7

DISCUSSION

The trend line in Fig 6.1 is based on an extensive series of field strength measurements. It represents the median field strength variation with distance from the transmitter for a 3m receiving antenna height. The cumulative distribution function shown in Fig 6.3 depicts that, from the trend line,

(a) 50% of measurements are within a margin of ± 3.25 dB

(b) 10% of measurements are outside a margin of ± 7 dB

(c) 1% of measurements are outside a margin of ± 10 dB

Although most of the median field strength measurements are within a reasonable margin from the trend line, some are strongly influenced by shadowing and multi-path effects by the clutter factors in the environment. This unveils the fact that, detailed topographic database alone is not sufficient but also availability of an environmental database is necessary for more accurate prediction. If not, test sites for field strength measurements should be strategically selected to minimize the influence of clutter factors.

Measurement of field strength in built-up areas in the broadcast environment is not as important as in the mobile environment. The most influential and significant factor in the broadcast environment is trees. Fig 6.8 shows the variation of estimated morphological loss due to trees with the clearance angle. This curve can be used with an environmental database for more accurate field strength predictions.

As shown in Fig 6.9, the Free Space model overestimates the median field strength whereas the Plane Earth model underestimates the same. This signifies that Free Space and the Plane Earth model do not yield correct results in unmodified form.

The Average(L_F, L_P) model underestimates the field strength at smaller distances and overestimates at longer distances. The Max(L_F, L_P) model fits the trend line very closely, but with the distance the deviation from the trend line becomes larger due to the effect of the smooth earth diffraction. But Max(L_F, L_P) model very accurately fits the trend line at almost all the distances compared to other theoretical models.

The predicted median field strength curves by FCC and ITU-R PN 370-6 empirical models for receiver heights of 9.1 m and 10m respectively are shown in Fig 6.6. These curves are around 10 dB greater than the trend line due to greater receiving antenna heights. The FCC curve underestimates the field strength than ITU PN 370-6 for smaller distances but both models fit the trend line with the increase in distance.

A qualitative description of the environment is often employed using terms such as rural, urban and suburban. ITU PN 370-6 model has been corrected to 3m receiving antenna heights under urban, suburban and rural environmental conditions and shown

in Fig 6.6. The ITU-R PN 370-6 urban, suburban and rural curves successively fit the trend-line with the increase of distance from the transmitting station.

In irregular terrain under none line-of-sight conditions model Max (L_F, L_P') has yielded a mean error of –0.98 with a standard deviation of 1.6 dB with Epstein Peterson diffraction correction as per Table 6.6. Deygout and Bullington methods have yielded underestimated diffraction losses.

The model Max (L_F, L_P) has yielded highly inaccurate results. Therefore application of model Max (L_F, L_P) is not recommended for irregular terrain under non-line of sight condition.

ITU PN 370-6 has produced a mean error of 4.4 dB with a standard deviation of 5.21dB. This is an acceptable model but not accurate as in the case of model Max (L_F, L_P'). The concept of effective antenna height used in this model, inevitably suffer from the fact that they do not take full account of the distinctive features of terrain. By this method significant obstructions can be ignored or underestimated. The use of diffraction calculation based on the knife-edge theory to account for losses caused by real obstacles produce more accurate readings, but involves time-consuming procedures.

The FCC model has produced unacceptable results and application of FCC method for propagation over irregular terrain is not recommended.

7.1 CONCLUSION

Choosing a propagation prediction model for the application for a specific problem generally depends on accuracy and simplicity.

In prediction, many data inputs are required with intricate and complex procedures of analysis for greater accuracy. But we can trade the accuracy for simplicity and ease of application if approximated results are required.

By application of theoretical and empirical models under two most common situations in Sri Lankan FM environment, it is found that, model Max (L_F, L_P') with Epstein Peterson diffraction correction yields more accurate results in both cases. But many data inputs are required and an intricate procedure is involved.

ITU PN 370-6 model is not accurate as aforesaid model. But the application is easy and acceptable in both cases for moderate accuracy. Therefore depending on the degree of accuracy required one of the above models are recommended for propagation prediction in FM broadcast service in Sri Lanka.

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APPENDIX 1

Median field strength readings taken within the service area of a reference transmitter are shown in Table 1. Reference frequency is 106.5 MHz. Transmitter is located at 79 51'46" E and 06 55' 07" N with 2 KW output power fed to an antenna of gain 7.8 dB. Antenna is mounted on top of 102m tower.

All readings are taken with a receiving antenna height of 3m. In order to estimate the median field strength of a test site, 150 field strength measurements were taken within a small area of radius 50m.

Table 1 Median field strength measurements

No	Latitude	Longitude	Median field strength (dBuV/m)
1	06°52'30.3"N	079°53'27.2"E	74.1
2	06°50'59.2"N	079°55'24.3"E	67.6
3	06°50'30.8"N	079°57'46.2"E	62.1
4	06°50'30.8"N	079°57'46.2"E	56.7
5	06°51'04.3"N	080°01'50.3"E	51.1
6	06°51'16.6"N	080°05'21.2"E	49.7
7	06°50'39.2"N	080°05'23.1"E	51.2
8	06°55'27.2"N	079°55'37.3"E	71.2
9	06°54'14.2"N	079°57'19.7"E	67.4
10	06°56'07.0"N	079°59'04.7"E	59.2
11	06°52'48.5"N	079°52'34.7"E	78.1
12	06°51'11.1"N	079°51'56.8"E	74.2
13	06°50'04.1"N	079°52'02.5"E	68.7
14	06°48'13.9"N	079°53'14.0"E	64.2
15	06°45'42.6"N	079°53'06.1"E	57.5
16	06°44'21.8"N	079°53'35.9"E	56.4
17	06°43'00.4"N	079°54'27.7"E	55.7
18	06°59'0.8"N	079°53'18.5"E	71.6
19	06°54'39.5"N	079°52'38.9"E	89.9
20	06°56'07.9"N	079°52'41.1"E	88.5
21	06°57'42.9"N	079°52'58.5"E	78.8
22	07°00'23.3"N	079°53'49.0"E	65.1
23	07°01'16.3"N	079°53'58.1"E	61.3
24	07°02'43.1"N	079°53'49.9"E	60.8
25	07°04'34.1"N	079°53'29.2"E	56.0
26	07°05'20.0"N	079°53'57.7"E	57.7
27	07°06'14.6"N	079°56'09.9"E	51.4
28	07°05'29.8"N	079°58'4.7"E	51.7
29	07°05'26.6"N	079°59'35.3"E	50.9
30	07°04'35.2"N	080°00'49.6"E	51.1
31	07°02'54.1"N	080°00'12.5"E	52.9
32	07°01'30.7"N	079°58'43.3"E	57.7
33	07°00'07.0"N	079°57'04.6"E	65.3

No	Latitude	Longitude	Median field strength (dBuV/m)
34	06°42'31.3"N	079°55'39.0"E	67.1
35	06°58'36.7"N	079°55'38.1"E	74.9
36	06°57'36.8"N	079°53'33.5"E	77.4
37	06°52'02.7"N	079°53'3.8"E	76.2
38	06°51'25.0"N	079°53'26.5"E	69.5
39	06°50'20.2"N	079°54'5.7"E	69.3
40	06°49'07.4"N	079°55'3.7"E	70.0
42	06°47'44.8"N	079°56'26.3"E	61.0
43	06°47'13.8"N	079°57'49.4"E	55.6
44	06°46'59.8"N	079°59'03.8"E	52.4
45	06°46'51.0"N	079°59'46.1"E	55.5
46	06°45'48.6"N	080°00'46.3"E	51.7
47	06°45'21.0"N	080°00'52.9"E	52.0
48	06°42'49.0"N	079°59'17.3"E	50.3
49	06°42'25.7"N	079°57'16.3"E	51.5
50	06°42'31.3"N	079°55'39.0"E	50.9
51	06°41'04.6"N	079°55'11.4"E	51.5
52	06°40'48.1"N	079°55'50.8"E	50.2
53	06°37'45.5"N	079°56'34.7"E	50.9
54	06°35'30.6"N	079°57'33.6"E	50.6
55	06°39'45.1"N	079°58'18.6"E	51.4
56	06°43'17.0"N	080°00'49.9"E	51.6
57	06°43'33.9"N	080°02'03.4"E	50.0
58	06°43'0.5"N	080°03'45.2"E	51.0
59	06°47'49.9"N	080°02'30.4"E	55.2
60	06°45'07.0"N	079°59'22.5"E	53.0
61	06°46'08.8"N	079°56'54.7"E	52.2
62	06°45'03.9"N	079°57'40.0"E	53.8
63	06°44'18.3"N	079°58'38.6"E	55.5
64	06°53'22.7"N	079°52'49.5"E	86.6
65	06°53'14.6"N	079°53'09.8"E	86.1
66	06°53'38.3"N	079°53'22.8"E	82.4
67	06°53'55.7"N	079°53'35.9"E	82.2
68	06°54'25.3"N	079°53'43.2"E	85.2
69	06°54'31.9"N	079°53'25.2"E	90.6
70	06°54'45.3"N	079°53'06.4"E	87.0
71	06°54'57.8"N	079°53'26.9"E	84.1
72	06°55'24.1"N	079°53'28.2"E	89.6
73	06°55'43.9"N	079°53'26.7"E	85.0
74	06°54'49.5"N	079°52'59.3"E	87.6
75	06°54'30.7"N	079°52'38.8"E	89.5
76	06°54'35.9"N	079°54'09.3"E	78.0
77	06°55'04.7"N	079°54'37.9"E	72.6
78	06°55'27.8"N	079°54'45.2"E	82.8
79	06°55'42.2"N	079°54'06.2"E	87.8
80	06°55'57.9"N	079°53'36.2"E	89.0

No	Latitude	Longitude	Median field strength (dBuV/m)
81	06°55'51.9"N	079°52'58.3"E	92.2
82	06°55'34.1"N	079°52'30.4"E	96.8
83	06°55'17.3"N	079°52'24.9"E	100.2
84	06°55'35.2"N	079°51'58.4"E	98.4
85	06°55'37.0"N	079°51'41.9"E	87.0
86	06°55'50.5"N	079°51'43.7"E	100.6
87	06°55'59.2"N	079°51'48.7"E	81.0
88	06°56'15.5"N	079°51'58.9"E	96.4
89	06°56'34.3"N	079°51'51.9"E	92.7
90	06°56'50.8"N	079°51'43.9"E	79.6
91	06°52'52.9"N	079°52'34.2"E	80.7
92	06°52'39.1"N	079°52'45.8"E	77.6
93	06°52'14.7"N	079°53'11.4"E	73.7
94	06°51'58.4"N	079°52'53.6"E	72.4
95	06°52'20.6"N	079°52'08.2"E	73.8
96	06°52'43.3"N	079°52'17.2"E	84.7
97	06°53'06.4"N	079°52'01.0"E	77.7
98	06°51'05.9"N	080°01'56.4"E	51.7
99	06°51'03.9"N	080°02'54.1"E	52.0
100	06°51'20.2"N	080°03'44.6"E	51.6
101	06°51'15.5"N	080°04'45.8"E	55.3
102	06°51'36.1"N	080°05'26.9"E	50.1
103	06°52'23.8"N	080°05'12.4"E	53.9
104	06°53'20.8"N	080°05'18.9"E	51.4
105	06°54'22.3"N	080°05'03.2"E	51.7
106	06°54'29.8"N	080°04'47.2"E	52.8
107	06°54'29.1"N	080°04'07.1"E	54.2
108	06°54'10.0"N	080°03'25.4"E	52.2
109	06°53'46.7"N	080°03'24.9"E	52.6
110	06°53'28.8"N	080°03'26.9"E	46.2
111	06°54'24.6"N	080°03'16.3"E	51.7
112	06°54'49.3"N	080°02'39.5"E	52.1
113	06°55'08.1"N	080°02'06.1"E	55.8
114	06°55'23.5"N	080°01'25.5"E	55.5
115	06°55'39.4"N	080°00'44.6"E	55.8
116	06°56'07.1"N	080°00'00.5"E	61.6
117	06°56'00.2"N	079°59'31.8"E	59.2
118	06°55'54.0"N	079°58'57.1"E	55.9
119	06°55'24.4"N	079°58'39.9"E	63.3
120	06°54'51.4"N	079°58'19.7"E	66.5
121	06°54'19.3"N	079°57'45.4"E	62.1
122	06°53'58.4"N	079°57'28.0"E	59.8
123	06°53'15.8"N	079°58'01.3"E	62.4
124	06°52'57.6"N	079°58'46.9"E	63.6
125	06°52'44.1"N	079°59'15.4"E	62.1
126	06°53'08.6"N	079°59'37.2"E	63.9

