

## Proposed Site Change for W291CC

### Technical Statement

#### Allowed Move and Fill-In Status

The instant application proposes a minor relocation of W291CC to the nearby existing AM tower of co-owned AM station WNB(AM) at Newburyport, MA from an antenna site near the western edge of the WNB(AM) 2 mV/m AM service contour in order to provide more useful service to the public, and optimize fill-in translator service for WNB(AM).

The 60 dBu service contour of the proposed amended facility overlaps that of the presently licensed facility (File No. BLFT-20120124ABS) and is located in the same market, and the proposed 60 dBu fill-in service contour lies entirely within the 2 mV/m service contour of co-owned AM station WNB(AM) at Newburyport, MA, as illustrated in Figure 1 below.

#### 74.1204 Study

All facilities not meeting the spacing requirements of Section 73.207 with respect to the proposed facility considered as a Class A were studied. These are:

<u>Call Sign</u>	<u>Location</u>	<u>Channel No.</u>	<u>Service Contour</u>
WROR-FM	Framingham, MA	289B	54 dBu
WHDQ	Claremont, NH	291B	54 dBu
WSCA-LP	Portsmouth, NH	291LP100	60 dBu
WFNQ	Nashua, NH	292A	60 dBu
WMJX	Boston, MA	294B	54 dBu

Figure 2 illustrates the absence of prohibited overlap between the proposed modified translator F(50,10) interfering contours and the pertinent service contours of all facilities listed above except WROR-FM and WMJX. (Service contours as shown above, and contours of same color may not overlap.)

As shown in Figures 1 and 2, the proposed translator interfering contour lies inside the protected service contours of WROR-FM and WMJX, the two being co-located. Therefore, the applicant hereby respectfully requests a waiver pursuant to 74.1204(d) as described below.

As detailed in Figure 1, the signal level from both WROR-FM and WMJX in proximity to the proposed translator site is between 59.2 dBu and 58 dBu. The Commission has generally considered overlap from a proposed translator interfering contour to be acceptable where the ratio of undesired to desired signal (U/D) does not exceed 40 dB i.e. where in the instant case the proposed translator F(50,10) interfering signal does not exceed 98 dBu.

### Protection of Second and Third Adjacent Stations, and Antenna Parameters

The proposed translator facility will operate with an ERP of 0.25 kW. As seen in Figure 3, the nearest residence to the proposed antenna site is 55 meters from the tower base and located on Ferry Road, a lightly traveled secondary road,. At the other extreme, for 0.25 kW ERP the 98 dBu F(50,10) interfering contour extends 1,396 meters in free space.

The applicant will employ an antenna array designed to protect the entire area that lies at distances between 55 meters and 1,400 meters from the proposed site from receiving an interfering signal level that could equal or exceed 98 dBu F(50,10). That is to say, the interfering signal will clear the ground by a significant margin at every point.

The proposed antenna system designed by Kathrein-Scala consists of six Scala FMV vertical-only antenna bays centered 50 meters above ground level on the WNBPA(AM) tower and oriented at 232 degrees True. The power divider employs 1-5-12-12-5-1 binomial power distribution. The relative spacing, magnitude, and phase of the power fed to each bay is shown in Fig 4. Appendix 2 provides all antenna parameters in detail.

The antenna produces the elevation pattern graphed in Figure 5. The blue curve illustrates the field produced by the antenna array. The red curve shown indicates the maximum allowed field limits at all pertinent vertical angles in order that the 98 dBu F(50,10) interfering contour avoid reaching the ground for an ERP of 0.25 kW. As seen in Figure 5, at all points the field from the proposed antenna remains well below the maximum limit. Appendix 1 contains a tabulation of Figure 5 data at increments of 0.1 degree, also showing the clearance in dB.

Figure 6 illustrates interference protection by showing the location of the proposed 98 dBu F(50,10) interfering contour relative to all points on the ground at distances between 55 meters and 1,400 meters. Figure 6A is a tabulation of this data showing downward angle or depression angle together with the actual distance in space (hypotenuse of right triangle) to each point, the field and ERP produced by the antenna array at the pertinent downward angle, the distance to the 98 dBu F(50,10) interfering contour, and the clearance between the interfering contour and the corresponding point on the ground.

As an example, referring to Figure 6A, the nearest residence is located 55 meters from the proposed antenna site and is thus at a downward angle of 42.3 degrees. The antenna center of radiation is 74.3 meters from this residence. At 42.3 degrees, the relative field from the antenna is 0.035, the ERP is 0.31 Watts, and the 98 dBu interfering contour extends 49 meters, thus providing a margin of clearance of 25.3 meters.

It may also be noted that whereas these tabulations and figures assume an ERP of 0.25 kW, the horizontal field of the directional antenna along most azimuths is such that the ERP is less than 0.25 kW, even though it is the worst case interfering contour being considered. In front of the proposed pattern, the level of the pertinent service contour to be protected increases from 58 dBu to 59.2 dBu, so actual protection will be greater there, as well.

The applicant therefore believes its application meets the requirements of Section 74.1204(d) with respect to "other factors" insuring no actual interference to either WROR-FM or WMJX. Nevertheless, as required by the Commission's Rules, in the event of any complaints that the proposed translator interferes with reception of either station, the applicant will take the required steps to eliminate the interference, including, if necessary, reducing power or cessation of translator operation.

#### Environmental Considerations

The proposed antenna will be mounted on an existing tower with no new construction or change in height. Compliance with RFR limits was determined by use of the Commission's RF Worksheet #1.

The applicant will cease operation or reduce power as necessary in order to prevent uncontrolled or controlled exposure in excess of the guidelines of OET-65 Appendix A.

