

Engineer's Declaration

I, Mark Miller, subject to the penalties of perjury, do declare the following:

1.) I am the holder of a valid General Radio Telephone Operators License, Number

P-1-1140095(exp) (FCC License No.)

2.) I have been a member of the Society of Broadcast Engineer's since _____ (year)

3.) That I have been employed as a technical consultant with the firm of:

Miller Technical Services (firm name), of

Chico, CA (city state)

4.) That Miller Technical Services (Firm's Name) was retained

by _____ (Permit tee's Name) for the

purpose of preparing its application for the construction permit of ~~KPBS~~ **KROV**-FM

Oroville (City), California (State), from which the underlying Construction Permit

(FCC File Number BNPED-20071015ALT) was granted by the Commission.

5.) That I am familiar with the terms and conditions of the ~~KPBS~~ **KROV**-FM Construction Permit.

6.) I hereby certify that I have overseen the installation of the ~~KPBS~~ **KROV**-FM directional

antenna and that the installation was complete to the manufacturer's instructions

outlined in the Proof of Performance Drawings section (Exhibit 7) for ~~KPBS~~ **KROV**-FM.

(7) *I have performed multiple Sec. 13.215 installations over past 30 years and am Site Manager at the above installation.*

Sign Mark Miller

Dated: 7-2-13 mm/dd/yy

KROY

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SYSTEMS WITH RELIABILITY, LLP
BROADCAST ANTENNAS AND TRANSMISSION LINE

PATTERN CERTIFICATION

DIRECTIONAL FM ANTENNA

KRBS KROV

March 2, 2012

Call Sign	:	KRBS
Location	:	Oroville, CA
Frequency	:	91.1 MHz
Channel	:	216A
Antenna Model	:	FMEC/1 DA
Maximum Antenna Gain	:	
Horizontal	:	1.103 / 0.425 dB
Vertical	:	1.103 / 0.425 dB

ANTENNA DESCRIPTION

A custom designed FMEC/1-DA antenna was used to produce the required directional azimuth pattern. The antenna bay consists of a circularly polarized cross-V dipole-radiating element with horizontal parasitics. The array is comprised of one bay that is mounted to a support pipe and mounted to an 18" face 18M Magnum Tower pointing 340 degrees true north.

DESCRIPTION OF TEST PROCEDURE

The test antenna consists of a single bay third-scale model antenna and parasitic system. This antenna was mounted to a third scale model tower with the use of mounting brackets supplied with the finalized antenna. The tower was placed on a 20 ft. high platform. All feed cables are properly grounded during pattern testing. Horizontal parasitic elements were used to obtain the desired directional pattern.

The source antenna, a vertical/horizontal dipole Cavity Back Resonator antenna configuration was mounted approximately 100 feet from the test antenna. The source's height was adjusted to provide a uniform field at the test antenna location. The CBR antenna was operated in the transmit mode at a frequency of 273.3 MHz. The antenna under test was rotated in a clockwise direction. A gain reference was taken using a dipole tuned to 273.3 MHz. Nowhere, does the received signal exceed a maximum to minimum ratio of 15 dB.

TEST RESULTS

The attached calculations verify that the **RMS** value of this antenna is **90.9%** of the **RMS** value of the pattern authorized in the related construction permit **BNPED-20071015ALT**. The vertical component **RMS** value is **0.642**. The horizontal component **RMS** value is **0.623**. The circular polarized component **RMS** value is **0.653**.

Azimuth and elevation plots and associated tabulations of this antenna are included with this package.

Measured vertical polarized directivity:	2.426 / 3.850dB
Measured horizontal polarized directivity:	2.576 / 4.110 dB
Measured circular polarized pattern directivity:	2.345 / 3.700 dB

Gain in each polarization was calculated using the following relation:

$$\text{GAIN} = \text{Azimuth Directivity} \times \text{Power Ratio Between Polarizations} \times \text{Elevation Directivity}$$

Using this relationship along with ratio measured at our testing facilities:

$$\begin{aligned}\text{V-Pol. Gain} &= (2.426) (.515) (0.883) = 1.103 / 0.425 \text{ dB} \\ \text{H-Pol. Gain} &= (2.576) (.485) (0.883) = 1.103 / 0.425 \text{ dB}\end{aligned}$$

INSTALLATION AND MOUNTING

The antenna is to be mounted in accordance with the supplied drawings. The antenna center of radiation is to be **23 meters (75.463 ft.)** above ground level. The antenna aperture is **2 feet**. No other antennas are to be mounted within **10 feet** of the antenna. No other obstructions other than those specified by original drawings supplied are to be mounted at the same level as the antenna. The antenna is to be oriented **340 degrees** true north.

The parasitic system is custom designed to shape and direct the antenna pattern as required. The systems orientation and the mounting details are described in the following drawings:

DRAWING NO.	TITLE
1641D00	ELEVATION
1641D01	ANTENNA ORIENTATION WITH PARASITICS
1641D02	BAY PARASITIC PLACEMENT AND ASSEMBLY
2105A10	TEST RANGE SCHEMATIC

The array shall be mounted according to **DWG. 1641D00**. The antenna elements shall be aligned at the same heading as in **DWG. 1641D01**. This will ensure that the antenna is oriented properly at 340 degrees true north. The bay's parasitic assembly is shown in **DWG. 1641D02**. The test range schematic shows the mounting configuration of the antenna setup on our range.

