



**SYSTEMS WITH RELIABILITY, LTD.**  
**Broadcast Antenna and Transmission Systems**

## **PATTERN CERTIFICATION**

### **DIRECTIONAL FM ANTENNA KTOC May 4, 2005**

<b>Call Sign</b>	:	KTOC
<b>Location</b>	:	Jonesboro, LA
<b>Frequency</b>	:	104.9 MHz
<b>Channel</b>	:	285
<b>Antenna Model</b>	:	FM3/6-DA
<b>Maximum Antenna Gain</b>	:	
<b>Horizontal</b>	:	4.914/ 6.914 dB
<b>Vertical</b>	:	4.914/ 6.914 dB

### **ANTENNA DESCRIPTION**

A custom designed **FM3/6-DA** antenna was used to produce the required directional azimuth pattern. Each antenna bay consists of a circularly polarized dipole-radiating element with a vertical and horizontal parasitic system. The array is comprised of **six** bays, that are spaced a full wavelength apart, mounted to a tower pointing **250** degrees true north.

### **DESCRIPTION OF TEST PROCEDURE**

The test antenna consists of a third-scale antenna and parasitic system. This antenna was mounted to an 8-inch third-scale model tower with the use of mounting brackets supplied with the finalized antenna. The tower was 20 ft. on a platform. All feed cables are properly grounded during pattern testing. Horizontal and vertical parasitic elements were used to obtain the desired directional pattern.

The source antenna, a vertical/horizontal 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 314.7 MHz. The antenna under test was rotated in a clockwise direction. A gain reference was taken using a dipole tuned to 314.7 MHz. Nowhere does the received signal exceed a maximum to minimum ratio of 15 dB.

## DOCUMENT EXHIBITS

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

<b>Exhibit 1</b>	Circular Polarized Azimuth Pattern Field Strength Tabulations (Composite)
<b>Exhibit 2</b>	Measured Horizontal Polarized Azimuth Pattern Measured Field Strength Tabulations (Horizontal)
<b>Exhibit 3</b>	Measured Vertical Polarized Azimuth Pattern Measured Field Strength Tabulations (Vertical)
<b>Exhibit 4</b>	Elevation Pattern Elevation Tabulations
<b>Exhibit 5</b>	Antenna Data Sheet

## TEST EQUIPMENT

<b>Network Analyzer</b>	:	Hewlett Packard Model # 8753C Serial Number : 08753 – 69138 Calibrated 4/26/05, SWR, Inc.
<b>Computer</b>	:	White Mountain 366 Computer
<b>Plotter</b>	:	Hewlett-Packard 7550A
<b>Positioner</b>	:	Orbit Positioner Calibrated 1/06/05, SWR, Inc.

*Prepared by:*



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**Jason Duncan**  
SWR, Inc.

## TEST RESULTS

The attached calculations verify that the **RMS** value of this antenna is **92.58 %** of the **RMS** value of the pattern authorized in the related construction permit **BPH-20040209ABI**. The vertical component **RMS** value is **0.774** and the horizontal component **RMS** value is **0.829**.

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

Measured horizontal polarized directivity	:	1.4552 / 1.63 dB
Measured vertical polarized directivity	:	1.66883/ 2.22 dB
Measured composite azimuth pattern directivity	:	1.6641 / 2.2119 dB

Gain in each polarization was calculated using the following relation:

**GAIN** = Azimuth Directivity x Elevation Directivity x Power Ratio Between Polarizations

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

**H-Pol. Gain** = (1.4552)(6.321)(0.534191) = **4.914 / 6.914 dB**

**V-Pol. Gain** = (1.66883)(6.321)(0.465809) = **4.914 / 6.914 dB**

## INSTALLATION AND MOUNTING

The antenna is to be mounted in accordance with the supplied drawings. The antenna center of radiation is to be **73 meters** above ground level. The antenna (parasitic system included) aperture is **46.91 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 **250 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
0159D05	ORIENTATION WITH PARASITICS
0159D06	ANTENNA ORIENTATION
0159D07	PARASITIC PLACEMENT
2105A10	TEST RANGE SCHEMATIC

The array shall be mounted according to **DWG. 0159D05**. The parasitic assembly is shown in **DWG. 0159D06 AND DWG. 0159D07**. The antenna elements shall be aligned at the same heading as in **DWG. 0159D06**. This will ensure that the antenna is oriented properly at **250** degrees true north.

## Surveyor's Declaration

I, \_\_\_\_\_, subject to the penalties of perjury, do declare the following:

- 1.) I am a licensed surveyor in the state(s) of \_\_\_\_\_,  
\_\_\_\_\_ and \_\_\_\_\_.
- 2.) I have provided professional services to \_\_\_\_\_ (permit tee name), permit tee of \_\_\_\_\_ -FM, \_\_\_\_\_ (city of license), \_\_\_\_\_ (state), during the installation of the \_\_\_\_\_ -FM directional antenna.
- 3.) I certify that the \_\_\_\_\_ -FM directional antenna has been oriented at the proper azimuth as authorized in the construction permit (FCC File Number \_\_\_\_\_).

Dated: \_\_\_\_\_ mm/dd/yy

## Engineer's Declaration

I, \_\_\_\_\_, subject to the penalties of perjury, do declare the following:

- 1.) I am the holder of a valid General Radio Telephone Operators License, Number \_\_\_\_\_ (FCC License No.)
- 2.) I have been a member of the Society of Broadcast Engineer's since 19 \_\_\_\_\_
- 3.) That I have been employed as a technical consultant with the firm of: \_\_\_\_\_ (firm name), of \_\_\_\_\_ (city state)
- 4.) That \_\_\_\_\_ (Firm's Name) was retained by \_\_\_\_\_ (Permittee's Name) for the purpose of preparing its application for the construction permit of \_\_\_\_\_ -FM \_\_\_\_\_ (City), \_\_\_\_\_ (State), from which the underlying Construction Permit (FCC File Number \_\_\_\_\_) was granted by the Commission.
- 5.) That I am familiar with the terms and conditions of the \_\_\_\_\_ -FM Construction Permit.
- 6.) I hereby certify that I have overseen the installation of the \_\_\_\_\_ -FM directional antenna and that the installation was complete to the manufacturer's instructions.

Dated: \_\_\_\_\_ mm/dd/yy



**SYSTEMS WITH RELIABILITY, INC.**  
**Broadcast Antennas and Transmission Systems**

## KTOC Antenna RMS Comparison

### PROPOSED ANTENNA

Azimuth Heading	Relative Field
0	1.000
10	0.829
20	0.691
30	0.624
40	0.620
50	0.657
60	0.789
70	1.000
80	1.000
90	1.000
100	1.000
110	1.000
120	1.000
130	1.000
140	1.000
150	1.000
160	1.000
170	1.000
180	1.000
190	1.000
200	1.000
210	1.000
220	1.000
230	1.000
240	1.000
250	1.000
260	1.000

### DESIGNED ANTENNA

Azimuth Heading	Relative Field
0	0.915
10	0.828
20	0.688
30	0.586
40	0.495
50	0.486
60	0.566
70	0.658
80	0.764
90	0.847
100	0.916
110	0.953
120	0.980
130	0.949
140	0.869
150	0.796
160	0.785
170	0.864
180	0.934
190	0.977
200	0.995
210	0.994
220	0.975
230	0.979
240	0.980
250	0.988
260	0.996

**PROPOSED ANTENNA**

Azimuth Heading	Relative Field
270	1.000
280	1.000
290	1.000
300	1.000
310	1.000
320	1.000
330	1.000
340	1.000
350	1.000

