



SYSTEMS WITH RELIABILITY, LTD.
Broadcast Antenna and Transmission Systems

PATTERN CERTIFICATION

DIRECTIONAL FM ANTENNA WQXB August 28, 2003

Call Sign	:	WQXB
Location	:	Grenada, MS
Frequency	:	100.1 MHz
Channel	:	261
Antenna Model	:	FM10/6 DA
Maximum Antenna Gain	:	
Horizontal	:	5.767/ 7.609 dB
Vertical	:	5.767/ 7.609 dB

ANTENNA DESCRIPTION

A custom designed **FM10/6 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, pointing at **350** degrees true north, mounted to a tower.

DESCRIPTION OF TEST PROCEDURE

The test antenna consists of a third-scale dipole 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 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 300.3 MHz. The antenna under test was rotated in a clockwise direction. A gain reference was taken using a dipole tuned to 300.3 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:

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

TEST EQUIPMENT

Network Analyzer	:	Hewlett Packard Model # 8753C Serial Number : 08753 – 69138 Calibrated 8/26/02, SWR, Inc.
Computer	:	White Mountain 366 Computer
Plotter	:	Hewlett-Packard 7550A
Positioner	:	Orbit Positioner Calibrated 1/06/03, SWR, Inc.

Prepared by.



Jason P Duncan
SWR, Inc.

TEST RESULTS

The attached calculations verify that the **RMS** value of this antenna is **88.32 %** of the **RMS** value of the pattern authorized in the related construction permit **BMPH-20030225AAY**. The vertical component **RMS** value is **0.724** and the horizontal component **RMS** value is **0.756**.

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

Measured horizontal polarized directivity	:	1.749 /2.427 dB
Measured vertical polarized directivity	:	1.907/2.8035 dB
Measured composite azimuth pattern directivity	:	1.7443 /2.4164 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 = (1.749)(6.321)(0.521608) = **5.767 / 7.609 dB**

V-Pol. Gain = (1.907)(6.321)(0.478392) = **5.767 / 7.609 dB**

INSTALLATION AND MOUNTING

The antenna is to be mounted in accordance with the supplied drawings. The antenna center of radiation is to be **127 meters** above ground level. The antenna (parasitic system included) aperture is **49.129 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 **350 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
0606C00	ORIENTATION WITH PARASITICS
0606C01	ANTENNA ORIENTATION
0606C02	FRONT VIEW WITH PARASITICS
0606C03	PARASITIC PLACEMENT
2105A10	TEST RANGE SCHEMATIC

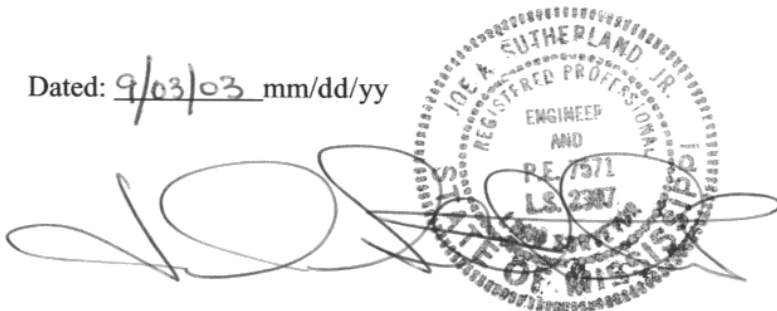
The array shall be mounted according to **DWG. 0606C00**. Each bay is mounted using the bracket assemblies in **DWG. 0434A03**. The parasitic assembly is shown in **DWG. 0606C01** and **DWG. 0606C02**. All lengths of the dipoles are shown in **DWG. 0606C03**. The antenna elements shall be aligned at the same heading as in **DWG. 0606C01**. This will ensure that the antenna is oriented properly at 59 degrees.

Surveyor's Declaration

I, Joe A. Sutherland, Jr. ^{P.E.-L.S.}, subject to the penalties of perjury, do declare the following:

- 1.) I am a licensed surveyor in the state(s) of Mississippi,
_____ and _____.
- 2.) I have provided professional services to CHATTERBOX, INC. (permit tee name), permit tee of 100.1 -FM, GRENADA (city of license), MS (state), during the installation of the 100.1 -FM directional antenna.
- 3.) I certify that the 100.1 -FM directional antenna has been oriented at the proper azimuth as authorized in the construction permit (FCC File Number BMPH-20030225 4A.Y.)

Dated: 9/03/03 mm/dd/yy



RE.# 7571
L.S.# 2307

Engineer's Declaration

I, Virgle Leon Strickland, subject to the penalties of perjury, do declare the following:

- 1) I am the holder of a valid General Radio Telephone Operators License, Number PG-6-24807.
- 2) That my qualifications are known with the Federal Communication Commission
- 3) That I have been employed as a technical consultant with the firm of:
Reynolds Technical Associates
12585 Old Highway 280 East, Suite 102
Chelsea, Alabama 35043
- 4) That Reynolds Technical Associates was retained by Chatterbox, Inc. for the purposed of preparing its application for the license of WQXB (FM), Grenada, Mississppi, for which the underlying Construction Permit BMPH-20030225AAY was granted by the Commission.
- 5) That I am familiar with the terms and conditions of the WQXB(FM) Construction Permit.
- 6) I hereby certify that I have supervised the installation of the WQXB(FM) directional antenna. A detailed inspection after completion determined that the antenna was installed exactly according to the manufacturer's instructions. In addition, I inspected the installation to verify the following: 1) That no platforms on the structure are larger than the nominal cross sectional area of the tower in the antenna horizontal plane, 2) No additional antennae are located within the area of the antenna, vertical or horizontal, and 3) The tower and all cables, steps and etc., are properly grounded.



Dated: 09/10/2003



SYSTEMS WITH RELIABILITY, INC.
Broadcast Antennas and Transmission Systems

WQXB Antenna RMS Comparison

PROPOSED ANTENNA

Azimuth Heading	Relative Field
0	1.000
10	1.000
20	1.000
30	1.000
40	1.000
50	1.000
60	1.000
70	0.990
80	0.790
90	0.646
100	0.577
110	0.577
120	0.646
130	0.790
140	0.990
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	0.840
10	0.860
20	0.860
30	0.920
40	0.960
50	1.000
60	0.980
70	0.940
80	0.780
90	0.640
100	0.560
110	0.560
120	0.620
130	0.780
140	0.840
150	0.880
160	0.860
170	0.800
180	0.740
190	0.700
200	0.680
210	0.720
220	0.800
230	0.940
240	1.000
250	0.960
260	0.880

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 : 32.709

Sum Divided by 36 (Readings) : 0.909

Square Root : 0.953

Percentage of Construction Permit Antenna Filled :

