

Azimuth Pattern

Systems with Reliability

Scale: Linear

Unit: Relative Field

CLIENT: KWBA

EXHIBIT 1

Date: 11/5/02

ANTENNA TYPE: SWCD24BFS/44D

FREQUENCY: 653

PATTERN POL.: Horizontal

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.748 / 4.39dB

PATTERN RMS: 0.603

Relative Field Tabulation(Azimuth)

Azimuth Heading	Relative Field(dB)	Azimuth Heading	Relative Field(dB)
0	.95 (-0.44)	180	.12 (-18.34)
5	.90 (-0.91)	185	.11 (-19.09)
10	.85 (-1.4)	190	.10 (-19.91)
15	.80 (-1.93)	195	.10 (-19.91)
20	.76 (-2.37)	200	.10 (-19.91)
25	.72 (-2.84)	205	.10 (-19.91)
30	.69 (-3.21)	210	.10 (-19.91)
35	.65 (-3.73)	215	.10 (-19.91)
40	.64 (-3.86)	220	.10 (-19.91)
45	.62 (-4.14)	225	.10 (-19.91)
50	.62 (-4.14)	230	.10 (-19.91)
55	.62 (-4.14)	235	.10 (-19.91)
60	.64 (-3.86)	240	.10 (-19.91)
65	.65 (-3.73)	245	.10 (-19.91)
70	.67 (-3.47)	250	.10 (-19.91)
75	.70 (-3.09)	255	.10 (-19.91)
80	.74 (-2.6)	260	.10 (-19.91)
85	.79 (-2.04)	265	.10 (-19.91)
90	.84 (-1.5)	270	.10 (-19.91)
95	.89 (-1)	275	.10 (-19.91)
100	.94 (-0.53)	280	.10 (-19.91)
105	.98 (-0.17)	285	.12 (-18.34)
110	1.00 (0.01)	290	.15 (-16.42)
115	1.00 (0.01)	295	.20 (-13.94)
120	.98 (-0.17)	300	.26 (-11.67)
125	.92 (-0.71)	305	.32 (-9.87)
130	.86 (-1.3)	310	.40 (-7.94)
135	.75 (-2.49)	315	.50 (-6)
140	.67 (-3.47)	320	.60 (-4.42)
145	.55 (-5.18)	325	.70 (-3.09)
150	.45 (-6.92)	330	.79 (-2.04)
155	.36 (-8.85)	335	.88 (-1.1)
160	.30 (-10.43)	340	.95 (-0.44)
165	.23 (-12.73)	345	.96 (-0.35)
170	.18 (-14.85)	350	1.00 (0.01)
175	.14 (-17.02)	355	.99 (-0.08)

