

## Azimuth Pattern

Scale: Linear

Unit: Relative Field

## Systems With Reliability

CLIENT: WZMQ

Date: 5/17/2010

ANTENNA TYPE: SWMP16WC/19

FREQUENCY: 503 MHz

PATTERN POL.: Horizontal

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.627 / 2.114 dB

PATTERN RMS: 0.782

## Relative Field Tabulation(Azimuth)

Azimuth Heading	Normalized Field(dB)	Azimuth Heading	Normalized Field(dB)
0	1.0000 ( 0 )	180	.2300 (-12.765 )
5	.9850 (-0.131 )	185	.2275 (-12.86 )
10	.9700 (-0.265 )	190	.2250 (-12.956 )
15	.9600 (-0.355 )	195	.2225 (-13.053 )
20	.9500 (-0.446 )	200	.2200 (-13.152 )
25	.9375 (-0.561 )	205	.2250 (-12.956 )
30	.9250 (-0.677 )	210	.2300 (-12.765 )
35	.9225 (-0.701 )	215	.2900 (-10.752 )
40	.9200 (-0.724 )	220	.3500 (-9.119 )
45	.9300 (-0.63 )	225	.4100 (-7.744 )
50	.9400 (-0.537 )	230	.4700 (-6.558 )
55	.9575 (-0.377 )	235	.5500 (-5.193 )
60	.9750 (-0.22 )	240	.6300 (-4.013 )
65	.9875 (-0.109 )	245	.7025 (-3.067 )
70	1.0000 ( 0 )	250	.7750 (-2.214 )
75	.9900 (-0.087 )	255	.8250 (-1.671 )
80	.9800 (-0.175 )	260	.8750 (-1.16 )
85	.9650 (-0.309 )	265	.9125 (-0.795 )
90	.9500 (-0.446 )	270	.9500 (-0.446 )
95	.9125 (-0.795 )	275	.9650 (-0.309 )
100	.8750 (-1.16 )	280	.9800 (-0.175 )
105	.8250 (-1.671 )	285	.9900 (-0.087 )
110	.7750 (-2.214 )	290	1.0000 ( 0 )
115	.7025 (-3.067 )	295	.9875 (-0.109 )
120	.6300 (-4.013 )	300	.9750 (-0.22 )
125	.5500 (-5.193 )	305	.9575 (-0.377 )
130	.4700 (-6.558 )	310	.9400 (-0.537 )
135	.4100 (-7.744 )	315	.9300 (-0.63 )
140	.3500 (-9.119 )	320	.9200 (-0.724 )
145	.2900 (-10.752 )	325	.9225 (-0.701 )
150	.2300 (-12.765 )	330	.9250 (-0.677 )
155	.2250 (-12.956 )	335	.9375 (-0.561 )
160	.2200 (-13.152 )	340	.9500 (-0.446 )
165	.2225 (-13.053 )	345	.9600 (-0.355 )
170	.2250 (-12.956 )	350	.9700 (-0.265 )
175	.2275 (-12.86 )	355	.9850 (-0.131 )