DOCUMENT EXHIBITS

The following exhibits are included as part of this Certificate of Compliance:

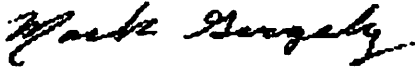
Exhibit 1	Circular Polarized Azimuth Pattern Field Strength Tabulations (Composite)
Exhibit 2	Measured Horizontal Polarized Azimuth Pattern Measured Field Strength Tabulations (Horizontal)
Exhibit 3	Measured Vertical Polarized Azimuth Pattern Measured Field Strength Tabulations (Vertical)
Exhibit 4	Elevation Pattern Elevation Tabulations
Exhibit 5	Antenna Data Sheet
Exhibit 6	RMS Calculations
Exhibit 7	Drawings

TEST EQUIPMENT

Network Analyzer	:	Hewlett Packard Model # 8753C Serial Number: 08753 – 69138
Computer	:	Pentium 3, 450 MHz, Range Program
Printer	:	Hewlett-Packard Laser Jet 6L
Positioner	:	Orbit Positioner

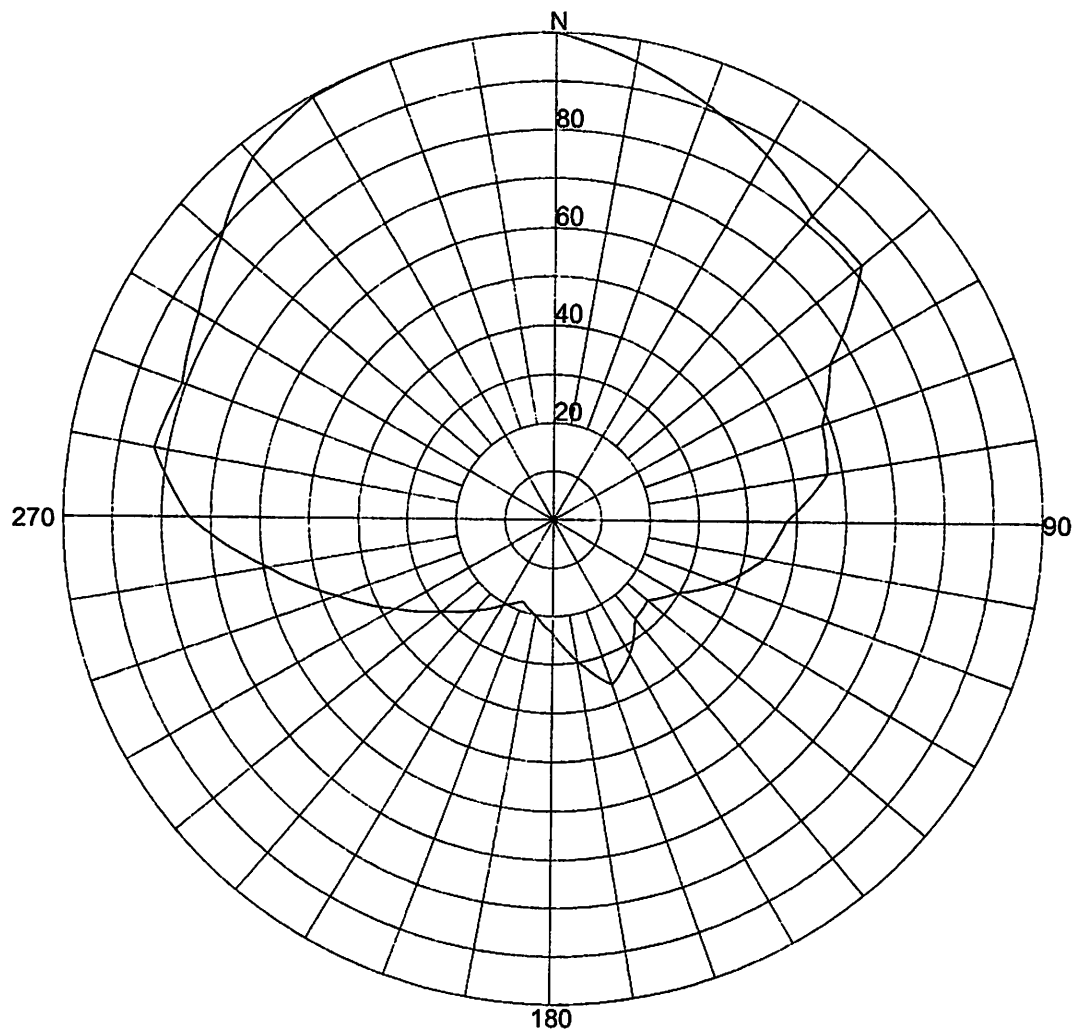
All equipment is calibrated to ANSI/NCSL Z540-1-1994 specs

Prepared by:



Mark A. Gergely
Electrical Engineer
Systems With Reliability LLP

Exhibit 1: Composite Circular Polarized Azimuth Pattern



Azimuth Pattern

Systems With Reliability

Scale: Linear

Unit: Relative Field

CLIENT: KRBS Composite

Date: 2/24/2012

ANTENNA TYPE: FMEC/1 DA

FREQUENCY: 91.1 MHz

PATTERN POL.: Circular

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.34526 / 3.7dB

PATTERN RMS: 0.653

Exhibit 1 (cont'd): Composite Circular Polarized Azimuth Pattern Tabulations

Relative Field Tabulation(Azimuth)

