	84,811	84,867	84,867	84,867	84,886
	20	65,696	70,000	74,911	81,237	84,393	84,475	84,475	84,475	84,491
	25	62,888	66,997	71,679	77,714	82,401	82,738	82,738	82,738	82,738
	30	60,824	64,742	69,203	74,955	80,422	81,260	81,260	81,260	81,260
	35	59,256	63,005	67,271	72,774	78,456	79,982	79,982	79,982	79,982
	40	58,126	61,697	65,761	71,003	76,606	78,856	78,856	78,856	78,856
	45	57,364	60,739	64,580	69,535	74,931	77,790	77,853	77,853	77,853
	50	56,873	60,043	63,652	68,306	73,442	76,745	76,949	76,949	76,949
	55	56,553	59,525	62,909	67,272	72,124	75,722	76,128	76,128	76,128
	60	56,330	59,120	62,299	66,397	70,958	74,717	75,376	75,376	75,376
	65	56,155	58,785	61,783	65,647	69,927	73,733	74,682	74,682	74,682
	70	56,000	58,491	61,333	64,993	69,012	72,772	74,029	74,040	74,040
	75	55,850	58,220	60,927	64,411	68,196	71,843	73,361	73,441	73,441
	80	55,695	57,962	60,551	63,883	67,460	70,953	72,711	72,853	72,881
	85	55,532	57,707	60,194	63,393	66,789	70,109	72,074	72,284	72,355
	90	55,441	57,453	59,850	62,930	66,170	69,313	71,441	71,741	71,859
	95	55,341	57,216	59,512	62,487	65,589	68,567	70,806	71,221	71,389
	100	55,227	57,021	59,178	62,057	65,039	67,866	70,166	70,720	70,943
	110	54,957	56,606	58,547	61,218	63,998	66,577	68,868	69,766	70,116
	120	54,637	56,158	57,954	60,387	63,004	65,398	67,576	68,853	69,360
	130	54,276	55,682	57,348	59,564	62,030	64,285	66,328	67,947	68,665
	140	53,881	55,183	56,731	58,784	61,061	63,207	65,132	66,995	68,021
	150	53,461	54,668	56,107	58,012	60,089	62,144	63,975	65,951	67,422
	160	53,023	54,142	55,481	57,248	59,111	61,084	62,840	64,817	66,861
	170	52,572	53,610	54,855	56,495	58,127	60,022	61,712	63,618	66,335
	180	52,113	53,075	54,232	55,752	57,137	58,955	60,582	62,382	65,838
	190	51,649	52,539	53,614	55,021	56,276	57,882	59,445	61,123	65,368
	200	51,183	52,005	53,001	54,302	55,469	56,803	58,298	59,848	64,923
	225	50,016	50,684	51,498	52,554	53,516	54,377	55,377	56,593	63,900
	250	48,858	49,387	50,038	50,876	51,651	52,352	52,973	53,530	62,985
	275	47,687	48,103	48,619	49,276	49,897	50,466	50,959	51,342	62,157
	300	46,416	46,781	47,234	47,811	48,368	48,888	49,342	49,670	61,401
	325	45,142	45,471	45,878	46,397	46,907	47,393	47,820	48,114	60,706
	350	43,881	44,178	44,545	45,014	45,483	45,937	46,336	46,597	60,062
	375	42,627	42,897	43,230	43,656	44,090	44,514	44,884	45,113	59,463
	400	41,378	41,626	41,929	42,319	42,722	43,118	43,460	43,658	58,902
	425	40,133	40,361	40,639	40,998	41,372	41,743	42,058	42,228	58,376
	450	38,891	39,102	39,358	39,690	40,039	40,385	40,674	40,819	57,879
	475	37,652	37,848	38,085	38,393	38,719	39,041	39,305	39,429	57,410
	500	36,416	36,599	36,818	37,106	37,411	37,711	37,950	38,055	56,964
	525	35,184	35,356	35,560	35,828	36,114	36,392	36,607	36,698	56,540
	550	33,958	34,119	34,309	34,561	34,828	35,085	35,279	35,357	56,136
	575	32,739	32,890	33,068	33,304	33,555	33,792	33,966	34,035	55,750
	600	31,529	31,670	31,838	32,060	32,294	32,512	32,668	32,730	55,381
	625	30,329	30,462	30,619	30,828	31,047	31,249	31,389	31,447	55,026
	650	29,141	29,267	29,415	29,612	29,817	30,003	30,130	30,184	54,685
	675	27,967	28,086	28,226	28,412	28,604	28,775	28,891	28,944	54,357
	700	26,809	26,922	27,054	27,230	27,410	27,568	27,675	27,727	54,042
	725	25,669	25,776	25,900	26,067	26,236	26,384	26,482	26,534	53,737
	750	24,548	24,649	24,767	24,926	25,085	25,222	25,314	25,367	53,442
	775	23,447	23,543	23,655	23,806	23,956	24,085	24,172	24,225	53,158
	800	22,367	22,459	22,566	22,710	22,852	22,973	23,056	23,110	52,882
	825	21,311	21,399	21,501	21,638	21,773	21,887	21,967	22,022	52,614
	850	20,278	20,362	20,460	20,592	20,720	20,828	20,906	20,962	52,355
	875	19,270	19,351	19,445	19,572	19,694	19,797	19,873	19,930	52,103
	900	18,288	18,365	18,456	18,578	18,695	18,794	18,868	18,926	51,859
	925	17,331	17,406	17,494	17,611	17,724	17,819	17,892	17,951	51,621
	950	16,401	16,474	16,558	16,672	16,781	16,873	16,944	17,004	51,389
	975	15,498	15,568	15,650	15,761	15,866	15,955	16,026	16,086	51,163
	1000	14,622	14,690	14,770	14,877	14,979	15,066	15,136	15,197	50,944

600 MHz – Zone 5 – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	106,891	106,893	106,900	106,900	106,900	106,900	106,900	106,900	106,900
	2	100,292	100,769	100,875	100,878	100,879	100,879	100,879	100,879	100,879
	3	94,553	96,847	97,317	97,352	97,357	97,358	97,358	97,358	97,358
	4	89,791	93,521	94,673	94,842	94,858	94,859	94,859	94,859	94,859
	5	86,015	90,437	92,410	92,879	92,918	92,920	92,921	92,921	92,921
	6	82,917	87,598	90,371	91,252	91,332	91,337	91,337	91,337	91,337
	7	80,294	85,029	88,492	89,844	89,988	89,997	89,998	89,998	89,998
	8	78,020	82,718	86,719	88,580	88,820	88,837	88,838	88,838	88,838
	9	76,012	80,636	85,027	87,410	87,784	87,813	87,815	87,815	87,815
	10	74,214	78,746	83,407	86,299	86,850	86,897	86,900	86,900	86,900
	11	72,583	77,018	81,857	85,221	85,995	86,067	86,072	86,072	86,072
	12	71,089	75,427	80,375	84,158	85,203	85,308	85,316	85,316	85,316
	13	69,709	73,949	78,959	83,097	84,459	84,609	84,620	84,621	84,621
	14	68,423	72,567	77,605	82,033	83,753	83,960	83,976	83,977	83,977
	15	67,215	71,265	76,309	80,963	83,074	83,354	83,376	83,378	83,378
	16	66,073	70,032	75,067	79,887	82,415	82,784	82,815	82,817	82,818
	17	64,986	68,857	73,873	78,808	81,768	82,246	82,288	82,291	82,291
	18	63,944	67,731	72,722	77,731	81,126	81,734	81,790	81,794	81,795
	19	62,940	66,647	71,611	76,659	80,486	81,246	81,319	81,325	81,325
	20	61,967	65,599	70,535	75,595	79,841	80,778	80,872	80,879	80,879
	25	57,403	60,761	65,559	70,504	76,457	78,641	78,916	78,939	78,941
	30	53,168	56,424	61,029	65,866	72,741	76,642	77,290	77,352	77,358
	35	49,251	52,512	56,763	61,612	68,827	74,568	75,867	76,006	76,019
	40	45,145	48,561	52,694	57,611	64,893	72,283	74,553	74,831	74,859
	45	41,133	44,695	48,804	53,765	61,031	69,736	73,273	73,782	73,836
	50	37,432	41,035	45,098	50,031	57,260	66,951	71,959	72,824	72,921
	55	34,071	37,617	41,580	46,417	53,572	63,988	70,556	71,928	72,093
	60	30,982	34,420	38,249	42,945	49,962	60,901	69,017	71,069	71,337
	65	28,088	31,410	35,101	39,635	46,440	57,720	67,316	70,224	70,642
	70	25,337	28,558	32,127	36,496	43,023	54,458	65,443	69,370	69,998
	75	22,694	25,842	29,314	33,530	39,731	51,126	63,402	68,487	69,399
	80	20,136	23,247	26,653	30,733	36,578	47,752	61,197	67,552	68,838
	85	17,776	20,812	24,132	28,099	33,574	44,370	58,826	66,548	68,312
	90	15,529	18,498	21,744	25,622	30,726	41,025	56,275	65,460	67,815
	95	13,368	16,289	19,482	23,298	28,038	37,755	53,529	64,276	67,346
	100	11,297	14,186	17,345	21,120	25,511	34,591	50,585	62,988	66,900
	110	7,516	10,362	13,473	17,192	20,947	28,669	44,242	60,068	66,072
	120	4,498	7,207	10,210	13,799	17,023	23,396	37,694	56,587	65,316
	130	3,004	4,751	7,543	10,880	13,692	18,855	31,387	52,282	64,621
	140	1,541	2,748	5,301	8,352	10,866	15,065	25,617	46,965	63,977
	150	0,103	0,980	3,329	6,138	8,444	11,962	20,580	40,928	63,378
	160	-1,311	-0,648	1,548	4,173	6,335	9,415	16,395	34,736	62,818
	170	-2,702	-2,137	-0,081	2,407	4,468	7,279	13,055	28,850	62,291
	180	-4,070	-3,557	-1,588	0,797	2,787	5,435	10,422	23,581	61,795
	190	-5,417	-4,923	-2,996	-0,693	1,242	3,790	8,295	19,132	61,325
	200	-6,741	-6,205	-4,334	-2,097	-0,205	2,277	6,494	15,557	60,879
	225	-9,955	-9,274	-7,514	-5,411	-3,598	-1,212	2,673	9,498	59,856
	250	-13,033	-12,311	-10,642	-8,646	-6,893	-4,566	-0,827	5,292	58,941
	275	-15,981	-15,355	-13,766	-11,867	-10,166	-7,887	-4,247	1,553	58,113
	300	-18,809	-18,342	-16,824	-15,009	-13,353	-11,115	-7,554	-1,927	57,358
	325	-21,529	-21,201	-19,747	-18,009	-16,394	-14,194	-10,702	-5,214	56,662
	350	-24,151	-23,902	-22,507	-20,841	-19,263	-17,097	-13,669	-8,307	56,019
	375	-26,687	-26,453	-25,115	-23,515	-21,971	-19,838	-16,470	-11,223	55,419
	400	-29,150	-28,884	-27,597	-26,060	-24,548	-22,445	-19,133	-13,995	54,859
	425	-31,550	-31,224	-29,987	-28,508	-27,027	-24,952	-21,692	-16,656	54,332
	450	-33,896	-33,501	-32,310	-30,886	-29,434	-27,386	-24,175	-19,236	53,836
	475	-36,198	-35,736	-34,588	-33,216	-31,791	-29,768	-26,604	-21,756	53,366
	500	-38,464	-37,943	-36,836	-35,514	-34,114	-32,115	-28,996	-24,234	52,921
	525	-40,700	-40,132	-39,065	-37,789	-36,414	-34,438	-31,361	-26,682	52,497
	550	-42,911	-42,310	-41,280	-40,050	-38,698	-36,744	-33,707	-29,106	52,093
	575	-45,104	-44,482	-43,488	-42,300	-40,970	-39,037	-36,039	-31,513	51,707
	600	-47,281	-46,650	-45,690	-44,543	-43,235	-41,322	-38,360	-33,907	51,337
	625	-49,445	-48,815	-47,889	-46,781	-45,493	-43,599	-40,673	-36,288	50,982
	650	-51,598	-50,978	-50,083	-49,013	-47,745	-45,869	-42,977	-38,659	50,642
	675	-53,743	-53,137	-52,273	-51,239	-49,990	-48,132	-45,240	-41,018	50,314
	700	-55,878	-55,291	-54,455	-53,457	-52,226	-50,278	-47,390	-43,364	49,998
	725	-58,005	-57,436	-56,629	-55,665	-54,451	-52,412	-49,529	-45,695	49,693
	750	-60,123	-59,570	-58,790	-57,859	-56,662	-54,536	-51,657	-48,009	49,399
	775	-62,230	-61,689	-60,936	-60,035	-58,855	-56,649	-53,774	-50,144	49,114
	800	-64,325	-63,788	-63,061	-62,191	-60,962	-58,748	-55,877	-52,258	48,838
	825	-66,405	-65,863	-65,161	-64,321	-63,045	-60,834	-57,966	-54,355	48,571
	850	-68,469	-67,910	-67,231	-66,420	-65,112	-62,901	-60,037	-56,435	48,312
	875	-70,514	-69,923	-69,268	-68,485	-67,159	-64,950	-62,088	-58,493	48,060
	900	-72,460	-71,891	-71,265	-70,509	-69,183	-66,975	-64,116	-60,528	47,815
	925	-74,355	-73,816	-73,219	-72,489	-71,182	-68,975	-66,118	-62,537	47,577
	950	-76,205	-75,693	-75,124	-74,420	-73,152	-70,946	-68,091	-64,515	47,346
	975	-78,004	-77,519	-76,977	-76,298	-75,090	-72,885	-70,031	-66,461	47,120
	1000	-79,748	-79,290	-78,773	-78,119	-76,993	-74,789	-71,937	-68,371	46,900

600 MHz – Zone 5 – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,039	107,069	107,073	107,074	107,074	107,074	107,074	107,074	107,076
	2	100,292	101,061	101,149	101,161	101,161	101,161	101,161	101,161	101,213
	3	94,553	97,257	97,742	97,802	97,803	97,803	97,803	97,803	97,832
	4	89,791	93,886	95,258	95,445	95,448	95,448	95,448	95,448	95,459
	5	86,015	90,642	93,184	93,623	93,632	93,632	93,632	93,632	93,633
	6	82,917	87,632	91,281	92,128	92,150	92,150	92,150	92,150	92,150
	7	80,294	85,029	89,439	90,847	90,900	90,900	90,900	90,900	90,901
	8	78,020	82,718	87,627	89,707	89,814	89,816	89,816	89,816	89,822
	9	76,012	80,636	85,850	88,657	88,855	88,859	88,859	88,859	88,871
	10	74,214	78,746	84,128	87,654	87,993	88,001	88,001	88,001	88,020
	11	72,583	77,018	82,475	86,665	87,209	87,223	87,224	87,224	87,250
	12	71,089	75,427	80,898	85,662	86,487	86,512	86,512	86,512	86,545
	13	69,709	73,949	79,400	84,627	85,815	85,856	85,857	85,857	85,896
	14	68,423	72,567	77,976	83,551	85,182	85,247	85,248	85,248	85,294
	15	67,215	71,265	76,622	82,435	84,579	84,678	84,680	84,680	84,731
	16	66,073	70,032	75,331	81,285	83,996	84,144	84,148	84,148	84,203
	17	64,986	68,857	74,098	80,114	83,426	83,641	83,646	83,646	83,706
	18	63,944	67,731	72,916	78,933	82,860	83,165	83,172	83,172	83,236
	19	62,940	66,647	71,781	77,756	82,290	82,712	82,723	82,723	82,790
	20	61,967	65,599	70,687	76,592	81,708	82,280	82,295	82,295	82,365
	25	57,403	60,761	65,710	71,179	78,434	80,348	80,422	80,423	80,503
	30	53,168	56,424	61,381	66,626	74,485	78,604	78,870	78,876	78,963
	35	49,251	52,540	57,704	62,924	70,396	76,787	77,533	77,554	77,649
	40	46,045	49,790	54,788	59,950	66,718	74,649	76,336	76,396	76,503
	45	44,050	47,946	52,527	57,531	63,644	72,100	75,216	75,364	75,488
	50	42,608	46,414	50,657	55,485	61,111	69,294	74,100	74,430	74,578
	55	41,319	44,965	48,990	53,672	58,969	66,486	72,907	73,572	73,753
	60	40,039	43,563	47,438	52,004	57,084	63,870	71,553	72,771	72,998
	65	38,777	42,205	45,966	50,434	55,364	61,522	69,976	72,011	72,304
	70	37,545	40,891	44,560	48,938	53,757	59,440	68,166	71,271	71,661
	75	36,349	39,622	43,211	47,504	52,231	57,584	66,171	70,529	71,062
	80	35,193	38,398	41,912	46,124	50,769	55,901	64,071	69,760	70,502
	85	34,074	37,216	40,660	44,792	49,360	54,345	61,949	68,932	69,975
	90	32,993	36,073	39,450	43,505	47,998	52,879	59,875	68,015	69,479
	95	31,945	34,967	38,279	42,258	46,679	51,479	57,907	66,982	69,009
	100	30,930	33,894	37,144	41,049	45,399	50,131	56,089	65,812	68,564
	110	28,985	31,839	34,969	38,731	42,943	47,553	52,931	63,041	67,736
	120	27,140	29,890	32,906	36,531	40,612	45,106	50,236	59,747	66,980
	130	25,381	28,032	30,939	34,435	38,389	42,770	47,779	56,115	66,285
	140	23,694	26,252	29,056	32,428	36,262	40,532	45,455	52,634	65,641
	150	22,070	24,539	27,246	30,502	34,219	38,383	43,224	49,749	65,042
	160	20,501	22,886	25,501	28,645	32,253	36,313	41,073	47,346	64,481
	170	18,980	21,285	23,812	26,852	30,356	34,315	38,993	45,176	63,955
	180	17,501	19,731	22,176	25,116	28,521	32,384	36,979	43,116	63,458
	190	16,061	18,219	20,586	23,432	26,743	30,514	35,025	41,123	62,988
	200	14,655	16,746	19,038	21,795	25,018	28,700	33,130	39,184	62,543
	225	11,273	13,210	15,334	17,888	20,907	24,385	28,617	34,541	61,520
	250	8,053	9,855	11,831	14,208	17,048	20,345	24,392	30,161	60,605
	275	4,971	6,654	8,501	10,721	13,404	16,539	20,416	26,019	59,777
	300	2,009	3,589	5,321	7,403	9,947	12,937	16,658	22,094	59,021
	325	-0,844	0,643	2,274	4,234	6,654	9,516	13,093	18,365	58,326
	350	-3,599	-2,194	-0,653	1,199	3,509	6,255	9,701	14,813	57,682
	375	-6,261	-4,930	-3,470	-1,714	0,497	3,139	6,465	11,425	57,083
	400	-8,839	-7,573	-6,185	-4,516	-2,394	0,154	3,371	8,185	56,522
	425	-11,336	-10,130	-8,807	-7,216	-5,173	-2,710	0,407	5,082	55,996
	450	-13,757	-12,604	-11,340	-9,819	-7,849	-5,462	-2,438	2,106	55,499
	475	-16,105	-15,001	-13,790	-12,333	-10,428	-8,112	-5,173	-0,752	55,030
	500	-18,385	-17,325	-16,162	-14,763	-12,918	-10,666	-7,805	-3,500	54,584
	525	-20,599	-19,578	-18,460	-17,114	-15,323	-13,130	-10,341	-6,146	54,160
	550	-22,749	-21,766	-20,687	-19,390	-17,649	-15,510	-12,787	-8,696	53,756
	575	-24,839	-23,889	-22,847	-21,595	-19,899	-17,810	-15,149	-11,155	53,370
	600	-26,870	-25,951	-24,944	-23,732	-22,079	-20,035	-17,432	-13,530	53,001
	625	-28,845	-27,955	-26,979	-25,805	-24,190	-22,189	-19,639	-15,824	52,646
	650	-30,766	-29,902	-28,955	-27,816	-26,237	-24,275	-21,776	-18,042	52,305
	675	-32,634	-31,795	-30,875	-29,769	-28,223	-26,297	-23,844	-20,188	51,977
	700	-34,452	-33,636	-32,741	-31,664	-30,150	-28,258	-25,848	-22,265	51,662
	725	-36,221	-35,426	-34,554	-33,506	-32,020	-30,160	-27,791	-24,277	51,357
	750	-37,943	-37,168	-36,318	-35,295	-33,836	-32,006	-29,675	-26,226	51,062
	775	-39,619	-38,863	-38,033	-37,035	-35,601	-33,798	-31,503	-28,116	50,778
	800	-41,252	-40,512	-39,701	-38,726	-37,316	-35,539	-33,277	-29,949	50,502
	825	-42,835	-42,115	-41,325	-40,371	-38,983	-37,230	-35,000	-31,727	50,234
	850	-44,378	-43,676	-42,905	-41,971	-40,603	-38,874	-36,673	-33,454	49,975
	875	-45,880	-45,196	-44,442	-43,527	-42,179	-40,471	-38,299	-35,130	49,723
	900	-47,344	-46,677	-45,940	-45,042	-43,713	-42,025	-39,879	-36,758	49,479
	925	-48,771	-48,119	-47,397	-46,517	-45,205	-43,536	-41,416	-38,340	49,241
	950	-50,162	-49,523	-48,817	-47,953	-46,657	-45,006	-42,910	-39,877	49,009
	975	-51,517	-50,892	-50,200	-49,350	-48,070	-46,437	-44,363	-41,372	48,783
	1000	-52,838	-52,226	-51,547	-50,712	-49,446	-47,829	-45,776	-42,825	48,564

600 MHz – Zone 5 – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,073	107,208	107,262	107,266	107,266	107,266	107,266	107,266	107,328
	2	100,311	101,201	101,593	101,612	101,613	101,613	101,613	101,613	101,690
	3	95,293	97,276	98,437	98,506	98,507	98,507	98,507	98,507	98,510
	4	91,161	93,962	96,157	96,317	96,317	96,317	96,317	96,317	96,317
	5	87,749	91,040	94,236	94,653	94,653	94,653	94,653	94,653	94,653
	6	84,887	88,465	92,437	93,314	93,314	93,314	93,314	93,314	93,314
	7	82,437	86,195	90,673	92,194	92,194	92,194	92,194	92,194	92,194
	8	80,301	84,181	88,941	91,229	91,229	91,229	91,229	91,229	91,229
	9	78,410	82,378	87,271	90,344	90,381	90,381	90,381	90,381	90,381
	10	76,715	80,752	85,691	89,502	89,622	89,622	89,622	89,622	89,622
	11	75,180	79,272	84,215	88,691	88,934	88,934	88,934	88,934	88,934
	12	73,777	77,915	82,846	87,887	88,304	88,304	88,304	88,304	88,304
	13	72,486	76,664	81,579	87,076	87,718	87,720	87,720	87,720	87,720
	14	71,290	75,504	80,407	86,249	87,164	87,170	87,170	87,170	87,176
	15	70,176	74,422	79,321	85,407	86,644	86,654	86,654	86,654	86,666
	16	69,134	73,408	78,313	84,555	86,154	86,170	86,170	86,170	86,186
	17	68,154	72,456	77,374	83,703	85,687	85,712	85,712	85,712	85,731
	18	67,231	71,557	76,499	82,861	85,241	85,279	85,279	85,279	85,298
	19	66,419	70,744	75,680	82,036	84,811	84,867	84,867	84,867	84,886
	20	65,696	70,000	74,911	81,237	84,393	84,475	84,475	84,475	84,491
	25	62,888	66,997	71,679	77,714	82,401	82,738	82,738	82,738	82,738
	30	60,824	64,742	69,203	74,955	80,422	81,260	81,260	81,260	81,260
	35	59,256	63,005	67,271	72,774	78,456	79,982	79,982	79,982	79,982
	40	58,126	61,697	65,761	71,003	76,606	78,856	78,856	78,856	78,856
	45	57,364	60,739	64,580	69,535	74,931	77,790	77,853	77,853	77,853
	50	56,873	60,043	63,652	68,306	73,442	76,745	76,949	76,949	76,949
	55	56,553	59,525	62,909	67,272	72,124	75,722	76,128	76,128	76,128
	60	56,330	59,120	62,299	66,397	70,958	74,717	75,376	75,376	75,376
	65	56,155	58,785	61,783	65,647	69,927	73,733	74,682	74,682	74,682
	70	56,000	58,491	61,333	64,993	69,012	72,772	74,029	74,040	74,040
	75	55,850	58,220	60,927	64,411	68,196	71,843	73,361	73,441	73,441
	80	55,695	57,962	60,551	63,883	67,460	70,953	72,711	72,853	72,881
	85	55,532	57,707	60,194	63,393	66,789	70,109	72,074	72,284	72,355
	90	55,359	57,453	59,850	62,930	66,170	69,313	71,441	71,741	71,859
	95	55,174	57,196	59,512	62,487	65,589	68,567	70,806	71,221	71,389
	100	54,978	56,934	59,178	62,057	65,039	67,866	70,166	70,720	70,943
	110	54,549	56,390	58,506	61,218	63,998	66,577	68,868	69,766	70,116
	120	54,076	55,817	57,822	60,387	63,004	65,398	67,576	68,853	69,360
	130	53,563	55,214	57,118	59,552	62,030	64,285	66,328	67,947	68,665
	140	53,014	54,582	56,392	58,705	61,061	63,207	65,132	66,995	68,021
	150	52,434	53,924	55,646	57,844	60,089	62,144	63,975	65,951	67,422
	160	51,827	53,243	54,882	56,972	59,111	61,084	62,840	64,817	66,861
	170	51,196	52,543	54,101	56,088	58,127	60,022	61,712	63,618	66,335
	180	50,545	51,825	53,306	55,194	57,137	58,955	60,582	62,382	65,838
	190	49,875	51,091	52,498	54,292	56,142	57,882	59,445	61,123	65,368
	200	49,189	50,344	51,680	53,383	55,140	56,803	58,298	59,848	64,923
	225	47,414	48,424	49,589	51,076	52,611	54,073	55,377	56,593	63,900
	250	45,565	46,436	47,439	48,721	50,036	51,282	52,362	53,241	62,985
	275	43,657	44,392	45,235	46,316	47,407	48,419	49,247	49,834	62,157
	300	41,702	42,303	42,991	43,874	44,738	45,506	46,085	46,463	61,401
	325	39,708	40,185	40,730	41,429	42,082	42,627	43,000	43,249	60,706
	350	37,646	38,036	38,482	39,055	39,566	39,969	40,223	40,401	60,062
	375	35,549	35,891	36,281	36,783	37,221	37,556	37,760	37,905	59,463
	400	33,511	33,812	34,154	34,595	34,972	35,253	35,422	35,545	58,902
	425	31,554	31,820	32,122	32,512	32,840	33,079	33,222	33,330	58,376
	450	29,690	29,927	30,197	30,544	30,832	31,039	31,164	31,261	57,879
	475	27,924	28,138	28,380	28,693	28,948	29,131	29,242	29,333	57,410
	500	26,255	26,449	26,669	26,953	27,183	27,346	27,448	27,533	56,964
	525	24,676	24,853	25,054	25,314	25,524	25,672	25,767	25,849	56,540
	550	23,177	23,340	23,526	23,766	23,958	24,094	24,184	24,263	56,136
	575	21,747	21,898	22,071	22,293	22,471	22,598	22,684	22,760	55,750
	600	20,374	20,516	20,676	20,884	21,050	21,169	21,252	21,326	55,381
	625	19,048	19,180	19,331	19,526	19,681	19,793	19,873	19,946	55,026
	650	17,758	17,883	18,024	18,208	18,353	18,460	18,538	18,610	54,685
	675	16,497	16,614	16,748	16,921	17,059	17,160	17,236	17,308	54,357
	700	15,258	15,369	15,496	15,660	15,790	15,887	15,962	16,033	54,042
	725	14,038	14,144	14,264	14,419	14,543	14,636	14,709	14,779	53,737
	750	12,834	12,935	13,049	13,196	13,314	13,404	13,476	13,546	53,442
	775	11,647	11,742	11,851	11,992	12,104	12,191	12,263	12,332	53,158
	800	10,477	10,569	10,673	10,807	10,915	10,999	11,070	11,139	52,882
	825	9,328	9,416	9,516	9,644	9,748	9,830	9,900	9,969	52,614
	850	8,204	8,289	8,385	8,508	8,608	8,688	8,758	8,827	52,355
	875	7,111	7,192	7,284	7,404	7,501	7,578	7,648	7,717	52,103
	900	6,052	6,131	6,221	6,336	6,430	6,506	6,575	6,644	51,859
	925	5,036	5,112	5,199	5,311	5,403	5,478	5,547	5,615	51,621
	950	4,067	4,141	4,226	4,335	4,424	4,498	4,567	4,636	51,389
	975	3,151	3,223	3,306	3,412	3,500	3,573	3,642	3,710	51,163
	1000	2,293	2,364	2,444	2,549	2,635	2,708	2,776	2,845	50,944

600 MHz – Zone A – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	106,958	106,958	106,958	106,958	106,958	106,958	106,958	106,958	106,958
	2	100,702	100,939	100,992	100,994	100,994	100,994	100,994	100,994	100,994
	3	95,162	97,097	97,494	97,523	97,528	97,528	97,528	97,528	97,528
	4	90,596	93,899	94,919	95,069	95,083	95,084	95,084	95,084	95,084
	5	87,010	90,974	92,741	93,162	93,197	93,199	93,199	93,199	93,199
	6	84,099	88,307	90,800	91,592	91,664	91,668	91,668	91,668	91,668
	7	81,660	85,915	89,027	90,242	90,371	90,380	90,380	90,380	90,380
	8	79,566	83,781	87,370	89,039	89,254	89,270	89,271	89,271	89,271
	9	77,734	81,872	85,802	87,935	88,269	88,295	88,297	88,297	88,297
	10	76,108	80,153	84,313	86,894	87,386	87,427	87,430	87,430	87,430
	11	74,647	78,593	82,899	85,893	86,581	86,645	86,650	86,650	86,650
	12	73,319	77,167	81,557	84,913	85,840	85,933	85,940	85,940	85,940
	13	72,101	75,851	80,283	83,943	85,148	85,280	85,290	85,291	85,291
	14	70,973	74,628	79,072	82,977	84,494	84,676	84,691	84,691	84,692
	15	69,922	73,484	77,920	82,012	83,869	84,114	84,134	84,136	84,136
	16	68,932	72,405	76,820	81,048	83,265	83,589	83,616	83,618	83,618
	17	67,995	71,382	75,769	80,087	82,675	83,094	83,131	83,133	83,133
	18	67,100	70,405	74,760	79,132	82,095	82,625	82,674	82,678	82,678
	19	66,239	69,467	73,790	78,185	81,518	82,180	82,243	82,248	82,249
	20	65,407	68,563	72,853	77,250	80,940	81,755	81,836	81,842	81,842
	25	61,505	64,402	68,543	72,809	77,946	79,831	80,068	80,088	80,090
	30	57,868	60,668	64,629	68,789	74,703	78,058	78,615	78,669	78,673
	35	54,491	57,292	60,944	65,109	71,308	76,240	77,355	77,474	77,486
	40	50,872	53,814	57,373	61,608	67,879	74,244	76,198	76,438	76,462
	45	47,299	50,378	53,929	58,216	64,496	72,019	75,075	75,516	75,562
	50	43,994	47,118	50,640	54,916	61,183	69,583	73,925	74,674	74,758
	55	40,991	44,073	47,516	51,720	57,937	66,988	72,694	73,887	74,030
	60	38,225	41,219	44,553	48,642	54,753	64,278	71,344	73,131	73,365
	65	35,622	38,520	41,741	45,697	51,635	61,477	69,849	72,386	72,751
	70	33,133	35,949	39,069	42,890	48,596	58,593	68,198	71,632	72,181
	75	30,726	33,484	36,527	40,221	45,654	55,638	66,393	70,848	71,647
	80	28,381	31,112	34,103	37,686	42,819	52,630	64,437	70,017	71,146
	85	26,212	28,884	31,805	35,295	40,112	49,610	62,328	69,122	70,673
	90	24,138	26,755	29,616	33,035	37,533	46,611	60,053	68,149	70,225
	95	22,132	24,711	27,530	30,900	35,086	43,668	57,597	67,088	69,799
	100	20,200	22,756	25,550	28,890	32,775	40,808	54,958	65,931	69,392
	110	16,656	19,182	21,944	25,245	28,577	35,432	49,255	63,301	68,631
	120	13,829	16,239	18,910	22,103	24,971	30,639	43,358	60,164	67,929
	130	12,488	14,041	16,524	19,491	21,992	26,582	37,725	56,305	67,276
	140	11,146	12,220	14,490	17,203	19,439	23,173	32,556	51,539	66,667
	150	9,805	10,585	12,676	15,174	17,225	20,355	28,022	46,122	66,094
	160	8,467	9,058	11,013	13,349	15,274	18,015	24,229	40,556	65,555
	170	7,135	7,638	9,470	11,687	13,524	16,029	21,175	35,248	65,045
	180	5,812	6,270	8,026	10,153	11,928	14,290	18,738	30,476	64,561
	190	4,499	4,940	6,661	8,718	10,446	12,721	16,744	26,422	64,101
	200	3,200	3,679	5,352	7,352	9,044	11,263	15,034	23,137	63,662
	225	0,017	0,628	2,207	4,094	5,720	7,861	11,346	17,469	62,648
	250	-3,058	-2,409	-0,906	0,891	2,469	4,563	7,929	13,438	61,734
	275	-6,022	-5,456	-4,021	-2,306	-0,770	1,289	4,577	9,816	60,902
	300	-8,876	-8,452	-7,077	-5,432	-3,932	-1,904	1,323	6,422	60,139
	325	-11,626	-11,329	-10,007	-8,428	-6,960	-4,960	-1,787	3,200	59,435
	350	-14,284	-14,057	-12,786	-11,268	-9,829	-7,855	-4,731	0,156	58,781
	375	-16,858	-16,644	-15,421	-13,959	-12,548	-10,599	-7,521	-2,727	58,171
	400	-19,359	-19,115	-17,937	-16,528	-15,144	-13,217	-10,183	-5,476	57,600
	425	-21,798	-21,499	-20,363	-19,005	-17,645	-15,740	-12,746	-8,122	57,062
	450	-24,185	-23,821	-22,725	-21,414	-20,078	-18,193	-15,238	-10,693	56,555
	475	-26,527	-26,100	-25,042	-23,777	-22,462	-20,597	-17,679	-13,208	56,074
	500	-28,832	-28,351	-27,328	-26,106	-24,813	-22,966	-20,083	-15,683	55,617
	525	-31,108	-30,582	-29,594	-28,413	-27,140	-25,310	-22,461	-18,129	55,182
	550	-33,359	-32,801	-31,846	-30,705	-29,451	-27,638	-24,821	-20,553	54,767
	575	-35,591	-35,013	-34,090	-32,986	-31,751	-29,954	-27,168	-22,962	54,370
	600	-37,808	-37,221	-36,327	-35,260	-34,042	-32,261	-29,504	-25,359	53,989
	625	-40,011	-39,424	-38,560	-37,528	-36,327	-34,561	-31,832	-27,745	53,623
	650	-42,204	-41,625	-40,789	-39,790	-38,606	-36,854	-34,153	-30,121	53,272
	675	-44,387	-43,821	-43,012	-42,046	-40,878	-39,140	-36,435	-32,486	52,933
	700	-46,562	-46,012	-45,229	-44,294	-43,141	-41,317	-38,611	-34,841	52,606
	725	-48,728	-48,194	-47,437	-46,532	-45,394	-43,482	-40,777	-37,181	52,291
	750	-50,884	-50,365	-49,632	-48,757	-47,633	-45,636	-42,932	-39,506	51,985
	775	-53,029	-52,520	-51,812	-50,965	-49,855	-47,780	-45,076	-41,662	51,690
	800	-55,162	-54,657	-53,972	-53,153	-51,995	-49,911	-47,208	-43,799	51,403
	825	-57,281	-56,770	-56,108	-55,316	-54,113	-52,028	-49,324	-45,920	51,125
	850	-59,383	-58,855	-58,214	-57,449	-56,214	-54,127	-51,423	-48,023	50,855
	875	-61,466	-60,907	-60,288	-59,548	-58,295	-56,207	-53,502	-50,105	50,593
	900	-63,449	-62,911	-62,319	-61,604	-60,349	-58,260	-55,555	-52,161	50,338
	925	-65,382	-64,871	-64,306	-63,615	-62,377	-60,287	-57,581	-54,189	50,089
	950	-67,269	-66,784	-66,245	-65,577	-64,375	-62,284	-59,577	-56,188	49,847
	975	-69,105	-68,645	-68,131	-67,487	-66,341	-64,248	-61,541	-58,153	49,611
	1000	-70,886	-70,451	-69,961	-69,339	-68,270	-66,177	-63,468	-60,082	49,381

600 MHz – Zone A – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,173	107,173	107,173	107,173	107,173	107,173	107,173	107,173	107,173
	2	100,771	101,301	101,361	101,369	101,369	101,369	101,369	101,369	101,405
	3	95,265	97,624	98,038	98,091	98,091	98,091	98,091	98,091	98,116
	4	90,731	94,450	95,654	95,823	95,825	95,825	95,825	95,825	95,835
	5	87,178	91,453	93,690	94,089	94,097	94,097	94,097	94,097	94,098
	6	84,299	88,707	91,913	92,682	92,703	92,703	92,703	92,703	92,703
	7	81,890	86,258	90,214	91,490	91,538	91,539	91,539	91,539	91,540
	8	79,826	84,093	88,559	90,440	90,537	90,539	90,539	90,539	90,544
	9	78,025	82,214	86,953	89,482	89,661	89,664	89,664	89,664	89,675
	10	76,428	80,524	85,410	88,577	88,881	88,888	88,888	88,888	88,905
	11	74,995	78,992	83,942	87,691	88,177	88,190	88,190	88,190	88,214
	12	73,694	77,593	82,555	86,802	87,535	87,557	87,557	87,557	87,587
	13	72,504	76,304	81,248	85,893	86,941	86,977	86,978	86,978	87,013
	14	71,403	75,108	80,017	84,957	86,386	86,443	86,444	86,444	86,485
	15	70,378	73,989	78,856	83,995	85,860	85,948	85,950	85,950	85,995
	16	69,414	72,936	77,760	83,013	85,356	85,487	85,490	85,490	85,539
	17	68,502	71,937	76,721	82,023	84,866	85,054	85,059	85,059	85,112
	18	67,632	70,984	75,734	81,034	84,382	84,647	84,654	84,654	84,710
	19	66,795	70,070	74,794	80,058	83,898	84,263	84,272	84,272	84,331
	20	65,986	69,189	73,894	79,101	83,407	83,897	83,911	83,911	83,972
	25	62,196	65,136	69,890	74,761	80,711	82,284	82,348	82,350	82,420
	30	58,660	61,978	66,506	71,215	77,599	80,852	81,077	81,083	81,159
	35	55,515	59,287	63,659	68,346	74,477	79,384	79,996	80,014	80,097
	40	53,431	57,283	61,393	66,042	71,705	77,709	79,035	79,086	79,179
	45	51,857	55,610	59,616	64,156	69,358	75,789	78,138	78,262	78,369
	50	50,751	54,366	58,225	62,605	67,396	73,739	77,247	77,517	77,644
	55	49,918	53,389	57,093	61,302	65,743	71,710	76,304	76,832	76,986
	60	49,219	52,559	56,123	60,175	64,328	69,804	75,253	76,191	76,382
	65	48,584	51,811	55,255	59,171	63,095	68,067	74,064	75,579	75,824
	70	47,984	51,115	54,456	58,256	61,999	66,508	72,739	74,981	75,303
	75	47,410	50,457	53,709	57,409	61,010	65,121	71,314	74,379	74,814
	80	46,859	49,832	53,005	56,616	60,102	63,895	69,836	73,756	74,353
	85	46,330	49,237	52,339	55,870	59,261	62,810	68,356	73,090	73,916
	90	45,823	48,670	51,708	55,165	58,476	61,840	66,912	72,365	73,500
	95	45,339	48,129	51,108	54,499	57,737	60,964	65,541	71,565	73,103
	100	44,876	47,615	50,538	53,866	57,041	60,162	64,273	70,683	72,723
	110	44,008	46,654	49,478	52,693	55,753	58,722	62,117	68,687	72,006
	120	43,210	45,773	48,508	51,622	54,583	57,442	60,429	66,452	71,339
	130	42,469	44,956	47,611	50,634	53,506	56,275	59,049	64,110	70,715
	140	41,770	44,190	46,772	49,712	52,503	55,194	57,846	61,922	70,129
	150	41,104	43,460	45,976	48,841	51,557	54,177	56,747	60,143	69,574
	160	40,459	42,758	45,212	48,007	50,655	53,211	55,717	58,746	69,049
	170	39,827	42,073	44,471	47,202	49,786	52,282	54,734	57,582	68,550
	180	39,204	41,400	43,745	46,416	48,942	51,383	53,785	56,539	68,075
	190	38,583	40,734	43,030	45,645	48,116	50,505	52,862	55,559	67,621
	200	37,962	40,070	42,320	44,884	47,304	49,644	51,959	54,617	67,187
	225	36,395	38,407	40,556	43,003	45,308	47,539	49,758	52,346	66,178
	250	34,797	36,727	38,787	41,134	43,340	45,476	47,611	50,140	65,264
	275	33,169	35,026	37,009	39,268	41,386	43,437	45,497	47,972	64,430
	300	31,516	33,309	35,223	37,403	39,443	41,418	43,409	45,832	63,662
	325	29,849	31,584	33,435	35,545	37,513	39,420	41,347	43,719	62,952
	350	28,177	29,858	31,653	33,698	35,602	37,445	39,312	41,634	62,292
	375	26,508	28,140	29,882	31,868	33,711	35,496	37,307	39,580	61,675
	400	24,848	26,435	28,129	30,059	31,847	33,576	35,335	37,560	61,096
	425	23,204	24,748	26,397	28,275	30,011	31,689	33,397	35,575	60,551
	450	21,579	23,084	24,690	26,520	28,207	29,836	31,496	33,628	60,036
	475	19,978	21,445	23,011	24,796	26,436	28,019	29,634	31,721	59,548
	500	18,404	19,835	21,363	23,104	24,701	26,240	27,812	29,855	59,084
	525	16,857	18,255	19,747	21,448	23,003	24,500	26,030	28,031	58,641
	550	15,341	16,707	18,165	19,826	21,342	22,799	24,290	26,250	58,219
	575	13,857	15,192	16,617	18,241	19,719	21,139	22,591	24,511	57,814
	600	12,405	13,711	15,105	16,693	18,135	19,519	20,934	22,815	57,426
	625	10,986	12,264	13,628	15,183	16,590	17,939	19,319	21,162	57,053
	650	9,601	10,852	12,188	13,710	15,084	16,399	17,746	19,553	56,694
	675	8,250	9,475	10,784	12,274	13,617	14,900	16,214	17,986	56,348
	700	6,933	8,134	9,416	10,876	12,189	13,441	14,724	16,461	56,014
	725	5,651	6,828	8,084	9,516	10,799	12,022	13,274	14,978	55,691
	750	4,403	5,557	6,789	8,193	9,447	10,642	11,865	13,536	55,379
	775	3,189	4,321	5,529	6,906	8,134	9,301	10,496	12,136	55,076
	800	2,009	3,120	4,305	5,657	6,857	7,998	9,166	10,775	54,782
	825	0,863	1,953	3,117	4,443	5,618	6,733	7,874	9,455	54,497
	850	-0,250	0,820	1,962	3,264	4,415	5,505	6,621	8,173	54,220
	875	-1,330	-0,279	0,842	2,121	3,248	4,314	5,406	6,929	53,951
	900	-2,378	-1,346	-0,244	1,012	2,116	3,159	4,226	5,723	53,688
	925	-3,394	-2,380	-1,297	-0,064	1,018	2,039	3,083	4,553	53,433
	950	-4,379	-3,382	-2,318	-1,106	-0,045	0,953	1,975	3,420	53,184
	975	-5,332	-4,353	-3,307	-2,115	-1,076	-0,098	0,902	2,321	52,941
	1000	-6,256	-5,293	-4,265	-3,093	-2,074	-1,117	-0,138	1,257	52,704