No	Latitude	Longitude	Median field strength (dBuV/m)
127	06°52'21.1"N	079°59'46.1"E	58.1
128	06°51'51.9"N	080°00'26.8"E	58.6
129	06°52'21.2"N	080°01'02.8"E	52.5
130	06°52'46.4"N	080°01'03.5"E	50.3
131	06°51'57.1"N	080°01'05.4"E	55.3
132	06°51'48.6"N	080°01'31.3"E	53.5
133	06°51'11.8"N	080°01'55.1"E	48.9
134	06°38'09.4"N	079°57'04.5"E	50.0
135	06°39'04.7"N	079°57'58.4"E	50.7
136	06°39'37.1"N	079°58'20.0"E	51.5
137	06°40'15.8"N	079°58'21.0"E	51.6
138	06°41'10.9"N	079°58'49.7"E	53.2
139	06°41'55.6"N	079°59'12.4"E	50.6
140	06°42'59.3"N	079°58'33.6"E	55.2
141	06°43'10.0"N	079°58'22.7"E	51.9
142	06°44'34.4"N	079°56'53.0"E	52.1
143	06°44'40.0"N	079°57'01.1"E	55.7
144	06°45'25.4"N	079°57'14.7"E	59.7
145	06°47'05.9"N	079°55'19.7"E	69.8
146	06°46'19.4"N	079°55'42.4"E	58.3
147	06°45'55.8"N	079°56'20.2"E	53.2
148	06°45'45.5"N	079°55'27.7"E	56.0
149	06°46'43.9"N	079°54'56.3"E	55.5
150	06°47'21.8"N	079°54'37.5"E	60.7
151	06°47'43.6"N	079°54'29.6"E	52.5
152	06°49'08.4"N	079°53'59.3"E	68.5
153	06°48'09.2"N	079°56'12.9"E	56.8
154	06°48'22.8"N	079°56'59.9"E	56.1
155	06°49'11.2"N	079°57'37.8"E	61.1
156	06°49'44.2"N	079°58'08.2"E	60.7
157	06°49'33.8"N	079°58'34.5"E	55.7
158	06°48'32.2"N	079°59'14.1"E	63.2
159	06°48'17.0"N	079°59'51.4"E	57.5
160	06°48'00.9"N	080°00'48.6"E	56.2
161	06°48'05.0"N	080°01'21.5"E	55.4
162	06°47'47.9"N	080°03'04.0"E	51.1
163	06°47'07.8"N	080°03'19.2"E	50.7
164	06°46'05.8"N	080°03'21.7"E	52.3
165	06°45'29.2"N	080°03'13.4"E	52.2
166	06°44'32.7"N	080°03'16.3"E	50.4
167	06°43'38.5"N	080°03'16.9"E	49.6
168	06°43'12.8"N	080°03'03.6"E	49.8
169	06°43'17.3"N	080°00'58.2"E	49.6
170	06°43'07.9"N	079°59'56.7"E	49.5
171	06°42'09.7"N	079°57'59.2"E	51.0
172	06°42'24.2"N	079°56'14.6"E	50.6

No	Latitude	Longitude	Median field strength (dBuV/m)
173	06°52'37.9"N	079°53'34.7"E	73.0
174	06°52'58.3"N	079°53'54.9"E	76.9
175	06°53'03.1"N	079°54'07.7"E	83.5
176	06°53'00.4"N	079°54'36.9"E	76.4
177	06°52'44.0"N	079°55'19.0"E	68.5
178	06°52'33.3"N	079°55'47.1"E	68.2
179	06°52'37.1"N	079°56'06.7"E	65.7
180	06°52'57.5"N	079°56'00.8"E	65.6
181	06°53'23.3"N	079°55'45.7"E	70.6
182	06°53'37.8"N	079°54'59.6"E	79.1
183	06°53'27.1"N	079°55'26.1"E	80.0
184	06°54'10.6"N	079°54'38.9"E	82.6
185	06°54'23.0"N	079°54'09.8"E	82.8
186	06°54'30.4"N	079°53'45.3"E	80.2
187	06°52'29.1"N	079°53'55.3"E	69.9
188	06°52'20.9"N	079°54'18.1"E	73.6
189	06°52'01.8"N	079°54'37.8"E	73.6
190	06°51'37.7"N	079°54'50.2"E	74.9
191	06°51'18.2"N	079°55'04.5"E	66.6
192	06°50'41.2"N	079°56'03.8"E	62.6
193	06°50'43.9"N	079°57'10.3"E	59.1
194	06°50'37.9"N	079°58'01.6"E	65.1
195	06°50'54.8"N	079°58'34.3"E	61.3
196	06°51'26.0"N	079°59'12.1"E	64.1
197	06°51'54.9"N	079°59'46.4"E	65.0
198	06°52'10.6"N	079°59'59.9"E	65.0
199	06°52'34.9"N	079°59'27.4"E	67.0
200	06°52'51.8"N	079°59'01.4"E	66.4
201	06°53'01.0"N	079°58'41.6"E	67.5
202	06°53'30.1"N	079°57'49.7"E	68.1
203	06°56'29.9"N	079°59'14.2"E	67.5
204	06°57'02.7"N	079°59'37.1"E	67.5
205	06°57'41.5"N	079°59'39.8"E	68.1
206	06°57'58.1"N	079°59'13.8"E	67.5
207	06°58'16.7"N	079°58'36.8"E	70.7
208	06°58'02.5"N	079°57'57.0"E	71.8
209	06°58'08.0"N	079°57'25.3"E	74.1
210	06°58'26.2"N	079°57'03.7"E	68.3
211	06°58'35.6"N	079°55'55.8"E	69.1
212	06°58'18.1"N	079°54'59.8"E	77.1
213	06°57'42.7"N	079°53'39.0"E	75.6
214	06°56'52.1"N	079°52'42.4"E	88.0
215	06°51'51.5"N	079°53'14.1"E	70.3
216	06°51'22.7"N	079°53'26.3"E	66.6
217	06°51'02.7"N	079°53'42.8"E	70.8
218	06°50'51.1"N	079°53'54.4"E	71.6

No	Latitude	Longitude	Median field strength (dBuV/m)
219	06°50'29.7"N	079°54'05.1"E	73.4
220	06°50'14.5"N	079°54'12.0"E	71.8
221	06°49'39.5"N	079°54'44.3"E	72.1
222	06°49'02.9"N	079°55'06.2"E	68.2
223	06°48'24.0"N	079°55'15.2"E	68.0
224	06°47'57.5"N	079°55'07.3"E	68.4
225	06°47'52.1"N	079°54'42.5"E	69.7
226	06°47'39.7"N	079°54'26.3"E	67.7
227	06°47'42.0"N	079°54'14.9"E	67.0
228	06°47'43.7"N	079°53'57.5"E	68.8
229	06°47'52.1"N	079°53'27.3"E	69.0
230	06°48'08.6"N	079°53'16.0"E	69.1
231	06°48'27.1"N	079°53'03.1"E	69.1
232	06°48'42.7"N	079°52'53.3"E	70.0
233	06°48'59.8"N	079°52'34.0"E	68.0
234	06°49'30.5"N	079°52'11.5"E	69.0
235	06°50'02.2"N	079°52'02.3"E	71.6
236	06°50'40.6"N	079°51'58.7"E	73.4
237	06°51'01.3"N	079°52'16.7"E	73.6
238	06°50'58.6"N	079°52'57.2"E	74.4
239	06°50'42.4"N	079°53'26.7"E	68.3
240	06°50'23.3"N	079°53'46.0"E	69.7
241	06°50'28.3"N	079°54'08.7"E	70.6
242	06°50'31.9"N	079°54'34.9"E	70.4
243	06°50'32.5"N	079°55'05.4"E	71.6
244	06°56'37.6"N	079°59'29.6"E	61.4
245	06°56'41.2"N	080°00'13.9"E	58.3
246	06°56'52.1"N	080°00'50.1"E	59.2
247	06°56'56.2"N	080°01'27.5"E	56.1
248	06°57'02.9"N	080°01'48.3"E	59.7
249	06°56'59.8"N	080°02'07.7"E	62.6
250	06°57'03.3"N	080°02'47.1"E	63.5
251	06°57'00.4"N	080°03'26.3"E	55.4
252	06°57'20.6"N	080°03'06.4"E	53.0
253	06°58'11.3"N	080°02'39.8"E	54.0
254	06°57'29.8"N	080°02'06.1"E	52.5
255	06°57'28.9"N	080°01'22.7"E	50.7
256	06°57'30.8"N	080°00'58.0"E	58.8
257	06°57'18.5"N	080°00'59.0"E	56.3
258	06°56'39.6"N	080°00'09.8"E	60.4
259	06°57'10.3"N	079°59'38.4"E	56.8
260	06°58'10.4"N	080°00'03.1"E	57.3
261	06°58'39.2"N	080°00'24.9"E	60.1
262	06°58'50.6"N	080°01'17.7"E	59.8
263	06°58'26.0"N	080°02'11.7"E	55.6
264	06°58'12.1"N	080°02'36.6"E	53.7

No	Latitude	Longitude	Median field strength (dBuV/m)
265	06°57'42.1"N	080°02'58.9"E	53.1
266	06°56'38.9"N	079°52'43.2"E	81.2
267	06°56'34.0"N	079°53'10.6"E	86.1
268	06°56'13.7"N	079°53'52.6"E	80.6
269	06°56'10.4"N	079°54'45.9"E	84.7
270	06°56'09.4"N	079°55'30.4"E	75.9
271	06°56'11.2"N	079°56'05.8"E	74.4
272	06°56'15.3"N	079°56'50.7"E	70.5
273	06°56'19.4"N	079°57'42.9"E	65.3
274	06°56'11.4"N	079°58'28.7"E	57.7
275	06°56'09.2"N	079°59'03.1"E	65.1
276	06°57'21.1"N	079°52'59.0"E	77.9
277	06°57'21.4"N	079°53'33.0"E	73.5
278	06°57'25.3"N	079°53'58.1"E	71.0
279	06°57'06.4"N	079°54'16.0"E	72.7
280	06°57'03.6"N	079°54'40.6"E	67.8
281	06°57'10.5"N	079°55'02.8"E	78.1
282	06°57'09.8"N	079°55'33.1"E	70.1
283	06°57'05.2"N	079°56'01.5"E	65.2
284	06°56'43.6"N	079°56'27.1"E	64.5
285	06°56'39.7"N	079°57'01.1"E	65.8
286	06°56'34.5"N	079°57'35.9"E	62.9
287	06°56'22.6"N	079°58'32.3"E	58.5
288	06°56'29.4"N	079°59'11.7"E	58.5
289	06°57'32.2"N	079°52'31.9"E	77.2
290	06°58'07.0"N	079°52'21.7"E	77.6
291	06°58'29.5"N	079°52'36.3"E	69.3
292	06°58'54.8"N	079°53'09.9"E	68.5
293	06°58'58.9"N	079°52'40.3"E	68.3
294	06°59'08.3"N	079°52'28.4"E	78.1
295	06°59'41.6"N	079°52'25.7"E	73.6
296	07°00'14.6"N	079°52'09.7"E	71.3
297	07°00'50.1"N	079°52'03.2"E	70.8
298	07°01'18.1"N	079°51'59.1"E	70.5
299	07°01'56.8"N	079°51'53.5"E	65.7
300	07°02'34.5"N	079°51'46.9"E	66.2
301	07°02'55.6"N	079°51'54.2"E	62.5
302	07°03'22.0"N	079°51'55.4"E	61.4
303	07°03'48.4"N	079°51'49.7"E	57.8
304	07°04'18.4"N	079°51'36.2"E	55.9
305	07°04'46.5"N	079°51'34.0"E	51.9
306	07°05'07.5"N	079°51'09.8"E	52.1
307	07°05'36.8"N	079°50'55.1"E	52.0
308	07°06'02.8"N	079°50'49.9"E	52.5
309	07°06'42.3"N	079°50'35.0"E	55.5
310	07°04'45.1"N	079°53'29.6"E	53.3

No	Latitude	Longitude	Median field strength (dBuV/m)
311	07°04'59.0"N	079°54'15.8"E	52.6
312	07°05'24.3"N	079°55'26.5"E	50.5
313	07°05'15.5"N	079°56'15.6"E	49.3
314	07°04'43.2"N	079°57'17.0"E	52.9
315	07°04'13.8"N	079°57'30.7"E	64.1
316	07°04'09.8"N	079°57'04.7"E	55.7
317	07°03'50.2"N	079°56'24.3"E	55.8
318	07°03'41.0"N	079°55'51.8"E	58.7
319	07°03'10.8"N	079°55'37.3"E	61.1
320	07°02'39.0"N	079°55'52.2"E	58.7
321	07°02'14.0"N	079°56'10.3"E	52.1
322	07°02'02.0"N	079°56'32.4"E	52.6
323	07°01'43.9"N	079°56'48.5"E	51.1
324	07°01'22.7"N	079°57'20.2"E	57.4
325	07°00'46.9"N	079°57'14.5"E	58.2
326	07°00'10.3"N	079°57'12.7"E	65.3
327	06°59'43.5"N	079°56'48.1"E	71.8
328	07°07'31.5"N	079°52'36.4"E	55.6
329	07°05'49.9"N	079°57'12.8"E	57.2
330	07°03'00.6"N	079°53'44.1"E	58.1
331	07°01'19.0"N	079°54'17.9"E	59.6
332	07°02'09.8"N	079°59'28.2"E	56.4
333	07°09'54.1"N	079°58'49.4"E	45.6
334	07°03'26.3"N	080°04'36.3"E	49.5
335	06°59'20.3"N	079°59'53.7"E	57.3
336	07°01'30.3"N	079°51'56.9"E	62.1
337	06°59'14.8"N	080°02'28.7"E	57.3
338	07°01'41.6"N	080°02'11.8"E	57.6
339	07°03'43.3"N	080°00'34.8"E	47.9
340	06°47'57.6"N	080°02'37.3"E	49.3
341	06°47'03.2"N	080°08'44.6"E	45.8
342	06°48'14.6"N	080°07'57.0"E	45.9
343	06°43'25.5"N	080°05'20.5"E	49.1
344	06°43'52.7"N	079°56'09.5"E	48.4
345	06°44'13.1"N	080°07'09.4"E	46.1
346	06°37'41.9"N	079°58'46.0"E	46.8
347	06°43'01.7"N	079°59'43.8"E	48.6
348	06°43'01.7"N	079°59'43.8"E	48.1
349	06°45'00.7"N	080°05'06.9"E	47.4
350	07°05'01.6"N	080°02'50.9"E	47.6
351	07°01'13.4"N	079°58'31.8"E	62.3
352	07°00'05.6"N	080°00'24.6"E	62.3
353	06°59'43.1"N	079°55'31.3"E	64.3
354	06°53'36.2"N	080°00'52.8"E	62.1
355	06°55'29.1"N	080°01'21.0"E	61.2
356	06°59'14.8"N	079°58'54.3"E	55.9