Azimuth Heading	Relative Field(dB)	Azimuth Heading	Relative Field(dB)
0	1.0000 (0.01)	180	.2350 (-12.54)
5	.9780 (-0.18)	185	.2180 (-13.19)
10	.9560 (-0.38)	190	.2010 (-13.89)
15	.9330 (-0.59)	195	.1905 (-14.36)
20	.9100 (-0.81)	200	.1800 (-14.85)
25	.8885 (-1.02)	205	.1920 (-14.29)
30	.8670 (-1.23)	210	.2040 (-13.76)
35	.8430 (-1.47)	215	.2250 (-12.92)
40	.8190 (-1.72)	220	.2460 (-12.15)
45	.8195 (-1.72)	225	.2710 (-11.31)
50	.8200 (-1.71)	230	.2960 (-10.54)
55	.7360 (-2.65)	235	.3345 (-9.49)
60	.6520 (-3.7)	240	.3730 (-8.54)
65	.6185 (-4.16)	245	.4210 (-7.49)
70	.5850 (-4.64)	250	.4690 (-6.56)
75	.5775 (-4.75)	255	.5300 (-5.5)
80	.5700 (-4.87)	260	.5910 (-4.55)
85	.5240 (-5.6)	265	.6670 (-3.5)
90	.4780 (-6.39)	270	.7430 (-2.57)
95	.4595 (-6.74)	275	.7860 (-2.08)
100	.4410 (-7.09)	280	.8290 (-1.62)
105	.4065 (-7.8)	285	.8185 (-1.73)
110	.3720 (-8.57)	290	.8080 (-1.84)
115	.3340 (-9.5)	295	.8235 (-1.68)
120	.2960 (-10.54)	300	.8390 (-1.51)
125	.2760 (-11.15)	305	.8655 (-1.24)
130	.2560 (-11.8)	310	.8920 (-0.98)
135	.2605 (-11.65)	315	.9280 (-0.64)
140	.2650 (-11.5)	320	.9640 (-0.31)
145	.2930 (-10.63)	325	.9800 (-0.17)
150	.3210 (-9.84)	330	.9960 (-0.03)
155	.3420 (-9.29)	335	.9980 (-0.01)
160	.3630 (-8.78)	340	1.0000 (0.01)
165	.3295 (-9.62)	345	1.0000 (0.01)
170	.2960 (-10.54)	350	1.0000 (0.01)
175	.2655 (-11.49)	355	1.0000 (0.01)