DESIGNED ANTENNA

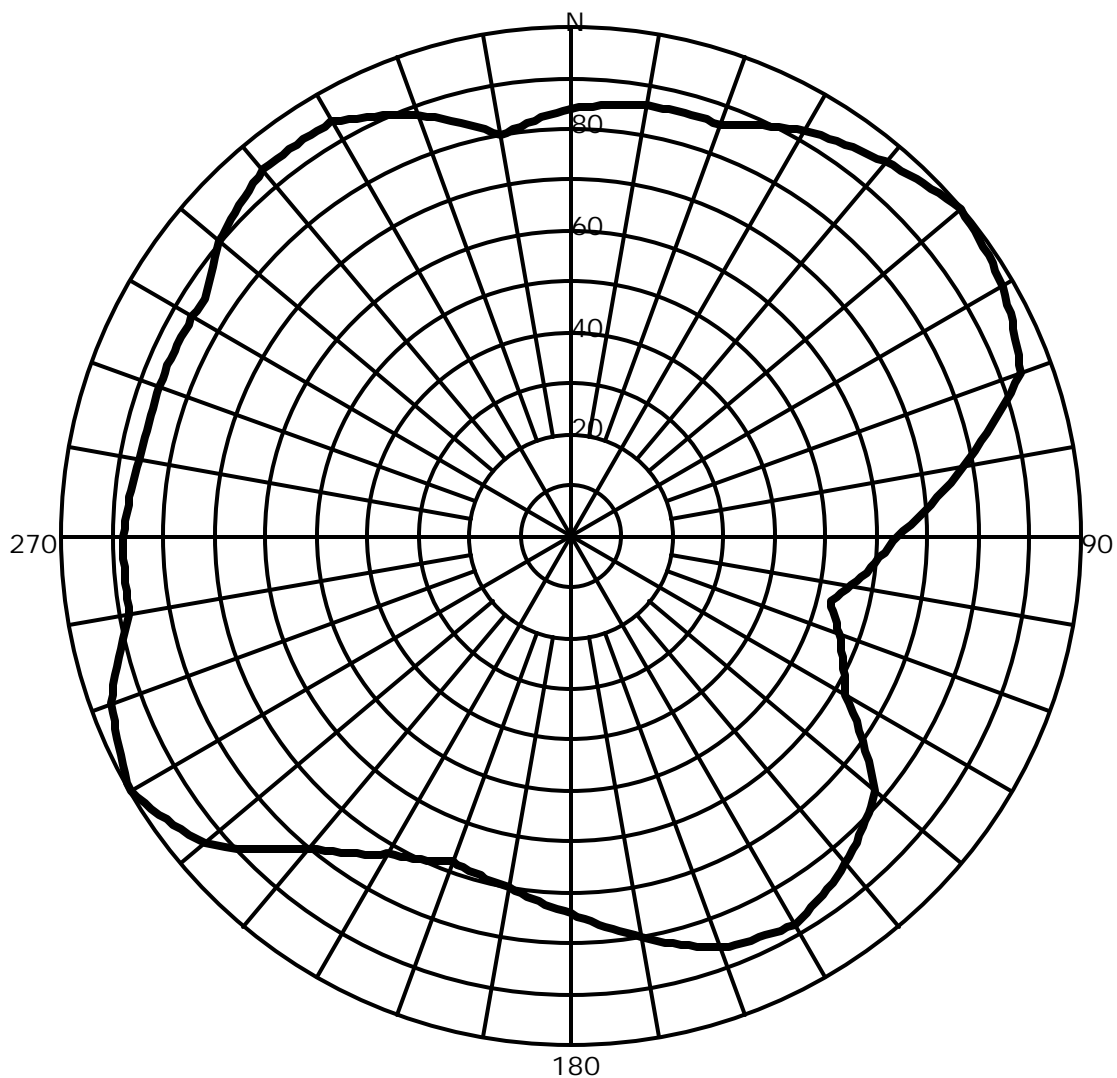
Azimuth Heading	Relative Field
270	0.880
280	0.860
290	0.860
300	0.860
310	0.900
320	0.940
330	0.940
340	0.880
350	0.800

Sum of Relative Field Squared : 25.517

Sum Divided by 36 (Readings) : 0.709

Square Root : 0.842

88.32%



Azimuth Pattern

Scale: Linear

Unit: Relative Field

Systems With Reliability Inc.

CLIENT: WQXB- Exhibit 1

Date: 8/28/03

ANTENNA TYPE: FM10/6 DA

FREQUENCY: 100.1

PATTERN POL.: Circular

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.7443 / 2.4164dB

PATTERN RMS: 0.757

Relative Field Tabulation(Azimuth)

Azimuth Heading	Relative Field(dB)	Azimuth Heading	Relative Field(dB)
0	.84 (-1.5)	180	.74 (-2.6)
5	.85 (-1.4)	185	.72 (-2.84)
10	.86 (-1.3)	190	.70 (-3.09)
15	.86 (-1.3)	195	.69 (-3.21)
20	.86 (-1.3)	200	.68 (-3.34)
25	.89 (-1)	205	.70 (-3.09)
30	.92 (-0.71)	210	.72 (-2.84)
35	.94 (-0.53)	215	.76 (-2.37)
40	.96 (-0.35)	220	.80 (-1.93)
45	.98 (-0.17)	225	.87 (-1.2)
50	1.00 (0.01)	230	.94 (-0.53)
55	.99 (-0.08)	235	.97 (-0.26)
60	.98 (-0.17)	240	1.00 (0.01)
65	.96 (-0.35)	245	.98 (-0.17)
70	.94 (-0.53)	250	.96 (-0.35)
75	.86 (-1.3)	255	.92 (-0.71)
80	.78 (-2.15)	260	.88 (-1.1)
85	.71 (-2.96)	265	.88 (-1.1)
90	.64 (-3.86)	270	.88 (-1.1)
95	.60 (-4.42)	275	.87 (-1.2)
100	.56 (-5.02)	280	.86 (-1.3)
105	.53 (-5.5)	285	.86 (-1.3)
110	.56 (-5.02)	290	.86 (-1.3)
115	.59 (-4.57)	295	.86 (-1.3)
120	.62 (-4.14)	300	.86 (-1.3)
125	.70 (-3.09)	305	.87 (-1.2)
130	.78 (-2.15)	310	.90 (-0.91)
135	.81 (-1.82)	315	.92 (-0.71)
140	.84 (-1.5)	320	.94 (-0.53)
145	.86 (-1.3)	325	.94 (-0.53)
150	.88 (-1.1)	330	.94 (-0.53)
155	.87 (-1.2)	335	.91 (-0.81)
160	.86 (-1.3)	340	.88 (-1.1)
165	.83 (-1.61)	345	.84 (-1.5)
170	.80 (-1.93)	350	.80 (-1.93)
175	.77 (-2.26)	355	.82 (-1.71)

Systems With Reliability Inc.