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ANTENNA TYPE: SWMP16WC/19

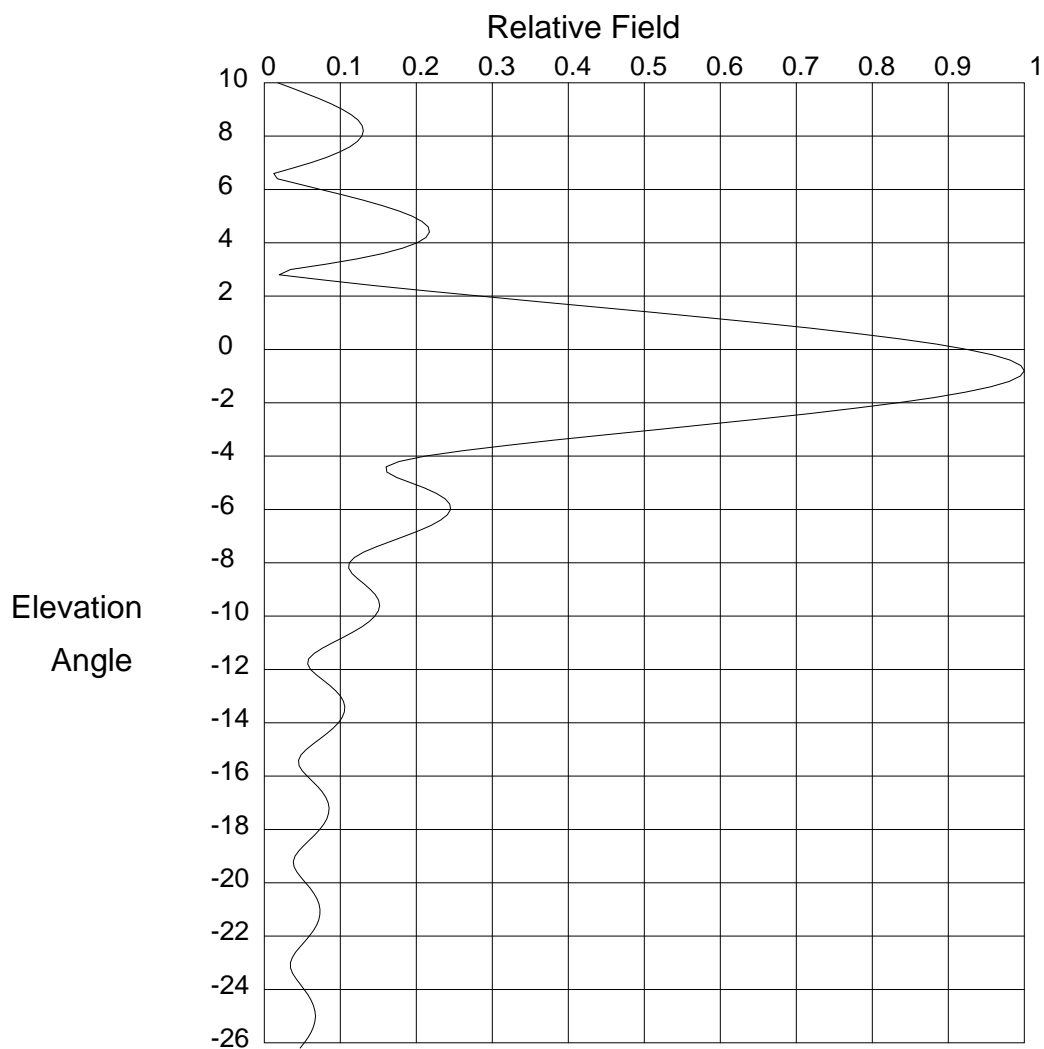
FREQUENCY: 503 MHz

PATTERN POL.: Horizontal

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.627 / 2.114 dB

PATTERN RMS: 0.782



## Elevation Pattern

Scale: Linear

Units: Field, Relative

## Systems With Reliability

CLIENT: WZMQ

Date: 5/17/2010

ANTENNA TYPE: SWMP16WC/19

FREQUENCY: 503 MHz

PATTERN POL.: Horizontal

DIRECTIVITY(Peak): 17.271/12.373 dBd

Beam Tilt (Deg.) : -0.75

DIRECTIVITY(Horiz): 14.79/11.70 dBd

Null Fill(s)(%) : 15, 10, 5

# Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
90.0	.101 (-19.907)	52.0	.062 (-24.177)	14.0	.008 (-41.426 )
89.0	.117 (-18.64)	51.0	.068 (-23.367)	13.0	.062 (-24.161 )
88.0	.133 (-17.536)	50.0	.056 (-25.025)	12.0	.096 (-20.361 )
87.0	.149 (-16.562)	49.0	.031 (-30.14)	11.0	.066 (-23.614 )
86.0	.164 (-15.696)	48.0	.02 (-33.911)	10.0	.018 (-34.95 )
85.0	.179 (-14.928)	47.0	.044 (-27.083)	9.8	.037 (-28.733 )
84.0	.194 (-14.253)	46.0	.06 (-24.401)	9.6	.055 (-25.178 )
83.0	.207 (-13.671)	45.0	.057 (-24.836)	9.4	.073 (-22.769 )
82.0	.219 (-13.188)	44.0	.037 (-28.749)	9.2	.089 (-21.028 )
81.0	.229 (-12.811)	43.0	.017 (-35.225)	9.0	.103 (-19.745 )
80.0	.236 (-12.556)	42.0	.039 (-28.25)	8.8	.115 (-18.815 )
79.0	.239 (-12.439)	41.0	.056 (-25.001)	8.6	.123 (-18.18 )
78.0	.238 (-12.485)	40.0	.053 (-25.442)	8.4	.129 (-17.808 )
77.0	.231 (-12.724)	39.0	.032 (-29.971)	8.2	.131 (-17.688 )