Systems With Reliability

CLIENT: KRBS Composite

Date: 2/24/2012

ANTENNA TYPE: FMEC/1 DA

FREQUENCY: 91.1 MHz

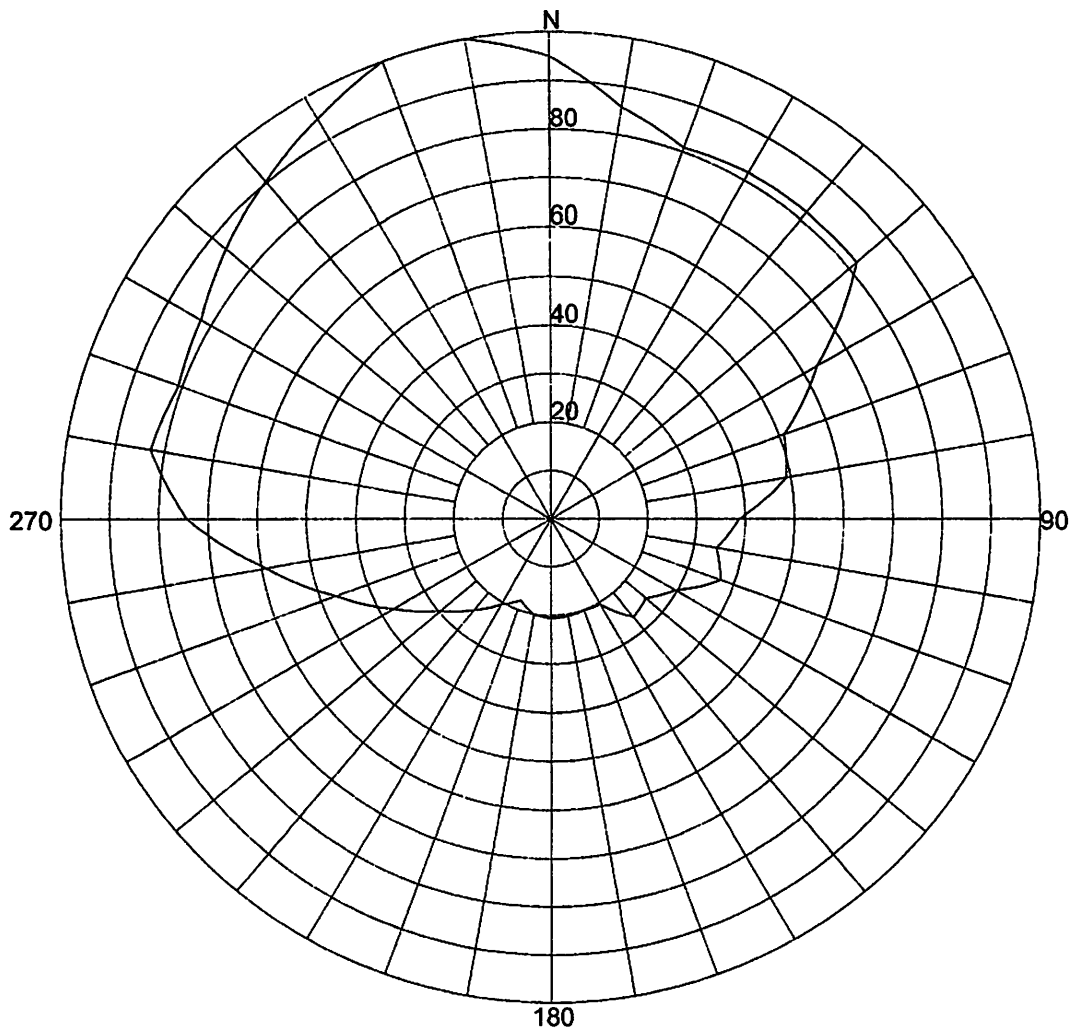
PATTERN POL.: Circular

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.34526 / 3.7dB

PATTERN RMS: 0.653

Exhibit 2: Measured Horizontal Polarized Azimuth Pattern



Azimuth Pattern

Scale: Linear

Unit: Relative Field

Systems With Reliability

CLIENT: *KRBS*

Date: 2/24/2012

ANTENNA TYPE: FMEC/1 DA

FREQUENCY: 91.1 MHz

PATTERN POL.: Horizontal

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.57603 / 4.11dB

PATTERN RMS: 0.623

Exhibit 2 (cont'd): Measured Horizontal Polarized Azimuth Pattern Tabulations

Relative Field Tabulation(Azimuth)

Azimuth Heading	Relative Field(dB)	Azimuth Heading	Relative Field(dB)
0	.9500 (-0.44)	180	.2050 (-13.72)
5	.9040 (-0.87)	185	.2030 (-13.81)
10	.8580 (-1.32)	190	.2010 (-13.89)
15	.8335 (-1.57)	195	.1905 (-14.36)
20	.8090 (-1.83)	200	.1800 (-14.85)
25	.8135 (-1.78)	205	.1920 (-14.29)
30	.8180 (-1.73)	210	.2040 (-13.76)
35	.8185 (-1.73)	215	.2250 (-12.92)
40	.8190 (-1.72)	220	.2460 (-12.15)
45	.8195 (-1.72)	225	.2710 (-11.31)
50	.8200 (-1.71)	230	.2960 (-10.54)
55	.7255 (-2.78)	235	.3340 (-9.5)
60	.6310 (-3.99)	240	.3720 (-8.57)
65	.5705 (-4.86)	245	.4200 (-7.51)
70	.5100 (-5.83)	250	.4680 (-6.58)
75	.5005 (-5.99)	255	.5290 (-5.51)
80	.4910 (-6.16)	260	.5900 (-4.57)
85	.4390 (-7.13)	265	.6660 (-3.52)
90	.3870 (-8.22)	270	.7420 (-2.58)
95	.3665 (-8.69)	275	.7855 (-2.09)
100	.3460 (-9.19)	280	.8290 (-1.62)
105	.3590 (-8.87)	285	.8185 (-1.73)
110	.3720 (-8.57)	290	.8080 (-1.84)
115	.3340 (-9.5)	295	.8160 (-1.76)
120	.2960 (-10.54)	300	.8240 (-1.67)
125	.2760 (-11.15)	305	.8440 (-1.46)
130	.2560 (-11.8)	310	.8640 (-1.26)
135	.2605 (-11.65)	315	.8835 (-1.07)
140	.2650 (-11.5)	320	.9030 (-0.88)
145	.2345 (-12.56)	325	.9260 (-0.66)
150	.2040 (-13.76)	330	.9490 (-0.45)
155	.2025 (-13.83)	335	.9745 (-0.22)
160	.2010 (-13.89)	340	1.0000 (0.01)
165	.2025 (-13.83)	345	1.0000 (0.01)
170	.2040 (-13.76)	350	1.0000 (0.01)
175	.2045 (-13.74)	355	.9750 (-0.21)