600 MHz – Zone A – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,313	107,383	107,411	107,413	107,413	107,413	107,413	107,413	107,446
	2	100,788	101,520	101,843	101,859	101,859	101,859	101,859	101,859	101,923
	3	96,001	97,760	98,791	98,852	98,853	98,853	98,853	98,853	98,856
	4	92,095	94,637	96,629	96,774	96,774	96,774	96,774	96,774	96,774
	5	88,905	91,914	94,836	95,218	95,218	95,218	95,218	95,218	95,218
	6	86,260	89,540	93,181	93,985	93,985	93,985	93,985	93,985	93,985
	7	84,023	87,469	91,574	92,969	92,969	92,969	92,969	92,969	92,969
	8	82,095	85,649	90,010	92,107	92,107	92,107	92,107	92,107	92,107
	9	80,409	84,038	88,514	91,325	91,358	91,358	91,358	91,358	91,358
	10	78,914	82,599	87,109	90,588	90,697	90,697	90,697	90,697	90,697
	11	77,575	81,303	85,806	89,883	90,105	90,105	90,105	90,105	90,105
	12	76,365	80,126	84,608	89,190	89,569	89,569	89,569	89,569	89,569
	13	75,262	79,051	83,508	88,493	89,075	89,077	89,077	89,077	89,077
	14	74,251	78,063	82,499	87,785	88,613	88,618	88,618	88,618	88,624
	15	73,318	77,150	81,572	87,066	88,182	88,192	88,192	88,192	88,202
	16	72,453	76,302	80,719	86,340	87,779	87,794	87,794	87,794	87,808
	17	71,647	75,512	79,931	85,617	87,399	87,422	87,422	87,422	87,438
	18	70,894	74,772	79,201	84,904	87,037	87,072	87,072	87,072	87,089
	19	70,249	74,115	78,528	84,211	86,691	86,741	86,741	86,741	86,758
	20	69,689	73,526	77,903	83,543	86,356	86,428	86,429	86,429	86,443
	25	67,650	71,255	75,363	80,658	84,770	85,066	85,066	85,066	85,066
	30	66,280	69,664	73,515	78,482	83,204	83,927	83,927	83,927	83,927
	35	65,339	68,525	72,151	76,828	81,658	82,955	82,955	82,955	82,955
	40	64,774	67,759	71,157	75,540	80,224	82,106	82,106	82,106	82,106
	45	64,522	67,295	70,450	74,519	78,952	81,300	81,352	81,352	81,352
	50	64,491	67,046	69,955	73,706	77,846	80,509	80,673	80,673	80,673
	55	64,587	66,935	69,609	73,057	76,891	79,734	80,055	80,055	80,055
	60	64,738	66,899	69,360	72,533	76,065	78,976	79,486	79,486	79,486
	65	64,901	66,896	69,171	72,102	75,349	78,237	78,958	78,958	78,958
	70	65,050	66,902	69,015	71,737	74,725	77,521	78,456	78,464	78,464
	75	65,174	66,902	68,875	71,416	74,175	76,834	77,941	77,999	77,999
	80	65,266	66,887	68,739	71,123	73,682	76,181	77,438	77,540	77,560
	85	65,326	66,853	68,600	70,847	73,233	75,564	76,945	77,093	77,142
	90	65,434	66,820	68,471	70,593	72,825	74,990	76,456	76,663	76,744
	95	65,514	66,781	68,334	70,345	72,441	74,454	75,968	76,248	76,362
	100	65,561	66,753	68,184	70,096	72,075	73,952	75,479	75,847	75,995
	110	65,567	66,626	67,873	69,588	71,374	73,030	74,501	75,078	75,302
	120	65,469	66,418	67,538	69,057	70,689	72,183	73,542	74,339	74,655
	130	65,285	66,141	67,155	68,505	70,006	71,380	72,624	73,610	74,046
	140	65,032	65,809	66,733	67,959	69,317	70,598	71,747	72,859	73,472
	150	64,724	65,433	66,279	67,398	68,618	69,826	70,902	72,064	72,927
	160	64,374	65,024	65,801	66,828	67,909	69,055	70,075	71,223	72,410
	170	63,992	64,589	65,306	66,250	67,190	68,282	69,255	70,352	71,917
	180	63,585	64,135	64,798	65,669	66,462	67,504	68,435	69,466	71,446
	190	63,160	63,668	64,282	65,086	65,802	66,720	67,612	68,571	70,995
	200	62,722	63,191	63,760	64,502	65,168	65,930	66,783	67,668	70,564
	225	61,592	61,975	62,442	63,048	63,600	64,094	64,668	65,365	69,559
	250	60,436	60,744	61,122	61,609	62,059	62,467	62,827	63,151	68,645
	275	59,248	59,494	59,799	60,188	60,556	60,892	61,184	61,410	67,808
	300	57,947	58,169	58,444	58,794	59,131	59,447	59,723	59,921	67,038
	325	56,637	56,842	57,095	57,418	57,736	58,038	58,304	58,487	66,325
	350	55,334	55,524	55,759	56,058	56,357	56,647	56,901	57,068	65,661
	375	54,037	54,214	54,431	54,710	54,994	55,271	55,513	55,662	65,041
	400	52,743	52,909	53,112	53,373	53,641	53,906	54,135	54,267	64,458
	425	51,453	51,609	51,798	52,043	52,299	52,552	52,767	52,883	63,909
	450	50,165	50,312	50,490	50,721	50,964	51,205	51,406	51,508	63,390
	475	48,879	49,018	49,186	49,405	49,636	49,865	50,052	50,140	62,898
	500	47,597	47,729	47,887	48,095	48,315	48,531	48,704	48,780	62,430
	525	46,319	46,444	46,594	46,791	47,001	47,205	47,363	47,429	61,983
	550	45,047	45,166	45,308	45,495	45,694	45,886	46,030	46,088	61,557
	575	43,781	43,895	44,030	44,208	44,397	44,576	44,707	44,759	61,148
	600	42,525	42,633	42,761	42,931	43,110	43,277	43,396	43,444	60,756
	625	41,279	41,383	41,504	41,666	41,835	41,991	42,100	42,144	60,379
	650	40,046	40,145	40,260	40,414	40,574	40,720	40,819	40,861	60,016
	675	38,827	38,921	39,031	39,178	39,330	39,465	39,557	39,598	59,666
	700	37,624	37,714	37,819	37,959	38,103	38,229	38,314	38,355	59,328
	725	36,439	36,525	36,625	36,759	36,895	37,013	37,093	37,134	59,002
	750	35,273	35,355	35,450	35,579	35,708	35,819	35,894	35,936	58,685
	775	34,127	34,206	34,297	34,420	34,543	34,648	34,719	34,763	58,379
	800	33,003	33,079	33,167	33,285	33,402	33,501	33,569	33,614	58,081
	825	31,903	31,975	32,060	32,173	32,285	32,379	32,445	32,491	57,792
	850	30,826	30,896	30,977	31,087	31,194	31,284	31,348	31,395	57,511
	875	29,774	29,842	29,920	30,026	30,128	30,215	30,278	30,326	57,238
	900	28,748	28,813	28,889	28,992	29,090	29,173	29,236	29,284	56,972
	925	27,748	27,811	27,885	27,984	28,079	28,160	28,221	28,271	56,713
	950	26,774	26,836	26,908	27,004	27,096	27,174	27,235	27,286	56,460
	975	25,828	25,888	25,958	26,052	26,141	26,217	26,278	26,329	56,213
	1000	24,909	24,968	25,036	25,127	25,215	25,289	25,349	25,401	55,972

600 MHz – Zone B – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	106,903	106,903	106,903	106,903	106,903	106,903	106,903	106,903	106,903
	2	100,489	100,810	100,882	100,884	100,885	100,885	100,885	100,885	100,885
	3	94,845	96,906	97,329	97,360	97,365	97,365	97,365	97,365	97,365
	4	90,177	93,630	94,697	94,853	94,868	94,869	94,869	94,869	94,869
	5	86,492	90,617	92,457	92,894	92,931	92,933	92,933	92,933	92,933
	6	83,484	87,858	90,449	91,273	91,347	91,352	91,352	91,352	91,352
	7	80,949	85,373	88,608	89,871	90,006	90,015	90,015	90,015	90,015
	8	78,762	83,146	86,880	88,616	88,840	88,856	88,857	88,858	88,858
	9	76,838	81,147	85,238	87,459	87,808	87,835	87,837	87,837	87,837
	10	75,123	79,339	83,674	86,365	86,877	86,921	86,924	86,924	86,924
	11	73,573	77,691	82,184	85,308	86,027	86,093	86,098	86,098	86,098
	12	72,159	76,178	80,765	84,271	85,239	85,337	85,344	85,344	85,344
	13	70,856	74,778	79,413	83,242	84,501	84,640	84,650	84,651	84,651
	14	69,646	73,473	78,126	82,214	83,802	83,993	84,008	84,009	84,009
	15	68,513	72,247	76,896	81,186	83,132	83,389	83,410	83,412	83,412
	16	67,445	71,088	75,721	80,156	82,483	82,822	82,851	82,853	82,853
	17	66,429	69,986	74,594	79,129	81,848	82,287	82,326	82,328	82,329
	18	65,458	68,932	73,511	78,106	81,221	81,779	81,830	81,834	81,834
	19	64,523	67,919	72,467	77,091	80,597	81,294	81,361	81,366	81,366
	20	63,617	66,940	71,457	76,087	79,972	80,830	80,915	80,922	80,922
	25	59,370	62,430	66,801	71,306	76,729	78,719	78,969	78,991	78,992
	30	55,423	58,383	62,570	66,968	73,219	76,766	77,355	77,411	77,416
	35	51,765	54,727	58,590	62,995	69,550	74,767	75,946	76,072	76,084
	40	47,892	51,001	54,761	59,236	65,862	72,587	74,652	74,905	74,930
	45	44,091	47,339	51,086	55,610	62,236	70,174	73,399	73,864	73,913
	50	40,580	43,872	47,584	52,091	58,695	67,549	72,124	72,915	73,003
	55	37,391	40,636	44,261	48,687	55,234	64,764	70,773	72,029	72,179
	60	34,456	37,606	41,115	45,417	51,845	61,867	69,302	71,182	71,428
	65	31,702	34,749	38,135	42,294	48,536	58,883	67,685	70,353	70,736
	70	29,077	32,035	35,313	39,326	45,321	55,822	65,912	69,519	70,096
	75	26,547	29,442	32,635	36,513	42,215	52,695	63,984	68,660	69,499
	80	24,091	26,956	30,093	33,850	39,233	49,522	61,905	67,757	68,941
	85	21,823	24,623	27,684	31,341	36,389	46,343	59,672	66,791	68,417
	90	19,659	22,399	25,395	28,976	33,687	43,194	57,271	65,749	67,923
	95	17,572	20,271	23,222	26,748	31,129	40,109	54,686	64,619	67,455
	100	15,568	18,241	21,163	24,656	28,719	37,119	51,917	63,392	67,011
	110	11,900	14,539	17,423	20,871	24,352	31,511	45,949	60,620	66,186
	120	8,974	11,489	14,277	17,609	20,602	26,518	39,791	57,329	65,433
	130	7,554	9,175	11,766	14,863	17,473	22,264	33,896	53,288	64,740
	140	6,149	7,270	9,639	12,470	14,804	18,701	28,494	48,308	64,098
	150	4,757	5,571	7,753	10,360	12,500	15,767	23,768	42,657	63,499
	160	3,380	3,996	6,035	8,473	10,481	13,341	19,825	36,859	62,940
	170	2,017	2,542	4,452	6,764	8,680	11,293	16,660	31,337	62,414
	180	0,670	1,148	2,979	5,196	7,046	9,509	14,146	26,384	61,918
	190	-0,660	-0,201	1,592	3,736	5,537	7,908	12,100	22,185	61,449
	200	-1,972	-1,473	0,270	2,352	4,114	6,426	10,354	18,794	61,004
	225	-5,171	-4,536	-2,894	-0,931	0,761	2,988	6,614	12,984	59,981
	250	-8,248	-7,573	-6,012	-4,145	-2,506	-0,330	3,168	8,890	59,066
	275	-11,204	-10,617	-9,127	-7,347	-5,754	-3,617	-0,206	5,230	58,238
	300	-14,044	-13,605	-12,180	-10,475	-8,920	-6,819	-3,474	1,810	57,482
	325	-16,778	-16,470	-15,102	-13,467	-11,948	-9,877	-6,592	-1,429	56,786
	350	-19,417	-19,183	-17,869	-16,298	-14,811	-12,770	-9,539	-4,485	56,142
	375	-21,972	-21,751	-20,487	-18,977	-17,520	-15,506	-12,326	-7,373	55,542
	400	-24,453	-24,201	-22,985	-21,531	-20,102	-18,114	-14,981	-10,124	54,981
	425	-26,872	-26,564	-25,392	-23,991	-22,589	-20,624	-17,537	-12,768	54,454
	450	-29,237	-28,863	-27,733	-26,383	-25,006	-23,064	-20,019	-15,335	53,957
	475	-31,559	-31,120	-30,030	-28,727	-27,374	-25,453	-22,449	-17,845	53,487
	500	-33,843	-33,348	-32,296	-31,039	-29,708	-27,808	-24,842	-20,315	53,041
	525	-36,098	-35,558	-34,542	-33,328	-32,019	-30,138	-27,209	-22,754	52,617
	550	-38,329	-37,756	-36,775	-35,602	-34,313	-32,451	-29,557	-25,172	52,212
	575	-40,541	-39,947	-38,999	-37,866	-36,597	-34,753	-31,892	-27,574	51,826
	600	-42,736	-42,134	-41,217	-40,122	-38,872	-37,045	-34,216	-29,963	51,455
	625	-44,919	-44,317	-43,432	-42,373	-41,141	-39,330	-36,532	-32,340	51,100
	650	-47,092	-46,498	-45,642	-44,618	-43,404	-41,609	-38,840	-34,708	50,759
	675	-49,255	-48,675	-47,846	-46,857	-45,660	-43,880	-41,109	-37,065	50,431
	700	-51,409	-50,846	-50,045	-49,088	-47,907	-46,039	-43,269	-39,409	50,115
	725	-53,555	-53,008	-52,234	-51,308	-50,144	-48,187	-45,419	-41,740	49,809
	750	-55,691	-55,160	-54,411	-53,516	-52,366	-50,324	-47,559	-44,054	49,514
	775	-57,816	-57,296	-56,572	-55,706	-54,572	-52,450	-49,687	-46,197	49,229
	800	-59,930	-59,413	-58,713	-57,876	-56,694	-54,564	-51,802	-48,319	48,953
	825	-62,028	-61,507	-60,830	-60,021	-58,793	-56,663	-53,902	-50,425	48,685
	850	-64,111	-63,572	-62,918	-62,136	-60,875	-58,745	-55,984	-52,514	48,425
	875	-66,173	-65,604	-64,972	-64,216	-62,938	-60,807	-58,047	-54,581	48,173
	900	-68,137	-67,588	-66,985	-66,255	-64,975	-62,845	-60,085	-56,623	47,928
	925	-70,051	-69,530	-68,954	-68,249	-66,987	-64,856	-62,096	-58,638	47,689
	950	-71,918	-71,424	-70,874	-70,194	-68,969	-66,837	-64,078	-60,624	47,457
	975	-73,735	-73,267	-72,742	-72,086	-70,918	-68,786	-66,027	-62,576	47,231
	1000	-75,497	-75,054	-74,554	-73,921	-72,832	-70,700	-67,941	-64,492	47,011

600 MHz – Zone B – 10%

Transmitting / base antenna height (m)	Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
	1	107,104	107,104	107,104	107,104	107,104	107,104	107,104	107,104	107,104
	2	100,539	101,148	101,217	101,227	101,227	101,227	101,227	101,227	101,267
	3	94,919	97,396	97,831	97,886	97,886	97,886	97,886	97,886	97,913
	4	90,276	94,131	95,378	95,553	95,556	95,556	95,556	95,556	95,566
	5	86,614	91,032	93,344	93,756	93,764	93,764	93,764	93,764	93,765
	6	83,629	88,181	91,492	92,286	92,307	92,307	92,307	92,307	92,307
	7	81,116	85,628	89,714	91,031	91,081	91,082	91,082	91,082	91,083
	8	78,951	83,360	87,976	89,920	90,020	90,022	90,022	90,022	90,027
	9	77,049	81,382	86,284	88,900	89,085	89,088	89,088	89,088	89,100
	10	75,355	79,595	84,653	87,932	88,247	88,254	88,254	88,254	88,272
	11	73,826	77,968	83,097	86,982	87,486	87,499	87,499	87,499	87,524
	12	72,432	76,475	81,622	86,027	86,788	86,810	86,811	86,811	86,842
	13	71,149	75,095	80,227	85,051	86,139	86,176	86,177	86,177	86,214
	14	69,959	73,809	78,910	84,044	85,529	85,589	85,590	85,590	85,632
	15	68,845	72,601	77,664	83,009	84,950	85,042	85,043	85,043	85,091
	16	67,795	71,461	76,484	81,953	84,393	84,529	84,532	84,532	84,583
	17	66,798	70,377	75,362	80,887	83,849	84,046	84,050	84,050	84,106
	18	65,844	69,341	74,294	79,822	83,313	83,590	83,596	83,596	83,655
	19	64,927	68,345	73,274	78,768	82,776	83,157	83,166	83,166	83,228
	20	64,038	67,383	72,297	77,735	82,232	82,744	82,758	82,758	82,822
	25	59,873	62,951	67,929	73,029	79,259	80,906	80,974	80,975	81,048
	30	55,998	59,476	64,225	69,162	75,856	79,266	79,502	79,508	79,588
	35	52,548	56,506	61,094	66,013	72,447	77,597	78,239	78,258	78,345
	40	50,187	54,238	58,560	63,449	69,405	75,718	77,113	77,167	77,264
	45	48,364	52,320	56,542	61,328	66,810	73,589	76,064	76,195	76,308
	50	47,034	50,854	54,931	59,559	64,621	71,324	75,031	75,316	75,450
	55	45,998	49,675	53,599	58,057	62,762	69,083	73,950	74,510	74,672
	60	45,116	48,663	52,448	56,751	61,160	66,976	72,762	73,758	73,961
	65	44,317	47,751	51,416	55,584	59,759	65,050	71,433	73,045	73,305
	70	43,569	46,907	50,469	54,521	58,512	63,319	69,963	72,353	72,697
	75	42,861	46,115	49,588	53,539	57,385	61,777	68,390	71,664	72,129
	80	42,189	45,369	48,763	52,625	56,354	60,411	66,766	70,958	71,597
	85	41,552	44,665	47,988	51,769	55,401	59,201	65,141	70,211	71,096
	90	40,948	44,000	47,257	50,964	54,513	58,121	63,559	69,405	70,622
	95	40,376	43,371	46,568	50,206	53,682	57,145	62,057	68,522	70,173
	100	39,833	42,776	45,916	49,491	52,901	56,253	60,669	67,555	69,746
	110	38,832	41,678	44,716	48,174	51,466	54,660	58,313	65,380	68,950
	120	37,926	40,685	43,631	46,985	50,174	53,252	56,470	62,956	68,220
	130	37,098	39,779	42,641	45,899	48,995	51,980	54,970	60,424	67,545
	140	36,330	38,939	41,725	44,896	47,906	50,809	53,669	58,066	66,917
	150	35,609	38,152	40,866	43,957	46,889	49,716	52,489	56,153	66,331
	160	34,921	37,402	40,051	43,068	45,926	48,685	51,390	54,660	65,780
	170	34,256	36,680	39,269	42,216	45,006	47,701	50,347	53,422	65,261
	180	33,607	35,978	38,509	41,392	44,119	46,753	49,346	52,319	64,771
	190	32,967	35,288	37,766	40,589	43,256	45,834	48,377	51,289	64,306
	200	32,332	34,606	37,035	39,800	42,411	44,936	47,433	50,302	63,864
	225	30,747	32,916	35,231	37,869	40,353	42,757	45,149	47,937	62,845
	250	29,148	31,225	33,441	35,967	38,340	40,638	42,935	45,656	61,930
	275	27,528	29,523	31,652	34,078	36,352	38,556	40,768	43,425	61,100
	300	25,890	27,811	29,862	32,199	34,385	36,502	38,636	41,232	60,341
	325	24,241	26,096	28,076	30,332	32,437	34,476	36,537	39,073	59,641
	350	22,589	24,383	26,298	28,480	30,512	32,479	34,471	36,949	58,993
	375	20,941	22,679	24,534	26,648	28,612	30,512	32,441	34,861	58,389
	400	19,303	20,989	22,789	24,840	26,740	28,578	30,447	32,811	57,823
	425	17,681	19,319	21,067	23,060	24,901	26,680	28,492	30,802	57,291
	450	16,079	17,672	19,372	21,309	23,095	24,819	26,577	28,834	56,790
	475	14,501	16,051	17,706	19,591	21,325	22,998	24,704	26,910	56,315
	500	12,949	14,459	16,071	17,908	19,592	21,216	22,874	25,030	55,864
	525	11,425	12,897	14,469	16,260	17,898	19,475	21,086	23,194	55,435
	550	9,931	11,368	12,901	14,648	16,242	17,775	19,342	21,404	55,025
	575	8,469	9,872	11,368	13,074	14,626	16,117	17,642	19,658	54,634
	600	7,040	8,409	9,871	11,538	13,050	14,501	15,986	17,958	54,259
	625	5,643	6,982	8,411	10,039	11,514	12,926	14,372	16,303	53,899
	650	4,280	5,589	6,987	8,579	10,017	11,394	12,802	14,693	53,553
	675	2,952	4,232	5,599	7,158	8,561	9,902	11,275	13,127	53,220
	700	1,657	2,911	4,249	5,774	7,144	8,451	9,791	11,604	52,899
	725	0,397	1,624	2,935	4,428	5,766	7,041	8,348	10,125	52,589
	750	-0,830	0,373	1,657	3,120	4,427	5,672	6,946	8,688	52,290
	775	-2,022	-0,843	0,415	1,849	3,126	4,341	5,586	7,293	52,000
	800	-3,180	-2,025	-0,791	0,614	1,864	3,050	4,265	5,939	51,719
	825	-4,305	-3,172	-1,962	-0,584	0,638	1,797	2,984	4,626	51,447
	850	-5,396	-4,285	-3,098	-1,746	-0,550	0,582	1,741	3,353	51,182
	875	-6,455	-5,364	-4,200	-2,873	-1,703	-0,596	0,537	2,118	50,926
	900	-7,481	-6,411	-5,268	-3,965	-2,820	-1,738	-0,631	0,921	50,676
	925	-8,476	-7,425	-6,303	-5,024	-3,902	-2,844	-1,762	-0,238	50,433
	950	-9,440	-8,407	-7,305	-6,049	-4,950	-3,916	-2,857	-1,360	50,196
	975	-10,372	-9,358	-8,275	-7,041	-5,965	-4,953	-3,917	-2,447	49,966
	1000	-11,275	-10,278	-9,214	-8,002	-6,947	-5,957	-4,943	-3,500	49,741

600 MHz – Zone B – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,204	107,297	107,335	107,337	107,338	107,338	107,338	107,338	107,380
	2	100,570	101,360	101,708	101,725	101,725	101,725	101,725	101,725	101,794
	3	95,679	97,519	98,596	98,660	98,661	98,661	98,661	98,661	98,665
	4	91,669	94,305	96,371	96,521	96,521	96,521	96,521	96,521	96,521
	5	88,378	91,489	94,510	94,905	94,905	94,905	94,905	94,905	94,905
	6	85,634	89,022	92,783	93,613	93,613	93,613	93,613	93,613	93,613
	7	83,300	86,859	91,099	92,539	92,539	92,539	92,539	92,539	92,539
	8	81,278	84,949	89,455	91,621	91,621	91,621	91,621	91,621	91,621
	9	79,498	83,250	87,876	90,782	90,817	90,817	90,817	90,817	90,817
	10	77,912	81,724	86,389	89,988	90,102	90,102	90,102	90,102	90,102
	11	76,484	80,343	85,006	89,227	89,457	89,457	89,457	89,457	89,457
	12	75,185	79,083	83,727	88,476	88,868	88,868	88,868	88,868	88,868
	13	73,997	77,927	82,549	87,720	88,324	88,326	88,326	88,326	88,326
	14	72,901	76,859	81,464	86,952	87,811	87,816	87,816	87,816	87,822
	15	71,886	75,868	80,463	86,171	87,331	87,340	87,341	87,341	87,352
	16	70,940	74,944	79,536	85,383	86,880	86,895	86,895	86,895	86,910
	17	70,056	74,078	78,678	84,597	86,452	86,475	86,475	86,475	86,493
	18	69,225	73,265	77,880	83,821	86,043	86,079	86,079	86,079	86,097
	19	68,504	72,536	77,138	83,065	85,651	85,704	85,704	85,704	85,721
	20	67,869	71,876	76,446	82,334	85,271	85,347	85,347	85,347	85,362
	25	65,479	69,268	73,583	79,146	83,466	83,777	83,777	83,777	83,777
	30	63,794	67,371	71,443	76,694	81,685	82,450	82,450	82,450	82,450
	35	62,567	65,957	69,814	74,790	79,929	81,308	81,308	81,308	81,308
	40	61,744	64,942	68,581	73,274	78,291	80,306	80,306	80,306	80,306
	45	61,260	64,251	67,654	72,044	76,825	79,359	79,414	79,414	79,414
	50	61,019	63,797	66,959	71,037	75,538	78,432	78,611	78,611	78,611
	55	60,926	63,500	66,431	70,210	74,412	77,529	77,880	77,880	77,880
	60	60,906	63,295	66,016	69,524	73,428	76,646	77,210	77,210	77,210
	65	60,915	63,140	65,677	68,946	72,567	75,786	76,590	76,590	76,590
	70	60,926	63,009	65,386	68,447	71,809	74,954	76,005	76,014	76,014
	75	60,924	62,885	65,124	68,006	71,136	74,153	75,409	75,475	75,475
	80	60,904	62,759	64,878	67,605	70,532	73,391	74,830	74,946	74,969
	85	60,863	62,625	64,639	67,230	69,982	72,671	74,263	74,434	74,491
	90	60,880	62,493	64,414	66,883	69,479	71,998	73,703	73,944	74,038
	95	60,878	62,365	64,187	66,547	69,007	71,369	73,146	73,475	73,608
	100	60,852	62,261	63,955	66,217	68,559	70,780	72,587	73,022	73,198
	110	60,732	62,005	63,502	65,564	67,709	69,699	71,467	72,160	72,430
	120	60,533	61,689	63,054	64,903	66,892	68,711	70,367	71,338	71,723
	130	60,268	61,323	62,573	64,236	66,087	67,779	69,313	70,528	71,066
	140	59,950	60,917	62,067	63,592	65,283	66,877	68,307	69,691	70,453
	150	59,591	60,481	61,541	62,945	64,475	65,989	67,339	68,795	69,878
	160	59,201	60,021	61,001	62,296	63,660	65,106	66,391	67,840	69,337
	170	58,788	59,544	60,453	61,648	62,839	64,221	65,454	66,844	68,825
	180	58,357	59,056	59,898	61,004	62,011	63,334	64,517	65,826	68,340
	190	57,914	58,561	59,341	60,363	61,275	62,442	63,576	64,796	67,879
	200	57,463	58,060	58,783	59,728	60,575	61,544	62,629	63,755	67,440
	225	56,317	56,803	57,396	58,164	58,865	59,491	60,220	61,105	66,425
	250	55,160	55,548	56,025	56,638	57,206	57,720	58,175	58,583	65,510
	275	53,979	54,287	54,668	55,155	55,614	56,034	56,399	56,682	64,679
	300	52,692	52,965	53,305	53,737	54,154	54,544	54,884	55,130	63,916
	325	51,399	51,648	51,957	52,351	52,738	53,107	53,431	53,655	63,213
	350	50,115	50,343	50,626	50,986	51,348	51,697	52,003	52,204	62,561
	375	48,837	49,048	49,307	49,639	49,977	50,307	50,596	50,773	61,952
	400	47,564	47,759	47,998	48,306	48,623	48,936	49,206	49,361	61,381
	425	46,294	46,476	46,698	46,984	47,283	47,578	47,830	47,965	60,845
	450	45,027	45,197	45,403	45,671	45,953	46,232	46,465	46,582	60,338
	475	43,763	43,923	44,115	44,366	44,632	44,895	45,109	45,210	59,859
	500	42,502	42,652	42,833	43,069	43,320	43,566	43,763	43,850	59,403
	525	41,245	41,387	41,556	41,779	42,016	42,247	42,426	42,501	58,969
	550	39,993	40,128	40,287	40,498	40,722	40,937	41,099	41,164	58,555
	575	38,749	38,876	39,027	39,226	39,437	39,637	39,784	39,842	58,159
	600	37,514	37,634	37,776	37,965	38,164	38,350	38,482	38,535	57,779
	625	36,289	36,403	36,537	36,716	36,904	37,076	37,196	37,245	57,415
	650	35,076	35,185	35,312	35,482	35,658	35,818	35,928	35,974	57,064
	675	33,878	33,981	34,102	34,263	34,429	34,578	34,678	34,723	56,726
	700	32,696	32,794	32,908	33,062	33,218	33,356	33,449	33,494	56,401
	725	31,531	31,624	31,733	31,879	32,027	32,156	32,242	32,288	56,086
	750	30,385	30,474	30,578	30,717	30,857	30,978	31,059	31,105	55,782
	775	29,260	29,345	29,444	29,577	29,710	29,823	29,900	29,947	55,487
	800	28,156	28,238	28,333	28,460	28,586	28,693	28,767	28,815	55,202
	825	27,076	27,154	27,245	27,367	27,487	27,588	27,660	27,709	54,925
	850	26,019	26,094	26,182	26,299	26,414	26,510	26,579	26,630	54,656
	875	24,987	25,060	25,144	25,257	25,367	25,459	25,527	25,578	54,395
	900	23,981	24,051	24,132	24,242	24,347	24,436	24,502	24,554	54,140
	925	23,001	23,068	23,147	23,253	23,354	23,440	23,506	23,559	53,893
	950	22,047	22,113	22,189	22,292	22,390	22,473	22,538	22,592	53,652
	975	21,120	21,184	21,258	21,358	21,453	21,534	21,598	21,653	53,417
	1000	20,221	20,283	20,355	20,453	20,545	20,624	20,688	20,743	53,187

600 MHz – Zone C – 50%

Transmitting / base antenna height (m) \ Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
1	106,900	106,900	106,900	106,900	106,900	106,900	106,900	106,900	106,900
2	100,435	100,796	100,876	100,879	100,879	100,879	100,879	100,879	100,879
3	94,765	96,886	97,320	97,352	97,357	97,358	97,358	97,358	97,358
4	90,073	93,595	94,683	94,843	94,858	94,859	94,859	94,859	94,859
5	86,363	90,562	92,435	92,881	92,918	92,921	92,921	92,921	92,921
6	83,330	87,781	90,418	91,256	91,332	91,337	91,337	91,337	91,337
7	80,771	85,273	88,566	89,851	89,988	89,997	89,998	89,998	89,998
8	78,560	83,024	86,825	88,593	88,821	88,837	88,838	88,838	88,838
9	76,614	81,002	85,169	87,431	87,785	87,813	87,815	87,815	87,815
10	74,876	79,172	83,589	86,331	86,852	86,897	86,900	86,900	86,900
11	73,304	77,502	82,082	85,267	85,999	86,067	86,072	86,072	86,072
12	71,868	75,968	80,646	84,221	85,209	85,309	85,316	85,316	85,316
13	70,545	74,547	79,277	83,183	84,468	84,610	84,620	84,621	84,621
14	69,314	73,220	77,971	82,145	83,766	83,961	83,976	83,977	83,977
15	68,161	71,974	76,723	81,104	83,092	83,355	83,377	83,378	83,378
16	67,072	70,795	75,529	80,062	82,439	82,786	82,815	82,817	82,818
17	66,037	69,674	74,384	79,020	81,799	82,248	82,288	82,291	82,291
18	65,047	68,600	73,283	77,982	81,168	81,738	81,790	81,794	81,795
19	64,093	67,568	72,220	76,951	80,538	81,251	81,319	81,325	81,325
20	63,169	66,570	71,192	75,931	79,907	80,785	80,872	80,879	80,879
25	58,836	61,971	66,450	71,065	76,622	78,661	78,917	78,939	78,941
30	54,811	57,845	62,137	66,646	73,055	76,691	77,295	77,353	77,358
35	51,082	54,120	58,081	62,597	69,319	74,668	75,877	76,007	76,019
40	47,146	50,332	54,186	58,773	65,564	72,457	74,573	74,833	74,859
45	43,287	46,615	50,453	55,087	61,875	70,006	73,310	73,786	73,836
50	39,725	43,096	46,896	51,510	58,272	67,337	72,021	72,830	72,921
55	36,489	39,810	43,520	48,050	54,750	64,504	70,653	71,938	72,093
60	33,513	36,736	40,325	44,726	51,303	61,556	69,162	71,086	71,337
65	30,721	33,837	37,300	41,554	47,938	58,520	67,521	70,250	70,642
70	28,061	31,085	34,437	38,540	44,669	55,406	65,721	69,409	69,998
75	25,501	28,460	31,723	35,686	41,514	52,225	63,763	68,541	69,399
80	23,017	25,944	29,149	32,988	38,486	48,999	61,649	67,628	68,838
85	20,724	23,583	26,710	30,445	35,601	45,767	59,380	66,651	68,312
90	18,538	21,335	24,394	28,050	32,860	42,567	56,939	65,596	67,815
95	16,431	19,185	22,197	25,797	30,268	39,434	54,313	64,450	67,346
100	14,408	17,135	20,118	23,681	27,827	36,398	51,498	63,207	66,900
110	10,710	13,400	16,342	19,858	23,408	30,709	45,433	60,395	66,072
120	7,759	10,323	13,165	16,561	19,613	25,643	39,175	57,055	65,316
130	6,318	7,971	10,613	13,770	16,432	21,316	33,175	52,946	64,621
140	4,897	6,040	8,456	11,342	13,721	17,695	27,679	47,879	63,977
150	3,493	4,323	6,547	9,205	11,387	14,717	22,873	42,130	63,378
160	2,106	2,734	4,813	7,298	9,345	12,260	18,869	36,232	62,818
170	0,736	1,271	3,218	5,574	7,527	10,189	15,659	30,618	62,291
180	-0,617	-0,130	1,735	3,995	5,880	8,390	13,115	25,585	61,795
190	-1,952	-1,484	0,343	2,527	4,361	6,777	11,048	21,322	61,325
200	-3,267	-2,758	-0,984	1,138	2,933	5,288	9,288	17,885	60,879
225	-6,470	-5,823	-4,152	-2,153	-0,431	1,836	5,527	12,012	59,856
250	-9,547	-8,861	-7,272	-5,373	-3,705	-1,491	2,067	7,890	58,941
275	-12,501	-11,904	-10,390	-8,580	-6,959	-4,787	-1,318	4,210	58,113
300	-15,338	-14,892	-13,443	-11,711	-10,131	-7,995	-4,595	0,775	57,358
325	-18,068	-17,755	-16,366	-14,705	-13,161	-11,058	-7,721	-2,476	56,662
350	-20,703	-20,464	-19,130	-17,536	-16,025	-13,953	-10,672	-5,541	56,019
375	-23,252	-23,028	-21,746	-20,213	-18,734	-16,690	-13,462	-8,436	55,419
400	-25,729	-25,473	-24,239	-22,764	-21,314	-19,297	-16,119	-11,191	54,859
425	-28,142	-27,830	-26,641	-25,221	-23,798	-21,806	-18,675	-13,839	54,332
450	-30,502	-30,123	-28,978	-27,609	-26,213	-24,244	-21,157	-16,409	53,836
475	-32,819	-32,374	-31,269	-29,949	-28,578	-26,631	-23,587	-18,922	53,366
500	-35,098	-34,596	-33,531	-32,257	-30,909	-28,984	-25,979	-21,393	52,921
525	-37,348	-36,800	-35,772	-34,542	-33,216	-31,312	-28,345	-23,834	52,497
550	-39,574	-38,993	-38,000	-36,812	-35,508	-33,623	-30,692	-26,253	52,093
575	-41,780	-41,179	-40,219	-39,072	-37,788	-35,922	-33,026	-28,656	51,707
600	-43,970	-43,361	-42,433	-41,325	-40,061	-38,212	-35,349	-31,045	51,337
625	-46,148	-45,539	-44,643	-43,572	-42,326	-40,494	-37,664	-33,424	50,982
650	-48,316	-47,715	-46,849	-45,814	-44,586	-42,770	-39,971	-35,791	50,642
675	-50,474	-49,887	-49,050	-48,049	-46,839	-45,039	-42,238	-38,148	50,314
700	-52,623	-52,053	-51,244	-50,276	-49,083	-47,195	-44,395	-40,493	49,998
725	-54,763	-54,211	-53,429	-52,493	-51,316	-49,339	-46,542	-42,824	49,693
750	-56,894	-56,358	-55,601	-54,697	-53,536	-51,472	-48,678	-45,138	49,399
775	-59,015	-58,489	-57,758	-56,884	-55,738	-53,595	-50,803	-47,278	49,114
800	-61,123	-60,602	-59,895	-59,050	-57,855	-55,705	-52,915	-49,397	48,838
825	-63,217	-62,690	-62,007	-61,190	-59,950	-57,800	-55,011	-51,501	48,571
850	-65,294	-64,750	-64,090	-63,301	-62,028	-59,878	-57,091	-53,587	48,312
875	-67,352	-66,777	-66,139	-65,377	-64,086	-61,936	-59,150	-55,652	48,060
900	-69,311	-68,757	-68,148	-67,412	-66,120	-63,970	-61,185	-57,692	47,815
925	-71,220	-70,694	-70,113	-69,402	-68,128	-65,978	-63,194	-59,705	47,577
950	-73,082	-72,584	-72,029	-71,343	-70,107	-67,957	-65,173	-61,688	47,346
975	-74,894	-74,422	-73,893	-73,231	-72,053	-69,903	-67,120	-63,638	47,120
1000	-76,651	-76,204	-75,701	-75,062	-73,964	-71,813	-69,031	-65,553	46,900

600 MHz – Zone C – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,152	107,152	107,152	107,152	107,152	107,152	107,152	107,152	107,152
	2	100,715	101,257	101,319	101,327	101,327	101,327	101,327	101,327	101,363
	3	95,182	97,560	97,976	98,029	98,030	98,030	98,030	98,030	98,055
	4	90,622	94,362	95,572	95,742	95,744	95,744	95,744	95,744	95,754
	5	87,042	91,339	93,589	93,989	93,997	93,997	93,997	93,997	93,998
	6	84,137	88,568	91,790	92,563	92,584	92,584	92,584	92,584	92,584
	7	81,704	86,094	90,070	91,352	91,401	91,402	91,402	91,402	91,402
	8	79,616	83,905	88,394	90,285	90,382	90,384	90,384	90,384	90,389
	9	77,790	82,001	86,765	89,309	89,488	89,492	89,492	89,492	89,503
	10	76,169	80,288	85,201	88,385	88,691	88,698	88,698	88,698	88,715
	11	74,713	78,733	83,711	87,481	87,970	87,983	87,983	87,983	88,007
	12	73,391	77,311	82,302	86,574	87,311	87,333	87,333	87,333	87,363
	13	72,178	76,001	80,973	85,646	86,701	86,737	86,738	86,738	86,774
	14	71,056	74,783	79,721	84,692	86,130	86,187	86,188	86,188	86,229
	15	70,009	73,643	78,540	83,711	85,588	85,677	85,678	85,678	85,724
	16	69,024	72,568	77,423	82,710	85,068	85,200	85,202	85,202	85,252
	17	68,092	71,549	76,364	81,701	84,562	84,752	84,756	84,756	84,810
	18	67,201	70,576	75,358	80,693	84,063	84,330	84,337	84,337	84,394
	19	66,345	69,643	74,398	79,698	83,564	83,931	83,941	83,941	84,000
	20	65,517	68,742	73,480	78,723	83,058	83,552	83,565	83,565	83,627
	25	61,637	64,598	69,387	74,294	80,287	81,872	81,936	81,938	82,008
	30	58,019	61,362	65,924	70,669	77,101	80,379	80,605	80,611	80,687
	35	54,801	58,602	63,007	67,730	73,908	78,853	79,469	79,488	79,571
	40	52,650	56,533	60,676	65,362	71,071	77,122	78,460	78,511	78,604
	45	51,016	54,801	58,840	63,419	68,664	75,149	77,518	77,643	77,751
	50	49,856	53,503	57,396	61,814	66,647	73,046	76,586	76,858	76,986
	55	48,974	52,477	56,216	60,463	64,945	70,967	75,603	76,137	76,292
	60	48,231	51,603	55,202	59,293	63,485	69,015	74,516	75,463	75,656
	65	47,556	50,816	54,294	58,250	62,212	67,234	73,291	74,821	75,068
	70	46,921	50,084	53,460	57,299	61,081	65,635	71,931	74,195	74,521
	75	46,315	49,394	52,680	56,419	60,058	64,213	70,471	73,569	74,009
	80	45,735	48,740	51,947	55,597	59,121	62,956	68,961	72,922	73,526
	85	45,180	48,118	51,255	54,825	58,254	61,841	67,448	72,235	73,070
	90	44,650	47,528	50,600	54,096	57,444	60,846	65,975	71,489	72,637
	95	44,144	46,966	49,979	53,408	56,684	59,947	64,576	70,668	72,224
	100	43,662	46,432	49,390	52,756	55,967	59,124	63,282	69,767	71,830
	110	42,762	45,439	48,296	51,549	54,645	57,649	61,084	67,731	71,089
	120	41,938	44,531	47,299	50,450	53,447	56,340	59,363	65,457	70,403
	130	41,176	43,693	46,380	49,440	52,347	55,149	57,957	63,078	69,764
	140	40,461	42,909	45,523	48,500	51,324	54,048	56,732	60,859	69,165
	150	39,781	42,166	44,713	47,613	50,363	53,015	55,617	59,054	68,601
	160	39,125	41,453	43,937	46,767	49,448	52,035	54,572	57,638	68,069
	170	38,486	40,760	43,187	45,951	48,568	51,095	53,576	56,460	67,564
	180	37,856	40,080	42,454	45,158	47,715	50,186	52,617	55,405	67,084
	190	37,231	39,408	41,733	44,380	46,882	49,300	51,686	54,416	66,626
	200	36,606	38,740	41,019	43,613	46,063	48,432	50,775	53,466	66,190
	225	35,035	37,072	39,246	41,723	44,056	46,314	48,560	51,179	65,178
	250	33,437	35,390	37,474	39,849	42,081	44,242	46,402	48,961	64,264
	275	31,811	33,689	35,695	37,980	40,122	42,197	44,281	46,784	63,431
	300	30,162	31,974	33,910	36,114	38,177	40,174	42,187	44,637	62,666
	325	28,499	30,252	32,124	34,256	36,246	38,173	40,121	42,518	61,959
	350	26,832	28,531	30,344	32,410	34,334	36,196	38,083	40,429	61,302
	375	25,168	26,816	28,576	30,582	32,444	34,246	36,076	38,372	60,689
	400	23,513	25,115	26,826	28,775	30,580	32,326	34,102	36,349	60,114
	425	21,874	23,433	25,097	26,993	28,746	30,439	32,163	34,362	59,573
	450	20,255	21,773	23,394	25,241	26,943	28,587	30,263	32,414	59,062
	475	18,660	20,140	21,719	23,520	25,175	26,771	28,401	30,506	58,578
	500	17,090	18,534	20,075	21,831	23,442	24,994	26,579	28,640	58,118
	525	15,550	16,959	18,463	20,178	21,746	23,256	24,798	26,816	57,679
	550	14,039	15,416	16,885	18,560	20,088	21,557	23,059	25,035	57,261
	575	12,560	13,905	15,342	16,979	18,468	19,899	21,362	23,297	56,860
	600	11,113	12,429	13,834	15,434	16,887	18,281	19,707	21,603	56,476
	625	9,700	10,987	12,361	13,928	15,345	16,704	18,094	19,951	56,107
	650	8,320	9,580	10,925	12,458	13,843	15,167	16,524	18,343	55,752
	675	6,974	8,208	9,526	11,027	12,379	13,671	14,995	16,778	55,410
	700	5,663	6,872	8,163	9,633	10,954	12,215	13,507	15,256	55,080
	725	4,386	5,571	6,836	8,277	9,568	10,799	12,060	13,775	54,761
	750	3,143	4,305	5,545	6,958	8,221	9,423	10,654	12,336	54,452
	775	1,935	3,074	4,290	5,676	6,911	8,085	9,288	10,938	54,153
	800	0,760	1,878	3,071	4,430	5,639	6,786	7,961	9,581	53,863
	825	-0,381	0,716	1,886	3,220	4,403	5,525	6,673	8,263	53,582
	850	-1,489	-0,412	0,737	2,046	3,204	4,301	5,424	6,984	53,309
	875	-2,564	-1,507	-0,379	0,907	2,041	3,113	4,212	5,744	53,043
	900	-3,607	-2,568	-1,460	-0,197	0,913	1,962	3,036	4,541	52,785
	925	-4,617	-3,598	-2,509	-1,268	-0,180	0,846	1,897	3,375	52,533
	950	-5,597	-4,595	-3,525	-2,306	-1,239	-0,235	0,793	2,245	52,288
	975	-6,546	-5,561	-4,509	-3,311	-2,266	-1,283	-0,277	1,150	52,048
	1000	-7,464	-6,496	-5,462	-4,284	-3,260	-2,298	-1,313	0,090	51,815