76.0	.219 (-13.2)	38.0	.019 (-34.386)	8.0	.128 (-17.824 )
75.0	.20 (-13.971)	37.0	.043 (-27.323)	7.8	.123 (-18.236 )
74.0	.175 (-15.124)	36.0	.055 (-25.148)	7.6	.113 (-18.967 )
73.0	.145 (-16.795)	35.0	.045 (-26.971)	7.4	.099 (-20.095 )
72.0	.109 (-19.22)	34.0	.021 (-33.742)	7.2	.082 (-21.769 )
71.0	.072 (-22.814)	33.0	.029 (-30.691)	7.0	.061 (-24.299 )
70.0	.041 (-27.751)	32.0	.048 (-26.411)	6.8	.038 (-28.506 )
69.0	.039 (-28.07)	31.0	.044 (-27.219)	6.6	.013 (-38.029 )
68.0	.065 (-23.773)	30.0	.016 (-35.963)	6.4	.017 (-35.182 )
67.0	.09 (-20.933)	29.0	.021 (-33.423)	6.2	.046 (-26.831 )
66.0	.106 (-19.478)	28.0	.047 (-26.47)	6.0	.074 (-22.567 )
65.0	.111 (-19.116)	27.0	.047 (-26.571)	5.8	.103 (-19.757 )
64.0	.102 (-19.796)	26.0	.018 (-34.688)	5.6	.13 (-17.726 )
63.0	.082 (-21.683)	25.0	.024 (-32.289)	5.4	.155 (-16.205 )
62.0	.055 (-25.199)	24.0	.055 (-25.215)	5.2	.177 (-15.06 )
61.0	.033 (-29.732)	23.0	.055 (-25.223)	5.0	.195 (-14.221 )
60.0	.041 (-27.681)	22.0	.022 (-33.274)	4.8	.208 (-13.649 )
59.0	.064 (-23.892)	21.0	.028 (-31.027)	4.6	.216 (-13.327 )
58.0	.079 (-22.094)	20.0	.063 (-24.058)	4.4	.217 (-13.253 )
57.0	.079 (-22.056)	19.0	.06 (-24.433)	4.2	.213 (-13.442 )
56.0	.064 (-23.878)	18.0	.019 (-34.581)	4.0	.201 (-13.929 )
55.0	.038 (-28.433)	17.0	.04 (-28.05)	3.8	.182 (-14.783 )
54.0	.019 (-34.205)	16.0	.076 (-22.42)	3.6	.156 (-16.128 )
53.0	.041 (-27.819)	15.0	.064 (-23.849)	3.4	.123 (-18.224 )