Systems With Reliability

CLIENT: KRBS

Date: 2/24/2012

ANTENNA TYPE: FMEC/1 DA

FREQUENCY: 91.1 MHz

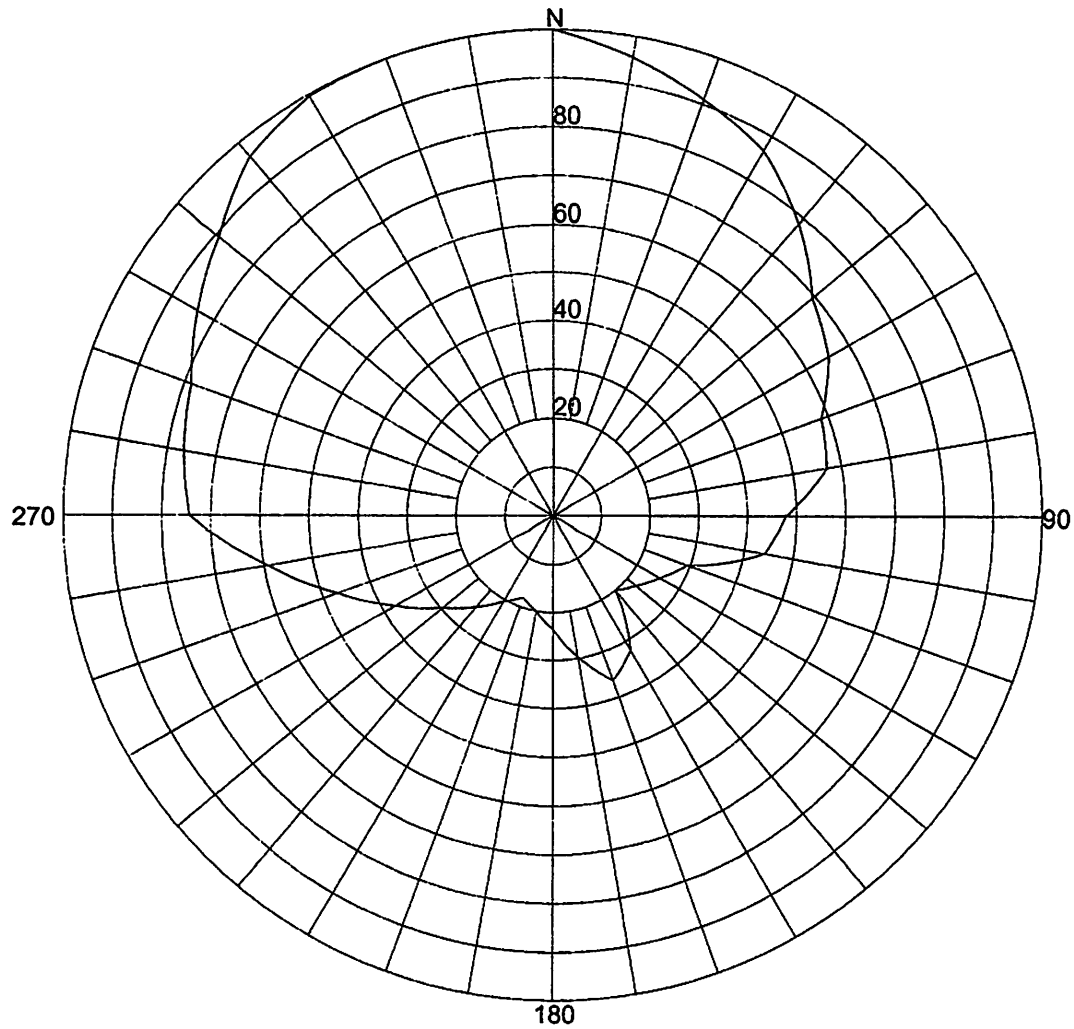
PATTERN POL.: Horizontal

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.57603 / 4.11dB

PATTERN RMS: 0.623

Exhibit 3: Measured Vertical Polarized Azimuth Pattern



Azimuth Pattern

Systems With Reliability

Scale: Linear

Unit: Relative Field

CLIENT: KRBS

Date: 2/24/2012

ANTENNA TYPE: FMEC/1 DA

FREQUENCY: 91.1 MHz

PATTERN POL.: Vertical

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.42467 / 3.85dB

PATTERN RMS: 0.642

Exhibit 3 (cont'd): Measured Vertical Polarized Azimuth Pattern Tabulations

Relative Field Tabulation(Azimuth)

Azimuth Heading	Relative Field(dB)	Azimuth Heading	Relative Field(dB)
0	1.0000 (0.01)	180	.2350 (-12.54)
5	.9780 (-0.18)	185	.2175 (-13.21)
10	.9560 (-0.38)	190	.2000 (-13.94)
15	.9330 (-0.59)	195	.1900 (-14.38)
20	.9100 (-0.81)	200	.1800 (-14.85)
25	.8885 (-1.02)	205	.1920 (-14.29)
30	.8670 (-1.23)	210	.2040 (-13.76)
35	.8260 (-1.65)	215	.2250 (-12.92)
40	.7850 (-2.09)	220	.2460 (-12.15)
45	.7395 (-2.61)	225	.2710 (-11.31)
50	.6940 (-3.16)	230	.2960 (-10.54)
55	.6730 (-3.43)	235	.3345 (-9.49)
60	.6520 (-3.7)	240	.3730 (-8.54)
65	.6185 (-4.16)	245	.4210 (-7.49)
70	.5850 (-4.64)	250	.4690 (-6.56)
75	.5775 (-4.75)	255	.5300 (-5.5)
80	.5700 (-4.87)	260	.5910 (-4.55)
85	.5240 (-5.6)	265	.6670 (-3.5)
90	.4780 (-6.39)	270	.7430 (-2.57)
95	.4595 (-6.74)	275	.7545 (-2.44)
100	.4410 (-7.09)	280	.7660 (-2.3)
105	.3675 (-8.67)	285	.7760 (-2.19)
110	.2940 (-10.6)	290	.7860 (-2.08)
115	.2740 (-11.21)	295	.8125 (-1.79)
120	.2540 (-11.87)	300	.8390 (-1.51)
125	.2390 (-12.4)	305	.8655 (-1.24)
130	.2240 (-12.96)	310	.8920 (-0.98)
135	.2120 (-13.43)	315	.9280 (-0.64)
140	.2000 (-13.94)	320	.9640 (-0.31)
145	.2605 (-11.65)	325	.9800 (-0.17)
150	.3210 (-9.84)	330	.9960 (-0.03)
155	.3420 (-9.29)	335	.9980 (-0.01)
160	.3630 (-8.78)	340	1.0000 (0.01)
165	.3295 (-9.62)	345	1.0000 (0.01)
170	.2960 (-10.54)	350	1.0000 (0.01)
175	.2655 (-11.49)	355	1.0000 (0.01)

