SYSTEMS WITH RELIABILITY, LTD.
Broadcast Antenna and Transmission Systems

PATTERN CERTIFICATION

DIRECTIONAL FM ANTENNA
WIRP
May 24, 2004

Call Sign	:	WIRP
Location	:	Pennsuco, FL
Frequency	:	88.3 MHz
Channel	:	202
Antenna Model	:	FM3/2-DA HWS Illumitron
Maximum Antenna Gain		
Horizontal	:	1.798/ 2.547 dB
Vertical	:	1.798/ 2.547 dB

ANTENNA DESCRIPTION

A custom designed **FM3/2-DA HWS Illumitron** 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 **two** bays, that are spaced a half wavelength apart, mounted to a tower pointing **350** 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 264.9 The antenna under test was rotated in a clockwise direction. A gain reference was taken using a dipole tuned to 264.9 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 4/26/04, SWR, Inc.
Computer	:	White Mountain 366 Computer
Plotter	:	Hewlett-Packard 7550A
Positioner	:	Orbit Positioner Calibrated 1/06/04, SWR, Inc.

Prepared by:

Jason Duncan
SWR, Inc.

TEST RESULTS

The attached calculations verify that the **RMS** value of this antenna is **97.20 %** of the **RMS** value of the pattern authorized in the related construction permit **BPED–20011017AEW**. The vertical component **RMS** value is **0.565** and the horizontal component **RMS** value is **0.674**.

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

Measured horizontal polarized directivity	**:**	**2.20072 / 3.43 dB**
Measured vertical polarized directivity	**:**	**3.13668/ 4.96 *dB***
Measured composite azimuth pattern directivity	**:**	**2.17659 / 3.38 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 = (2.20072)(1.39)(0.587679) = **1.798 / 2.547 dB**

V-Pol. Gain = (3.13668)(1.39)(0.412321) = **1.798 / 2.547 dB**

INSTALLATION AND MOUNTING

The antenna is to be mounted in accordance with the supplied drawings. The antenna center of radiation is to be **83 *meters*** above ground level. The antenna (parasitic system included) aperture is **5.57 *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**
0025D00	ORIENTATION WITH PARASITICS
0025D01	ANTENNA ORIENTATION
0025D02	PARASITIC PLACEMENT BAY 1
0025D03	PARASITIC PLACEMENT BAY 2
2105A10	TEST RANGE SCHEMATIC

The array shall be mounted according to **DWG. 0025D00**. The parasitic assembly is shown in **DWG. 0025D02 and 0025D03**. The antenna elements shall be aligned at the same heading as in **DWG. 0025D01**. This will ensure that the antenna is oriented properly at **350** degrees true north.

Engineer's Declaration

I, Ralph Chambers, 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-7-5705 (FCC License No.)

2.) I have been a member of the Society of Broadcast Engineer's since 19 85

3.) That I have been employed as a technical consultant with the firm of: Sterling Communications (firm name), of Ringgold, GA. (city state)

4.) That Sterling Communications (Firm's Name) was retained by Centro Internacional Apostolico, INC (Permittee's Name) for the purpose of preparing its application for the construction permit of WIRP -FM Pennsuco (City), Florida (State), from which the underlying Construction Permit (FCC File Number BPED-20011017AEW) was granted by the Commission.

5.) That I am familiar with the terms and conditions of the WIRP -FM Construction Permit.

6.) I hereby certify that I have overseen the installation of the WIRP -FM directional antenna and that the installation was complete to the manufacturer's instructions.

Dated: 8/27/04 mm/dd/yy Ralph Chambers

619 Industrial Park Road, Ebensburg, PA 15931 Tel. 800 762 7743 / 814 472 5436 • Fax 814 472 5552

Surveyor's Declaration

I, Robin D. Teagarden, Jr., subject to the penalties of perjury, do declare the following:

1.) I am a licensed surveyor in the sate(s) of Florida, PLS#2354, _____ and _____.

2.) I have provided professional services to WIRP F-M (permit tee name), permit tee of WIRP -FM, Pennsuco FL (city of license), FL (state), during the installation of the WIRP -FM directional antenna.

3.) I certify that the WIRP -FM directional antenna has been oriented at the proper azimuth as authorized in the construction permit (FCC File Number BPED 20011017 AEW).