No	Latitude	Longitude	Median field strength (dBuV/m)
357	06°49'44.8"N	080°02'40.0"E	57.7
358	06°54'21.4"N	080°03'42.0"E	56.7
359	06°52'28.5"N	080°03'30.7"E	58.9
360	06°45'30.9"N	079°53'49.7"E	62.9
361	06°46'21.7"N	079°55'36.9"E	64.3
362	07°04'14.0"N	079°53'27.1"E	63.3
363	06°44'40.1"N	079°55'31.3"E	62.4
364	06°50'30.0"N	080°00'35.9"E	63.6
365	06°58'57.9"N	079°56'50.2"E	64.1
366	06°52'00.3"N	080°01'15.41"E	63.4
367	06°47'12.4"N	079°58'37.4"E	64.5
368	07°05'59.4"N	079°58'35.8"E	48.1
369	07°09'57.5"N	079°56'40.1"E	45.1
370	07°09'16.7"N	079°57'48.2"E	45.3
371	07°11'02.2"N	079°54'41.1"E	45.9
372	07°00'05.6"N	080°08'07.2"E	48.4
373	06°58'06.5"N	080°08'17.4"E	48.6
374	06°58'06.5"N	080°08'17.4"E	48.9
375	06°57'42.7"N	080°06'31.9"E	49.8
376	06°54'01.6"N	080°08'10.6"E	46.7
377	06°54'22.0"N	080°06'01.3"E	47.6
378	06°50'06.9"N	080°07'02.6"E	47.9
379	06°40'25.2"N	080°01'12.2"E	48.9
380	06°40'25.2"N	080°01'12.2"E	46.4
381	06°40'59.2"N	080°02'40.7"E	46.9
382	06°43'25.5"N	080°05'20.5"E	48.9
383	06°38'02.3"N	079°57'27.8"E	48.6

APPENDIX 2

Table 1 shows a set of field strength readings taken at places where the transmitter and receiver line-of-sight path is obstructed by trees. The clearance angle is the vertical angle, which just clears the obstruction in the direction of the reference transmitting station. Reference frequency is 106.5 MHz. Transmitter is located at 79 51'46" E and 06 55' 07" N with 2 KW output power fed to an antenna of gain 7.8 dB. Antenna is mounted on top of 102 m tower

Table 1 Measurements of field strength with obstruction clearance angle

No	Geographical coordinates		Measured field strength (dBμV/m)	Clearance angle (Degree)
	Latitude	Longitude		
1	06°50'07.9"N	080°00'14.0"E	56.09	5-10
2	06°56'24.6"N	079°59'13.7"E	57.90	20-25
3	06°56'26.8"N	079°59'14.0"E	57.53	20-25
4	06°56'03.5"N	079°58'58.0"E	58.23	20-25
5	06°55'43.8"N	079°58'57.7"E	60.73	10-15
6	06°55'26.2"N	079°58'41.1"E	63.86	05-10
7	06°54'57.5"N	079°58'20.8"E	61.38	15-20
8	06°53'33.7"N	080°00'30.1"E	56.51	10-15
9	06°53'06.4"N	080°00'00.5"E	56.09	15-20
10	06°52'44.8"N	079°59'08.3"E	57.65	15-20
11	06°53'00.4"N	079°58'44.3"E	64.41	00-05
12	06°53'03.2"N	079°58'18.6"E	59.42	20-25
14	06°57'41.5"N	079°59'38.4"E	61.20	05-10
15	06°57'05.3"N	079°59'37.9"E	56.32	20-25
16	06°56'38.0"N	079°59'26.3"E	56.90	20-25
17	06°55'27.6"N	079°58'41.8"E	61.11	10-15
18	06°55'16.7"N	079°58'30.2"E	61.71	10-15
19	06°55'14.5"N	079°58'28.3"E	64.39	05-10
20	06°55'09.1"N	079°58'27.2"E	61.71	10-15
21	06°54'39.5"N	079°58'18.5"E	62.18	10-15
22	06°54'39.5"N	079°58'18.5"E	62.18	10-15
23	06°54'38.3"N	079°58'18.0"E	60.23	10-25
24	06°54'33.7"N	079°58'14.5"E	62.02	10-15
25	06°54'33.7"N	079°58'14.5"E	66.67	00-05
26	06°54'32.3"N	079°58'11.8"E	66.60	00-05
27	06°54'16.6"N	079°57'10.4"E	68.12	05-10
28	06°54'22.7"N	079°56'49.3"E	68.77	05-10
29	06°54'26.9"N	079°56'43.1"E	64.46	20-25
30	06°54'31.1"N	079°56'33.5"E	71.13	00-05
31	06°48'55.8"N	079°55'06.6"E	58.44	20-25
32	06°48'53.0"N	079°55'08.2"E	62.65	05-10
33	06°48'44.8"N	079°55'11.7"E	57.91	20-25
34	06°48'38.9"N	079°55'12.5"E	58.51	15-20

No	Geographical coordinates		Geographical coordinates	Clearance angle (Degree)
	Latitude	Latitude		
35	06°48'33.2"N	079°55'14.3"E	58.70	15-20
36	06°48'14.0"N	079°55'17.5"E	62.07	00-05
37	06°48'19.1"N	079°55'34.2"E	56.51	20-25
38	06°48'29.8"N	079°55'46.2"E	58.66	10-15
40	06°48'33.5"N	079°56'04.7"E	61.69	00-05
41	06°48'33.7"N	079°56'19.3"E	57.11	15-20
42	06°49'01.5"N	079°56'15.2"E	61.74	05-10
45	06°49'41.2"N	080°00'12.9"E	53.22	10-15
46	06°49'35.8"N	080°00'09.0"E	51.60	20-25
47	06°49'31.3"N	080°00'06.0"E	57.79	00-05
48	06°49'28.5"N	080°00'03.5"E	57.10	05-10
49	06°49'26.6"N	080°00'00.6"E	58.05	05-10
50	06°49'21.9"N	079°59'54.1"E	53.60	10-15
51	06°49'13.5"N	079°59'51.8"E	52.37	15-20
52	06°48'54.1"N	079°59'45.4"E	51.36	20-25
53	06°48'46.6"N	079°59'44.8"E	50.99	20-25
54	06°48'32.8"N	079°59'45.7"E	55.45	05-10
55	06°48'30.4"N	079°59'46.3"E	51.96	15-20
56	06°48'28.3"N	079°59'47.3"E	52.26	10-15
57	06°48'27.0"N	079°59'47.6"E	52.57	15-20
58	06°48'23.7"N	079°59'48.4"E	52.52	10-15
59	06°48'19.1"N	079°59'50.0"E	55.09	05-10
60	06°48'16.4"N	079°59'52.2"E	56.80	00-05
61	06°48'04.5"N	080°00'00.3"E	56.25	00-05
63	06°49'26.6"N	079°58'40.5"E	59.91	00-05
64	06°49'38.6"N	079°58'34.1"E	54.63	20-25
65	06°50'37.6"N	079°57'40.0"E	62.37	05-10
66	06°50'39.3"N	079°57'34.1"E	62.32	05-10
67	06°50'40.3"N	079°57'29.3"E	58.96	15-20
68	06°50'39.9"N	079°57'27.0"E	63.05	05-10
69	06°50'41.9"N	079°57'21.7"E	60.75	10-15
70	06°50'43.9"N	079°57'15.5"E	59.58	15-20
71	06°50'51.1"N	079°56'55.6"E	64.30	05-10
72	06°50'57.8"N	079°56'54.1"E	59.15	25-30
73	06°50'57.8"N	079°56'4.1"E	59.00	25-30

APPENDIX 3

Field strength readings taken at strategic uncluttered test sites are shown in Table 1. Reference frequency is 88.8 MHz. Transmitter is located at an elevation of 2130 m above mean sea level (80 44' 00" E and 06 59' 00" N) with 4 KW output power fed to an antenna of gain 7.8 dB. Antenna is mounted on top of 102 m tower. All readings are taken with a receiving antenna height of 3m.

Table 1 Field strength measurement in irregular terrain

No	Geographical coordinates		Measured field strength (dBuV/m)
1	Longitude: Latitude:	080°01'28.6"E 07°00'50.3"N	51.2
2	Longitude: Latitude:	079°55'59.2"E 06°54'26.2"N	52.9
3	Longitude: Latitude:	079°50'58.1"E 07°18'30.11"N	50.2
4	Longitude: Latitude:	079°59'35.7"E 06°59'51.3"N	50.3
5	Longitude: Latitude:	080°01'05.9"E 07°08'06.4"N	54.9
6	Longitude: Latitude:	080°00'01.4"E 07°03'32.7"N	62.6
7	Longitude: Latitude:	079°58'58.4"E 06°46'36.7"N	51.9
8	Longitude: Latitude:	079°51'30.5"E 07°19'48.3"N	46.9
9	Longitude: Latitude:	079°55'14.6"E 07°02'53"N	62.4
10	Longitude: Latitude:	079°49'50.7"E 07°43'03.80"N	52.8

APPENDIX 4

Table 1. Field strength per 1 KW ERP

No	Distance from the transmitter (km)	Bearing (Degrees)	Azimuth pattern loss (dB)	Elevation pattern loss (dB)	Total pattern loss (dB)	Field strength per 1 KW ERP
1	5.972	328.66	0.5	0.175	0.675	68.14
2	10.373	319.75	0.5	0.00	0.50	61.53
3	14.129	308.50	1.0	0.10	1.00	56.53
4	14.129	308.50	1.0	0.00	1.00	51.13
5	20.109	292.70	1.5	0.00	1.50	46.03
6	26.091	286.43	1.5	0.00	1.50	44.63
7	26.496	288.79	1.5	0.00	1.50	46.13
8	7.110	267.02	0.5	0.00	0.50	65.13
9	10.416	280.44	1.5	0.00	1.50	62.33
10	13.561	263.22	0.5	0.00	0.50	53.13
11	4.778	341.77	1.5	0.00	1.50	73.03
12	7.557	357.49	2.5	0.00	2.50	70.13
13	9.635	356.99	2.5	0.00	2.50	64.63
14	13.306	348.29	1.5	0.00	1.50	59.13
15	17.877	352.09	2.5	0.00	2.50	53.43
16	20.485	350.52	2.5	0.00	2.50	52.33
17	23.259	347.68	1.5	0.00	1.50	50.63
18	7.530	202.15	1.2	0.00	1.20	66.23
19	1.964	304.25	1.0	3.98	4.98	88.31
20	2.348	226.09	1.5	2.22	3.72	85.65
21	5.079	205.99	1.2	0.00	1.20	73.43
22	10.246	201.62	1.2	0.00	1.20	59.73
23	11.878	199.96	0.7	0.00	0.70	55.43
24	14.361	195.36	0.7	0.00	0.70	54.93
25	17.568	190.39	0.7	0.00	0.70	50.13
26	19.132	192.20	0.7	0.00	0.70	51.83
27	21.938	201.67	1.2	0.00	1.20	46.03
28	22.275	211.45	1.5	0.00	1.50	46.63
29	23.766	217.30	1.5	0.00	1.50	45.83
30	24.044	223.94	1.5	0.00	1.50	46.03
31	21.047	227.61	1.5	0.00	1.50	47.83
32	17.287	227.81	1.5	0.00	1.50	52.63
33	13.305	227.31	1.5	0.00	1.50	60.23
34	120.262	44.53	1.0	0.00	0.00	60.53
35	9.463	228.83	1.5	0.00	1.50	69.83
36	5.481	217.01	1.5	0.00	1.50	72.33
37	21.456	316.61	0.5	0.00	0.50	49.43
38	23.940	328.05	0.5	0.00	0.50	49.43
39	3.989	330.75	0.5	0.00	0.50	80.53

No	Distance from the transmitter (km)	Bearing (Degrees)	Azimuth pattern loss (dB)	Elevation pattern loss (dB)	Total pattern loss (dB)	Field strength per 1 KW ERP
41	4.221	315.25	0.5	0.00	0.50	76.33
42	4.175	306.10	1.0	0.00	1.00	76.63
43	3.915	293.23	1.5	0.00	1.50	80.13
44	27.847	344.34	1.5	0.00	1.50	45.13
45	21.456	316.61	0.5	0.00	0.50	49.43
46	24.128	316.57	0.5	0.00	0.50	45.63
47	24.891	317.58	0.5	0.00	0.50	45.93
48	26.916	329.02	0.5	0.00	0.50	44.23
49	25.866	336.92	0.5	0.00	0.50	45.43
50	24.682	343.15	1.5	0.00	1.50	45.83
51	27.049	346.52	1.5	0.00	1.50	46.43
52	27.847	344.34	1.5	0.00	1.50	45.13
53	33.648	344.73	1.5	0.00	1.50	45.83
54	38.154	343.75	1.5	0.00	1.50	42.53
55	31.186	337.26	0.5	0.00	0.50	42.33
56	27.787	323.06	0.5	0.00	0.50	45.53
57	28.803	318.84	0.5	0.00	0.50	43.93
58	31.682	315.82	0.5	0.00	0.50	42.63
59	24.104	304.84	1.0	0.00	1.00	49.63
60	23.456	323.31	0.5	0.00	0.50	46.93
61	19.373	330.71	0.5	0.00	0.50	46.13
62	21.805	330.10	0.5	0.00	0.50	47.73
63	23.940	328.05	0.5	0.00	0.50	49.43
64	3.989	330.75	0.5	0.00	0.50	80.53
65	4.532	325.41	0.5	0.00	0.50	80.03
66	4.221	315.25	0.5	0.00	0.50	76.33
67	4.175	306.10	1.0	0.00	1.00	76.63
68	3.915	293.23	1.5	0.00	1.50	80.13
69	3.327	293.76	1.5	0.00	1.50	85.53
70	2.636	290.57	1.5	0.22	1.72	82.15
71	3.144	279.88	1.2	0.00	1.20	78.73
72	3.149	265.01	0.5	0.00	0.50	83.53
73	3.216	254.01	0.0	0.00	0.00	78.43
74	2.387	289.49	1.5	0.22	1.72	82.75
75	2.127	310.36	0.5	0.22	0.72	83.65
76	4.564	285.46	1.5	0.00	1.50	72.93
77	5.287	273.54	1.2	0.00	1.20	67.23
78	5.514	265.96	0.5	0.00	0.50	76.73
79	4.383	259.04	0.0	0.00	0.00	81.23
80	3.631	248.70	0.5	0.00	0.50	82.93
81	2.492	242.95	0.5	0.22	0.72	86.35
82	1.482	246.85	0.5	0.97	1.47	91.70
83	1.196	266.96	0.5	0.97	1.47	95.10
84	0.725	211.68	1.5	0.00	1.50	93.33
85	0.684	169.40	1.5	0.00	1.50	81.93
86	1.092	176.29	0.5	0.97	1.47	95.50