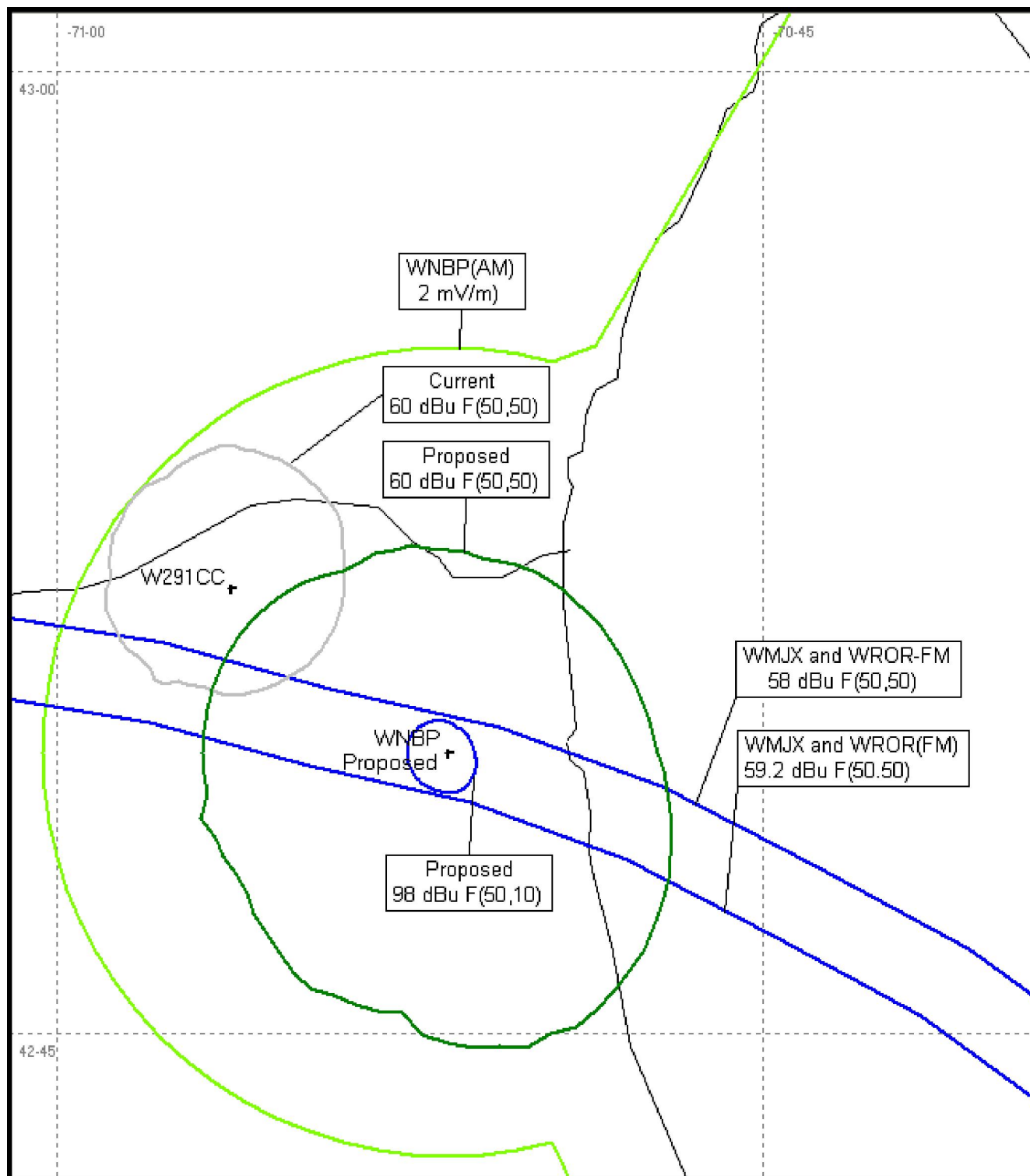
Respectfully submitted,

A handwritten signature in black ink, appearing to read "D. Jackson", with a stylized flourish at the end.

Dennis Jackson  
Technical Consultant  
February 28, 2012

**Figure 1**

**Proposed new 60 dBu service contour overlaps that of current facility  
and does not exceed the 2 mV/m service contour of primary station WNBP(AM).  
WMJX and WROR-FM 59.2 and 58 dBu service contours bracket the proposed site.**

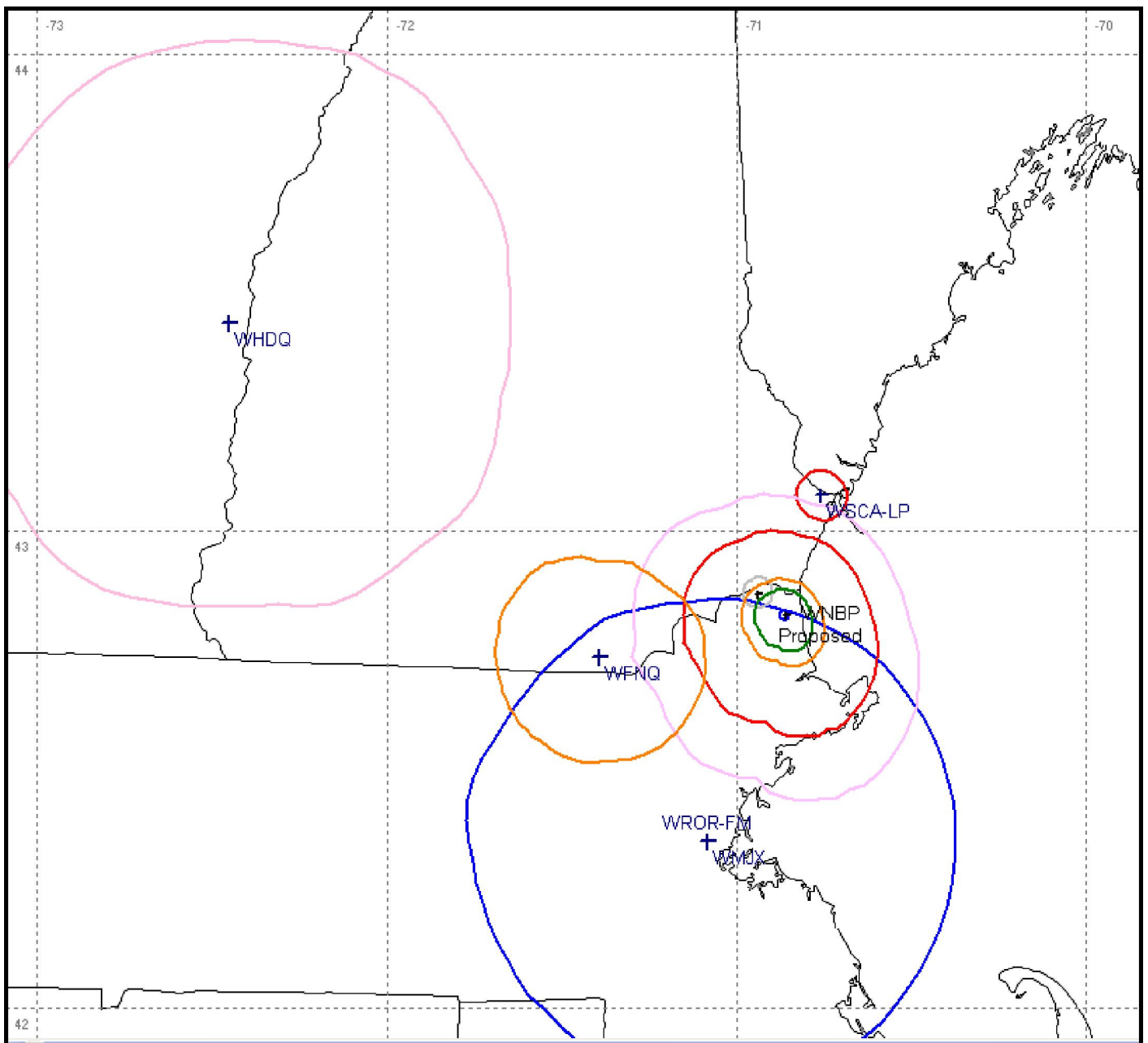


**Figure 2**

**Proposed interfering contours do not overlap service contours  
of WHDQ (54 dBu) , or WSCA-LP or WFNQ (both 60 dBu.)**

**WROR-FM and WMJX place 58 dBu service contours past the proposed antenna site  
and will be protected by the proposed translator 98 dBu interfering contour.**

**(Same colors may not overlap.)**



**Figure 3**

**Nearest residence is 55 meters from proposed antenna site at WNB(AM) tower**



**Figure 4**

**Antenna Array Parameters (spacing, magnitude, phase)**

Bay Number	1	2	3	4	5	6
Bay Spacing from bottom (inches):	0.0	120.5	223.2	330.3	439.6	560.1
Relative Magnitude (field):	0.289	0.646	1.000	1.000	0.646	0.289
Relative Phase (degrees):	116.0	117.9	88.6	64.1	29.3	0.0