Sum of Relative Field Squared : 32.993

Sum Divided by 36 (Readings) : 0.916

Square Root : 0.957

**Percentage of Construction Permit Antenna Filled :**

**DESIGNED ANTENNA**

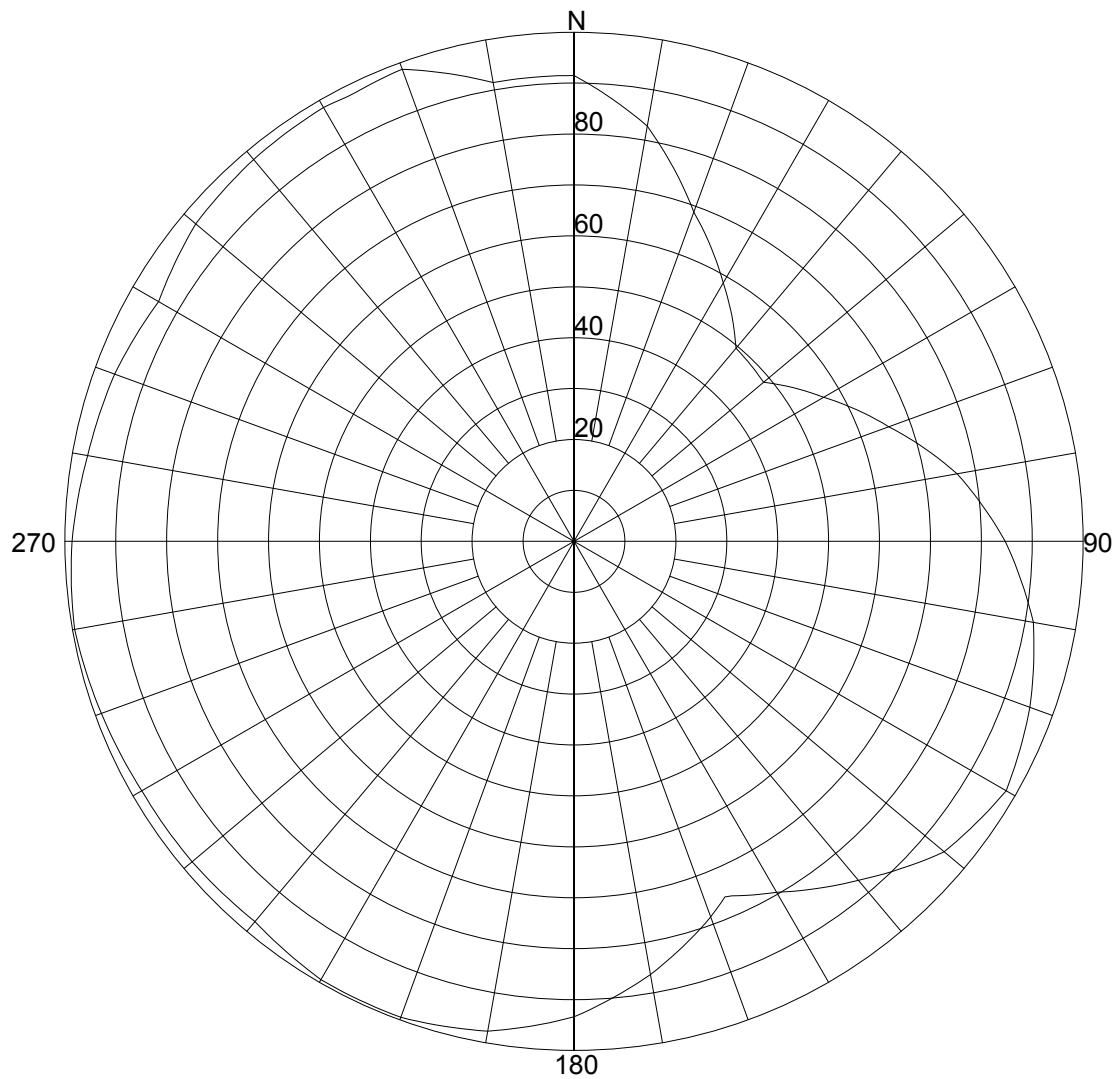
Azimuth Heading	Relative Field
270	0.986
280	0.970
290	0.960
300	0.942
310	0.970
320	0.979
330	0.984
340	0.987
350	0.915

Sum of Relative Field Squared : 28.279

Sum Divided by 36 (Readings) : 0.786

Square Root : 0.886

**92.58%**



## Azimuth Pattern

Scale: Linear

Unit: Relative Field

## Systems With Reliability

CLIENT: *KTOC*

Date: 5/2/2005

ANTENNA TYPE: FM3/6-DA

FREQUENCY: 104.9

PATTERN POL.: Circular

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.6641 / 2.2119dB

PATTERN RMS: 0.775



## Relative Field Tabulation(Azimuth)

Azimuth Heading	Relative Field(dB)	Azimuth Heading	Relative Field(dB)
0	.9150 (-0.76 )	180	.9340 (-0.58 )
5	.8715 (-1.18 )	185	.9555 (-0.39 )
10	.8280 (-1.63 )	190	.9770 (-0.19 )
15	.7580 (-2.4 )	195	.9860 (-0.11 )
20	.6880 (-3.24 )	200	.9950 (-0.03 )
25	.6370 (-3.9 )	205	.9945 (-0.04 )
30	.5860 (-4.63 )	210	.9940 (-0.04 )
35	.5405 (-5.33 )	215	.9845 (-0.13 )
40	.4950 (-6.09 )	220	.9750 (-0.21 )
45	.4905 (-6.17 )	225	.9770 (-0.19 )
50	.4860 (-6.25 )	230	.9790 (-0.18 )
55	.5260 (-5.56 )	235	.9795 (-0.17 )
60	.5660 (-4.93 )	240	.9800 (-0.17 )
65	.6120 (-4.25 )	245	.9840 (-0.13 )
70	.6580 (-3.62 )	250	.9880 (-0.1 )
75	.7110 (-2.95 )	255	.9920 (-0.06 )
80	.7640 (-2.33 )	260	.9960 (-0.03 )
85	.8055 (-1.87 )	265	.9910 (-0.07 )
90	.8470 (-1.43 )	270	.9860 (-0.11 )
95	.8815 (-1.09 )	275	.9780 (-0.18 )
100	.9160 (-0.75 )	280	.9700 (-0.26 )
105	.9345 (-0.58 )	285	.9650 (-0.3 )
110	.9530 (-0.41 )	290	.9600 (-0.35 )
115	.9665 (-0.29 )	295	.9510 (-0.43 )
120	.9800 (-0.17 )	300	.9420 (-0.51 )
125	.9645 (-0.3 )	305	.9560 (-0.38 )
130	.9490 (-0.45 )	310	.9700 (-0.26 )
135	.9090 (-0.82 )	315	.9745 (-0.22 )
140	.8690 (-1.21 )	320	.9790 (-0.18 )
145	.8325 (-1.58 )	325	.9815 (-0.15 )
150	.7960 (-1.97 )	330	.9840 (-0.13 )
155	.7680 (-2.28 )	335	.9815 (-0.15 )
160	.7850 (-2.09 )	340	.9870 (-0.1 )
165	.8245 (-1.67 )	345	.9510 (-0.43 )
170	.8640 (-1.26 )	350	.9150 (-0.76 )
175	.8990 (-0.92 )	355	.9150 (-0.76 )