CLIENT: *WQXB- Exhibit 1*

Date: 8/28/03

ANTENNA TYPE: FM10/6 DA

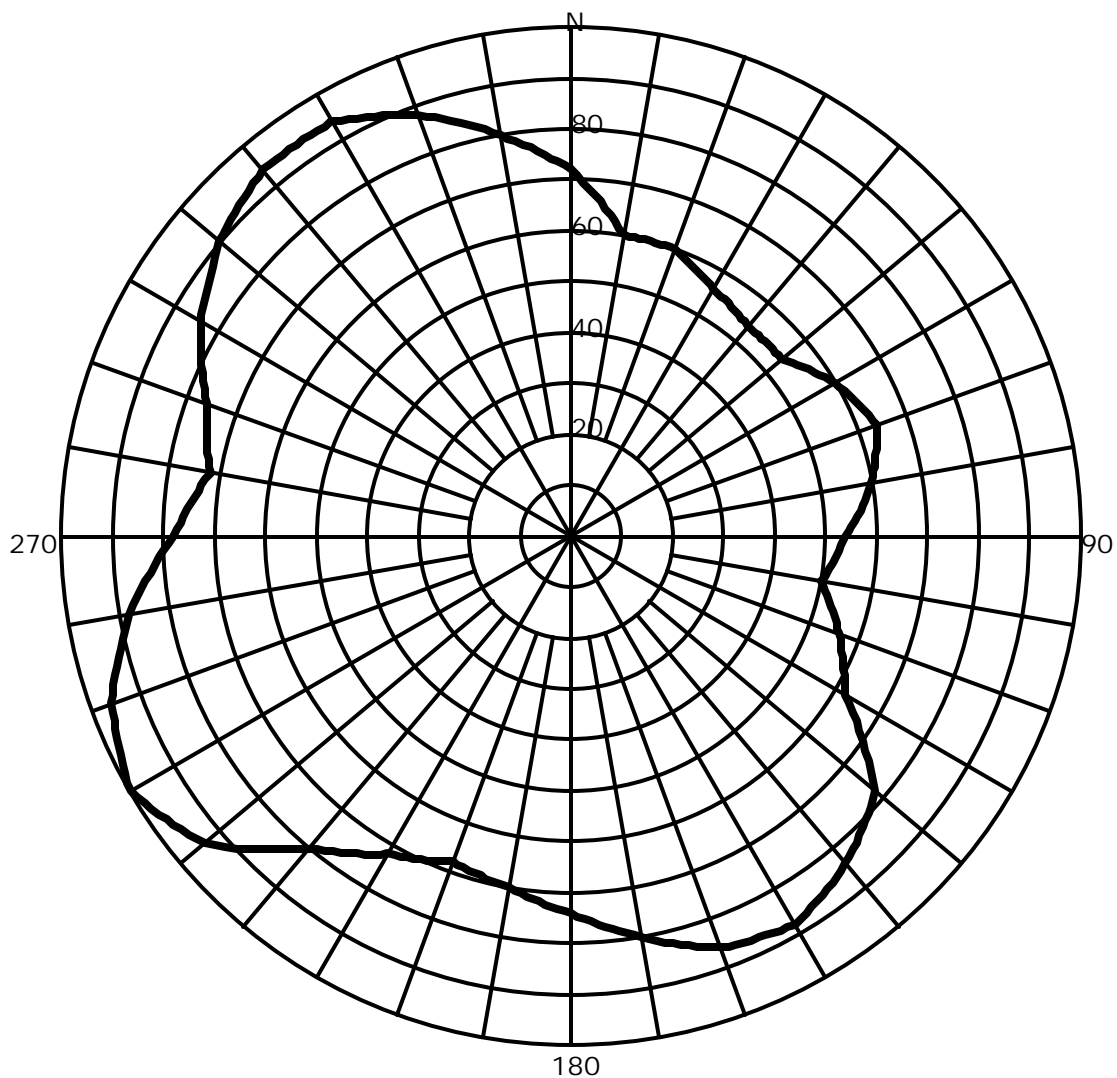
FREQUENCY: 100.1

PATTERN POL.: Circular

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.7443 / 2.4164dB

PATTERN RMS: 0.757



Azimuth Pattern

Scale: Linear

Unit: Relative Field

Systems With Reliability Inc.

CLIENT: WQXB- Exhibit 2

Date: 8/28/03

ANTENNA TYPE: FM10/6 DA

FREQUENCY: 100.1

PATTERN POL.: Horizontal

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.749 / 2.43dB

PATTERN RMS: 0.756

Relative Field Tabulation(Azimuth)

Azimuth Heading	Relative Field(dB)	Azimuth Heading	Relative Field(dB)
0	.72 (-2.84)	180	.74 (-2.6)
5	.66 (-3.6)	185	.72 (-2.84)
10	.60 (-4.42)	190	.70 (-3.09)
15	.60 (-4.42)	195	.69 (-3.21)
20	.60 (-4.42)	200	.68 (-3.34)
25	.58 (-4.72)	205	.70 (-3.09)
30	.56 (-5.02)	210	.72 (-2.84)
35	.55 (-5.18)	215	.76 (-2.37)
40	.54 (-5.34)	220	.80 (-1.93)
45	.54 (-5.34)	225	.87 (-1.2)
50	.54 (-5.34)	230	.94 (-0.53)
55	.57 (-4.87)	235	.97 (-0.26)
60	.60 (-4.42)	240	1.00 (0.01)
65	.62 (-4.14)	245	.98 (-0.17)
70	.64 (-3.86)	250	.96 (-0.35)
75	.62 (-4.14)	255	.92 (-0.71)
80	.60 (-4.42)	260	.88 (-1.1)
85	.57 (-4.87)	265	.83 (-1.61)
90	.54 (-5.34)	270	.78 (-2.15)
95	.52 (-5.66)	275	.75 (-2.49)
100	.50 (-6)	280	.72 (-2.84)
105	.53 (-5.5)	285	.74 (-2.6)
110	.56 (-5.02)	290	.76 (-2.37)
115	.59 (-4.57)	295	.80 (-1.93)
120	.62 (-4.14)	300	.84 (-1.5)
125	.70 (-3.09)	305	.87 (-1.2)
130	.78 (-2.15)	310	.90 (-0.91)
135	.81 (-1.82)	315	.92 (-0.71)
140	.84 (-1.5)	320	.94 (-0.53)
145	.86 (-1.3)	325	.94 (-0.53)
150	.88 (-1.1)	330	.94 (-0.53)
155	.87 (-1.2)	335	.91 (-0.81)
160	.86 (-1.3)	340	.88 (-1.1)
165	.83 (-1.61)	345	.84 (-1.5)
170	.80 (-1.93)	350	.80 (-1.93)
175	.77 (-2.26)	355	.76 (-2.37)