No	Distance from the transmitter (km)	Bearing (Degrees)	Azimuth pattern loss (dB)	Elevation pattern loss (dB)	Total pattern loss (dB)	Field strength per 1 KW ERP
88	1.905	192.00	0.7	0.97	1.67	91.50
89	2.451	184.24	0.7	0.22	0.92	87.05
90	2.955	178.75	0.5	0.22	0.72	73.75
91	4.644	341.42	1.5	0.00	1.50	75.63
92	5.166	339.18	0.5	0.00	0.50	71.53
93	6.168	334.85	0.5	0.00	0.50	67.63
94	6.431	341.17	1.5	0.00	1.50	67.33
95	5.443	352.81	2.5	0.00	2.50	69.73
96	4.795	348.48	1.5	0.00	1.50	79.63
97	4.011	353.41	2.5	0.00	2.50	73.63
98	20.263	292.37	1.5	0.00	1.50	46.63
99	21.933	290.75	1.5	0.00	1.50	46.93
100	23.226	288.24	1.5	0.00	1.50	46.53
101	25.060	287.21	1.5	0.00	1.50	50.23
102	26.095	285.05	1.5	0.00	1.50	45.03
103	25.316	282.09	1.5	0.00	1.50	48.83
104	25.203	278.07	1.2	0.00	1.20	46.03
105	24.526	273.83	1.2	0.00	1.20	46.33
106	24.021	273.35	1.2	0.00	1.20	47.43
107	22.794	273.59	1.2	0.00	1.20	48.83
108	21.564	275.37	1.2	0.00	1.20	46.83
109	21.628	277.27	1.2	0.00	1.20	47.23
110	21.766	278.70	1.2	0.00	1.20	40.83
111	21.248	274.23	1.2	0.00	1.20	46.33
112	20.076	272.29	1.2	0.00	1.20	46.73
113	19.036	270.67	1.2	0.00	1.20	50.43
114	17.790	269.18	0.5	0.00	0.50	49.43
115	16.550	267.41	0.5	0.00	0.50	49.73
116	15.263	263.97	0.5	0.00	0.50	55.53
117	14.365	264.45	0.5	0.00	0.50	53.13
118	13.287	264.83	0.5	0.00	0.50	49.83
119	12.708	268.72	0.5	0.00	0.50	57.23
120	12.108	273.49	1.2	0.00	1.20	61.13
121	11.167	278.91	1.2	0.00	1.20	56.73
122	10.764	282.75	1.5	0.00	1.50	54.73
123	12.098	287.78	1.5	0.00	1.50	57.33
124	13.604	288.23	1.5	0.00	1.50	58.53
125	14.566	288.72	1.5	0.00	1.50	57.03
126	14.985	285.15	1.5	0.00	1.50	58.83
127	15.691	290.07	1.5	0.00	1.50	53.03
128	17.180	291.47	1.5	0.00	1.50	53.53
129	17.920	287.48	1.5	0.00	1.50	47.43
130	17.722	285.05	1.5	0.00	1.50	45.23
131	18.233	289.64	1.5	0.00	1.50	50.23
132	19.070	289.58	1.5	0.00	1.50	48.43
133	20.157	291.93	1.5	0.00	1.50	43.83

No	Distance from the transmitter (km)	Bearing (Degrees)	Azimuth pattern loss (dB)	Elevation pattern loss (dB)	Total pattern loss (dB)	Field strength per 1 KW ERP
135	32.115	339.14	0.5	0.00	0.50	42.63
136	31.430	337.36	0.5	0.00	0.50	42.43
137	30.342	336.44	0.5	0.00	0.50	42.53
138	29.170	333.51	0.5	0.00	0.50	47.13
139	28.271	331.00	0.5	0.00	0.50	44.53
140	25.971	331.19	0.5	0.00	0.50	49.13
141	25.520	331.49	0.5	0.00	0.50	45.83
142	21.943	334.56	0.5	0.00	0.50	46.03
143	21.896	333.78	0.5	0.00	0.50	49.63
144	20.845	331.04	0.5	0.00	0.50	53.63
145	16.492	336.56	0.5	0.00	0.50	63.73
147	19.239	334.05	0.5	0.00	0.50	47.13
148	18.887	338.88	0.5	0.00	0.50	49.93
149	16.857	339.72	0.5	0.00	0.50	49.43
150	15.558	340.22	1.5	0.00	1.50	55.63
151	14.841	340.22	1.5	0.00	1.50	47.43
152	12.059	340.16	1.5	0.00	1.50	63.43
153	15.514	328.12	0.5	0.00	0.50	50.73
154	15.985	322.93	0.5	0.00	0.50	50.03
155	15.600	316.19	0.5	0.00	0.50	55.03
156	15.571	311.10	0.5	0.00	0.50	54.63
157	16.393	310.09	0.5	0.00	0.50	49.63
158	18.562	312.18	0.5	0.00	0.50	57.13
159	19.731	310.95	0.5	0.00	0.50	51.43
160	21.398	308.88	1.0	0.00	1.00	50.63
161	22.117	306.98	1.0	0.00	1.00	49.83
162	24.992	303.61	1.0	0.00	1.00	45.53
163	26.079	305.31	1.0	0.00	1.00	45.13
164	27.292	308.50	1.0	0.00	1.00	46.73
165	27.817	310.65	0.5	0.00	0.50	46.13
166	29.050	313.15	0.5	0.00	0.50	44.33
167	30.234	315.45	0.5	0.00	0.50	43.53
168	30.526	317.04	0.5	0.00	0.50	40.73
169	27.933	322.63	0.5	0.00	0.50	43.53
170	27.070	326.18	0.5	0.00	0.50	43.43
171	26.857	334.75	0.5	0.00	0.50	44.93
172	25.228	340.92	1.5	0.00	1.50	45.53
173	5.900	325.56	0.5	0.00	0.50	66.93
174	5.796	316.94	0.5	0.00	0.50	70.83
175	5.968	313.21	0.5	0.00	0.50	77.43
176	6.701	308.48	1.0	0.00	1.00	70.83
177	8.039	305.58	1.0	0.00	1.00	62.93
178	8.936	304.08	1.0	0.00	1.00	62.63
179	9.379	301.43	1.0	0.00	1.00	60.13
180	8.906	298.57	1.5	0.00	1.50	60.53
181	8.132	295.19	1.5	0.00	1.50	65.53

No	Distance from the transmitter (km)	Bearing (Degrees)	Azimuth pattern loss (dB)	Elevation pattern loss (dB)	Total pattern loss (dB)	Field strength per 1 KW ERP
183	7.539	296.33	1.5	0.00	1.50	74.93
184	5.671	290.64	1.5	0.00	1.50	77.53
185	4.701	290.10	1.5	0.00	1.50	77.73
186	3.916	290.74	1.5	0.00	1.50	75.13
187	6.492	322.31	0.5	0.00	0.50	63.83
188	7.132	319.11	0.5	0.00	0.50	67.53
189	7.975	318.60	0.5	0.00	0.50	67.53
190	8.788	319.95	0.5	0.00	0.50	68.83
191	9.532	320.26	0.5	0.00	0.50	60.53
192	11.595	316.96	0.5	0.00	0.50	56.53
193	13.020	310.12	0.5	0.00	0.50	53.03
194	14.370	306.64	1.0	0.00	1.00	59.53
195	14.898	302.72	1.0	0.00	1.00	55.73
196	15.420	297.37	1.5	0.00	1.50	59.03
197	15.996	292.79	1.5	0.00	1.50	59.93
198	16.201	290.64	1.5	0.00	1.50	59.93
199	15.007	289.29	1.5	0.00	1.50	61.93
200	14.082	288.36	1.5	0.00	1.50	61.33
201	13.416	288.02	1.5	0.00	1.50	62.43
202	11.628	286.24	1.5	0.00	1.50	63.03
203	13.950	260.48	0.5	0.00	0.50	61.43
204	14.837	257.06	0.0	0.00	0.00	60.93
205	15.230	252.73	0.0	0.00	0.00	61.53
206	14.638	249.88	0.5	0.00	0.50	61.43
207	13.801	246.01	0.5	0.00	0.50	64.63
208	12.507	245.58	0.5	0.00	0.50	65.73
209	11.705	242.85	0.5	0.00	0.50	68.03
210	11.400	238.81	1.2	0.00	1.20	62.93
211	9.857	231.06	1.2	0.00	1.20	63.73
212	8.207	226.45	1.5	0.00	1.50	72.03
213	5.729	217.26	1.5	0.00	1.50	70.53
214	3.459	210.03	1.5	0.00	1.50	82.93
215	6.856	336.77	0.5	0.00	0.50	64.23
216	7.822	336.82	0.5	0.00	0.50	60.53
217	8.593	335.34	0.5	0.00	0.50	64.73
218	9.069	334.24	0.5	0.00	0.50	65.53
219	9.808	334.19	0.5	0.00	0.50	67.33
220	10.323	334.27	0.5	0.00	0.50	65.73
221	11.736	332.20	0.5	0.00	0.50	66.03
222	13.051	331.91	0.5	0.00	0.50	62.13
223	14.246	333.20	0.5	0.00	0.50	61.93
224	14.880	335.46	0.5	0.00	0.50	62.33
225	14.735	338.42	0.5	0.00	0.50	63.63
226	14.921	340.74	1.5	0.00	1.50	62.63
227	14.742	341.94	1.5	0.00	1.50	61.93
228	14.534	343.87	1.5	0.00	1.50	63.73

No	Distance from the transmitter (km)	Bearing (Degrees)	Azimuth pattern loss (dB)	Elevation pattern loss (dB)	Total pattern loss (dB)	Field strength per 1 KW ERP
230	13.479	348.17	1.5	0.00	1.50	64.03
231	12.841	349.38	1.5	0.00	1.50	64.03
232	12.313	350.34	2.5	0.00	2.50	65.93
234	10.689	355.80	2.5	0.00	2.50	64.93
235	9.693	357.04	2.5	0.00	2.50	67.53
236	8.502	357.37	2.5	0.00	2.50	69.33
237	7.909	353.16	2.5	0.00	2.50	69.53
238	8.231	344.60	1.5	0.00	1.50	69.33
239	8.985	339.88	0.5	0.00	0.50	62.23
240	9.750	337.80	0.5	0.00	0.50	63.63
241	9.895	333.72	0.5	0.00	0.50	64.53
242	10.181	329.38	0.5	0.00	0.50	64.33
243	10.673	325.00	0.5	0.00	0.50	65.53
244	14.456	259.85	0.0	0.00	0.00	54.83
245	15.815	260.33	0.5	0.00	0.50	52.23
246	16.968	259.83	0.0	0.00	0.00	52.63
247	18.120	260.08	0.5	0.00	0.50	50.03
248	18.785	259.79	0.0	0.00	0.00	53.13
249	19.355	260.39	0.5	0.00	0.50	56.53
250	20.566	260.65	0.5	0.00	0.50	57.43
251	21.740	261.40	0.5	0.00	0.50	49.33
252	21.241	259.49	0.0	0.00	0.00	46.43
253	20.793	254.82	0.0	0.00	0.00	47.43
254	19.483	257.67	0.0	0.00	0.00	45.93
255	18.178	256.86	0.0	0.00	0.00	44.13
256	17.454	256.11	0.0	0.00	0.00	52.23
257	17.397	257.35	0.0	0.00	0.00	49.73
258	15.683	260.43	0.5	0.00	0.50	54.33
259	14.930	256.22	0.0	0.00	0.00	50.23
260	16.191	250.46	0.0	0.00	0.00	50.73
261	17.130	248.40	0.5	0.00	0.50	54.03
262	18.769	249.22	0.5	0.00	0.50	53.73
263	20.091	252.93	0.0	0.00	0.00	49.03
264	20.705	254.69	0.0	0.00	0.00	47.13
265	21.148	257.60	0.0	0.00	0.00	46.53
266	3.126	214.17	1.5	0.00	1.50	76.13
267	3.560	226.84	1.5	0.00	1.50	81.03
268	4.286	245.06	0.5	0.00	0.50	74.53
269	5.779	252.84	0.0	0.00	0.00	78.13
270	7.089	256.34	0.0	0.00	0.00	69.33
271	8.160	257.76	0.0	0.00	0.00	67.83
272	9.535	258.77	0.0	0.00	0.00	63.93
273	11.133	259.74	0.0	0.00	0.00	58.73
274	12.482	262.00	0.5	0.00	0.50	51.63
275	13.520	262.91	0.5	0.00	0.50	59.03
276	4.490	209.93	1.2	0.00	1.20	72.53