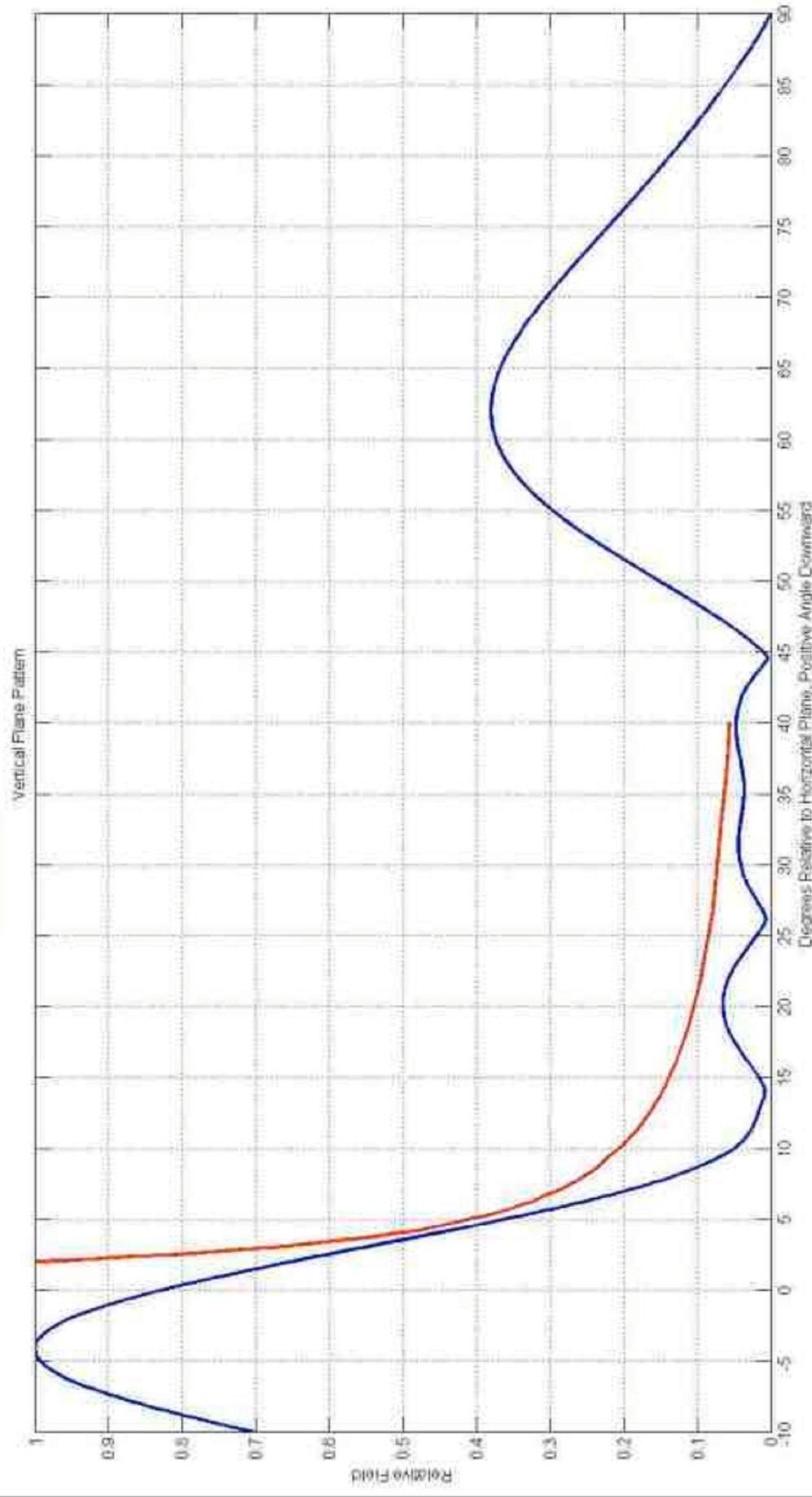
**Note: Bottom bay is +116.0 degrees ahead of top bay.  
(i.e feed to top bay is delayed by 116.0 degrees)**



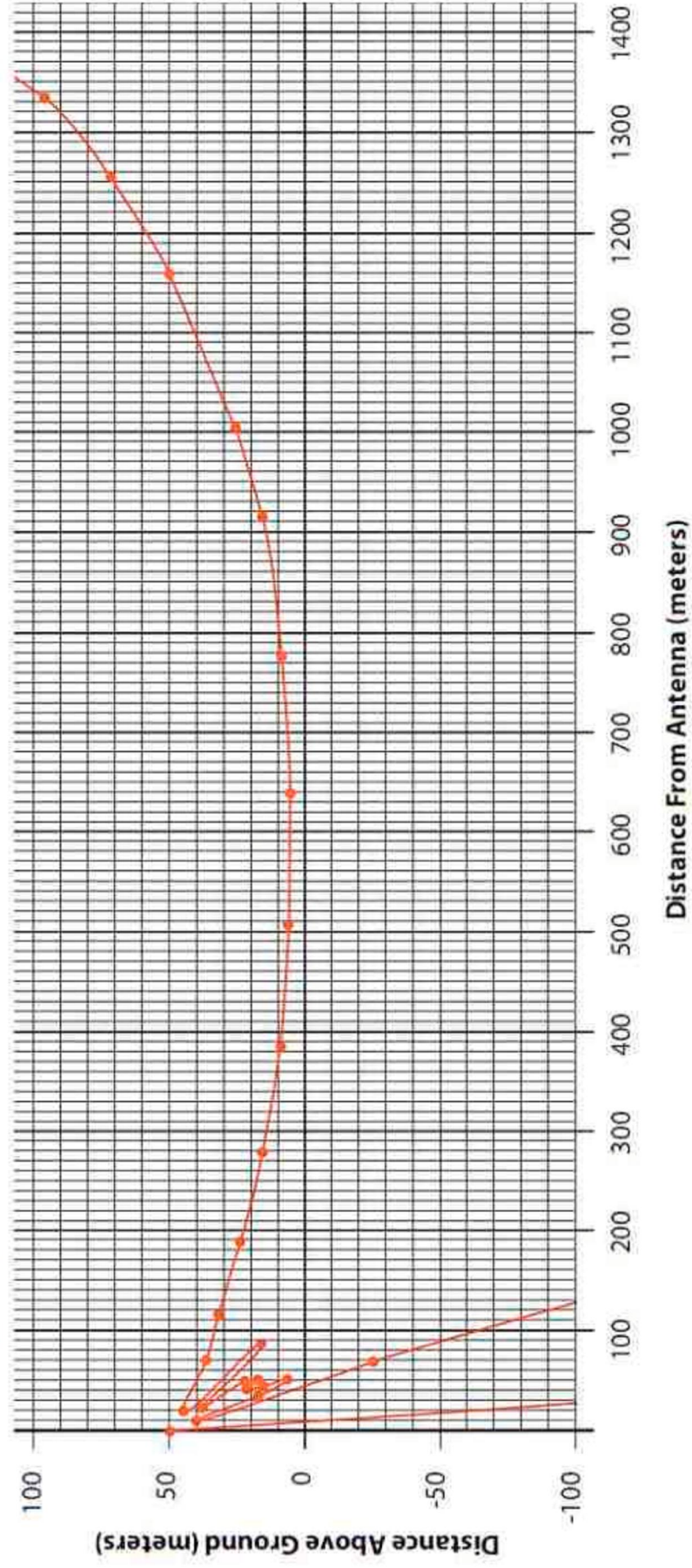
**Figure 5 - Vertical antenna pattern maximum field limits**

Red line indicates field limit in order than 98 dBu F(50,10) interfering contour not reach the ground. Blue line shows actual field produced by antenna.