600 MHz – Zone C – 1%

Transmitting / base antenna height (m) / Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
1	107,327	107,396	107,423	107,425	107,425	107,425	107,425	107,425	107,457
2	100,814	101,544	101,866	101,882	101,882	101,882	101,882	101,882	101,946
3	96,040	97,796	98,825	98,886	98,887	98,887	98,887	98,887	98,890
4	92,146	94,684	96,674	96,819	96,819	96,819	96,819	96,819	96,819
5	88,969	91,973	94,892	95,273	95,273	95,273	95,273	95,273	95,273
6	86,336	89,612	93,248	94,051	94,051	94,051	94,051	94,051	94,051
7	84,110	87,552	91,652	93,045	93,045	93,045	93,045	93,045	93,045
8	82,194	85,744	90,099	92,192	92,192	92,192	92,192	92,192	92,192
9	80,519	84,144	88,613	91,420	91,454	91,454	91,454	91,454	91,454
10	79,036	82,716	87,219	90,693	90,803	90,803	90,803	90,803	90,803
11	77,708	81,430	85,927	89,998	90,220	90,220	90,220	90,220	90,220
12	76,508	80,264	84,739	89,315	89,692	89,692	89,692	89,692	89,692
13	75,415	79,199	83,649	88,627	89,208	89,210	89,210	89,210	89,210
14	74,414	78,221	82,650	87,928	88,754	88,760	88,760	88,760	88,765
15	73,491	77,318	81,733	87,218	88,333	88,342	88,342	88,342	88,353
16	72,636	76,479	80,889	86,501	87,938	87,953	87,953	87,953	87,967
17	71,840	75,698	80,110	85,787	87,566	87,589	87,589	87,589	87,605
18	71,097	74,968	79,390	85,083	87,212	87,247	87,247	87,247	87,264
19	70,461	74,320	78,725	84,398	86,874	86,924	86,925	86,925	86,941
20	69,910	73,740	78,109	83,739	86,547	86,619	86,620	86,620	86,634
25	67,912	71,511	75,610	80,895	84,999	85,293	85,293	85,293	85,293
30	66,581	69,957	73,800	78,756	83,466	84,188	84,188	84,188	84,188
35	65,674	68,853	72,469	77,135	81,953	83,246	83,246	83,246	83,246
40	65,141	68,118	71,506	75,876	80,547	82,424	82,424	82,424	82,424
45	64,917	67,681	70,826	74,883	79,302	81,643	81,694	81,694	81,694
50	64,912	67,458	70,357	74,095	78,220	80,874	81,038	81,038	81,038
55	65,030	67,369	70,033	73,468	77,287	80,120	80,439	80,439	80,439
60	65,202	67,354	69,805	72,964	76,481	79,380	79,888	79,888	79,888
65	65,383	67,370	69,634	72,552	75,784	78,658	79,376	79,376	79,376
70	65,550	67,393	69,495	72,203	75,177	77,959	78,888	78,897	78,897
75	65,688	67,408	69,370	71,897	74,641	77,286	78,387	78,445	78,445
80	65,794	67,406	69,248	71,617	74,162	76,646	77,897	77,997	78,017
85	65,866	67,384	69,121	71,354	73,725	76,042	77,414	77,561	77,610
90	65,986	67,363	69,003	71,111	73,328	75,479	76,935	77,141	77,221
95	66,075	67,334	68,876	70,873	72,955	74,954	76,457	76,736	76,848
100	66,132	67,314	68,736	70,633	72,598	74,461	75,977	76,342	76,490
110	66,153	67,203	68,440	70,141	71,912	73,555	75,015	75,587	75,810
120	66,067	67,008	68,118	69,623	71,242	72,722	74,070	74,859	75,173
130	65,893	66,741	67,746	69,083	70,570	71,931	73,163	74,140	74,573
140	65,647	66,417	67,332	68,546	69,891	71,159	72,297	73,398	74,005
150	65,346	66,048	66,885	67,993	69,201	70,396	71,461	72,611	73,466
160	65,001	65,644	66,413	67,429	68,499	69,633	70,642	71,778	72,953
170	64,622	65,213	65,922	66,857	67,787	68,866	69,829	70,915	72,463
180	64,218	64,763	65,419	66,280	67,065	68,094	69,016	70,036	71,994
190	63,795	64,298	64,905	65,700	66,409	67,317	68,199	69,148	71,546
200	63,359	63,823	64,385	65,120	65,778	66,532	67,375	68,251	71,116
225	62,231	62,610	63,072	63,671	64,218	64,706	65,274	65,964	70,112
250	61,076	61,380	61,754	62,236	62,681	63,085	63,442	63,762	69,198
275	59,886	60,130	60,432	60,817	61,181	61,514	61,803	62,027	68,361
300	58,584	58,803	59,076	59,422	59,757	60,069	60,342	60,539	67,590
325	57,272	57,475	57,726	58,046	58,361	58,660	58,924	59,105	66,875
350	55,967	56,155	56,387	56,684	56,981	57,268	57,521	57,686	66,209
375	54,667	54,842	55,058	55,335	55,616	55,891	56,131	56,279	65,586
400	53,371	53,535	53,736	53,995	54,262	54,525	54,753	54,884	65,002
425	52,078	52,232	52,421	52,664	52,918	53,169	53,383	53,498	64,450
450	50,787	50,933	51,110	51,340	51,581	51,821	52,021	52,121	63,929
475	49,499	49,637	49,804	50,021	50,252	50,479	50,665	50,752	63,435
500	48,214	48,345	48,503	48,709	48,928	49,143	49,315	49,391	62,964
525	46,934	47,058	47,207	47,403	47,612	47,815	47,972	48,038	62,516
550	45,659	45,777	45,919	46,105	46,303	46,494	46,637	46,695	62,087
575	44,391	44,504	44,638	44,815	45,003	45,182	45,312	45,364	61,676
600	43,132	43,240	43,367	43,536	43,714	43,881	43,999	44,047	61,282
625	41,884	41,987	42,108	42,269	42,437	42,592	42,701	42,745	60,903
650	40,648	40,746	40,861	41,015	41,174	41,319	41,418	41,460	60,538
675	39,427	39,520	39,630	39,776	39,927	40,062	40,153	40,195	60,185
700	38,221	38,310	38,415	38,555	38,698	38,824	38,908	38,950	59,845
725	37,033	37,119	37,218	37,352	37,488	37,606	37,685	37,726	59,516
750	35,865	35,946	36,042	36,170	36,298	36,409	36,484	36,526	59,198
775	34,717	34,795	34,886	35,009	35,131	35,236	35,307	35,350	58,889
800	33,590	33,666	33,753	33,871	33,987	34,086	34,155	34,199	58,590
825	32,487	32,560	32,644	32,757	32,868	32,962	33,028	33,074	58,299
850	31,408	31,478	31,559	31,668	31,775	31,864	31,929	31,975	58,016
875	30,354	30,421	30,500	30,605	30,707	30,793	30,856	30,904	57,740
900	29,325	29,390	29,466	29,568	29,667	29,750	29,812	29,860	57,472
925	28,323	28,386	28,460	28,559	28,654	28,734	28,795	28,845	57,211
950	27,347	27,409	27,480	27,576	27,668	27,746	27,807	27,857	56,956
975	26,398	26,458	26,528	26,622	26,711	26,787	26,847	26,898	56,707
1000	25,477	25,535	25,603	25,695	25,782	25,856	25,916	25,968	56,464

600 MHz – Zone D – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	92,711	94,893	97,092	99,714	102,355	104,596	106,009	106,629	106,900
	2	81,166	84,340	87,133	90,388	93,824	97,082	99,421	100,485	100,879
	3	73,567	77,762	81,105	84,787	88,656	92,480	95,450	96,867	97,358
	4	67,808	72,768	76,652	80,727	84,919	89,132	92,572	94,288	94,859
	5	63,207	68,672	73,037	77,495	81,973	86,487	90,302	92,278	92,921
	6	59,398	65,185	69,947	74,774	79,521	84,293	88,421	90,630	91,337
	7	56,160	62,152	67,228	72,397	77,406	82,409	86,810	89,231	89,998
	8	53,351	59,475	64,790	70,267	75,530	80,750	85,397	88,015	88,838
	9	50,874	57,084	62,578	68,324	73,832	79,261	84,134	86,938	87,815
	10	48,664	54,928	60,556	66,531	72,271	77,902	82,989	85,971	86,900
	11	46,671	52,967	58,694	64,861	70,817	76,647	81,938	85,093	86,072
	12	44,861	51,172	56,971	63,295	69,452	75,473	80,963	84,287	85,316
	13	43,204	49,520	55,368	61,821	68,158	74,366	80,050	83,542	84,621
	14	41,679	47,990	53,872	60,427	66,926	73,315	79,189	82,848	83,977
	15	40,270	46,568	52,470	59,106	65,748	72,308	78,372	82,198	83,378
	16	38,961	45,240	51,151	57,849	64,616	71,340	77,590	81,585	82,818
	17	37,742	43,995	49,906	56,651	63,526	70,404	76,838	81,006	82,291
	18	36,602	42,826	48,729	55,506	62,473	69,495	76,112	80,454	81,795
	19	35,534	41,723	47,612	54,410	61,454	68,611	75,407	79,928	81,325
	20	34,530	40,680	46,549	53,358	60,466	67,747	74,720	79,424	80,879
	25	30,290	36,194	41,894	48,641	55,911	63,663	71,465	77,150	78,941
	30	27,010	32,596	38,045	44,599	51,841	59,851	68,357	75,138	77,358
	35	24,386	29,603	34,746	41,024	48,117	56,222	65,280	73,240	76,019
	40	22,229	27,047	31,850	37,800	44,663	52,739	62,196	71,351	74,859
	45	20,412	24,821	29,269	34,862	41,440	49,395	59,105	69,391	73,836
	50	18,848	22,854	26,948	32,170	38,432	46,197	56,032	67,311	72,921
	55	17,474	21,096	24,846	29,703	35,632	43,156	53,006	65,092	72,093
	60	16,245	19,509	22,936	27,440	33,033	40,282	50,056	62,752	71,337
	65	15,127	18,064	21,192	25,364	30,628	37,579	47,203	60,322	70,642
	70	14,095	16,736	19,592	23,458	28,407	35,050	44,463	57,844	69,998
	75	13,129	15,506	18,117	21,703	26,355	32,690	41,849	55,351	69,399
	80	12,215	14,357	16,750	20,082	24,459	30,492	39,365	52,874	68,838
	85	11,341	13,276	15,474	18,579	22,704	28,446	37,013	50,434	68,312
	90	10,499	12,251	14,278	17,179	21,073	26,539	34,792	48,048	67,815
	95	9,681	11,273	13,148	15,868	19,553	24,761	32,697	45,726	67,346
	100	8,884	10,335	12,076	14,634	18,130	23,098	30,722	43,477	66,900
	110	7,335	8,552	10,070	12,358	15,530	20,073	27,102	39,214	66,072
	120	5,831	6,865	8,208	10,282	13,194	17,378	23,870	35,275	65,316
	130	4,359	5,250	6,455	8,358	11,059	14,946	20,964	31,652	64,621
	140	2,913	3,690	4,785	6,552	9,082	12,722	18,328	28,324	63,977
	150	1,489	2,175	3,182	4,839	7,229	10,665	15,917	25,266	63,378
	160	0,086	0,699	1,634	3,201	5,477	8,742	13,691	22,449	62,818
	170	-1,296	-0,744	0,133	1,626	3,808	6,931	11,620	19,843	62,291
	180	-2,659	-2,156	-1,327	0,105	2,209	5,212	9,679	17,424	61,795
	190	-4,000	-3,539	-2,750	-1,369	0,669	3,571	7,848	15,167	61,325
	200	-5,321	-4,894	-4,139	-2,800	-0,817	1,999	6,112	13,053	60,879
	225	-8,530	-8,168	-7,477	-6,218	-4,340	-1,687	2,108	8,282	59,856
	250	-11,608	-11,290	-10,642	-9,438	-7,631	-5,092	-1,522	4,084	58,941
	275	-14,558	-14,272	-13,654	-12,489	-10,733	-8,274	-4,866	0,315	58,113
	300	-17,390	-17,127	-16,531	-15,393	-13,674	-11,274	-7,987	-3,127	57,358
	325	-20,114	-19,868	-19,288	-18,171	-16,479	-14,123	-10,927	-6,313	56,662
	350	-22,741	-22,507	-21,940	-20,839	-19,168	-16,846	-13,718	-9,297	56,019
	375	-25,283	-25,059	-24,502	-23,413	-21,758	-19,461	-16,388	-12,119	55,419
	400	-27,751	-27,535	-26,986	-25,906	-24,263	-21,987	-18,957	-14,809	54,859
	425	-30,157	-29,947	-29,403	-28,331	-26,699	-24,439	-21,442	-17,392	54,332
	450	-32,509	-32,304	-31,765	-30,699	-29,075	-26,828	-23,859	-19,889	53,836
	475	-34,817	-34,616	-34,081	-33,020	-31,402	-29,166	-26,220	-22,316	53,366
	500	-37,088	-36,891	-36,360	-35,302	-33,690	-31,462	-28,535	-24,685	52,921
	525	-39,330	-39,136	-38,607	-37,553	-35,944	-33,724	-30,812	-27,009	52,497
	550	-41,547	-41,355	-40,829	-39,777	-38,173	-35,958	-33,060	-29,295	52,093
	575	-43,745	-43,555	-43,031	-41,982	-40,380	-38,171	-35,283	-31,551	51,707
	600	-45,927	-45,740	-45,217	-44,169	-42,570	-40,365	-37,487	-33,783	51,337
	625	-48,097	-47,911	-47,389	-46,344	-44,747	-42,545	-39,675	-35,996	50,982
	650	-50,256	-50,071	-49,551	-48,507	-46,912	-44,713	-41,850	-38,191	50,642
	675	-52,406	-52,222	-51,703	-50,660	-49,066	-46,870	-44,013	-40,373	50,314
	700	-54,548	-54,365	-53,846	-52,804	-51,212	-49,018	-46,166	-42,541	49,998
	725	-56,680	-56,498	-55,980	-54,939	-53,348	-51,156	-48,308	-44,697	49,693
	750	-58,803	-58,622	-58,104	-57,064	-55,474	-53,284	-50,439	-46,841	49,399
	775	-60,916	-60,735	-60,218	-59,179	-57,589	-55,400	-52,559	-48,972	49,114
	800	-63,016	-62,836	-62,320	-61,281	-59,692	-57,504	-54,666	-51,088	48,838
	825	-65,102	-64,923	-64,407	-63,368	-61,780	-59,593	-56,758	-53,189	48,571
	850	-67,172	-66,993	-66,477	-65,439	-63,851	-61,665	-58,832	-55,271	48,312
	875	-69,222	-69,043	-68,528	-67,490	-65,903	-63,718	-60,887	-57,332	48,060
	900	-71,249	-71,071	-70,556	-69,519	-67,932	-65,748	-62,918	-59,370	47,815
	925	-73,252	-73,074	-72,559	-71,522	-69,936	-67,752	-64,924	-61,381	47,577
	950	-75,226	-75,048	-74,534	-73,497	-71,910	-69,727	-66,901	-63,362	47,346
	975	-77,167	-76,990	-76,476	-75,439	-73,853	-71,670	-68,845	-65,311	47,120
	1000	-79,074	-78,897	-78,383	-77,346	-75,761	-73,578	-70,754	-67,224	46,900

600 MHz – Zone D – 10%

Transmitting / base antenna height (m)	Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
	1	92,879	94,971	97,143	99,752	102,383	104,616	106,025	106,643	106,913
	2	82,136	84,904	87,584	90,781	94,157	97,322	99,547	100,539	100,905
	3	75,116	78,677	81,816	85,407	89,198	92,896	95,678	96,959	97,395
	4	69,694	73,952	77,551	81,505	85,612	89,686	92,892	94,414	94,908
	5	65,297	70,059	74,080	78,388	82,777	87,152	90,705	92,437	92,982
	6	61,631	66,728	71,105	75,751	80,408	85,045	88,896	90,820	91,409
	7	58,505	63,820	68,478	73,436	78,352	83,229	87,348	89,450	90,082
	8	55,791	61,247	66,119	71,352	76,516	81,622	85,989	88,261	88,933
	9	53,401	58,946	63,978	69,445	74,843	80,169	84,772	87,209	87,921
	10	51,271	56,872	62,020	67,681	73,295	78,833	83,664	86,265	87,016
	11	49,355	54,987	60,219	66,038	71,847	77,588	82,642	85,408	86,199
	12	47,618	53,265	58,555	64,498	70,480	76,415	81,688	84,622	85,453
	13	46,033	51,683	57,010	63,051	69,183	75,300	80,789	83,894	84,768
	14	44,580	50,221	55,571	61,686	67,947	74,233	79,933	83,215	84,134
	15	43,241	48,867	54,227	60,396	66,764	73,206	79,114	82,579	83,544
	16	42,002	47,606	52,966	59,173	65,630	72,214	78,324	81,978	82,993
	17	40,854	46,429	51,780	58,011	64,541	71,253	77,558	81,407	82,476
	18	39,785	45,326	50,662	56,905	63,493	70,319	76,813	80,863	81,988
	19	38,788	44,291	49,606	55,851	62,483	69,410	76,084	80,341	81,527
	20	37,856	43,317	48,605	54,844	61,508	68,523	75,370	79,839	81,090
	25	33,989	39,187	44,278	50,388	57,081	64,382	71,955	77,547	79,193
	30	31,101	35,970	40,791	46,663	53,235	60,628	68,860	75,479	77,646
	35	28,887	33,383	37,888	43,456	49,815	57,172	65,883	73,634	76,340
	40	27,149	31,253	35,418	40,644	46,729	53,960	62,904	71,801	75,210
	45	25,754	29,466	33,286	38,153	43,929	50,965	59,928	69,904	74,214
	50	24,609	27,944	31,427	35,936	41,386	48,178	56,974	67,892	73,323
	55	23,646	26,628	29,795	33,958	39,079	45,595	54,188	65,752	72,517
	60	22,814	25,476	28,351	32,191	36,990	43,211	51,630	63,498	71,781
	65	22,077	24,452	27,064	30,606	35,099	41,018	49,211	61,162	71,104
	70	21,406	23,527	25,904	29,178	33,386	39,007	46,934	58,782	70,476
	75	20,781	22,680	24,850	27,883	31,830	37,162	44,801	56,392	69,891
	80	20,187	21,891	23,879	26,699	30,409	35,468	42,806	54,085	69,344
	85	19,613	21,147	22,976	25,607	29,104	33,907	40,943	52,001	68,829
	90	19,048	20,436	22,126	24,591	27,897	32,464	39,203	49,993	68,343
	95	18,489	19,749	21,317	23,636	26,772	31,124	37,576	48,063	67,883
	100	17,930	19,078	20,541	22,731	25,715	29,871	36,050	46,215	67,446
	110	16,800	17,768	19,056	21,034	23,765	27,582	33,264	42,758	66,633
	120	15,648	16,476	17,630	19,443	21,973	25,515	30,769	39,603	65,888
	130	14,467	15,187	16,236	17,920	20,291	23,610	28,502	36,718	65,203
	140	13,260	13,895	14,862	16,443	18,688	21,825	26,412	34,068	64,566
	150	12,031	12,598	13,499	14,999	17,141	20,131	24,463	31,621	63,973
	160	10,785	11,297	12,144	13,579	15,639	18,508	22,626	29,345	63,417
	170	9,527	9,994	10,798	12,179	14,172	16,942	20,880	27,217	62,894
	180	8,262	8,693	9,461	10,799	12,737	15,424	19,211	25,215	62,400
	190	6,995	7,396	8,135	9,436	11,329	13,947	17,607	23,321	61,933
	200	5,732	6,107	6,822	8,093	9,948	12,508	16,060	21,522	61,489
	225	2,608	2,937	3,606	4,821	6,605	9,058	12,404	17,369	60,468
	250	-0,433	-0,136	0,503	1,681	3,418	5,797	9,001	13,611	59,553
	275	-3,367	-3,092	-2,475	-1,322	0,382	2,712	5,815	10,165	58,724
	300	-6,185	-5,926	-5,323	-4,189	-2,507	-0,214	2,817	6,975	57,967
	325	-8,885	-8,639	-8,047	-6,925	-5,260	-2,993	-0,016	3,997	57,269
	350	-11,476	-11,238	-10,654	-9,542	-7,889	-5,641	-2,704	1,197	56,624
	375	-13,965	-13,734	-13,156	-12,051	-10,407	-8,174	-5,268	-1,453	56,022
	400	-16,366	-16,140	-15,567	-14,467	-12,830	-10,608	-7,725	-3,978	55,459
	425	-18,691	-18,469	-17,900	-16,805	-15,172	-12,958	-10,094	-6,402	54,930
	450	-20,954	-20,736	-20,170	-19,078	-17,449	-15,241	-12,392	-8,743	54,431
	475	-23,170	-22,954	-22,391	-21,301	-19,675	-17,472	-14,634	-11,021	53,959
	500	-25,350	-25,137	-24,575	-23,487	-21,863	-19,664	-16,835	-13,251	53,511
	525	-27,508	-27,296	-26,736	-25,649	-24,027	-21,830	-19,009	-15,449	53,085
	550	-29,653	-29,443	-28,884	-27,798	-26,177	-23,983	-21,167	-17,626	52,678
	575	-31,797	-31,588	-31,030	-29,944	-28,324	-26,131	-23,320	-19,796	52,290
	600	-33,947	-33,740	-33,182	-32,097	-30,477	-28,285	-25,478	-21,967	51,918
	625	-36,111	-35,904	-35,347	-34,262	-32,643	-30,451	-27,647	-24,148	51,561
	650	-38,293	-38,087	-37,530	-36,446	-34,826	-32,635	-29,833	-26,343	51,218
	675	-40,497	-40,292	-39,735	-38,651	-37,031	-34,840	-32,039	-28,558	50,888
	700	-42,725	-42,520	-41,964	-40,879	-39,259	-37,068	-34,268	-30,793	50,569
	725	-44,975	-44,771	-44,214	-43,130	-41,509	-39,318	-36,519	-33,049	50,262
	750	-47,245	-47,041	-46,485	-45,400	-43,779	-41,587	-38,788	-35,324	49,965
	775	-49,529	-49,326	-48,769	-47,684	-46,063	-43,870	-41,072	-37,611	49,678
	800	-51,822	-51,619	-51,062	-49,977	-48,355	-46,161	-43,363	-39,906	49,400
	825	-54,113	-53,910	-53,354	-52,268	-50,646	-48,452	-45,653	-42,198	49,130
	850	-56,393	-56,191	-55,634	-54,548	-52,925	-50,730	-47,931	-44,479	48,869
	875	-58,651	-58,448	-57,892	-56,805	-55,181	-52,986	-50,186	-46,736	48,615
	900	-60,872	-60,670	-60,113	-59,026	-57,401	-55,205	-52,405	-48,956	48,368
	925	-63,044	-62,842	-62,285	-61,198	-59,572	-57,375	-54,575	-51,127	48,127
	950	-65,153	-64,951	-64,394	-63,306	-61,680	-59,483	-56,682	-53,236	47,893
	975	-67,186	-66,984	-66,427	-65,339	-63,713	-61,514	-58,713	-55,268	47,666
	1000	-69,131	-68,930	-68,372	-67,284	-65,657	-63,458	-60,656	-57,212	47,443

600 MHz – Zone D – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	92,923	95,015	97,186	99,795	102,426	104,658	106,066	106,685	106,954
	2	82,657	85,374	88,037	91,225	94,565	97,640	99,740	100,653	100,987
	3	76,428	79,561	82,558	86,104	89,849	93,427	96,006	97,138	97,518
	4	71,812	75,278	78,553	82,386	86,432	90,379	93,336	94,654	95,070
	5	68,107	71,836	75,345	79,423	83,722	87,967	91,247	92,733	93,182
	6	65,004	68,936	72,640	76,932	81,449	85,952	89,521	91,167	91,648
	7	62,332	66,421	70,285	74,762	79,472	84,202	88,039	89,844	90,357
	8	59,988	64,198	68,192	72,827	77,707	82,642	86,732	88,697	89,244
	9	57,903	62,205	66,305	71,073	76,103	81,222	85,552	87,682	88,267
	10	56,028	60,402	64,586	69,465	74,625	79,909	84,468	86,771	87,397
	11	54,327	58,755	63,008	67,979	73,250	78,681	83,458	85,941	86,614
	12	52,773	57,243	61,549	66,597	71,963	77,523	82,506	85,176	85,902
	13	51,344	55,845	60,194	65,305	70,752	76,425	81,600	84,465	85,249
	14	50,023	54,548	58,930	64,092	69,606	75,378	80,732	83,797	84,647
	15	48,798	53,340	57,748	62,950	68,520	74,378	79,895	83,166	84,089
	16	47,657	52,210	56,637	61,872	67,489	73,419	79,086	82,565	83,568
	17	46,591	51,151	55,591	60,851	66,506	72,499	78,301	82,017	83,081
	18	45,591	50,154	54,604	59,883	65,568	71,614	77,539	81,503	82,623
	19	44,652	49,214	53,670	58,962	64,673	70,763	76,798	81,011	82,191
	20	43,768	48,327	52,784	58,086	63,815	69,943	76,090	80,538	81,783
	25	40,019	44,527	48,957	54,255	60,019	66,255	72,820	78,381	80,018
	30	37,115	41,530	45,888	51,127	56,862	63,126	69,856	76,437	78,592
	35	34,807	39,099	43,355	48,498	54,165	60,414	67,212	74,704	77,394
	40	32,939	37,083	41,215	46,235	51,807	58,013	64,885	72,974	76,362
	45	31,402	35,381	39,369	44,246	49,702	55,845	62,766	71,170	75,455
	50	30,119	33,919	37,751	42,468	47,791	53,855	60,804	69,246	74,644
	55	29,034	32,645	36,312	40,857	46,033	52,002	58,962	67,186	73,910
	60	28,102	31,521	35,016	39,382	44,400	50,261	57,213	65,237	73,239
	65	27,290	30,515	33,838	38,019	42,872	48,612	55,539	63,754	72,620
	70	26,571	29,606	32,757	36,753	41,436	47,044	53,928	62,304	72,045
	75	25,926	28,776	31,758	35,572	40,083	45,550	52,371	60,879	71,508
	80	25,337	28,011	30,830	34,465	38,804	44,124	50,866	59,472	71,003
	85	24,792	27,298	29,963	33,424	37,594	42,762	49,408	58,083	70,527
	90	24,281	26,630	29,147	32,443	36,448	41,461	47,997	56,709	70,076
	95	23,795	25,997	28,375	31,515	35,360	40,219	46,633	55,352	69,647
	100	23,328	25,394	27,643	30,634	34,327	39,033	45,314	54,013	69,238
	110	22,432	24,255	26,272	28,995	32,406	36,814	42,813	51,394	68,472
	120	21,562	23,181	25,000	27,490	30,650	34,781	40,484	48,867	67,766
	130	20,702	22,149	23,799	26,090	29,030	32,909	38,318	46,444	67,111
	140	19,840	21,142	22,649	24,770	27,521	31,172	36,299	44,129	66,500
	150	18,972	20,150	21,535	23,513	26,099	29,549	34,412	41,926	65,926
	160	18,093	19,165	20,448	22,302	24,747	28,020	32,640	39,833	65,385
	170	17,203	18,184	19,379	21,128	23,452	26,570	30,968	37,845	64,874
	180	16,302	17,204	18,323	19,983	22,203	25,185	29,383	35,955	64,389
	190	15,391	16,224	17,277	18,860	20,991	23,854	27,873	34,156	63,929
	200	14,472	15,242	16,239	17,756	19,810	22,570	26,429	32,440	63,489
	225	12,142	12,787	13,672	15,061	16,963	19,518	23,050	28,469	62,475
	250	9,788	10,336	11,142	12,440	14,235	16,642	19,928	24,872	61,560
	275	7,428	7,904	8,651	9,883	11,601	13,900	17,001	21,568	60,728
	300	5,077	5,498	6,202	7,386	9,047	11,265	14,226	18,494	59,966
	325	2,748	3,126	3,798	4,946	6,565	8,721	11,574	15,605	59,262
	350	0,445	0,791	1,438	2,559	4,145	6,255	9,024	12,866	58,609
	375	-1,830	-1,508	-0,880	0,221	1,782	3,855	6,558	10,247	58,000
	400	-4,076	-3,773	-3,159	-2,076	-0,534	1,511	4,161	7,728	57,430
	425	-6,297	-6,008	-5,407	-4,335	-2,809	-0,787	1,821	5,287	56,893
	450	-8,496	-8,220	-7,627	-6,566	-5,052	-3,048	-0,474	2,909	56,386
	475	-10,680	-10,413	-9,828	-8,775	-7,270	-5,280	-2,734	0,580	55,906
	500	-12,854	-12,594	-12,014	-10,968	-9,471	-7,493	-4,970	-1,713	55,450
	525	-15,022	-14,768	-14,193	-13,153	-11,662	-9,693	-7,189	-3,980	55,015
	550	-17,190	-16,941	-16,371	-15,334	-13,849	-11,888	-9,399	-6,230	54,601
	575	-19,363	-19,118	-18,551	-17,517	-16,036	-14,082	-11,606	-8,472	54,204
	600	-21,543	-21,302	-20,737	-19,707	-18,229	-16,279	-13,815	-10,710	53,824
	625	-23,734	-23,496	-22,933	-21,905	-20,430	-18,485	-16,029	-12,949	53,459
	650	-25,937	-25,701	-25,141	-24,115	-22,642	-20,700	-18,251	-15,193	53,108
	675	-28,153	-27,919	-27,360	-26,335	-24,864	-22,925	-20,483	-17,443	52,770
	700	-30,379	-30,147	-29,589	-28,566	-27,096	-25,159	-22,723	-19,699	52,444
	725	-32,615	-32,384	-31,828	-30,805	-29,336	-27,401	-24,969	-21,959	52,129
	750	-34,856	-34,627	-34,071	-33,050	-31,581	-29,648	-27,220	-24,222	51,825
	775	-37,098	-36,870	-36,315	-35,294	-33,826	-31,894	-29,469	-26,482	51,530
	800	-39,334	-39,107	-38,553	-37,533	-36,066	-34,134	-31,712	-28,734	51,244
	825	-41,559	-41,333	-40,779	-39,759	-38,292	-36,361	-33,941	-30,971	50,967
	850	-43,763	-43,538	-42,985	-41,965	-40,498	-38,568	-36,150	-33,187	50,697
	875	-45,938	-45,714	-45,161	-44,142	-42,675	-40,745	-38,329	-35,372	50,436
	900	-48,076	-47,852	-47,300	-46,281	-44,814	-42,884	-40,469	-37,519	50,181
	925	-50,167	-49,944	-49,392	-48,373	-46,906	-44,976	-42,563	-39,617	49,933
	950	-52,202	-51,979	-51,428	-50,409	-48,942	-47,012	-44,600	-41,659	49,692
	975	-54,172	-53,950	-53,398	-52,379	-50,913	-48,983	-46,571	-43,634	49,457
	1000	-56,069	-55,847	-55,296	-54,277	-52,810	-50,880	-48,469	-45,536	49,227

2000 MHz – Zone 1 – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	94,233	96,509	98,662	101,148	103,509	105,319	106,328	106,732	106,900
	2	82,427	85,910	88,758	91,971	95,244	98,116	99,916	100,632	100,879
	3	74,501	79,135	82,671	86,395	90,171	93,677	96,070	97,049	97,358
	4	68,368	73,847	78,077	82,308	86,474	90,429	93,289	94,498	94,859
	5	63,385	69,412	74,253	79,006	83,536	87,851	91,099	92,513	92,921
	6	59,209	65,580	70,908	76,172	81,068	85,701	89,284	90,887	91,337
	7	55,628	62,216	67,909	73,643	78,912	83,845	87,729	89,509	89,998
	8	52,499	59,227	65,186	71,329	76,970	82,198	86,365	88,312	88,838
	9	49,725	56,544	62,696	69,181	75,181	80,707	85,144	87,253	87,815
	10	47,236	54,116	60,406	67,169	73,507	79,331	84,035	86,304	86,900
	11	44,981	51,901	58,291	65,277	71,922	78,043	83,013	85,442	86,072
	12	42,922	49,867	56,329	63,490	70,408	76,822	82,061	84,652	85,316
	13	41,029	47,989	54,502	61,800	68,956	75,653	81,165	83,922	84,621
	14	39,279	46,245	52,794	60,198	67,558	74,524	80,313	83,243	83,977
	15	37,653	44,619	51,191	58,677	66,210	73,429	79,497	82,608	83,378
	16	36,137	43,096	49,682	57,231	64,909	72,361	78,708	82,009	82,818
	17	34,717	41,665	48,257	55,853	63,652	71,316	77,942	81,442	82,291
	18	33,384	40,316	46,908	54,537	62,437	70,293	77,192	80,903	81,795
	19	32,129	39,041	45,627	53,278	61,260	69,289	76,455	80,387	81,325
	20	30,945	37,832	44,407	52,072	60,121	68,303	75,728	79,893	80,879
	25	25,889	32,596	39,051	46,684	54,906	63,628	72,179	77,642	78,941
	30	21,921	28,355	34,599	42,081	50,306	59,317	68,706	75,604	77,358
	35	18,729	24,802	30,756	37,994	46,119	55,280	65,291	73,633	76,019
	40	16,114	21,754	27,352	34,269	42,210	51,427	61,921	71,641	74,859
	45	13,939	19,099	24,292	30,826	38,510	47,703	58,580	69,571	73,836
	50	12,108	16,766	21,526	27,634	34,999	44,085	55,252	67,388	72,921
	55	10,548	14,707	19,028	24,685	31,681	40,581	51,937	65,076	72,093
	60	9,201	12,884	16,779	21,982	28,576	37,214	48,650	62,636	71,337
	65	8,025	11,268	14,761	19,525	25,699	34,012	45,413	60,085	70,642
	70	6,984	9,831	12,957	17,305	23,060	31,001	42,256	57,448	69,998
	75	6,050	8,546	11,343	15,308	20,658	28,196	39,207	54,753	69,399
	80	5,200	7,390	9,896	13,516	18,482	25,607	36,292	52,029	68,838
	85	4,416	6,342	8,594	11,905	16,516	23,230	33,529	49,305	68,312
	90	3,683	5,381	7,413	10,452	14,740	21,057	30,929	46,606	67,815
	95	2,990	4,493	6,334	9,135	13,131	19,074	28,496	43,955	67,346
	100	2,327	3,662	5,339	7,933	11,669	17,262	26,230	41,369	66,900
	110	1,061	2,131	3,544	5,800	9,102	14,082	22,170	36,454	66,072
	120	-0,158	0,716	1,934	3,934	6,899	11,377	18,668	31,936	65,316
	130	-1,356	-0,628	0,443	2,249	4,953	9,027	15,628	27,838	64,621
	140	-2,550	-1,932	-0,972	0,686	3,187	6,939	12,958	24,145	63,977
	150	-3,746	-3,213	-2,338	-0,794	1,548	5,042	10,577	20,821	63,378
	160	-4,950	-4,482	-3,674	-2,219	-0,002	3,287	8,421	17,823	62,818
	170	-6,161	-5,745	-4,989	-3,604	-1,486	1,637	6,440	15,102	62,291
	180	-7,380	-7,004	-6,290	-4,962	-2,923	0,066	4,597	12,617	61,795
	190	-8,604	-8,261	-7,581	-6,297	-4,322	-1,442	2,863	10,329	61,325
	200	-9,831	-9,515	-8,861	-7,614	-5,692	-2,901	1,216	8,208	60,879
	225	-12,895	-12,626	-12,020	-10,839	-9,011	-6,382	-2,610	3,469	59,856
	250	-15,923	-15,685	-15,110	-13,970	-12,202	-9,678	-6,132	-0,679	58,941
	275	-18,888	-18,670	-18,115	-17,003	-15,275	-12,821	-9,429	-4,412	58,113
	300	-21,771	-21,567	-21,026	-19,933	-18,232	-15,826	-12,542	-7,834	57,358
	325	-24,562	-24,368	-23,837	-22,758	-21,077	-18,705	-15,497	-11,013	56,662
	350	-27,260	-27,073	-26,549	-25,479	-23,813	-21,466	-18,314	-13,996	56,019
	375	-29,866	-29,684	-29,166	-28,103	-26,447	-24,120	-21,009	-16,816	55,419
	400	-32,387	-32,209	-31,695	-30,638	-28,989	-26,676	-23,597	-19,500	54,859
	425	-34,830	-34,656	-34,144	-33,092	-31,450	-29,147	-26,093	-22,070	54,332
	450	-37,206	-37,034	-36,525	-35,476	-33,839	-31,545	-28,510	-24,545	53,836
	475	-39,525	-39,355	-38,848	-37,801	-36,168	-33,881	-30,861	-26,943	53,366
	500	-41,798	-41,629	-41,123	-40,079	-38,449	-36,167	-33,160	-29,279	52,921
	525	-44,034	-43,866	-43,362	-42,319	-40,691	-38,414	-35,417	-31,566	52,497
	550	-46,243	-46,077	-45,574	-44,532	-42,906	-40,633	-37,644	-33,818	52,093
	575	-48,435	-48,269	-47,767	-46,727	-45,103	-42,832	-39,850	-36,045	51,707
	600	-50,617	-50,452	-49,951	-48,911	-47,289	-45,021	-42,044	-38,257	51,337
	625	-52,796	-52,631	-52,131	-51,092	-49,471	-47,205	-44,233	-40,460	50,982
	650	-54,976	-54,812	-54,312	-53,274	-51,654	-49,389	-46,422	-42,661	50,642
	675	-57,162	-56,998	-56,498	-55,461	-53,841	-51,579	-48,614	-44,864	50,314
	700	-59,354	-59,190	-58,691	-57,654	-56,035	-53,774	-50,812	-47,072	49,998
	725	-61,552	-61,389	-60,890	-59,854	-58,236	-55,975	-53,016	-49,284	49,693
	750	-63,756	-63,593	-63,094	-62,058	-60,440	-58,181	-55,224	-51,498	49,399
	775	-65,960	-65,797	-65,298	-64,263	-62,646	-60,387	-57,433	-53,712	49,114
	800	-68,159	-67,997	-67,498	-66,463	-64,846	-62,589	-59,636	-55,920	48,838
	825	-70,347	-70,184	-69,686	-68,651	-67,035	-64,778	-61,826	-58,115	48,571
	850	-72,513	-72,351	-71,853	-70,818	-69,202	-66,946	-63,995	-60,289	48,312
	875	-74,649	-74,487	-73,989	-72,954	-71,339	-69,083	-66,134	-62,431	48,060
	900	-76,744	-76,582	-76,084	-75,049	-73,434	-71,179	-68,230	-64,530	47,815
	925	-78,785	-78,624	-78,126	-77,092	-75,476	-73,221	-70,274	-66,577	47,577
	950	-80,763	-80,602	-80,104	-79,070	-77,455	-75,200	-72,254	-68,559	47,346
	975	-82,667	-82,505	-82,008	-80,973	-79,359	-77,104	-74,159	-70,466	47,120
	1000	-84,485	-84,324	-83,826	-82,792	-81,178	-78,924	-75,979	-72,288	46,900

2000 MHz – Zone 1 – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	94,233	96,509	98,662	101,148	103,509	105,319	106,328	106,732	106,900
	2	82,427	85,910	88,762	92,000	95,276	98,138	99,926	100,635	100,879
	3	74,501	79,135	82,671	86,423	90,219	93,718	96,089	97,054	97,358
	4	68,368	73,847	78,077	82,310	86,522	90,481	93,317	94,505	94,859
	5	63,440	69,412	74,253	79,006	83,569	87,906	91,132	92,522	92,921
	6	59,326	65,580	70,908	76,172	81,072	85,751	89,321	90,898	91,337
	7	55,804	62,216	67,909	73,643	78,912	83,880	87,767	89,521	89,998
	8	52,734	59,227	65,186	71,329	76,970	82,211	86,400	88,324	88,838
	9	50,019	56,544	62,696	69,181	75,181	80,707	85,173	87,266	87,815
	10	47,590	54,149	60,406	67,169	73,507	79,331	84,052	86,316	86,900
	11	45,398	51,989	58,291	65,277	71,922	78,043	83,015	85,452	86,072
	12	43,403	50,015	56,329	63,490	70,408	76,822	82,061	84,660	85,316
	13	41,577	48,200	54,502	61,800	68,956	75,653	81,165	83,927	84,621
	14	39,897	46,523	52,816	60,198	67,558	74,524	80,313	83,244	83,977
	15	38,345	44,967	51,276	58,677	66,210	73,429	79,497	82,608	83,378
	16	36,904	43,519	49,836	57,231	64,909	72,361	78,708	82,009	82,818
	17	35,564	42,166	48,484	55,853	63,652	71,316	77,942	81,442	82,291
	18	34,312	40,898	47,212	54,557	62,437	70,293	77,192	80,903	81,795
	19	33,142	39,706	46,011	53,367	61,260	69,289	76,455	80,387	81,325
	20	32,044	38,584	44,874	52,235	60,121	68,303	75,728	79,893	80,879
	25	27,448	33,810	39,972	47,266	55,121	63,628	72,179	77,642	78,941
	30	23,966	30,064	36,014	43,134	50,933	59,475	68,706	75,604	77,358
	35	21,259	27,018	32,683	39,544	47,191	55,784	65,291	73,633	76,019
	40	19,114	24,470	29,794	36,325	43,743	52,298	62,125	71,641	74,859
	45	17,385	22,298	27,238	33,389	40,514	48,952	59,021	69,571	73,836
	50	15,967	20,421	24,957	30,694	37,476	45,725	55,936	67,447	72,921
	55	14,787	18,784	22,916	28,226	34,630	42,624	52,874	65,223	72,093
	60	13,788	17,350	21,090	25,978	31,988	39,673	49,858	62,869	71,337
	65	12,927	16,087	19,461	23,944	29,558	36,896	46,919	60,403	70,642
	70	12,171	14,968	18,007	22,113	27,343	34,310	44,088	57,862	69,998
	75	11,495	13,969	16,708	20,471	25,337	31,926	41,391	55,285	69,399
	80	10,878	13,069	15,543	18,997	23,527	29,743	38,847	52,709	68,838
	85	10,305	12,251	14,493	17,673	21,895	27,753	36,467	50,169	68,312
	90	9,764	11,497	13,537	16,476	20,422	25,942	34,254	47,690	67,815
	95	9,245	10,796	12,661	15,389	19,087	24,294	32,204	45,293	67,346
	100	8,741	10,134	11,848	14,392	17,871	22,792	30,310	42,991	66,900
	110	7,755	8,897	10,367	12,611	15,726	20,153	26,943	38,707	66,072
	120	6,775	7,731	9,018	11,035	13,867	17,896	24,054	34,861	65,316
	130	5,784	6,599	7,748	9,591	12,205	15,917	21,542	31,431	64,621
	140	4,772	5,480	6,524	8,234	10,677	14,137	19,320	28,371	63,977
	150	3,738	4,362	5,323	6,930	9,240	12,499	17,319	25,629	63,378
	160	2,679	3,238	4,135	5,660	7,865	10,963	15,485	23,151	62,818
	170	1,599	2,104	2,950	4,410	6,532	9,500	13,778	20,890	62,291
	180	0,499	0,961	1,765	3,174	5,228	8,092	12,168	18,808	61,795
	190	-0,618	-0,191	0,580	1,946	3,946	6,724	10,634	16,872	61,325
	200	-1,747	-1,350	-0,607	0,726	2,680	5,388	9,160	15,056	60,879
	225	-4,605	-4,264	-3,571	-2,301	-0,427	2,152	5,669	10,915	59,856
	250	-7,477	-7,174	-6,513	-5,283	-3,462	-0,966	2,383	7,187	58,941
	275	-10,327	-10,049	-9,410	-8,207	-6,421	-3,982	-0,747	3,749	58,113
	300	-13,128	-12,868	-12,245	-11,060	-9,299	-6,899	-3,744	0,533	57,358
	325	-15,865	-15,617	-15,005	-13,834	-12,090	-9,718	-6,621	-2,503	56,662
	350	-18,529	-18,290	-17,686	-16,524	-14,793	-12,442	-9,387	-5,387	56,019
	375	-21,116	-20,884	-20,286	-19,131	-17,410	-15,074	-12,051	-8,140	55,419
	400	-23,629	-23,402	-22,808	-21,659	-19,945	-17,621	-14,622	-10,779	54,859
	425	-26,072	-25,848	-25,257	-24,113	-22,405	-20,090	-17,110	-13,321	54,332
	450	-28,451	-28,230	-27,642	-26,501	-24,797	-22,490	-19,525	-15,778	53,836
	475	-30,775	-30,557	-29,971	-28,832	-27,132	-24,830	-21,878	-18,164	53,366
	500	-33,054	-32,837	-32,253	-31,116	-29,419	-27,122	-24,179	-20,493	52,921
	525	-35,296	-35,081	-34,498	-33,364	-31,669	-29,375	-26,440	-22,776	52,497
	550	-37,513	-37,299	-36,718	-35,584	-33,891	-31,601	-28,673	-25,027	52,093
	575	-39,714	-39,501	-38,920	-37,788	-36,097	-33,809	-30,886	-27,256	51,707
	600	-41,907	-41,695	-41,115	-39,984	-38,294	-36,009	-33,090	-29,473	51,337
	625	-44,102	-43,891	-43,312	-42,181	-40,492	-38,209	-35,294	-31,688	50,982
	650	-46,305	-46,095	-45,516	-44,386	-42,698	-40,416	-37,505	-33,907	50,642
	675	-48,522	-48,312	-47,733	-46,604	-44,917	-42,636	-39,728	-36,138	50,314
	700	-50,755	-50,546	-49,968	-48,839	-47,153	-44,873	-41,967	-38,384	49,998
	725	-53,007	-52,798	-52,220	-51,092	-49,406	-47,128	-44,223	-40,647	49,693
	750	-55,275	-55,066	-54,489	-53,361	-51,676	-49,399	-46,496	-42,924	49,399
	775	-57,557	-57,348	-56,771	-55,644	-53,959	-51,682	-48,781	-45,214	49,114
	800	-59,844	-59,636	-59,059	-57,932	-56,248	-53,971	-51,072	-47,508	48,838
	825	-62,128	-61,920	-61,343	-60,217	-58,532	-56,257	-53,358	-49,799	48,571
	850	-64,396	-64,188	-63,612	-62,485	-60,802	-58,527	-55,629	-52,073	48,312
	875	-66,635	-66,427	-65,851	-64,725	-63,041	-60,766	-57,870	-54,316	48,060
	900	-68,828	-68,620	-68,044	-66,918	-65,235	-62,960	-60,065	-56,513	47,815
	925	-70,958	-70,750	-70,174	-69,048	-67,365	-65,091	-62,197	-58,647	47,577
	950	-73,008	-72,801	-72,225	-71,099	-69,417	-67,143	-64,249	-60,701	47,346
	975	-74,964	-74,756	-74,180	-73,055	-71,372	-69,099	-66,205	-62,660	47,120
	1000	-76,809	-76,602	-76,026	-74,901	-73,218	-70,945	-68,052	-64,508	46,900