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CLIENT: *WQXB- Exhibit 2*

Date: 8/28/03

ANTENNA TYPE: FM10/6 DA

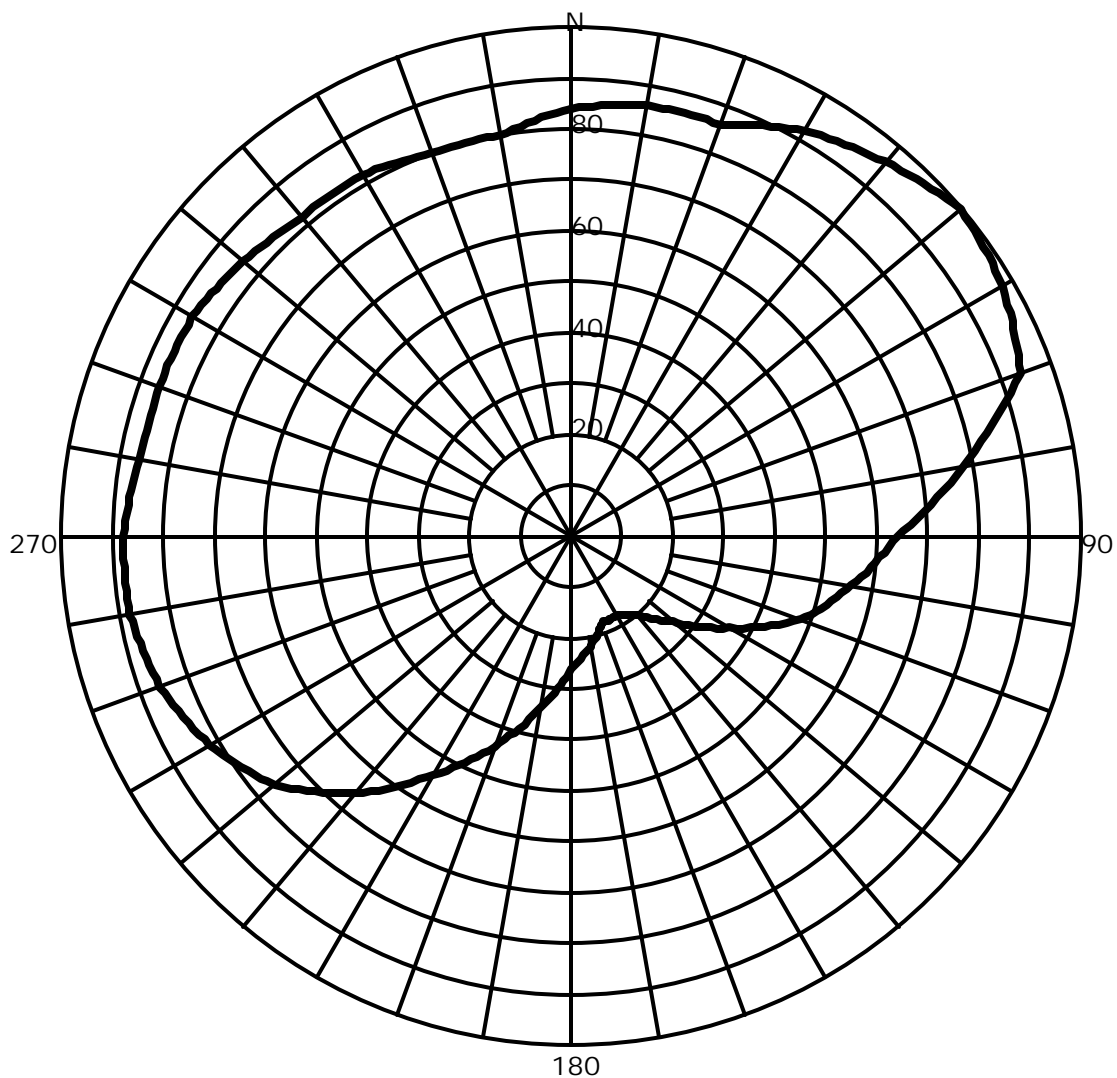
FREQUENCY: 100.1

PATTERN POL.: Horizontal

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.749 / 2.43dB

PATTERN RMS: 0.756



Azimuth Pattern

Scale: Linear

Unit: Relative Field

Systems With Reliability Inc.

CLIENT: WQXB- Exhibit 3

Date: 8/28/03

ANTENNA TYPE: FM10/6 DA

FREQUENCY: 100.1

PATTERN POL.: Vertical

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.907 / 2.8dB

PATTERN RMS: 0.724

Relative Field Tabulation(Azimuth)

Azimuth Heading	Relative Field(dB)	Azimuth Heading	Relative Field(dB)
0	.84 (-1.5)	180	.26 (-11.67)
5	.85 (-1.4)	185	.30 (-10.43)
10	.86 (-1.3)	190	.34 (-9.34)
15	.86 (-1.3)	195	.39 (-8.16)
20	.86 (-1.3)	200	.44 (-7.11)
25	.89 (-1)	205	.49 (-6.18)
30	.92 (-0.71)	210	.54 (-5.34)
35	.94 (-0.53)	215	.60 (-4.42)
40	.96 (-0.35)	220	.66 (-3.6)
45	.98 (-0.17)	225	.71 (-2.96)
50	1.00 (0.01)	230	.76 (-2.37)
55	.99 (-0.08)	235	.79 (-2.04)
60	.98 (-0.17)	240	.82 (-1.71)
65	.96 (-0.35)	245	.84 (-1.5)
70	.94 (-0.53)	250	.86 (-1.3)
75	.86 (-1.3)	255	.87 (-1.2)
80	.78 (-2.15)	260	.88 (-1.1)
85	.71 (-2.96)	265	.88 (-1.1)
90	.64 (-3.86)	270	.88 (-1.1)
95	.60 (-4.42)	275	.87 (-1.2)
100	.56 (-5.02)	280	.86 (-1.3)
105	.52 (-5.66)	285	.86 (-1.3)
110	.48 (-6.36)	290	.86 (-1.3)
115	.42 (-7.51)	295	.86 (-1.3)
120	.36 (-8.85)	300	.86 (-1.3)
125	.31 (-10.14)	305	.85 (-1.4)
130	.26 (-11.67)	310	.84 (-1.5)
135	.23 (-12.73)	315	.83 (-1.61)
140	.20 (-13.94)	320	.82 (-1.71)
145	.19 (-14.38)	325	.82 (-1.71)
150	.18 (-14.85)	330	.82 (-1.71)
155	.18 (-14.85)	335	.81 (-1.82)
160	.18 (-14.85)	340	.80 (-1.93)
165	.20 (-13.94)	345	.80 (-1.93)
170	.22 (-13.11)	350	.80 (-1.93)
175	.24 (-12.36)	355	.82 (-1.71)