X-Axis: Degrees Relative to Horizontal Plane (Positive Angle Downward)  
Y-Axis: Relative Field



**Figure 6**  
98 dBu F(50,10) Interfering Contour Relative to Ground Level (Elevation of 0 meters)





**Figure 6A**

**Clearance from 98 dBu F(50,10) Interfering Contour to Ground Level**

**at distances from 55 meters to 1,400 meters from antenna site.**

**Antenna HAGL = 50 meters**

<b>Horizontal Distance (meters)</b>	<b>Downward Angle (degrees)</b>	<b>Actual Distance (meters)</b>	<b>Antenna Field Toward Residence</b>	<b>ERP Toward Residence (Watts)</b>	<b>Distance to 98 dBu F(50,10) (meters)</b>	<b>Clearance (meters)</b>
55	42.3	74.3	0.035	0.31	49	25.3
60	39.8	78.1	0.047	0.55	66	12.1
64	38.0	81.2	0.043	0.46	60	21.2
69	35.9	85.2	0.036	0.32	50	35.2
75	33.7	90.1	0.039	0.38	54	36.1
100	26.6	111.8	0.009	0.02	12	99.8
125	21.8	134.6	0.059	0.87	82	52.6
150	18.4	158.1	0.058	0.84	81	77.1
175	15.9	182.0	0.027	0.18	38	144.0
200	14.0	206.2	0.008	0.02	11	195.2
225	12.5	230.5	0.017	0.07	24	206.5
250	11.3	255.0	0.027	0.18	38	217.0
275	10.3	279.5	0.043	0.46	60	219.5
300	9.5	304.1	0.066	1.09	92	212.1
325	8.7	328.8	0.099	2.45	138	190.8
350	8.1	353.6	0.130	4.23	182	171.6
375	7.6	378.3	0.159	6.32	222	156.3
400	7.1	403.1	0.192	9.22	268	135.1
425	6.7	427.9	0.221	12.21	309	118.9
450	6.3	452.8	0.252	15.88	352	100.8
475	6.0	477.6	0.276	19.04	385	92.6
500	5.7	502.5	0.302	22.80	422	80.5
525	5.4	527.4	0.328	26.90	458	69.4
550	5.2	552.3	0.346	29.93	483	69.3
575	5.0	577.2	0.364	33.12	508	69.2
600	4.8	602.1	0.382	36.48	533	69.1
625	4.6	627.0	0.401	40.20	560	67.0
650	4.4	651.9	0.420	44.10	586	65.9
675	4.2	676.8	0.439	48.18	613	63.8
700	4.1	701.8	0.449	50.40	627	74.8
750	3.8	751.7	0.478	57.12	667	84.7
800	3.6	801.6	0.498	62.00	695	106.6
850	3.4	851.5	0.518	67.08	723	128.5
900	3.2	901.4	0.537	72.09	750	151.4
950	3.0	951.3	0.557	77.56	778	173.3
1000	2.9	1001.2	0.567	80.37	792	209.2
1100	2.6	1101.1	0.596	88.80	832	269.1
1200	2.4	1201.0	0.616	94.86	860	341.0
1300	2.2	1301.0	0.635	100.81	887	414.0
1400	2.0	1400.9	0.655	107.26	915	485.9

## Appendix 1

**Vertical Field Limits (red curve in Figure 5) vs Antenna Vertical Pattern (blue curve)**

**At Downward Angles between 2.0 degrees (1400 meters from antenna)**

**To 43.0 degrees (42.3 degrees corresponds to 55 meters from antenna)**

<b>Downward Angle (Degrees)</b>	<b>Field Limit</b>	<b>Antenna Relative Field</b>	<b>Safety Margin (dB)</b>				
				6.2	0.328	0.260	-2.03
				6.3	0.322	0.252	-2.13
				6.4	0.318	0.244	-2.31
				6.5	0.315	0.236	-2.48
2.0	1.000	0.655	-3.68	6.6	0.311	0.229	-2.67
2.1	0.964	0.645	-3.48	6.7	0.307	0.221	-2.85
2.2	0.927	0.635	-3.28	6.8	0.302	0.214	-3.00
2.3	0.894	0.626	-3.09	6.9	0.297	0.206	-3.15
2.4	0.860	0.616	-2.90	7.0	0.291	0.199	-3.30
2.5	0.824	0.606	-2.66	7.1	0.286	0.192	-3.45
2.6	0.787	0.596	-2.41	7.2	0.282	0.185	-3.66
2.7	0.762	0.587	-2.28	7.3	0.279	0.179	-3.87
2.8	0.738	0.577	-2.14	7.4	0.275	0.172	-4.08
2.9	0.713	0.567	-1.99	7.5	0.272	0.166	-4.30
3.0	0.678	0.557	-1.71	7.6	0.268	0.159	-4.53
3.1	0.662	0.547	-1.65	7.7	0.265	0.153	-4.77
3.2	0.645	0.537	-1.59	7.8	0.262	0.147	-5.03
3.3	0.626	0.527	-1.49	7.9	0.259	0.141	-5.28
3.4	0.607	0.518	-1.39	8.0	0.256	0.135	-5.55
3.5	0.590	0.508	-1.31	8.1	0.253	0.130	-5.81
3.6	0.573	0.498	-1.22	8.2	0.250	0.124	-6.09
3.7	0.555	0.488	-1.12	8.3	0.247	0.119	-6.36
3.8	0.537	0.478	-1.01	8.4	0.244	0.114	-6.65
3.9	0.525	0.468	-1.00	8.5	0.241	0.108	-6.94
4.0	0.514	0.459	-0.99	8.6	0.238	0.104	-7.23
4.1	0.502	0.449	-0.97	8.7	0.235	0.099	-7.53
4.2	0.484	0.439	-0.84	8.8	0.233	0.094	-7.87
4.3	0.475	0.430	-0.86	8.9	0.231	0.090	-8.21
4.4	0.465	0.420	-0.88	9.0	0.229	0.085	-8.56
4.5	0.456	0.410	-0.91	9.1	0.227	0.081	-8.92
4.6	0.447	0.401	-0.94	9.2	0.225	0.077	-9.28
4.7	0.438	0.392	-0.97	9.3	0.223	0.073	-9.65
4.8	0.429	0.382	-1.00	9.4	0.221	0.070	-10.02
4.9	0.421	0.373	-1.04	9.5	0.219	0.066	-10.39
5.0	0.412	0.364	-1.08	9.6	0.217	0.063	-10.75
5.1	0.404	0.355	-1.12	9.7	0.214	0.060	-11.12
5.2	0.395	0.346	-1.16	9.8	0.212	0.056	-11.48
5.3	0.386	0.337	-1.19	9.9	0.210	0.054	-11.85
5.4	0.377	0.328	-1.22	10.0	0.207	0.051	-12.22
5.5	0.371	0.319	-1.31	10.1	0.205	0.048	-12.58
5.6	0.364	0.310	-1.40	10.2	0.202	0.046	-12.95
5.7	0.358	0.302	-1.49	10.3	0.200	0.043	-13.31
5.8	0.352	0.293	-1.60	10.4	0.198	0.041	-13.69
5.9	0.347	0.285	-1.71	10.5	0.196	0.039	-14.06
6.0	0.341	0.276	-1.83	10.6	0.195	0.037	-14.43
6.1	0.335	0.268	-1.93	10.7	0.193	0.035	-14.79