2000 MHz – Zone 1 – 1%

Transmitting / base antenna height (m)	Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
	1	94,233	96,509	98,662	101,148	103,509	105,319	106,328	106,732	106,900
	2	82,711	86,063	88,943	92,187	95,445	98,251	99,972	100,647	100,879
	3	75,466	79,573	82,996	86,732	90,502	93,925	96,182	97,077	97,358
	4	70,027	74,676	78,565	82,726	86,888	90,763	93,451	94,539	94,859
	5	65,657	70,683	74,957	79,501	84,003	88,248	91,304	92,565	92,921
	6	62,006	67,294	71,875	76,760	81,573	86,141	89,526	90,949	91,337
	7	58,874	64,345	69,167	74,349	79,451	84,314	88,001	89,580	89,998
	8	56,136	61,735	66,743	72,180	77,547	82,686	86,660	88,391	88,838
	9	53,705	59,397	64,548	70,199	75,807	81,206	85,457	87,339	87,815
	10	51,522	57,280	62,541	68,369	74,194	79,839	84,359	86,395	86,900
	11	49,543	55,348	60,693	66,667	72,684	78,558	83,344	85,538	86,072
	12	47,736	53,573	58,982	65,075	71,260	77,348	82,394	84,751	85,316
	13	46,073	51,933	57,390	63,580	69,909	76,194	81,495	84,023	84,621
	14	44,536	50,409	55,903	62,170	68,623	75,088	80,638	83,345	83,977
	15	43,109	48,989	54,508	60,836	67,396	74,022	79,815	82,708	83,378
	16	41,777	47,658	53,196	59,572	66,220	72,993	79,018	82,107	82,818
	17	40,531	46,409	51,957	58,371	65,094	71,996	78,243	81,536	82,291
	18	39,362	45,232	50,786	57,227	64,011	71,028	77,487	80,991	81,795
	19	38,261	44,120	49,675	56,136	62,971	70,088	76,745	80,469	81,325
	20	37,223	43,068	48,619	55,093	61,969	69,173	76,017	79,966	80,879
	25	32,791	38,529	44,017	50,483	57,457	64,947	72,530	77,659	78,941
	30	29,313	34,900	40,271	46,649	53,606	61,212	69,260	75,604	77,358
	35	26,509	31,910	37,130	43,372	50,246	57,871	66,197	73,633	76,019
	40	24,203	29,394	34,437	40,508	47,258	54,843	63,329	71,641	74,859
	45	22,275	27,239	32,087	37,965	44,561	52,066	60,636	69,571	73,836
	50	20,641	25,367	30,009	35,677	42,098	49,494	58,096	67,447	72,921
	55	19,239	23,722	28,150	33,599	39,830	47,095	55,688	65,425	72,093
	60	18,021	22,260	26,473	31,696	37,727	44,844	53,398	63,427	71,337
	65	16,951	20,949	24,948	29,945	35,771	42,726	51,214	61,454	70,642
	70	16,000	19,764	23,554	28,327	33,944	40,727	49,126	59,511	69,998
	75	15,145	18,684	22,271	26,825	32,235	38,839	47,129	57,605	69,399
	80	14,368	17,692	21,086	25,427	30,632	37,054	45,218	55,738	68,838
	85	13,655	16,776	19,985	24,122	29,128	35,364	43,389	53,914	68,312
	90	12,994	15,924	18,957	22,901	27,713	33,764	41,639	52,135	67,815
	95	12,375	15,126	17,995	21,754	26,380	32,249	39,964	50,402	67,346
	100	11,791	14,375	17,089	20,675	25,123	30,812	38,362	48,717	66,900
	110	10,700	12,985	15,421	18,690	22,808	28,153	35,364	45,491	66,072
	120	9,683	11,711	13,906	16,898	20,722	25,747	32,617	42,457	65,316
	130	8,715	10,523	12,510	15,262	18,825	23,557	30,096	39,612	64,621
	140	7,777	9,397	11,205	13,748	17,082	21,550	27,774	36,945	63,977
	150	6,859	8,317	9,971	12,333	15,466	19,698	25,627	34,447	63,378
	160	5,951	7,270	8,792	10,997	13,955	17,974	23,632	32,104	62,818
	170	5,051	6,249	7,656	9,725	12,529	16,360	21,768	29,903	62,291
	180	4,153	5,247	6,554	8,505	11,173	14,837	20,017	27,831	61,795
	190	3,257	4,260	5,480	7,328	9,877	13,392	18,366	25,876	61,325
	200	2,362	3,284	4,428	6,186	8,631	12,013	16,800	24,025	60,879
	225	0,125	0,885	1,876	3,452	5,686	8,798	13,191	19,788	59,856
	250	-2,108	-1,470	-0,591	0,851	2,928	5,835	9,922	16,003	58,941
	275	-4,330	-3,785	-2,991	-1,650	0,309	3,058	6,905	12,567	58,113
	300	-6,534	-6,061	-5,332	-4,069	-2,202	0,425	4,084	9,403	57,358
	325	-8,715	-8,299	-7,621	-6,417	-4,622	-2,092	1,415	6,456	56,662
	350	-10,870	-10,499	-9,861	-8,705	-6,967	-4,514	-1,129	3,683	56,019
	375	-12,999	-12,663	-12,058	-10,941	-9,248	-6,858	-3,572	1,050	55,419
	400	-15,104	-14,797	-14,217	-13,131	-11,476	-9,137	-5,933	-1,470	54,859
	425	-17,187	-16,903	-16,345	-15,285	-13,661	-11,364	-8,229	-3,897	54,332
	450	-19,253	-18,989	-18,449	-17,410	-15,811	-13,549	-10,471	-6,252	53,836
	475	-21,307	-21,060	-20,534	-19,513	-17,936	-15,704	-12,675	-8,551	53,366
	500	-23,356	-23,122	-22,609	-21,603	-20,045	-17,838	-14,850	-10,807	52,921
	525	-25,405	-25,183	-24,680	-23,687	-22,144	-19,959	-17,006	-13,034	52,497
	550	-27,461	-27,248	-26,754	-25,772	-24,243	-22,077	-19,154	-15,243	52,093
	575	-29,527	-29,323	-28,837	-27,865	-26,347	-24,197	-21,301	-17,443	51,707
	600	-31,610	-31,413	-30,934	-29,970	-28,463	-26,327	-23,454	-19,642	51,337
	625	-33,714	-33,523	-33,050	-32,093	-30,595	-28,471	-25,618	-21,848	50,982
	650	-35,840	-35,654	-35,187	-34,237	-32,746	-30,633	-27,798	-24,064	50,642
	675	-37,990	-37,810	-37,347	-36,402	-34,919	-32,815	-29,996	-26,294	50,314
	700	-40,165	-39,989	-39,530	-38,591	-37,113	-35,018	-32,213	-28,540	49,998
	725	-42,363	-42,190	-41,735	-40,800	-39,328	-37,241	-34,449	-30,801	49,693
	750	-44,579	-44,410	-43,959	-43,027	-41,560	-39,480	-36,699	-33,074	49,399
	775	-46,810	-46,644	-46,195	-45,268	-43,805	-41,731	-38,960	-35,356	49,114
	800	-49,047	-48,884	-48,438	-47,514	-46,055	-43,986	-41,225	-37,639	48,838
	825	-51,283	-51,122	-50,679	-49,758	-48,302	-46,239	-43,485	-39,917	48,571
	850	-53,507	-53,349	-52,907	-51,989	-50,537	-48,478	-45,732	-42,179	48,312
	875	-55,708	-55,552	-55,113	-54,196	-52,748	-50,693	-47,954	-44,414	48,060
	900	-57,874	-57,720	-57,282	-56,368	-54,922	-52,871	-50,138	-46,612	47,815
	925	-59,992	-59,839	-59,403	-58,491	-57,048	-55,000	-52,273	-48,758	47,577
	950	-62,049	-61,898	-61,463	-60,553	-59,112	-57,067	-54,345	-50,841	47,346
	975	-64,033	-63,883	-63,450	-62,541	-61,102	-59,060	-56,343	-52,849	47,120
	1000	-65,931	-65,783	-65,351	-64,444	-63,007	-60,968	-58,255	-54,770	46,900

2000 MHz – Zone 2 – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	94,212	96,492	98,648	101,139	103,503	105,317	106,327	106,732	106,900
	2	82,385	85,876	88,730	91,951	95,231	98,109	99,914	100,632	100,879
	3	74,439	79,085	82,632	86,366	90,151	93,667	96,067	97,048	97,358
	4	68,287	73,782	78,026	82,269	86,448	90,416	93,285	94,497	94,859
	5	63,284	69,331	74,189	78,958	83,504	87,834	91,092	92,512	92,921
	6	59,089	65,484	70,831	76,115	81,030	85,680	89,276	90,885	91,337
	7	55,489	62,104	67,819	73,577	78,867	83,820	87,720	89,507	89,998
	8	52,342	59,099	65,084	71,253	76,918	82,170	86,354	88,310	88,838
	9	49,550	56,401	62,580	69,095	75,123	80,674	85,132	87,251	87,815
	10	47,043	53,957	60,278	67,074	73,442	79,294	84,021	86,301	86,900
	11	44,771	51,727	58,150	65,170	71,849	78,002	82,997	85,438	86,072
	12	42,695	49,678	56,175	63,373	70,328	76,776	82,044	84,648	85,316
	13	40,786	47,785	54,334	61,673	68,868	75,602	81,146	83,918	84,621
	14	39,020	46,026	52,613	60,060	67,463	74,469	80,292	83,239	83,977
	15	37,378	44,385	50,997	58,529	66,107	73,369	79,474	82,603	83,378
	16	35,846	42,848	49,476	57,072	64,798	72,295	78,683	82,004	82,818
	17	34,411	41,404	48,039	55,683	63,532	71,246	77,914	81,437	82,291
	18	33,064	40,041	46,677	54,356	62,308	70,216	77,162	80,897	81,795
	19	31,794	38,753	45,384	53,087	61,124	69,207	76,422	80,381	81,325
	20	30,595	37,531	44,152	51,871	59,976	68,215	75,692	79,886	80,879
	25	25,472	32,232	38,738	46,431	54,717	63,507	72,126	77,632	78,941
	30	21,444	27,932	34,231	41,777	50,073	59,162	68,632	75,588	77,358
	35	18,197	24,325	30,336	37,640	45,841	55,087	65,191	73,610	76,019
	40	15,532	21,228	26,881	33,867	41,886	51,195	61,793	71,609	74,859
	45	13,313	18,527	23,774	30,376	38,141	47,429	58,420	69,526	73,836
	50	11,441	16,150	20,963	27,137	34,583	43,769	55,058	67,327	72,921
	55	9,844	14,051	18,421	24,143	31,220	40,221	51,707	64,995	72,093
	60	8,465	12,192	16,132	21,398	28,069	36,810	48,381	62,533	71,337
	65	7,260	10,542	14,078	18,900	25,150	33,564	45,105	59,956	70,642
	70	6,192	9,074	12,240	16,642	22,470	30,510	41,907	57,290	69,998
	75	5,234	7,762	10,595	14,611	20,029	27,665	38,818	54,564	69,399
	80	4,362	6,581	9,120	12,788	17,819	25,038	35,863	51,808	68,838
	85	3,559	5,510	7,792	11,148	15,821	22,625	33,062	49,050	68,312
	90	2,809	4,529	6,589	9,670	14,016	20,419	30,425	46,317	67,815
	95	2,099	3,623	5,489	8,330	12,381	18,405	27,959	43,631	67,346
	100	1,422	2,776	4,476	7,106	10,895	16,566	25,660	41,012	66,900
	110	0,132	1,217	2,651	4,939	8,288	13,339	21,543	36,031	66,072
	120	-1,107	-0,220	1,016	3,045	6,053	10,595	17,993	31,453	65,316
	130	-2,320	-1,581	-0,495	1,338	4,081	8,215	14,913	27,300	64,621
	140	-3,526	-2,899	-1,925	-0,242	2,295	6,102	12,209	23,560	63,977
	150	-4,732	-4,191	-3,304	-1,737	0,639	4,185	9,801	20,196	63,378
	160	-5,944	-5,469	-4,649	-3,173	-0,923	2,414	7,623	17,163	62,818
	170	-7,161	-6,738	-5,972	-4,567	-2,418	0,751	5,624	14,413	62,291
	180	-8,385	-8,003	-7,279	-5,931	-3,863	-0,830	3,767	11,903	61,795
	190	-9,612	-9,264	-8,574	-7,271	-5,268	-2,347	2,020	9,594	61,325
	200	-10,842	-10,521	-9,858	-8,593	-6,643	-3,812	0,364	7,455	60,879
	225	-13,908	-13,636	-13,022	-11,824	-9,970	-7,304	-3,480	2,683	59,856
	250	-16,937	-16,695	-16,113	-14,957	-13,165	-10,607	-7,014	-1,487	58,941
	275	-19,900	-19,679	-19,117	-17,990	-16,240	-13,753	-10,317	-5,233	58,113
	300	-22,780	-22,574	-22,026	-20,919	-19,197	-16,760	-13,433	-8,666	57,358
	325	-25,569	-25,372	-24,835	-23,742	-22,040	-19,639	-16,391	-11,852	56,662
	350	-28,263	-28,073	-27,544	-26,461	-24,774	-22,399	-19,209	-14,839	56,019
	375	-30,865	-30,681	-30,157	-29,082	-27,406	-25,051	-21,904	-17,662	55,419
	400	-33,382	-33,202	-32,682	-31,613	-29,946	-27,606	-24,492	-20,348	54,859
	425	-35,821	-35,645	-35,128	-34,063	-32,403	-30,075	-26,987	-22,919	54,332
	450	-38,193	-38,019	-37,505	-36,444	-34,789	-32,470	-29,402	-25,395	53,836
	475	-40,508	-40,336	-39,824	-38,766	-37,115	-34,804	-31,752	-27,792	53,366
	500	-42,777	-42,606	-42,095	-41,040	-39,393	-37,088	-34,049	-30,128	52,921
	525	-45,009	-44,839	-44,330	-43,277	-41,632	-39,332	-36,305	-32,415	52,497
	550	-47,214	-47,046	-46,538	-45,486	-43,844	-41,548	-38,530	-34,667	52,093
	575	-49,402	-49,235	-48,728	-47,677	-46,038	-43,745	-40,734	-36,893	51,707
	600	-51,580	-51,413	-50,907	-49,858	-48,220	-45,931	-42,926	-39,103	51,337
	625	-53,755	-53,589	-53,083	-52,035	-50,399	-48,112	-45,112	-41,305	50,982
	650	-55,931	-55,765	-55,261	-54,213	-52,578	-50,294	-47,299	-43,505	50,642
	675	-58,112	-57,947	-57,443	-56,396	-54,763	-52,480	-49,489	-45,706	50,314
	700	-60,300	-60,136	-59,632	-58,586	-56,953	-54,672	-51,685	-47,912	49,998
	725	-62,495	-62,331	-61,827	-60,782	-59,150	-56,871	-53,887	-50,122	49,693
	750	-64,695	-64,530	-64,027	-62,983	-61,352	-59,074	-56,093	-52,336	49,399
	775	-66,895	-66,731	-66,228	-65,184	-63,554	-61,277	-58,298	-54,548	49,114
	800	-69,090	-68,927	-68,424	-67,380	-65,751	-63,476	-60,499	-56,754	48,838
	825	-71,274	-71,110	-70,608	-69,565	-67,936	-65,662	-62,687	-58,947	48,571
	850	-73,437	-73,273	-72,771	-71,728	-70,100	-67,827	-64,854	-61,119	48,312
	875	-75,569	-75,405	-74,904	-73,861	-72,234	-69,961	-66,990	-63,259	48,060
	900	-77,659	-77,496	-76,995	-75,953	-74,325	-72,053	-69,084	-65,356	47,815
	925	-79,697	-79,535	-79,033	-77,991	-76,365	-74,093	-71,125	-67,401	47,577
	950	-81,672	-81,509	-81,008	-79,966	-78,340	-76,069	-73,102	-69,381	47,346
	975	-83,571	-83,408	-82,907	-81,866	-80,240	-77,970	-75,004	-71,286	47,120
	1000	-85,386	-85,223	-84,723	-83,681	-82,056	-79,786	-76,821	-73,105	46,900

2000 MHz – Zone 2 – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	94,183	96,468	98,629	101,125	103,496	105,313	106,326	106,731	106,900
	2	82,327	85,829	88,696	91,952	95,246	98,123	99,921	100,634	100,879
	3	74,352	79,016	82,576	86,352	90,172	93,694	96,081	97,052	97,358
	4	68,172	73,692	77,953	82,217	86,460	90,448	93,305	94,502	94,859
	5	63,197	69,218	74,099	78,892	83,492	87,865	91,117	92,519	92,921
	6	59,037	65,348	70,724	76,036	80,980	85,700	89,303	90,894	91,337
	7	55,471	61,945	67,693	73,483	78,804	83,820	87,746	89,516	89,998
	8	52,357	58,918	64,939	71,146	76,846	82,142	86,375	88,319	88,838
	9	49,599	56,197	62,417	68,974	75,041	80,628	85,143	87,260	87,815
	10	47,129	53,764	60,095	66,938	73,350	79,242	84,019	86,309	86,900
	11	44,895	51,568	57,948	65,019	71,747	77,943	82,977	85,445	86,072
	12	42,860	49,557	55,954	63,207	70,215	76,712	82,019	84,652	85,316
	13	40,994	47,706	54,094	61,491	68,744	75,531	81,118	83,918	84,621
	14	39,276	45,995	52,376	59,863	67,327	74,391	80,262	83,234	83,977
	15	37,685	44,405	50,806	58,315	65,959	73,283	79,440	82,596	83,378
	16	36,207	42,922	49,335	56,842	64,637	72,202	78,646	81,997	82,818
	17	34,830	41,536	47,953	55,438	63,360	71,144	77,873	81,429	82,291
	18	33,543	40,235	46,651	54,115	62,123	70,106	77,117	80,888	81,795
	19	32,338	39,011	45,421	52,901	60,925	69,088	76,374	80,372	81,325
	20	31,206	37,857	44,256	51,743	59,765	68,087	75,640	79,876	80,879
	25	26,448	32,933	39,215	46,651	54,658	63,330	72,048	77,617	78,941
	30	22,820	29,049	35,127	42,399	50,366	59,091	68,521	75,566	77,358
	35	19,982	25,875	31,673	38,693	46,518	55,312	65,040	73,577	76,019
	40	17,718	23,208	28,665	35,360	42,964	51,733	61,806	71,560	74,859
	45	15,882	20,926	25,998	32,312	39,626	48,290	58,627	69,457	73,836
	50	14,368	18,946	23,610	29,508	36,480	44,961	55,459	67,293	72,921
	55	13,100	17,215	21,468	26,935	33,527	41,757	52,309	65,021	72,093
	60	12,023	15,694	19,549	24,586	30,781	38,701	49,199	62,609	71,337
	65	11,091	14,351	17,832	22,458	28,251	35,822	46,164	60,077	70,642
	70	10,271	13,159	16,298	20,540	25,941	33,138	43,237	57,463	69,998
	75	9,537	12,094	14,926	18,816	23,847	30,659	40,444	54,807	69,399
	80	8,868	11,135	13,695	17,269	21,956	28,387	37,807	52,150	68,838
	85	8,249	10,263	12,585	15,878	20,249	26,315	35,338	49,526	68,312
	90	7,665	9,462	11,575	14,621	18,708	24,428	33,041	46,963	67,815
	95	7,109	8,716	10,650	13,478	17,312	22,711	30,912	44,482	67,346
	100	6,570	8,016	9,794	12,433	16,041	21,146	28,944	42,099	66,900
	110	5,527	6,713	8,239	10,569	13,802	18,399	25,448	37,661	66,072
	120	4,500	5,493	6,831	8,926	11,868	16,054	22,451	33,677	65,316
	130	3,472	4,319	5,513	7,429	10,146	14,003	19,849	30,126	64,621
	140	2,431	3,167	4,251	6,029	8,569	12,166	17,554	26,963	63,977
	150	1,373	2,022	3,021	4,691	7,094	10,482	15,493	24,132	63,378
	160	0,296	0,876	1,809	3,394	5,687	8,908	13,609	21,578	62,818
	170	-0,799	-0,274	0,605	2,123	4,329	7,415	11,861	19,255	62,291
	180	-1,910	-1,430	-0,594	0,870	3,005	5,981	10,218	17,119	61,795
	190	-3,035	-2,591	-1,791	-0,371	1,707	4,593	8,656	15,138	61,325
	200	-4,170	-3,758	-2,986	-1,602	0,428	3,240	7,159	13,283	60,879
	225	-7,036	-6,682	-5,963	-4,645	-2,701	-0,024	3,626	9,070	59,856
	250	-9,909	-9,594	-8,909	-7,634	-5,746	-3,159	0,312	5,292	58,941
	275	-12,755	-12,467	-11,806	-10,560	-8,711	-6,185	-2,835	1,821	58,113
	300	-15,550	-15,281	-14,636	-13,411	-11,589	-9,106	-5,843	-1,419	57,358
	325	-18,279	-18,023	-17,390	-16,180	-14,378	-11,927	-8,727	-4,472	56,662
	350	-20,934	-20,688	-20,064	-18,864	-17,078	-14,651	-11,497	-7,368	56,019
	375	-23,512	-23,273	-22,656	-21,465	-19,690	-17,281	-14,164	-10,130	55,419
	400	-26,016	-25,782	-25,169	-23,985	-22,219	-19,825	-16,735	-12,775	54,859
	425	-28,449	-28,219	-27,610	-26,432	-24,673	-22,290	-19,222	-15,321	54,332
	450	-30,818	-30,591	-29,986	-28,812	-27,059	-24,685	-21,636	-17,780	53,836
	475	-33,133	-32,908	-32,306	-31,135	-29,387	-27,021	-23,986	-20,168	53,366
	500	-35,401	-35,179	-34,579	-33,411	-31,668	-29,308	-26,285	-22,498	52,921
	525	-37,634	-37,414	-36,815	-35,650	-33,910	-31,556	-28,543	-24,781	52,497
	550	-39,842	-39,622	-39,025	-37,863	-36,126	-33,776	-30,771	-27,031	52,093
	575	-42,033	-41,814	-41,219	-40,058	-38,324	-35,978	-32,981	-29,258	51,707
	600	-44,217	-43,999	-43,405	-42,246	-40,514	-38,172	-35,181	-31,474	51,337
	625	-46,402	-46,185	-45,592	-44,434	-42,705	-40,366	-37,381	-33,687	50,982
	650	-48,595	-48,380	-47,787	-46,631	-44,903	-42,567	-39,587	-35,905	50,642
	675	-50,802	-50,587	-49,995	-48,841	-47,114	-44,781	-41,805	-38,133	50,314
	700	-53,026	-52,812	-52,221	-51,067	-49,343	-47,012	-44,040	-40,376	49,998
	725	-55,269	-55,054	-54,464	-53,311	-51,588	-49,260	-46,292	-42,636	49,693
	750	-57,528	-57,314	-56,724	-55,572	-53,851	-51,524	-48,559	-44,911	49,399
	775	-59,800	-59,586	-58,997	-57,846	-56,126	-53,801	-50,839	-47,197	49,114
	800	-62,078	-61,865	-61,276	-60,126	-58,407	-56,084	-53,125	-49,488	48,838
	825	-64,352	-64,140	-63,552	-62,402	-60,684	-58,363	-55,406	-51,775	48,571
	850	-66,611	-66,399	-65,811	-64,663	-62,946	-60,626	-57,672	-54,045	48,312
	875	-68,841	-68,629	-68,041	-66,893	-65,178	-62,859	-59,907	-56,285	48,060
	900	-71,024	-70,812	-70,225	-69,078	-67,363	-65,046	-62,096	-58,478	47,815
	925	-73,145	-72,934	-72,347	-71,200	-69,486	-67,170	-64,222	-60,607	47,577
	950	-75,187	-74,975	-74,389	-73,243	-71,530	-69,215	-66,269	-62,657	47,346
	975	-77,133	-76,922	-76,336	-75,190	-73,478	-71,164	-68,219	-64,610	47,120
	1000	-78,970	-78,758	-78,173	-77,028	-75,316	-73,003	-70,060	-66,454	46,900

2000 MHz – Zone 2 – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	94,073	96,378	98,557	101,075	103,466	105,299	106,321	106,730	106,900
	2	82,393	85,804	88,734	92,035	95,350	98,205	99,957	100,643	100,879
	3	74,994	79,190	82,686	86,503	90,355	93,851	96,156	97,071	97,358
	4	69,404	74,170	78,157	82,422	86,688	90,660	93,415	94,531	94,859
	5	64,886	70,055	74,450	79,121	83,751	88,116	91,258	92,555	92,921
	6	61,090	66,543	71,268	76,305	81,269	85,979	89,469	90,937	91,337
	7	57,817	63,473	68,459	73,818	79,093	84,121	87,933	89,566	89,998
	8	54,939	60,743	65,935	71,571	77,134	82,461	86,581	88,375	88,838
	9	52,372	58,286	63,638	69,510	75,338	80,948	85,365	87,321	87,815
	10	50,056	56,052	61,531	67,601	73,668	79,546	84,254	86,374	86,900
	11	47,946	54,004	59,583	65,819	72,099	78,230	83,225	85,514	86,072
	12	46,010	52,115	57,773	64,146	70,614	76,982	82,260	84,725	85,316
	13	44,222	50,363	56,082	62,569	69,203	75,789	81,345	83,994	84,621
	14	42,562	48,729	54,497	61,078	67,855	74,643	80,471	83,313	83,977
	15	41,014	47,199	53,006	59,663	66,564	73,536	79,629	82,673	83,378
	16	39,564	45,762	51,598	58,318	65,325	72,463	78,813	82,068	82,818
	17	38,202	44,408	50,265	57,036	64,134	71,421	78,017	81,494	82,291
	18	36,919	43,127	49,000	55,812	62,988	70,408	77,239	80,945	81,795
	19	35,707	41,914	47,797	54,642	61,882	69,421	76,474	80,418	81,325
	20	34,560	40,761	46,651	53,520	60,815	68,459	75,720	79,911	80,879
	25	29,616	35,749	41,614	48,525	55,979	63,984	72,089	77,571	78,941
	30	25,675	31,684	37,463	44,324	51,807	59,989	68,647	75,471	77,358
	35	22,453	28,297	33,944	40,697	48,134	56,384	65,393	73,437	76,019
	40	19,770	25,415	30,899	37,502	44,843	53,091	62,320	71,359	74,859
	45	17,502	22,925	28,222	34,644	41,851	50,050	59,414	69,176	73,836
	50	15,561	20,746	25,839	32,058	39,103	47,218	56,655	66,915	72,921
	55	13,882	18,819	23,696	29,697	36,560	44,561	54,026	64,749	72,093
	60	12,414	17,099	21,755	27,528	34,193	42,058	51,512	62,595	71,337
	65	11,119	15,551	19,985	25,525	31,983	39,694	49,104	60,456	70,642
	70	9,965	14,149	18,363	23,670	29,915	37,456	46,794	58,339	69,998
	75	8,927	12,872	16,870	21,946	27,976	35,337	44,577	56,253	69,399
	80	7,986	11,700	15,491	20,341	26,156	33,329	42,451	54,203	68,838
	85	7,125	10,619	14,210	18,843	24,446	31,427	40,411	52,194	68,312
	90	6,331	9,616	13,019	17,442	22,838	29,625	38,457	50,229	67,815
	95	5,592	8,682	11,905	16,128	21,325	27,917	36,585	48,311	67,346
	100	4,899	7,806	10,860	14,894	19,899	26,299	34,794	46,443	66,900
	110	3,625	6,202	8,949	12,636	17,280	23,308	31,440	42,861	66,072
	120	2,461	4,752	7,232	10,612	14,933	20,610	28,372	39,489	65,316
	130	1,374	3,419	5,667	8,780	12,811	18,165	25,563	36,328	64,621
	140	0,342	2,176	4,223	7,102	10,878	15,937	22,985	33,369	63,977
	150	-0,652	1,000	2,875	5,550	9,100	13,893	20,611	30,603	63,378
	160	-1,618	-0,123	1,601	4,100	7,451	12,006	18,416	28,016	62,818
	170	-2,564	-1,206	0,388	2,733	5,909	10,250	16,377	25,595	62,291
	180	-3,496	-2,257	-0,777	1,433	4,455	8,606	14,473	23,324	61,795
	190	-4,418	-3,283	-1,902	0,190	3,076	7,056	12,687	21,190	61,325
	200	-5,333	-4,289	-2,995	-1,006	1,760	5,588	11,004	19,178	60,879
	225	-7,594	-6,736	-5,616	-3,837	-1,314	2,200	7,161	14,610	59,856
	250	-9,829	-9,110	-8,120	-6,496	-4,156	-0,882	3,723	10,573	58,941
	275	-12,039	-11,427	-10,535	-9,029	-6,828	-3,739	0,583	6,944	58,113
	300	-14,224	-13,694	-12,877	-11,462	-9,370	-6,427	-2,328	3,632	57,358
	325	-16,380	-15,915	-15,158	-13,813	-11,807	-8,980	-5,062	0,570	56,662
	350	-18,508	-18,094	-17,383	-16,096	-14,159	-11,426	-7,654	-2,293	56,019
	375	-20,608	-20,235	-19,562	-18,320	-16,440	-13,783	-10,133	-4,997	55,419
	400	-22,682	-22,342	-21,700	-20,496	-18,662	-16,069	-12,519	-7,571	54,859
	425	-24,735	-24,422	-23,805	-22,632	-20,837	-18,297	-14,831	-10,043	54,332
	450	-26,770	-26,479	-25,883	-24,737	-22,975	-20,480	-17,086	-12,432	53,836
	475	-28,794	-28,522	-27,943	-26,820	-25,085	-22,629	-19,296	-14,758	53,366
	500	-30,812	-30,555	-29,992	-28,887	-27,177	-24,754	-21,474	-17,036	52,921
	525	-32,830	-32,586	-32,036	-30,948	-29,258	-26,865	-23,631	-19,280	52,497
	550	-34,855	-34,622	-34,083	-33,009	-31,338	-28,970	-25,776	-21,502	52,093
	575	-36,891	-36,668	-36,138	-35,078	-33,422	-31,077	-27,919	-23,711	51,707
	600	-38,943	-38,728	-38,207	-37,158	-35,518	-33,192	-30,066	-25,917	51,337
	625	-41,016	-40,808	-40,295	-39,256	-37,628	-35,321	-32,223	-28,127	50,982
	650	-43,112	-42,911	-42,404	-41,374	-39,758	-37,467	-34,394	-30,346	50,642
	675	-45,232	-45,037	-44,536	-43,514	-41,908	-39,633	-36,582	-32,577	50,314
	700	-47,377	-47,186	-46,691	-45,676	-44,081	-41,818	-38,789	-34,822	49,998
	725	-49,544	-49,358	-48,868	-47,860	-46,273	-44,023	-41,013	-37,080	49,693
	750	-51,731	-51,549	-51,063	-50,061	-48,482	-46,244	-43,251	-39,350	49,399
	775	-53,932	-53,753	-53,271	-52,275	-50,704	-48,476	-45,499	-41,627	49,114
	800	-56,140	-55,965	-55,486	-54,495	-52,931	-50,712	-47,750	-43,905	48,838
	825	-58,346	-58,174	-57,699	-56,713	-55,154	-52,945	-49,997	-46,176	48,571
	850	-60,541	-60,371	-59,900	-58,918	-57,365	-55,164	-52,228	-48,430	48,312
	875	-62,713	-62,546	-62,077	-61,099	-59,552	-57,358	-54,434	-50,656	48,060
	900	-64,849	-64,685	-64,218	-63,244	-61,702	-59,516	-56,603	-52,843	47,815
	925	-66,938	-66,776	-66,311	-65,341	-63,804	-61,624	-58,721	-54,979	47,577
	950	-68,966	-68,805	-68,343	-67,376	-65,843	-63,669	-60,775	-57,050	47,346
	975	-70,921	-70,762	-70,302	-69,337	-67,809	-65,641	-62,755	-59,045	47,120
	1000	-72,791	-72,634	-72,176	-71,214	-69,689	-67,526	-64,649	-60,952	46,900

2000 MHz – Zone 3 – 50%

Transmitting / base antenna height (m)	Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
	1	94,228	96,505	98,658	101,146	103,508	105,319	106,328	106,732	106,900
	2	82,417	85,902	88,751	91,966	95,241	98,114	99,916	100,632	100,879
	3	74,486	79,122	82,662	86,388	90,166	93,675	96,069	97,049	97,358
	4	68,348	73,831	78,065	82,298	86,468	90,426	93,288	94,498	94,859
	5	63,360	69,392	74,237	78,994	83,528	87,847	91,097	92,513	92,921
	6	59,180	65,556	70,889	76,158	81,059	85,696	89,282	90,887	91,337
	7	55,593	62,188	67,886	73,626	78,900	83,838	87,727	89,508	89,998
	8	52,460	59,195	65,161	71,310	76,957	82,191	86,362	88,311	88,838
	9	49,681	56,509	62,667	69,160	75,167	80,699	85,141	87,253	87,815
	10	47,188	54,077	60,374	67,146	73,491	79,322	84,031	86,303	86,900
	11	44,929	51,858	58,256	65,250	71,904	78,033	83,009	85,441	86,072
	12	42,866	49,820	56,291	63,461	70,388	76,810	82,057	84,651	85,316
	13	40,969	47,938	54,460	61,768	68,934	75,640	81,160	83,921	84,621
	14	39,215	46,191	52,749	60,164	67,535	74,511	80,308	83,242	83,977
	15	37,585	44,561	51,143	58,640	66,185	73,414	79,491	82,607	83,378
	16	36,065	43,034	49,631	57,191	64,882	72,344	78,702	82,008	82,818
	17	34,641	41,600	48,203	55,810	63,622	71,299	77,935	81,441	82,291
	18	33,305	40,248	46,851	54,492	62,405	70,274	77,184	80,901	81,795
	19	32,046	38,969	45,567	53,231	61,226	69,268	76,447	80,386	81,325
	20	30,858	37,758	44,344	52,022	60,085	68,281	75,720	79,891	80,879
	25	25,785	32,506	38,973	46,621	54,859	63,598	72,166	77,640	78,941
	30	21,803	28,250	34,508	42,005	50,249	59,279	68,688	75,600	77,358
	35	18,597	24,683	30,652	37,906	46,050	55,232	65,266	73,627	76,019
	40	15,969	21,623	27,235	34,169	42,130	51,369	61,889	71,633	74,859
	45	13,784	18,957	24,164	30,714	38,419	47,635	58,540	69,560	73,836
	50	11,943	16,613	21,386	27,510	34,896	44,007	55,204	67,373	72,921
	55	10,373	14,544	18,877	24,551	31,567	40,492	51,880	65,056	72,093
	60	9,019	12,712	16,618	21,837	28,450	37,114	48,583	62,611	71,337
	65	7,835	11,088	14,592	19,370	25,563	33,901	45,337	60,053	70,642
	70	6,788	9,643	12,779	17,140	22,914	30,879	42,169	57,409	69,998
	75	5,848	8,351	11,158	15,135	20,502	28,065	39,111	54,706	69,399
	80	4,992	7,189	9,704	13,335	18,317	25,466	36,186	51,974	68,838
	85	4,203	6,135	8,395	11,717	16,343	23,080	33,413	49,242	68,312
	90	3,466	5,170	7,208	10,258	14,560	20,899	30,804	46,534	67,815
	95	2,769	4,277	6,124	8,935	12,945	18,908	28,363	43,874	67,346
	100	2,102	3,442	5,125	7,728	11,477	17,089	26,089	41,281	66,900
	110	0,830	1,904	3,323	5,586	8,900	13,897	22,014	36,349	66,072
	120	-0,394	0,484	1,706	3,713	6,689	11,183	18,501	31,816	65,316
	130	-1,596	-0,865	0,210	2,023	4,736	8,825	15,451	27,704	64,621
	140	-2,792	-2,172	-1,209	0,456	2,966	6,731	12,772	24,000	63,977
	150	-3,991	-3,455	-2,578	-1,028	1,322	4,830	10,384	20,666	63,378
	160	-5,196	-4,727	-3,916	-2,455	-0,230	3,070	8,223	17,659	62,818
	170	-6,409	-5,991	-5,233	-3,843	-1,718	1,417	6,238	14,931	62,291
	180	-7,629	-7,252	-6,536	-5,202	-3,156	-0,156	4,391	12,439	61,795
	190	-8,854	-8,510	-7,827	-6,539	-4,557	-1,666	2,654	10,147	61,325
	200	-10,082	-9,765	-9,108	-7,857	-5,928	-3,127	1,005	8,021	60,879
	225	-13,146	-12,877	-12,269	-11,083	-9,249	-6,611	-2,826	3,274	59,856
	250	-16,174	-15,936	-15,359	-14,215	-12,441	-9,908	-6,351	-0,880	58,941
	275	-19,139	-18,920	-18,364	-17,248	-15,514	-13,052	-9,649	-4,616	58,113
	300	-22,021	-21,817	-21,274	-20,178	-18,472	-16,058	-12,763	-8,040	57,358
	325	-24,812	-24,617	-24,085	-23,002	-21,316	-18,937	-15,719	-11,222	56,662
	350	-27,509	-27,321	-26,796	-25,723	-24,051	-21,698	-18,536	-14,205	56,019
	375	-30,114	-29,932	-29,412	-28,346	-26,685	-24,351	-21,231	-17,026	55,419
	400	-32,634	-32,455	-31,940	-30,880	-29,227	-26,907	-23,819	-19,710	54,859
	425	-35,076	-34,901	-34,388	-33,333	-31,686	-29,377	-26,315	-22,280	54,332
	450	-37,451	-37,278	-36,768	-35,716	-34,074	-31,774	-28,731	-24,756	53,836
	475	-39,769	-39,598	-39,090	-38,040	-36,403	-34,110	-31,082	-27,153	53,366
	500	-42,041	-41,871	-41,365	-40,317	-38,683	-36,395	-33,380	-29,489	52,921
	525	-44,276	-44,108	-43,602	-42,557	-40,925	-38,642	-35,637	-31,777	52,497
	550	-46,484	-46,317	-45,813	-44,769	-43,139	-40,860	-37,864	-34,029	52,093
	575	-48,675	-48,509	-48,006	-46,963	-45,335	-43,059	-40,069	-36,256	51,707
	600	-50,856	-50,691	-50,188	-49,146	-47,520	-45,247	-42,263	-38,467	51,337
	625	-53,034	-52,869	-52,367	-51,326	-49,701	-47,430	-44,451	-40,670	50,982
	650	-55,213	-55,049	-54,547	-53,507	-51,883	-49,614	-46,639	-42,871	50,642
	675	-57,398	-57,233	-56,732	-55,693	-54,070	-51,802	-48,831	-45,073	50,314
	700	-59,589	-59,425	-58,924	-57,885	-56,263	-53,997	-51,029	-47,280	49,998
	725	-61,786	-61,623	-61,123	-60,084	-58,462	-56,198	-53,232	-49,492	49,693
	750	-63,989	-63,825	-63,325	-62,287	-60,666	-58,403	-55,440	-51,706	49,399
	775	-66,192	-66,029	-65,529	-64,491	-62,871	-60,608	-57,647	-53,920	49,114
	800	-68,390	-68,227	-67,728	-66,690	-65,071	-62,809	-59,850	-56,127	48,838
	825	-70,577	-70,414	-69,915	-68,878	-67,258	-64,997	-62,040	-58,322	48,571
	850	-72,742	-72,580	-72,081	-71,044	-69,425	-67,164	-64,208	-60,495	48,312
	875	-74,877	-74,715	-74,216	-73,179	-71,561	-69,301	-66,346	-62,636	48,060
	900	-76,971	-76,809	-76,310	-75,273	-73,655	-71,396	-68,442	-64,735	47,815
	925	-79,012	-78,850	-78,351	-77,315	-75,697	-73,438	-70,485	-66,781	47,577
	950	-80,989	-80,827	-80,328	-79,292	-77,674	-75,416	-72,464	-68,763	47,346
	975	-82,891	-82,729	-82,231	-81,195	-79,577	-77,319	-74,368	-70,669	47,120
	1000	-84,709	-84,547	-84,049	-83,013	-81,396	-79,138	-76,188	-72,491	46,900

2000 MHz – Zone 3 – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	94,215	96,494	98,649	101,140	103,504	105,317	106,327	106,732	106,900
	2	82,390	85,880	88,737	91,982	95,265	98,133	99,924	100,634	100,879
	3	74,446	79,090	82,636	86,397	90,202	93,709	96,086	97,053	97,358
	4	68,295	73,789	78,031	82,275	86,499	90,469	93,312	94,504	94,859
	5	63,349	69,340	74,196	78,963	83,540	87,890	91,127	92,521	92,921
	6	59,218	65,494	70,839	76,121	81,038	85,732	89,314	90,896	91,337
	7	55,680	62,115	67,828	73,583	78,871	83,858	87,759	89,519	89,998
	8	52,594	59,111	65,094	71,261	76,923	82,185	86,391	88,322	88,838
	9	49,863	56,415	62,592	69,104	75,129	80,677	85,162	87,264	87,815
	10	47,418	54,005	60,290	67,083	73,448	79,298	84,040	86,313	86,900
	11	45,210	51,832	58,163	65,181	71,856	78,006	83,001	85,449	86,072
	12	43,200	49,844	56,189	63,384	70,336	76,781	82,045	84,657	85,316
	13	41,360	48,016	54,350	61,684	68,877	75,607	81,148	83,924	84,621
	14	39,665	46,326	52,652	60,073	67,472	74,474	80,294	83,240	83,977
	15	38,099	44,757	51,101	58,542	66,117	73,374	79,476	82,604	83,378
	16	36,644	43,296	49,649	57,086	64,808	72,301	78,685	82,004	82,818
	17	35,290	41,931	48,286	55,698	63,543	71,252	77,916	81,437	82,291
	18	34,026	40,650	47,003	54,392	62,320	70,223	77,164	80,898	81,795
	19	32,842	39,447	45,791	53,193	61,135	69,214	76,425	80,382	81,325
	20	31,731	38,313	44,644	52,052	59,988	68,222	75,695	79,886	80,879
	25	27,075	33,483	39,690	47,037	54,948	63,517	72,130	77,633	78,941
	30	23,538	29,686	35,683	42,860	50,721	59,332	68,637	75,590	77,358
	35	20,783	26,591	32,306	39,226	46,940	55,607	65,197	73,612	76,019
	40	18,593	24,000	29,373	35,965	43,452	52,088	62,006	71,611	74,859
	45	16,824	21,786	26,776	32,987	40,183	48,705	58,874	69,528	73,836
	50	15,371	19,870	24,455	30,252	37,104	45,440	55,758	67,390	72,921
	55	14,158	18,199	22,376	27,744	34,219	42,300	52,663	65,148	72,093
	60	13,129	16,732	20,515	25,459	31,538	39,311	49,613	62,772	71,337
	65	12,242	15,439	18,853	23,390	29,071	36,495	46,638	60,282	70,642
	70	11,462	14,293	17,369	21,526	26,820	33,873	43,770	57,713	69,998
	75	10,764	13,269	16,043	19,854	24,781	31,454	41,038	55,107	69,399
	80	10,128	12,348	14,854	18,353	22,941	29,237	38,459	52,501	68,838
	85	9,538	11,509	13,781	17,003	21,281	27,216	36,046	49,929	68,312
	90	8,981	10,738	12,805	15,784	19,782	25,377	33,801	47,419	67,815
	95	8,448	10,020	11,911	14,676	18,425	23,704	31,722	44,990	67,346
	100	7,931	9,344	11,082	13,661	17,188	22,178	29,800	42,658	66,900
	110	6,924	8,083	9,573	11,849	15,008	19,498	26,385	38,317	66,072
	120	5,926	6,896	8,202	10,248	13,121	17,209	23,456	34,419	65,316
	130	4,921	5,749	6,914	8,785	11,437	15,203	20,910	30,944	64,621
	140	3,899	4,617	5,676	7,411	9,891	13,402	18,661	27,846	63,977
	150	2,855	3,489	4,465	6,095	8,440	11,746	16,638	25,070	63,378
	160	1,790	2,357	3,267	4,815	7,053	10,196	14,785	22,564	62,818
	170	0,704	1,217	2,075	3,557	5,710	8,722	13,063	20,280	62,291
	180	-0,400	0,069	0,885	2,315	4,399	7,304	11,441	18,178	61,795
	190	-1,519	-1,086	-0,305	1,082	3,110	5,929	9,896	16,225	61,325
	200	-2,651	-2,248	-1,494	-0,143	1,840	4,587	8,413	14,395	60,879
	225	-5,512	-5,166	-4,463	-3,175	-1,275	1,340	4,907	10,227	59,856
	250	-8,384	-8,076	-7,407	-6,160	-4,314	-1,785	1,611	6,480	58,941
	275	-11,232	-10,951	-10,304	-9,085	-7,275	-4,804	-1,526	3,030	58,113
	300	-14,032	-13,768	-13,137	-11,937	-10,153	-7,722	-4,527	-0,195	57,358
	325	-16,766	-16,515	-15,895	-14,709	-12,944	-10,542	-7,407	-3,237	56,662
	350	-19,426	-19,185	-18,573	-17,397	-15,645	-13,266	-10,174	-6,126	56,019
	375	-22,010	-21,775	-21,170	-20,002	-18,260	-15,897	-12,839	-8,882	55,419
	400	-24,519	-24,290	-23,689	-22,527	-20,793	-18,443	-15,411	-11,524	54,859
	425	-26,958	-26,732	-26,135	-24,978	-23,251	-20,910	-17,898	-14,067	54,332
	450	-29,334	-29,111	-28,517	-27,363	-25,641	-23,309	-20,312	-16,525	53,836
	475	-31,655	-31,434	-30,842	-29,691	-27,973	-25,647	-22,664	-18,912	53,366
	500	-33,929	-33,711	-33,121	-31,972	-30,258	-27,937	-24,964	-21,241	52,921
	525	-36,169	-35,951	-35,363	-34,217	-32,505	-30,189	-27,225	-23,524	52,497
	550	-38,382	-38,166	-37,578	-36,434	-34,725	-32,412	-29,455	-25,775	52,093
	575	-40,579	-40,364	-39,778	-38,635	-36,927	-34,618	-31,667	-28,003	51,707
	600	-42,769	-42,555	-41,969	-40,828	-39,122	-36,816	-33,870	-30,219	51,337
	625	-44,960	-44,747	-44,162	-43,022	-41,318	-39,013	-36,072	-32,433	50,982
	650	-47,160	-46,947	-46,363	-45,224	-43,521	-41,219	-38,281	-34,652	50,642
	675	-49,373	-49,160	-48,577	-47,439	-45,737	-43,437	-40,503	-36,883	50,314
	700	-51,603	-51,391	-50,808	-49,670	-47,970	-45,671	-42,740	-39,127	49,998
	725	-53,851	-53,639	-53,057	-51,920	-50,220	-47,923	-44,995	-41,389	49,693
	750	-56,116	-55,905	-55,323	-54,186	-52,487	-50,191	-47,266	-43,665	49,399
	775	-58,393	-58,183	-57,601	-56,465	-54,767	-52,473	-49,549	-45,954	49,114
	800	-60,677	-60,467	-59,886	-58,750	-57,053	-54,759	-51,838	-48,247	48,838
	825	-62,958	-62,748	-62,167	-61,032	-59,335	-57,042	-54,122	-50,536	48,571
	850	-65,223	-65,013	-64,432	-63,298	-61,602	-59,310	-56,391	-52,809	48,312
	875	-67,458	-67,248	-66,668	-65,534	-63,838	-61,547	-58,630	-55,050	48,060
	900	-69,647	-69,438	-68,858	-67,724	-66,029	-63,738	-60,823	-57,246	47,815
	925	-71,774	-71,565	-70,985	-69,851	-68,157	-65,867	-62,952	-59,378	47,577
	950	-73,821	-73,612	-73,032	-71,899	-70,205	-67,916	-65,002	-61,431	47,346
	975	-75,773	-75,564	-74,984	-73,851	-72,158	-69,869	-66,957	-63,387	47,120
	1000	-77,615	-77,406	-76,827	-75,694	-74,001	-71,713	-68,801	-65,234	46,900