No	Distance from the transmitter (km)	Bearing (Degrees)	Azimuth pattern loss (dB)	Elevation pattern loss (dB)	Total pattern loss (dB)	Field strength per 1 KW ERP
278	5.711	225.24	1.5	0.00	1.50	65.93
279	5.746	233.26	1.2	0.00	1.20	67.33
280	6.320	237.99	1.2	0.00	1.20	62.43
281	7.014	239.46	1.2	0.00	1.20	72.73
282	7.819	243.06	0.5	0.00	0.50	64.03
283	8.548	246.56	0.5	0.00	0.50	59.13
284	9.051	252.43	0.0	0.00	0.00	57.93
285	10.018	254.89	0.0	0.00	0.00	59.23
286	11.016	257.15	0.0	0.00	0.00	56.33
287	12.644	260.52	0.5	0.00	0.50	52.43
288	13.872	260.49	0.5	0.00	0.50	52.43
289	4.463	198.40	0.7	0.00	0.70	71.33
290	5.423	191.66	0.7	0.00	0.70	71.73
291	6.202	194.42	0.7	0.00	0.70	63.43
292	7.261	200.77	1.2	0.00	1.20	63.13
293	7.114	193.55	0.7	0.00	0.70	62.43
294	7.323	190.24	0.7	0.00	0.70	72.23
295	8.326	188.42	0.7	0.00	0.70	67.73
296	9.285	184.49	0.7	0.00	0.70	65.43
297	10.367	182.92	0.7	0.00	0.70	64.93
298	11.227	182.05	0.7	0.00	0.70	64.63
299	12.419	181.06	0.7	0.00	0.70	59.83
300	13.582	180.12	0.7	0.00	0.70	60.33
301	14.237	181.01	0.7	0.00	0.70	56.63
302	15.054	181.10	0.7	0.00	0.70	55.53
303	15.868	180.41	0.7	0.00	0.70	51.93
304	16.798	178.97	0.5	0.00	0.50	49.83
305	17.668	178.81	0.5	0.00	0.50	45.83
306	18.347	176.53	0.5	0.00	0.50	46.03
307	19.283	175.35	0.5	0.00	0.50	45.93
308	20.097	175.09	0.5	0.00	0.50	46.43
309	21.356	174.14	0.5	0.00	0.50	49.43
310	17.905	190.23	0.7	0.00	0.70	47.43
311	18.627	194.29	0.7	0.00	0.70	46.73
312	20.012	199.77	0.7	0.00	0.70	44.63
313	20.321	204.03	1.2	0.00	1.20	43.93
314	20.288	210.05	1.5	0.00	1.50	47.83
315	19.729	212.43	1.5	0.00	1.50	59.03
316	19.206	210.62	1.5	0.00	1.50	50.63
317	18.069	208.21	1.2	0.00	1.20	50.43
318	17.363	205.75	1.2	0.00	1.20	53.33
319	16.329	205.77	1.2	0.00	1.20	55.73
320	15.664	208.84	1.2	0.00	1.20	53.33
321	15.279	212.07	1.5	0.00	1.50	47.03
322	15.345	214.95	1.5	0.00	1.50	47.53
323	15.186	217.69	1.5	0.00	1.50	46.03

No	Distance from the transmitter (km)	Bearing (Degrees)	Azimuth pattern loss (dB)	Elevation pattern loss (dB)	Total pattern loss (dB)	Field strength per 1 KW ERP
325	14.381	224.51	1.5	0.00	1.50	53.13
326	13.557	227.70	1.5	0.00	1.50	60.23
327	12.441	228.19	1.5	0.00	1.50	66.73
328	22.818	183.89	0.7	0.00	0.70	49.73
329	22.039	207.07	1.2	0.00	1.20	51.83
330	14.839	194.14	0.7	0.00	0.70	52.23
331	12.176	202.51	1.2	0.00	1.20	54.23
332	19.119	227.90	1.5	0.00	1.50	51.33
333	30.122	205.55	1.2	0.00	1.20	40.23
334	28.098	237.29	1.2	0.00	1.20	44.13
335	16.778	243.15	0.5	0.00	0.50	51.23
336	11.602	181.65	0.7	0.00	0.70	56.23
337	21.072	249.42	0.5	0.00	0.50	51.23
338	22.620	238.12	1.2	0.00	1.20	52.23
339	22.587	225.93	1.5	0.00	1.50	42.83
340	24.144	304.09	1.0	0.00	1.00	43.73
341	34.776	295.94	1.5	0.00	1.50	39.73
342	32.524	293.57	1.5	0.00	1.50	39.83
343	33.272	311.27	0.5	0.00	0.50	41.03
344	22.603	339.03	0.5	0.00	0.50	42.33
345	34.971	305.84	1.0	0.00	1.00	39.53
346	35.031	338.40	0.5	0.00	0.50	36.73
347	27.013	327.11	0.5	0.00	0.50	42.53
348	27.013	327.11	0.5	0.00	0.50	42.03
349	31.076	307.70	1.0	0.00	1.00	38.83
350	27.297	228.38	1.5	0.00	1.50	42.53
351	16.667	228.36	1.5	0.00	1.50	57.23
352	18.275	240.58	0.5	0.00	0.50	56.23
353	10.790	219.86	1.5	0.00	1.50	59.23
354	17.062	280.34	1.5	0.00	1.50	57.03
355	17.655	268.61	0.5	0.00	0.50	55.13
356	15.089	240.60	0.5	0.00	0.50	49.83
357	22.528	296.97	1.5	0.00	1.50	52.63
358	22.042	274.33	1.2	0.00	1.20	51.33
359	22.239	283.41	1.5	0.00	1.50	53.83
360	18.464	348.13	1.5	0.00	1.50	57.83
361	17.957	336.75	0.5	0.00	0.50	58.23
362	16.945	190.55	0.7	0.00	0.70	57.43
363	20.822	340.60	1.5	0.00	1.50	57.33
364	18.505	298.47	1.5	0.00	1.50	58.53
365	11.601	233.60	1.2	0.00	1.20	58.73
366	18.490	289.03	1.5	0.00	1.50	58.33
367	19.556	319.77	0.5	0.00	0.50	58.43
368	23.556	212.27	1.5	0.00	1.50	43.03
369	28.735	198.31	0.7	0.00	0.70	39.23
370	28.294	203.13	1.2	0.00	1.20	39.93

No	Distance from the transmitter (km)	Bearing (Degrees)	Azimuth pattern loss (dB)	Elevation pattern loss (dB)	Total pattern loss (dB)	Field strength per 1 KW ERP
372	31.426	253.40	0.0	0.00	0.00	38.83
373	30.888	260.13	0.5	0.00	0.50	39.83
374	30.888	260.13	0.5	0.00	0.50	42.83
375	27.572	260.48	0.5	0.00	0.50	43.73
376	30.310	274.31	1.2	0.00	1.20	41.33
377	26.306	273.59	1.2	0.00	1.20	42.23
378	29.710	288.72	1.5	0.00	1.50	42.83
379	32.552	327.72	0.5	0.00	0.50	39.83
380	32.552	327.72	0.5	0.00	0.50	37.33
381	33.238	322.79	0.5	0.00	0.50	40.83
382	33.272	311.27	0.5	0.00	0.50	40.83
383	33.620	341.81	1.5	0.00	1.50	43.53

APPENDIX 5

Table 1. Prediction errors

No	Distance from the transmitter (km)	Median Field strength per 1 KW ERP (dBuV/m)	Expected median field strength per 1 KW ERP (dBuV/m)	Error (dB)
1	5.972	67.93	70.91	-2.98
2	10.373	61.53	62.60	-1.07
3	14.129	56.53	57.10	-0.57
4	14.129	51.13	57.10	-5.97
5	20.109	46.03	49.89	-3.86
6	26.091	44.63	44.58	0.05
7	26.496	46.13	44.29	1.84
8	7.110	65.13	68.24	-3.11
9	10.416	62.33	62.53	-0.20
10	13.561	53.13	57.88	-4.75
11	4.778	73.03	74.23	-1.20
12	7.557	70.13	67.30	2.83
13	9.635	64.63	63.77	0.86
14	13.306	59.13	58.24	0.89
15	17.877	53.43	52.36	1.07
16	20.485	52.33	49.50	2.83
17	23.259	50.63	46.86	3.77
18	7.530	66.23	67.35	-1.12
19	1.964	88.31	85.56	2.75
20	2.348	85.65	83.62	2.02
21	5.079	73.43	73.33	0.10
22	10.246	59.73	62.80	-3.07
23	11.878	55.43	60.31	-4.88
24	14.361	54.93	56.78	-1.85
25	17.568	50.13	52.72	-2.59
26	19.132	51.83	50.94	0.89
27	21.938	46.03	48.06	-2.03
28	22.275	46.63	47.75	-1.12
29	23.766	45.83	46.42	-0.59
30	24.044	46.03	46.18	-0.15
31	21.047	47.83	48.93	-1.10
32	17.287	52.63	53.05	-0.42
33	13.305	60.23	58.24	1.99
34	25.100	42.20	45.33	-3.13
35	9.463	69.83	64.04	5.79
36	5.481	72.33	72.19	0.14
37	6.415	70.13	69.82	0.31

No	Distance from the transmitter (km)	Median Field strength per 1 KW ERP (dBuV/m)	Expected median field strength per 1 KW ERP (dBuV/m)	Error (dB)
38	7.759	63.43	66.88	-3.45
39	10.081	63.23	63.06	0.17
40	12.892	63.93	58.83	5.10
41	14.819	56.93	56.17	0.76
42	16.372	54.93	54.17	0.76
43	18.604	49.53	51.52	-1.99
44	20.380	46.33	49.61	-3.28
45	21.456	49.43	48.53	0.90
46	24.128	45.63	46.11	-0.48
47	24.891	45.93	45.49	0.44
48	26.916	44.23	44.00	0.23
49	25.866	45.43	44.74	0.69
50	24.682	45.83	45.66	0.17
51	27.049	46.43	43.91	2.52
52	27.847	45.13	43.38	1.75
53	33.648	45.83	40.59	5.24
54	31.154	42.53	41.57	0.96
55	31.186	42.33	41.56	0.77
56	27.787	45.53	43.42	2.11
57	28.803	43.93	42.80	1.13
58	31.682	41.93	41.34	0.59
59	24.104	49.63	46.13	3.50
60	23.456	46.93	46.68	0.25
61	19.373	46.13	50.67	-4.54
62	21.805	47.73	48.19	-0.46
63	23.940	49.43	46.27	3.16
65	4.532	80.03	75.00	5.03
66	4.221	76.33	76.02	0.31
67	4.175	76.63	76.17	0.46
68	3.915	80.13	77.08	3.05
69	3.327	85.53	79.30	6.23
70	2.636	82.15	82.26	-0.11
71	3.144	78.73	80.05	-1.32
72	3.149	83.53	80.03	3.50
73	3.216	78.43	79.76	-1.33
74	2.387	82.75	83.43	-0.68
75	2.127	83.65	84.72	-1.07
76	4.564	72.93	74.89	-1.96
77	5.287	67.23	72.73	-5.50
78	5.514	76.73	72.10	4.63
79	4.383	81.23	75.48	5.75
80	3.631	82.93	78.13	4.80
81	2.492	86.35	82.93	3.42
82	1.482	91.70	88.22	3.48

No	Distance from the transmitter (km)	Median Field strength per 1 KW ERP (dBuV/m)	Expected median field strength per 1 KW ERP (dBuV/m)	Error (dB)
83	1.196	95.10	89.93	5.17
84	0.725	93.33	92.97	0.36
85	0.684	81.93	93.25	-11.32
86	1.092	95.50	90.57	4.93
87	1.362	76.10	88.93	-12.83
88	1.905	91.50	85.87	5.62
89	2.451	87.05	83.13	3.93
90	2.955	73.75	80.85	-7.09
91	4.644	75.63	74.64	0.99
92	5.166	71.53	73.08	-1.55
93	6.168	67.63	70.42	-2.79
94	6.431	67.33	69.78	-2.45
95	5.443	69.73	72.30	-2.57
96	4.795	79.63	74.17	5.46
97	4.011	73.63	76.74	-3.11
98	20.263	46.63	49.73	-3.10
99	21.933	46.93	48.07	-1.14
100	23.226	46.53	46.88	-0.35
101	25.060	50.23	45.36	4.87
102	26.095	45.03	44.58	0.45
103	25.316	48.83	45.16	3.67
104	25.203	46.03	45.25	0.78
105	24.526	46.33	45.78	0.55
106	24.021	47.43	46.20	1.23
107	22.794	48.83	47.27	1.56
108	21.564	46.83	48.42	-1.59
109	21.628	47.23	48.36	-1.13
110	21.766	40.83	48.23	-7.40
111	21.248	46.33	48.73	-2.40
112	20.076	46.73	49.92	-3.19
113	19.036	50.43	51.04	-0.61
114	17.790	49.43	52.46	-3.03
115	16.550	49.73	53.95	-4.22
116	15.263	55.53	55.58	-0.05
117	14.365	53.13	56.78	-3.65
118	13.287	49.83	58.27	-8.44
119	12.708	57.23	59.09	-1.86
120	12.108	61.13	59.97	1.16
121	11.167	56.73	61.37	-4.64
122	10.764	54.73	61.99	-7.26
123	12.098	57.33	59.98	-2.65
124	13.604	58.53	57.82	0.71
125	14.566	57.03	56.51	0.52
126	14.985	58.83	55.95	2.88