Systems with Reliability

CLIENT: *KWBA*

EXHIBIT 2

Date: 11/5/02

ANTENNA TYPE: SWCD24BFS/44D

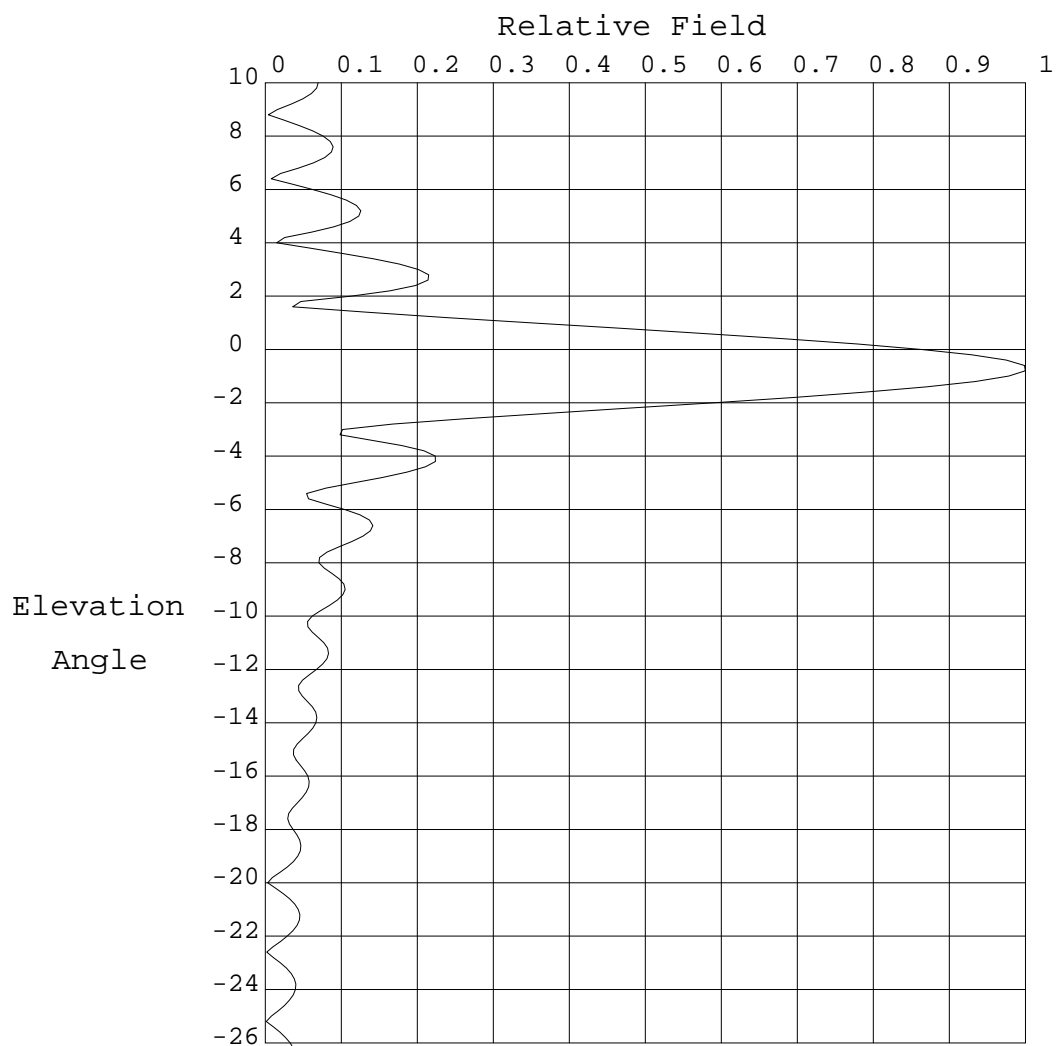
FREQUENCY: 653

PATTERN POL.: Horizontal

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.748 / 4.39dB

PATTERN RMS: 0.603



Elevation Pattern

Scale: Linear

Systems With Reliability Inc.