2000 MHz – Zone 3 – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	94,152	96,442	98,609	101,111	103,487	105,309	106,324	106,731	106,900
	2	82,550	85,932	88,837	92,110	95,396	98,227	99,964	100,645	100,879
	3	75,227	79,379	82,839	86,616	90,427	93,888	96,169	97,074	97,358
	4	69,711	74,420	78,358	82,572	86,786	90,711	93,433	94,535	94,859
	5	65,266	70,365	74,700	79,309	83,875	88,181	91,280	92,560	92,921
	6	61,542	66,914	71,568	76,530	81,419	86,059	89,497	90,943	91,337
	7	58,339	63,903	68,808	74,080	79,269	84,216	87,967	89,573	89,998
	8	55,530	61,233	66,334	71,872	77,338	82,572	86,620	88,383	88,838
	9	53,030	58,834	64,087	69,850	75,570	81,076	85,411	87,330	87,815
	10	50,779	56,658	62,029	67,980	73,928	79,690	84,306	86,385	86,900
	11	48,734	54,668	60,131	66,238	72,388	78,392	83,284	85,526	86,072
	12	46,862	52,835	58,370	64,605	70,933	77,163	82,326	84,738	85,316
	13	45,136	51,138	56,728	63,068	69,551	75,989	81,419	84,009	84,621
	14	43,536	49,558	55,191	61,617	68,234	74,863	80,554	83,328	83,977
	15	42,048	48,082	53,747	60,242	66,974	73,776	79,721	82,690	83,378
	16	40,656	46,698	52,386	58,937	65,767	72,725	78,914	82,087	82,818
	17	39,352	45,395	51,100	57,695	64,608	71,705	78,129	81,514	82,291
	18	38,125	44,166	49,882	56,511	63,493	70,714	77,361	80,968	81,795
	19	36,968	43,003	48,724	55,379	62,420	69,750	76,608	80,443	81,325
	20	35,874	41,900	47,622	54,296	61,385	68,812	75,867	79,938	80,879
	25	31,183	37,121	42,800	49,492	56,708	64,459	72,306	77,614	78,941
	30	27,471	33,271	38,849	45,472	52,695	60,593	68,950	75,536	77,358
	35	24,455	30,080	35,517	42,017	49,177	57,118	65,790	73,534	76,019
	40	21,958	27,379	32,645	38,986	46,035	53,956	62,818	71,498	74,859
	45	19,858	25,054	30,130	36,283	43,189	51,045	60,017	69,371	73,836
	50	18,068	23,027	27,897	33,844	40,581	48,341	57,366	67,178	72,921
	55	16,526	21,239	25,895	31,623	38,174	45,812	54,846	65,083	72,093
	60	15,182	19,646	24,084	29,585	35,938	43,433	52,443	63,006	71,337
	65	13,997	18,215	22,435	27,707	33,853	41,190	50,145	60,948	70,642
	70	12,944	16,921	20,925	25,968	31,904	39,071	47,945	58,918	69,998
	75	11,996	15,740	19,536	24,354	30,078	37,066	45,837	56,920	69,399
	80	11,136	14,658	18,252	22,851	28,365	35,168	43,817	54,961	68,838
	85	10,348	13,658	17,060	21,449	26,757	33,370	41,881	53,043	68,312
	90	9,620	12,730	15,950	20,136	25,244	31,668	40,028	51,170	67,815
	95	8,940	11,863	14,911	18,905	23,820	30,055	38,253	49,343	67,346
	100	8,301	11,048	13,935	17,748	22,477	28,526	36,555	47,565	66,900
	110	7,117	9,550	12,143	15,624	20,009	25,699	33,377	44,159	66,072
	120	6,026	8,187	10,526	13,715	17,790	23,145	30,467	40,954	65,316
	130	4,997	6,925	9,045	11,979	15,779	20,827	27,800	37,949	64,621
	140	4,012	5,740	7,670	10,383	13,940	18,708	25,349	35,134	63,977
	150	3,055	4,611	6,377	8,898	12,242	16,758	23,087	32,500	63,378
	160	2,118	3,526	5,151	7,504	10,661	14,952	20,990	30,034	62,818
	170	1,194	2,474	3,976	6,184	9,176	13,266	19,038	27,721	62,291
	180	0,279	1,447	2,842	4,924	7,771	11,681	17,210	25,549	61,795
	190	-0,630	0,440	1,742	3,713	6,433	10,184	15,490	23,502	61,325
	200	-1,535	-0,551	0,669	2,543	5,151	8,759	13,865	21,570	60,879
	225	-3,784	-2,975	-1,918	-0,239	2,141	5,456	10,137	17,166	59,856
	250	-6,018	-5,339	-4,404	-2,870	-0,659	2,433	6,783	13,253	58,941
	275	-8,234	-7,655	-6,812	-5,387	-3,306	-0,384	3,704	9,719	58,113
	300	-10,428	-9,927	-9,153	-7,813	-5,832	-3,045	0,836	6,481	57,358
	325	-12,597	-12,156	-11,438	-10,163	-8,261	-5,580	-1,865	3,475	56,662
	350	-14,738	-14,345	-13,670	-12,448	-10,609	-8,014	-4,433	0,656	56,019
	375	-16,852	-16,498	-15,858	-14,678	-12,890	-10,365	-6,895	-2,012	55,419
	400	-18,942	-18,618	-18,007	-16,861	-15,115	-12,648	-9,268	-4,560	54,859
	425	-21,009	-20,711	-20,123	-19,006	-17,295	-14,875	-11,572	-7,010	54,332
	450	-23,060	-22,782	-22,214	-21,121	-19,439	-17,059	-13,821	-9,382	53,836
	475	-25,099	-24,839	-24,286	-23,213	-21,556	-19,211	-16,028	-11,694	53,366
	500	-27,132	-26,886	-26,348	-25,292	-23,656	-21,340	-18,204	-13,962	52,921
	525	-29,165	-28,932	-28,405	-27,364	-25,747	-23,457	-20,361	-16,197	52,497
	550	-31,205	-30,982	-30,466	-29,437	-27,836	-25,568	-22,508	-18,412	52,093
	575	-33,256	-33,042	-32,535	-31,518	-29,930	-27,681	-24,652	-20,617	51,707
	600	-35,324	-35,118	-34,618	-33,610	-32,036	-29,804	-26,802	-22,820	51,337
	625	-37,412	-37,212	-36,719	-35,720	-34,157	-31,940	-28,963	-25,028	50,982
	650	-39,522	-39,329	-38,842	-37,851	-36,297	-34,094	-31,138	-27,245	50,642
	675	-41,658	-41,469	-40,988	-40,004	-38,458	-36,268	-33,332	-29,476	50,314
	700	-43,817	-43,634	-43,157	-42,179	-40,642	-38,462	-35,543	-31,721	49,998
	725	-45,999	-45,820	-45,347	-44,375	-42,845	-40,675	-37,773	-33,981	49,693
	750	-48,201	-48,025	-47,556	-46,589	-45,066	-42,905	-40,017	-36,252	49,399
	775	-50,416	-50,244	-49,779	-48,816	-47,299	-45,146	-42,271	-38,532	49,114
	800	-52,639	-52,470	-52,007	-51,049	-49,537	-47,392	-44,529	-40,812	48,838
	825	-54,860	-54,693	-54,234	-53,280	-51,772	-49,635	-46,783	-43,086	48,571
	850	-57,069	-56,905	-56,448	-55,498	-53,995	-51,864	-49,022	-45,344	48,312
	875	-59,256	-59,094	-58,639	-57,692	-56,193	-54,068	-51,236	-47,575	48,060
	900	-61,407	-61,247	-60,795	-59,850	-58,356	-56,236	-53,412	-49,767	47,815
	925	-63,510	-63,352	-62,902	-61,960	-60,469	-58,354	-55,538	-51,908	47,577
	950	-65,552	-65,396	-64,947	-64,008	-62,521	-60,411	-57,602	-53,986	47,346
	975	-67,521	-67,367	-66,920	-65,983	-64,498	-62,393	-59,590	-55,987	47,120
	1000	-69,405	-69,252	-68,807	-67,873	-66,391	-64,289	-61,493	-57,901	46,900

2000 MHz – Zone 4 – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	106,896	106,899	106,900	106,900	106,900	106,900	106,900	106,900	106,900
	2	100,851	100,871	100,878	100,879	100,879	100,879	100,879	100,879	100,879
	3	97,265	97,327	97,350	97,357	97,358	97,358	97,358	97,358	97,358
	4	94,647	94,782	94,837	94,856	94,859	94,859	94,859	94,859	94,859
	5	92,520	92,764	92,873	92,914	92,921	92,921	92,921	92,921	92,921
	6	90,664	91,059	91,247	91,323	91,337	91,337	91,337	91,337	91,337
	7	88,961	89,548	89,844	89,971	89,998	89,998	89,998	89,998	89,998
	8	87,338	88,156	88,593	88,792	88,837	88,838	88,838	88,838	88,838
	9	85,752	86,835	87,445	87,740	87,814	87,815	87,815	87,815	87,815
	10	84,173	85,550	86,367	86,785	86,897	86,900	86,900	86,900	86,900
	11	82,585	84,277	85,333	85,903	86,068	86,072	86,072	86,072	86,072
	12	80,980	82,998	84,323	85,075	85,309	85,316	85,316	85,316	85,316
	13	79,357	81,704	83,321	84,288	84,610	84,621	84,621	84,621	84,621
	14	77,715	80,387	82,314	83,528	83,961	83,977	83,977	83,977	83,977
	15	76,060	79,044	81,294	82,786	83,354	83,378	83,378	83,378	83,378
	16	74,396	77,675	80,254	82,052	82,782	82,817	82,818	82,818	82,818
	17	72,730	76,281	79,189	81,318	82,241	82,291	82,291	82,291	82,291
	18	71,067	74,866	78,097	80,578	81,726	81,794	81,795	81,795	81,795
	19	69,414	73,435	76,976	79,826	81,232	81,324	81,325	81,325	81,325
	20	67,774	71,991	75,827	79,056	80,756	80,879	80,879	80,879	80,879
	25	59,906	64,756	69,741	74,834	78,512	78,937	78,941	78,941	78,941
	30	52,745	57,810	63,403	69,926	76,198	77,339	77,358	77,358	77,358
	35	46,318	51,376	57,195	64,535	73,432	75,954	76,019	76,019	76,019
	40	40,545	45,497	51,325	58,984	69,941	74,668	74,858	74,859	74,859
	45	35,334	40,138	45,867	53,530	65,684	73,342	73,834	73,836	73,836
	50	30,599	35,242	40,824	48,314	60,852	71,785	72,915	72,921	72,921
	55	26,267	30,751	36,168	43,398	55,727	69,755	72,076	72,093	72,093
	60	22,280	26,613	31,866	38,797	50,561	67,015	71,290	71,337	71,337
	65	18,596	22,790	27,884	34,504	45,520	63,458	70,520	70,642	70,642
	70	15,185	19,250	24,195	30,507	40,703	59,174	69,707	69,998	69,998
	75	12,036	15,980	20,782	26,792	36,160	54,405	68,752	69,398	69,399
	80	9,151	12,975	17,634	23,348	31,914	49,421	67,500	68,836	68,838
	85	6,550	10,245	14,750	20,166	27,978	44,440	65,743	68,307	68,312
	90	4,259	7,807	12,133	17,241	24,356	39,611	63,276	67,803	67,815
	95	2,990	5,676	9,787	14,571	21,046	35,026	60,002	67,315	67,346
	100	2,327	3,855	7,708	12,149	18,044	30,740	55,998	66,829	66,900
	110	1,061	2,131	4,298	8,020	12,920	23,174	46,736	65,729	66,072
	120	-0,158	0,716	1,934	4,745	8,854	16,999	37,327	63,948	65,316
	130	-1,356	-0,628	0,443	2,249	5,659	12,134	28,841	60,302	64,621
	140	-2,550	-1,932	-0,972	0,686	3,187	8,377	21,701	53,843	63,977
	150	-3,746	-3,213	-2,338	-0,794	1,548	5,475	15,978	45,422	63,378
	160	-4,950	-4,482	-3,674	-2,219	-0,002	3,287	11,535	36,725	62,818
	170	-6,161	-5,745	-4,989	-3,604	-1,486	1,637	8,111	28,811	62,291
	180	-7,380	-7,004	-6,290	-4,962	-2,923	0,066	5,425	22,093	61,795
	190	-8,604	-8,261	-7,581	-6,297	-4,322	-1,442	3,237	16,618	61,325
	200	-9,831	-9,515	-8,861	-7,614	-5,692	-2,901	1,369	12,250	60,879
	225	-12,895	-12,626	-12,020	-10,839	-9,011	-6,382	-2,565	4,720	59,856
	250	-15,923	-15,685	-15,110	-13,963	-12,195	-9,668	-6,003	-0,199	58,941
	275	-18,888	-18,670	-18,046	-16,825	-15,117	-12,673	-9,163	-3,994	58,113
	300	-21,771	-21,567	-20,743	-19,548	-17,891	-15,512	-12,103	-7,239	57,358
	325	-24,562	-24,306	-23,308	-22,137	-20,523	-18,199	-14,866	-10,170	56,662
	350	-27,260	-26,753	-25,770	-24,619	-23,043	-20,768	-17,498	-12,911	56,019
	375	-29,866	-29,131	-28,161	-27,030	-25,488	-23,258	-20,042	-15,534	55,419
	400	-32,253	-31,469	-30,512	-29,398	-27,888	-25,699	-22,532	-18,087	54,859
	425	-34,564	-33,789	-32,843	-31,746	-30,266	-28,114	-24,993	-20,603	54,332
	450	-36,871	-36,105	-35,171	-34,088	-32,635	-30,520	-27,441	-23,099	53,836
	475	-39,183	-38,426	-37,502	-36,434	-35,007	-32,925	-29,886	-25,588	53,366
	500	-41,505	-40,756	-39,842	-38,787	-37,384	-35,335	-32,333	-28,077	52,921
	525	-43,838	-43,096	-42,191	-41,150	-39,770	-37,751	-34,785	-30,567	52,497
	550	-46,181	-45,446	-44,550	-43,521	-42,163	-40,173	-37,241	-33,060	52,093
	575	-48,435	-47,803	-46,915	-45,897	-44,561	-42,598	-39,698	-35,553	51,707
	600	-50,617	-50,162	-49,281	-48,275	-46,958	-45,021	-42,044	-38,041	51,337
	625	-52,796	-52,517	-51,644	-50,648	-49,351	-47,205	-44,233	-40,460	50,982
	650	-54,976	-54,812	-53,997	-53,011	-51,654	-49,389	-46,422	-42,661	50,642
	675	-57,162	-56,998	-56,331	-55,356	-53,841	-51,579	-48,614	-44,864	50,314
	700	-59,354	-59,190	-58,641	-57,654	-56,035	-53,774	-50,812	-47,072	49,998
	725	-61,552	-61,389	-60,890	-59,854	-58,236	-55,975	-53,016	-49,284	49,693
	750	-63,756	-63,593	-63,094	-62,058	-60,440	-58,181	-55,224	-51,498	49,399
	775	-65,960	-65,797	-65,298	-64,263	-62,646	-60,387	-57,433	-53,712	49,114
	800	-68,159	-67,997	-67,468	-66,463	-64,846	-62,589	-59,636	-55,920	48,838
	825	-70,347	-70,184	-69,534	-68,610	-67,035	-64,778	-61,826	-58,115	48,571
	850	-72,513	-72,345	-71,529	-70,612	-69,202	-66,946	-63,995	-60,289	48,312
	875	-74,649	-74,259	-73,447	-72,538	-71,339	-69,083	-66,134	-62,431	48,060
	900	-76,744	-76,091	-75,284	-74,383	-73,256	-71,179	-68,230	-64,530	47,815
	925	-78,494	-77,838	-77,036	-76,142	-75,028	-73,221	-70,274	-66,577	47,577
	950	-80,149	-79,497	-78,700	-77,812	-76,711	-75,060	-72,254	-68,559	47,346
	975	-81,714	-81,065	-80,273	-79,392	-78,303	-76,669	-74,153	-70,420	47,120
	1000	-83,188	-82,543	-81,756	-80,881	-79,804	-78,185	-75,687	-71,974	46,900

2000 MHz – Zone 4 – 10%

Transmitting / base antenna height (m) \ Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
1	107,071	107,074	107,074	107,074	107,074	107,074	107,074	107,074	107,076
2	101,147	101,160	101,161	101,161	101,161	101,161	101,161	101,161	101,213
3	97,762	97,797	97,802	97,803	97,803	97,803	97,803	97,803	97,832
4	95,365	95,435	95,447	95,448	95,448	95,448	95,448	95,448	95,459
5	93,486	93,607	93,629	93,632	93,632	93,632	93,632	93,632	93,633
6	91,923	92,109	92,145	92,150	92,150	92,150	92,150	92,150	92,150
7	90,571	90,834	90,890	90,899	90,900	90,900	90,900	90,900	90,901
8	89,387	89,719	89,800	89,814	89,816	89,816	89,816	89,816	89,822
9	88,316	88,722	88,835	88,856	88,859	88,859	88,859	88,859	88,871
10	87,334	87,816	87,967	87,996	88,001	88,001	88,001	88,001	88,020
11	86,419	86,981	87,177	87,217	87,223	87,224	87,224	87,224	87,250
12	85,560	86,203	86,450	86,503	86,511	86,512	86,512	86,512	86,545
13	84,746	85,470	85,775	85,844	85,855	85,856	85,857	85,857	85,896
14	83,969	84,774	85,144	85,231	85,246	85,248	85,248	85,248	85,294
15	83,224	84,108	84,550	84,658	84,678	84,680	84,680	84,680	84,731
16	82,504	83,468	83,987	84,120	84,144	84,147	84,148	84,148	84,203
17	81,808	82,848	83,451	83,611	83,642	83,646	83,646	83,646	83,706
18	81,132	82,247	82,938	83,128	83,167	83,172	83,172	83,172	83,236
19	80,473	81,660	82,444	82,669	82,716	82,722	82,723	82,723	82,790
20	79,830	81,087	81,967	82,230	82,287	82,295	82,295	82,295	82,365
25	76,800	78,452	79,767	80,273	80,400	80,421	80,423	80,423	80,503
30	74,009	76,030	77,756	78,582	78,825	78,871	78,876	78,876	78,963
35	71,403	73,735	75,845	77,045	77,454	77,543	77,553	77,554	77,649
40	68,957	71,538	74,002	75,592	76,221	76,375	76,396	76,397	76,503
45	66,655	69,428	72,221	74,184	75,079	75,327	75,365	75,367	75,488
50	64,484	67,402	70,505	72,800	73,994	74,369	74,433	74,438	74,578
55	62,434	65,609	68,858	71,431	72,941	73,480	73,581	73,590	73,753
60	60,496	63,964	67,284	70,079	71,903	72,641	72,795	72,810	72,998
65	58,914	62,426	65,783	68,747	70,868	71,839	72,063	72,087	72,304
70	57,508	60,983	64,354	67,441	69,831	71,059	71,376	71,413	71,661
75	56,192	59,626	62,995	66,168	68,790	70,292	70,726	70,780	71,062
80	54,956	58,346	61,701	64,931	67,746	69,529	70,106	70,184	70,502
85	53,792	57,138	60,470	63,734	66,705	68,764	69,510	69,620	69,975
90	52,693	55,994	59,299	62,579	65,671	67,993	68,932	69,085	69,479
95	51,654	54,910	58,184	61,466	64,651	67,214	68,368	68,574	69,009
100	50,671	53,883	57,123	60,398	63,648	66,427	67,813	68,085	68,564
110	48,854	51,982	55,150	58,390	61,713	64,837	66,714	67,163	67,736
120	47,217	50,263	53,359	56,548	59,889	63,249	65,612	66,301	66,980
130	45,731	48,701	51,725	54,856	58,182	61,688	64,493	65,483	66,285
140	44,372	47,269	50,224	53,293	56,585	60,172	63,352	64,697	65,641
150	43,110	45,940	48,828	51,835	55,081	58,706	62,188	63,928	65,042
160	41,922	44,688	47,512	50,458	53,653	57,284	61,001	63,164	64,481
170	40,785	43,490	46,254	49,141	52,281	55,900	59,791	62,391	63,955
180	39,683	42,330	45,037	47,866	50,951	54,543	58,560	61,593	63,458
190	38,602	41,195	43,847	46,620	49,650	53,208	57,308	60,755	62,988
200	37,537	40,078	42,677	45,397	48,372	51,888	56,039	59,865	62,543
225	34,921	37,342	39,820	42,414	45,257	48,655	52,824	57,369	61,520
250	32,387	34,700	37,067	39,546	42,265	45,536	49,635	54,535	60,605
275	29,966	32,181	34,448	36,821	39,423	42,570	46,560	51,555	59,777
300	27,678	29,804	31,978	34,254	36,748	39,775	43,645	48,602	59,021
325	25,525	27,567	29,657	31,843	34,236	37,151	40,900	45,763	58,326
350	23,492	25,458	27,468	29,571	31,871	34,681	38,312	43,063	57,682
375	21,561	23,455	25,392	27,417	29,630	32,341	35,862	40,495	57,083
400	19,713	21,540	23,408	25,360	27,491	30,110	33,526	38,044	56,522
425	17,931	19,695	21,498	23,382	25,436	27,968	31,285	35,692	55,996
450	16,201	17,907	19,649	21,467	23,449	25,899	29,122	33,424	55,499
475	14,515	16,164	17,848	19,606	21,519	23,891	27,026	31,227	55,030
500	12,863	14,459	16,089	17,788	19,636	21,934	24,985	29,090	54,584
525	11,241	12,786	14,363	16,007	17,793	20,022	22,992	27,005	54,160
550	9,643	11,140	12,668	14,259	15,986	18,147	21,042	24,968	53,756
575	8,067	9,518	10,998	12,539	14,210	16,307	19,128	22,971	53,370
600	6,511	7,918	9,353	10,846	12,462	14,498	17,249	21,012	53,001
625	4,973	6,337	7,729	9,175	10,740	12,717	15,402	19,088	52,646
650	3,452	4,776	6,125	7,528	9,043	10,963	13,583	17,195	52,305
675	1,948	3,232	4,541	5,901	7,368	9,234	11,792	15,333	51,977
700	0,459	1,706	2,976	4,295	5,715	7,530	10,028	13,500	51,662
725	-1,014	0,197	1,429	2,708	4,085	5,848	8,289	11,696	51,357
750	-2,470	-1,295	-0,099	1,142	2,475	4,190	6,575	9,918	51,062
775	-3,911	-2,770	-1,608	-0,405	0,887	2,554	4,885	8,167	50,778
800	-5,335	-4,227	-3,099	-1,932	-0,680	0,942	3,220	6,442	50,502
825	-6,742	-5,665	-4,571	-3,438	-2,226	-0,648	1,580	4,744	50,234
850	-8,131	-7,086	-6,023	-4,924	-3,749	-2,215	-0,036	3,072	49,975
875	-9,502	-8,487	-7,455	-6,389	-5,251	-3,758	-1,627	1,427	49,723
900	-10,854	-9,868	-8,866	-7,832	-6,730	-5,277	-3,192	-0,192	49,479
925	-12,186	-11,228	-10,256	-9,253	-8,186	-6,773	-4,732	-1,783	49,241
950	-13,498	-12,568	-11,624	-10,651	-9,618	-8,243	-6,247	-3,348	49,009
975	-14,789	-13,886	-12,969	-12,026	-11,025	-9,688	-7,735	-4,885	48,783
1000	-16,058	-15,181	-14,292	-13,377	-12,409	-11,108	-9,196	-6,393	48,564

2000 MHz – Zone 4 – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,266	107,266	107,266	107,266	107,266	107,266	107,266	107,266	107,328
	2	101,613	101,613	101,613	101,613	101,613	101,613	101,613	101,613	101,690
	3	98,507	98,507	98,507	98,507	98,507	98,507	98,507	98,507	98,510
	4	96,317	96,317	96,317	96,317	96,317	96,317	96,317	96,317	96,317
	5	94,653	94,653	94,653	94,653	94,653	94,653	94,653	94,653	94,653
	6	93,314	93,314	93,314	93,314	93,314	93,314	93,314	93,314	93,314
	7	92,194	92,194	92,194	92,194	92,194	92,194	92,194	92,194	92,194
	8	91,229	91,229	91,229	91,229	91,229	91,229	91,229	91,229	91,229
	9	90,381	90,381	90,381	90,381	90,381	90,381	90,381	90,381	90,381
	10	89,622	89,622	89,622	89,622	89,622	89,622	89,622	89,622	89,622
	11	88,934	88,934	88,934	88,934	88,934	88,934	88,934	88,934	88,934
	12	88,304	88,304	88,304	88,304	88,304	88,304	88,304	88,304	88,304
	13	87,720	87,720	87,720	87,720	87,720	87,720	87,720	87,720	87,720
	14	87,170	87,170	87,170	87,170	87,170	87,170	87,170	87,170	87,176
	15	86,654	86,654	86,654	86,654	86,654	86,654	86,654	86,654	86,666
	16	86,170	86,170	86,170	86,170	86,170	86,170	86,170	86,170	86,186
	17	85,712	85,712	85,712	85,712	85,712	85,712	85,712	85,712	85,731
	18	85,279	85,279	85,279	85,279	85,279	85,279	85,279	85,279	85,298
	19	84,867	84,867	84,867	84,867	84,867	84,867	84,867	84,867	84,886
	20	84,475	84,475	84,475	84,475	84,475	84,475	84,475	84,475	84,491
	25	82,738	82,738	82,738	82,738	82,738	82,738	82,738	82,738	82,738
	30	81,260	81,260	81,260	81,260	81,260	81,260	81,260	81,260	81,260
	35	79,982	79,982	79,982	79,982	79,982	79,982	79,982	79,982	79,982
	40	78,856	78,856	78,856	78,856	78,856	78,856	78,856	78,856	78,856
	45	77,853	77,853	77,853	77,853	77,853	77,853	77,853	77,853	77,853
	50	76,949	76,949	76,949	76,949	76,949	76,949	76,949	76,949	76,949
	55	76,128	76,128	76,128	76,128	76,128	76,128	76,128	76,128	76,128
	60	75,376	75,376	75,376	75,376	75,376	75,376	75,376	75,376	75,376
	65	74,682	74,682	74,682	74,682	74,682	74,682	74,682	74,682	74,682
	70	74,040	74,040	74,040	74,040	74,040	74,040	74,040	74,040	74,040
	75	73,417	73,417	73,417	73,417	73,417	73,417	73,417	73,417	73,441
	80	72,810	72,810	72,810	72,810	72,810	72,810	72,810	72,810	72,881
	85	72,231	72,231	72,231	72,231	72,231	72,231	72,231	72,231	72,355
	90	71,677	71,677	71,677	71,677	71,677	71,677	71,677	71,677	71,859
	95	71,145	71,145	71,145	71,145	71,145	71,145	71,145	71,145	71,389
	100	70,632	70,632	70,632	70,632	70,632	70,632	70,632	70,632	70,943
	110	69,656	69,656	69,656	69,656	69,656	69,656	69,656	69,656	70,116
	120	68,737	68,737	68,737	68,737	68,737	68,737	68,737	68,737	69,360
	130	67,870	67,870	67,870	67,870	67,870	67,870	67,870	67,870	68,665
	140	67,043	67,043	67,043	67,043	67,043	67,043	67,043	67,043	68,021
	150	66,249	66,249	66,249	66,249	66,249	66,249	66,249	66,249	67,422
	160	65,483	65,483	65,483	65,483	65,483	65,483	65,483	65,483	66,861
	170	64,741	64,741	64,741	64,741	64,741	64,741	64,741	64,741	66,335
	180	64,019	64,019	64,019	64,019	64,019	64,019	64,019	64,019	65,838
	190	63,315	63,315	63,315	63,315	63,315	63,315	63,315	63,315	65,368
	200	62,626	62,626	62,626	62,626	62,626	62,626	62,626	62,626	64,923
	225	60,962	60,962	60,962	60,962	60,962	60,962	60,962	60,962	63,900
	250	59,368	59,368	59,368	59,368	59,368	59,368	59,368	59,368	62,985
	275	57,834	57,834	57,834	57,834	57,834	57,834	57,834	57,834	62,157
	300	56,358	56,358	56,358	56,358	56,358	56,358	56,358	56,358	61,401
	325	54,938	54,938	54,938	54,938	54,938	54,938	54,938	54,938	60,706
	350	53,572	53,572	53,572	53,572	53,572	53,572	53,572	53,572	60,062
	375	52,256	52,256	52,256	52,256	52,256	52,256	52,256	52,256	59,463
	400	50,986	50,986	50,986	50,986	50,986	50,986	50,986	50,986	58,902
	425	49,753	49,753	49,753	49,753	49,753	49,753	49,753	49,753	58,376
	450	48,551	48,551	48,551	48,551	48,551	48,551	48,551	48,551	57,879
	475	47,371	47,371	47,371	47,371	47,371	47,371	47,371	47,371	57,410
	500	46,210	46,210	46,210	46,210	46,210	46,210	46,210	46,210	56,964
	525	45,061	45,061	45,061	45,061	45,061	45,061	45,061	45,061	56,540
	550	43,921	43,921	43,921	43,921	43,921	43,921	43,921	43,921	56,136
	575	42,789	42,789	42,789	42,789	42,789	42,789	42,789	42,789	55,750
	600	41,664	41,664	41,664	41,664	41,664	41,664	41,664	41,664	55,381
	625	40,543	40,543	40,543	40,543	40,543	40,543	40,543	40,543	55,026
	650	39,428	39,428	39,428	39,428	39,428	39,428	39,428	39,428	54,685
	675	38,318	38,318	38,318	38,318	38,318	38,318	38,318	38,318	54,357
	700	37,214	37,214	37,214	37,214	37,214	37,214	37,214	37,214	54,042
	725	36,114	36,114	36,114	36,114	36,114	36,114	36,114	36,114	53,737
	750	35,019	35,019	35,019	35,019	35,019	35,019	35,019	35,019	53,442
	775	33,928	33,928	33,928	33,928	33,928	33,928	33,928	33,928	53,158
	800	32,842	32,842	32,842	32,842	32,842	32,842	32,842	32,842	52,882
	825	31,760	31,760	31,760	31,760	31,760	31,760	31,760	31,760	52,614
	850	30,683	30,683	30,683	30,683	30,683	30,683	30,683	30,683	52,355
	875	29,611	29,611	29,611	29,611	29,611	29,611	29,611	29,611	52,103
	900	28,545	28,545	28,545	28,545	28,545	28,545	28,545	28,545	51,859
	925	27,485	27,485	27,485	27,485	27,485	27,485	27,485	27,485	51,621
	950	26,433	26,433	26,433	26,433	26,433	26,433	26,433	26,433	51,389
	975	25,390	25,390	25,390	25,390	25,390	25,390	25,390	25,390	51,163
	1000	24,357	24,357	24,357	24,357	24,357	24,357	24,357	24,357	50,944

2000 MHz – Zone 5 – 50%

Transmitting / base antenna height (m)	Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
	1	106,896	106,899	106,900	106,900	106,900	106,900	106,900	106,900	106,900
	2	100,851	100,871	100,878	100,879	100,879	100,879	100,879	100,879	100,879
	3	97,265	97,327	97,350	97,357	97,358	97,358	97,358	97,358	97,358
	4	94,647	94,782	94,837	94,856	94,859	94,859	94,859	94,859	94,859
	5	92,520	92,764	92,873	92,914	92,921	92,921	92,921	92,921	92,921
	6	90,664	91,059	91,247	91,323	91,337	91,337	91,337	91,337	91,337
	7	88,961	89,548	89,844	89,971	89,998	89,998	89,998	89,998	89,998
	8	87,338	88,156	88,593	88,792	88,837	88,838	88,838	88,838	88,838
	9	85,752	86,835	87,445	87,740	87,814	87,815	87,815	87,815	87,815
	10	84,173	85,550	86,367	86,785	86,897	86,900	86,900	86,900	86,900
	11	82,585	84,277	85,333	85,903	86,068	86,072	86,072	86,072	86,072
	12	80,980	82,998	84,323	85,075	85,309	85,316	85,316	85,316	85,316
	13	79,357	81,704	83,321	84,288	84,610	84,621	84,621	84,621	84,621
	14	77,715	80,387	82,314	83,528	83,961	83,977	83,977	83,977	83,977
	15	76,060	79,044	81,294	82,786	83,354	83,378	83,378	83,378	83,378
	16	74,396	77,675	80,254	82,052	82,782	82,817	82,818	82,818	82,818
	17	72,730	76,281	79,189	81,318	82,241	82,291	82,291	82,291	82,291
	18	71,067	74,866	78,097	80,578	81,726	81,794	81,795	81,795	81,795
	19	69,414	73,435	76,976	79,826	81,232	81,324	81,325	81,325	81,325
	20	67,774	71,991	75,827	79,056	80,756	80,879	80,879	80,879	80,879
	25	59,906	64,756	69,741	74,834	78,512	78,937	78,941	78,941	78,941
	30	52,745	57,810	63,403	69,926	76,198	77,339	77,358	77,358	77,358
	35	46,318	51,376	57,195	64,535	73,432	75,954	76,019	76,019	76,019
	40	40,545	45,497	51,325	58,984	69,941	74,668	74,858	74,859	74,859
	45	35,334	40,138	45,867	53,530	65,684	73,342	73,834	73,836	73,836
	50	30,599	35,242	40,824	48,314	60,852	71,785	72,915	72,921	72,921
	55	26,267	30,751	36,168	43,398	55,727	69,755	72,076	72,093	72,093
	60	22,280	26,613	31,866	38,797	50,561	67,015	71,290	71,337	71,337
	65	18,596	22,790	27,884	34,504	45,520	63,458	70,520	70,642	70,642
	70	15,185	19,250	24,195	30,507	40,703	59,174	69,707	69,998	69,998
	75	12,036	15,980	20,782	26,792	36,160	54,405	68,752	69,398	69,399
	80	9,151	12,975	17,634	23,348	31,914	49,421	67,500	68,836	68,838
	85	6,550	10,245	14,750	20,166	27,978	44,440	65,743	68,307	68,312
	90	4,259	7,807	12,133	17,241	24,356	39,611	63,276	67,803	67,815
	95	2,990	5,676	9,787	14,571	21,046	35,026	60,002	67,315	67,346
	100	2,327	3,855	7,708	12,149	18,044	30,740	55,998	66,829	66,900
	110	1,061	2,131	4,298	8,020	12,920	23,174	46,736	65,729	66,072
	120	-0,158	0,716	1,934	4,745	8,854	16,999	37,327	63,948	65,316
	130	-1,356	-0,628	0,443	2,249	5,659	12,134	28,841	60,302	64,621
	140	-2,550	-1,932	-0,972	0,686	3,187	8,377	21,701	53,843	63,977
	150	-3,746	-3,213	-2,338	-0,794	1,548	5,475	15,978	45,422	63,378
	160	-4,950	-4,482	-3,674	-2,219	-0,002	3,287	11,535	36,725	62,818
	170	-6,161	-5,745	-4,989	-3,604	-1,486	1,637	8,111	28,811	62,291
	180	-7,380	-7,004	-6,290	-4,962	-2,923	0,066	5,425	22,093	61,795
	190	-8,604	-8,261	-7,581	-6,297	-4,322	-1,442	3,237	16,618	61,325
	200	-9,831	-9,515	-8,861	-7,614	-5,692	-2,901	1,369	12,250	60,879
	225	-12,895	-12,626	-12,020	-10,839	-9,011	-6,382	-2,565	4,720	59,856
	250	-15,923	-15,685	-15,110	-13,963	-12,195	-9,668	-6,003	-0,199	58,941
	275	-18,888	-18,670	-18,046	-16,825	-15,117	-12,673	-9,163	-3,994	58,113
	300	-21,771	-21,567	-20,743	-19,548	-17,891	-15,512	-12,103	-7,239	57,358
	325	-24,562	-24,306	-23,308	-22,137	-20,523	-18,199	-14,866	-10,170	56,662
	350	-27,260	-26,753	-25,770	-24,619	-23,043	-20,768	-17,498	-12,911	56,019
	375	-29,866	-29,131	-28,161	-27,030	-25,488	-23,258	-20,042	-15,534	55,419
	400	-32,253	-31,469	-30,512	-29,398	-27,888	-25,699	-22,532	-18,087	54,859
	425	-34,564	-33,789	-32,843	-31,746	-30,266	-28,114	-24,993	-20,603	54,332
	450	-36,871	-36,105	-35,171	-34,088	-32,635	-30,520	-27,441	-23,099	53,836
	475	-39,183	-38,426	-37,502	-36,434	-35,007	-32,925	-29,886	-25,588	53,366
	500	-41,505	-40,756	-39,842	-38,787	-37,384	-35,335	-32,333	-28,077	52,921
	525	-43,838	-43,096	-42,191	-41,150	-39,770	-37,751	-34,785	-30,567	52,497
	550	-46,181	-45,446	-44,550	-43,521	-42,163	-40,173	-37,241	-33,060	52,093
	575	-48,435	-47,803	-46,915	-45,897	-44,561	-42,598	-39,698	-35,553	51,707
	600	-50,617	-50,162	-49,281	-48,275	-46,958	-45,021	-42,044	-38,041	51,337
	625	-52,796	-52,517	-51,644	-50,648	-49,351	-47,205	-44,233	-40,460	50,982
	650	-54,976	-54,812	-53,997	-53,011	-51,654	-49,389	-46,422	-42,661	50,642
	675	-57,162	-56,998	-56,331	-55,356	-53,841	-51,579	-48,614	-44,864	50,314
	700	-59,354	-59,190	-58,641	-57,654	-56,035	-53,774	-50,812	-47,072	49,998
	725	-61,552	-61,389	-60,890	-59,854	-58,236	-55,975	-53,016	-49,284	49,693
	750	-63,756	-63,593	-63,094	-62,058	-60,440	-58,181	-55,224	-51,498	49,399
	775	-65,960	-65,797	-65,298	-64,263	-62,646	-60,387	-57,433	-53,712	49,114
	800	-68,159	-67,997	-67,468	-66,463	-64,846	-62,589	-59,636	-55,920	48,838
	825	-70,347	-70,184	-69,534	-68,610	-67,035	-64,778	-61,826	-58,115	48,571
	850	-72,513	-72,345	-71,529	-70,612	-69,202	-66,946	-63,995	-60,289	48,312
	875	-74,649	-74,259	-73,447	-72,538	-71,339	-69,083	-66,134	-62,431	48,060
	900	-76,744	-76,091	-75,284	-74,383	-73,256	-71,179	-68,230	-64,530	47,815
	925	-78,494	-77,838	-77,036	-76,142	-75,028	-73,221	-70,274	-66,577	47,577
	950	-80,149	-79,497	-78,700	-77,812	-76,711	-75,060	-72,254	-68,559	47,346
	975	-81,714	-81,065	-80,273	-79,392	-78,303	-76,669	-74,153	-70,420	47,120
	1000	-83,188	-82,543	-81,756	-80,881	-79,804	-78,185	-75,687	-71,974	46,900

2000 MHz – Zone 5 – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,067	107,073	107,074	107,074	107,074	107,074	107,074	107,074	107,076
	2	101,135	101,155	101,160	101,161	101,161	101,161	101,161	101,161	101,213
	3	97,743	97,787	97,799	97,802	97,803	97,803	97,803	97,803	97,832
	4	95,341	95,417	95,441	95,447	95,448	95,448	95,448	95,448	95,459
	5	93,465	93,580	93,619	93,630	93,632	93,632	93,632	93,632	93,633
	6	91,910	92,071	92,130	92,147	92,150	92,150	92,150	92,150	92,150
	7	90,571	90,786	90,869	90,894	90,900	90,900	90,900	90,900	90,901
	8	89,387	89,661	89,771	89,806	89,815	89,816	89,816	89,816	89,822
	9	88,316	88,655	88,797	88,845	88,857	88,859	88,859	88,859	88,871
	10	87,334	87,741	87,919	87,981	87,998	88,001	88,001	88,001	88,020
	11	86,419	86,900	87,117	87,197	87,219	87,223	87,224	87,224	87,250
	12	85,560	86,117	86,378	86,478	86,506	86,512	86,512	86,512	86,545
	13	84,746	85,383	85,691	85,812	85,849	85,856	85,857	85,857	85,896
	14	83,969	84,688	85,046	85,192	85,238	85,247	85,248	85,248	85,294
	15	83,224	84,027	84,438	84,611	84,667	84,679	84,680	84,680	84,731
	16	82,504	83,393	83,860	84,063	84,131	84,146	84,148	84,148	84,203
	17	81,808	82,783	83,309	83,544	83,625	83,644	83,646	83,646	83,706
	18	81,132	82,193	82,781	83,050	83,146	83,169	83,172	83,172	83,236
	19	80,473	81,622	82,272	82,578	82,691	82,719	82,723	82,723	82,790
	20	79,830	81,065	81,781	82,126	82,257	82,291	82,295	82,295	82,365
	25	76,800	78,452	79,514	80,089	80,336	80,410	80,423	80,423	80,503
	30	74,009	76,030	77,448	78,298	78,707	78,846	78,874	78,876	78,963
	35	71,403	73,735	75,493	76,644	77,259	77,495	77,549	77,554	77,649
	40	68,957	71,538	73,603	75,065	75,924	76,292	76,386	76,397	76,503
	45	66,655	69,428	71,758	73,523	74,654	75,191	75,346	75,367	75,488
	50	64,484	67,402	69,952	71,998	73,417	74,161	74,401	74,436	74,578
	55	62,434	65,458	68,184	70,481	72,190	73,175	73,528	73,587	73,753
	60	60,496	63,593	66,457	68,970	70,960	72,213	72,711	72,805	72,998
	65	58,659	61,806	64,774	67,466	69,718	71,257	71,935	72,078	72,304
	70	56,917	60,093	63,137	65,975	68,463	70,296	71,188	71,398	71,661
	75	55,261	58,452	61,549	64,502	67,195	69,320	70,458	70,756	71,062
	80	53,687	56,880	60,012	63,053	65,919	68,322	69,735	70,148	70,502
	85	52,188	55,376	58,528	61,632	64,640	67,302	69,010	69,565	69,975
	90	50,761	53,936	57,096	60,245	63,366	66,260	68,275	69,003	69,479
	95	49,403	52,559	55,718	58,895	62,104	65,200	67,524	68,457	69,009
	100	48,109	51,243	54,393	57,586	60,860	64,127	66,753	67,922	68,564
	110	45,705	48,788	51,905	55,100	58,450	61,972	65,147	66,863	67,736
	120	43,527	46,552	49,624	52,794	56,167	59,846	63,465	65,793	66,980
	130	41,548	44,513	47,532	50,662	54,025	57,786	61,734	64,682	66,285
	140	39,736	42,640	45,603	48,684	52,017	55,810	59,986	63,511	65,641
	150	38,055	40,900	43,805	46,834	50,123	53,916	58,238	62,269	65,042
	160	36,470	39,258	42,107	45,081	48,320	52,091	56,499	60,949	64,481
	170	34,952	37,684	40,477	43,396	46,582	50,317	54,769	59,550	63,955
	180	33,476	36,154	38,892	41,756	44,887	48,578	53,042	58,072	63,458
	190	32,024	34,650	37,335	40,145	43,219	46,861	51,315	56,520	62,988
	200	30,586	33,161	35,796	38,553	41,571	45,159	49,586	54,905	62,543
	225	27,033	29,490	32,003	34,633	37,513	40,960	45,278	50,686	61,520
	250	23,572	25,919	28,320	30,830	33,579	36,886	41,065	46,402	60,605
	275	20,265	22,512	24,808	27,209	29,836	33,007	37,042	42,248	59,777
	300	17,155	19,309	21,509	23,809	26,323	29,368	33,263	38,323	59,021
	325	14,251	16,319	18,431	20,636	23,046	25,975	29,739	34,654	58,326
	350	11,535	13,524	15,554	17,673	19,986	22,807	26,448	31,226	57,682
	375	8,983	10,897	12,851	14,890	17,113	19,833	23,360	28,008	57,083
	400	6,564	8,410	10,292	12,256	14,396	17,021	20,442	24,968	56,522
	425	4,255	6,035	7,851	9,745	11,806	14,343	17,663	22,075	55,996
	450	2,034	3,753	5,507	7,334	9,321	11,775	15,001	19,305	55,499
	475	-0,114	1,548	3,242	5,007	6,925	9,300	12,436	16,639	55,030
	500	-2,201	-0,594	1,044	2,750	4,602	6,902	9,954	14,060	54,584
	525	-4,237	-2,681	-1,096	0,553	2,342	4,572	7,544	11,558	54,160
	550	-6,227	-4,722	-3,187	-1,591	0,139	2,301	5,196	9,123	53,756
	575	-8,179	-6,720	-5,234	-3,689	-2,016	0,083	2,904	6,747	53,370
	600	-10,094	-8,680	-7,240	-5,744	-4,126	-2,089	0,663	4,426	53,001
	625	-11,977	-10,606	-9,210	-7,761	-6,194	-4,216	-1,532	2,154	52,646
	650	-13,829	-12,500	-11,146	-9,742	-8,225	-6,304	-3,684	-0,072	52,305
	675	-15,652	-14,363	-13,051	-11,689	-10,221	-8,354	-5,796	-2,254	51,977
	700	-17,448	-16,197	-14,924	-13,604	-12,182	-10,368	-7,869	-4,396	51,662
	725	-19,218	-18,004	-16,769	-15,488	-14,111	-12,347	-9,907	-6,500	51,357
	750	-20,962	-19,783	-18,584	-17,343	-16,009	-14,294	-11,909	-8,565	51,062
	775	-22,680	-21,536	-20,372	-19,168	-17,875	-16,208	-13,877	-10,595	50,778
	800	-24,372	-23,262	-22,132	-20,964	-19,712	-18,090	-15,811	-12,589	50,502
	825	-26,040	-24,961	-23,865	-22,732	-21,519	-19,941	-17,713	-14,549	50,234
	850	-27,682	-26,634	-25,570	-24,471	-23,296	-21,761	-19,582	-16,474	49,975
	875	-29,298	-28,281	-27,248	-26,182	-25,044	-23,551	-21,419	-18,366	49,723
	900	-30,889	-29,901	-28,898	-27,864	-26,761	-25,309	-23,224	-20,223	49,479
	925	-32,453	-31,494	-30,521	-29,517	-28,450	-27,037	-24,996	-22,047	49,241
	950	-33,991	-33,059	-32,115	-31,141	-30,108	-28,733	-26,737	-23,838	49,009
	975	-35,501	-34,597	-33,680	-32,736	-31,736	-30,399	-28,445	-25,595	48,783
	1000	-36,985	-36,107	-35,217	-34,302	-33,333	-32,033	-30,120	-27,318	48,564