10.8	0.191	0.033	-15.13	16.2	0.128	0.032	-12.17
10.9	0.189	0.032	-15.47	16.3	0.127	0.033	-11.74
11.0	0.187	0.030	-15.80	16.4	0.127	0.034	-11.34
11.1	0.186	0.029	-16.11	16.5	0.126	0.036	-10.95
11.2	0.184	0.028	-16.41	16.6	0.125	0.037	-10.58
11.3	0.182	0.027	-16.69	16.7	0.125	0.038	-10.22
11.4	0.181	0.026	-16.99	16.8	0.124	0.040	-9.87
11.5	0.179	0.025	-17.27	16.9	0.123	0.041	-9.54
11.6	0.178	0.024	-17.54	17.0	0.123	0.042	-9.22
11.7	0.176	0.023	-17.80	17.1	0.122	0.044	-8.92
11.8	0.175	0.022	-18.05	17.2	0.121	0.045	-8.62
11.9	0.174	0.021	-18.30	17.3	0.120	0.046	-8.34
12.0	0.172	0.020	-18.54	17.4	0.120	0.047	-8.07
12.1	0.171	0.020	-18.79	17.5	0.119	0.049	-7.80
12.2	0.169	0.019	-19.04	17.6	0.118	0.050	-7.55
12.3	0.168	0.018	-19.29	17.7	0.118	0.051	-7.31
12.4	0.166	0.018	-19.55	17.8	0.117	0.052	-7.08
12.5	0.165	0.017	-19.83	17.9	0.116	0.053	-6.85
12.6	0.164	0.016	-20.13	18.0	0.116	0.054	-6.64
12.7	0.163	0.015	-20.44	18.1	0.115	0.055	-6.43
12.8	0.161	0.015	-20.78	18.2	0.114	0.056	-6.23
12.9	0.160	0.014	-21.13	18.3	0.114	0.057	-6.04
13.0	0.159	0.013	-21.51	18.4	0.113	0.058	-5.86
13.1	0.158	0.013	-21.91	18.5	0.113	0.058	-5.70
13.2	0.157	0.012	-22.33	18.6	0.112	0.059	-5.55
13.3	0.155	0.011	-22.77	18.7	0.111	0.060	-5.41
13.4	0.154	0.011	-23.23	18.8	0.111	0.061	-5.27
13.5	0.153	0.010	-23.68	18.9	0.111	0.061	-5.14
13.6	0.152	0.009	-24.13	19.0	0.110	0.062	-5.01
13.7	0.151	0.009	-24.52	19.1	0.110	0.062	-4.90
13.8	0.149	0.009	-24.85	19.2	0.109	0.063	-4.79
13.9	0.148	0.008	-25.05	19.3	0.109	0.063	-4.69
14.0	0.147	0.008	-25.11	19.4	0.108	0.064	-4.59
14.1	0.146	0.008	-24.99	19.5	0.108	0.064	-4.50
14.2	0.145	0.008	-24.69	19.6	0.107	0.064	-4.42
14.3	0.144	0.009	-24.22	19.7	0.106	0.065	-4.34
14.4	0.143	0.009	-23.61	19.8	0.106	0.065	-4.27
14.5	0.143	0.010	-22.92	19.9	0.106	0.065	-4.21
14.6	0.142	0.011	-22.16	20.0	0.105	0.065	-4.16
14.7	0.141	0.012	-21.39	20.1	0.105	0.065	-4.11
14.8	0.140	0.013	-20.61	20.2	0.104	0.065	-4.06
14.9	0.139	0.014	-19.84	20.3	0.104	0.065	-4.02
15.0	0.138	0.015	-19.09	20.4	0.103	0.065	-3.99
15.1	0.137	0.017	-18.36	20.5	0.103	0.065	-3.97
15.2	0.136	0.018	-17.67	20.6	0.102	0.065	-3.95
15.3	0.135	0.019	-17.00	20.7	0.101	0.064	-3.94
15.4	0.134	0.020	-16.36	20.8	0.101	0.064	-3.93
15.5	0.134	0.022	-15.75	20.9	0.101	0.064	-3.94
15.6	0.133	0.023	-15.16	21.0	0.100	0.064	-3.94
15.7	0.132	0.025	-14.60	21.1	0.100	0.063	-3.96
15.8	0.131	0.026	-14.06	21.2	0.099	0.063	-3.98
15.9	0.130	0.027	-13.54	21.3	0.099	0.062	-4.01
16.0	0.129	0.029	-13.07	21.4	0.098	0.062	-4.04
16.1	0.129	0.030	-12.61	21.5	0.098	0.061	-4.08

21.6	0.097	0.060	-4.13	27.0	0.078	0.013	-15.53
21.7	0.096	0.060	-4.18	27.1	0.078	0.014	-14.74
21.8	0.096	0.059	-4.25	27.2	0.078	0.016	-14.01
21.9	0.096	0.058	-4.33	27.3	0.078	0.017	-13.34
22.0	0.095	0.057	-4.42	27.4	0.078	0.018	-12.71
22.1	0.095	0.056	-4.52	27.5	0.077	0.019	-12.13
22.2	0.095	0.056	-4.63	27.6	0.077	0.020	-11.59
22.3	0.094	0.055	-4.74	27.7	0.077	0.021	-11.09
22.4	0.094	0.054	-4.86	27.8	0.077	0.023	-10.61
22.5	0.094	0.053	-5.00	27.9	0.077	0.024	-10.17
22.6	0.093	0.052	-5.14	28.0	0.076	0.025	-9.76
22.7	0.093	0.051	-5.29	28.1	0.076	0.026	-9.37
22.8	0.092	0.049	-5.45	28.2	0.076	0.027	-9.01
22.9	0.092	0.048	-5.62	28.3	0.076	0.028	-8.66
23.0	0.092	0.047	-5.80	28.4	0.076	0.029	-8.34
23.1	0.091	0.046	-5.99	28.5	0.076	0.030	-8.03
23.2	0.091	0.045	-6.19	28.6	0.075	0.031	-7.74
23.3	0.091	0.043	-6.40	28.7	0.075	0.032	-7.47
23.4	0.090	0.042	-6.63	28.8	0.075	0.033	-7.21
23.5	0.090	0.041	-6.87	28.9	0.075	0.034	-6.97
23.6	0.090	0.039	-7.12	29.0	0.075	0.034	-6.74
23.7	0.089	0.038	-7.39	29.1	0.074	0.035	-6.53
23.8	0.089	0.037	-7.67	29.2	0.074	0.036	-6.32
23.9	0.089	0.035	-7.97	29.3	0.074	0.037	-6.13
24.0	0.088	0.034	-8.29	29.4	0.074	0.037	-5.95
24.1	0.088	0.033	-8.62	29.5	0.074	0.038	-5.78
24.2	0.087	0.031	-8.98	29.6	0.074	0.038	-5.62
24.3	0.087	0.030	-9.36	29.7	0.073	0.039	-5.47
24.4	0.087	0.028	-9.76	29.8	0.073	0.040	-5.33
24.5	0.086	0.027	-10.18	29.9	0.073	0.040	-5.19
24.6	0.086	0.025	-10.64	30.0	0.073	0.041	-5.07
24.7	0.086	0.024	-11.12	30.1	0.073	0.041	-4.96
24.8	0.085	0.022	-11.64	30.2	0.072	0.041	-4.85
24.9	0.085	0.021	-12.20	30.3	0.072	0.042	-4.75
25.0	0.085	0.019	-12.79	30.4	0.072	0.042	-4.66
25.1	0.084	0.018	-13.44	30.5	0.072	0.042	-4.57
25.2	0.084	0.017	-14.13	30.6	0.072	0.043	-4.49
25.3	0.084	0.015	-14.88	30.7	0.071	0.043	-4.42
25.4	0.083	0.014	-15.68	30.8	0.071	0.043	-4.36
25.5	0.083	0.012	-16.56	30.9	0.071	0.043	-4.30
25.6	0.083	0.011	-17.50	31.0	0.071	0.043	-4.25
25.7	0.082	0.010	-18.49	31.1	0.071	0.044	-4.20
25.8	0.082	0.009	-19.53	31.2	0.071	0.044	-4.16
25.9	0.081	0.008	-20.55	31.3	0.070	0.044	-4.13
26.0	0.081	0.007	-21.45	31.4	0.070	0.044	-4.10
26.1	0.081	0.006	-22.09	31.5	0.070	0.044	-4.08
26.2	0.080	0.006	-22.29	31.6	0.070	0.044	-4.06
26.3	0.080	0.006	-22.00	31.7	0.070	0.044	-4.05
26.4	0.080	0.007	-21.30	31.8	0.069	0.044	-4.05
26.5	0.079	0.008	-20.35	31.9	0.069	0.044	-4.04
26.6	0.079	0.009	-19.32	32.0	0.069	0.043	-4.05
26.7	0.079	0.010	-18.29	32.1	0.069	0.043	-4.05
26.8	0.079	0.011	-17.31	32.2	0.069	0.043	-4.06
26.9	0.078	0.012	-16.39	32.3	0.069	0.043	-4.08