## Systems With Reliability

CLIENT: *KTOC*

Date: 5/2/2005

ANTENNA TYPE: FM3/6-DA

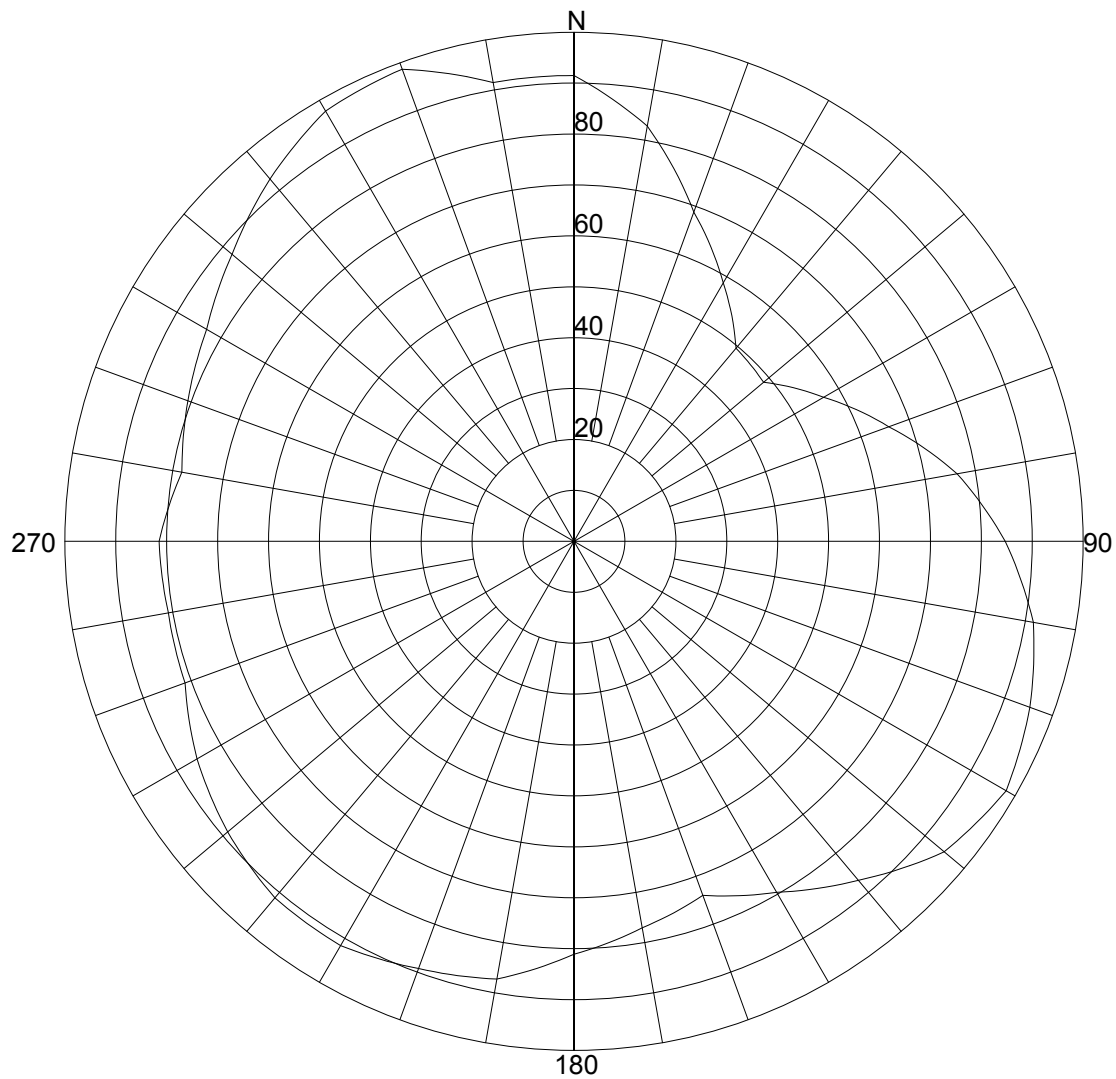
FREQUENCY: 104.9

PATTERN POL.: Circular

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.6641 / 2.2119dB

PATTERN RMS: 0.775



## Azimuth Pattern

Scale: Linear

Unit: Relative Field

## Systems With Reliability

CLIENT: *KTOC*

Date: 5/2/2005

ANTENNA TYPE: FM3/6-DA

FREQUENCY: 104.9

PATTERN POL.: Horizontal

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.4552 / 1.63dB

PATTERN RMS: 0.829

## Relative Field Tabulation(Azimuth)

Azimuth Heading	Relative Field(dB)	Azimuth Heading	Relative Field(dB)
0	.9150 (-0.76 )	180	.8110 (-1.81 )
5	.8715 (-1.18 )	185	.8420 (-1.48 )
10	.8280 (-1.63 )	190	.8730 (-1.17 )
15	.7580 (-2.4 )	195	.8830 (-1.07 )
20	.6880 (-3.24 )	200	.8930 (-0.97 )
25	.6370 (-3.9 )	205	.9050 (-0.86 )
30	.5860 (-4.63 )	210	.9170 (-0.74 )
35	.5405 (-5.33 )	215	.9155 (-0.76 )
40	.4950 (-6.09 )	220	.9140 (-0.77 )
45	.4905 (-6.17 )	225	.9010 (-0.9 )
50	.4860 (-6.25 )	230	.8880 (-1.02 )
55	.5260 (-5.56 )	235	.8715 (-1.18 )
60	.5660 (-4.93 )	240	.8550 (-1.35 )
65	.6120 (-4.25 )	245	.8340 (-1.57 )
70	.6580 (-3.62 )	250	.8130 (-1.79 )
75	.7110 (-2.95 )	255	.8110 (-1.81 )
80	.7640 (-2.33 )	260	.8090 (-1.83 )
85	.8055 (-1.87 )	265	.8120 (-1.8 )
90	.8470 (-1.43 )	270	.8150 (-1.77 )
95	.8815 (-1.09 )	275	.7985 (-1.94 )
100	.9160 (-0.75 )	280	.7820 (-2.12 )
105	.9345 (-0.58 )	285	.7945 (-1.99 )
110	.9530 (-0.41 )	290	.8070 (-1.85 )
115	.9665 (-0.29 )	295	.8200 (-1.71 )
120	.9800 (-0.17 )	300	.8330 (-1.58 )
125	.9645 (-0.3 )	305	.8550 (-1.35 )
130	.9490 (-0.45 )	310	.8770 (-1.13 )
135	.9090 (-0.82 )	315	.9030 (-0.88 )
140	.8690 (-1.21 )	320	.9290 (-0.63 )
145	.8325 (-1.58 )	325	.9525 (-0.41 )
150	.7960 (-1.97 )	330	.9760 (-0.2 )
155	.7680 (-2.28 )	335	.9815 (-0.15 )
160	.7400 (-2.6 )	340	.9870 (-0.1 )
165	.7555 (-2.42 )	345	.9510 (-0.43 )
170	.7710 (-2.25 )	350	.9150 (-0.76 )
175	.7910 (-2.03 )	355	.9150 (-0.76 )