2000 MHz – Zone 5 – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,266	107,266	107,266	107,266	107,266	107,266	107,266	107,266	107,328
	2	101,613	101,613	101,613	101,613	101,613	101,613	101,613	101,613	101,690
	3	98,507	98,507	98,507	98,507	98,507	98,507	98,507	98,507	98,510
	4	96,317	96,317	96,317	96,317	96,317	96,317	96,317	96,317	96,317
	5	94,653	94,653	94,653	94,653	94,653	94,653	94,653	94,653	94,653
	6	93,314	93,314	93,314	93,314	93,314	93,314	93,314	93,314	93,314
	7	92,194	92,194	92,194	92,194	92,194	92,194	92,194	92,194	92,194
	8	91,229	91,229	91,229	91,229	91,229	91,229	91,229	91,229	91,229
	9	90,381	90,381	90,381	90,381	90,381	90,381	90,381	90,381	90,381
	10	89,622	89,622	89,622	89,622	89,622	89,622	89,622	89,622	89,622
	11	88,934	88,934	88,934	88,934	88,934	88,934	88,934	88,934	88,934
	12	88,304	88,304	88,304	88,304	88,304	88,304	88,304	88,304	88,304
	13	87,720	87,720	87,720	87,720	87,720	87,720	87,720	87,720	87,720
	14	87,170	87,170	87,170	87,170	87,170	87,170	87,170	87,170	87,176
	15	86,654	86,654	86,654	86,654	86,654	86,654	86,654	86,654	86,666
	16	86,170	86,170	86,170	86,170	86,170	86,170	86,170	86,170	86,186
	17	85,712	85,712	85,712	85,712	85,712	85,712	85,712	85,712	85,731
	18	85,279	85,279	85,279	85,279	85,279	85,279	85,279	85,279	85,298
	19	84,867	84,867	84,867	84,867	84,867	84,867	84,867	84,867	84,886
	20	84,475	84,475	84,475	84,475	84,475	84,475	84,475	84,475	84,491
	25	82,738	82,738	82,738	82,738	82,738	82,738	82,738	82,738	82,738
	30	81,260	81,260	81,260	81,260	81,260	81,260	81,260	81,260	81,260
	35	79,982	79,982	79,982	79,982	79,982	79,982	79,982	79,982	79,982
	40	78,856	78,856	78,856	78,856	78,856	78,856	78,856	78,856	78,856
	45	77,853	77,853	77,853	77,853	77,853	77,853	77,853	77,853	77,853
	50	76,949	76,949	76,949	76,949	76,949	76,949	76,949	76,949	76,949
	55	76,128	76,128	76,128	76,128	76,128	76,128	76,128	76,128	76,128
	60	75,376	75,376	75,376	75,376	75,376	75,376	75,376	75,376	75,376
	65	74,682	74,682	74,682	74,682	74,682	74,682	74,682	74,682	74,682
	70	74,040	74,040	74,040	74,040	74,040	74,040	74,040	74,040	74,040
	75	73,417	73,417	73,417	73,417	73,417	73,417	73,417	73,417	73,441
	80	72,810	72,810	72,810	72,810	72,810	72,810	72,810	72,810	72,881
	85	72,231	72,231	72,231	72,231	72,231	72,231	72,231	72,231	72,355
	90	71,677	71,677	71,677	71,677	71,677	71,677	71,677	71,677	71,859
	95	71,145	71,145	71,145	71,145	71,145	71,145	71,145	71,145	71,389
	100	70,632	70,632	70,632	70,632	70,632	70,632	70,632	70,632	70,943
	110	69,656	69,656	69,656	69,656	69,656	69,656	69,656	69,656	70,116
	120	68,735	68,735	68,735	68,735	68,735	68,735	68,735	68,735	69,360
	130	67,859	67,859	67,859	67,859	67,859	67,859	67,859	67,859	68,665
	140	67,019	67,019	67,019	67,019	67,019	67,019	67,019	67,019	68,021
	150	66,207	66,207	66,207	66,207	66,207	66,207	66,207	66,207	67,422
	160	65,420	65,420	65,420	65,420	65,420	65,420	65,420	65,420	66,861
	170	64,653	64,653	64,653	64,653	64,653	64,653	64,653	64,653	66,335
	180	63,904	63,904	63,904	63,904	63,904	63,904	63,904	63,904	65,838
	190	63,170	63,170	63,170	63,170	63,170	63,170	63,170	63,170	65,368
	200	62,452	62,452	62,452	62,452	62,452	62,452	62,452	62,452	64,923
	225	60,713	60,713	60,713	60,713	60,713	60,713	60,713	60,713	63,900
	250	59,042	59,042	59,042	59,042	59,042	59,042	59,042	59,042	62,985
	275	57,413	57,413	57,413	57,413	57,413	57,413	57,413	57,413	62,157
	300	55,795	55,795	55,795	55,795	55,795	55,795	55,795	55,795	61,401
	325	54,159	54,159	54,159	54,159	54,159	54,159	54,159	54,159	60,706
	350	52,487	52,487	52,487	52,487	52,487	52,487	52,487	52,487	60,062
	375	50,772	50,772	50,772	50,772	50,772	50,772	50,772	50,772	59,463
	400	49,018	49,018	49,018	49,018	49,018	49,018	49,018	49,018	58,902
	425	47,237	47,237	47,237	47,237	47,237	47,237	47,237	47,237	58,376
	450	45,439	45,439	45,439	45,439	45,439	45,439	45,439	45,439	57,879
	475	43,637	43,637	43,637	43,637	43,637	43,637	43,637	43,637	57,410
	500	41,836	41,836	41,836	41,836	41,836	41,836	41,836	41,836	56,964
	525	40,043	40,043	40,043	40,043	40,043	40,043	40,043	40,043	56,540
	550	38,257	38,257	38,257	38,257	38,257	38,257	38,257	38,257	56,136
	575	36,479	36,479	36,479	36,479	36,479	36,479	36,479	36,479	55,750
	600	34,706	34,706	34,706	34,706	34,706	34,706	34,706	34,706	55,381
	625	32,935	32,935	32,935	32,935	32,935	32,935	32,935	32,935	55,026
	650	31,164	31,164	31,164	31,164	31,164	31,164	31,164	31,164	54,685
	675	29,391	29,391	29,391	29,391	29,391	29,391	29,391	29,391	54,357
	700	27,613	27,613	27,613	27,613	27,613	27,613	27,613	27,613	54,042
	725	25,829	25,829	25,829	25,829	25,829	25,829	25,829	25,829	53,737
	750	24,038	24,038	24,038	24,038	24,038	24,038	24,038	24,038	53,442
	775	22,239	22,239	22,239	22,239	22,239	22,239	22,239	22,239	53,158
	800	20,434	20,434	20,434	20,434	20,434	20,434	20,434	20,434	52,882
	825	18,621	18,621	18,621	18,621	18,621	18,621	18,621	18,621	52,614
	850	16,804	16,804	16,804	16,804	16,804	16,804	16,804	16,804	52,355
	875	14,983	14,983	14,983	14,983	14,983	14,983	14,983	14,983	52,103
	900	13,160	13,160	13,160	13,160	13,160	13,160	13,160	13,160	51,859
	925	11,337	11,337	11,337	11,337	11,337	11,337	11,337	11,337	51,621
	950	9,518	9,518	9,518	9,518	9,518	9,518	9,518	9,518	51,389
	975	7,706	7,706	7,706	7,706	7,706	7,706	7,706	7,706	51,163
	1000	5,902	5,902	5,902	5,902	5,902	5,902	5,902	5,902	50,944

2000 MHz – Zone A – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	106,958	106,958	106,958	106,958	106,958	106,958	106,958	106,958	106,958
	2	100,994	100,994	100,994	100,994	100,994	100,994	100,994	100,994	100,994
	3	97,528	97,528	97,528	97,528	97,528	97,528	97,528	97,528	97,528
	4	95,084	95,084	95,084	95,084	95,084	95,084	95,084	95,084	95,084
	5	93,199	93,199	93,199	93,199	93,199	93,199	93,199	93,199	93,199
	6	91,668	91,668	91,668	91,668	91,668	91,668	91,668	91,668	91,668
	7	90,327	90,357	90,373	90,379	90,380	90,380	90,380	90,380	90,380
	8	88,884	89,095	89,208	89,259	89,271	89,271	89,271	89,271	89,271
	9	87,474	87,906	88,150	88,267	88,297	88,297	88,297	88,297	88,297
	10	86,067	86,755	87,164	87,373	87,429	87,430	87,430	87,430	87,430
	11	84,649	85,619	86,226	86,553	86,647	86,650	86,650	86,650	86,650
	12	83,210	84,481	85,315	85,789	85,936	85,940	85,940	85,940	85,940
	13	81,748	83,328	84,416	85,066	85,283	85,291	85,291	85,291	85,291
	14	80,266	82,154	83,516	84,374	84,680	84,692	84,692	84,692	84,692
	15	78,766	80,956	82,607	83,701	84,118	84,136	84,136	84,136	84,136
	16	77,255	79,732	81,682	83,040	83,591	83,618	83,618	83,618	83,618
	17	75,739	78,485	80,735	82,381	83,095	83,133	83,133	83,133	83,133
	18	74,223	77,217	79,764	81,719	82,624	82,678	82,678	82,678	82,678
	19	72,713	75,932	78,767	81,049	82,174	82,248	82,249	82,249	82,249
	20	71,214	74,634	77,745	80,364	81,742	81,842	81,842	81,842	81,842
	25	64,009	68,105	72,317	76,620	79,727	80,086	80,090	80,090	80,090
	30	57,445	61,813	66,638	72,264	77,674	78,658	78,673	78,673	78,673
	35	51,557	55,974	61,053	67,460	75,227	77,429	77,485	77,486	77,486
	40	46,272	50,629	55,756	62,495	72,135	76,294	76,462	76,462	76,462
	45	41,500	45,750	50,819	57,598	68,351	75,125	75,561	75,562	75,562
	50	37,162	41,286	46,245	52,899	64,036	73,749	74,753	74,758	74,758
	55	33,187	37,184	42,012	48,456	59,444	71,946	74,015	74,030	74,030
	60	29,523	33,396	38,090	44,284	54,797	69,502	73,322	73,365	73,365
	65	26,130	29,886	34,450	40,380	50,248	66,316	72,642	72,751	72,751
	70	22,981	26,630	31,069	36,734	45,886	62,465	71,919	72,180	72,181
	75	20,068	23,614	27,933	33,337	41,760	58,165	71,066	71,647	71,647
	80	17,396	20,840	25,035	30,181	37,895	53,660	69,941	71,145	71,146
	85	14,986	18,318	22,380	27,263	34,307	49,150	68,357	70,669	70,673
	90	12,868	16,069	19,974	24,584	31,004	44,772	66,129	70,214	70,225
	95	11,754	14,176	17,884	22,199	28,039	40,649	63,175	69,771	69,799
	100	11,229	12,606	16,077	20,076	25,386	36,822	59,573	69,328	69,392
	110	10,201	11,162	13,111	16,455	20,860	30,076	51,252	68,323	68,631
	120	9,173	9,957	11,050	13,573	17,261	24,570	42,811	66,701	67,929
	130	8,128	8,780	9,740	11,360	14,417	20,221	35,200	63,404	67,276
	140	7,056	7,610	8,470	9,956	12,196	16,847	28,785	57,586	66,667
	150	5,956	6,434	7,217	8,601	10,699	14,217	23,628	50,007	66,094
	160	4,828	5,248	5,972	7,276	9,262	12,209	19,600	42,173	65,555
	170	3,676	4,049	4,727	5,968	7,867	10,667	16,471	35,030	65,045
	180	2,502	2,839	3,480	4,672	6,501	9,183	13,990	28,943	64,561
	190	1,312	1,620	2,231	3,384	5,156	7,743	11,944	23,959	64,101
	200	0,109	0,394	0,981	2,102	3,830	6,338	10,176	19,955	63,662
	225	-2,923	-2,681	-2,135	-1,070	0,578	2,947	6,387	12,953	62,648
	250	-5,949	-5,733	-5,214	-4,177	-2,578	-0,294	3,020	8,267	61,734
	275	-8,928	-8,731	-8,165	-7,058	-5,509	-3,293	-0,109	4,578	60,902
	300	-11,837	-11,651	-10,902	-9,815	-8,308	-6,144	-3,043	1,382	60,139
	325	-14,660	-14,427	-13,516	-12,447	-10,975	-8,855	-5,815	-1,531	59,435
	350	-17,393	-16,929	-16,030	-14,977	-13,536	-11,455	-8,464	-4,268	58,781
	375	-20,037	-19,362	-18,473	-17,436	-16,022	-13,977	-11,028	-6,894	58,171
	400	-22,463	-21,742	-20,862	-19,838	-18,451	-16,438	-13,528	-9,443	57,600
	425	-24,812	-24,099	-23,228	-22,217	-20,854	-18,872	-15,998	-11,954	57,062
	450	-27,159	-26,452	-25,590	-24,591	-23,250	-21,298	-18,457	-14,449	56,555
	475	-29,511	-28,811	-27,957	-26,969	-25,649	-23,724	-20,914	-16,940	56,074
	500	-31,873	-31,179	-30,332	-29,355	-28,055	-26,156	-23,375	-19,431	55,617
	525	-34,246	-33,558	-32,718	-31,751	-30,470	-28,595	-25,842	-21,927	55,182
	550	-36,629	-35,946	-35,112	-34,155	-32,892	-31,041	-28,314	-24,426	54,767
	575	-38,923	-38,334	-37,506	-36,558	-35,313	-33,485	-30,783	-26,921	54,370
	600	-41,145	-40,719	-39,898	-38,959	-37,730	-35,922	-33,145	-29,410	53,989
	625	-43,363	-43,101	-42,286	-41,355	-40,143	-38,137	-35,360	-31,834	53,623
	650	-45,582	-45,428	-44,665	-43,742	-42,472	-40,353	-37,575	-34,056	53,272
	675	-47,806	-47,653	-47,028	-46,114	-44,694	-42,573	-39,795	-36,280	52,933
	700	-50,037	-49,884	-49,368	-48,442	-46,922	-44,800	-42,020	-38,509	52,606
	725	-52,275	-52,121	-51,652	-50,678	-49,157	-47,033	-44,251	-40,743	52,291
	750	-54,517	-54,363	-53,894	-52,919	-51,396	-49,270	-46,487	-42,980	51,985
	775	-56,759	-56,606	-56,136	-55,160	-53,636	-51,508	-48,723	-45,217	51,690
	800	-58,997	-58,843	-58,345	-57,396	-55,871	-53,740	-50,954	-47,448	51,403
	825	-61,222	-61,069	-60,454	-59,582	-58,093	-55,961	-53,172	-49,667	51,125
	850	-63,427	-63,268	-62,496	-61,629	-60,295	-58,161	-55,370	-51,864	50,855
	875	-65,600	-65,231	-64,462	-63,602	-62,466	-60,330	-57,537	-54,031	50,593
	900	-67,733	-67,114	-66,349	-65,495	-64,427	-62,458	-59,663	-56,156	50,338
	925	-69,521	-68,898	-68,137	-67,289	-66,232	-64,518	-61,722	-58,214	50,089
	950	-71,213	-70,593	-69,837	-68,994	-67,948	-66,381	-63,716	-60,208	49,847
	975	-72,815	-72,199	-71,446	-70,609	-69,574	-68,021	-65,630	-62,082	49,611
	1000	-74,326	-73,713	-72,964	-72,133	-71,108	-69,569	-67,193	-63,662	49,381

2000 MHz – Zone A – 10%

Transmitting / base antenna height (m)	Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
	1	107,173	107,173	107,173	107,173	107,173	107,173	107,173	107,173	107,173
	2	101,405	101,405	101,405	101,405	101,405	101,405	101,405	101,405	101,405
	3	98,116	98,116	98,116	98,116	98,116	98,116	98,116	98,116	98,116
	4	95,835	95,835	95,835	95,835	95,835	95,835	95,835	95,835	95,835
	5	94,098	94,098	94,098	94,098	94,098	94,098	94,098	94,098	94,098
	6	92,703	92,703	92,703	92,703	92,703	92,703	92,703	92,703	92,703
	7	91,540	91,540	91,540	91,540	91,540	91,540	91,540	91,540	91,540
	8	90,544	90,544	90,544	90,544	90,544	90,544	90,544	90,544	90,544
	9	89,675	89,675	89,675	89,675	89,675	89,675	89,675	89,675	89,675
	10	88,905	88,905	88,905	88,905	88,905	88,905	88,905	88,905	88,905
	11	88,214	88,214	88,214	88,214	88,214	88,214	88,214	88,214	88,214
	12	87,587	87,587	87,587	87,587	87,587	87,587	87,587	87,587	87,587
	13	87,013	87,013	87,013	87,013	87,013	87,013	87,013	87,013	87,013
	14	86,485	86,485	86,485	86,485	86,485	86,485	86,485	86,485	86,485
	15	85,995	85,995	85,995	85,995	85,995	85,995	85,995	85,995	85,995
	16	85,539	85,539	85,539	85,539	85,539	85,539	85,539	85,539	85,539
	17	85,112	85,112	85,112	85,112	85,112	85,112	85,112	85,112	85,112
	18	84,710	84,710	84,710	84,710	84,710	84,710	84,710	84,710	84,710
	19	84,328	84,330	84,331	84,331	84,331	84,331	84,331	84,331	84,331
	20	83,850	83,910	83,953	83,966	83,969	83,969	83,969	83,969	83,972
	25	81,594	81,962	82,255	82,368	82,397	82,401	82,402	82,402	82,420
	30	79,501	80,177	80,755	81,031	81,113	81,128	81,130	81,130	81,159
	35	77,525	78,485	79,354	79,848	80,017	80,053	80,057	80,058	80,097
	40	75,649	76,856	78,009	78,753	79,047	79,119	79,128	79,129	79,179
	45	73,860	75,276	76,701	77,704	78,160	78,287	78,306	78,307	78,369
	50	72,153	73,741	75,428	76,677	77,326	77,530	77,565	77,568	77,644
	55	70,521	72,334	74,190	75,660	76,522	76,830	76,888	76,893	76,986
	60	68,959	71,019	72,990	74,649	75,732	76,170	76,262	76,270	76,382
	65	67,718	69,844	71,876	73,670	74,954	75,542	75,678	75,692	75,824
	70	66,618	68,750	70,819	72,714	74,180	74,934	75,128	75,151	75,303
	75	65,578	67,711	69,804	71,774	73,403	74,336	74,606	74,639	74,814
	80	64,591	66,720	68,827	70,855	72,623	73,743	74,105	74,154	74,353
	85	63,650	65,772	67,887	69,957	71,842	73,148	73,621	73,691	73,916
	90	62,753	64,866	66,982	69,082	71,063	72,549	73,150	73,248	73,500
	95	61,895	63,998	66,112	68,232	70,288	71,944	72,689	72,822	73,103
	100	61,074	63,165	65,274	67,406	69,522	71,332	72,234	72,411	72,723
	110	59,535	61,600	63,693	65,833	68,028	70,091	71,331	71,627	72,006
	120	58,120	60,158	62,228	64,362	66,596	68,843	70,424	70,885	71,339
	130	56,814	58,822	60,868	62,985	65,235	67,606	69,504	70,173	70,715
	140	55,596	57,576	59,595	61,692	63,941	66,392	68,565	69,484	70,129
	150	54,448	56,400	58,392	60,466	62,704	65,204	67,606	68,806	69,574
	160	53,348	55,273	57,239	59,289	61,513	64,040	66,627	68,133	69,049
	170	52,280	54,180	56,121	58,148	60,353	62,894	65,627	67,452	68,550
	180	51,230	53,106	55,024	57,028	59,214	61,759	64,604	66,753	68,075
	190	50,189	52,043	53,938	55,921	58,087	60,630	63,560	66,024	67,621
	200	49,152	50,985	52,860	54,821	56,967	59,503	62,496	65,256	67,187
	225	46,574	48,358	50,184	52,096	54,192	56,696	59,769	63,119	66,178
	250	44,042	45,782	47,562	49,427	51,471	53,932	57,014	60,700	65,264
	275	41,603	43,300	45,035	46,852	48,845	51,254	54,309	58,135	64,430
	300	39,286	40,939	42,630	44,400	46,340	48,694	51,703	55,559	63,662
	325	37,096	38,706	40,353	42,076	43,963	46,261	49,215	53,049	62,952
	350	35,022	36,590	38,193	39,870	41,705	43,946	46,842	50,632	62,292
	375	33,047	34,574	36,135	37,766	39,550	41,735	44,572	48,306	61,675
	400	31,154	32,640	34,159	35,747	37,481	39,611	42,390	46,065	61,096
	425	29,325	30,773	32,252	33,797	35,482	37,559	40,280	43,896	60,551
	450	27,550	28,959	30,400	31,903	33,541	35,566	38,231	41,787	60,036
	475	25,816	27,189	28,592	30,055	31,648	33,623	36,233	39,730	59,548
	500	24,118	25,455	26,821	28,245	29,794	31,720	34,277	37,717	59,084
	525	22,449	23,752	25,082	26,469	27,975	29,853	32,359	35,743	58,641
	550	20,805	22,074	23,370	24,720	26,185	28,018	30,472	33,802	58,219
	575	19,183	20,420	21,682	22,996	24,421	26,209	28,615	31,892	57,814
	600	17,580	18,786	20,016	21,295	22,681	24,426	26,784	30,009	57,426
	625	15,997	17,171	18,370	19,616	20,963	22,666	24,978	28,152	57,053
	650	14,430	15,575	16,742	17,955	19,266	20,928	23,194	26,319	56,694
	675	12,880	13,996	15,133	16,314	17,589	19,211	21,433	24,510	56,348
	700	11,346	12,433	13,541	14,691	15,931	17,514	19,693	22,723	56,014
	725	9,828	10,887	11,967	13,087	14,292	15,837	17,974	20,958	55,691
	750	8,326	9,359	10,410	11,501	12,673	14,180	16,276	19,214	55,379
	775	6,840	7,847	8,871	9,933	11,072	12,543	14,599	17,493	55,076
	800	5,372	6,352	7,350	8,383	9,491	10,926	12,942	15,793	54,782
	825	3,920	4,876	5,847	6,853	7,929	9,329	11,307	14,116	54,497
	850	2,487	3,417	4,364	5,342	6,388	7,754	9,694	12,461	54,220
	875	1,072	1,978	2,899	3,851	4,867	6,200	8,103	10,829	53,951
	900	-0,324	0,559	1,455	2,381	3,368	4,668	6,535	9,221	53,688
	925	-1,700	-0,841	0,032	0,932	1,890	3,158	4,990	7,637	53,433
	950	-3,056	-2,219	-1,370	-0,494	0,435	1,672	3,468	6,077	53,184
	975	-4,390	-3,576	-2,749	-1,898	-0,996	0,210	1,972	4,542	52,941
	1000	-5,702	-4,910	-4,106	-3,279	-2,404	-1,228	0,500	3,033	52,704

2000 MHz – Zone A – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,446	107,446	107,446	107,446	107,446	107,446	107,446	107,446	107,446
	2	101,923	101,923	101,923	101,923	101,923	101,923	101,923	101,923	101,923
	3	98,856	98,856	98,856	98,856	98,856	98,856	98,856	98,856	98,856
	4	96,774	96,774	96,774	96,774	96,774	96,774	96,774	96,774	96,774
	5	95,218	95,218	95,218	95,218	95,218	95,218	95,218	95,218	95,218
	6	93,985	93,985	93,985	93,985	93,985	93,985	93,985	93,985	93,985
	7	92,969	92,969	92,969	92,969	92,969	92,969	92,969	92,969	92,969
	8	92,107	92,107	92,107	92,107	92,107	92,107	92,107	92,107	92,107
	9	91,358	91,358	91,358	91,358	91,358	91,358	91,358	91,358	91,358
	10	90,697	90,697	90,697	90,697	90,697	90,697	90,697	90,697	90,697
	11	90,105	90,105	90,105	90,105	90,105	90,105	90,105	90,105	90,105
	12	89,569	89,569	89,569	89,569	89,569	89,569	89,569	89,569	89,569
	13	89,077	89,077	89,077	89,077	89,077	89,077	89,077	89,077	89,077
	14	88,624	88,624	88,624	88,624	88,624	88,624	88,624	88,624	88,624
	15	88,202	88,202	88,202	88,202	88,202	88,202	88,202	88,202	88,202
	16	87,808	87,808	87,808	87,808	87,808	87,808	87,808	87,808	87,808
	17	87,438	87,438	87,438	87,438	87,438	87,438	87,438	87,438	87,438
	18	87,089	87,089	87,089	87,089	87,089	87,089	87,089	87,089	87,089
	19	86,758	86,758	86,758	86,758	86,758	86,758	86,758	86,758	86,758
	20	86,443	86,443	86,443	86,443	86,443	86,443	86,443	86,443	86,443
	25	85,066	85,066	85,066	85,066	85,066	85,066	85,066	85,066	85,066
	30	83,927	83,927	83,927	83,927	83,927	83,927	83,927	83,927	83,927
	35	82,955	82,955	82,955	82,955	82,955	82,955	82,955	82,955	82,955
	40	82,106	82,106	82,106	82,106	82,106	82,106	82,106	82,106	82,106
	45	81,352	81,352	81,352	81,352	81,352	81,352	81,352	81,352	81,352
	50	80,673	80,673	80,673	80,673	80,673	80,673	80,673	80,673	80,673
	55	80,055	80,055	80,055	80,055	80,055	80,055	80,055	80,055	80,055
	60	79,486	79,486	79,486	79,486	79,486	79,486	79,486	79,486	79,486
	65	78,958	78,958	78,958	78,958	78,958	78,958	78,958	78,958	78,958
	70	78,464	78,464	78,464	78,464	78,464	78,464	78,464	78,464	78,464
	75	77,999	77,999	77,999	77,999	77,999	77,999	77,999	77,999	77,999
	80	77,560	77,560	77,560	77,560	77,560	77,560	77,560	77,560	77,560
	85	77,142	77,142	77,142	77,142	77,142	77,142	77,142	77,142	77,142
	90	76,744	76,744	76,744	76,744	76,744	76,744	76,744	76,744	76,744
	95	76,362	76,362	76,362	76,362	76,362	76,362	76,362	76,362	76,362
	100	75,995	75,995	75,995	75,995	75,995	75,995	75,995	75,995	75,995
	110	75,302	75,302	75,302	75,302	75,302	75,302	75,302	75,302	75,302
	120	74,655	74,655	74,655	74,655	74,655	74,655	74,655	74,655	74,655
	130	74,046	74,046	74,046	74,046	74,046	74,046	74,046	74,046	74,046
	140	73,472	73,472	73,472	73,472	73,472	73,472	73,472	73,472	73,472
	150	72,927	72,927	72,927	72,927	72,927	72,927	72,927	72,927	72,927
	160	72,410	72,410	72,410	72,410	72,410	72,410	72,410	72,410	72,410
	170	71,917	71,917	71,917	71,917	71,917	71,917	71,917	71,917	71,917
	180	71,446	71,446	71,446	71,446	71,446	71,446	71,446	71,446	71,446
	190	70,995	70,995	70,995	70,995	70,995	70,995	70,995	70,995	70,995
	200	70,564	70,564	70,564	70,564	70,564	70,564	70,564	70,564	70,564
	225	69,559	69,559	69,559	69,559	69,559	69,559	69,559	69,559	69,559
	250	68,645	68,645	68,645	68,645	68,645	68,645	68,645	68,645	68,645
	275	67,808	67,808	67,808	67,808	67,808	67,808	67,808	67,808	67,808
	300	67,038	67,038	67,038	67,038	67,038	67,038	67,038	67,038	67,038
	325	66,325	66,325	66,325	66,325	66,325	66,325	66,325	66,325	66,325
	350	65,026	65,026	65,026	65,026	65,026	65,026	65,026	65,026	65,661
	375	63,667	63,667	63,667	63,667	63,667	63,667	63,667	63,667	65,041
	400	62,351	62,351	62,351	62,351	62,351	62,351	62,351	62,351	64,458
	425	61,073	61,073	61,073	61,073	61,073	61,073	61,073	61,073	63,909
	450	59,824	59,824	59,824	59,824	59,824	59,824	59,824	59,824	63,390
	475	58,599	58,599	58,599	58,599	58,599	58,599	58,599	58,599	62,898
	500	57,390	57,390	57,390	57,390	57,390	57,390	57,390	57,390	62,430
	525	56,195	56,195	56,195	56,195	56,195	56,195	56,195	56,195	61,983
	550	55,010	55,010	55,010	55,010	55,010	55,010	55,010	55,010	61,557
	575	53,832	53,832	53,832	53,832	53,832	53,832	53,832	53,832	61,148
	600	52,660	52,660	52,660	52,660	52,660	52,660	52,660	52,660	60,756
	625	51,494	51,494	51,494	51,494	51,494	51,494	51,494	51,494	60,379
	650	50,333	50,333	50,333	50,333	50,333	50,333	50,333	50,333	60,016
	675	49,178	49,178	49,178	49,178	49,178	49,178	49,178	49,178	59,666
	700	48,028	48,028	48,028	48,028	48,028	48,028	48,028	48,028	59,328
	725	46,883	46,883	46,883	46,883	46,883	46,883	46,883	46,883	59,002
	750	45,743	45,743	45,743	45,743	45,743	45,743	45,743	45,743	58,685
	775	44,608	44,608	44,608	44,608	44,608	44,608	44,608	44,608	58,379
	800	43,478	43,478	43,478	43,478	43,478	43,478	43,478	43,478	58,081
	825	42,352	42,352	42,352	42,352	42,352	42,352	42,352	42,352	57,792
	850	41,231	41,231	41,231	41,231	41,231	41,231	41,231	41,231	57,511
	875	40,115	40,115	40,115	40,115	40,115	40,115	40,115	40,115	57,238
	900	39,005	39,005	39,005	39,005	39,005	39,005	39,005	39,005	56,972
	925	37,902	37,902	37,902	37,902	37,902	37,902	37,902	37,902	56,713
	950	36,806	36,806	36,806	36,806	36,806	36,806	36,806	36,806	56,460
	975	35,720	35,720	35,720	35,720	35,720	35,720	35,720	35,720	56,213
	1000	34,644	34,644	34,644	34,644	34,644	34,644	34,644	34,644	55,972

2000 MHz – Zone B – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	106,903	106,903	106,903	106,903	106,903	106,903	106,903	106,903	106,903
	2	100,885	100,885	100,885	100,885	100,885	100,885	100,885	100,885	100,885
	3	97,365	97,365	97,365	97,365	97,365	97,365	97,365	97,365	97,365
	4	94,869	94,869	94,869	94,869	94,869	94,869	94,869	94,869	94,869
	5	92,933	92,933	92,933	92,933	92,933	92,933	92,933	92,933	92,933
	6	91,231	91,302	91,336	91,349	91,352	91,352	91,352	91,352	91,352
	7	89,616	89,842	89,956	90,005	90,015	90,015	90,015	90,015	90,015
	8	88,080	88,504	88,730	88,834	88,857	88,858	88,858	88,858	88,858
	9	86,578	87,238	87,611	87,791	87,836	87,837	87,837	87,837	87,837
	10	85,082	86,012	86,564	86,846	86,922	86,924	86,924	86,924	86,924
	11	83,575	84,799	85,563	85,975	86,095	86,098	86,098	86,098	86,098
	12	82,050	83,583	84,589	85,161	85,339	85,344	85,344	85,344	85,344
	13	80,504	82,353	83,627	84,388	84,642	84,651	84,651	84,651	84,651
	14	78,939	81,102	82,663	83,646	83,996	84,009	84,009	84,009	84,009
	15	77,358	79,827	81,688	82,922	83,392	83,412	83,412	83,412	83,412
	16	75,768	78,526	80,697	82,209	82,824	82,853	82,853	82,853	82,853
	17	74,173	77,202	79,683	81,499	82,286	82,328	82,329	82,329	82,329
	18	72,581	75,858	78,645	80,785	81,775	81,834	81,834	81,834	81,834
	19	70,997	74,497	77,580	80,061	81,285	81,366	81,366	81,366	81,366
	20	69,424	73,124	76,489	79,323	80,814	80,922	80,922	80,922	80,922
	25	61,874	66,235	70,718	75,299	78,607	78,989	78,992	78,992	78,992
	30	55,000	59,612	64,707	70,648	76,361	77,400	77,416	77,416	77,416
	35	48,831	53,473	58,812	65,547	73,710	76,025	76,084	76,084	76,084
	40	43,292	47,858	53,231	60,294	70,396	74,754	74,930	74,930	74,930
	45	38,292	42,736	48,037	55,126	66,371	73,456	73,911	73,913	73,913
	50	33,747	38,054	43,231	50,179	61,808	71,950	72,998	73,003	73,003
	55	29,587	33,754	38,790	45,509	56,968	70,006	72,164	72,179	72,179
	60	25,755	29,789	34,679	41,132	52,084	67,404	71,383	71,428	71,428
	65	22,210	26,120	30,870	37,042	47,314	64,038	70,622	70,736	70,736
	70	18,925	22,720	27,337	33,229	42,747	59,991	69,824	70,095	70,096
	75	15,889	19,575	24,063	29,680	38,435	55,486	68,895	69,499	69,499
	80	13,106	16,683	21,042	26,387	34,400	50,777	67,689	68,940	68,941
	85	10,597	14,056	18,274	23,344	30,658	46,069	66,012	68,413	68,417
	90	8,389	11,712	15,765	20,549	27,214	41,504	63,671	67,911	67,923
	95	7,194	9,709	13,558	18,038	24,101	37,192	60,579	67,427	67,455
	100	6,597	8,027	11,632	15,787	21,302	33,180	56,812	66,945	67,011
	110	5,445	6,445	8,470	11,947	16,526	26,106	48,120	65,866	66,186
	120	4,318	5,134	6,271	8,895	12,730	20,333	39,307	64,156	65,433
	130	3,193	3,872	4,871	6,557	9,738	15,777	31,363	60,711	64,740
	140	2,058	2,635	3,529	5,076	7,408	12,248	24,673	54,647	64,098
	150	0,908	1,406	2,221	3,661	5,844	9,506	19,301	46,756	63,499
	160	-0,259	0,178	0,931	2,288	4,355	7,422	15,114	38,606	62,940
	170	-1,442	-1,054	-0,349	0,943	2,919	5,832	11,871	31,182	62,414
	180	-2,640	-2,289	-1,622	-0,382	1,520	4,310	9,311	24,866	61,918
	190	-3,848	-3,527	-2,892	-1,693	0,151	2,840	7,209	19,704	61,449
	200	-5,063	-4,767	-4,156	-2,991	-1,195	1,412	5,402	15,568	61,004
	225	-8,111	-7,860	-7,293	-6,187	-4,476	-2,015	1,557	8,375	59,981
	250	-11,138	-10,915	-10,376	-9,301	-7,642	-5,273	-1,836	3,607	59,066
	275	-14,110	-13,906	-13,320	-12,172	-10,568	-8,271	-4,973	-0,116	58,238
	300	-17,005	-16,813	-16,038	-14,913	-13,353	-11,114	-7,904	-3,326	57,482
	325	-19,812	-19,571	-18,629	-17,525	-16,003	-13,811	-10,668	-6,240	56,786
	350	-22,527	-22,048	-21,119	-20,032	-18,543	-16,394	-13,305	-8,972	56,142
	375	-25,151	-24,455	-23,538	-22,467	-21,009	-18,898	-15,856	-11,590	55,542
	400	-27,557	-26,813	-25,907	-24,851	-23,421	-21,346	-18,346	-14,134	54,981
	425	-29,886	-29,151	-28,254	-27,213	-25,808	-23,767	-20,806	-16,640	54,454
	450	-32,212	-31,485	-30,597	-29,569	-28,189	-26,179	-23,254	-19,129	53,957
	475	-34,543	-33,823	-32,944	-31,928	-30,571	-28,591	-25,700	-21,612	53,487
	500	-36,885	-36,171	-35,300	-34,296	-32,960	-31,008	-28,150	-24,096	53,041
	525	-39,237	-38,530	-37,667	-36,674	-35,358	-33,433	-30,605	-26,584	52,617
	550	-41,598	-40,898	-40,042	-39,059	-37,763	-35,863	-33,065	-29,074	52,212
	575	-43,872	-43,268	-42,419	-41,447	-40,169	-38,294	-35,523	-31,561	51,826
	600	-46,073	-45,637	-44,795	-43,832	-42,573	-40,720	-37,872	-34,043	51,455
	625	-48,271	-48,003	-47,168	-46,214	-44,972	-42,917	-40,071	-36,459	51,100
	650	-50,470	-50,312	-49,531	-48,586	-47,285	-45,115	-42,271	-38,667	50,759
	675	-52,674	-52,517	-51,877	-50,941	-49,488	-47,318	-44,474	-40,877	50,431
	700	-54,884	-54,728	-54,200	-53,252	-51,698	-49,527	-46,683	-43,091	50,115
	725	-57,102	-56,945	-56,465	-55,469	-53,914	-51,742	-48,899	-45,311	49,809
	750	-59,324	-59,167	-58,687	-57,690	-56,135	-53,962	-51,118	-47,534	49,514
	775	-61,546	-61,390	-60,910	-59,912	-58,356	-56,182	-53,338	-49,756	49,229
	800	-63,764	-63,607	-63,098	-62,130	-60,572	-58,397	-55,552	-51,973	48,953
	825	-65,969	-65,813	-65,186	-64,295	-62,776	-60,600	-57,754	-54,177	48,685
	850	-68,154	-67,992	-67,204	-66,320	-64,960	-62,783	-59,936	-56,359	48,425
	875	-70,308	-69,931	-69,148	-68,270	-67,112	-64,934	-62,086	-58,511	48,173
	900	-72,421	-71,790	-71,011	-70,140	-69,051	-67,044	-64,196	-60,621	47,928
	925	-74,189	-73,555	-72,780	-71,915	-70,839	-69,092	-66,243	-62,669	47,689
	950	-75,862	-75,231	-74,460	-73,602	-72,537	-70,940	-68,226	-64,652	47,457
	975	-77,445	-76,817	-76,051	-75,198	-74,145	-72,563	-70,128	-66,515	47,231
	1000	-78,937	-78,313	-77,550	-76,704	-75,661	-74,093	-71,675	-68,080	47,011

2000 MHz – Zone B – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,104	107,104	107,104	107,104	107,104	107,104	107,104	107,104	107,104
	2	101,267	101,267	101,267	101,267	101,267	101,267	101,267	101,267	101,267
	3	97,913	97,913	97,913	97,913	97,913	97,913	97,913	97,913	97,913
	4	95,566	95,566	95,566	95,566	95,566	95,566	95,566	95,566	95,566
	5	93,765	93,765	93,765	93,765	93,765	93,765	93,765	93,765	93,765
	6	92,307	92,307	92,307	92,307	92,307	92,307	92,307	92,307	92,307
	7	91,083	91,083	91,083	91,083	91,083	91,083	91,083	91,083	91,083
	8	90,027	90,027	90,027	90,027	90,027	90,027	90,027	90,027	90,027
	9	89,100	89,100	89,100	89,100	89,100	89,100	89,100	89,100	89,100
	10	88,272	88,272	88,272	88,272	88,272	88,272	88,272	88,272	88,272
	11	87,524	87,524	87,524	87,524	87,524	87,524	87,524	87,524	87,524
	12	86,842	86,842	86,842	86,842	86,842	86,842	86,842	86,842	86,842
	13	86,186	86,204	86,211	86,213	86,213	86,213	86,213	86,213	86,214
	14	85,505	85,582	85,618	85,626	85,628	85,628	85,628	85,628	85,632
	15	84,853	84,993	85,062	85,079	85,082	85,083	85,083	85,083	85,091
	16	84,226	84,429	84,538	84,566	84,571	84,571	84,571	84,571	84,583
	17	83,620	83,886	84,041	84,082	84,089	84,090	84,091	84,091	84,106
	18	83,032	83,362	83,567	83,623	83,635	83,636	83,636	83,636	83,655
	19	82,460	82,853	83,113	83,188	83,204	83,206	83,206	83,206	83,228
	20	81,901	82,358	82,678	82,773	82,794	82,797	82,797	82,797	82,822
	25	79,270	80,063	80,695	80,938	80,999	81,009	81,010	81,010	81,048
	30	76,839	77,960	78,918	79,376	79,511	79,536	79,539	79,539	79,588
	35	74,558	75,972	77,251	77,979	78,227	78,281	78,287	78,288	78,345
	40	72,405	74,067	75,654	76,678	77,082	77,181	77,195	77,196	77,264
	45	70,368	72,233	74,111	75,431	76,032	76,199	76,224	76,226	76,308
	50	68,436	70,464	72,619	74,214	75,044	75,305	75,349	75,353	75,450
	55	66,602	68,865	71,182	73,017	74,093	74,478	74,550	74,556	74,672
	60	64,857	67,383	69,800	71,835	73,163	73,701	73,813	73,824	73,961
	65	63,451	66,035	68,506	70,687	72,248	72,962	73,128	73,145	73,305
	70	62,203	64,779	67,279	69,568	71,340	72,250	72,486	72,513	72,697
	75	61,029	63,592	66,107	68,476	70,433	71,554	71,878	71,919	72,129
	80	59,921	62,467	64,987	67,413	69,527	70,867	71,300	71,359	71,597
	85	58,872	61,399	63,917	66,382	68,626	70,181	70,744	70,828	71,096
	90	57,877	60,383	62,893	65,383	67,731	69,495	70,207	70,323	70,622
	95	56,931	59,416	61,914	64,418	66,848	68,804	69,684	69,841	70,173
	100	56,032	58,494	60,977	63,487	65,979	68,109	69,171	69,380	69,746
	110	54,358	56,775	59,224	61,728	64,296	66,710	68,160	68,507	68,950
	120	52,836	55,207	57,617	60,099	62,700	65,315	67,155	67,691	68,220
	130	51,442	53,769	56,138	58,591	61,197	63,944	66,141	66,917	67,545
	140	50,156	52,440	54,768	57,187	59,780	62,608	65,113	66,173	66,917
	150	48,953	51,195	53,484	55,866	58,438	61,310	64,069	65,449	66,331
	160	47,810	50,013	52,263	54,610	57,155	60,047	63,008	64,731	65,780
	170	46,709	48,875	51,088	53,399	55,914	58,812	61,928	64,009	65,261
	180	45,633	47,764	49,943	52,220	54,704	57,595	60,828	63,269	64,771
	190	44,573	46,671	48,817	51,061	53,513	56,392	59,709	62,499	64,306
	200	43,522	45,590	47,704	49,916	52,336	55,197	58,573	61,686	63,864
	225	40,926	42,921	44,963	47,100	49,443	52,243	55,679	59,424	62,845
	250	38,393	40,323	42,297	44,365	46,632	49,361	52,780	56,867	61,930
	275	35,963	37,831	39,742	41,743	43,937	46,591	49,955	54,168	61,100
	300	33,660	35,469	37,320	39,258	41,381	43,958	47,252	51,472	60,341
	325	31,488	33,241	35,034	36,910	38,965	41,467	44,684	48,859	59,641
	350	29,434	31,133	32,871	34,689	36,677	39,107	42,247	46,354	58,993
	375	27,480	29,128	30,814	32,575	34,501	36,860	39,924	43,955	58,389
	400	25,608	27,208	28,842	30,551	32,416	34,708	37,697	41,651	57,823
	425	23,803	25,355	26,941	28,598	30,405	32,633	35,551	39,429	57,291
	450	22,049	23,557	25,097	26,705	28,456	30,622	33,472	37,274	56,790
	475	20,339	21,803	23,299	24,859	26,558	28,664	31,448	35,178	56,315
	500	18,663	20,086	21,539	23,054	24,702	26,751	29,472	33,132	55,864
	525	17,016	18,400	19,812	21,283	22,882	24,876	27,536	31,128	55,435
	550	15,395	16,740	18,112	19,542	21,093	23,035	25,635	29,162	55,025
	575	13,795	15,103	16,438	17,827	19,333	21,223	23,767	27,230	54,634
	600	12,215	13,488	14,785	16,135	17,597	19,439	21,927	25,330	54,259
	625	10,654	11,891	13,153	14,466	15,885	17,679	20,114	23,457	53,899
	650	9,109	10,313	11,541	12,817	14,195	15,942	18,326	21,612	53,553
	675	7,581	8,753	9,947	11,187	12,526	14,228	16,562	19,792	53,220
	700	6,069	7,209	8,371	9,577	10,877	12,536	14,821	17,997	52,899
	725	4,573	5,683	6,813	7,985	9,247	10,864	13,102	16,226	52,589
	750	3,093	4,173	5,273	6,413	7,638	9,214	11,405	14,478	52,290
	775	1,629	2,680	3,750	4,859	6,048	7,584	9,731	12,754	52,000
	800	0,183	1,205	2,246	3,324	4,479	5,976	8,079	11,053	51,719
	825	-1,247	-0,252	0,760	1,808	2,929	4,388	6,449	9,375	51,447
	850	-2,659	-1,691	-0,706	0,312	1,401	2,823	4,842	7,722	51,182
	875	-4,053	-3,111	-2,153	-1,163	-0,107	1,279	3,258	6,092	50,926
	900	-5,428	-4,511	-3,579	-2,618	-1,593	-0,242	1,697	4,487	50,676
	925	-6,782	-5,891	-4,985	-4,050	-3,056	-1,740	0,160	2,907	50,433
	950	-8,117	-7,249	-6,369	-5,461	-4,497	-3,215	-1,352	1,352	50,196
	975	-9,430	-8,586	-7,730	-6,849	-5,914	-4,665	-2,839	-0,176	49,966
	1000	-10,721	-9,901	-9,069	-8,213	-7,307	-6,090	-4,301	-1,679	49,741