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CLIENT: *WQXB- Exhibit 3*

Date: 8/28/03

ANTENNA TYPE: FM10/6 DA

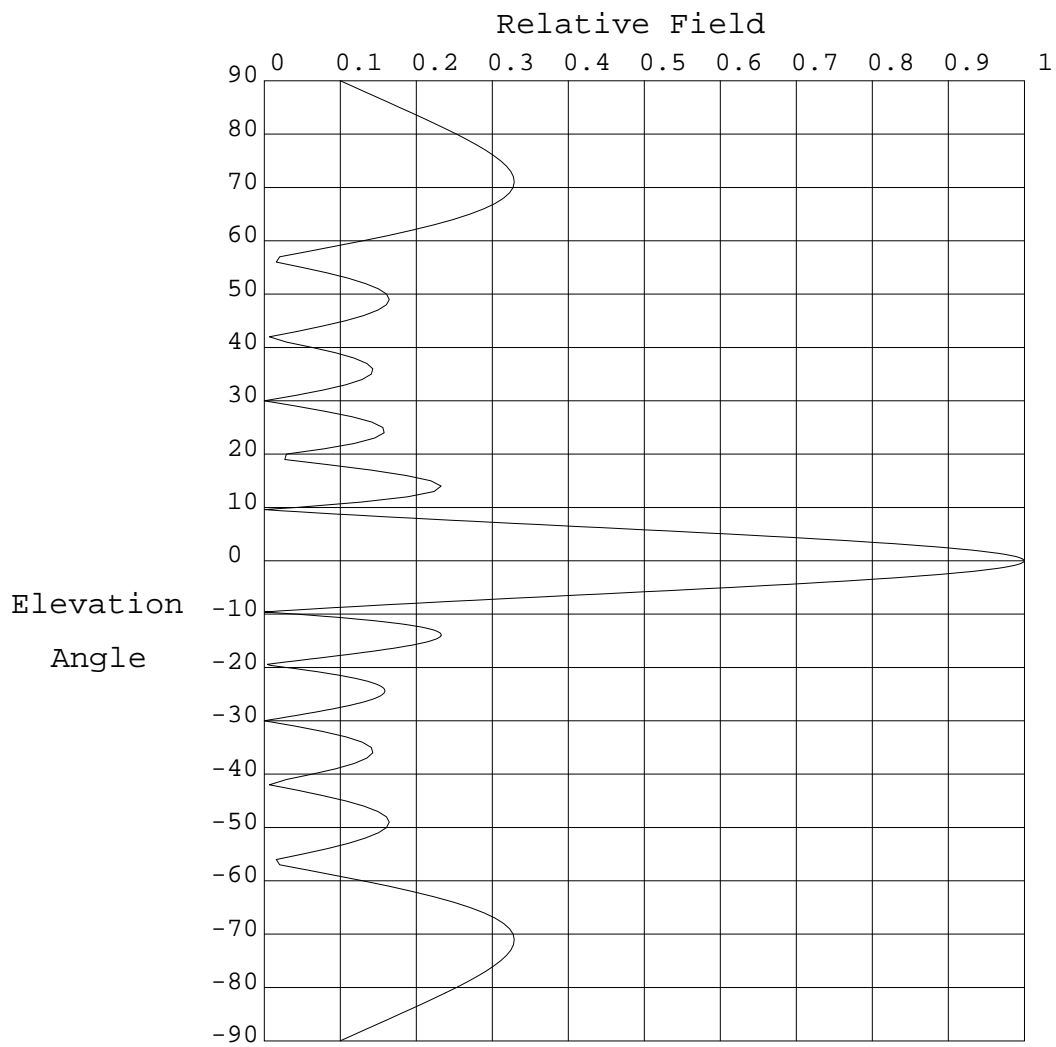
FREQUENCY: 100.1

PATTERN POL.: Vertical

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.907 / 2.8dB

PATTERN RMS: 0.724



Elevation Pattern

Scale: Linear

Systems With Reliability Inc.

Units: Field, Relative

CLIENT: WQXB- Exhibit 4

Date: 2/19/03

ANTENNA TYPE: FM10/6

FREQUENCY: 100.1

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
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 Inc.

Page 1 of 2

CLIENT: WQXB- Exhibit 4

Date: 2/19/03

ANTENNA TYPE: FM10/6

FREQUENCY: 100.1

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		
-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 Inc.

Page 2 of 2

CLIENT: WQXB- Exhibit 4

Date: 2/19/03

ANTENNA TYPE: FM10/6

FREQUENCY: 100.1

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

Call Letters WQXB
Contact Bob Evans
Location Grenada, MS
Antenna Model FM10/6-DA
Channel / Frequency 100.1 MHz

ELECTRICAL SPECIFICATION

Polarization Type	Circular		
Polarization Ratio			
H-Pol. (PRH)	52.1608	%	
V-Pol. (PRV)	47.8392	%	
Elevation Directivity (ED)	6.321		
Azimuth Directivity (AD) H-Pol.	1.749		
Azimuth Directivity (AD) V-Pol.	1.907		
Antenna Gain (GH)			
H-Pol. (GH)	5.767		
V-Pol. (GV)	5.767		
dB Gain (AG)			
H-Pol (AGH)	7.609		
V-Pol (AGV)	7.609		
ERP			
H-Pol. (ERPH)	50.000	kW	
V-Pol. (ERPV)	50.000	kW	
Line Type	2 1/4 air 50 Ohm		
Attenuation per 100 ft.	0.183	dB/100ft	
Line Length (LL)	450.00	ft.	
Total Line Attenuation	0.82	dB	
Line Efficiency (LE)	82.73	%	
Line Loss (LPL)	1.81	kW	
Antenna Input Power (AIP)	8.67	kW	
Req'd. Transmitter Output Power	10.48	kW	