## Systems With Reliability

CLIENT: *KTOC*

Date: 5/2/2005

ANTENNA TYPE: FM3/6-DA

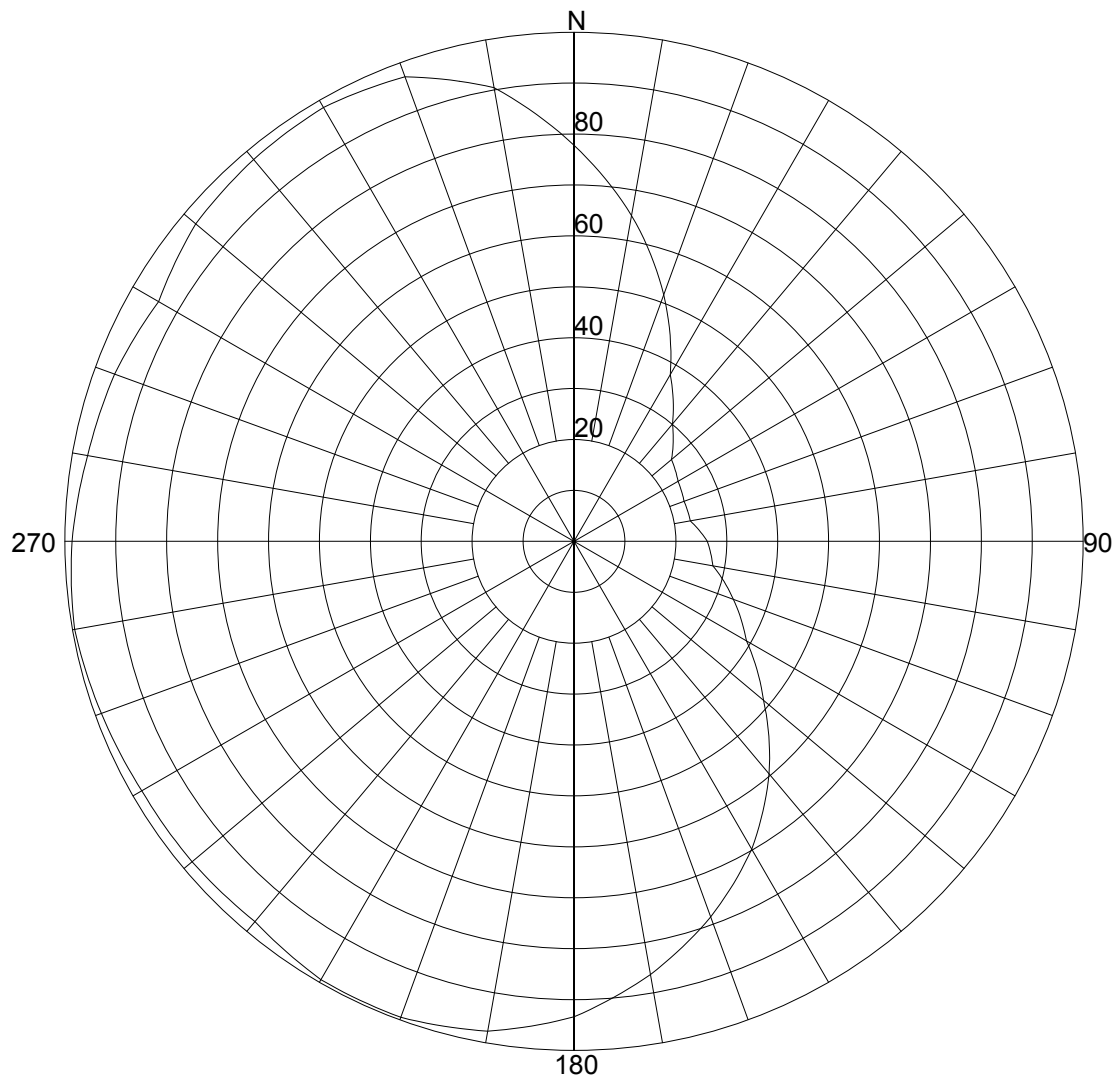
FREQUENCY: 104.9

PATTERN POL.: Horizontal

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.4552 / 1.63dB

PATTERN RMS: 0.829



## Azimuth Pattern

Scale: Linear

Unit: Relative Field

## Systems With Reliability

CLIENT: *KTOC*

Date: 5/2/2005

ANTENNA TYPE: FM3/6-DA

FREQUENCY: 104.9

PATTERN POL.: Vertical

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.66883 / 2.22dB

PATTERN RMS: 0.774

## Relative Field Tabulation(Azimuth)

Azimuth Heading	Relative Field(dB)	Azimuth Heading	Relative Field(dB)
0	.7780 (-2.17 )	180	.9340 (-0.58 )
5	.7140 (-2.91 )	185	.9555 (-0.39 )
10	.6500 (-3.73 )	190	.9770 (-0.19 )
15	.5825 (-4.68 )	195	.9860 (-0.11 )
20	.5150 (-5.75 )	200	.9950 (-0.03 )
25	.4465 (-6.98 )	205	.9945 (-0.04 )
30	.3780 (-8.43 )	210	.9940 (-0.04 )
35	.3395 (-9.36 )	215	.9845 (-0.13 )
40	.3010 (-10.4 )	220	.9750 (-0.21 )
45	.2755 (-11.17 )	225	.9770 (-0.19 )
50	.2500 (-12.01 )	230	.9790 (-0.18 )
55	.2430 (-12.25 )	235	.9795 (-0.17 )
60	.2360 (-12.51 )	240	.9800 (-0.17 )
65	.2330 (-12.62 )	245	.9840 (-0.13 )
70	.2300 (-12.73 )	250	.9880 (-0.1 )
75	.2310 (-12.69 )	255	.9920 (-0.06 )
80	.2320 (-12.65 )	260	.9960 (-0.03 )
85	.2470 (-12.11 )	265	.9910 (-0.07 )
90	.2620 (-11.6 )	270	.9860 (-0.11 )
95	.2695 (-11.36 )	275	.9780 (-0.18 )
100	.2770 (-11.12 )	280	.9700 (-0.26 )
105	.3050 (-10.29 )	285	.9650 (-0.3 )
110	.3330 (-9.53 )	290	.9600 (-0.35 )
115	.3620 (-8.8 )	295	.9510 (-0.43 )
120	.3910 (-8.13 )	300	.9420 (-0.51 )
125	.4385 (-7.14 )	305	.9560 (-0.38 )
130	.4860 (-6.25 )	310	.9700 (-0.26 )
135	.5410 (-5.32 )	315	.9745 (-0.22 )
140	.5960 (-4.48 )	320	.9790 (-0.18 )
145	.6470 (-3.77 )	325	.9815 (-0.15 )
150	.6980 (-3.11 )	330	.9840 (-0.13 )
155	.7415 (-2.59 )	335	.9775 (-0.19 )
160	.7850 (-2.09 )	340	.9710 (-0.25 )
165	.8245 (-1.67 )	345	.9380 (-0.55 )
170	.8640 (-1.26 )	350	.9050 (-0.86 )
175	.8990 (-0.92 )	355	.8415 (-1.49 )