2000 MHz – Zone B – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,380	107,380	107,380	107,380	107,380	107,380	107,380	107,380	107,380
	2	101,794	101,794	101,794	101,794	101,794	101,794	101,794	101,794	101,794
	3	98,665	98,665	98,665	98,665	98,665	98,665	98,665	98,665	98,665
	4	96,521	96,521	96,521	96,521	96,521	96,521	96,521	96,521	96,521
	5	94,905	94,905	94,905	94,905	94,905	94,905	94,905	94,905	94,905
	6	93,613	93,613	93,613	93,613	93,613	93,613	93,613	93,613	93,613
	7	92,539	92,539	92,539	92,539	92,539	92,539	92,539	92,539	92,539
	8	91,621	91,621	91,621	91,621	91,621	91,621	91,621	91,621	91,621
	9	90,817	90,817	90,817	90,817	90,817	90,817	90,817	90,817	90,817
	10	90,102	90,102	90,102	90,102	90,102	90,102	90,102	90,102	90,102
	11	89,457	89,457	89,457	89,457	89,457	89,457	89,457	89,457	89,457
	12	88,868	88,868	88,868	88,868	88,868	88,868	88,868	88,868	88,868
	13	88,326	88,326	88,326	88,326	88,326	88,326	88,326	88,326	88,326
	14	87,822	87,822	87,822	87,822	87,822	87,822	87,822	87,822	87,822
	15	87,352	87,352	87,352	87,352	87,352	87,352	87,352	87,352	87,352
	16	86,910	86,910	86,910	86,910	86,910	86,910	86,910	86,910	86,910
	17	86,493	86,493	86,493	86,493	86,493	86,493	86,493	86,493	86,493
	18	86,097	86,097	86,097	86,097	86,097	86,097	86,097	86,097	86,097
	19	85,721	85,721	85,721	85,721	85,721	85,721	85,721	85,721	85,721
	20	85,362	85,362	85,362	85,362	85,362	85,362	85,362	85,362	85,362
	25	83,777	83,777	83,777	83,777	83,777	83,777	83,777	83,777	83,777
	30	82,450	82,450	82,450	82,450	82,450	82,450	82,450	82,450	82,450
	35	81,308	81,308	81,308	81,308	81,308	81,308	81,308	81,308	81,308
	40	80,306	80,306	80,306	80,306	80,306	80,306	80,306	80,306	80,306
	45	79,414	79,414	79,414	79,414	79,414	79,414	79,414	79,414	79,414
	50	78,611	78,611	78,611	78,611	78,611	78,611	78,611	78,611	78,611
	55	77,880	77,880	77,880	77,880	77,880	77,880	77,880	77,880	77,880
	60	77,210	77,210	77,210	77,210	77,210	77,210	77,210	77,210	77,210
	65	76,590	76,590	76,590	76,590	76,590	76,590	76,590	76,590	76,590
	70	76,014	76,014	76,014	76,014	76,014	76,014	76,014	76,014	76,014
	75	75,475	75,475	75,475	75,475	75,475	75,475	75,475	75,475	75,475
	80	74,969	74,969	74,969	74,969	74,969	74,969	74,969	74,969	74,969
	85	74,491	74,491	74,491	74,491	74,491	74,491	74,491	74,491	74,491
	90	74,038	74,038	74,038	74,038	74,038	74,038	74,038	74,038	74,038
	95	73,608	73,608	73,608	73,608	73,608	73,608	73,608	73,608	73,608
	100	73,198	73,198	73,198	73,198	73,198	73,198	73,198	73,198	73,198
	110	72,430	72,430	72,430	72,430	72,430	72,430	72,430	72,430	72,430
	120	71,723	71,723	71,723	71,723	71,723	71,723	71,723	71,723	71,723
	130	71,066	71,066	71,066	71,066	71,066	71,066	71,066	71,066	71,066
	140	70,453	70,453	70,453	70,453	70,453	70,453	70,453	70,453	70,453
	150	69,878	69,878	69,878	69,878	69,878	69,878	69,878	69,878	69,878
	160	69,337	69,337	69,337	69,337	69,337	69,337	69,337	69,337	69,337
	170	68,825	68,825	68,825	68,825	68,825	68,825	68,825	68,825	68,825
	180	68,340	68,340	68,340	68,340	68,340	68,340	68,340	68,340	68,340
	190	67,879	67,879	67,879	67,879	67,879	67,879	67,879	67,879	67,879
	200	67,440	67,440	67,440	67,440	67,440	67,440	67,440	67,440	67,440
	225	66,425	66,425	66,425	66,425	66,425	66,425	66,425	66,425	66,425
	250	65,510	65,510	65,510	65,510	65,510	65,510	65,510	65,510	65,510
	275	64,127	64,127	64,127	64,127	64,127	64,127	64,127	64,127	64,679
	300	62,634	62,634	62,634	62,634	62,634	62,634	62,634	62,634	63,916
	325	61,194	61,194	61,194	61,194	61,194	61,194	61,194	61,194	63,213
	350	59,806	59,806	59,806	59,806	59,806	59,806	59,806	59,806	62,561
	375	58,467	58,467	58,467	58,467	58,467	58,467	58,467	58,467	61,952
	400	57,172	57,172	57,172	57,172	57,172	57,172	57,172	57,172	61,381
	425	55,914	55,914	55,914	55,914	55,914	55,914	55,914	55,914	60,845
	450	54,687	54,687	54,687	54,687	54,687	54,687	54,687	54,687	60,338
	475	53,482	53,482	53,482	53,482	53,482	53,482	53,482	53,482	59,859
	500	52,295	52,295	52,295	52,295	52,295	52,295	52,295	52,295	59,403
	525	51,121	51,121	51,121	51,121	51,121	51,121	51,121	51,121	58,969
	550	49,956	49,956	49,956	49,956	49,956	49,956	49,956	49,956	58,555
	575	48,799	48,799	48,799	48,799	48,799	48,799	48,799	48,799	58,159
	600	47,649	47,649	47,649	47,649	47,649	47,649	47,649	47,649	57,779
	625	46,503	46,503	46,503	46,503	46,503	46,503	46,503	46,503	57,415
	650	45,364	45,364	45,364	45,364	45,364	45,364	45,364	45,364	57,064
	675	44,229	44,229	44,229	44,229	44,229	44,229	44,229	44,229	56,726
	700	43,100	43,100	43,100	43,100	43,100	43,100	43,100	43,100	56,401
	725	41,975	41,975	41,975	41,975	41,975	41,975	41,975	41,975	56,086
	750	40,856	40,856	40,856	40,856	40,856	40,856	40,856	40,856	55,782
	775	39,741	39,741	39,741	39,741	39,741	39,741	39,741	39,741	55,487
	800	38,631	38,631	38,631	38,631	38,631	38,631	38,631	38,631	55,202
	825	37,525	37,525	37,525	37,525	37,525	37,525	37,525	37,525	54,925
	850	36,424	36,424	36,424	36,424	36,424	36,424	36,424	36,424	54,656
	875	35,328	35,328	35,328	35,328	35,328	35,328	35,328	35,328	54,395
	900	34,238	34,238	34,238	34,238	34,238	34,238	34,238	34,238	54,140
	925	33,155	33,155	33,155	33,155	33,155	33,155	33,155	33,155	53,893
	950	32,079	32,079	32,079	32,079	32,079	32,079	32,079	32,079	53,652
	975	31,012	31,012	31,012	31,012	31,012	31,012	31,012	31,012	53,417
	1000	29,956	29,956	29,956	29,956	29,956	29,956	29,956	29,956	53,187

2000 MHz – Zone C – 50%

Transmitting / base antenna height (m)	Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
	1	106,900	106,900	106,900	106,900	106,900	106,900	106,900	106,900	106,900
	2	100,879	100,879	100,879	100,879	100,879	100,879	100,879	100,879	100,879
	3	97,358	97,358	97,358	97,358	97,358	97,358	97,358	97,358	97,358
	4	94,859	94,859	94,859	94,859	94,859	94,859	94,859	94,859	94,859
	5	92,867	92,900	92,914	92,920	92,921	92,921	92,921	92,921	92,921
	6	91,077	91,230	91,302	91,331	91,337	91,337	91,337	91,337	91,337
	7	89,438	89,755	89,915	89,984	89,998	89,998	89,998	89,998	89,998
	8	87,879	88,402	88,681	88,809	88,838	88,838	88,838	88,838	88,838
	9	86,353	87,121	87,553	87,762	87,814	87,815	87,815	87,815	87,815
	10	84,835	85,877	86,497	86,813	86,898	86,900	86,900	86,900	86,900
	11	83,306	84,648	85,486	85,938	86,069	86,072	86,072	86,072	86,072
	12	81,759	83,415	84,501	85,119	85,311	85,316	85,316	85,316	85,316
	13	80,192	82,167	83,527	84,341	84,612	84,621	84,621	84,621	84,621
	14	78,606	80,898	82,551	83,592	83,963	83,977	83,977	83,977	83,977
	15	77,006	79,604	81,564	82,862	83,357	83,378	83,378	83,378	83,378
	16	75,395	78,285	80,558	82,143	82,786	82,818	82,818	82,818	82,818
	17	73,781	76,942	79,531	81,425	82,247	82,291	82,291	82,291	82,291
	18	72,170	75,578	78,477	80,703	81,733	81,794	81,795	81,795	81,795
	19	70,567	74,199	77,397	79,971	81,241	81,325	81,325	81,325	81,325
	20	68,976	72,807	76,290	79,224	80,767	80,879	80,879	80,879	80,879
	25	61,340	65,824	70,434	75,144	78,544	78,937	78,941	78,941	78,941
	30	54,387	59,114	64,335	70,422	76,276	77,341	77,358	77,358	77,358
	35	48,149	52,896	58,355	65,242	73,591	75,958	76,019	76,019	76,019
	40	42,546	47,209	52,697	59,910	70,228	74,679	74,858	74,859	74,859
	45	37,489	42,024	47,432	54,666	66,141	73,370	73,834	73,836	73,836
	50	32,892	37,283	42,563	49,648	61,506	71,847	72,915	72,921	72,921
	55	28,685	32,932	38,064	44,912	56,591	69,878	72,077	72,093	72,093
	60	24,811	28,921	33,903	40,476	51,633	67,238	71,292	71,337	71,337
	65	21,229	25,210	30,047	36,332	46,791	63,821	70,526	70,642	70,642
	70	17,910	21,773	26,472	32,470	42,159	59,712	69,722	69,998	69,998
	75	14,843	18,594	23,161	28,877	37,786	55,139	68,784	69,398	69,399
	80	12,032	15,672	20,106	25,544	33,697	50,358	67,565	68,837	68,838
	85	9,498	13,017	17,307	22,464	29,904	45,580	65,865	68,307	68,312
	90	7,268	10,647	14,769	19,635	26,413	40,946	63,491	67,803	67,815
	95	6,052	8,610	12,525	17,082	23,249	36,564	60,351	67,317	67,346
	100	5,438	6,892	10,560	14,787	20,398	32,482	56,523	66,832	66,900
	110	4,254	5,272	7,333	10,872	15,532	25,282	47,686	65,746	66,072
	120	3,102	3,933	5,090	7,762	11,666	19,406	38,721	64,016	65,316
	130	1,958	2,649	3,666	5,382	8,621	14,770	30,638	60,519	64,621
	140	0,807	1,394	2,305	3,880	6,254	11,182	23,834	54,355	63,977
	150	-0,356	0,151	0,981	2,447	4,671	8,399	18,373	46,329	63,378
	160	-1,533	-1,088	-0,321	1,060	3,166	6,289	14,120	38,040	62,818
	170	-2,724	-2,328	-1,611	-0,295	1,716	4,683	10,831	30,493	62,291
	180	-3,927	-3,570	-2,891	-1,629	0,308	3,148	8,239	24,075	61,795
	190	-5,139	-4,813	-4,166	-2,946	-1,069	1,668	6,115	18,834	61,325
	200	-6,358	-6,057	-5,435	-4,249	-2,421	0,232	4,293	14,639	60,879
	225	-9,410	-9,154	-8,578	-7,453	-5,712	-3,209	0,425	7,360	59,856
	250	-12,437	-12,210	-11,662	-10,569	-8,883	-6,474	-2,980	2,554	58,941
	275	-15,408	-15,200	-14,604	-13,438	-11,808	-9,474	-6,122	-1,187	58,113
	300	-18,299	-18,104	-17,317	-16,174	-14,590	-12,315	-9,055	-4,405	57,358
	325	-21,102	-20,857	-19,901	-18,780	-17,235	-15,010	-11,818	-7,323	56,662
	350	-23,812	-23,326	-22,383	-21,280	-19,770	-17,589	-14,454	-10,057	56,019
	375	-26,431	-25,726	-24,795	-23,709	-22,230	-20,089	-17,003	-12,676	55,419
	400	-28,832	-28,078	-27,159	-26,089	-24,638	-22,535	-19,493	-15,222	54,859
	425	-31,156	-30,411	-29,502	-28,446	-27,023	-24,954	-21,953	-17,730	54,332
	450	-33,477	-32,740	-31,841	-30,799	-29,400	-27,364	-24,400	-20,221	53,836
	475	-35,803	-35,074	-34,183	-33,154	-31,780	-29,774	-26,846	-22,705	53,366
	500	-38,139	-37,417	-36,535	-35,518	-34,166	-32,189	-29,295	-25,190	52,921
	525	-40,486	-39,770	-38,897	-37,892	-36,560	-34,611	-31,748	-27,677	52,497
	550	-42,843	-42,134	-41,268	-40,273	-38,962	-37,039	-34,207	-30,168	52,093
	575	-45,111	-44,500	-43,641	-42,657	-41,365	-39,468	-36,664	-32,656	51,707
	600	-47,307	-46,866	-46,015	-45,041	-43,767	-41,892	-39,012	-35,139	51,337
	625	-49,500	-49,229	-48,384	-47,420	-46,164	-44,086	-41,208	-37,555	50,982
	650	-51,694	-51,534	-50,744	-49,789	-48,474	-46,280	-43,405	-39,761	50,642
	675	-53,892	-53,734	-53,088	-52,141	-50,673	-48,479	-45,605	-41,969	50,314
	700	-56,098	-55,940	-55,407	-54,449	-52,878	-50,684	-47,811	-44,182	49,998
	725	-58,310	-58,152	-57,667	-56,661	-55,090	-52,896	-50,023	-46,399	49,693
	750	-60,527	-60,369	-59,884	-58,878	-57,306	-55,112	-52,239	-48,619	49,399
	775	-62,745	-62,587	-62,102	-61,095	-59,523	-57,328	-54,456	-50,839	49,114
	800	-64,957	-64,799	-64,286	-63,307	-61,735	-59,539	-56,667	-53,054	48,838
	825	-67,158	-67,000	-66,367	-65,468	-63,935	-61,739	-58,866	-55,255	48,571
	850	-69,338	-69,175	-68,379	-67,487	-66,114	-63,917	-61,044	-57,435	48,312
	875	-71,487	-71,107	-70,316	-69,431	-68,262	-66,064	-63,191	-59,583	48,060
	900	-73,595	-72,958	-72,172	-71,294	-70,196	-68,170	-65,297	-61,690	47,815
	925	-75,358	-74,718	-73,937	-73,064	-71,979	-70,217	-67,343	-63,738	47,577
	950	-77,026	-76,390	-75,613	-74,747	-73,673	-72,062	-69,325	-65,720	47,346
	975	-78,604	-77,971	-77,198	-76,339	-75,276	-73,681	-71,225	-67,583	47,120
	1000	-80,091	-79,462	-78,693	-77,840	-76,788	-75,208	-72,769	-69,145	46,900

2000 MHz – Zone C – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,152	107,152	107,152	107,152	107,152	107,152	107,152	107,152	107,152
	2	101,363	101,363	101,363	101,363	101,363	101,363	101,363	101,363	101,363
	3	98,055	98,055	98,055	98,055	98,055	98,055	98,055	98,055	98,055
	4	95,754	95,754	95,754	95,754	95,754	95,754	95,754	95,754	95,754
	5	93,998	93,998	93,998	93,998	93,998	93,998	93,998	93,998	93,998
	6	92,584	92,584	92,584	92,584	92,584	92,584	92,584	92,584	92,584
	7	91,402	91,402	91,402	91,402	91,402	91,402	91,402	91,402	91,402
	8	90,389	90,389	90,389	90,389	90,389	90,389	90,389	90,389	90,389
	9	89,503	89,503	89,503	89,503	89,503	89,503	89,503	89,503	89,503
	10	88,715	88,715	88,715	88,715	88,715	88,715	88,715	88,715	88,715
	11	88,007	88,007	88,007	88,007	88,007	88,007	88,007	88,007	88,007
	12	87,363	87,363	87,363	87,363	87,363	87,363	87,363	87,363	87,363
	13	86,774	86,774	86,774	86,774	86,774	86,774	86,774	86,774	86,774
	14	86,229	86,229	86,229	86,229	86,229	86,229	86,229	86,229	86,229
	15	85,724	85,724	85,724	85,724	85,724	85,724	85,724	85,724	85,724
	16	85,252	85,252	85,252	85,252	85,252	85,252	85,252	85,252	85,252
	17	84,810	84,810	84,810	84,810	84,810	84,810	84,810	84,810	84,810
	18	84,389	84,391	84,393	84,393	84,394	84,394	84,394	84,394	84,394
	19	83,878	83,941	83,982	83,994	83,996	83,997	83,997	83,997	84,000
	20	83,380	83,503	83,589	83,614	83,620	83,621	83,621	83,621	83,627
	25	81,034	81,469	81,815	81,948	81,981	81,987	81,987	81,987	82,008
	30	78,860	79,606	80,242	80,547	80,636	80,653	80,655	80,655	80,687
	35	76,811	77,842	78,774	79,304	79,485	79,524	79,529	79,529	79,571
	40	74,868	76,146	77,366	78,153	78,465	78,541	78,551	78,552	78,604
	45	73,019	74,505	76,001	77,052	77,531	77,664	77,684	77,686	77,751
	50	71,258	72,914	74,674	75,977	76,654	76,867	76,903	76,906	76,986
	55	69,578	71,461	73,388	74,915	75,810	76,130	76,190	76,195	76,292
	60	67,972	70,103	72,144	73,861	74,982	75,436	75,531	75,540	75,656
	65	66,691	68,888	70,988	72,842	74,170	74,777	74,918	74,932	75,068
	70	65,555	67,756	69,892	71,848	73,362	74,140	74,341	74,364	74,521
	75	64,483	66,682	68,841	70,874	72,553	73,515	73,794	73,828	74,009
	80	63,467	65,660	67,831	69,922	71,743	72,897	73,270	73,321	73,526
	85	62,500	64,685	66,862	68,994	70,934	72,279	72,766	72,839	73,070
	90	61,579	63,753	65,931	68,091	70,129	71,658	72,277	72,377	72,637
	95	60,700	62,862	65,036	67,215	69,330	71,032	71,798	71,935	72,224
	100	59,860	62,009	64,176	66,367	68,541	70,400	71,327	71,510	71,830
	110	58,289	60,409	62,557	64,753	67,006	69,124	70,396	70,701	71,089
	120	56,848	58,937	61,061	63,248	65,540	67,844	69,465	69,938	70,403
	130	55,521	57,579	59,674	61,844	64,149	66,579	68,523	69,209	69,764
	140	54,287	56,314	58,381	60,527	62,830	65,340	67,564	68,505	69,165
	150	53,125	55,122	57,160	59,282	61,572	64,130	66,587	67,816	68,601
	160	52,015	53,983	55,993	58,090	60,363	62,947	65,592	67,131	68,069
	170	50,939	52,880	54,863	56,934	59,188	61,784	64,576	66,441	67,564
	180	49,883	51,798	53,756	55,803	58,035	60,634	63,540	65,734	67,084
	190	48,837	50,729	52,663	54,686	56,897	59,492	62,483	64,997	66,626
	200	47,797	49,666	51,578	53,578	55,767	58,353	61,406	64,220	66,190
	225	45,214	47,031	48,891	50,838	52,972	55,522	58,652	62,062	65,178
	250	42,682	44,451	46,262	48,158	50,237	52,739	55,874	59,622	64,264
	275	40,245	41,968	43,731	45,577	47,601	50,048	53,151	57,037	63,431
	300	37,932	39,609	41,325	43,121	45,089	47,478	50,531	54,444	62,666
	325	35,746	37,378	39,048	40,795	42,707	45,037	48,033	51,919	61,959
	350	33,676	35,265	36,889	38,588	40,446	42,717	45,651	49,490	61,302
	375	31,707	33,252	34,833	36,485	38,290	40,502	43,375	47,155	60,689
	400	29,819	31,323	32,860	34,466	36,220	38,376	41,187	44,906	60,114
	425	27,996	29,460	30,955	32,518	34,222	36,322	39,074	42,730	59,573
	450	26,226	27,650	29,106	30,626	32,281	34,329	37,022	40,616	59,062
	475	24,498	25,885	27,302	28,780	30,389	32,385	35,022	38,555	58,578
	500	22,805	24,156	25,535	26,973	28,537	30,483	33,065	36,539	58,118
	525	21,141	22,457	23,799	25,199	26,720	28,616	31,145	34,562	57,679
	550	19,502	20,784	22,091	23,454	24,932	26,782	29,259	32,619	57,261
	575	17,886	19,134	20,407	21,733	23,170	24,975	27,402	30,708	56,860
	600	16,289	17,505	18,745	20,036	21,433	23,193	25,571	28,824	56,476
	625	14,710	15,895	17,103	18,359	19,718	21,435	23,766	26,966	56,107
	650	13,149	14,303	15,480	16,703	18,024	19,699	21,984	25,134	55,752
	675	11,604	12,729	13,875	15,065	16,350	17,984	20,224	23,324	55,410
	700	10,075	11,171	12,287	13,446	14,695	16,290	18,485	21,538	55,080
	725	8,563	9,630	10,718	11,846	13,060	14,616	16,768	19,774	54,761
	750	7,066	8,106	9,165	10,263	11,444	12,961	15,072	18,032	54,452
	775	5,586	6,599	7,631	8,699	9,847	11,327	13,397	16,312	54,153
	800	4,122	5,110	6,114	7,154	8,269	9,714	11,744	14,614	53,863
	825	2,676	3,638	4,616	5,628	6,711	8,121	10,111	12,938	53,582
	850	1,248	2,184	3,137	4,121	5,174	6,548	8,501	11,285	53,309
	875	-0,162	0,750	1,677	2,635	3,657	4,998	6,913	9,656	53,043
	900	-1,553	-0,665	0,237	1,169	2,161	3,469	5,347	8,050	52,785
	925	-2,924	-2,059	-1,181	-0,276	0,688	1,964	3,805	6,468	52,533
	950	-4,274	-3,433	-2,578	-1,698	-0,763	0,481	2,287	4,911	52,288
	975	-5,603	-4,784	-3,953	-3,098	-2,191	-0,978	0,794	3,378	52,048
	1000	-6,911	-6,114	-5,306	-4,474	-3,594	-2,412	-0,675	1,872	51,815

2000 MHz – Zone C – 1%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	107,457	107,457	107,457	107,457	107,457	107,457	107,457	107,457	107,457
	2	101,946	101,946	101,946	101,946	101,946	101,946	101,946	101,946	101,946
	3	98,890	98,890	98,890	98,890	98,890	98,890	98,890	98,890	98,890
	4	96,819	96,819	96,819	96,819	96,819	96,819	96,819	96,819	96,819
	5	95,273	95,273	95,273	95,273	95,273	95,273	95,273	95,273	95,273
	6	94,051	94,051	94,051	94,051	94,051	94,051	94,051	94,051	94,051
	7	93,045	93,045	93,045	93,045	93,045	93,045	93,045	93,045	93,045
	8	92,192	92,192	92,192	92,192	92,192	92,192	92,192	92,192	92,192
	9	91,454	91,454	91,454	91,454	91,454	91,454	91,454	91,454	91,454
	10	90,803	90,803	90,803	90,803	90,803	90,803	90,803	90,803	90,803
	11	90,220	90,220	90,220	90,220	90,220	90,220	90,220	90,220	90,220
	12	89,692	89,692	89,692	89,692	89,692	89,692	89,692	89,692	89,692
	13	89,210	89,210	89,210	89,210	89,210	89,210	89,210	89,210	89,210
	14	88,765	88,765	88,765	88,765	88,765	88,765	88,765	88,765	88,765
	15	88,353	88,353	88,353	88,353	88,353	88,353	88,353	88,353	88,353
	16	87,967	87,967	87,967	87,967	87,967	87,967	87,967	87,967	87,967
	17	87,605	87,605	87,605	87,605	87,605	87,605	87,605	87,605	87,605
	18	87,264	87,264	87,264	87,264	87,264	87,264	87,264	87,264	87,264
	19	86,941	86,941	86,941	86,941	86,941	86,941	86,941	86,941	86,941
	20	86,634	86,634	86,634	86,634	86,634	86,634	86,634	86,634	86,634
	25	85,293	85,293	85,293	85,293	85,293	85,293	85,293	85,293	85,293
	30	84,188	84,188	84,188	84,188	84,188	84,188	84,188	84,188	84,188
	35	83,246	83,246	83,246	83,246	83,246	83,246	83,246	83,246	83,246
	40	82,424	82,424	82,424	82,424	82,424	82,424	82,424	82,424	82,424
	45	81,694	81,694	81,694	81,694	81,694	81,694	81,694	81,694	81,694
	50	81,038	81,038	81,038	81,038	81,038	81,038	81,038	81,038	81,038
	55	80,439	80,439	80,439	80,439	80,439	80,439	80,439	80,439	80,439
	60	79,888	79,888	79,888	79,888	79,888	79,888	79,888	79,888	79,888
	65	79,376	79,376	79,376	79,376	79,376	79,376	79,376	79,376	79,376
	70	78,897	78,897	78,897	78,897	78,897	78,897	78,897	78,897	78,897
	75	78,445	78,445	78,445	78,445	78,445	78,445	78,445	78,445	78,445
	80	78,017	78,017	78,017	78,017	78,017	78,017	78,017	78,017	78,017
	85	77,610	77,610	77,610	77,610	77,610	77,610	77,610	77,610	77,610
	90	77,221	77,221	77,221	77,221	77,221	77,221	77,221	77,221	77,221
	95	76,848	76,848	76,848	76,848	76,848	76,848	76,848	76,848	76,848
	100	76,490	76,490	76,490	76,490	76,490	76,490	76,490	76,490	76,490
	110	75,810	75,810	75,810	75,810	75,810	75,810	75,810	75,810	75,810
	120	75,173	75,173	75,173	75,173	75,173	75,173	75,173	75,173	75,173
	130	74,573	74,573	74,573	74,573	74,573	74,573	74,573	74,573	74,573
	140	74,005	74,005	74,005	74,005	74,005	74,005	74,005	74,005	74,005
	150	73,466	73,466	73,466	73,466	73,466	73,466	73,466	73,466	73,466
	160	72,953	72,953	72,953	72,953	72,953	72,953	72,953	72,953	72,953
	170	72,463	72,463	72,463	72,463	72,463	72,463	72,463	72,463	72,463
	180	71,994	71,994	71,994	71,994	71,994	71,994	71,994	71,994	71,994
	190	71,546	71,546	71,546	71,546	71,546	71,546	71,546	71,546	71,546
	200	71,116	71,116	71,116	71,116	71,116	71,116	71,116	71,116	71,116
	225	70,112	70,112	70,112	70,112	70,112	70,112	70,112	70,112	70,112
	250	69,198	69,198	69,198	69,198	69,198	69,198	69,198	69,198	69,198
	275	68,361	68,361	68,361	68,361	68,361	68,361	68,361	68,361	68,361
	300	67,590	67,590	67,590	67,590	67,590	67,590	67,590	67,590	67,590
	325	66,875	66,875	66,875	66,875	66,875	66,875	66,875	66,875	66,875
	350	65,658	65,658	65,658	65,658	65,658	65,658	65,658	65,658	66,209
	375	64,297	64,297	64,297	64,297	64,297	64,297	64,297	64,297	65,586
	400	62,979	62,979	62,979	62,979	62,979	62,979	62,979	62,979	65,002
	425	61,698	61,698	61,698	61,698	61,698	61,698	61,698	61,698	64,450
	450	60,446	60,446	60,446	60,446	60,446	60,446	60,446	60,446	63,929
	475	59,218	59,218	59,218	59,218	59,218	59,218	59,218	59,218	63,435
	500	58,008	58,008	58,008	58,008	58,008	58,008	58,008	58,008	62,964
	525	56,810	56,810	56,810	56,810	56,810	56,810	56,810	56,810	62,516
	550	55,622	55,622	55,622	55,622	55,622	55,622	55,622	55,622	62,087
	575	54,441	54,441	54,441	54,441	54,441	54,441	54,441	54,441	61,676
	600	53,267	53,267	53,267	53,267	53,267	53,267	53,267	53,267	61,282
	625	52,098	52,098	52,098	52,098	52,098	52,098	52,098	52,098	60,903
	650	50,935	50,935	50,935	50,935	50,935	50,935	50,935	50,935	60,538
	675	49,778	49,778	49,778	49,778	49,778	49,778	49,778	49,778	60,185
	700	48,625	48,625	48,625	48,625	48,625	48,625	48,625	48,625	59,845
	725	47,478	47,478	47,478	47,478	47,478	47,478	47,478	47,478	59,516
	750	46,336	46,336	46,336	46,336	46,336	46,336	46,336	46,336	59,198
	775	45,198	45,198	45,198	45,198	45,198	45,198	45,198	45,198	58,889
	800	44,065	44,065	44,065	44,065	44,065	44,065	44,065	44,065	58,590
	825	42,937	42,937	42,937	42,937	42,937	42,937	42,937	42,937	58,299
	850	41,813	41,813	41,813	41,813	41,813	41,813	41,813	41,813	58,016
	875	40,695	40,695	40,695	40,695	40,695	40,695	40,695	40,695	57,740
	900	39,582	39,582	39,582	39,582	39,582	39,582	39,582	39,582	57,472
	925	38,477	38,477	38,477	38,477	38,477	38,477	38,477	38,477	57,211
	950	37,379	37,379	37,379	37,379	37,379	37,379	37,379	37,379	56,956
	975	36,290	36,290	36,290	36,290	36,290	36,290	36,290	36,290	56,707
	1000	35,212	35,212	35,212	35,212	35,212	35,212	35,212	35,212	56,464

2000 MHz – Zone D – 50%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	94,263	96,533	98,681	101,162	103,517	105,323	106,329	106,732	106,900
	2	82,486	85,958	88,796	92,000	95,262	98,124	99,919	100,633	100,879
	3	74,588	79,204	82,727	86,437	90,198	93,691	96,075	97,050	97,358
	4	68,483	73,938	78,150	82,363	86,511	90,449	93,296	94,499	94,859
	5	63,527	69,525	74,343	79,073	83,582	87,876	91,107	92,515	92,921
	6	59,378	65,716	71,015	76,252	81,122	85,731	89,295	90,890	91,337
	7	55,823	62,374	68,034	73,736	78,975	83,880	87,742	89,512	89,998
	8	52,720	59,407	65,330	71,435	77,042	82,239	86,380	88,315	88,838
	9	49,971	56,746	62,858	69,301	75,263	80,753	85,161	87,257	87,815
	10	47,506	54,340	60,587	67,304	73,599	79,382	84,054	86,308	86,900
	11	45,276	52,146	58,491	65,426	72,023	78,100	83,035	85,446	86,072
	12	43,240	50,134	56,547	63,654	70,520	76,885	82,086	84,657	85,316
	13	41,371	48,276	54,738	61,979	69,079	75,723	81,192	83,928	84,621
	14	39,643	46,552	53,048	60,392	67,692	74,601	80,343	83,249	83,977
	15	38,040	44,946	51,463	58,886	66,356	73,513	79,530	82,614	83,378
	16	36,545	43,443	49,972	57,455	65,066	72,452	78,744	82,016	82,818
	17	35,147	42,032	48,565	56,092	63,821	71,415	77,981	81,450	82,291
	18	33,835	40,702	47,233	54,791	62,617	70,400	77,235	80,911	81,795
	19	32,601	39,446	45,969	53,547	61,453	69,404	76,502	80,396	81,325
	20	31,436	38,256	44,766	52,356	60,325	68,427	75,779	79,902	80,879
	25	26,475	33,108	39,492	47,041	55,171	63,797	72,254	77,656	78,941
	30	22,593	28,948	35,117	42,508	50,634	59,536	68,811	75,625	77,358
	35	19,478	25,471	31,348	38,491	46,509	55,551	65,431	73,664	76,019
	40	16,932	22,494	28,014	34,834	42,664	51,753	62,101	71,685	74,859
	45	14,820	19,904	25,021	31,458	39,030	48,087	58,804	69,633	73,836
	50	13,046	17,632	22,319	28,332	35,583	44,530	55,524	67,473	72,921
	55	11,536	15,628	19,880	25,447	32,331	41,088	52,261	65,188	72,093
	60	10,236	13,857	17,687	22,804	29,288	37,782	49,028	62,781	71,337
	65	9,102	12,289	15,722	20,403	26,472	34,642	45,847	60,267	70,642
	70	8,098	10,894	13,965	18,236	23,890	31,690	42,746	57,670	69,998
	75	7,197	9,648	12,395	16,288	21,540	28,943	39,754	55,018	69,399
	80	6,378	8,527	10,987	14,540	19,414	26,407	36,894	52,340	68,838
	85	5,621	7,510	9,720	12,969	17,493	24,081	34,185	49,664	68,312
	90	4,913	6,578	8,571	11,552	15,757	21,954	31,636	47,013	67,815
	95	4,242	5,715	7,521	10,268	14,186	20,013	29,252	44,410	67,346
	100	3,598	4,908	6,551	9,094	12,757	18,239	27,031	41,872	66,900
	110	2,366	3,415	4,800	7,010	10,246	15,126	23,052	37,049	66,072
	120	1,175	2,031	3,224	5,184	8,088	12,475	19,618	32,616	65,316
	130	-0,002	0,712	1,761	3,530	6,178	10,168	16,634	28,593	64,621
	140	-1,177	-0,572	0,368	1,992	4,441	8,115	14,010	24,966	63,977
	150	-2,360	-1,838	-0,982	0,531	2,824	6,247	11,667	21,700	63,378
	160	-3,553	-3,094	-2,303	-0,878	1,293	4,514	9,542	18,750	62,818
	170	-4,756	-4,348	-3,608	-2,252	-0,177	2,882	7,587	16,071	62,291
	180	-5,969	-5,600	-4,901	-3,599	-1,602	1,326	5,764	13,620	61,795
	190	-7,188	-6,852	-6,185	-4,927	-2,993	-0,171	4,047	11,362	61,325
	200	-8,411	-8,101	-7,461	-6,239	-4,355	-1,620	2,415	9,265	60,879
	225	-11,470	-11,207	-10,613	-9,455	-7,662	-5,085	-1,387	4,573	59,856
	250	-14,498	-14,265	-13,701	-12,582	-10,848	-8,372	-4,894	0,455	58,941
	275	-17,465	-17,251	-16,707	-15,615	-13,919	-11,510	-8,181	-3,256	58,113
	300	-20,352	-20,151	-19,620	-18,547	-16,877	-14,514	-11,288	-6,665	57,358
	325	-23,148	-22,957	-22,436	-21,375	-19,723	-17,393	-14,240	-9,835	56,662
	350	-25,851	-25,667	-25,152	-24,100	-22,461	-20,155	-17,056	-12,811	56,019
	375	-28,462	-28,283	-27,773	-26,728	-25,099	-22,810	-19,751	-15,627	55,419
	400	-30,988	-30,813	-30,307	-29,267	-27,645	-25,369	-22,339	-18,308	54,859
	425	-33,437	-33,265	-32,762	-31,726	-30,109	-27,843	-24,836	-20,876	54,332
	450	-35,819	-35,649	-35,148	-34,115	-32,503	-30,244	-27,255	-23,350	53,836
	475	-38,144	-37,976	-37,477	-36,445	-34,836	-32,583	-29,608	-25,748	53,366
	500	-40,422	-40,255	-39,757	-38,728	-37,121	-34,873	-31,909	-28,085	52,921
	525	-42,664	-42,498	-42,001	-40,973	-39,369	-37,124	-34,169	-30,373	52,497
	550	-44,879	-44,714	-44,219	-43,191	-41,588	-39,346	-36,399	-32,626	52,093
	575	-47,077	-46,913	-46,418	-45,391	-43,789	-41,550	-38,608	-34,855	51,707
	600	-49,264	-49,101	-48,606	-47,581	-45,980	-43,742	-40,805	-37,068	51,337
	625	-51,449	-51,286	-50,792	-49,766	-48,166	-45,930	-42,996	-39,273	50,982
	650	-53,634	-53,472	-52,978	-51,953	-50,354	-48,118	-45,188	-41,476	50,642
	675	-55,825	-55,663	-55,170	-54,145	-52,546	-50,312	-47,384	-43,681	50,314
	700	-58,023	-57,861	-57,368	-56,344	-54,745	-52,511	-49,586	-45,890	49,998
	725	-60,227	-60,066	-59,573	-58,548	-56,950	-54,717	-51,793	-48,104	49,693
	750	-62,436	-62,275	-61,782	-60,758	-59,159	-56,926	-54,004	-50,321	49,399
	775	-64,645	-64,485	-63,992	-62,968	-61,369	-59,137	-56,216	-52,538	49,114
	800	-66,850	-66,690	-66,197	-65,173	-63,574	-61,342	-58,422	-54,748	48,838
	825	-69,043	-68,883	-68,390	-67,366	-65,767	-63,535	-60,616	-56,946	48,571
	850	-71,215	-71,055	-70,562	-69,538	-67,940	-65,708	-62,789	-59,122	48,312
	875	-73,356	-73,196	-72,703	-71,680	-70,081	-67,849	-64,931	-61,267	48,060
	900	-75,456	-75,296	-74,804	-73,780	-72,181	-69,949	-67,031	-63,369	47,815
	925	-77,504	-77,344	-76,851	-75,827	-74,228	-71,996	-69,079	-65,419	47,577
	950	-79,487	-79,327	-78,834	-77,810	-76,211	-73,979	-71,062	-67,404	47,346
	975	-81,396	-81,236	-80,743	-79,719	-78,120	-75,888	-72,971	-69,314	47,120
	1000	-83,219	-83,060	-82,567	-81,543	-79,944	-77,711	-74,795	-71,140	46,900

2000 MHz – Zone D – 10%

	Distance (km)									
Transmitting / base antenna height (m)		10	20	37,5	75	150	300	600	1200	Emax
	1	94,325	96,586	98,725	101,196	103,543	105,342	106,344	106,746	106,913
	2	82,607	86,061	88,889	92,100	95,348	98,186	99,959	100,662	100,905
	3	74,769	79,356	82,857	86,571	90,328	93,792	96,139	97,094	97,395
	4	68,722	74,138	78,319	82,503	86,667	90,580	93,384	94,558	94,908
	5	63,877	69,773	74,553	79,245	83,749	88,031	91,216	92,588	92,982
	6	59,845	66,013	71,266	76,456	81,288	85,901	89,422	90,976	91,409
	7	56,404	62,719	68,326	73,974	79,163	84,056	87,885	89,612	90,082
	8	53,413	59,801	65,664	71,707	77,256	82,413	86,534	88,428	88,933
	9	50,776	57,189	63,234	69,607	75,504	80,935	85,324	87,381	87,921
	10	48,423	54,862	61,005	67,645	73,867	79,585	84,220	86,442	87,016
	11	46,305	52,770	58,951	65,802	72,320	78,323	83,200	85,591	86,199
	12	44,383	50,861	57,049	64,066	70,845	77,129	82,263	84,810	85,453
	13	42,628	49,112	55,282	62,426	69,432	75,988	81,384	84,089	84,768
	14	41,018	47,499	53,654	60,875	68,074	74,887	80,550	83,417	84,134
	15	39,534	46,006	52,172	59,405	66,767	73,821	79,751	82,791	83,544
	16	38,161	44,620	50,788	58,009	65,506	72,782	78,981	82,203	82,993
	17	36,886	43,327	49,492	56,681	64,291	71,768	78,232	81,647	82,476
	18	35,699	42,119	48,274	55,435	63,117	70,775	77,501	81,119	81,988
	19	34,592	40,986	47,127	54,294	61,982	69,803	76,784	80,614	81,527
	20	33,556	39,921	46,044	53,209	60,885	68,849	76,077	80,130	81,090
	25	29,251	35,421	41,397	48,472	56,090	64,341	72,635	77,933	79,193
	30	26,031	31,927	37,678	44,561	52,101	60,358	69,282	75,950	77,646
	35	23,562	29,112	34,573	41,185	48,555	56,837	66,000	74,040	76,340
	40	21,631	26,779	31,895	38,173	45,303	53,526	62,970	72,117	75,210
	45	20,094	24,805	29,541	35,438	42,268	50,358	60,011	70,125	74,214
	50	18,851	23,111	27,450	32,937	39,423	47,312	57,078	68,088	73,323
	55	17,829	21,643	25,586	30,654	36,765	44,394	54,176	65,961	72,517
	60	16,971	20,364	23,926	28,581	34,305	41,624	51,325	63,716	71,781
	65	16,238	19,242	22,449	26,711	32,048	39,023	48,552	61,370	71,104
	70	15,597	18,251	21,135	25,032	29,996	36,608	45,887	58,958	70,476
	75	15,024	17,369	19,964	23,530	28,141	34,384	43,353	56,517	69,891
	80	14,501	16,574	18,915	22,184	26,469	32,351	40,966	54,082	69,344
	85	14,012	15,851	17,970	20,975	24,965	30,500	38,736	51,684	68,829
	90	13,547	15,183	17,109	19,883	23,607	28,818	36,664	49,346	68,343
	95	13,096	14,558	16,317	18,889	22,376	27,287	34,746	47,088	67,883
	100	12,653	13,966	15,581	17,977	21,255	25,891	32,973	44,921	67,446
	110	11,771	12,846	14,229	16,340	19,270	23,435	29,822	40,889	66,633
	120	10,875	11,774	12,983	14,878	17,540	21,326	27,113	37,268	65,888
	130	9,951	10,717	11,796	13,527	15,981	19,467	24,749	34,035	65,203
	140	8,994	9,658	10,637	12,242	14,536	17,784	22,649	31,145	64,566
	150	8,001	8,588	9,490	10,997	13,166	16,224	20,747	28,546	63,973
	160	6,976	7,500	8,342	9,773	11,843	14,751	18,995	26,189	63,417
	170	5,921	6,396	7,190	8,561	10,552	13,339	17,355	24,031	62,894
	180	4,841	5,276	6,031	7,354	9,282	11,971	15,800	22,035	62,400
	190	3,740	4,141	4,865	6,149	8,027	10,637	14,311	20,171	61,933
	200	2,621	2,994	3,693	4,945	6,783	9,328	12,873	18,416	61,489
	225	-0,223	0,098	0,751	1,947	3,710	6,139	9,450	14,389	60,468
	250	-3,094	-2,808	-2,185	-1,024	0,693	3,047	6,206	10,737	59,553
	275	-5,950	-5,687	-5,084	-3,947	-2,260	0,045	3,102	7,351	58,724
	300	-8,763	-8,516	-7,927	-6,805	-5,138	-2,865	0,121	4,171	57,967
	325	-11,514	-11,279	-10,698	-9,587	-7,933	-5,684	-2,747	1,159	57,269
	350	-14,193	-13,966	-13,392	-12,288	-10,644	-8,411	-5,509	-1,708	56,624
	375	-16,797	-16,576	-16,006	-14,908	-13,270	-11,048	-8,172	-4,451	56,022
	400	-19,327	-19,110	-18,544	-17,449	-15,816	-13,602	-10,745	-7,083	55,459
	425	-21,786	-21,573	-21,010	-19,917	-18,288	-16,079	-13,236	-9,620	54,930
	450	-24,183	-23,972	-23,411	-22,320	-20,693	-18,488	-15,656	-12,076	54,431
	475	-26,525	-26,316	-25,756	-24,666	-23,040	-20,838	-18,014	-14,462	53,959
	500	-28,821	-28,614	-28,054	-26,966	-25,340	-23,141	-20,322	-16,792	53,511
	525	-31,081	-30,875	-30,316	-29,228	-27,603	-25,405	-22,591	-19,079	53,085
	550	-33,316	-33,110	-32,552	-31,464	-29,840	-27,642	-24,831	-21,333	52,678
	575	-35,534	-35,329	-34,771	-33,684	-32,059	-29,861	-27,053	-23,566	52,290
	600	-37,745	-37,541	-36,983	-35,895	-34,270	-32,073	-29,266	-25,788	51,918
	625	-39,957	-39,753	-39,196	-38,108	-36,482	-34,284	-31,479	-28,008	51,561
	650	-42,177	-41,974	-41,416	-40,328	-38,702	-36,504	-33,699	-30,233	51,218
	675	-44,411	-44,208	-43,650	-42,562	-40,935	-38,736	-35,931	-32,471	50,888
	700	-46,661	-46,459	-45,901	-44,812	-43,185	-40,985	-38,180	-34,723	50,569
	725	-48,930	-48,728	-48,170	-47,080	-45,452	-43,251	-40,446	-36,992	50,262
	750	-51,215	-51,013	-50,455	-49,365	-47,736	-45,535	-42,729	-39,277	49,965
	775	-53,514	-53,312	-52,753	-51,663	-50,033	-47,830	-45,024	-41,573	49,678
	800	-55,818	-55,616	-55,057	-53,966	-52,336	-50,132	-47,325	-43,875	49,400
	825	-58,119	-57,917	-57,358	-56,266	-54,635	-52,430	-49,622	-46,173	49,130
	850	-60,404	-60,202	-59,643	-58,551	-56,918	-54,713	-51,904	-48,455	48,869
	875	-62,659	-62,457	-61,898	-60,805	-59,172	-56,965	-54,155	-50,707	48,615
	900	-64,868	-64,666	-64,107	-63,014	-61,380	-59,172	-56,361	-52,913	48,368
	925	-67,014	-66,813	-66,253	-65,160	-63,525	-61,316	-58,504	-55,056	48,127
	950	-69,082	-68,880	-68,320	-67,226	-65,590	-63,381	-60,568	-57,120	47,893
	975	-71,053	-70,851	-70,291	-69,197	-67,561	-65,350	-62,536	-59,088	47,666
	1000	-72,915	-72,713	-72,153	-71,058	-69,421	-67,210	-64,395	-60,947	47,443