Dated: 8-26-2004 mm/dd/yy

619 Industrial Park Road, Ebensburg, PA 15931 Tel. 800 762 7743 / 814 472 5436 • Fax 814 472 5562

SYSTEMS WITH RELIABILITY, INC.
Broadcast Antennas and Transmission Systems

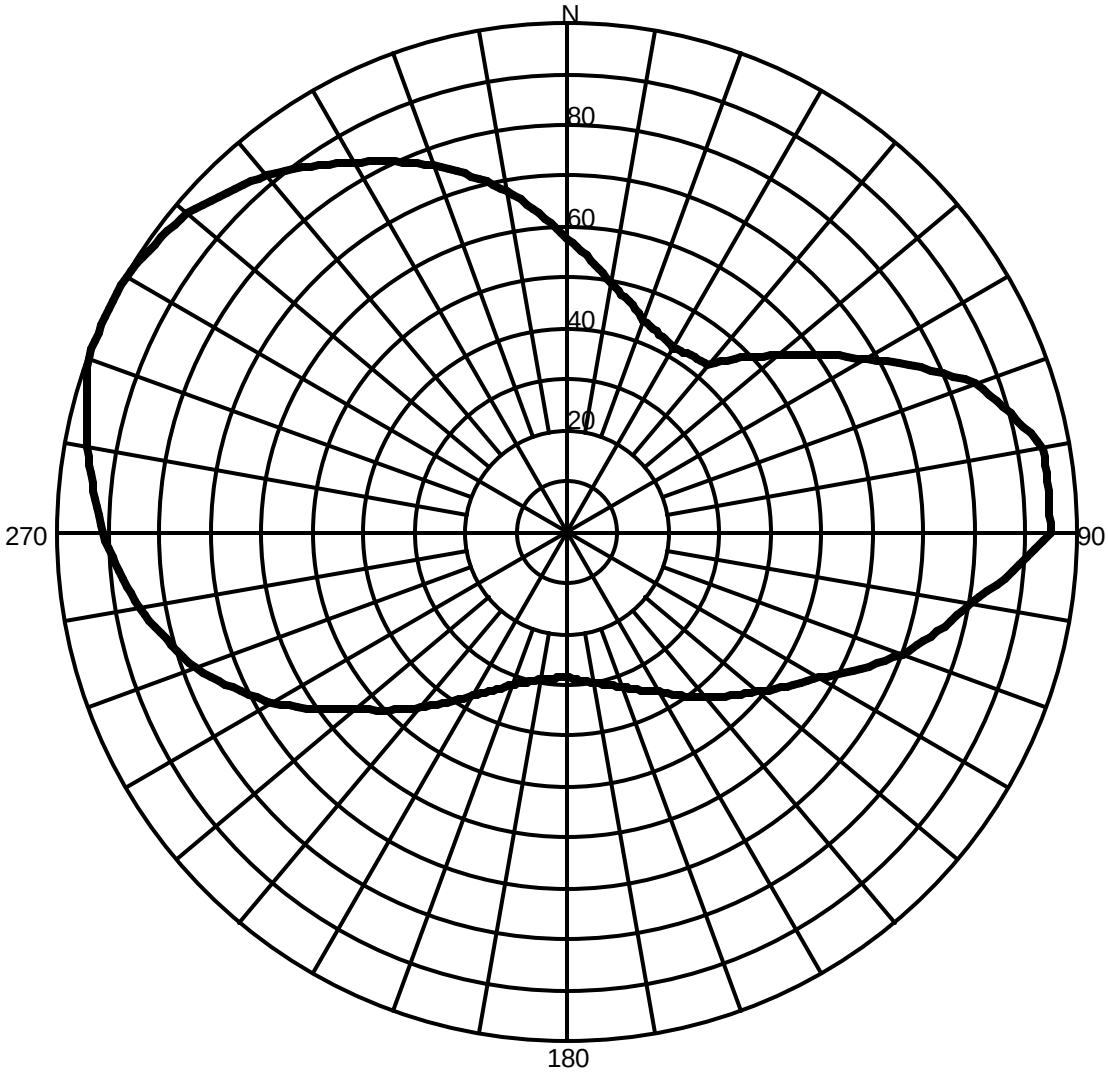
WIRP Antenna RMS Comparison

PROPOSED ANTENNA	
Azimuth Heading	Relative Field
0	0.606
10	0.515
20	0.452
30	0.440
40	0.452
50	0.568
60	0.714
70	0.898
80	1.000
90	1.000
100	0.831
110	0.722
120	0.589
130	0.501
140	0.434
150	0.381
160	0.339
170	0.315
180	0.292
190	0.306
200	0.328
210	0.386
220	0.472
230	0.550
240	0.690
250	0.800
260	0.880

DESIGNED ANTENNA	
Azimuth Heading	Relative Field
0	0.576
10	0.497
20	0.441
30	0.418
40	0.429
50	0.540
60	0.678
70	0.853
80	0.950
90	0.949
100	0.806
110	0.700
120	0.571
130	0.486
140	0.421
150	0.362
160	0.322
170	0.299
180	0.283
190	0.292
200	0.318
210	0.369
220	0.448
230	0.539
240	0.669
250	0.776
260	0.854

PROPOSED ANTENNA		DESIGNED ANTENNA	
Azimuth Heading	**Relative Field**	**Azimuth Heading**	**Relative Field**
270	0.940	270	0.912
280	0.985	280	0.956
290	1.000	290	1.000
300	1.000	300	1.000
310	0.984	310	0.974
320	0.925	320	0.916
330	0.847	330	0.839
340	0.775	340	0.767
350	0.687	350	0.680
Sum of Relative Field Squared :	17.550	Sum of Relative Field Squared :	16.579
Sum Divided by 36 (Readings) :	0.487	Sum Divided by 36 (Readings) :	0.461
Square Root :	0.698	Square Root :	0.679

Percentage of Construction Permit Antenna Filled : 97.20%



Azimuth Pattern

Scale: Linear

Unit: Relative Field

Systems With Reliability Inc.