Systems With Reliability

CLIENT: KRBS

Date: 2/24/2012

ANTENNA TYPE: FMEC/1 DA

FREQUENCY: 91.1 MHz

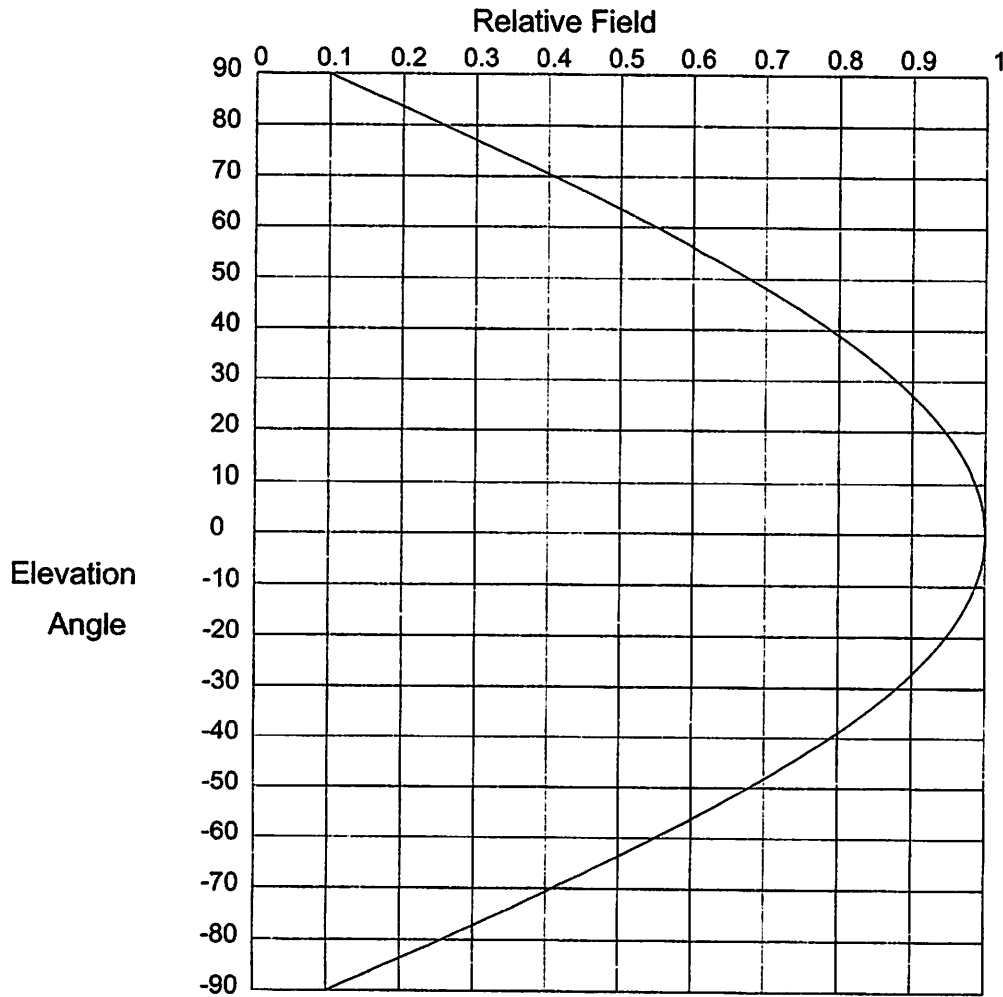
PATTERN POL.: Vertical

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.42467 / 3.85dB

PATTERN RMS: 0.642

Exhibit 4: Elevation Pattern



Elevation Pattern

Scale: Linear

Units: Field, Relative

Systems With Reliability

CLIENT: KRBS

Date: 3/2/2012

ANTENNA TYPE: FMEC/1 DA

FREQUENCY: 91.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 0.883/-0.539 dBd

Beam Tilt (Deg.) : 0

DIRECTIVITY(Horiz): 0.883/-0.539 dBd

Null Fill(s)(%) : 0, 0, 0

Exhibit 4 (cont'd): Elevation Pattern Tabulations

Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
90.0	.10 (-20)	52.0	.654 (-3.687)	14.0	.973 (-0.235)
89.0	.116 (-18.733)	51.0	.666 (-3.525)	13.0	.977 (-0.203)
88.0	.131 (-17.627)	50.0	.679 (-3.369)	12.0	.98 (-0.173)
87.0	.147 (-16.648)	49.0	.69 (-3.217)	11.0	.983 (-0.145)
86.0	.163 (-15.768)	48.0	.702 (-3.071)	10.0	.986 (-0.12)
85.0	.178 (-14.97)	47.0	.714 (-2.928)	9.8	.987 (-0.115)
84.0	.194 (-14.241)	46.0	.725 (-2.791)	9.6	.987 (-0.11)
83.0	.21 (-13.569)	45.0	.736 (-2.658)	9.4	.988 (-0.106)
82.0	.225 (-12.946)	44.0	.747 (-2.529)	9.2	.988 (-0.101)
81.0	.241 (-12.367)	43.0	.758 (-2.404)	9.0	.989 (-0.097)
80.0	.256 (-11.826)	42.0	.769 (-2.283)	8.8	.989 (-0.093)
79.0	.272 (-11.317)	41.0	.779 (-2.167)	8.6	.99 (-0.088)
78.0	.287 (-10.839)	40.0	.789 (-2.054)	8.4	.99 (-0.084)
77.0	.302 (-10.387)	39.0	.799 (-1.944)	8.2	.991 (-0.08)
76.0	.318 (-9.959)	38.0	.809 (-1.839)	8.0	.991 (-0.076)
75.0	.333 (-9.553)	37.0	.819 (-1.737)	7.8	.992 (-0.073)
74.0	.348 (-9.167)	36.0	.828 (-1.638)	7.6	.992 (-0.069)
73.0	.363 (-8.799)	35.0	.837 (-1.543)	7.4	.993 (-0.065)
72.0	.378 (-8.448)	34.0	.846 (-1.451)	7.2	.993 (-0.062)
71.0	.393 (-8.112)	33.0	.855 (-1.363)	7.0	.993 (-0.058)
70.0	.408 (-7.791)	32.0	.863 (-1.277)	6.8	.994 (-0.055)
69.0	.423 (-7.483)	31.0	.871 (-1.195)	6.6	.994 (-0.052)
68.0	.437 (-7.187)	30.0	.879 (-1.116)	6.4	.994 (-0.049)
67.0	.452 (-6.904)	29.0	.887 (-1.04)	6.2	.995 (-0.046)
66.0	.466 (-6.631)	28.0	.895 (-0.967)	6.0	.995 (-0.043)
65.0	.48 (-6.369)	27.0	.902 (-0.897)	5.8	.995 (-0.04)
64.0	.495 (-6.116)	26.0	.909 (-0.83)	5.6	.996 (-0.037)
63.0	.509 (-5.873)	25.0	.916 (-0.765)	5.4	.996 (-0.035)
62.0	.523 (-5.638)	24.0	.922 (-0.704)	5.2	.996 (-0.032)
61.0	.536 (-5.411)	23.0	.928 (-0.645)	5.0	.997 (-0.03)
60.0	.55 (-5.193)	22.0	.934 (-0.589)	4.8	.997 (-0.027)
59.0	.564 (-4.982)	21.0	.94 (-0.535)	4.6	.997 (-0.025)
58.0	.577 (-4.778)	20.0	.946 (-0.485)	4.4	.997 (-0.023)
57.0	.59 (-4.58)	19.0	.951 (-0.437)	4.2	.998 (-0.021)
56.0	.603 (-4.39)	18.0	.956 (-0.391)	4.0	.998 (-0.019)
55.0	.616 (-4.205)	17.0	.961 (-0.348)	3.8	.998 (-0.017)
54.0	.629 (-4.027)	16.0	.965 (-0.308)	3.6	.998 (-0.015)
53.0	.642 (-3.854)	15.0	.969 (-0.271)	3.4	.998 (-0.014)