No	Distance from the transmitter (km)	Median Field strength per 1 KW ERP (dBuV/m)	Expected median field strength per 1 KW ERP (dBuV/m)	Error (dB)
127	15.691	53.03	55.03	-2.00
128	17.180	53.53	53.18	0.35
129	17.920	47.43	52.31	-4.88
130	17.722	45.23	52.54	-7.31
131	18.233	50.23	51.95	-1.72
132	19.070	48.43	51.00	-2.57
134	33.194	41.93	40.75	1.18
135	32.115	42.63	41.16	1.47
136	31.430	42.43	41.45	0.98
137	30.342	42.53	41.96	0.57
138	29.170	47.13	42.59	4.54
139	28.271	44.53	43.12	1.41
140	25.971	49.13	44.67	4.46
141	25.520	45.83	45.00	0.83
142	21.943	46.03	48.06	-2.03
143	21.896	49.63	48.10	1.53
144	20.845	53.63	49.13	4.50
145	16.492	63.73	54.02	9.71
146	18.089	52.23	52.11	0.12
147	19.239	47.13	50.82	-3.69
148	18.887	49.93	51.21	-1.28
149	16.857	49.43	53.57	-4.14
150	15.558	55.63	55.20	0.43
151	14.841	47.43	56.14	-8.71
152	12.059	63.43	60.04	3.39
153	15.514	50.73	55.26	-4.53
154	15.985	50.03	54.66	-4.63
155	15.600	55.03	55.15	-0.12
156	15.571	54.63	55.19	-0.56
157	16.393	49.63	54.14	-4.51
158	18.562	57.13	51.57	5.56
159	19.731	51.43	50.29	1.14
160	21.398	50.63	48.58	2.05
161	22.117	49.83	47.89	1.94
162	24.992	45.53	45.41	0.12
163	26.079	45.13	44.59	0.54
164	27.292	46.73	43.74	2.99
165	27.817	46.13	43.40	2.73
166	29.050	44.33	42.66	1.67
167	30.234	41.53	42.02	-0.49
168	30.526	40.73	41.87	-1.14
169	27.933	43.53	43.33	0.20
170	27.070	43.43	43.89	-0.46
171	26.857	44.93	44.04	0.89

No	Distance from the transmitter (km)	Median Field strength per 1 KW ERP (dBuV/m)	Expected median field strength per 1 KW ERP (dBuV/m)	Error (dB)
172	25.228	45.53	45.23	0.30
173	5.900	66.93	71.09	-4.16
174	5.796	70.83	71.36	-0.53
175	5.968	77.43	70.92	6.51
176	6.701	70.83	69.15	1.68
177	8.039	62.93	66.40	-3.47
178	8.936	62.63	64.90	-2.27
179	9.379	60.13	64.18	-4.05
180	8.906	60.53	64.95	-4.42
181	8.132	65.53	66.24	-0.71
182	6.663	74.03	69.24	4.79
183	7.539	74.93	67.34	7.59
184	5.671	77.53	71.68	5.85
185	4.701	77.73	74.46	3.27
186	3.916	75.13	77.08	-1.95
187	6.492	63.83	69.64	-5.81
188	7.132	67.53	68.20	-0.67
189	7.975	67.53	66.45	1.08
190	8.788	68.83	65.15	3.68
191	9.532	60.53	63.93	-3.40
192	11.595	56.53	60.73	-4.20
193	13.020	53.03	58.65	-5.62
194	14.370	59.53	56.77	2.76
195	14.898	55.73	56.06	-0.33
197	15.996	59.93	54.64	5.29
198	16.201	59.93	54.38	5.55
199	15.007	61.93	55.92	6.01
200	14.082	61.33	57.16	4.17
201	13.416	62.43	58.08	4.35
203	13.950	61.43	57.34	4.09
204	14.837	60.93	56.15	4.78
205	15.230	61.53	55.63	5.90
206	14.638	61.43	56.41	5.02
207	13.801	64.63	57.55	7.08
208	12.507	65.73	59.38	6.35
209	11.705	68.03	60.56	7.47
210	11.400	62.93	61.02	1.91
211	9.857	63.73	63.41	0.32
212	8.207	72.03	66.11	5.92
213	5.729	70.53	71.53	-1.00
214	3.459	82.93	78.78	4.15
215	6.856	64.23	68.80	-4.57
216	7.822	60.53	66.76	-6.23
217	8.593	64.73	65.47	-0.74

No	Distance from the transmitter (km)	Median Field strength per 1 KW ERP (dBuV/m)	Expected median field strength per 1 KW ERP (dBuV/m)	Error (dB)
218	9.069	65.53	64.68	0.85
219	9.808	67.33	63.49	3.84
220	10.323	65.73	62.68	3.05
221	11.736	66.03	60.52	5.51
222	13.051	62.13	58.60	3.53
223	14.246	61.93	56.94	4.99
224	14.880	62.33	56.09	6.24
225	14.735	63.63	56.28	7.35
226	14.921	62.63	56.03	6.60
227	14.742	61.93	56.27	5.66
228	14.534	63.73	56.55	7.18
229	14.051	63.93	57.20	6.73
230	13.479	64.03	58.00	6.03
231	12.841	64.03	58.90	5.13
232	12.313	65.93	59.66	6.27
233	11.703	63.93	60.57	3.36
234	10.689	64.93	62.11	2.82
235	9.693	67.53	63.68	3.85
236	8.502	69.33	65.62	3.71
237	7.909	69.53	66.58	2.95
238	8.231	69.33	66.07	3.26
239	8.985	62.23	64.82	-2.59
240	9.750	63.63	63.58	0.05
241	9.895	64.53	63.35	1.18
242	10.181	64.33	62.90	1.43
243	10.673	65.53	62.13	3.40
244	14.456	54.83	56.65	-1.82
245	15.815	52.23	54.87	-2.64
246	16.968	52.63	53.44	-0.81
247	18.120	50.03	52.08	-2.05
248	18.785	53.13	51.32	1.81
249	19.355	56.53	50.69	5.84
250	20.566	57.43	49.42	8.01
251	21.740	49.33	48.25	1.08
252	21.241	46.43	48.74	-2.31
253	20.793	47.43	49.18	-1.75
254	19.483	45.93	50.55	-4.62
255	18.178	44.13	52.01	-7.88
256	17.454	52.23	52.85	-0.62
257	17.397	49.73	52.92	-3.19
258	15.683	54.33	55.04	-0.71
259	14.930	50.23	56.02	-5.79
260	16.191	50.73	54.40	-3.67
261	17.130	54.03	53.24	0.79

No	Distance from the transmitter (km)	Median Field strength per 1 KW ERP (dBuV/m)	Expected median field strength per 1 KW ERP (dBuV/m)	Error (dB)
262	18.769	53.73	51.34	2.39
263	20.091	49.03	49.91	-0.88
264	20.705	47.13	49.27	-2.14
266	3.126	76.13	80.12	-3.99
267	3.560	81.03	78.39	2.64
268	4.286	74.53	75.80	-1.27
269	5.779	78.13	71.40	6.73
270	7.089	69.33	68.29	1.04
272	9.535	63.93	63.93	0.00
273	11.133	58.73	61.43	-2.70
274	12.482	51.63	59.42	-7.79
275	13.520	59.03	57.94	1.09
276	4.490	72.53	75.13	-2.60
277	5.099	68.43	73.27	-4.84
278	5.711	65.93	71.58	-5.65
279	5.746	67.33	71.49	-4.16
280	6.320	62.43	70.05	-7.62
281	7.014	72.73	68.45	4.28
282	7.819	64.03	66.76	-2.73
283	8.548	59.13	65.54	-6.41
284	9.051	57.93	64.72	-6.79
285	10.018	59.23	63.16	-3.93
286	11.016	56.33	61.60	-5.27
287	12.644	52.43	59.18	-6.75
288	13.872	52.43	57.45	-5.02
289	4.463	71.33	75.22	-3.89
290	5.423	71.73	72.35	-0.62
291	6.202	63.43	70.33	-6.90
292	7.261	63.13	67.92	-4.79
293	7.114	62.43	68.24	-5.81
294	7.323	72.23	67.79	4.44
295	8.326	67.73	65.91	1.82
296	9.285	65.43	64.33	1.10
297	10.367	64.93	62.61	2.32
298	11.227	64.63	61.28	3.35
299	12.419	59.83	59.51	0.32
300	13.582	60.33	57.85	2.48
301	14.237	56.63	56.95	-0.32
302	15.054	55.53	55.86	-0.33
303	15.868	51.93	54.81	-2.88
304	16.798	49.83	53.65	-3.82
305	17.668	45.83	52.60	-6.77
306	18.347	46.03	51.82	-5.79
307	19.283	45.93	50.77	-4.84

No	Distance from the transmitter (km)	Median Field strength per 1 KW ERP (dBuV/m)	Expected median field strength per 1 KW ERP (dBuV/m)	Error (dB)
308	20.097	46.43	49.90	-3.47
309	21.356	49.43	48.62	0.81
310	17.905	47.43	52.32	-4.89
311	18.627	46.73	51.50	-4.77
312	20.012	44.63	49.99	-5.36
313	20.321	43.93	49.67	-5.74
314	20.288	47.83	49.70	-1.87
315	19.729	59.03	50.29	8.74
316	19.206	50.63	50.86	-0.23
317	18.069	50.43	52.13	-1.70
318	17.363	53.33	52.96	0.37
319	16.329	55.73	54.23	1.50
320	15.664	53.33	55.07	-1.74
321	15.279	47.03	55.56	-8.53
322	15.345	47.53	55.48	-7.95
323	15.186	46.03	55.69	-9.66
324	15.307	52.33	55.53	-3.20
325	14.381	53.13	56.76	-3.63
326	13.557	60.23	57.89	2.34
327	12.441	66.73	59.48	7.25
328	22.818	49.73	47.25	2.48
329	22.039	51.83	47.97	3.86
330	14.839	52.23	56.14	-3.91
331	12.176	54.23	59.87	-5.64
332	19.119	51.33	50.95	0.38
333	30.122	40.23	42.08	-1.85
334	28.098	44.13	43.23	0.90
336	11.602	56.23	60.72	-4.49
337	21.072	51.23	48.91	2.32
338	22.620	52.23	47.43	4.80
339	22.587	42.83	47.46	-4.63
341	34.776	39.73	40.26	-0.53
342	32.524	39.83	41.00	-1.17
343	33.272	41.03	40.72	0.31
344	22.603	42.33	47.44	-5.11
345	34.971	39.53	40.21	-0.68
346	35.031	36.73	40.19	-3.46
347	27.013	42.53	43.93	-1.40
348	27.013	42.03	43.93	-1.90
349	31.076	38.83	41.61	-2.78
350	27.297	42.53	43.74	-1.21
351	16.667	57.23	53.81	3.42
352	18.275	56.23	51.90	4.33
353	10.790	59.23	61.95	-2.72

No	Distance from the transmitter (km)	Median Field strength per 1 KW ERP (dBuV/m)	Expected median field strength per 1 KW ERP (dBuV/m)	Error (dB)
354	17.062	57.03	53.32	3.71
355	17.655	55.13	52.62	2.51
356	15.089	49.83	55.81	-5.98
357	22.528	52.63	47.51	5.12
358	22.042	51.33	47.97	3.36
359	22.239	53.83	47.78	6.05
360	18.464	57.83	51.68	6.15
361	17.957	58.23	52.26	5.97
362	16.945	57.43	53.47	3.96
363	20.822	57.33	49.16	8.17
364	18.505	58.53	51.64	6.89
365	11.601	58.73	60.72	-1.99
366	18.490	58.33	51.65	6.68
367	19.556	58.43	50.48	7.95
368	23.556	43.03	46.60	-3.57
369	28.735	39.23	42.84	-3.61
370	28.294	39.93	43.10	-3.17
371	29.770	40.03	42.26	-2.23
372	31.426	38.83	41.45	-2.62
373	30.888	39.53	41.70	-2.17
374	30.888	39.83	41.70	-1.87
375	27.572	43.73	43.56	0.17
376	30.310	38.33	41.98	-3.65
377	26.306	42.23	44.42	-2.19
378	29.710	42.83	42.29	0.54
379	32.552	39.83	40.98	-1.15
380	32.552	37.33	40.98	-3.65
381	33.238	40.83	40.73	0.10
382	33.272	40.83	40.72	0.11
383	33.620	43.53	40.60	2.93

Table 2. Probabilities of prediction errors

Error (dB)	Percentage (%)
-18	0.00
-17	0.00
-16	0.00
-15	0.00
-14	0.00
-13	0.26
-12	0.00
-11	0.26
-10	0.26
-9	0.52
-8	1.31
-7	2.09
-6	3.66
-5	5.22
-4	5.74
-3	8.09
-2	8.36
-1	8.88
0	11.49
1	10.44
2	6.01
3	7.05
4	6.01
5	4.70
6	5.22
7	2.87
8	1.04
9	0.26
10	0.26
11	0.00
12	0.00
13	0.00
14	0.00
15	0.00
16	0.00
17	0.00
18	0.00

APPENDIX 6

Table 1 shows the estimated morphological losses of field strength at places where the transmitter and receiver line-of-sight path is obstructed by trees. The clearance angle is the vertical angle, which just clears the obstruction in the direction of the reference transmitting station. Reference frequency is 106.5 MHz. Transmitter is located at 79 51'46" E and 06 55' 07" N with 2 KW output power fed to an antenna of gain 7.8 dB. Antenna is mounted on top of 102 m tower