CLIENT: *Sterling Communications Inc. WIRP-FM, Exhibit 1*

Date: 5/21/2004

ANTENNA TYPE: FM 3/2-DA HWS

FREQUENCY: 88.3 MHz

PATTERN POL.: Circular

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.17659 / 3.38dB

PATTERN RMS: *0.678*

Micro-Tek Eng. Ver. 2000

Relative Field Tabulation(Azimuth)

Azimuth Heading	Relative Field(dB)	Azimuth Heading	Relatve Field(dB)
0	.5757 (-4.78)	180	.2833 (-10.92)
5	.5363 (-5.4)	185	.2877 (-10.79)
10	.4968 (-6.06)	190	.2920 (-10.66)
15	.4689 (-6.56)	195	.3051 (-10.28)
20	.4410 (-7.09)	200	.3182 (-9.92)
25	.4295 (-7.32)	205	.3435 (-9.26)
30	.4180 (-7.56)	210	.3687 (-8.64)
35	.4237 (-7.44)	215	.4086 (-7.75)
40	.4294 (-7.32)	220	.4484 (-6.95)
45	.4845 (-6.28)	225	.4937 (-6.11)
50	.5396 (-5.34)	230	.5390 (-5.35)
55	.6090 (-4.29)	235	.6042 (-4.36)
60	.6783 (-3.36)	240	.6694 (-3.47)
65	.7657 (-2.31)	245	.7228 (-2.81)
70	.8531 (-1.37)	250	.7762 (-2.19)
75	.9015 (-0.89)	255	.8150 (-1.77)
80	.9499 (-0.44)	260	.8538 (-1.36)
85	.9495 (-0.44)	265	.8829 (-1.07)
90	.9491 (-0.44)	270	.9120 (-0.79)
95	.8776 (-1.12)	275	.9338 (-0.59)
100	.8061 (-1.86)	280	.9555 (-0.39)
105	.7532 (-2.45)	285	.9778 (-0.19)
110	.7003 (-3.08)	290	1.0000 (0.01)
115	.6358 (-3.92)	295	1.0000 (0.01)
120	.5713 (-4.85)	300	1.0000 (0.01)
125	.5287 (-5.52)	305	.9872 (-0.1)
130	.4860 (-6.25)	310	.9743 (-0.22)
135	.4535 (-6.85)	315	.9451 (-0.48)
140	.4210 (-7.49)	320	.9158 (-0.75)
145	.3915 (-8.12)	325	.8772 (-1.13)
150	.3620 (-8.8)	330	.8385 (-1.52)
155	.3421 (-9.29)	335	.8029 (-1.9)
160	.3221 (-9.81)	340	.7673 (-2.29)
165	.3107 (-10.13)	345	.7237 (-2.8)
170	.2993 (-10.45)	350	.6801 (-3.34)
175	.2913 (-10.68)	355	.6279 (-4.03)

Systems With Reliability Inc.