## Systems With Reliability

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Date: 5/17/2010

ANTENNA TYPE: SWMP16WC/19

FREQUENCY: 503 MHz

PATTERN POL.: Horizontal

DIRECTIVITY(Peak): 17.271/12.373 dBd

Beam Tilt (Deg.) : -0.75

DIRECTIVITY(Horiz): 14.79/11.70 dBd

Null Fill(s)(%) : 15, 10, 5

# Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
3.2	.082 (-21.717)	-4.4	.16 (-15.893)	-12.0	.061 (-24.305 )
3.0	.035 (-29.192)	-4.6	.161 (-15.846)	-12.2	.068 (-23.295 )
2.8	.02 (-34.082)	-4.8	.174 (-15.167)	-12.4	.077 (-22.222 )
2.6	.079 (-22.04)	-5.0	.193 (-14.298)	-12.6	.086 (-21.277 )
2.4	.144 (-16.856)	-5.2	.211 (-13.505)	-12.8	.094 (-20.526 )
2.2	.212 (-13.46)	-5.4	.227 (-12.886)	-13.0	.10 (-19.981 )
2.0	.284 (-10.929)	-5.6	.238 (-12.467)	-13.2	.104 (-19.641 )
1.8	.358 (-8.92)	-5.8	.244 (-12.246)	-13.4	.106 (-19.498 )
1.6	.433 (-7.271)	-6.0	.245 (-12.214)	-13.6	.105 (-19.547 )
1.4	.508 (-5.89)	-6.2	.241 (-12.363)	-13.8	.103 (-19.785 )
1.2	.581 (-4.72)	-6.4	.232 (-12.687)	-14.0	.098 (-20.215 )
1.0	.651 (-3.724)	-6.6	.219 (-13.18)	-14.2	.091 (-20.839 )
.8	.718 (-2.877)	-6.8	.203 (-13.837)	-14.4	.083 (-21.663 )
.6	.78 (-2.161)	-7.0	.185 (-14.649)	-14.6	.073 (-22.683 )
.4	.836 (-1.561)	-7.2	.166 (-15.595)	-14.8	.064 (-23.874 )
.2	.884 (-1.067)	-7.4	.147 (-16.627)	-15.0	.055 (-25.145 )
.0	.925 (-0.673)	-7.6	.131 (-17.653)	-15.2	.049 (-26.279 )
-.2	.958 (-0.373)	-7.8	.119 (-18.515)	-15.4	.045 (-26.914 )
-.4	.981 (-0.162)	-8.0	.112 (-19.028)	-15.6	.046 (-26.779 )
-.6	.996 (-0.039)	-8.2	.111 (-19.086)	-15.8	.05 (-26.003 )
-.8	1.00 (0)	-8.4	.115 (-18.752)	-16.0	.057 (-24.956 )
-1.0	.995 (-0.046)	-8.6	.123 (-18.204)	-16.2	.064 (-23.921 )
-1.2	.98 (-0.176)	-8.8	.132 (-17.614)	-16.4	.071 (-23.03 )
-1.4	.956 (-0.392)	-9.0	.14 (-17.092)	-16.6	.076 (-22.327 )
-1.6	.923 (-0.696)	-9.2	.146 (-16.697)	-16.8	.081 (-21.821 )
-1.8	.882 (-1.091)	-9.4	.15 (-16.454)	-17.0	.084 (-21.509 )
-2.0	.834 (-1.581)	-9.6	.152 (-16.375)	-17.2	.085 (-21.384 )
-2.2	.779 (-2.171)	-9.8	.15 (-16.467)	-17.4	.085 (-21.443 )
-2.4	.719 (-2.869)	-10.0	.146 (-16.733)	-17.6	.082 (-21.684 )
-2.6	.654 (-3.685)	-10.2	.138 (-17.181)	-17.8	.078 (-22.109 )
-2.8	.587 (-4.628)	-10.4	.129 (-17.817)	-18.0	.073 (-22.721 )
-3.0	.518 (-5.712)	-10.6	.117 (-18.651)	-18.2	.067 (-23.522 )
-3.2	.449 (-6.952)	-10.8	.104 (-19.689)	-18.4	.06 (-24.506 )
-3.4	.382 (-8.363)	-11.0	.09 (-20.922)	-18.6	.052 (-25.638 )
-3.6	.318 (-9.95)	-11.2	.077 (-22.298)	-18.8	.046 (-26.817 )
-3.8	.26 (-11.689)	-11.4	.066 (-23.655)	-19.0	.041 (-27.82 )
-4.0	.212 (-13.473)	-11.6	.059 (-24.65)	-19.2	.038 (-28.316 )
-4.2	.177 (-15.023)	-11.8	.057 (-24.881)	-19.4	.039 (-28.098 )