## Systems With Reliability

CLIENT: *KTOC*

Date: 5/2/2005

ANTENNA TYPE: FM3/6-DA

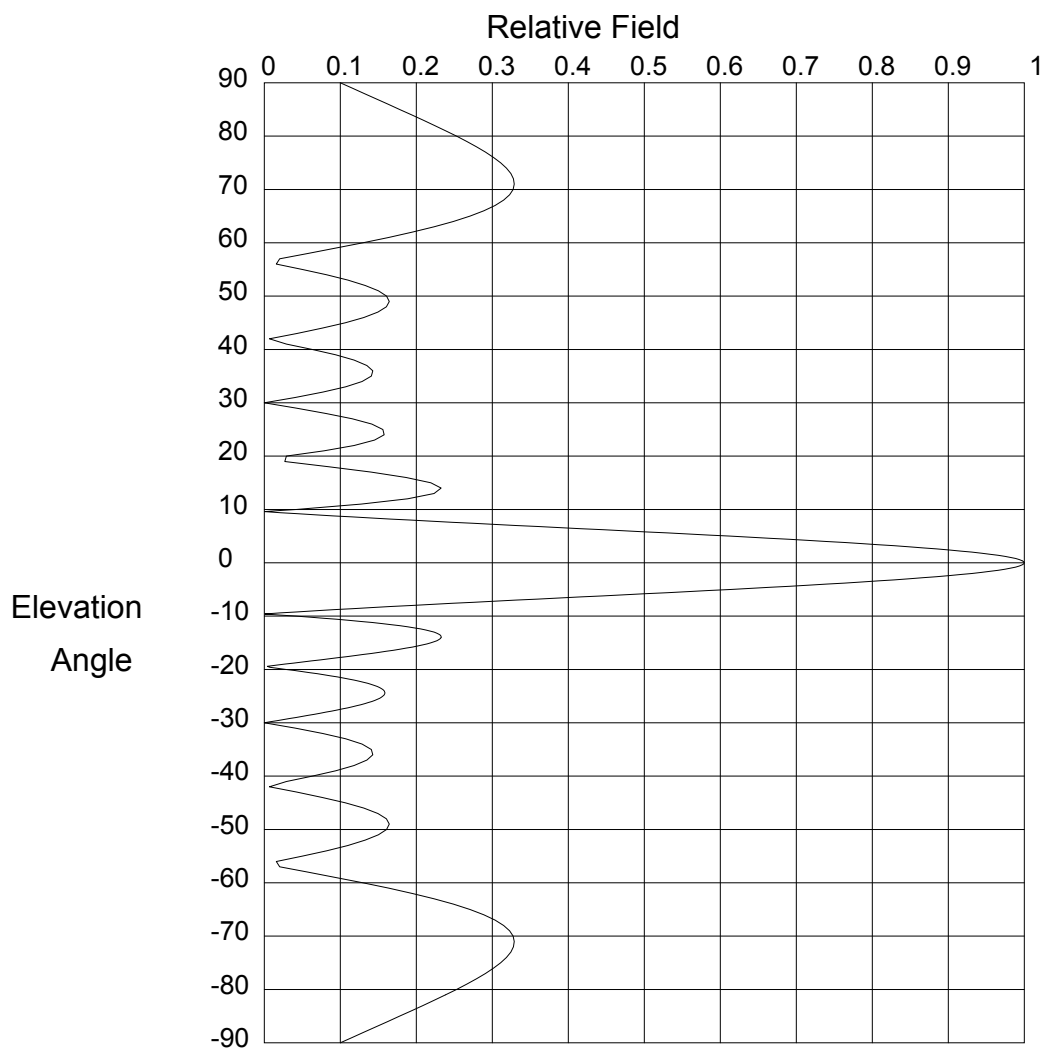
FREQUENCY: 104.9

PATTERN POL.: Vertical

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.66883 / 2.22dB

PATTERN RMS: 0.774



# Elevation Pattern

Scale: Linear

Units: Field, Relative

## Systems With Reliability

CLIENT: *KTOC-FM*  
 ANTENNA TYPE: FM3/6-DA  
 FREQUENCY: 104.9  
 PATTERN POL.: Circular  
 DIRECTIVITY(Peak): 6.321/8.008 dBd  
 DIRECTIVITY(Horiz): 6.321/8.008 dBd

Date: 6/21/2004

Beam Tilt (Deg.) : 0  
 Null Fill(s)(%) : 0, 0, 0

# Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
3.2	.829 (-1.634)	-4.4	.691 (-3.211)	-12.0	.189 (-14.489 )
3.0	.848 (-1.429)	-4.6	.665 (-3.538)	-12.2	.198 (-14.083 )
2.8	.867 (-1.239)	-4.8	.639 (-3.886)	-12.4	.206 (-13.739 )
2.6	.885 (-1.064)	-5.0	.613 (-4.256)	-12.6	.213 (-13.451 )
2.4	.901 (-0.903)	-5.2	.586 (-4.649)	-12.8	.218 (-13.213 )
2.2	.917 (-0.756)	-5.4	.558 (-5.067)	-13.0	.223 (-13.022 )
2.0	.931 (-0.623)	-5.6	.53 (-5.512)	-13.2	.227 (-12.873 )
1.8	.944 (-0.503)	-5.8	.502 (-5.985)	-13.4	.23 (-12.765 )
1.6	.955 (-0.397)	-6.0	.474 (-6.489)	-13.6	.232 (-12.695 )
1.4	.966 (-0.303)	-6.2	.445 (-7.028)	-13.8	.233 (-12.661 )
1.2	.975 (-0.222)	-6.4	.417 (-7.603)	-14.0	.233 (-12.663 )
1.0	.982 (-0.154)	-6.6	.388 (-8.22)	-14.2	.232 (-12.699 )
.8	.989 (-0.098)	-6.8	.36 (-8.882)	-14.4	.23 (-12.769 )
.6	.994 (-0.055)	-7.0	.331 (-9.596)	-14.6	.227 (-12.872 )
.4	.997 (-0.025)	-7.2	.303 (-10.369)	-14.8	.224 (-13.008 )
.2	.999 (-0.006)	-7.4	.275 (-11.21)	-15.0	.219 (-13.178 )
.0	1.00 (0)	-7.6	.247 (-12.13)	-15.2	.214 (-13.382 )
-.2	.999 (-0.006)	-7.8	.22 (-13.145)	-15.4	.208 (-13.621 )
-.4	.997 (-0.025)	-8.0	.193 (-14.277)	-15.6	.202 (-13.897 )
-.6	.994 (-0.055)	-8.2	.167 (-15.553)	-15.8	.195 (-14.21 )
-.8	.989 (-0.098)	-8.4	.141 (-17.018)	-16.0	.187 (-14.563 )
-1.0	.982 (-0.154)	-8.6	.116 (-18.737)	-16.2	.179 (-14.959 )
-1.2	.975 (-0.222)	-8.8	.091 (-20.823)	-16.4	.17 (-15.4 )
-1.4	.966 (-0.303)	-9.0	.067 (-23.485)	-16.6	.16 (-15.891 )
-1.6	.955 (-0.397)	-9.2	.044 (-27.201)	-16.8	.151 (-16.437 )
-1.8	.944 (-0.503)	-9.4	.021 (-33.511)	-17.0	.141 (-17.043 )
-2.0	.931 (-0.623)	-9.6	.001 (-63.973)	-17.2	.13 (-17.718 )
-2.2	.917 (-0.756)	-9.8	.022 (-33.336)	-17.4	.119 (-18.472 )
-2.4	.901 (-0.903)	-10.0	.042 (-27.624)	-17.6	.108 (-19.319 )
-2.6	.885 (-1.064)	-10.2	.061 (-24.335)	-17.8	.097 (-20.276 )
-2.8	.867 (-1.239)	-10.4	.079 (-22.058)	-18.0	.085 (-21.369 )
-3.0	.848 (-1.429)	-10.6	.096 (-20.341)	-18.2	.074 (-22.635 )
-3.2	.829 (-1.634)	-10.8	.112 (-18.983)	-18.4	.062 (-24.13 )
-3.4	.808 (-1.855)	-11.0	.128 (-17.877)	-18.6	.05 (-25.942 )
-3.6	.786 (-2.091)	-11.2	.142 (-16.957)	-18.8	.039 (-28.236 )
-3.8	.763 (-2.344)	-11.4	.155 (-16.183)	-19.0	.027 (-31.347 )
-4.0	.74 (-2.615)	-11.6	.167 (-15.527)	-19.2	.016 (-36.193 )
-4.2	.716 (-2.903)	-11.8	.179 (-14.967)	-19.4	.004 (-47.865 )