Systems With Reliability

Page 1 of 3

CLIENT: KRBS

Date: 3/2/2012

ANTENNA TYPE: FMEC/1 DA

FREQUENCY: 91.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 0.883/-0.539 dBd

Beam Tilt (Deg.): 0

DIRECTIVITY(Horiz): 0.883/-0.539 dBd

Null Fill(s)(%): 0, 0, 0

Exhibit 4 (cont'd): Elevation Pattern Tabulations

Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
3.2	.999 (-0.012)	-4.4	.997 (-0.023)	-12.0	.98 (-0.173)
3.0	.999 (-0.011)	-4.6	.997 (-0.025)	-12.2	.98 (-0.178)
2.8	.999 (-0.009)	-4.8	.997 (-0.027)	-12.4	.979 (-0.184)
2.6	.999 (-0.008)	-5.0	.997 (-0.03)	-12.6	.978 (-0.19)
2.4	.999 (-0.007)	-5.2	.996 (-0.032)	-12.8	.978 (-0.196)
2.2	.999 (-0.006)	-5.4	.996 (-0.035)	-13.0	.977 (-0.203)
2.0	.999 (-0.005)	-5.6	.996 (-0.037)	-13.2	.976 (-0.209)
1.8	1.00 (-0.004)	-5.8	.995 (-0.04)	-13.4	.975 (-0.215)
1.6	1.00 (-0.003)	-6.0	.995 (-0.043)	-13.6	.975 (-0.222)
1.4	1.00 (-0.002)	-6.2	.995 (-0.046)	-13.8	.974 (-0.229)
1.2	1.00 (-0.002)	-6.4	.994 (-0.049)	-14.0	.973 (-0.235)
1.0	1.00 (-0.001)	-6.6	.994 (-0.052)	-14.2	.973 (-0.242)
.8	1.00 (-0.001)	-6.8	.994 (-0.055)	-14.4	.972 (-0.249)
.6	1.00 (0)	-7.0	.993 (-0.058)	-14.6	.971 (-0.256)
.4	1.00 (0)	-7.2	.993 (-0.062)	-14.8	.97 (-0.263)
.2	1.00 (0)	-7.4	.993 (-0.065)	-15.0	.969 (-0.271)
.0	1.00 (0)	-7.6	.992 (-0.069)	-15.2	.969 (-0.278)
-.2	1.00 (0)	-7.8	.992 (-0.073)	-15.4	.968 (-0.285)
-.4	1.00 (0)	-8.0	.991 (-0.076)	-15.6	.967 (-0.293)
-.6	1.00 (0)	-8.2	.991 (-0.08)	-15.8	.966 (-0.3)
-.8	1.00 (-0.001)	-8.4	.99 (-0.084)	-16.0	.965 (-0.308)
-1.0	1.00 (-0.001)	-8.6	.99 (-0.088)	-16.2	.964 (-0.316)
-1.2	1.00 (-0.002)	-8.8	.989 (-0.093)	-16.4	.963 (-0.324)
-1.4	1.00 (-0.002)	-9.0	.989 (-0.097)	-16.6	.962 (-0.332)
-1.6	1.00 (-0.003)	-9.2	.988 (-0.101)	-16.8	.962 (-0.34)
-1.8	1.00 (-0.004)	-9.4	.988 (-0.106)	-17.0	.961 (-0.348)
-2.0	.999 (-0.005)	-9.6	.987 (-0.11)	-17.2	.96 (-0.357)
-2.2	.999 (-0.006)	-9.8	.987 (-0.115)	-17.4	.959 (-0.365)
-2.4	.999 (-0.007)	-10.0	.986 (-0.12)	-17.6	.958 (-0.374)
-2.6	.999 (-0.008)	-10.2	.986 (-0.124)	-17.8	.957 (-0.383)
-2.8	.999 (-0.009)	-10.4	.985 (-0.129)	-18.0	.956 (-0.391)
-3.0	.999 (-0.011)	-10.6	.985 (-0.134)	-18.2	.955 (-0.4)
-3.2	.999 (-0.012)	-10.8	.984 (-0.14)	-18.4	.954 (-0.409)
-3.4	.998 (-0.014)	-11.0	.983 (-0.145)	-18.6	.953 (-0.418)
-3.6	.998 (-0.015)	-11.2	.983 (-0.15)	-18.8	.952 (-0.427)
-3.8	.998 (-0.017)	-11.4	.982 (-0.156)	-19.0	.951 (-0.437)
-4.0	.998 (-0.019)	-11.6	.982 (-0.161)	-19.2	.95 (-0.446)
-4.2	.998 (-0.021)	-11.8	.981 (-0.167)	-19.4	.949 (-0.456)