## Systems With Reliability

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CLIENT: WZMQ

Date: 5/17/2010

ANTENNA TYPE: SWMP16WC/19

FREQUENCY: 503 MHz

PATTERN POL.: Horizontal

DIRECTIVITY(Peak): 17.271/12.373 dBd

Beam Tilt (Deg.) : -0.75

DIRECTIVITY(Horiz): 14.79/11.70 dBd

Null Fill(s)(%) : 15, 10, 5

# Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
-19.6	.043 (-27.311)	-27.2	.032 (-29.909)	-54.0	.059 (-24.522 )
-19.8	.048 (-26.286)	-27.4	.035 (-29.055)	-55.0	.049 (-26.241 )
-20.0	.054 (-25.275)	-27.6	.04 (-27.946)	-56.0	.027 (-31.256)
-20.2	.06 (-24.396)	-27.8	.046 (-26.836)	-57.0	.014 (-37.199)
-20.4	.065 (-23.693)	-28.0	.051 (-25.847)	-58.0	.036 (-28.821 )
-20.6	.069 (-23.176)	-28.2	.056 (-25.025)	-59.0	.058 (-24.731 )
-20.8	.072 (-22.842)	-28.4	.06 (-24.378)	-60.0	.07 (-23.08 )
-21.0	.073 (-22.687)	-28.6	.064 (-23.904)	-61.0	.07 (-23.037 )
-21.2	.073 (-22.707)	-28.8	.066 (-23.597)	-62.0	.06 (-24.482 )
-21.4	.072 (-22.902)	-29.0	.067 (-23.455)	-63.0	.041 (-27.75 )
-21.6	.069 (-23.273)	-29.2	.067 (-23.477)	-64.0	.023 (-32.826 )
-21.8	.064 (-23.822)	-29.4	.066 (-23.665)	-65.0	.028 (-30.919 )
-22.0	.059 (-24.553)	-29.6	.063 (-24.03)	-66.0	.049 (-26.116 )
-22.2	.053 (-25.458)	-29.8	.059 (-24.586)	-67.0	.068 (-23.3 )
-22.4	.047 (-26.514)	-30.0	.054 (-25.359)	-68.0	.081 (-21.847 )
-22.6	.042 (-27.638)	-31.0	.016 (-35.747)	-69.0	.085 (-21.365 )
-22.8	.037 (-28.65)	-32.0	.027 (-31.279)	-70.0	.082 (-21.699 )
-23.0	.034 (-29.254)	-33.0	.056 (-25.059)	-71.0	.072 (-22.835 )
-23.2	.035 (-29.2)	-34.0	.057 (-24.866)	-72.0	.057 (-24.882 )
-23.4	.037 (-28.535)	-35.0	.032 (-29.839)	-73.0	.04 (-28.039 )
-23.6	.042 (-27.551)	-36.0	.006 (-43.751)	-74.0	.026 (-31.561 )
-23.8	.047 (-26.517)	-37.0	.04 (-28.058)	-75.0	.03 (-30.514 )
-24.0	.053 (-25.581)	-38.0	.054 (-25.375)	-76.0	.046 (-26.745 )
-24.2	.058 (-24.802)	-39.0	.044 (-27.116)	-77.0	.064 (-23.836 )
-24.4	.062 (-24.199)	-40.0	.016 (-35.78)	-78.0	.081 (-21.819 )
-24.6	.065 (-23.772)	-41.0	.02 (-34.069)	-79.0	.095 (-20.428 )
-24.8	.067 (-23.517)	-42.0	.045 (-26.917)	-80.0	.106 (-19.489 )
-25.0	.067 (-23.432)	-43.0	.053 (-25.588)	-81.0	.114 (-18.894 )
-25.2	.067 (-23.515)	-44.0	.04 (-27.984)	-82.0	.118 (-18.573 )
-25.4	.065 (-23.766)	-45.0	.014 (-37.048)	-83.0	.119 (-18.482 )
-25.6	.062 (-24.188)	-46.0	.022 (-33.228)	-84.0	.118 (-18.59 )
-25.8	.058 (-24.787)	-47.0	.045 (-26.847)	-85.0	.114 (-18.88 )
-26.0	.053 (-25.566)	-48.0	.055 (-25.258)	-86.0	.108 (-19.341 )
-26.2	.047 (-26.518)	-49.0	.046 (-26.697)	-87.0	.10 (-19.973 )
-26.4	.042 (-27.613)	-50.0	.024 (-32.265)	-88.0	.091 (-20.783 )
-26.6	.037 (-28.751)	-51.0	.013 (-37.64)	-89.0	.081 (-21.789 )
-26.8	.033 (-29.716)	-52.0	.038 (-28.498)	-90.0	.071 (-23.023 )
-27.0	.031 (-30.174)	-53.0	.055 (-25.119)	90.0	.00 (-50 )

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Beam Tilt (Deg.) : -0.75

DIRECTIVITY(Horiz): 14.79/11.70 dBd

Null Fill(s)(%) : 15, 10, 5

# WZMQ (Marquette, MI) Proposed Ch. 19 Facility

<b>Parameters:</b>		<b>Maxima:</b>	
ERP:	255.0 kW	N080E	24.07 dBk
RCAMSL:	604.0 m	N150E	
HAAT:	174.0 m	N220E	
		<b>Minima:</b>	
		N310E	10.91 dBk
		N350E	10.91 dBk

Directional Antenna dBk Table				
Bearing	Pattern Azimuth	Relative Field	ERP (dBk)	Distance to Noise-Limited Contour (km)
N000E	0	0.230	11.30	59.6
	10	0.350	14.95	
	20	0.470	17.51	
	30	0.630	20.05	
	40	0.775	21.85	
N045E	45	0.825	22.39	76.1
	50	0.875	22.91	
	60	0.950	23.62	
	70	0.980	23.89	
	80	1.000	24.07	
N090E	90	0.975	23.85	78.3
	100	0.940	23.53	
	110	0.920	23.34	
	120	0.925	23.39	
	130	0.950	23.62	
N135E	135	0.960	23.71	76.5
	140	0.970	23.80	
	150	1.000	24.07	
	160	0.970	23.80	
	170	0.950	23.62	
N180E	180	0.925	23.39	74.9
	190	0.920	23.34	
	200	0.940	23.53	
	210	0.975	23.85	
	220	1.000	24.07	
N225E	225	0.990	23.98	73.8
	230	0.980	23.89	
	240	0.950	23.62	
	250	0.875	22.91	
	260	0.775	21.85	
N270E	270	0.630	20.05	67.2
	280	0.470	17.51	
	290	0.350	14.95	
	300	0.230	11.30	
	310	0.220	10.91	
N315E	315	0.223	11.01	60.2
	320	0.225	11.11	
	330	0.230	11.30	
	340	0.225	11.11	
	350	0.220	10.91	