CLIENT: *Sterling Communications Inc. WIRP-FM Exhibit 1* Date: 5/21/2004

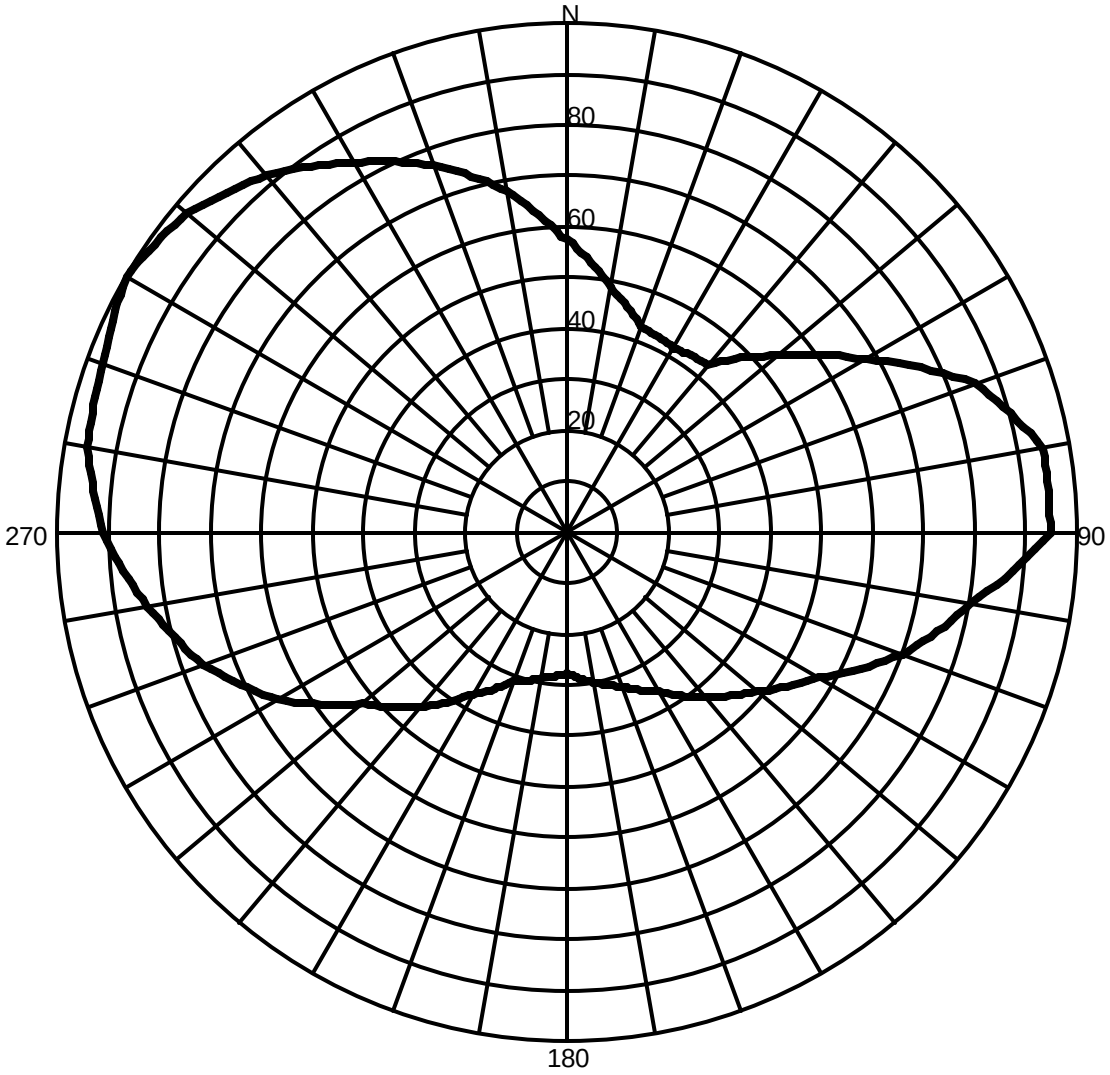
ANTENNA TYPE: FM 3/2-DA HWS

FREQUENCY: 88.3 MHz

PATTERN POL.: Circular CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.17659 / 3.38dB PATTERN RMS: *0.678*

Micro-Tek Eng. Ver. 2000



Azimuth Pattern

Scale: Linear

Unit: Relative Field

Systems With Reliability Inc.

CLIENT: *Sterling Communications Inc. WIRP-FM, Exhibit 2*

Date: 5/21/2004

ANTENNA TYPE: FM 3/2-DA HWS

FREQUENCY: 88.3 Mhz

PATTERN POL.: Horizontal

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.20072 / 3.43dB

PATTERN RMS: *0.674*

Micro-Tek Eng. Ver. 2000

Relative Field Tabulation(Azimuth)

Azimuth Heading	Relative Field(dB)	Azimuth Heading	Relatve Field(dB)
0	.5757 (-4.78)	180	.2774 (-11.11)
5	.5325 (-5.46)	185	.2841 (-10.9)
10	.4893 (-6.19)	190	.2907 (-10.7)
15	.4593 (-6.74)	195	.3012 (-10.4)
20	.4294 (-7.32)	200	.3116 (-10.1)
25	.4237 (-7.44)	205	.3392 (-9.37)
30	.4180 (-7.56)	210	.3667 (-8.69)
35	.4237 (-7.44)	215	.4076 (-7.78)
40	.4294 (-7.32)	220	.4484 (-6.95)
45	.4845 (-6.28)	225	.4855 (-6.26)
50	.5396 (-5.34)	230	.5225 (-5.62)
55	.6090 (-4.29)	235	.5890 (-4.58)
60	.6783 (-3.36)	240	.6555 (-3.66)
65	.7657 (-2.31)	245	.7078 (-2.99)
70	.8531 (-1.37)	250	.7600 (-2.37)
75	.9015 (-0.89)	255	.7980 (-1.95)
80	.9499 (-0.44)	260	.8360 (-1.55)
85	.9495 (-0.44)	265	.8739 (-1.16)
90	.9491 (-0.45)	270	.9118 (-0.79)
95	.8776 (-1.12)	275	.9336 (-0.59)
100	.8061 (-1.86)	280	.9555 (-0.39)
105	.7532 (-2.45)	285	.9627 (-0.32)
110	.7003 (-3.08)	290	.9700 (-0.26)
115	.6358 (-3.92)	295	.9850 (-0.12)
120	.5713 (-4.85)	300	1.0000 (0.01)
125	.5287 (-5.52)	305	.9871 (-0.1)
130	.4860 (-6.25)	310	.9743 (-0.22)
135	.4535 (-6.85)	315	.9450 (-0.48)
140	.4210 (-7.49)	320	.9158 (-0.75)
145	.3915 (-8.12)	325	.8771 (-1.13)
150	.3620 (-8.8)	330	.8385 (-1.52)
155	.3420 (-9.29)	335	.8029 (-1.9)
160	.3221 (-9.81)	340	.7673 (-2.29)
165	.3107 (-10.13)	345	.7237 (-2.8)
170	.2993 (-10.45)	350	.6801 (-3.34)
175	.2883 (-10.77)	355	.6250 (-4.07)

Systems With Reliability Inc.