MECHANICAL SPECIFICATION

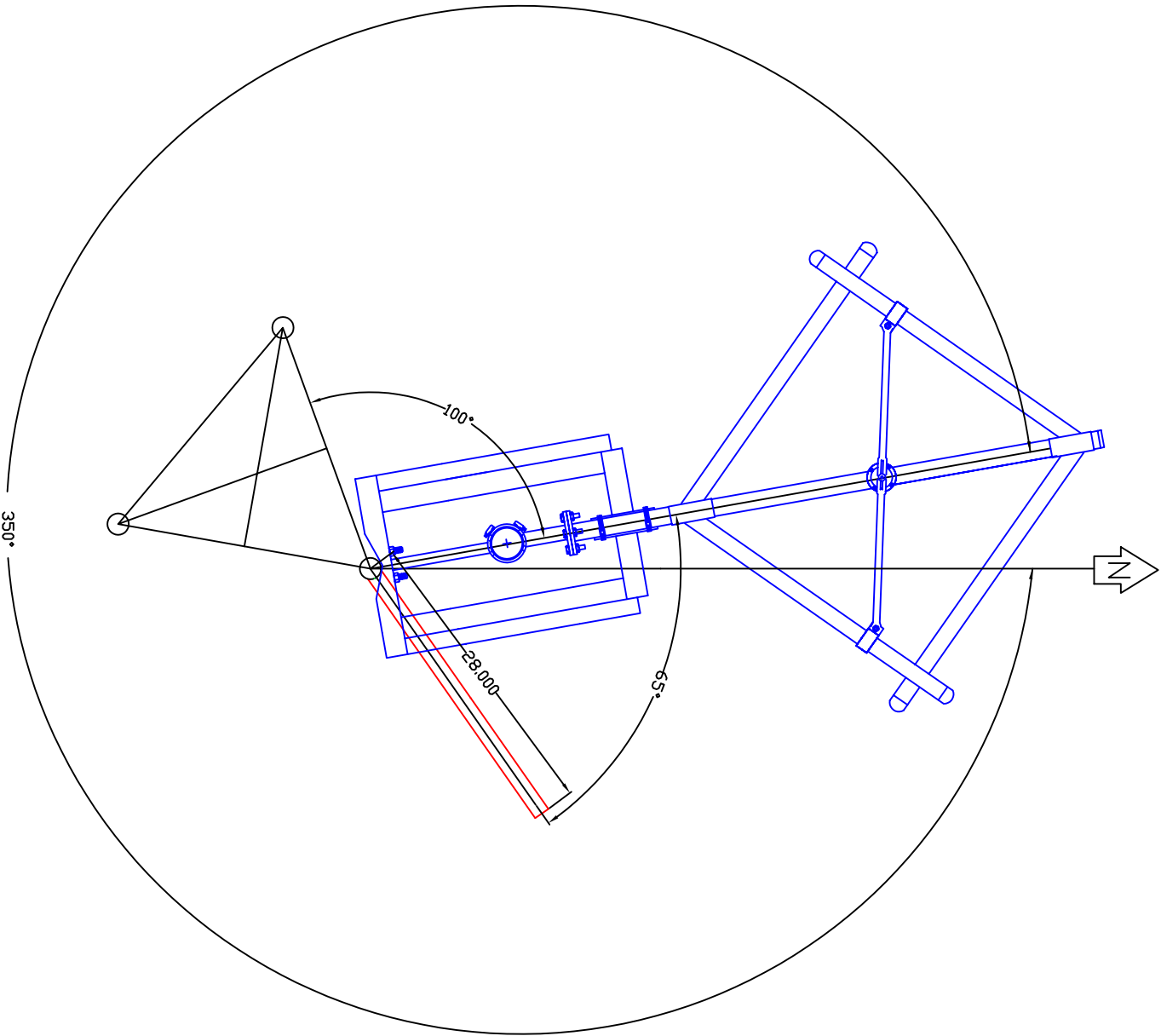
No. Of Bays	6			
Antenna Aperture	49.13	ft.	14.98	m
Center of Radiation AGL	416.56	ft.	127.00	m
Antenna Weight	425.00	lbs.	193.18	kg
Windload (50/33)	730.00	lbs.	331.82	kg

Prepared by:

Jason Duncan

NOTE:

DRAWING
NUMBER: 0606C01



TITLE:

FM10/6-DA, ORIENTATION
REQ. 100.1, WQXB, BESCO

MATERIAL:



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

SIZE

A

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

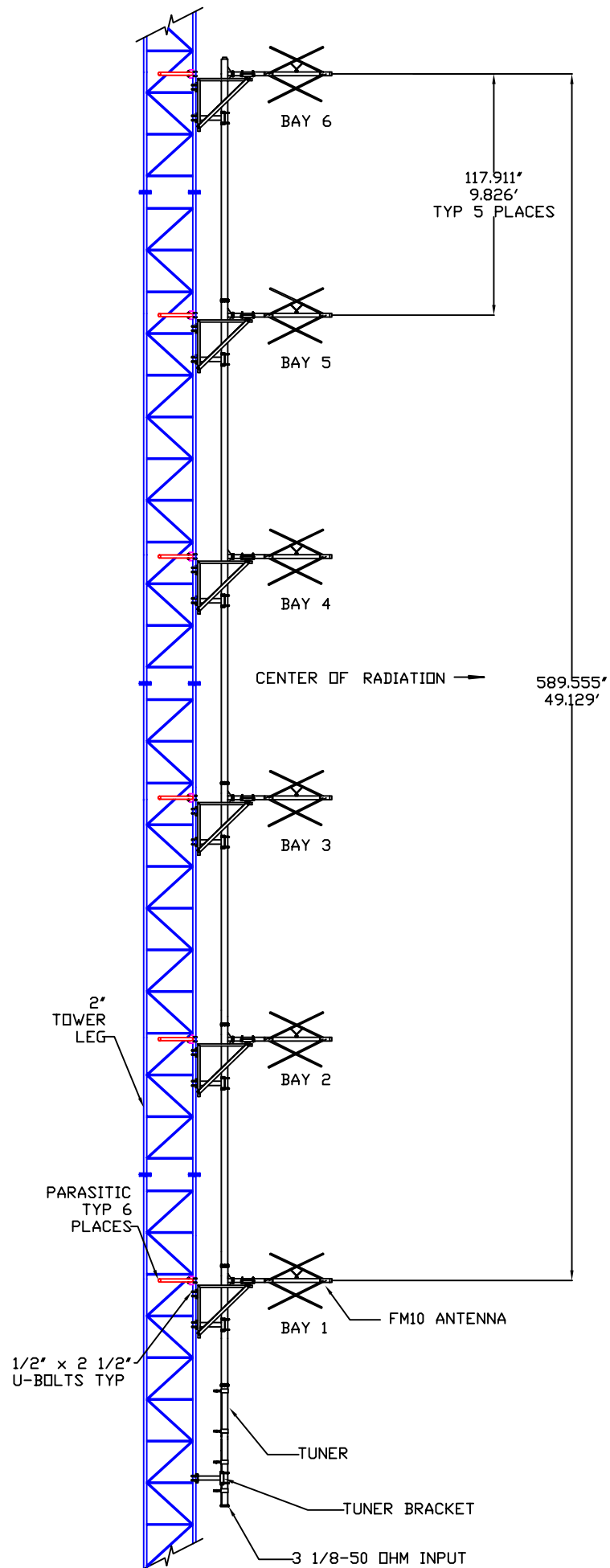
2 9/03/03

1 8/29/03

PARTS MADE BY THIS DRAWING

DRAWING
NUMBER: 0606C01

SCALE: NTS NAME: JJC DATE: 3/24/03 SHEET 1 OF 1



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

TITLE: FM10/6-DA
FREQ. 100.1, WQXB, BESCO
MATERIAL:

SIZE: C
REV: 1
2
3

APPR. DATE

ENGINEER:

SCALE: NTS

NAME: JJC

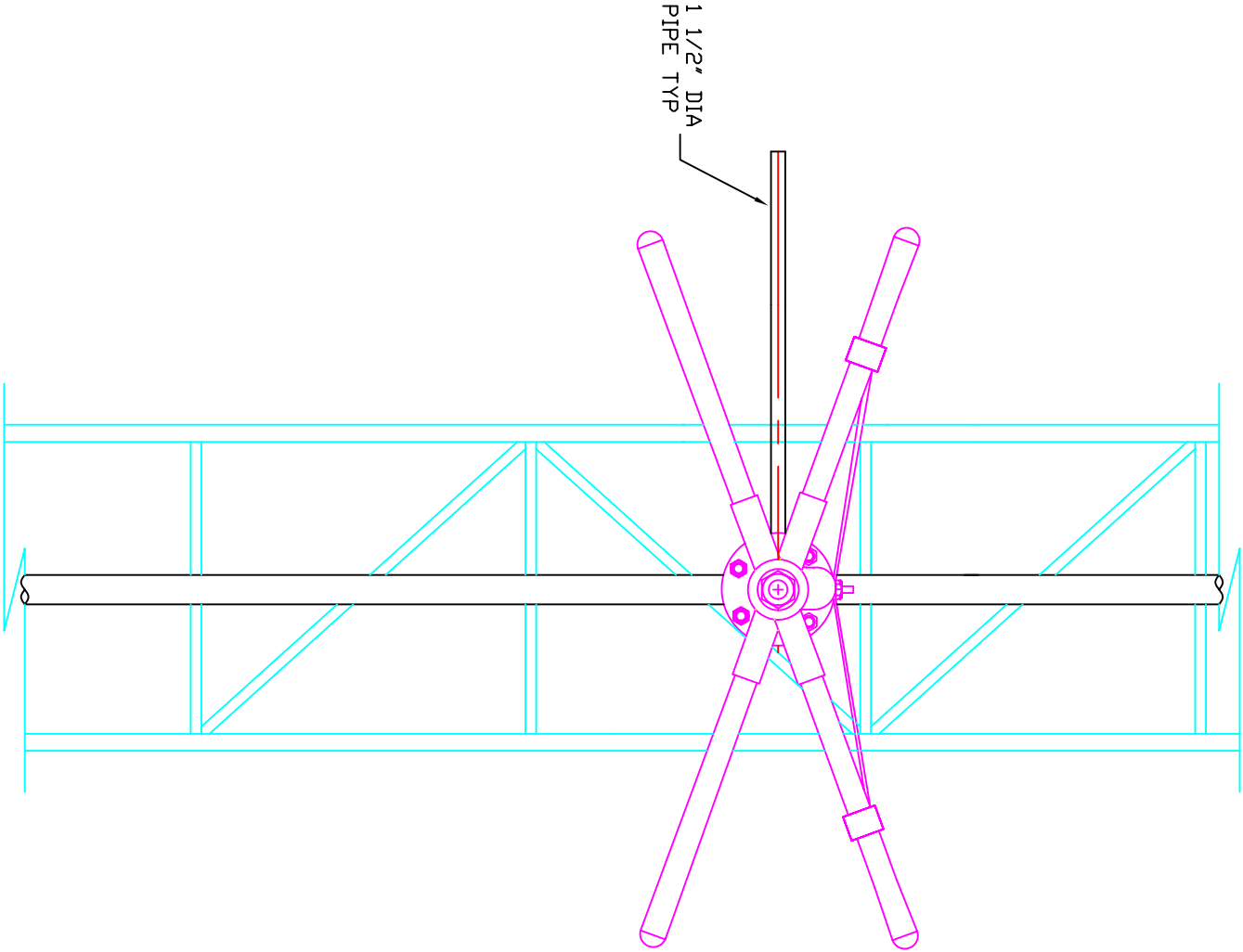
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SHEET 1 OF 1

DRAWING
NUMBER: 0606C00

NOTE:

DRAWING
NUMBER: 0606C02



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.XXX	± .002		
X/X	± 1/32		
DEG.	± 1/2		
UNLESS OTHERWISE SPECIFIED			

TITLE:

FM10/6-DA, FRONT VIEW WITH PARASITICS
WQXB, FREQ. 100.1, BESCO.

MATERIAL:



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

SIZE

A

PARTS MADE BY THIS DRAWING

SCALE: NTS

NAME: OLA

DATE: 03/19/03

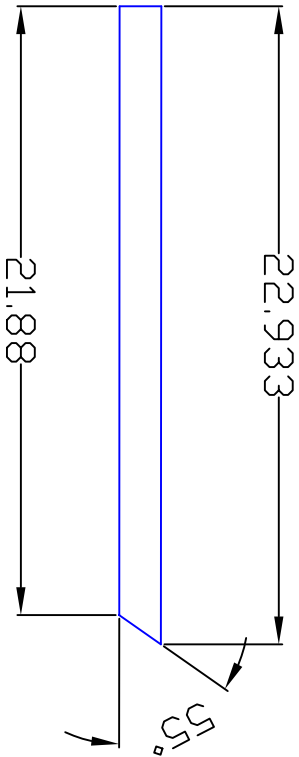
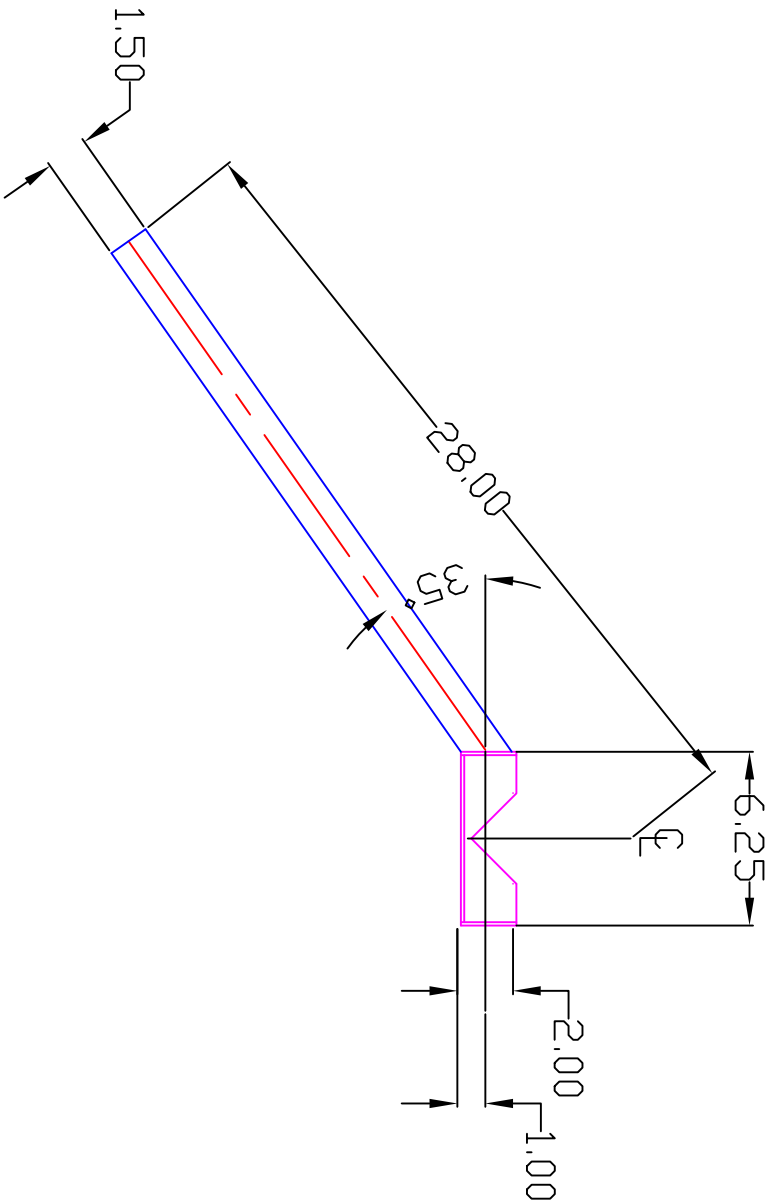
SHEET 1 OF 1