Table 1 Estimated morphological loss

No	Geographical coordinates		Measured field strength (dBμV/m)	Clearance angle (Degree)	Predicted field strength (dBμV/m)	Loss (dB)
	Latitude	Longitude				
1	06°50'07.9"N	080°00'14.0"E	56.09	05-10	57.57	1.48
2	06°56'24.6"N	079°59'13.7"E	57.90	20-25	63.97	6.07
3	06°56'26.8"N	079°59'14.0"E	57.53	20-25	63.94	6.41
4	06°56'03.5"N	079°58'58.0"E	58.23	20-25	64.76	6.52
5	06°55'43.8"N	079°58'57.7"E	60.73	10-15	64.85	4.12
6	06°55'26.2"N	079°58'41.1"E	63.86	05-10	65.61	1.75
7	06°54'57.5"N	079°58'20.8"E	61.31	15-20	66.50	5.12
8	06°53'33.7"N	080°00'30.1"E	56.51	10-15	60.72	4.21
9	06°53'06.4"N	080°00'00.5"E	56.09	15-20	61.60	5.51
10	06°52'44.8"N	079°59'08.3"E	57.65	15-20	63.36	5.71
11	06°53'00.4"N	079°58'44.3"E	64.41	00-05	64.54	0.12
12	06°53'03.2"N	079°58'18.6"E	59.42	20-25	65.64	6.21
14	06°57'41.5"N	079°59'38.4"E	61.20	05-10	62.25	1.05
15	06°57'05.3"N	079°59'37.9"E	56.32	20-25	62.66	6.34
16	06°56'38.0"N	079°59'26.3"E	56.90	20-25	63.36	6.46
17	06°55'27.6"N	079°58'41.8"E	61.11	10-15	65.57	4.46
18	06°55'16.7"N	079°58'30.2"E	61.71	10-15	66.10	4.39
19	06°55'14.5"N	079°58'28.3"E	64.39	05-10	66.18	1.79
20	06°55'09.1"N	079°58'27.2"E	61.71	10-15	66.23	4.52
21	06°54'39.5"N	079°58'18.5"E	62.18	10-15	66.55	4.37
22	06°54'39.5"N	079°58'18.5"E	62.18	10-15	66.55	4.37
23	06°54'38.3"N	079°58'18.0"E	60.23	10-25	66.57	6.34
24	06°54'33.7"N	079°58'14.5"E	62.02	10-15	66.70	4.68
25	06°54'33.7"N	079°58'14.5"E	66.67	00-05	66.70	0.03
26	06°54'32.3"N	079°58'11.8"E	66.60	000-5	66.82	0.22
27	06°54'16.6"N	079°57'10.4"E	68.12	05-10	69.56	1.44
28	06°54'22.7"N	079°56'49.3"E	68.77	05-10	70.63	1.87
29	06°54'26.9"N	079°56'43.1"E	64.4	20-25	70.97	6.51
30	06°54'31.1"N	079°56'33.5"E	71.13	00-05	71.48	0.35
31	06°48'55.8"N	079°55'06.6"E	58.44	20-25	64.89	6.45
32	06°48'53.0"N	079°55'08.2"E	62.65	05-10	64.75	2.10
33	06°48'44.8"N	079°55'11.7"E	57.91	20-25	64.36	6.45
34	06°48'38.9"N	079°55'12.5"E	58.51	15-20	64.12	5.61
35	06°48'33.2"N	079°55'14.3"E	58.7	15-20	63.87	5.17
36	06°48'14.0"N	079°55'17.5"E	62.07	00-05	63.09	1.02

No	Geographical coordinates		Measured field strength (dBμV/m)	Clearance angle (Degree)	Predicted field strength (dBμV/m)	Loss (dB
	Latitude	Longitude				
37	06°48'19.1"N	079°55'34.2"E	56.51	20-25	62.96	6.45
38	06°48'29.8"N	079°55'46.2"E	58.66	10-15	63.11	4.45
39	06°48'31.7"N	079°55'52.9"E	60.93	05-10	63.03	2.10
40	06°48'33.5"N	079°56'04.7"E	61.69	00-05	62.84	1.15
41	06°48'33.7"N	079°56'19.3"E	57.11	15-20	62.52	5.41
42	06°49'01.5"N	079°56'15.2"E	61.74	05-10	63.56	1.82
43	06°50'07.9"N	080°00'14.0"E	54.23	10-15	58.48	4.25
44	06°49'45.4"N	080°00'13.8"E	53.72	10-15	58.07	4.35
45	06°49'41.2"N	080°00'12.9"E	53.22	10-15	58.01	4.79
46	06°49'35.8"N	080°00'09.0"E	51.60	20-25	58.02	6.42
47	06°49'31.3"N	080°00'06.0"E	57.79	00-05	58.02	0.23
48	06°49'28.5"N	080°00'03.5"E	57.10	05-10	58.03	0.93
49	06°49'26.6"N	080°00'00.6"E	58.05	05-10	58.07	0.02
50	06°49'21.9"N	079°59'54.1"E	53.60	10-15	58.16	4.56
51	06°49'13.5"N	079°59'51.8"E	52.37	15-20	58.05	5.68
52	06°48'54.1"N	079°59'45.4"E	51.36	20-25	57.81	6.45
53	06°48'46.6"N	079°59'44.8"E	50.99	20-25	57.67	6.68
54	06°48'32.8"N	079°59'45.7"E	55.45	05-10	57.34	1.89
55	06°48'30.4"N	079°59'46.3"E	51.96	15-20	57.28	5.32
56	06°48'28.3"N	079°59'47.3"E	52.26	10-15	57.21	4.95
57	06°48'27.0"N	079°59'47.6"E	52.57	15-20	57.17	4.60
58	06°48'23.7"N	079°59'48.4"E	52.52	10-15	57.08	4.56
59	06°48'19.1"N	079°59'50.0"E	55.09	05-10	56.94	1.85
60	06°48'16.4"N	079°59'52.2"E	56.80	00-05	56.83	0.03
61	06°48'04.5"N	080°00'00.3"E	56.25	00-05	56.37	0.13
63	06°49'26.6"N	079°58'40.5"E	59.91	00-05	60.36	0.45
64	06°49'38.6"N	079°58'34.1"E	54.63	20-25	60.85	6.21
65	06°50'37.6"N	079°57'40.0"E	62.37	05-10	64.05	1.68
66	06°50'39.3"N	079°57'34.1"E	62.32	05-10	64.29	1.97
67	06°50'40.3"N	079°57'29.3"E	58.96	15-20	64.48	5.52
68	06°50'39.9"N	079°57'27.0"E	63.05	05-10	64.55	1.50
69	06°50'41.9"N	079°57'21.7"E	60.75	10-15	64.78	4.03
70	06°50'43.9"N	079°57'15.5"E	59.58	15-20	65.04	5.46
71	06°50'51.1"N	079°56'55.6"E	64.30	05-10	65.92	1.62
72	06°50'57.8"N	079°56'54.1"E	59.15	25-30	66.16	7.01