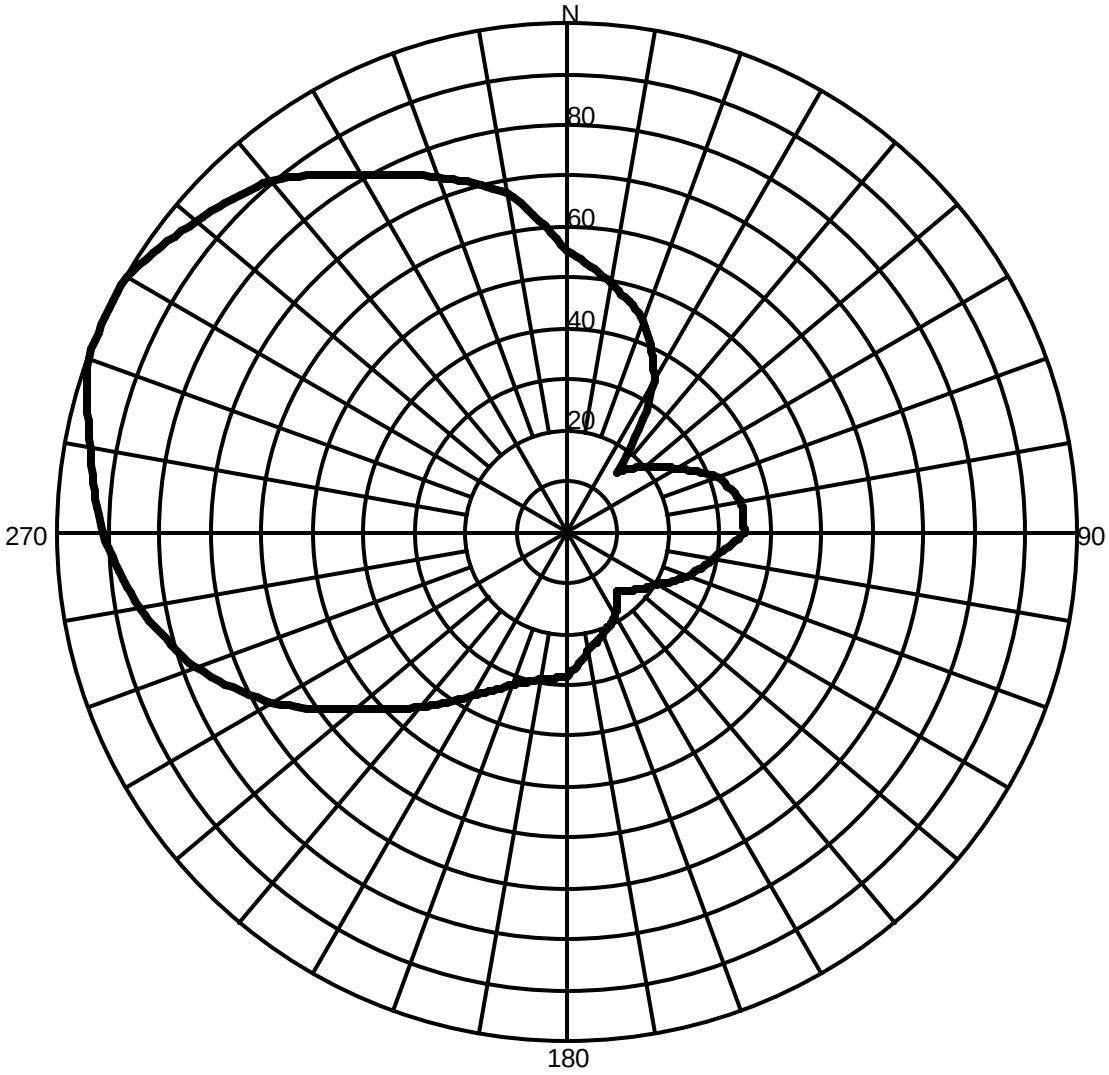
CLIENT: *Sterling Communications Inc. WIRP-FM, Exhibit 2* Date: 5/21/2004

ANTENNA TYPE: FM 3/2-DA HWS

FREQUENCY: 88.3 Mhz

PATTERN POL.: Horizontal CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.20072 / 3.43dB PATTERN RMS: *0.674*



Azimuth Pattern

Scale: Linear

Unit: Relative Field

Systems With Reliability Inc.

CLIENT: *Sterling Communications Inc. WIRP- FM, Exhibit 3*

Date: 5/21/2004

ANTENNA TYPE: FM 3/2-DA HWS

FREQUENCY: 88.3 Mhz

PATTERN POL.: Vertical

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 3.13668 / 4.96dB

PATTERN RMS: *0.565*

Micro-Tek Eng. Ver. 2000

Relative Field Tabulation(Azimuth)

Azimuth Heading	Relative Field(dB)	Azimuth Heading	Relatve Field(dB)
0	.5530 (-5.13)	180	.2833 (-10.92)
5	.5249 (-5.58)	185	.2877 (-10.79)
10	.4968 (-6.06)	190	.2920 (-10.66)
15	.4689 (-6.56)	195	.3051 (-10.28)
20	.4410 (-7.09)	200	.3182 (-9.92)
25	.3920 (-8.11)	205	.3435 (-9.26)
30	.3430 (-9.27)	210	.3687 (-8.64)
35	.2485 (-12.06)	215	.4078 (-7.77)
40	.1540 (-16.19)	220	.4469 (-6.98)
45	.1768 (-15)	225	.4929 (-6.13)
50	.1995 (-13.96)	230	.5390 (-5.35)
55	.2244 (-12.94)	235	.6042 (-4.36)
60	.2494 (-12.03)	240	.6694 (-3.47)
65	.2824 (-10.95)	245	.7228 (-2.81)
70	.3154 (-10)	250	.7762 (-2.19)
75	.3316 (-9.56)	255	.8150 (-1.77)
80	.3477 (-9.15)	260	.8538 (-1.36)
85	.3477 (-9.15)	265	.8829 (-1.07)
90	.3477 (-9.15)	270	.9120 (-0.79)
95	.3196 (-9.88)	275	.9314 (-0.61)
100	.2915 (-10.68)	280	.9508 (-0.43)
105	.2722 (-11.27)	285	.9754 (-0.21)
110	.2529 (-11.91)	290	1.0000 (0.01)
115	.2283 (-12.79)	295	1.0000 (0.01)
120	.2037 (-13.78)	300	1.0000 (0.01)
125	.1898 (-14.39)	305	.9754 (-0.21)
130	.1760 (-15.04)	310	.9508 (-0.43)
135	.1642 (-15.64)	315	.9266 (-0.65)
140	.1524 (-16.28)	320	.9025 (-0.88)
145	.1708 (-15.3)	325	.8563 (-1.34)
150	.1893 (-14.41)	330	.8100 (-1.82)
155	.1999 (-13.94)	335	.7758 (-2.19)
160	.2105 (-13.49)	340	.7416 (-2.58)
165	.2231 (-12.99)	345	.7101 (-2.96)
170	.2358 (-12.51)	350	.6786 (-3.36)
175	.2595 (-11.68)	355	.6158 (-4.2)