DRAWING
NUMBER: 0606C02

1 03/19/03

2 03/19/03

NOTE:



TOLERANCES		REVISION RECORD	
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.XXX	± .002		
X/X	± 1/32		
DEG.	± 1/2		
UNLESS OTHERWISE SPECIFIED			

TITLE:

FM10/6-DA PARASITIC PLACEMENT
WQXB, FREQ 100.1, BESCO

SIZE

A

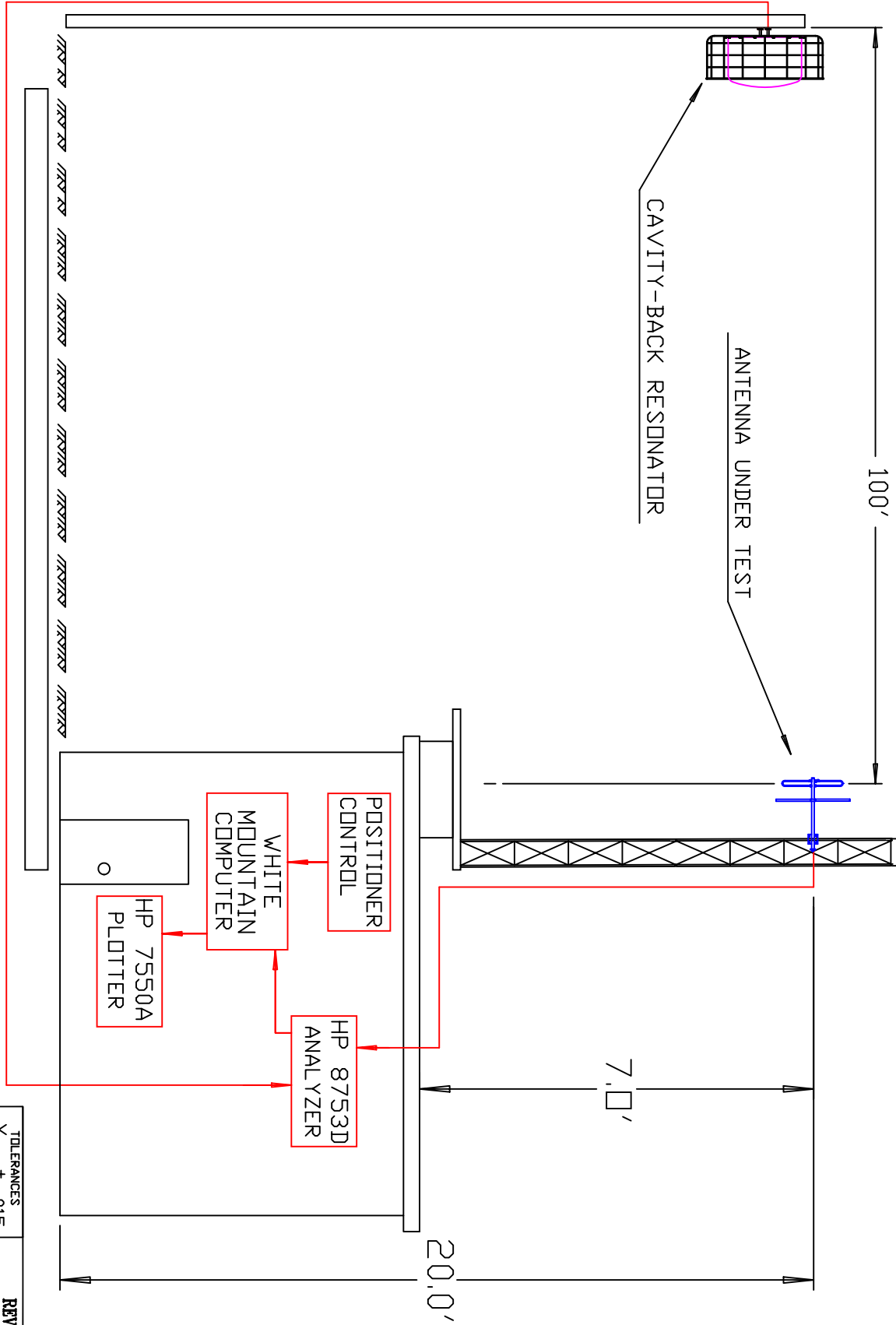
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SYSTEMS WITH RELIABILITY, INC
619 INDUSTRIAL PARK ROAD
EBENSBURG, PENNSYLVANIA 15931

PARTS MADE BY THIS DRAWING				DRAWING NUMBER
SCALE: NTS	NAME: OLA	DATE: 03/20/03	SHEET 1 OF 1	0606C03

NOTE:



TOLERANCES		REVISION RECORD	
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.XXX	± .002		
X/X	± 1/32		
DEG.	± 1/2		
UNLESS OTHERWISE SPECIFIED			



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

TITLE: TEST RANGE SCHEMATIC

SIZE: A

SCALE: NTS

NAME: JRM

DATE: 11/1/98

SHEET 1 OF 1

MATERIAL:

PARTS MADE BY THIS DRAWING

DRAWING NUMBER: 2105A10