32.4	0.068	0.043	-4.10	37.8	0.058	0.043	-2.73
32.5	0.068	0.042	-4.12	37.9	0.058	0.043	-2.63
32.6	0.068	0.042	-4.15	38.0	0.058	0.043	-2.53
32.7	0.068	0.042	-4.18	38.1	0.058	0.044	-2.44
32.8	0.068	0.042	-4.21	38.2	0.058	0.044	-2.36
32.9	0.067	0.041	-4.24	38.3	0.058	0.044	-2.28
33.0	0.067	0.041	-4.28	38.4	0.058	0.045	-2.20
33.1	0.067	0.041	-4.32	38.5	0.058	0.045	-2.12
33.2	0.067	0.041	-4.36	38.6	0.057	0.045	-2.05
33.3	0.067	0.040	-4.40	38.7	0.057	0.046	-1.98
33.4	0.067	0.040	-4.44	38.8	0.057	0.046	-1.92
33.5	0.066	0.040	-4.49	38.9	0.057	0.046	-1.86
33.6	0.066	0.039	-4.53	39.0	0.057	0.046	-1.80
33.7	0.066	0.039	-4.58	39.1	0.057	0.047	-1.75
33.8	0.066	0.039	-4.61	39.2	0.057	0.047	-1.70
33.9	0.066	0.038	-4.65	39.3	0.057	0.047	-1.66
34.0	0.065	0.038	-4.69	39.4	0.057	0.047	-1.62
34.1	0.065	0.038	-4.72	39.5	0.057	0.047	-1.59
34.2	0.065	0.038	-4.75	39.6	0.056	0.047	-1.56
34.3	0.065	0.037	-4.78	39.7	0.056	0.047	-1.54
34.4	0.064	0.037	-4.80	39.8	0.056	0.047	-1.53
34.5	0.064	0.037	-4.83	39.9	0.056	0.047	-1.52
34.6	0.064	0.037	-4.84	40.0	0.056	0.047	-1.52
34.7	0.064	0.037	-4.85	40.1	0.056	0.047	-1.52
34.8	0.064	0.036	-4.86	40.2	0.056	0.047	-1.52
34.9	0.063	0.036	-4.86	40.3	0.056	0.047	-1.52
35.0	0.063	0.036	-4.85	40.4	0.056	0.046	-1.71
35.1	0.063	0.036	-4.84	40.5	0.055	0.046	-1.55
35.2	0.063	0.036	-4.82	40.6	0.055	0.046	-1.55
35.3	0.063	0.036	-4.80	40.7	0.055	0.046	-1.55
35.4	0.062	0.036	-4.77	40.8	0.055	0.045	-1.74
35.5	0.062	0.036	-4.73	40.9	0.055	0.045	-1.74
35.6	0.062	0.036	-4.68	41.0	0.055	0.044	-1.94
35.7	0.062	0.036	-4.63	41.1	0.055	0.044	-1.94
35.8	0.061	0.036	-4.57	41.2	0.055	0.043	-2.14
35.9	0.061	0.036	-4.51	41.3	0.055	0.043	-2.14
36.0	0.061	0.037	-4.43	41.4	0.055	0.042	-2.34
36.1	0.061	0.037	-4.37	41.5	0.055	0.042	-2.34
36.2	0.061	0.037	-4.29	41.6	0.055	0.041	-2.55
36.3	0.061	0.037	-4.21	41.7	0.055	0.040	-2.77
36.4	0.060	0.038	-4.13	41.8	0.054	0.039	-2.83
36.5	0.060	0.038	-4.04	41.9	0.054	0.039	-2.83
36.6	0.060	0.038	-3.95	42.0	0.054	0.038	-3.05
36.7	0.060	0.038	-3.86	42.1	0.054	0.037	-3.28
36.8	0.060	0.039	-3.76	42.2	0.054	0.036	-3.52
36.9	0.060	0.039	-3.66	42.3	0.054	0.035	-3.77
37.0	0.059	0.040	-3.56	42.4	0.054	0.034	-4.02
37.1	0.059	0.040	-3.46	42.5	0.054	0.033	-4.28
37.2	0.059	0.040	-3.35	42.6	0.054	0.032	-4.54
37.3	0.059	0.041	-3.25	42.7	0.054	0.031	-4.82
37.4	0.059	0.041	-3.14	42.8	0.054	0.029	-5.40
37.5	0.059	0.041	-3.04	42.9	0.054	0.028	-5.70
37.6	0.059	0.042	-2.93	43.0	0.054	0.027	-6.02
37.7	0.058	0.042	-2.83				



## **Appendix 2**

### **Proposed Kathrein-Scala Antenna**

**Please see following pages for pattern data as follows:**

- 1      Proposed antenna parameters and dimensions**
- 2      Directional antenna horizontal azimuth pattern**
- 3      Tabulation of directional antenna horizontal azimuth pattern**
- 4      Antenna vertical pattern profile (tabulation in Appendix 1 above)**
- 5      Closeup of antenna vertical pattern profile at pertinent angles**

## Appendix 2 – Figure 1

### Proposed Kathrein-Scala antenna parameters

#### Dimensions and Feeding of Antenna System antenna type:

operating f in MHz : 106.100

max. azimuth angle 150

max. declination 90

cable design frequency: 106.100 MHz

compensation in % : 57.61

bay height v-feed power|cab-ph|

6 14226 1.0| 0|

bay height v-feed power|cab-ph|

5 11166 5.0| 23|

bay height v-feed power|cab-ph|

4 8388 12.0| 44|

bay height v-feed power|cab-ph|

3 5658 12.0| 89|

bay height v-feed power|cab-ph|

2 3080 5.0| 118|

bay height v-feed power|cab-ph|

1 0 1.0| 116|

↑ Vertical Spacing in mm  
↑ Power Splitting  
↑ Phase From customer supplied Plot  
↑ From customer supplied Plot