Units: Field, Relative

CLIENT: KWBA

EXHIBIT 3

Date: 2/3/03

ANTENNA TYPE: SWCD24BFS/44D

FREQUENCY: 653

PATTERN POL.: Horizontal

DIRECTIVITY(Peak) 25.735/14.105 dBd

Beam Tilt (Deg.) :- .7

DIRECTIVITY(Horiz) 19.205/12.834 dBd

Null Fill(s)(%) 10, 5, 7

Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)		Elev. Angle	Rel. Fld(dB)		Elev. Angle
3.2	.177 (-15.064)	-4.4	.211 (-13.522)	-12.0	.067 (-23.44)	
3.0	.202 (-13.908)	-4.6	.187 (-14.584)	-12.2	.058 (-24.747)	
2.8	.215 (-13.351)	-4.8	.154 (-16.251)	-12.4	.049 (-26.152)	
2.6	.214 (-13.381)	-5.0	.117 (-18.656)	-12.6	.044 (-27.134)	
2.4	.198 (-14.079)	-5.2	.08 (-21.939)	-12.8	.044 (-27.116)	
2.2	.164 (-15.686)	-5.4	.054 (-25.293)	-13.0	.049 (-26.227)	
2.0	.114 (-18.877)	-5.6	.057 (-24.893)	-13.2	.056 (-25.101)	
1.8	.047 (-26.587)	-5.8	.08 (-21.96)	-13.4	.062 (-24.163)	
1.6	.036 (-28.807)	-6.0	.105 (-19.604)	-13.6	.066 (-23.565)	
1.4	.131 (-17.632)	-6.2	.125 (-18.094)	-13.8	.068 (-23.344)	
1.2	.237 (-12.513)	-6.4	.137 (-17.26)	-14.0	.067 (-23.507)	
1.0	.349 (-9.147)	-6.6	.142 (-16.976)	-14.2	.063 (-24.05)	
.8	.464 (-6.678)	-6.8	.139 (-17.17)	-14.4	.056 (-24.964)	
.6	.577 (-4.782)	-7.0	.129 (-17.804)	-14.6	.049 (-26.195)	
.4	.684 (-3.301)	-7.2	.114 (-18.852)	-14.8	.042 (-27.548)	
.2	.781 (-2.149)	-7.4	.097 (-20.25)	-15.0	.037 (-28.552)	
.0	.864 (-1.271)	-7.6	.081 (-21.786)	-15.2	.037 (-28.623)	
-.2	.93 (-0.635)	-7.8	.071 (-22.925)	-15.4	.041 (-27.798)	
-.4	.975 (-0.218)	-8.0	.071 (-23.027)	-15.6	.046 (-26.671)	
-.6	.999 (-0.008)	-8.2	.078 (-22.199)	-15.8	.052 (-25.692)	
-.8	1.00 (0)	-8.4	.088 (-21.119)	-16.0	.056 (-25.037)	
-1.0	.978 (-0.192)	-8.6	.097 (-20.236)	-16.2	.058 (-24.753)	
-1.2	.934 (-0.589)	-8.8	.103 (-19.708)	-16.4	.057 (-24.852)	
-1.4	.871 (-1.203)	-9.0	.105 (-19.57)	-16.6	.054 (-25.338)	
-1.6	.79 (-2.051)	-9.2	.102 (-19.824)	-16.8	.049 (-26.211)	
-1.8	.695 (-3.164)	-9.4	.095 (-20.466)	-17.0	.042 (-27.446)	
-2.0	.59 (-4.586)	-9.6	.084 (-21.479)	-17.2	.036 (-28.911)	
-2.2	.479 (-6.386)	-9.8	.073 (-22.79)	-17.4	.031 (-30.193)	
-2.4	.368 (-8.678)	-10.0	.062 (-24.166)	-17.6	.03 (-30.59)	
-2.6	.262 (-11.643)	-10.2	.056 (-25.083)	-17.8	.032 (-29.885)	
-2.8	.167 (-15.527)	-10.4	.056 (-25.025)	-18.0	.037 (-28.698)	
-3.0	.102 (-19.84)	-10.6	.062 (-24.166)	-18.2	.042 (-27.616)	
-3.2	.098 (-20.132)	-10.8	.07 (-23.111)	-18.4	.045 (-26.882)	
-3.4	.138 (-17.175)	-11.0	.077 (-22.252)	-18.6	.047 (-26.569)	
-3.6	.18 (-14.916)	-11.2	.082 (-21.732)	-18.8	.046 (-26.71)	
-3.8	.209 (-13.598)	-11.4	.083 (-21.587)	-19.0	.043 (-27.352)	
-4.0	.224 (-13.004)	-11.6	.081 (-21.824)	-19.2	.037 (-28.593)	
-4.2	.224 (-12.997)	-11.8	.075 (-22.446)	-19.4	.029 (-30.648)	

Systems With Reliability Inc.