## Systems With Reliability

Page 1 of 2

CLIENT: *KTOC-FM*

Date: 6/21/2004

ANTENNA TYPE: FM3/6-DA

FREQUENCY: 104.9

PATTERN POL.: Circular

DIRECTIVITY(Peak): 6.321/8.008 dBd

Beam Tilt (Deg.) : 0

DIRECTIVITY(Horiz): 6.321/8.008 dBd

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

# Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
-19.6	.007 (-42.789)	-27.2	.11 (-19.207)	-54.0	.082 (-21.708 )
-19.8	.018 (-34.726)	-27.4	.103 (-19.746)	-55.0	.05 (-25.949 )
-20.0	.029 (-30.687)	-27.6	.096 (-20.348)	-56.0	.016 (-35.975 )
-20.2	.04 (-27.998)	-27.8	.089 (-21.02)	-57.0	.02 (-33.828 )
-20.4	.05 (-26)	-28.0	.082 (-21.775)	-58.0	.057 (-24.836 )
-20.6	.06 (-24.424)	-28.2	.074 (-22.626)	-59.0	.094 (-20.535 )
-20.8	.07 (-23.136)	-28.4	.066 (-23.596)	-60.0	.13 (-17.743 )
-21.0	.079 (-22.057)	-28.6	.058 (-24.712)	-61.0	.164 (-15.729 )
-21.2	.088 (-21.138)	-28.8	.05 (-26.016)	-62.0	.195 (-14.202 )
-21.4	.096 (-20.346)	-29.0	.042 (-27.575)	-63.0	.223 (-13.015 )
-21.6	.104 (-19.659)	-29.2	.034 (-29.497)	-64.0	.249 (-12.082 )
-21.8	.111 (-19.059)	-29.4	.025 (-31.989)	-65.0	.271 (-11.35 )
-22.0	.118 (-18.535)	-29.6	.017 (-35.513)	-66.0	.289 (-10.781 )
-22.2	.125 (-18.076)	-29.8	.008 (-41.544)	-67.0	.304 (-10.349 )
-22.4	.131 (-17.675)	-30.0	.00 (-50)	-68.0	.315 (-10.034 )
-22.6	.136 (-17.327)	-31.0	.041 (-27.815)	-69.0	.323 (-9.821 )
-22.8	.141 (-17.026)	-32.0	.077 (-22.242)	-70.0	.327 (-9.697 )
-23.0	.145 (-16.768)	-33.0	.107 (-19.39)	-71.0	.329 (-9.654 )
-23.2	.149 (-16.551)	-34.0	.129 (-17.795)	-72.0	.328 (-9.682 )
-23.4	.152 (-16.371)	-35.0	.141 (-17.02)	-73.0	.324 (-9.777 )
-23.6	.154 (-16.228)	-36.0	.143 (-16.897)	-74.0	.319 (-9.931 )
-23.8	.156 (-16.118)	-37.0	.135 (-17.386)	-75.0	.311 (-10.142 )
-24.0	.158 (-16.041)	-38.0	.118 (-18.539)	-76.0	.302 (-10.405 )
-24.2	.159 (-15.997)	-39.0	.094 (-20.549)	-77.0	.291 (-10.718 )
-24.4	.159 (-15.983)	-40.0	.064 (-23.941)	-78.0	.279 (-11.079 )
-24.6	.158 (-16)	-41.0	.029 (-30.681)	-79.0	.266 (-11.487 )
-24.8	.158 (-16.047)	-42.0	.007 (-43.222)	-80.0	.253 (-11.941 )
-25.0	.156 (-16.124)	-43.0	.043 (-27.366)	-81.0	.239 (-12.443 )
-25.2	.154 (-16.231)	-44.0	.077 (-22.315)	-82.0	.224 (-12.994 )
-25.4	.152 (-16.37)	-45.0	.107 (-19.452)	-83.0	.209 (-13.597 )
-25.6	.149 (-16.539)	-46.0	.131 (-17.644)	-84.0	.194 (-14.256 )
-25.8	.146 (-16.741)	-47.0	.149 (-16.509)	-85.0	.178 (-14.977 )
-26.0	.142 (-16.977)	-48.0	.161 (-15.879)	-86.0	.163 (-15.771 )
-26.2	.137 (-17.247)	-49.0	.165 (-15.674)	-87.0	.147 (-16.649 )
-26.4	.133 (-17.555)	-50.0	.161 (-15.864)	-88.0	.131 (-17.628 )
-26.6	.127 (-17.901)	-51.0	.15 (-16.461)	-89.0	.116 (-18.733 )
-26.8	.122 (-18.289)	-52.0	.133 (-17.519)	-90.0	.10 (-20 )
-27.0	.116 (-18.723)	-53.0	.11 (-19.169)	90.0	.00 (-50 )

## Systems With Reliability

Page 2 of 2

CLIENT: *KTOC-FM*

Date: 6/21/2004

ANTENNA TYPE: FM3/6-DA

FREQUENCY: 104.9

PATTERN POL.: Circular

DIRECTIVITY(Peak): 6.321/8.008 dBd

Beam Tilt (Deg.) : 0

DIRECTIVITY(Horiz): 6.321/8.008 dBd

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





**SYSTEMS WITH RELIABILITY, Inc.**  
Broadcast Antenna & Transmission Systems

# SYSTEM DATA SHEET

<b>Customer</b>	KTOC-FM		
<b>Contact</b>	Steve Vogt		
<b>Location</b>	Jonesboro, LA		
<b>Antenna Model</b>	FM3/6-DA		
<b>Channel / Frequency</b>	104.9	MHz	
<b>Shop Order No.</b>	05079		

## ELECTRICAL SPECIFICATION

<b>Polarization Type</b>	Circular		
<b>Polarization Ratio</b>			
	H-Pol. (PRH)	53.4191	%
	V-Pol. (PRV)	46.5809	%
<b>Elevation Directivity (ED)</b>		6.321	
<b>Azimuth Directivity (AD) H-Pol.</b>		1.455	
<b>Azimuth Directivity (AD) V-Pol.</b>		1.669	
<b>Antenna Gain (GH)</b>			
	H-Pol. (GH)	4.914	
	V-Pol. (GV)	4.914	
<b>dB Gain (AG)</b>			
	H-Pol (AGH)	6.914	
	V-Pol (AGV)	6.914	
<b>ERP</b>			
	H-Pol. (ERPH)	25.000	kW
	V-Pol. (ERPV)	25.000	kW
<b>Line Type</b>	1 5/8-50 OHM AIR	HJ7-50A	
<b>Attenuation per 100 ft.</b>	0.212	dB/100ft	
<b>Line Length (LL)</b>	280.00	ft.	
<b>Total Line Attenuation</b>	0.59	dB	
<b>Line Efficiency (LE)</b>	87.22	%	
<b>Line Loss (LPL)</b>	0.75	kW	
<b>Antenna Input Power (AIP)</b>	5.09	kW	
<b>Req'd. Transmitter Output Power</b>	5.83	kW	

## MECHANICAL SPECIFICATION

<b>No. Of Bays</b>	6			
<b>Antenna Aperture</b>	46.91	ft.	14.30	m
<b>Center of Radiation AGL</b>	239.44	ft.	73.00	m
<b>Antenna Weight</b>	196.90	lbs.	89.50	kg
<b>Windload (50/33)</b>	271.19	lbs.	123.27	kg

Mechanical Specifications will be certified upon final construction and testing.