#### Directivity from HRP and zoomed VRP

operating f in MHz : 106.100

HRP max/mean in dB : 2.23

VRP omnidir in dB : 7.54

directivity in dB : 9.77

harness losses : .00

gain in dB : 9.77

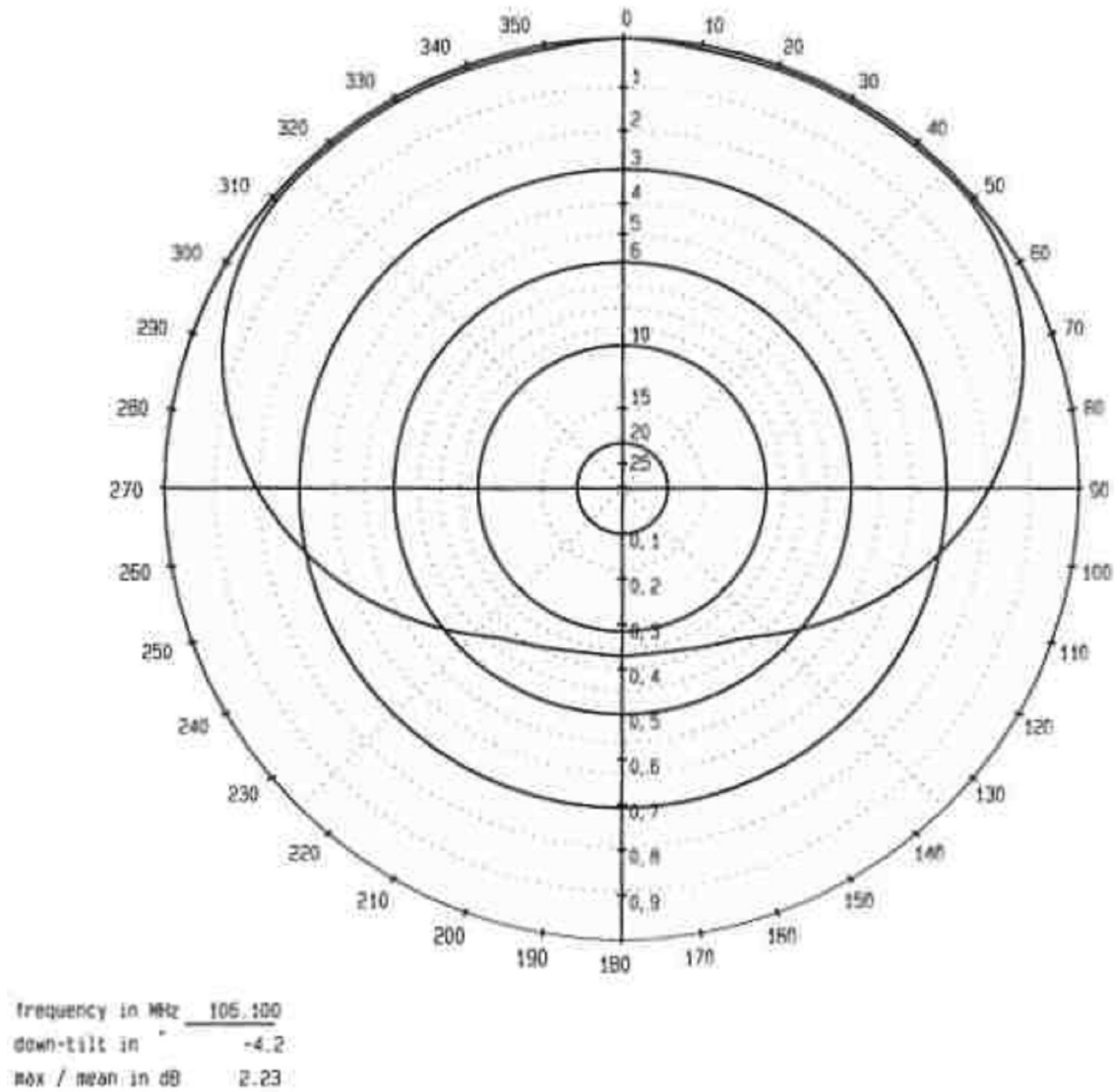
9.77  
- 0.20dB HARNESS LOSS  
9.57dB PEAK ARRAY GAIN

WNEP

SCALA Medford Oregon	6 x FMV-MP	Typ. Nr.
MB 22.2.12.13.44	Freq. 106.1 MHz Version-2	B1.1

## Appendix 2 – Figure 2

### Directional antenna horizontal azimuth pattern



WNBP

<b>SCALE</b> Medford Oregon	6 x FMV-MP	Typ No.
ME 22.2.12 13:44	Freq: 105.1 MHz Version-2	81.:

## Appendix 2 – Figure 3

### Tabulation of directional antenna horizontal azimuth pattern

Azimuth Radiation Pattern in % and dB at downtilt: -4.2

f = 106.100MHz

azimuth	%	dB	azimuth	%	dB
0	100.0	.0	180	37.0	-8.6
5	99.6	.0	185	36.9	-8.7
10	99.0	-.1	190	37.0	-8.6
15	98.9	-.1	195	37.4	-8.5
20	99.0	-.1	200	38.0	-8.4
25	99.0	-.1	205	38.9	-8.2
30	99.0	-.1	210	40.0	-8.0
35	99.0	-.1	215	41.2	-7.7
40	99.0	-.1	220	43.0	-7.3
45	99.1	-.1	225	45.8	-6.8
50	99.0	-.1	230	49.0	-6.2
55	98.3	-.2	235	52.4	-5.6
60	97.0	-.3	240	56.0	-5.0
65	95.3	-.4	245	59.9	-4.4
70	93.0	-.6	250	64.0	-3.9
75	90.2	-.9	255	68.0	-3.3
80	87.0	-1.2	260	72.0	-2.9
85	83.6	-1.6	265	76.1	-2.4
90	80.0	-1.9	270	80.0	-1.9
95	76.1	-2.4	275	83.6	-1.6
100	72.0	-2.9	280	87.0	-1.2
105	68.0	-3.3	285	90.2	-.9
110	64.0	-3.9	290	93.0	-.6
115	59.9	-4.4	295	95.3	-.4
120	56.0	-5.0	300	97.0	-.3
125	52.4	-5.6	305	98.2	-.2
130	49.0	-6.2	310	99.0	-.1
135	45.8	-6.8	315	99.1	-.1
140	43.0	-7.3	320	99.0	-.1
145	41.3	-7.7	325	99.0	-.1
150	40.0	-8.0	330	99.0	-.1
155	38.9	-8.2	335	99.0	-.1
160	38.0	-8.4	340	99.0	-.1
165	37.4	-8.5	345	98.9	-.1
170	37.0	-8.6	350	99.0	-.1
175	36.9	-8.7	355	99.6	.0
180	37.0	-8.6	360	100.0	.0

maximum fieldstrength was found at:

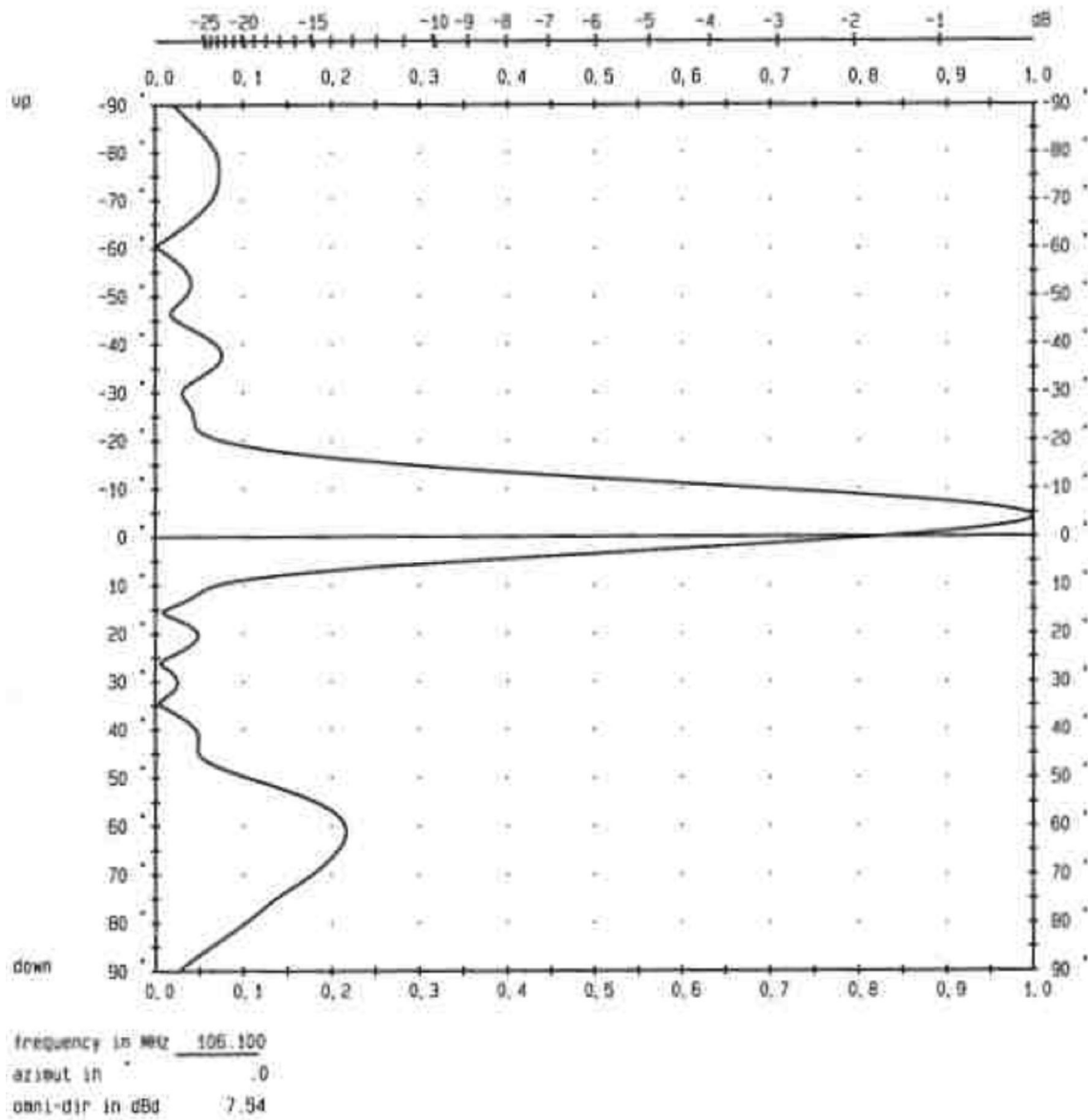
azimuth            0.  
downtilt          -4.

WNSP

<b>SCALA</b> Medford Oregon ME 22.2.12 13:44	5 x FMV-MP  Frew. 106.1 MHz    Version-2	Typ Nr.
		Bl.

## Appendix 2 – Figure 4

### Antenna vertical pattern profile



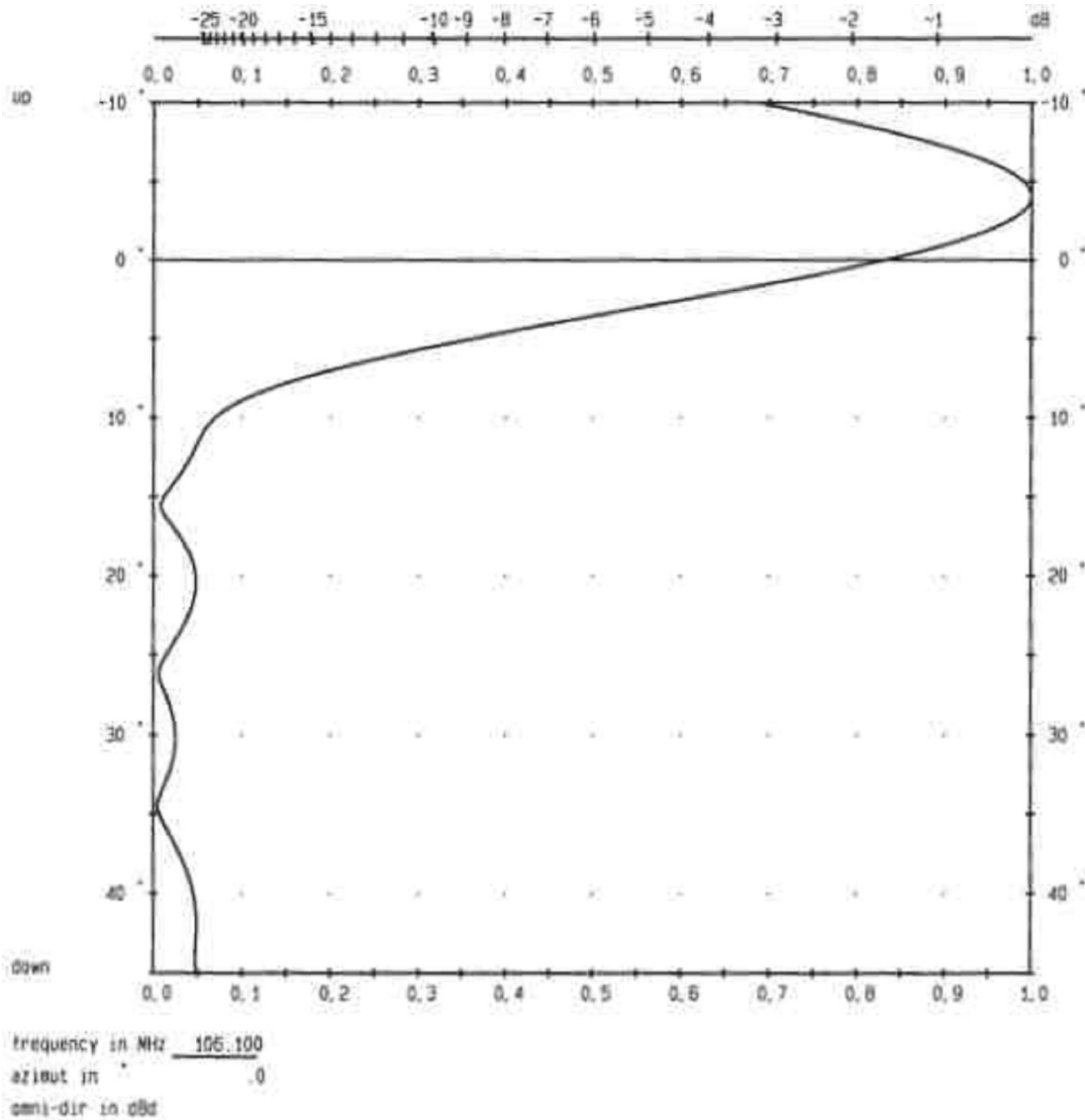
WNSP

SCALA Medford Oregon	6 x FMV-MP	Typ Nr.
M6 22.2.12 13:43	Freq: 105.1 MHz Version-2	El.:



## Appendix 2 – Figure 5

### Closeup of antenna vertical pattern profile at pertinent angles



WNB

S C A L A Medford Oregon MB 22.2.12 13:44	6 x FMV-MP Frew: 106.1 MHz Version-2	Typ No.
		81.