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CLIENT: KWBA

EXHIBIT 4 - Page 1

Date: 2/3/03

ANTENNA TYPE: SWCD24BFS/44D

FREQUENCY: 653

PATTERN POL.: Horizontal

DIRECTIVITY(Peak) 25.735/14.105 dBd

Beam Tilt (Deg.) :- .7

DIRECTIVITY(Horiz) 19.205/12.834 dBd

Null Fill(s)(%) 10, 5, 7

Relative Field Tabulation

Elev. Angle		Rel. Fld(dB)		Elev. Angle		Rel. Fld(dB)		Elev. Angle	
-19.6	.02 (-34.038)	-27.2	.026 (-31.603)	-54.0	.037 (-28.656)				
-19.8	.009 (-40.54)	-27.4	.019 (-34.432)	-55.0	.056 (-24.985)				
-20.0	.003 (-49.629)	-27.6	.011 (-39.398)	-56.0	.046 (-26.705)				
-20.2	.013 (-37.51)	-27.8	.002 (-54.141)	-57.0	.013 (-37.894)				
-20.4	.023 (-32.625)	-28.0	.007 (-43.29)	-58.0	.031 (-30.117)				
-20.6	.032 (-29.872)	-28.2	.015 (-36.375)	-59.0	.061 (-24.248)				
-20.8	.039 (-28.195)	-28.4	.023 (-32.912)	-60.0	.068 (-23.403)				
-21.0	.043 (-27.233)	-28.6	.029 (-30.822)	-61.0	.048 (-26.286)				
-21.2	.046 (-26.835)	-28.8	.033 (-29.547)	-62.0	.016 (-35.669)				
-21.4	.045 (-26.945)	-29.0	.036 (-28.864)	-63.0	.034 (-29.45)				
-21.6	.042 (-27.57)	-29.2	.037 (-28.679)	-64.0	.062 (-24.106)				
-21.8	.036 (-28.781)	-29.4	.036 (-28.966)	-65.0	.072 (-22.795)				
-22.0	.029 (-30.763)	-29.6	.033 (-29.753)	-66.0	.061 (-24.288)				
-22.2	.02 (-33.966)	-29.8	.028 (-31.137)	-67.0	.032 (-29.918)				
-22.4	.01 (-39.848)	-30.0	.022 (-33.347)	-68.0	.009 (-40.827)				
-22.6	.002 (-54.036)	-31.0	.018 (-34.887)	-69.0	.048 (-26.445)				
-22.8	.011 (-39.436)	-32.0	.036 (-28.772)	-70.0	.08 (-21.962)				
-23.0	.02 (-34.009)	-33.0	.014 (-37.185)	-71.0	.099 (-20.06)				
-23.2	.028 (-31.077)	-34.0	.023 (-32.592)	-72.0	.104 (-19.635)				
-23.4	.034 (-29.321)	-35.0	.035 (-29.22)	-73.0	.096 (-20.335)				
-23.6	.038 (-28.32)	-36.0	.008 (-41.419)	-74.0	.08 (-21.967)				
-23.8	.04 (-27.906)	-37.0	.027 (-31.442)	-75.0	.063 (-23.947)				
-24.0	.04 (-28.013)	-38.0	.035 (-29.107)	-76.0	.06 (-24.38)				
-24.2	.037 (-28.65)	-39.0	.009 (-41.147)	-77.0	.075 (-22.504)				
-24.4	.032 (-29.892)	-40.0	.026 (-31.826)	-78.0	.097 (-20.242)				
-24.6	.025 (-31.942)	-41.0	.035 (-29.123)	-79.0	.119 (-18.483)				
-24.8	.017 (-35.311)	-42.0	.011 (-39.018)	-80.0	.137 (-17.274)				
-25.0	.008 (-41.822)	-43.0	.026 (-31.729)	-81.0	.149 (-16.516)				
-25.2	.001 (-57.416)	-44.0	.041 (-27.705)	-82.0	.156 (-16.117)				
-25.4	.011 (-39.462)	-45.0	.022 (-33.023)	-83.0	.158 (-16.006)				
-25.6	.019 (-34.301)	-46.0	.016 (-35.773)	-84.0	.156 (-16.134)				
-25.8	.027 (-31.448)	-47.0	.045 (-27.018)	-85.0	.15 (-16.466)				
-26.0	.033 (-29.705)	-48.0	.041 (-27.684)	-86.0	.142 (-16.979)				
-26.2	.037 (-28.683)	-49.0	.009 (-41.02)	-87.0	.131 (-17.661)				
-26.4	.039 (-28.218)	-50.0	.031 (-30.086)	-88.0	.119 (-18.513)				
-26.6	.039 (-28.246)	-51.0	.051 (-25.786)	-89.0	.105 (-19.546)				
-26.8	.036 (-28.766)	-52.0	.039 (-28.072)	-90.0	.091 (-20.79)				
-27.0	.032 (-29.835)	-53.0	.007 (-43.555)	90.0	.00 (-50)				

Systems With Reliability Inc.

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CLIENT: KWBA

EXHIBIT 4 - Page 2

Date: 2/3/03

ANTENNA TYPE: SWCD24BFS/44D

FREQUENCY: 653

PATTERN POL.: Horizontal

DIRECTIVITY(Peak) 25.735/14.105 dBd

Beam Tilt (Deg.) :- .7

DIRECTIVITY(Horiz) 19.205/12.834 dBd

Null Fill(s)(%) 10, 5, 7