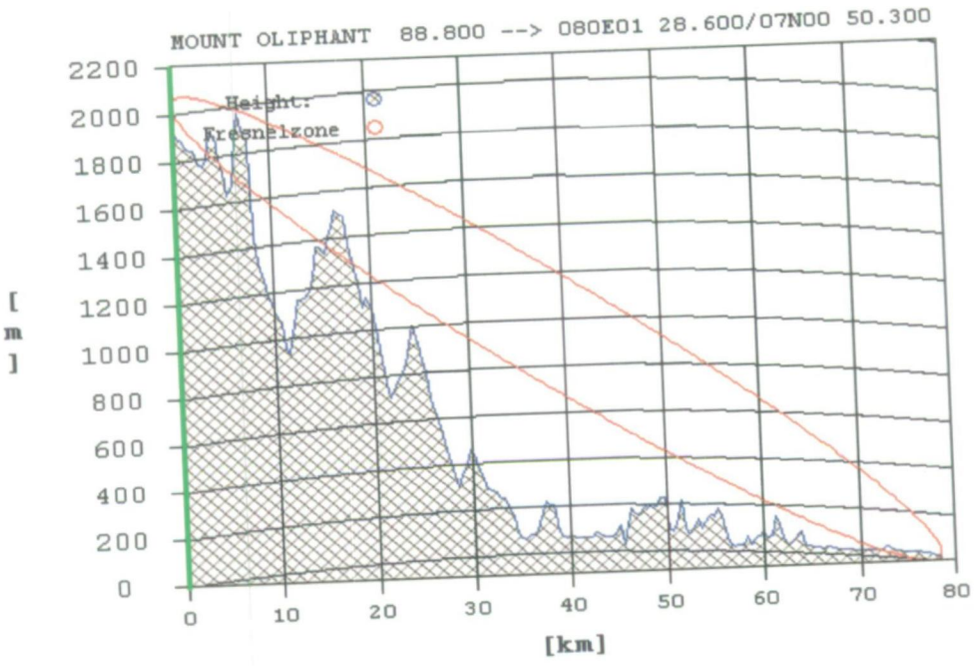

Fig. 1 Path profile between transmitting station and test site 1

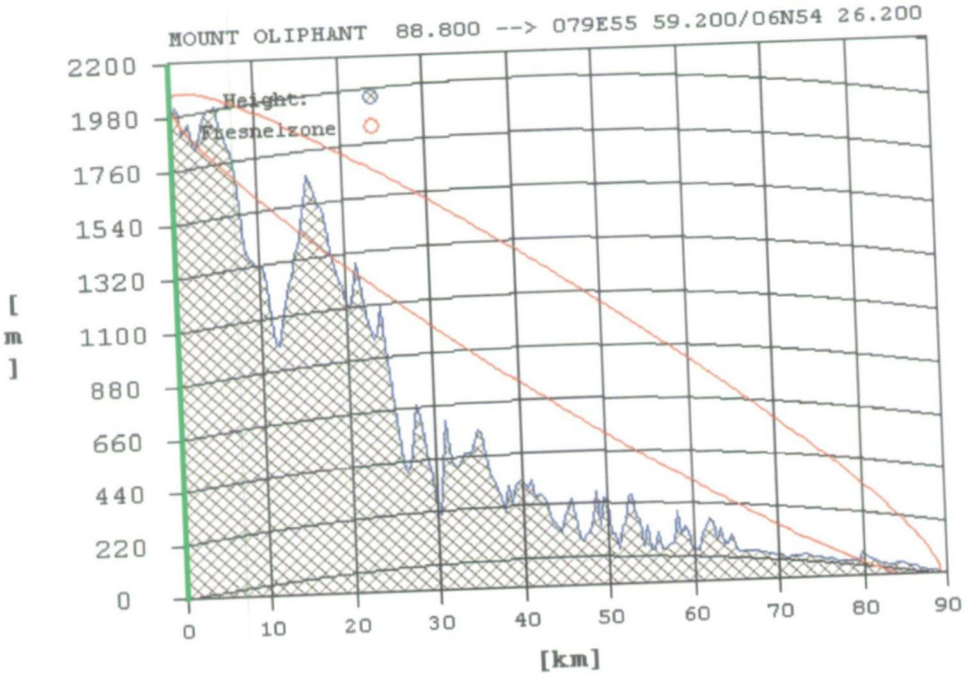

Fig. 2 Path profile between transmitting station and test site 2

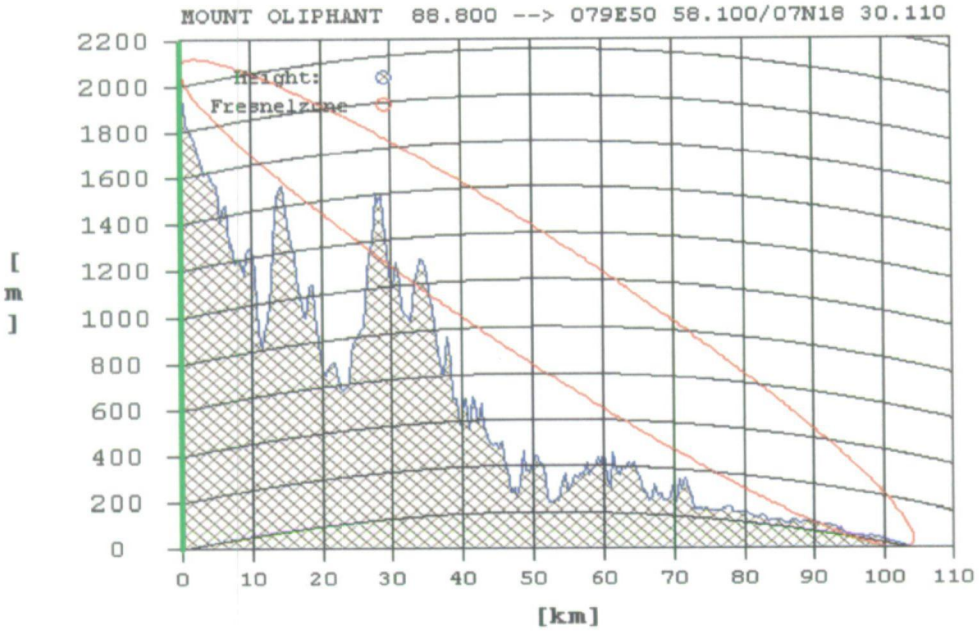

Fig. 3 Path profile between transmitting station and test site 3

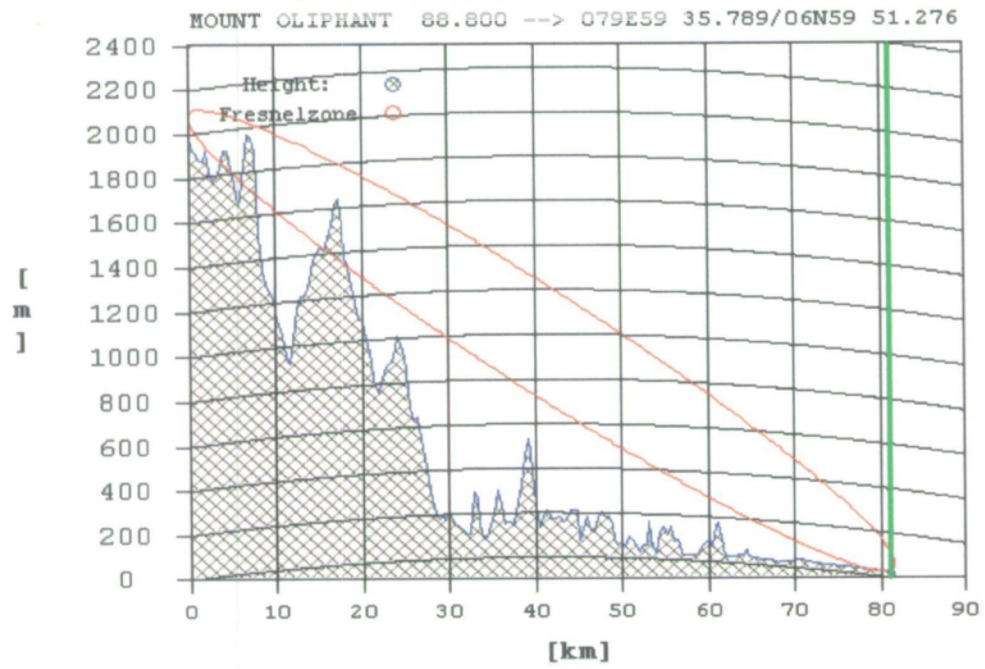

Fig. 4 Path profile between transmitting station and test site 4

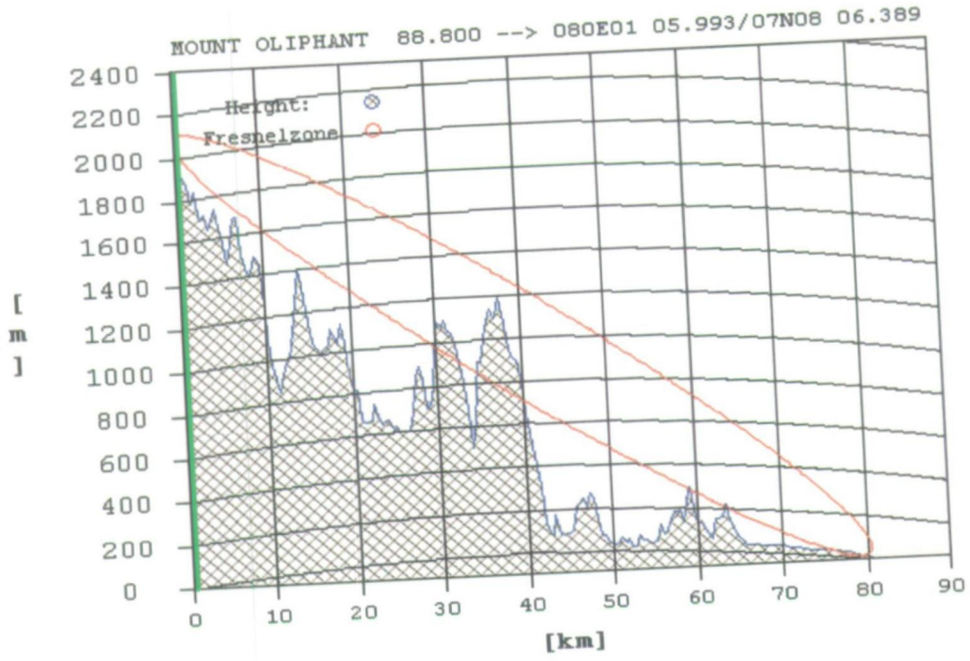

Fig. 5 Path profile between transmitting station and test site 5

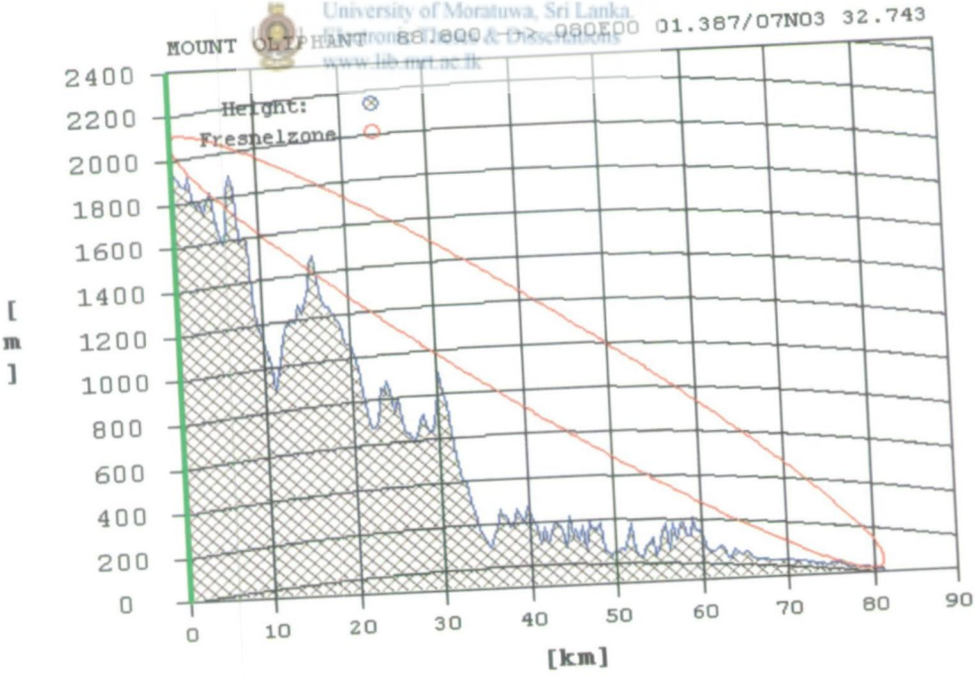

Fig. 6 Path profile between transmitting station and test site 6

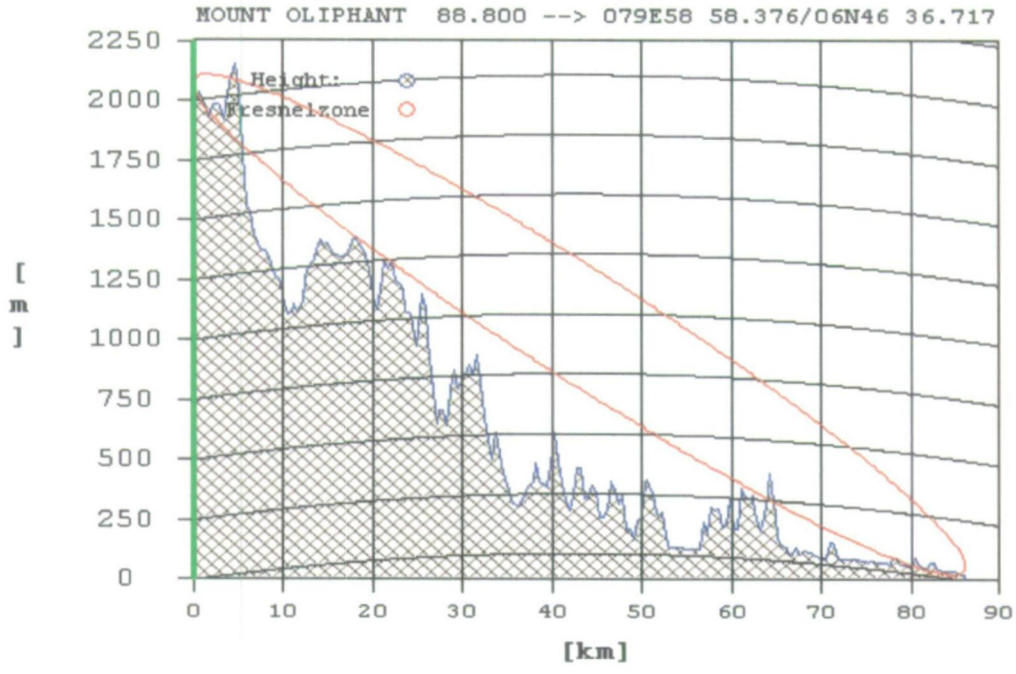

Fig. 7 Path profile between transmitting station and test site 7

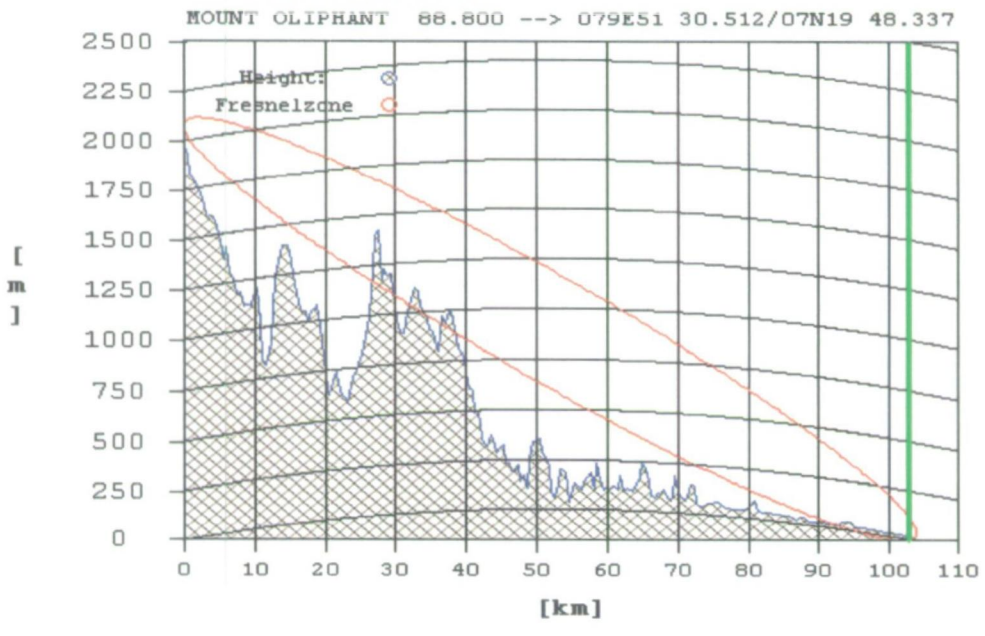

Fig. 8 Path profile between transmitting station and test site 8

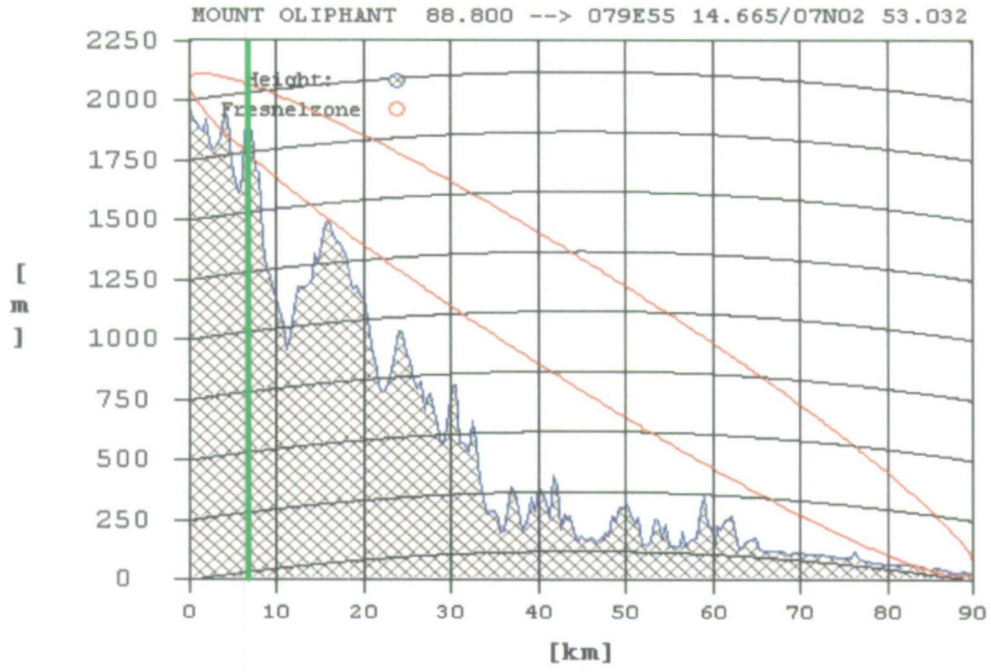

Fig. 9 Path profile between transmitting station and test site 9

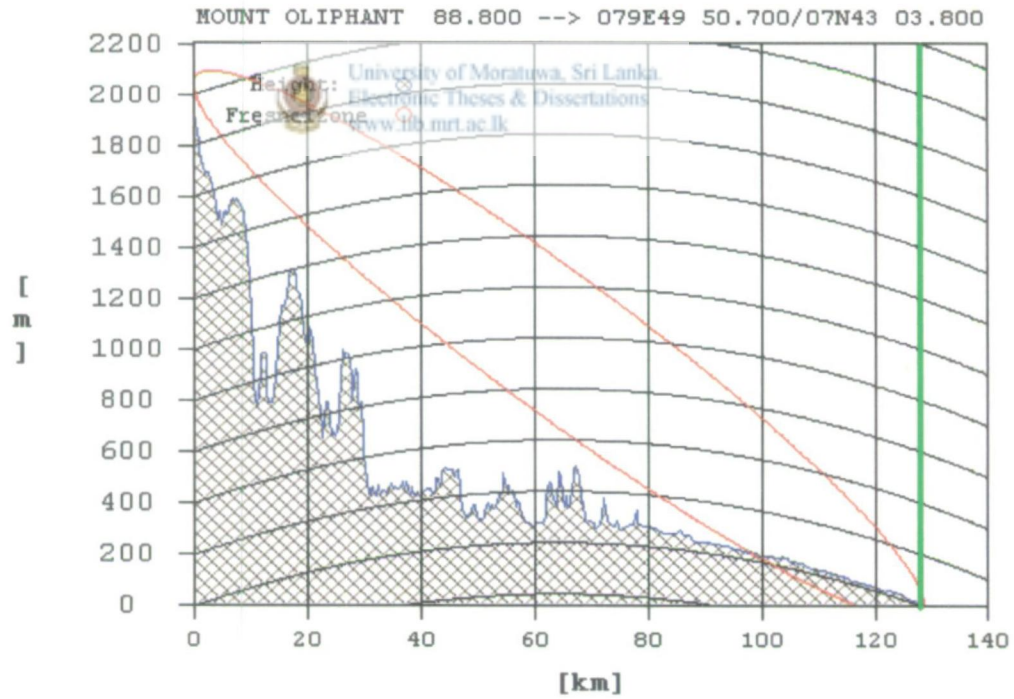

Fig. 10 Path profile between transmitting station and test site 10