2000 MHz – Zone D – 1%

Transmitting / base antenna height (m)	Distance (km)	10	20	37,5	75	150	300	600	1200	Emax
	1	94,369	96,630	98,769	101,239	103,585	105,384	106,386	106,787	106,954
	2	82,978	86,301	89,155	92,371	95,600	98,381	100,088	100,757	100,987
	3	75,863	79,926	83,311	87,007	90,736	94,123	96,354	97,240	97,518
	4	70,551	75,142	78,982	83,090	87,199	91,026	93,680	94,754	95,070
	5	66,305	71,261	75,474	79,953	84,391	88,575	91,588	92,832	93,182
	6	62,777	67,981	72,491	77,299	82,037	86,533	89,865	91,266	91,648
	7	59,765	65,142	69,881	74,975	79,990	84,770	88,394	89,946	90,357
	8	57,143	62,640	67,555	72,893	78,161	83,205	87,106	88,805	89,244
	9	54,827	60,407	65,457	70,997	76,495	81,788	85,956	87,801	88,267
	10	52,757	58,394	63,546	69,253	74,957	80,483	84,910	86,903	87,397
	11	50,888	56,565	61,793	67,636	73,520	79,265	83,946	86,091	86,614
	12	49,188	54,891	60,175	66,128	72,170	78,117	83,047	85,349	85,902
	13	47,632	53,350	58,676	64,716	70,892	77,026	82,199	84,666	85,249
	14	46,199	51,924	57,279	63,388	69,680	75,981	81,392	84,030	84,647
	15	44,872	50,599	55,974	62,136	68,524	74,978	80,619	83,436	84,089
	16	43,641	49,362	54,749	60,953	67,421	74,010	79,872	82,877	83,568
	17	42,492	48,205	53,598	59,831	66,366	73,074	79,147	82,347	83,081
	18	41,418	47,118	52,511	58,766	65,355	72,168	78,440	81,843	82,623
	19	40,411	46,095	51,484	57,753	64,384	71,289	77,748	81,361	82,191
	20	39,464	45,130	50,511	56,787	63,452	70,435	77,069	80,898	81,783
	25	35,464	41,004	46,302	52,545	59,277	66,508	73,829	78,780	80,018
	30	32,376	37,750	42,917	49,052	55,744	63,061	70,803	76,904	78,592
	35	29,924	35,102	40,107	46,092	52,683	59,994	67,978	75,107	77,394
	40	27,935	32,897	37,719	43,523	49,976	57,227	65,340	73,286	76,362
	45	26,293	31,026	35,649	41,253	47,542	54,698	62,869	71,388	75,455
	50	24,918	29,413	33,828	39,219	45,327	52,362	60,543	69,438	74,644
	55	23,749	28,003	32,206	37,377	43,290	50,185	58,341	67,582	73,910
	60	22,741	26,756	30,746	35,693	41,406	48,146	56,249	65,747	73,239
	65	21,860	25,640	29,421	34,145	39,653	46,228	54,253	63,933	72,620
	70	21,080	24,632	28,210	32,715	38,016	44,419	52,346	62,147	72,045
	75	20,379	23,714	27,095	31,386	36,485	42,708	50,521	60,393	71,508
	80	19,741	22,869	26,063	30,149	35,047	41,090	48,774	58,674	71,003
	85	19,153	22,086	25,102	28,991	33,696	39,558	47,101	56,994	70,527
	90	18,604	21,355	24,203	27,906	32,424	38,105	45,499	55,353	70,076
	95	18,086	20,666	23,357	26,883	31,222	36,727	43,964	53,754	69,647
	100	17,592	20,014	22,558	25,918	30,087	35,418	42,494	52,197	69,238
	110	16,656	18,794	21,074	24,133	27,987	32,988	39,736	49,213	68,472
	120	15,764	17,659	19,711	22,508	26,082	30,779	37,201	46,399	67,766
	130	14,895	16,584	18,440	21,010	24,338	28,758	34,865	43,753	67,111
	140	14,037	15,549	17,237	19,611	22,723	26,894	32,704	41,265	66,500
	150	13,181	14,542	16,086	18,290	21,214	25,163	30,696	38,927	65,926
	160	12,323	13,554	14,974	17,032	19,791	23,542	28,821	36,726	65,385
	170	11,461	12,580	13,892	15,823	18,439	22,014	27,060	34,652	64,874
	180	10,593	11,614	12,834	14,655	17,145	20,564	25,399	32,691	64,389
	190	9,719	10,655	11,794	13,519	15,899	19,181	23,824	30,835	63,929
	200	8,840	9,701	10,770	12,411	14,694	17,853	22,324	29,071	63,489
	225	6,623	7,334	8,261	9,734	11,823	14,733	18,841	25,009	62,475
	250	4,392	4,989	5,812	7,162	9,108	11,829	15,657	21,352	61,560
	275	2,160	2,671	3,416	4,674	6,511	9,089	12,698	18,008	60,728
	300	-0,060	0,384	1,068	2,256	4,010	6,478	9,915	14,913	59,966
	325	-2,262	-1,870	-1,232	-0,100	1,590	3,971	7,271	12,015	59,262
	350	-4,440	-4,090	-3,489	-2,400	-0,761	1,551	4,742	9,277	58,609
	375	-6,594	-6,277	-5,705	-4,650	-3,052	-0,795	2,306	6,670	58,000
	400	-8,723	-8,433	-7,885	-6,858	-5,294	-3,082	-0,053	4,168	57,430
	425	-10,832	-10,564	-10,035	-9,031	-7,493	-5,318	-2,349	1,752	56,893
	450	-12,924	-12,674	-12,162	-11,176	-9,661	-7,516	-4,597	-0,596	56,386
	475	-15,005	-14,770	-14,271	-13,301	-11,804	-9,684	-6,807	-2,891	55,906
	500	-17,080	-16,857	-16,369	-15,413	-13,931	-11,833	-8,991	-5,147	55,450
	525	-19,155	-18,943	-18,464	-17,519	-16,050	-13,970	-11,158	-7,376	55,015
	550	-21,236	-21,033	-20,563	-19,627	-18,169	-16,104	-13,317	-9,589	54,601
	575	-23,328	-23,133	-22,670	-21,742	-20,293	-18,241	-15,477	-11,795	54,204
	600	-25,437	-25,249	-24,791	-23,870	-22,430	-20,389	-17,643	-14,001	53,824
	625	-27,566	-27,383	-26,931	-26,016	-24,583	-22,551	-19,822	-16,215	53,459
	650	-29,718	-29,540	-29,093	-28,183	-26,755	-24,731	-22,016	-18,440	53,108
	675	-31,894	-31,721	-31,277	-30,371	-28,949	-26,932	-24,229	-20,680	52,770
	700	-34,094	-33,925	-33,485	-32,583	-31,165	-29,154	-26,462	-22,936	52,444
	725	-36,317	-36,151	-35,714	-34,816	-33,401	-31,396	-28,713	-25,208	52,129
	750	-38,559	-38,396	-37,962	-37,066	-35,655	-33,654	-30,980	-27,493	51,825
	775	-40,814	-40,654	-40,222	-39,330	-37,921	-35,925	-33,257	-29,787	51,530
	800	-43,077	-42,919	-42,490	-41,599	-40,193	-38,200	-35,539	-32,084	51,244
	825	-45,337	-45,182	-44,754	-43,866	-42,463	-40,472	-37,817	-34,375	50,967
	850	-47,586	-47,433	-47,007	-46,120	-44,719	-42,731	-40,081	-36,651	50,697
	875	-49,812	-49,661	-49,236	-48,351	-46,951	-44,966	-42,320	-38,901	50,436
	900	-52,002	-51,853	-51,430	-50,546	-49,148	-47,165	-44,523	-41,113	50,181
	925	-54,144	-53,997	-53,575	-52,692	-51,296	-49,314	-46,676	-43,275	49,933
	950	-56,226	-56,079	-55,659	-54,777	-53,382	-51,402	-48,767	-45,374	49,692
	975	-58,233	-58,088	-57,669	-56,789	-55,394	-53,416	-50,784	-47,399	49,457
	1000	-60,157	-60,013	-59,594	-58,715	-57,321	-55,345	-52,715	-49,337	49,227

ANEXO II

Principal.py

```
# -*- coding: utf-8 -*-

from Funciones import (porcentajes_tiempo_nominales,frecuencias_funcionamiento_nominales,
distancias_nominales,alturas_nominales,obtener_intensidad,interpolacion_distancia,
interpolacion_altura,interpolacion_frecuencia,interpolacion_tiempo,dispersion_troposferica)
from eleccionhojaexcel import elegir_hoja_excel
from Comprobaciones import (comprob_frecuencia,comprob_distancia,comprob_tiempo,
comprob_progapacion,comprob_zona,comprob_trayecto,comprob_h1,comprob_h2)
from Correcciones import correc_libre,correc_altura,correc_transmisor,correc_oblicuo

print "Simulador en Python"
print "Métodos de predicción de punto a zona para servicios terrenales"
print "en la gama de frecuencias de 30 a 3000 MHz"

print "Introduzca los datos de entrada del simulador:"
f=comprob_frecuencia()
d,LatTx,LonTx,LatRx,LonRx=comprob_distancia()
p=comprob_tiempo()
progapacion=comprob_progapacion()
zona=comprob_zona()
trayecto=comprob_trayecto(zona)
print "La frecuencia de funcionamiento elegida es",f,"Mhz"
print "La distancia calculada es",d,"km"
print "El porcentaje de tiempo elegido es",p,"%"
print "La",zona,"es de tipo",trayecto
h2=comprob_h2(trayecto)
h1,thetatca,thetaeff=comprob_h1(d,trayecto,LatTx,LonTx,LatRx,LonRx,h2)
print "La altura calculada de la antena transmisora es de",h1,"metros"

print "Calculando porcentajes de tiempo nominales"
pinf,psup=porcentajes_tiempo_nominales(p)

print "Calculando frecuencias de funcionamiento nominales"
finf,fsup=frecuencias_funcionamiento_nominales(f)
```

```
print "Calculando distancias nominales"
dinf,dsup=distancias_nominales(d)

h1inf,h1sup=alturas_nominales(h1)
#E,indicex,indicey=valor_nominal(150,25,distancias)
#numerohoja=elegir_hoja_excel('Zone 1',100,50)

"""#PARA PORCENTAJE DE TIEMPO INFERIOR"""
#para frecuencia inferior
numerohoja=elegir_hoja_excel(zona,finf,pinf)
E_h1inf_dinf=obtener_intensidad(numerohoja,h1inf,dinf,trayecto,f,d,p)
E_h1inf_dsup=obtener_intensidad(numerohoja,h1inf,dsup,trayecto,f,d,p)
Einterpol_h1inf=interpolacion_distancia(d,dinf,dsup,E_h1inf_dinf,E_h1inf_dsup)

E_h1sup_dinf=obtener_intensidad(numerohoja,h1sup,dinf,trayecto,f,d,p)
E_h1sup_dsup=obtener_intensidad(numerohoja,h1sup,dsup,trayecto,f,d,p)
Einterpol_h1sup=interpolacion_distancia(d,dinf,dsup,E_h1sup_dinf,E_h1sup_dsup)

Einterpol_finf=interpolacion_altura(h1,h1inf,h1sup,Einterpol_h1inf,Einterpol_h1sup)

#para frecuencia superior
numerohoja=elegir_hoja_excel(zona,fsup,pinf)
E_h1inf_dinf=obtener_intensidad(numerohoja,h1inf,dinf,trayecto,f,d,p)
E_h1inf_dsup=obtener_intensidad(numerohoja,h1inf,dsup,trayecto,f,d,p)
Einterpol_h1inf=interpolacion_distancia(d,dinf,dsup,E_h1inf_dinf,E_h1inf_dsup)

E_h1sup_dinf=obtener_intensidad(numerohoja,h1sup,dinf,trayecto,f,d,p)
E_h1sup_dsup=obtener_intensidad(numerohoja,h1sup,dsup,trayecto,f,d,p)
Einterpol_h1sup=interpolacion_distancia(d,dinf,dsup,E_h1sup_dinf,E_h1sup_dsup)

Einterpol_fsup=interpolacion_altura(h1,h1inf,h1sup,Einterpol_h1inf,Einterpol_h1sup)

Einterpol_pinf=interpolacion_frecuencia(f,finf,fsup,Einterpol_finf,Einterpol_fsup)

"""#PARA PORCENTAJE DE TIEMPO SUPERIOR"""
#para frecuencia inferior
numerohoja=elegir_hoja_excel(zona,finf,psup)
```

```
E_h1inf_dinf=obtener_intensidad(numerohoja,h1inf,dinf,trayecto,f,d,p)
E_h1inf_dsup=obtener_intensidad(numerohoja,h1inf,dsup,trayecto,f,d,p)
Einterpol_h1inf=interpolacion_distancia(d,dinf,dsup,E_h1inf_dinf,E_h1inf_dsup)

E_h1sup_dinf=obtener_intensidad(numerohoja,h1sup,dinf,trayecto,f,d,p)
E_h1sup_dsup=obtener_intensidad(numerohoja,h1sup,dsup,trayecto,f,d,p)
Einterpol_h1sup=interpolacion_distancia(d,dinf,dsup,E_h1sup_dinf,E_h1sup_dsup)

Einterpol_finf=interpolacion_altura(h1,h1inf,h1sup,Einterpol_h1inf,Einterpol_h1sup)

#para frecuencia superior
numerohoja=elegir_hoja_excel(zona,fsup,psup)
E_h1inf_dinf=obtener_intensidad(numerohoja,h1inf,dinf,trayecto,f,d,p)
E_h1inf_dsup=obtener_intensidad(numerohoja,h1inf,dsup,trayecto,f,d,p)
Einterpol_h1inf=interpolacion_distancia(d,dinf,dsup,E_h1inf_dinf,E_h1inf_dsup)

E_h1sup_dinf=obtener_intensidad(numerohoja,h1sup,dinf,trayecto,f,d,p)
E_h1sup_dsup=obtener_intensidad(numerohoja,h1sup,dsup,trayecto,f,d,p)
Einterpol_h1sup=interpolacion_distancia(d,dinf,dsup,E_h1sup_dinf,E_h1sup_dsup)

Einterpol_fsup=interpolacion_altura(h1,h1inf,h1sup,Einterpol_h1inf,Einterpol_h1sup)

Einterpol_psup=interpolacion_frecuencia(f,finf,fsup,Einterpol_finf,Einterpol_fsup)

Einterpol=interpolacion_tiempo(p,pinf,psup,Einterpol_pinf,Einterpol_psup)
print ""
print "RESULTADOS FINALES"
print "La intensidad de campo calculada es",Einterpol,"dB uV/m"

"""corregir la intensidad de campo para el ángulo de despejamiento del terreno en la antena receptora/móvil"""
Einterpol=Einterpol+correc_libre(f,trayecto,thetatca)
print "La intensidad de campo corregida para el angulo de despejamiento en la antena receptora es",Einterpol,"dB uV/m"
"""Calcular la intensidad de campo estimada debida a la dispersión troposférica"""
Einterpol=max(Einterpol,dispersion_troposferica(d,f,p,thetatca,thetaeff))
print "La intensidad de campo corregida debido a la dispersión troposférica es",Einterpol,"dB uV/m"
"""Corregir la intensidad de campo para la altura de la antena receptora/móvil, h2"""
Einterpol=Einterpol+correc_altura(d,trayecto,h1,f,h2)
print "La intensidad de campo corregida debido a la altura de la antena receptora es",Einterpol,"dB uV/m"
```

```
"""Si hay obstáculos alrededor del terminal transmisor/de base, incluso a una altura sobre el suelo inferior a la de la antena, se corrige su efecto"""
Einterpol=Einterpol+correc_transmisor(f,h1)
print "La intensidad de campo corregida debido a obstaculos en de la antena transmisora es",Einterpol,"dB uV/m"
"""Aplicar la corrección del trayecto oblicuo"""
Einterpol=Einterpol+correc_oblicuo(d,h1,h2)
print "La intensidad de campo corregida debido al trayecto oblicuo es",Einterpol,"dB uV/m"


print "FIN DEL PROGRAMA"
```

Funciones.py

```
# -*- coding: utf-8 -*-

import xlrd
from math import log10,sqrt,log,pi,sin,cos,asin,exp

def porcentajes_tiempo_nominales(p):
    if p>1 and p<10:
        pinf=1
        psup=10
    elif p>10 and p<50:
        pinf=10
        psup=50
    elif p==1:
        pinf=1
        psup=1
    elif p==10:
        pinf=10
        psup=10
    elif p==50:
        pinf=50
        psup=50
    else:
        pinf=0
        psup=0
        print "Error"
    return pinf,psup

def frecuencias_funcionamiento_nominales(f):
    if f==100:
        finf=100
        #fsup=0
        fsup=100
    elif f==600:
        finf=600
        #fsup=0
        fsup=600
    elif f==2000:
```

```
        finf=2000
        #fsup=0
        fsup=200
    elif f<600:
        finf=100
        fsup=600
    elif f>600:
        finf=600
        fsup=2000
    else:
        finf=0
        fsup=0
        print "Error"
    return finf,fsup

def buscar_distancias():
    book = xlrd.open_workbook('../R0C0700000600001ZIPM07/FS_curves_RRC_04.xls')
    first_sheet = book.sheet_by_index(0)
    col_num=1
    cells=first_sheet.col_slice(col_num, start_rowx=2, end_rowx=80)
    distancias=[]
    for cell in cells:
        distancias.append(cell.value)
    return distancias

def buscar_alturas():
    book=xlrd.open_workbook('../R0C0700000600001ZIPM07/FS_curves_RRC_04.xls')
    first_sheet = book.sheet_by_index(0)
    row_num=1
    cells=first_sheet.row_slice(row_num,start_colx=2,end_colx=10)
    alturas=[]
    for cell in cells:
        alturas.append(cell.value)
    return alturas

def distancias_nominales(d):
    distancias=buscar_distancias()
    if d in distancias:
```

```
        dinf=d
        #dsup=0
        dsup=d
    else:
        for i in range(len(distancias)):
            if distancias[i]<d:
                dinf=distancias[int(i)]
                dsup=distancias[int(i)+1]
    return dinf,dsup

def alturas_nominales(h1):
    alturas=buscar_alturas()
    if h1 in alturas:
        h1inf=h1
        h1sup=h1
    elif h1>1200:
        h1inf=600
        h1sup=1200
    elif h1<10:
        h1inf=h1
        h1inf=h1
    else:
        for i in range(len(alturas)):
            if alturas[i]<h1:
                h1inf=alturas[int(i)]
                h1sup=alturas[int(i)+1]
    return h1inf,h1sup

def obtener_intensidad(numerohoja,h1inf,dinf,trayecto,f,d,p):
    book=xlrd.open_workbook('../R0C070000060001ZIPM07/FS_curves_RRC_04.xls')
    sheet = book.sheet_by_index(numerohoja)
    alturas=buscar_alturas()
    distancias=buscar_distancias()
    indicex=alturas.index(h1inf)
    indicey=distancias.index(dinf)
    intensidad=sheet.cell(2+indicey,2+indicex).value
    return intensidad

def interpolacion_distancia(d,dinf,dsup,Einf,Esup):
```

```
    if (dinf==dsup):
        intensidadinterpolada=Einf
    else:
        intensidadinterpolada=Einf+(Esup-Einf)*log10(d/dinf)/(log10(dsup/dinf))
    return intensidadinterpolada

def interpolacion_altura(h1,h1inf,h1sup,Einf,Esup):
    if (h1inf==h1sup):
        intensidadinterpolada=Einf
    else:
        intensidadinterpolada=Einf+(Esup-Einf)*log10(h1/h1inf)/(log10(h1sup/h1inf))
    return intensidadinterpolada

def interpolacion_frecuencia(f,finf,fsup,Einf,Esup):
    if (finf==fsup):
        intensidadinterpolada=Einf
    else:
        intensidadinterpolada=Einf+(Esup-Einf)*log10(f/finf)/(log10(fsup/finf))
    return intensidadinterpolada

def distribucion_normal_inversa(x):
    C0=2.515517
    C1=0.802853
    C2=0.010328
    D1=1.432788
    D2=0.189269
    D3=0.001308
    if x>=0.01 and x<=0.5:
        T=sqrt(-2*log(x))
        Epsi=(((C2*T+C1)*T)+C0)/(((D3*T+D2)*T+D1)*T+1)
        Q=T-Epsi
    elif x>0.5 and x<=0.99:
        T=sqrt(-2*log(1-x))
        Epsi=(((C2*T+C1)*T)+C0)/(((D3*T+D2)*T+D1)*T+1)
        Q=-(T-Epsi)
    else:
        print "Error distribucion normal"
    return Q
```

```
def interpolacion_tiempo(p,pinf,psup,Einf,Esup):
    if (pinf==psup):
        intensidadinterpolada=Einf
    else:
        Qt=distribucion_normal_inversa(p/100.0)
        Qinf=distribucion_normal_inversa(pinf/100.0)
        Qsup=distribucion_normal_inversa(psup/100.0)
        intensidadinterpolada=Esup*(Qinf-Qt)/(Qinf-Qsup)+Einf*(Qt-Qsup)/(Qinf-Qsup)
    return intensidadinterpolada

def dispersion_troposferica(d,f,p,thetatca,thetaeff):
    k=4/3
    a=6371
    Thetaeff=thetaeff
    print "El angulo de despejamiento thetaeff es",thetaeff,"º"
    Theta=thetatca
    #Hay que calcular Thetaeff forma dinámica
    ThetaS=((180*d)/(pi*k*a))+Thetaeff+Theta
    if (ThetaS<0):
        ThetaS=0
    Lf=5*log(f)-2.5*(log(f)-3.3)**2
    Ncero=325
    Gt=10.1*(-log(0.02*p))**0.7
    Ets=24.4-20*log(d)-10*ThetaS-Lf+0.15*Ncero+Gt
    return Ets

def haversine(lat1, lon1, lat2, lon2):
    rad=pi/180
    dlat=lat2-lat1
    dlon=lon2-lon1
    R=6372.795477598
    R=6371
    a=(sin(rad*dlat/2))**2 + cos(rad*lat1)*cos(rad*lat2)*(sin(rad*dlon/2))**2
    distancia=2*R*asin(sqrt(a))
    return distancia
```

Comprobaciones.py

```
# -*- coding: utf-8 -*-

from random import uniform
from ApiElevation import elevacion_api
from Funciones import haversine

def comprob_frecuencia():
    f=0
    while f<30 or f>3000:
        f=float(raw_input("Frecuencia de funcionamiento en MHz: "))
    return f

def comprob_distancia():
    d=0
    while d<=0 or d>1000:
        LatTx=1000
        while LatTx<-90 or LatTx>90:
            LatTx=float(raw_input("Latitud geografica de la antena transmisora: "))
        LonTx=1000
        while LonTx<-180 or LonTx>180:
            LonTx=float(raw_input("Longitud geografica de la antena transmisora: "))
        LatRx=1000
        while LatRx<-90 or LatRx>90:
            LatRx=float(raw_input("Latitud geografica de la antena receptora: "))
        LonRx=1000
        while LonRx<-180 or LonRx>180:
            LonRx=float(raw_input("Longitud geografica de la antena receptora:"))

        d=haversine(LatTx,LonTx,LatRx,LonRx)
    return d,LatTx,LonTx,LatRx,LonRx

def comprob_tiempo():
    p=0
    while p<1 or p>50:
        p=float(raw_input("Porcentaje de tiempo: "))
    return p
```

```
def comprob_progapacion():
    progapacion=0
    while progapacion<1 or progapacion>2:
        progapacion=float(raw_input("Trayecto unico(1) o mixto(2) : "))
    return progapacion

def comprob_zona():
    zona='Zone 0'
    while (zona!='Zone 1' and zona!='Zone 2' and zona!='Zone 3' and zona!='Zone 4'
           and zona!='Zone 5' and zona!='Zone A' and zona!='Zone B' and zona!='Zone C'
           and zona!='Zone D'):
        zona=raw_input("Tipo de zona (Zone 1-5 o Zone A-D): ")
    return zona

def comprob_trayecto(zona):
    trayecto='Error'
    if zona=='Zone 1' or zona=='Zone 2' or zona=='Zone 3' or zona=='Zone D':
        trayecto='Terrestre'
    elif zona=='Zone 4' or zona=='Zone 5' or zona=='Zone A' or zona=='Zone B' or zona=='Zone C':
        trayecto='Maritimo'
    return trayecto

def calcular_heff(ha):
    lista = [0]  * 100
    for i in range(100):
        lista[i] = uniform(0.9*ha, 1.1*ha)
    sum=0.0
    for i in range(0,len(lista)):
        sum=sum+lista[i]
    heff=sum/len(lista)
    return heff

def comprob_h1(d,trayecto,LatTx,LonTx,LatRx,LonRx,h2):
    h1=0.0
    ha=0.0
    thetatca=0.0
    thetaeff=0.0
    if trayecto=='Terrestre':
```

```
    #Distancias inferiores a 15 km
    if d < 15:
        print "Distancia menor de 15 km"
        #Informacion sobre el terreno NO disponible
        if False:
            print "Info Terreno No Disponible"
            if d<=3:
                while h1<=1:
                    ha=float(raw_input("Altura de la antena transmisora sobre el suelo : "))
                    h1=ha
            elif 3<d and d<15:
                while ha<=1:
                    ha=float(raw_input("Altura de la antena transmisora sobre el suelo : "))
                heff=calcular_heff(ha)
                h1=ha+(heff-ha)*(d-3)/12
        #Informacion sobre el terreno disponible
        else:
            print "Info Terreno Disponible"
            #hb=calcular_heff(100.0)
            while ha<=1:
                ha=float(raw_input("Altura de la antena transmisora sobre el suelo : "))
            hb,heff,thetatca,thetaeff=elevacion_api(LatTx,LonTx,LatRx,LonRx,ha,h2)
            h1=hb
    #Distancias superiores a 15 km
    else:
        print "Distancia mayor de 15 km"
        #h1=calcular_heff(100.0)
        while ha<=1:
            ha=float(raw_input("Altura de la antena transmisora sobre el suelo : "))
        hb,heff,thetatca,thetaeff=elevacion_api(LatTx,LonTx,LatRx,LonRx,ha,h2)
        h1=heff
  elif trayecto=='Maritimo':
    print "Trayecto Maritimo"
    while h1<1 or h1>3000:
        h1=float(raw_input("Altura de la antena transmisora sobre el nivel del mar : "))
  return h1,thetatca,thetaeff


def comprob_h2(trayecto):
```

```
h2=0
if(trayecto=="Terrestre"):
   while h2<1 or h2>3000:
      h2=float(raw_input("Altura de la antena receptora sobre el suelo: "))
elif(trayecto=="Maritimo"):
   while h2<3 or h2>3000:
      h2=float(raw_input("Altura de la antena receptora sobre el suelo: "))
return h2
```

eleccionhojaexcel.py

```
# -*- coding: utf-8 -*-

def elegir_hoja_excel(zona, frecuencia, tiempo):
    numerohoja=1000
    if zona=='Zone 1':
        if frecuencia==100:
            if tiempo==50:
                numerohoja=0
            elif tiempo==10:
                numerohoja=1
            elif tiempo==1:
                numerohoja=2
            else:
                print 'Porcentaje de tiempo incorrecto'
        elif frecuencia==600:
            if tiempo==50:
                numerohoja=27
            elif tiempo==10:
                numerohoja=28
            elif tiempo==1:
                numerohoja=29
            else:
                print 'Porcentaje de tiempo incorrecto'
        elif frecuencia==2000:
            if tiempo==50:
                numerohoja=54
            elif tiempo==10:
                numerohoja=55
            elif tiempo==1:
                numerohoja=56
            else:
                print 'Porcentaje de tiempo incorrecto'
        else:
            print 'Frecuencia Incorrecta'
    elif zona=='Zone 2':
        if frecuencia==100:
```

```
            if tiempo==50:
                numerohoja=3
            elif tiempo==10:
                numerohoja=4
            elif tiempo==1:
                numerohoja=5
            else:
                print 'Porcentaje de tiempo incorrecto'
        elif frecuencia==600:
            if tiempo==50:
                numerohoja=30
            elif tiempo==10:
                numerohoja=31
            elif tiempo==1:
                numerohoja=32
            else:
                print 'Porcentaje de tiempo incorrecto'
        elif frecuencia==2000:
            if tiempo==50:
                numerohoja=57
            elif tiempo==10:
                numerohoja=58
            elif tiempo==1:
                numerohoja=59
            else:
                print 'Porcentaje de tiempo incorrecto'
        else:
            print 'Frecuencia Incorrecta'
    elif zona=='Zone 3':
        if frecuencia==100:
            if tiempo==50:
                numerohoja=6
            elif tiempo==10:
                numerohoja=7
            elif tiempo==1:
                numerohoja=8
            else:
                print 'Porcentaje de tiempo incorrecto'
        elif frecuencia==600:
```

```
            if tiempo==50:
                numerohoja=33
            elif tiempo==10:
                numerohoja=34
            elif tiempo==1:
                numerohoja=35
            else:
                print 'Porcentaje de tiempo incorrecto'
        elif frecuencia==2000:
            if tiempo==50:
                numerohoja=60
            elif tiempo==10:
                numerohoja=61
            elif tiempo==1:
                numerohoja=62
            else:
                print 'Porcentaje de tiempo incorrecto'
        else:
            print 'Frecuencia Incorrecta'
    elif zona=='Zone 4':
        if frecuencia==100:
            if tiempo==50:
                numerohoja=9
            elif tiempo==10:
                numerohoja=10
            elif tiempo==1:
                numerohoja=11
            else:
                print 'Porcentaje de tiempo incorrecto'
        elif frecuencia==600:
            if tiempo==50:
                numerohoja=36
            elif tiempo==10:
                numerohoja=37
            elif tiempo==1:
                numerohoja=38
            else:
                print 'Porcentaje de tiempo incorrecto'
```

```
    elif frecuencia==2000:
        if tiempo==50:
            numerohoja=63
        elif tiempo==10:
            numerohoja=64
        elif tiempo==1:
            numerohoja=65
        else:
            print 'Porcentaje de tiempo incorrecto'
    else:
        print 'Frecuencia Incorrecta'
elif zona=='Zone 5':
    if frecuencia==100:
        if tiempo==50:
            numerohoja=12
        elif tiempo==10:
            numerohoja=13
        elif tiempo==1:
            numerohoja=14
        else:
            print 'Porcentaje de tiempo incorrecto'
    elif frecuencia==600:
        if tiempo==50:
            numerohoja=39
        elif tiempo==10:
            numerohoja=40
        elif tiempo==1:
            numerohoja=41
        else:
            print 'Porcentaje de tiempo incorrecto'
    elif frecuencia==2000:
        if tiempo==50:
            numerohoja=66
        elif tiempo==10:
            numerohoja=67
        elif tiempo==1:
            numerohoja=68
        else:
            print 'Porcentaje de tiempo incorrecto'
```

```
    else:
        print 'Frecuencia Incorrecta'
elif zona=='Zone A':
    if frecuencia==100:
        if tiempo==50:
            numerohoja=15
        elif tiempo==10:
            numerohoja=16
        elif tiempo==1:
            numerohoja=17
        else:
            print 'Porcentaje de tiempo incorrecto'
    elif frecuencia==600:
        if tiempo==50:
            numerohoja=42
        elif tiempo==10:
            numerohoja=43
        elif tiempo==1:
            numerohoja=44
        else:
            print 'Porcentaje de tiempo incorrecto'
    elif frecuencia==2000:
        if tiempo==50:
            numerohoja=69
        elif tiempo==10:
            numerohoja=70
        elif tiempo==1:
            numerohoja=71
        else:
            print 'Porcentaje de tiempo incorrecto'
    else:
        print 'Frecuencia Incorrecta'
elif zona=='Zone B':
    if frecuencia==100:
        if tiempo==50:
            numerohoja=18
        elif tiempo==10:
            numerohoja=19
```

```
            elif tiempo==1:
                numerohoja=20
            else:
                print 'Porcentaje de tiempo incorrecto'
        elif frecuencia==600:
            if tiempo==50:
                numerohoja=45
            elif tiempo==10:
                numerohoja=46
            elif tiempo==1:
                numerohoja=47
            else:
                print 'Porcentaje de tiempo incorrecto'
        elif frecuencia==2000:
            if tiempo==50:
                numerohoja=72
            elif tiempo==10:
                numerohoja=73
            elif tiempo==1:
                numerohoja=74
            else:
                print 'Porcentaje de tiempo incorrecto'
        else:
            print 'Frecuencia Incorrecta'
    elif zona=='Zone C':
        if frecuencia==100:
            if tiempo==50:
                numerohoja=21
            elif tiempo==10:
                numerohoja=22
            elif tiempo==1:
                numerohoja=23
            else:
                print 'Porcentaje de tiempo incorrecto'
        elif frecuencia==600:
            if tiempo==50:
                numerohoja=48
            elif tiempo==10:
                numerohoja=49
```

```
            elif tiempo==1:
                numerohoja=50
            else:
                print 'Porcentaje de tiempo incorrecto'
        elif frecuencia==2000:
            if tiempo==50:
                numerohoja=75
            elif tiempo==10:
                numerohoja=76
            elif tiempo==1:
                numerohoja=77
            else:
                print 'Porcentaje de tiempo incorrecto'
        else:
            print 'Frecuencia Incorrecta'
    elif zona=='Zone D':
        if frecuencia==100:
            if tiempo==50:
                numerohoja=24
            elif tiempo==10:
                numerohoja=25
            elif tiempo==1:
                numerohoja=26
            else:
                print 'Porcentaje de tiempo incorrecto'
        elif frecuencia==600:
            if tiempo==50:
                numerohoja=51
            elif tiempo==10:
                numerohoja=52
            elif tiempo==1:
                numerohoja=53
            else:
                print 'Porcentaje de tiempo incorrecto'
        elif frecuencia==2000:
            if tiempo==50:
                numerohoja=78
            elif tiempo==10:
```

```
            numerohoja=79
        elif tiempo==1:
            numerohoja=80
        else:
            print 'Porcentaje de tiempo incorrecto'
    else:
        print 'Frecuencia Incorrecta'
else:
    print 'Zona Incorrecta'


return numerohoja
```

Correcciones.py

```
# -*- coding: utf-8 -*-

from math import log10,sqrt,log,atan

def correc_libre(f,trayecto,thetatca):
    correccion=0
    if(trayecto=="Terrestre"):
        if(thetatca<0.55):
            thetatca=0.55
        elif(thetatca>40.0):
            thetatca=40.0
        print "El angulo de despejamiento thetatca es",thetatca,"º"
        vprima=0.065*thetatca*sqrt(f)
        v=0.036*sqrt(f)
        Jvprima=6.9+20*log10(sqrt(((vprima-0.1)**2)+1)+vprima-0.1)
        Jv=6.9+20*log10(sqrt(((v-0.1)**2)+1)+v-0.1)
        correccion=Jvprima-Jv
    return correccion

def correc_altura(d,trayecto,h1,f,h2):
    correccion=0
    R2=10
    if(trayecto=="Terrestre"):
        zona='Zone 0'
        while (zona!='Urbana' and  zona!='No urbana'):
            zona=raw_input("Tipo de zona (Urbana o No urbana): ")
            if(zona=="Urbana"):
                zona='Zona 0'
                while (zona!='Urbana' and zona!='Urbana Densa' and  zona!='Suburbana'):
                    zona=raw_input("Tipo de zona (Urbana o Urbana Densa o Suburbana): ")
                if(zona=="Urbana"):
                    R2=20
                elif(zona=="No urbana"):
                    R2=30
                elif(zona=="No urbana"):
                    R2=10
```

```
            R2prima=(1000*d*R2-15*h1)/(1000*d-15)
            R2prima=max(1,R2prima)
            if(R2prima<10):
               Kh2=3.2+6.2*log(f)
               correccion=Kh2*log(10/R2prima)
            elif(h2<R2prima):
               Knu=0.0108*sqrt(f)
               hdif=R2prima-h2
               thetaclut=atan(hdif/27)
               v=Knu*sqrt(hdif*thetaclut)
               Jv=(6.9+20*log(sqrt(((v-0.1)**2)+1))+v-0.1)
               correccion=6.03-Jv
            elif(h2>=R2prima):
               Kh2=3.2+6.2*log(f)
               correccion=Kh2*log(h2/R2prima)
         elif(zona=="No urbana"):
            Kh2=3.2+6.2*log(f)
            correccion=Kh2*log(h2/10)
   elif(trayecto=="Marítimo"):
      if(h2>=10):
         Kh2=3.2+6.2*log(f)
         correccion=Kh2*log(h2/10)
   return correccion

def correc_transmisor(f,ha):
   correccion=0
   #ha=100
   R1=100
   #Hay que calcular las alturas de forma dinamica
   hdif1=ha-R1
   ThetaClut1=atan(hdif1/27)
   Knu=0.0108*sqrt(f)
   if (R1>=ha):
      v=Knu*sqrt(hdif1*ThetaClut1)
   else:
      v=-Knu*sqrt(hdif1*ThetaClut1)
   if (v>-0.7806):
      Jv=6.9+20*log10(sqrt(((v-0.1)**2)+1)+v-0.1)
   else:
```

```
        Jv=0
    correccion=-Jv
    return correccion


def correc_oblicuo(d,ha,h2):
    correccion=0
    #ha=100
    #h2=100
    htter=100
    hrter=100
    #Hay que calcular las alturas de forma dinamica
    #Con informacion del terreno
    dslope=sqrt(d**2+(10**-6)*((ha+htter)-(h2+hrter))**2)
    #Sin informacion del terreno
    dslope=sqrt(d**2+(10**-6)*(ha-h2)**2)
    correccion=20*log(d/dslope)
    return correccion
```

ApiElevation.py

```
# -*- coding: utf-8 -*-

import urllib2
import json
from math import atan
import matplotlib.pyplot as plt
from Funciones import haversine

def inicializacion_api(LatTx,LonTx,LatRx,LonRx):
    #START-END POINT
    P1=[LatTx,LonTx]
    P2=[LatRx,LonRx]

    #NUMBER OF POINTS
    s=100
    interval_lat=(P2[0]-P1[0])/s #interval for latitude
    interval_lon=(P2[1]-P1[1])/s #interval for longitude

    #SET A NEW VARIABLE FOR START POINT
    lat0=P1[0]
    lon0=P1[1]

    #LATITUDE AND LONGITUDE LIST
    lat_list=[lat0]
    lon_list=[lon0]

    #GENERATING POINTS
    for i in range(s):
        lat_step=lat0+interval_lat
        lon_step=lon0+interval_lon
        lon0=lon_step
        lat0=lat_step
        lat_list.append(lat_step)
        lon_list.append(lon_step)

    #DISTANCE CALCULATION
    d_list=[]
```

```
    for j in range(len(lat_list)):
        lat_p=lat_list[j]
        lon_p=lon_list[j]
        dp=haversine(lat0,lon0,lat_p,lon_p)#/1000 #km
        d_list.append(dp)
    d_list_rev=d_list[::-1]#reverse list

    return d_list_rev,lat_list,lon_list

def llamada_api(lat_list,lon_list):
    #CONSTRUCT JSON
    d_ar=[{}]*len(lat_list)
    for i in range(len(lat_list)):
        d_ar[i]={"latitude":lat_list[i],"longitude":lon_list[i]}
    location={"locations":d_ar}
    json_data=json.dumps(location,skipkeys=int).encode('utf8')

    #SEND REQUEST
    url="https://api.open-elevation.com/api/v1/lookup"
    #response = urllib.request.Request(url,json_data,headers={'Content-Type': 'application/json'})
    #fp=urllib.request.urlopen(response)
    response = urllib2.Request(url,json_data,headers={'Content-Type': 'application/json'})
    fp=urllib2.urlopen(response)

    #RESPONSE PROCESSING
    res_byte=fp.read()
    res_str=res_byte.decode("utf8")
    js_str=json.loads(res_str)
    #print (js_mystr)
    fp.close()

    #GETTING ELEVATION
    response_len=len(js_str['results'])
    elev_list=[]
    for j in range(response_len):
        elev_list.append(js_str['results'][j]['elevation'])

    return elev_list
```

```
def resultados_api(elev_list,d_list_rev,ha,h2):
    #BASIC STAT INFORMATION
    mean_elev=round((sum(elev_list)/len(elev_list)),3)
    min_elev=min(elev_list)
    max_elev=max(elev_list)
    distance=d_list_rev[-1]

    #Calculo de heff y hb
    if distance<15:
        for i in d_list_rev:
            if(i<=0.2*distance):
                x=i
                ind=d_list_rev.index(x)
        mean_elev_hb=round((sum(elev_list[ind:])/len(elev_list[ind:])),3)
        hb=(elev_list[0]+ha)-mean_elev_hb
        mean_elev_heff=0
        heff=0
        y=max_elev-hb
        dist=d_list_rev[elev_list.index(max_elev)]
        if(dist==0):
            thetaeff=0
        else:
            thetaeff=atan(y/dist)
    else:
        for i in d_list_rev:
            if(i<=3):
                x=i
                indx=d_list_rev.index(x)
            if(i<=15):
                y=i
                indy=d_list_rev.index(y)
        mean_elev_heff=round((sum(elev_list[indx:indy])/len(elev_list[indx:indy])),3)
        heff=(elev_list[0]+ha)-mean_elev_heff
        mean_elev_hb=0
        hb=0
        for i in d_list_rev:
            if(i<=15):
                x=i
```

```
                ind=d_list_rev.index(x)
            y=max(elev_list[:ind])-heff
            dist=d_list_rev[elev_list.index(max(elev_list[:ind]))]
            if(dist==0):
              thetaeff=0
            else:
              thetaeff=atan(y/dist)

        #Calculo de thetatca
        if(distance<16):
            y=max(elev_list)-(h2+elev_list[-1])
            dist=distance-d_list_rev[elev_list.index(max(elev_list))]
            thetatca=atan(y/dist)
        else:
            for i in d_list_rev:
              if(i<=(distance-16)):
                x=i
                indx=d_list_rev.index(x)
            y=max(elev_list[x:])-(h2+elev_list[-1])
            dist=distance-d_list_rev[elev_list.index(max(elev_list[x:]))]
            thetatca=atan(y/dist)
        return
distance,mean_elev,min_elev,max_elev,mean_elev_hb,hb,mean_elev_heff,heff,thetatca,thetaeff


    def
grafica_api(d_list_rev,elev_list,distance,mean_elev,min_elev,max_elev,mean_elev_hb,hb,mean_elev_heff,hef
f):
        #PLOT ELEVATION PROFILE
        base_reg=0
        plt.figure(figsize=(10,4))
        plt.plot(d_list_rev,elev_list)
        plt.plot([0,distance],[min_elev,min_elev],'--g',label='min: '+str(min_elev)+' m')
        plt.plot([0,distance],[max_elev,max_elev],'--r',label='max: '+str(max_elev)+' m')
        plt.plot([0,distance],[mean_elev,mean_elev],'--y',label='ave: '+str(mean_elev)+' m')
        if distance<15:
            plt.plot([0.2*distance,distance],[mean_elev_hb,mean_elev_hb],'--b',label='ave_hb:
'+str(mean_elev_hb)+' m')
            plt.plot([0,distance],[hb,hb],'--b',label='hb: '+str(hb)+' m')
        else:
```

```
            plt.plot([3,15],[mean_elev_heff,mean_elev_heff],'--b',label='ave_heff:    '+str(mean_elev_heff)+'
m')
            plt.plot([3,15],[heff,heff],'--b',label='heff: '+str(heff)+' m')
        plt.fill_between(d_list_rev,elev_list,base_reg,alpha=0.1)
        plt.text(d_list_rev[0],elev_list[0],"P1")
        plt.text(d_list_rev[-1],elev_list[-1],"P2")
        plt.xlabel("Distance(km)")
        plt.ylabel("Elevation(m)")
        plt.grid()
        plt.legend(fontsize='small')
        plt.show()
        return 0


    def elevacion_api(LatTx,LonTx,LatRx,LonRx,ha,h2):
        print "Inicializando ApiElevation"
        d_list_rev,lat_list,lon_list=inicializacion_api(LatTx,LonTx,LatRx,LonRx)
        print "Llamada a la API"
        elev_list=llamada_api(lat_list,lon_list)
        print "Obteniendo resultados y calculando variables desde la API"

distance,mean_elev,min_elev,max_elev,mean_elev_hb,hb,mean_elev_heff,heff,thetatca,thetaeff=resultados_a
pi(elev_list,d_list_rev,ha,h2)
        print "Obteniendo gráficas desde la API"

grafica_api(d_list_rev,elev_list,distance,mean_elev,min_elev,max_elev,mean_elev_hb,hb,mean_elev_heff,hef
f)


        return hb,heff,thetatca,thetaeff
```