Systems With Reliability Inc.

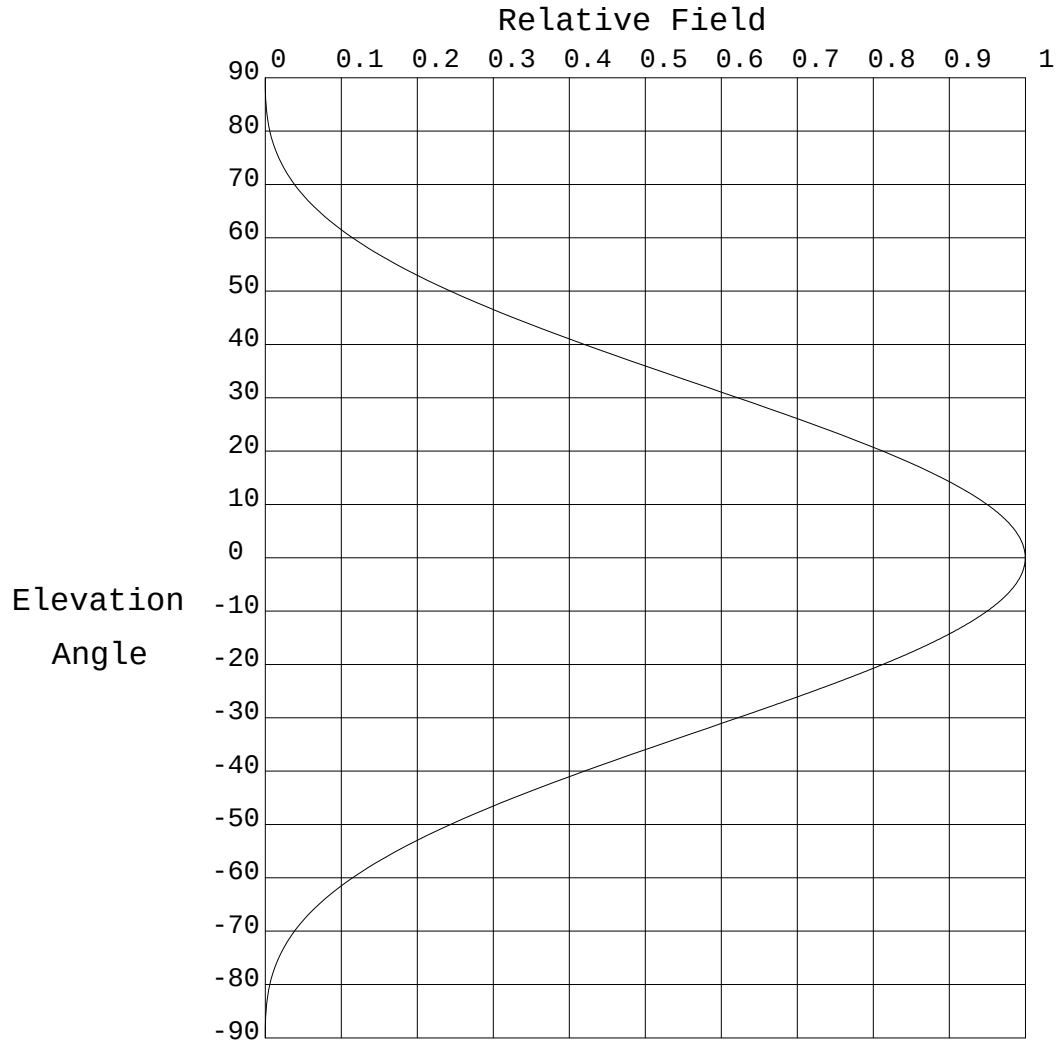
CLIENT: *Sterling Communications Inc. WIRP- FM, Exhibit 3* Date: 5/21/2004

ANTENNA TYPE: FM 3/2-DA HWS

FREQUENCY: 88.3 Mhz

PATTERN POL.: Vertical CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 3.13668 / 4.96dB PATTERN RMS: *0.565*



Elevation Pattern

Scale: Linear

Units: Field, Relative

Systems With Reliability Inc.