Systems With Reliability

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CLIENT: KRBS

Date: 3/2/2012

ANTENNA TYPE: FMEC/1 DA

FREQUENCY: 91.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 0.883/-0.539 dBd

Beam Tilt (Deg.) : 0

DIRECTIVITY(Horiz): 0.883/-0.539 dBd

Null Fill(s)(%) : 0, 0, 0

Exhibit 4 (cont'd): Elevation Pattern Tabulations

Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
-19.6	.948 (-0.465)	-27.2	.90 (-0.911)	-54.0	.629 (-4.027)
-19.8	.947 (-0.475)	-27.4	.899 (-0.924)	-55.0	.616 (-4.205)
-20.0	.946 (-0.485)	-27.6	.898 (-0.939)	-56.0	.603 (-4.39)
-20.2	.945 (-0.495)	-27.8	.896 (-0.953)	-57.0	.59 (-4.58)
-20.4	.944 (-0.505)	-28.0	.895 (-0.967)	-58.0	.577 (-4.778)
-20.6	.942 (-0.515)	-28.2	.893 (-0.981)	-59.0	.564 (-4.982)
-20.8	.941 (-0.525)	-28.4	.892 (-0.996)	-60.0	.55 (-5.193)
-21.0	.94 (-0.535)	-28.6	.89 (-1.01)	-61.0	.536 (-5.411)
-21.2	.939 (-0.546)	-28.8	.889 (-1.025)	-62.0	.523 (-5.638)
-21.4	.938 (-0.556)	-29.0	.887 (-1.04)	-63.0	.509 (-5.873)
-21.6	.937 (-0.567)	-29.2	.886 (-1.055)	-64.0	.495 (-6.116)
-21.8	.936 (-0.578)	-29.4	.884 (-1.07)	-65.0	.48 (-6.369)
-22.0	.934 (-0.589)	-29.6	.883 (-1.085)	-66.0	.466 (-6.631)
-22.2	.933 (-0.6)	-29.8	.881 (-1.101)	-67.0	.452 (-6.904)
-22.4	.932 (-0.611)	-30.0	.879 (-1.116)	-68.0	.437 (-7.187)
-22.6	.931 (-0.622)	-31.0	.871 (-1.195)	-69.0	.423 (-7.483)
-22.8	.93 (-0.633)	-32.0	.863 (-1.277)	-70.0	.408 (-7.791)
-23.0	.928 (-0.645)	-33.0	.855 (-1.363)	-71.0	.393 (-8.112)
-23.2	.927 (-0.656)	-34.0	.846 (-1.451)	-72.0	.378 (-8.448)
-23.4	.926 (-0.668)	-35.0	.837 (-1.543)	-73.0	.363 (-8.799)
-23.6	.925 (-0.68)	-36.0	.828 (-1.638)	-74.0	.348 (-9.167)
-23.8	.923 (-0.692)	-37.0	.819 (-1.737)	-75.0	.333 (-9.553)
-24.0	.922 (-0.704)	-38.0	.809 (-1.839)	-76.0	.318 (-9.959)
-24.2	.921 (-0.716)	-39.0	.799 (-1.944)	-77.0	.302 (-10.387)
-24.4	.92 (-0.728)	-40.0	.789 (-2.054)	-78.0	.287 (-10.839)
-24.6	.918 (-0.74)	-41.0	.779 (-2.167)	-79.0	.272 (-11.317)
-24.8	.917 (-0.753)	-42.0	.769 (-2.283)	-80.0	.256 (-11.826)
-25.0	.916 (-0.765)	-43.0	.758 (-2.404)	-81.0	.241 (-12.367)
-25.2	.914 (-0.778)	-44.0	.747 (-2.529)	-82.0	.225 (-12.946)
-25.4	.913 (-0.791)	-45.0	.736 (-2.658)	-83.0	.21 (-13.569)
-25.6	.912 (-0.803)	-46.0	.725 (-2.791)	-84.0	.194 (-14.241)
-25.8	.91 (-0.816)	-47.0	.714 (-2.928)	-85.0	.178 (-14.97)
-26.0	.909 (-0.83)	-48.0	.702 (-3.071)	-86.0	.163 (-15.768)
-26.2	.908 (-0.843)	-49.0	.69 (-3.217)	-87.0	.147 (-16.648)
-26.4	.906 (-0.856)	-50.0	.679 (-3.369)	-88.0	.131 (-17.627)
-26.6	.905 (-0.87)	-51.0	.666 (-3.525)	-89.0	.116 (-18.733)
-26.8	.903 (-0.883)	-52.0	.654 (-3.687)	-90.0	.10 (-20)
-27.0	.902 (-0.897)	-53.0	.642 (-3.854)	90.0	.00 (-50)

Systems With Reliability

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CLIENT: KRBS

Date: 3/2/2012

ANTENNA TYPE: FMEC/1 DA

FREQUENCY: 91.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 0.883/-0.539 dBd

Beam Tilt (Deg.): 0

DIRECTIVITY(Horiz): 0.883/-0.539 dBd

Null Fill(s)(%): 0, 0, 0