Note: Given values can be used for planning system.

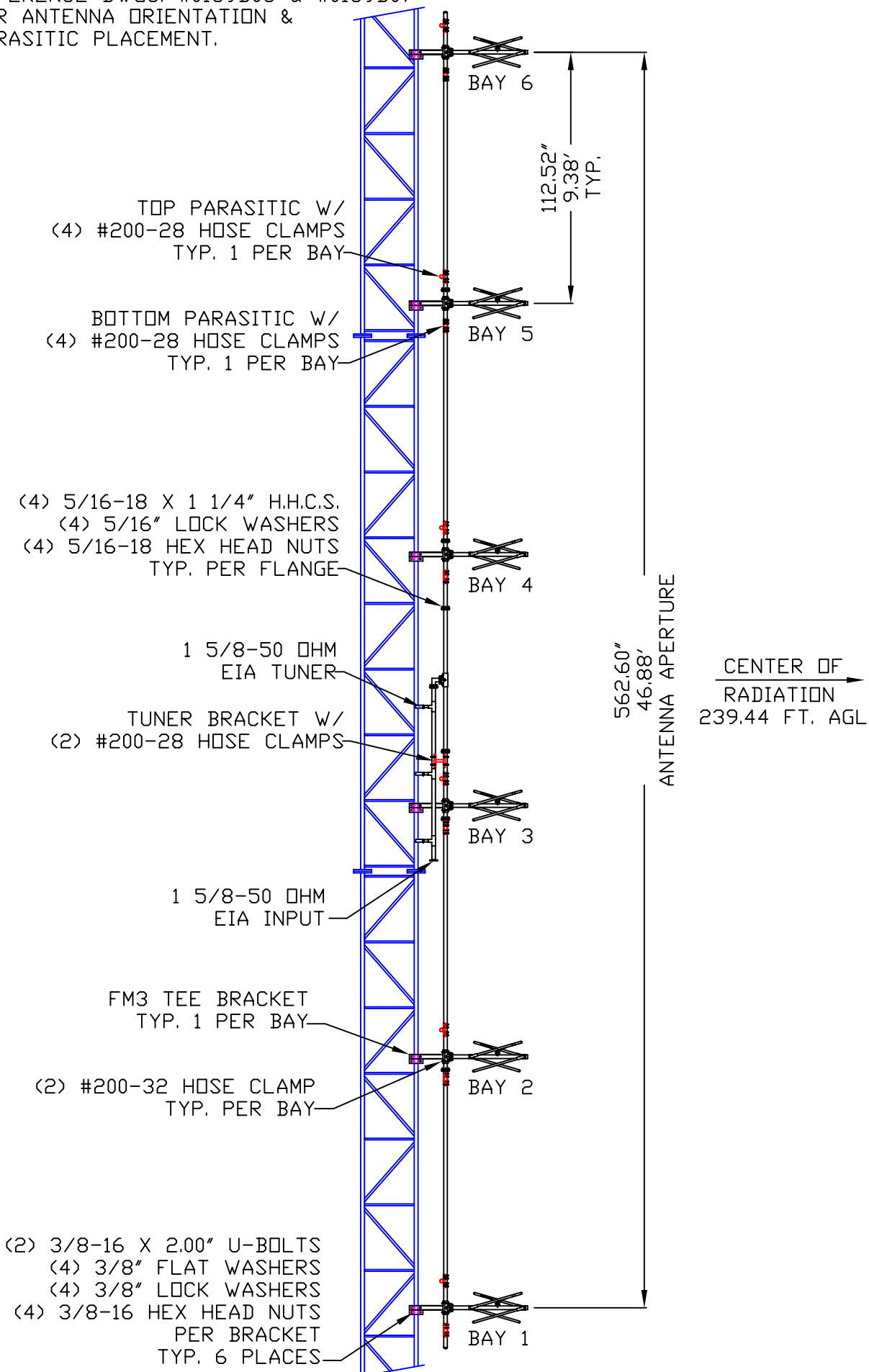
Prepared by:

Jason Duncan

**NOTE:**

REFERENCE DWGS. #0159D06 & #0159D07  
FOR ANTENNA ORIENTATION &  
PARASITIC PLACEMENT.

DRAWING  
NUMBER: 0159D05



SYSTEMS WITH RELIABILITY, INC.  
619 INDUSTRIAL PARK ROAD  
EBENSBURG, PENNSYLVANIA 15931

TITLE: FM3/6-DA, FREQ. 104.9  
KTCC, JONESBORO, LA

MATERIAL:

SIZE REV APPR. DATE  
C 1  
2  
3

ENGINEER:

SCALE: NTS

NAME: RAC

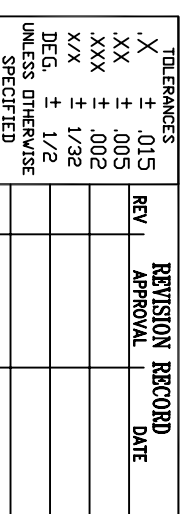
DATE: 5/24/05

SHEET 1 OF 1

DRAWING  
NUMBER: 0159D05


DRAWING  
NUMBER:  
0159D06

TRUE  
NORTH




FM3/6-DA, FREQ. 104.9

KT0C, JONESBORO, LA



SYSTEMS WITH RELIABILITY, INC  
619 INDUSTRIAL PARK ROAD  
EBEENSBURG, PENNSYLVANIA 15531

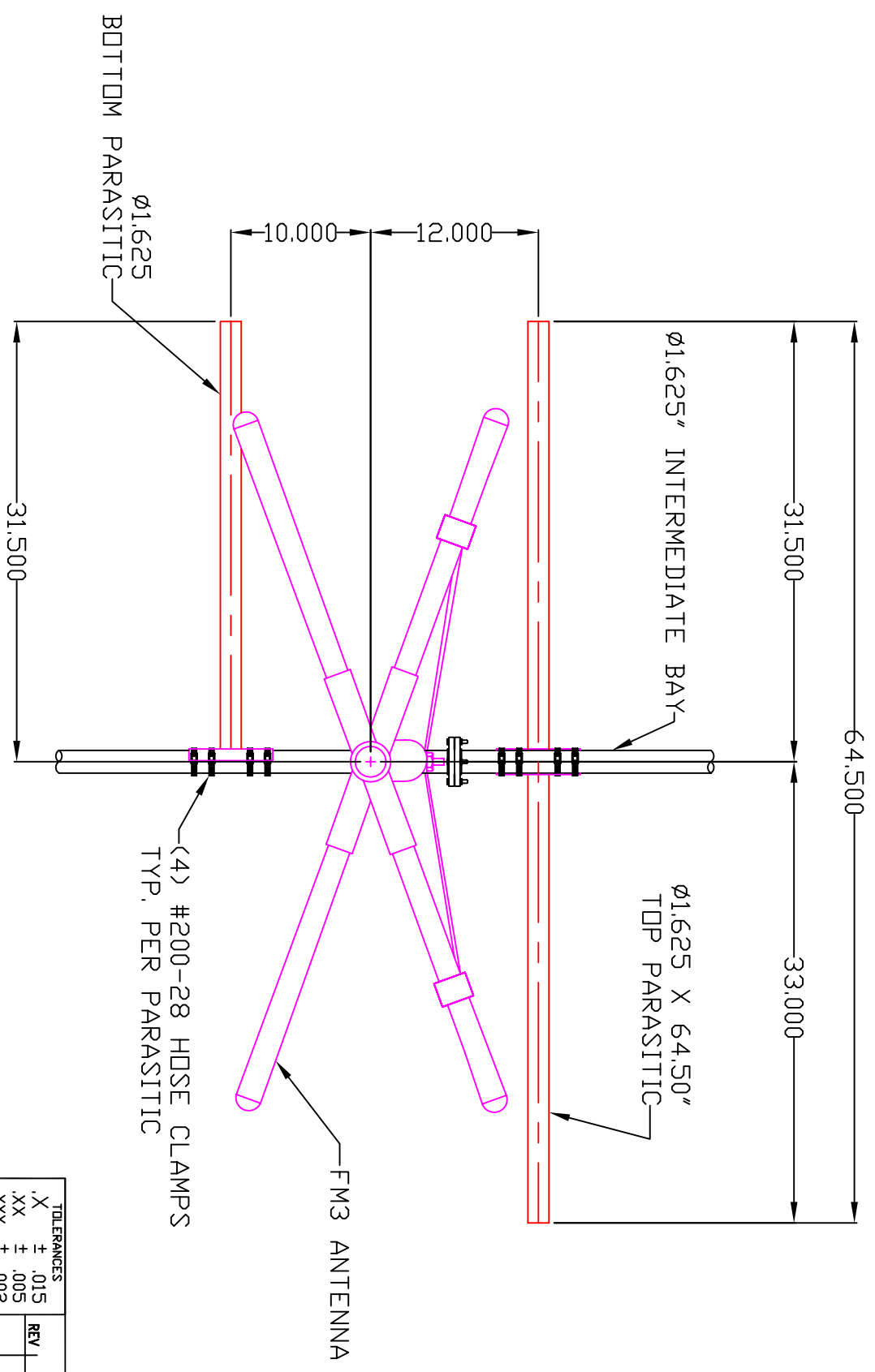



SYSTEMS WITH RELIABILITY, INC  
619 INDUSTRIAL PARK ROAD  
EBENSBURG, PENNSYLVANIA 15931

A

DRAWING  
NUMBER: 0159D06

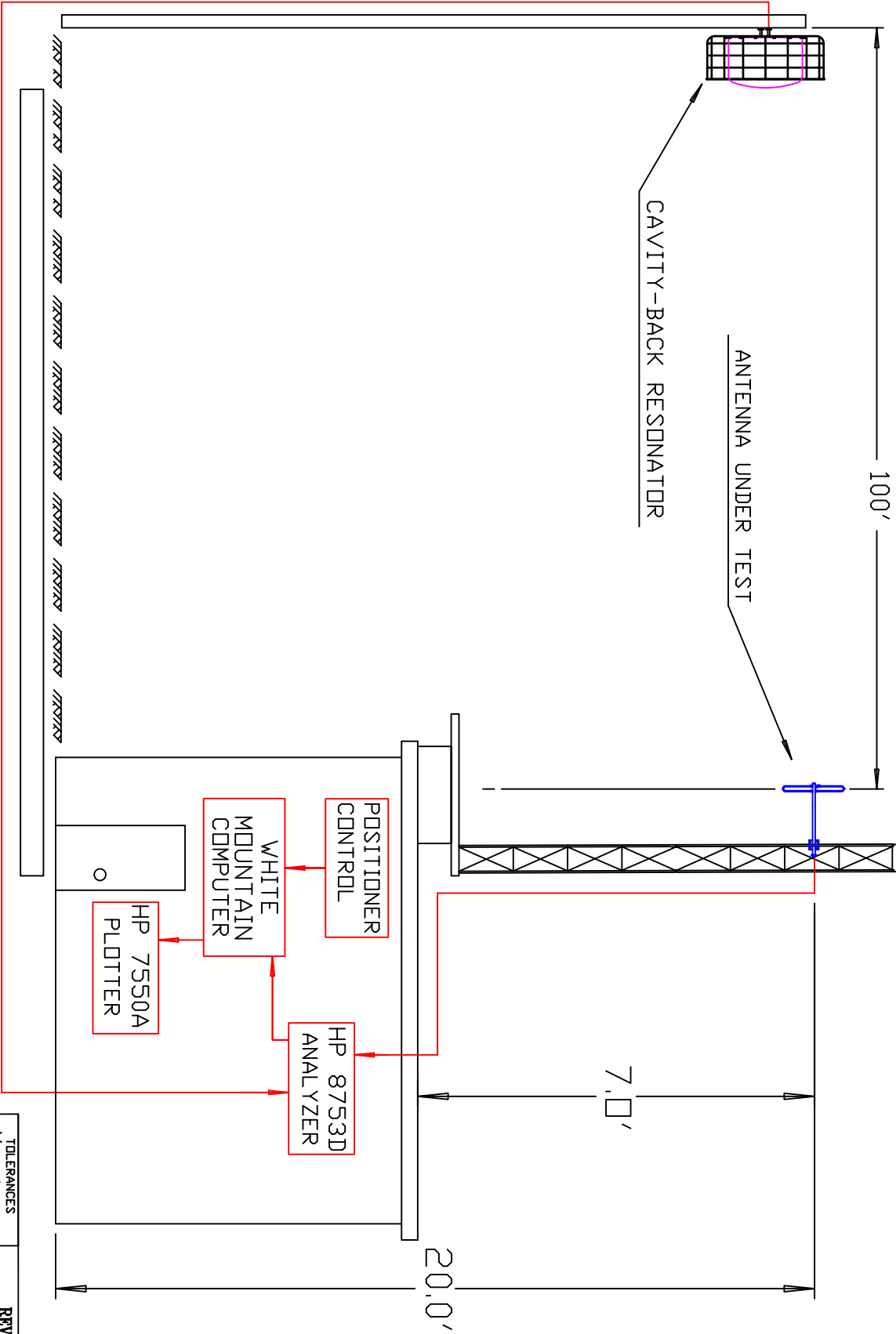
SHEET 1 OF 1




 <div>SYSTEMS WITH RELIABILITY, INC 619 INDUSTRIAL PARK ROAD EBENSBURG, PENNSYLVANIA 15931</div>		TITLE:  FM3/6-DA, FREQ. 104.9 KTCC, JONESBORO, LA PARASITIC PLACEMENT FRONT VIEW		SIZE: A	PARTS MADE BY THIS DRAWING		DRAWING NUMBER: 0159D07	
SCALE: NTS		NAME: RAC	DATE: 5/16/05	SHEET: 1	OF 1			

TOLERANCES		REVISION RECORD	
REV	DATE	APPROVAL	DATE
X	± .015		
.XX	± .005		
.XXX	± .002		
X/X	± 1/32		
DEG.	± 1/2		
UNLESS OTHERWISE SPECIFIED			

NOTE:



TOLERANCES		REVISION RECORD	
X	± .015	REV	APPROVAL DATE
.XX	± .005		
.XXX	± .002		
X/X	± 1/32		
DEG.	± 1/2		
UNLESS OTHERWISE SPECIFIED			

 SYSTEMS WITH RELIABILITY, INC 619 INDUSTRIAL PARK ROAD EBENSBURG, PENNSYLVANIA 15931		TITLE: <b>TEST RANGE SCHEMATIC</b>		SIZE: <b>A</b>	PARTS MADE BY THIS DRAWING		DRAWING NUMBER: <b>2105A10</b>
MATERIAL:				SCALE: NTS	NAME: JRM	DATE: 11/1/98	SHEET 1 OF 1