CLIENT: *Sterling Communications, Inc, WIRP* Date: 2/18/04

ANTENNA TYPE: FM3/2-DA HWS

FREQUENCY: 88.3 Exhibit 4

PATTERN POL.: Circular

DIRECTIVITY(Peak) 1.39/1.43 dBd Beam Tilt (Deg.) : *0*

DIRECTIVITY(Horiz) 1.39/1.43 dBd Null Fill(s)(%) *0, 0, 0*

Micro-Tek Eng. Ver. 2000

Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
3.2	.995 (-0.046)	-4.4	.99 (-0.086)	-12.0	.929 (-0.644)
3.0	.995 (-0.04)	-4.6	.989 (-0.094)	-12.2	.926 (-0.666)
2.8	.996 (-0.035)	-4.8	.988 (-0.103)	-12.4	.924 (-0.688)
2.6	.997 (-0.03)	-5.0	.987 (-0.111)	-12.6	.921 (-0.711)
2.4	.997 (-0.026)	-5.2	.986 (-0.121)	-12.8	.919 (-0.733)
2.2	.998 (-0.022)	-5.4	.985 (-0.13)	-13.0	.917 (-0.757)
2.0	.998 (-0.018)	-5.6	.984 (-0.14)	-13.2	.914 (-0.78)
1.8	.998 (-0.014)	-5.8	.983 (-0.15)	-13.4	.912 (-0.804)
1.6	.999 (-0.011)	-6.0	.982 (-0.161)	-13.6	.909 (-0.828)
1.4	.999 (-0.009)	-6.2	.98 (-0.171)	-13.8	.906 (-0.853)
1.2	.999 (-0.006)	-6.4	.979 (-0.183)	-14.0	.904 (-0.878)
1.0	.999 (-0.004)	-6.6	.978 (-0.194)	-14.2	.901 (-0.904)
.8	1.00 (-0.003)	-6.8	.977 (-0.206)	-14.4	.899 (-0.929)
.6	1.00 (-0.002)	-7.0	.975 (-0.219)	-14.6	.896 (-0.956)
.4	1.00 (-0.001)	-7.2	.974 (-0.231)	-14.8	.893 (-0.982)
.2	1.00 (0)	-7.4	.972 (-0.244)	-15.0	.89 (-1.009)
.0	1.00 (0)	-7.6	.971 (-0.258)	-15.2	.888 (-1.036)
-.2	1.00 (0)	-7.8	.969 (-0.272)	-15.4	.885 (-1.064)
-.4	1.00 (-0.001)	-8.0	.968 (-0.286)	-15.6	.882 (-1.092)
-.6	1.00 (-0.002)	-8.2	.966 (-0.3)	-15.8	.879 (-1.12)
-.8	1.00 (-0.003)	-8.4	.964 (-0.315)	-16.0	.876 (-1.149)
-1.0	.999 (-0.004)	-8.6	.963 (-0.33)	-16.2	.873 (-1.178)
-1.2	.999 (-0.006)	-8.8	.961 (-0.346)	-16.4	.87 (-1.208)
-1.4	.999 (-0.009)	-9.0	.959 (-0.362)	-16.6	.867 (-1.238)
-1.6	.999 (-0.011)	-9.2	.957 (-0.378)	-16.8	.864 (-1.268)
-1.8	.998 (-0.014)	-9.4	.956 (-0.395)	-17.0	.861 (-1.299)
-2.0	.998 (-0.018)	-9.6	.954 (-0.412)	-17.2	.858 (-1.33)
-2.2	.998 (-0.022)	-9.8	.952 (-0.429)	-17.4	.855 (-1.361)
-2.4	.997 (-0.026)	-10.0	.95 (-0.447)	-17.6	.852 (-1.393)
-2.6	.997 (-0.03)	-10.2	.948 (-0.465)	-17.8	.849 (-1.425)
-2.8	.996 (-0.035)	-10.4	.946 (-0.483)	-18.0	.846 (-1.457)
-3.0	.995 (-0.04)	-10.6	.944 (-0.502)	-18.2	.842 (-1.49)
-3.2	.995 (-0.046)	-10.8	.942 (-0.521)	-18.4	.839 (-1.524)
-3.4	.994 (-0.052)	-11.0	.94 (-0.541)	-18.6	.836 (-1.557)
-3.6	.993 (-0.058)	-11.2	.937 (-0.561)	-18.8	.833 (-1.591)
-3.8	.993 (-0.064)	-11.4	.935 (-0.581)	-19.0	.829 (-1.626)
-4.0	.992 (-0.071)	-11.6	.933 (-0.602)	-19.2	.826 (-1.661)
-4.2	.991 (-0.079)	-11.8	.931 (-0.623)	-19.4	.823 (-1.696)

Systems With Reliability Inc.

CLIENT: *Sterling Communications, Inc, WIRP* Date: 2/18/04

ANTENNA TYPE: FM3/2-DA HWS

FREQUENCY: 88.3 Exhibit 4

PATTERN POL.: Circular

DIRECTIVITY(Peak)1.39/1.43 dBd Beam Tilt (Deg.) : *0*

DIRECTIVITY(Horiz)1.39/1.43 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	.819 (-1.731)	-27.2	.678 (-3.373)	-54.0	.186 (-14.615)
-19.8	.816 (-1.767)	-27.4	.674 (-3.424)	-55.0	.173 (-15.254)
-20.0	.812 (-1.804)	-27.6	.67 (-3.476)	-56.0	.16 (-15.914)
-20.2	.809 (-1.84)	-27.8	.666 (-3.528)	-57.0	.148 (-16.597)
-20.4	.806 (-1.877)	-28.0	.662 (-3.58)	-58.0	.136 (-17.304)
-20.6	.802 (-1.915)	-28.2	.658 (-3.633)	-59.0	.125 (-18.036)
-20.8	.799 (-1.953)	-28.4	.654 (-3.686)	-60.0	.115 (-18.794)
-21.0	.795 (-1.991)	-28.6	.65 (-3.739)	-61.0	.105 (-19.581)
-21.2	.792 (-2.03)	-28.8	.646 (-3.793)	-62.0	.096 (-20.397)
-21.4	.788 (-2.069)	-29.0	.642 (-3.848)	-63.0	.087 (-21.245)
-21.6	.784 (-2.108)	-29.2	.638 (-3.903)	-64.0	.078 (-22.126)
-21.8	.781 (-2.148)	-29.4	.634 (-3.958)	-65.0	.07 (-23.044)
-22.0	.777 (-2.188)	-29.6	.63 (-4.014)	-66.0	.063 (-24)
-22.2	.774 (-2.229)	-29.8	.626 (-4.07)	-67.0	.056 (-24.997)
-22.4	.77 (-2.27)	-30.0	.622 (-4.126)	-68.0	.05 (-26.039)
-22.6	.766 (-2.311)	-31.0	.601 (-4.416)	-69.0	.044 (-27.13)
-22.8	.763 (-2.353)	-32.0	.581 (-4.716)	-70.0	.039 (-28.274)
-23.0	.759 (-2.395)	-33.0	.561 (-5.027)	-71.0	.034 (-29.475)
-23.2	.755 (-2.438)	-34.0	.54 (-5.349)	-72.0	.029 (-30.74)
-23.4	.752 (-2.481)	-35.0	.52 (-5.683)	-73.0	.025 (-32.074)
-23.6	.748 (-2.524)	-36.0	.50 (-6.029)	-74.0	.021 (-33.487)
-23.8	.744 (-2.568)	-37.0	.479 (-6.387)	-75.0	.018 (-34.986)
-24.0	.74 (-2.612)	-38.0	.459 (-6.756)	-76.0	.015 (-36.583)
-24.2	.737 (-2.657)	-39.0	.44 (-7.138)	-77.0	.012 (-38.292)
-24.4	.733 (-2.701)	-40.0	.42 (-7.533)	-78.0	.01 (-40.128)
-24.6	.729 (-2.747)	-41.0	.401 (-7.941)	-79.0	.008 (-42.113)
-24.8	.725 (-2.793)	-42.0	.382 (-8.362)	-80.0	.006 (-44.272)
-25.0	.721 (-2.839)	-43.0	.363 (-8.797)	-81.0	.005 (-46.639)
-25.2	.717 (-2.885)	-44.0	.345 (-9.246)	-82.0	.003 (-49.26)
-25.4	.713 (-2.932)	-45.0	.327 (-9.71)	-83.0	.002 (-52.199)
-25.6	.71 (-2.98)	-46.0	.309 (-10.188)	-84.0	.002 (-55.546)
-25.8	.706 (-3.027)	-47.0	.292 (-10.682)	-85.0	.001 (-59.44)
-26.0	.702 (-3.076)	-48.0	.276 (-11.191)	-86.0	.001 (-64.112)
-26.2	.698 (-3.124)	-49.0	.259 (-11.717)	-87.0	.00 (-69.988)
-26.4	.694 (-3.173)	-50.0	.244 (-12.26)	-88.0	.00 (-78.01)
-26.6	.69 (-3.223)	-51.0	.229 (-12.821)	-89.0	.00 (-91.156)
-26.8	.686 (-3.272)	-52.0	.214 (-13.4)	-90.0	.00 (-50)
-27.0	.682 (-3.323)	-53.0	.20 (-13.998)	90.0	.00 (-50)

Systems With Reliability Inc.

CLIENT: *Sterling Communications Inc, WIRP* Date: 2/18/04
ANTENNA TYPE: FM3/2-DA HWS
FREQUENCY: 88.3 Exhibit 4
PATTERN POL.: Circular
DIRECTIVITY(Peak)1.39/1.43 dBd Beam Tilt (Deg.) : *0*
DIRECTIVITY(Horiz)1.39/1.43 dBd Null Fill(s)(%) *0, 0, 0*

SYSTEMS WITH RELIABILITY, Inc.

Broadcast Antenna & Transmission Systems

SYSTEM DATA SHEET

Customer	Sterling Communications, Inc, WIRP
Contact	Jim Price
Location	Pennsuco, FL
Antenna Model	FM3/2-DA HWS
Channel / Frequency	88.3 MHz

ELECTRICAL SPECIFICATION

Polarization Type	Circular	
Polarization Ratio		
H-Pol. (PRH)	58.7679	**%**
V-Pol. (PRV)	41.2321	**%**
Elevation Directivity (ED)	1.390	
Azimuth Directivity (AD) H-Pol.	2.201	
Azimuth Directivity (AD) V-Pol.	3.137	
Antenna Gain (GH)		
H-Pol. (GH)	1.798	
V-Pol. (GV)	1.798	
dB Gain (AG)		
H-Pol (AGH)	2.547	
V-Pol (AGV)	2.547	
ERP		
H-Pol. (ERPH)	6.000	**kW**
V-Pol. (ERPV)	6.000	**kW**

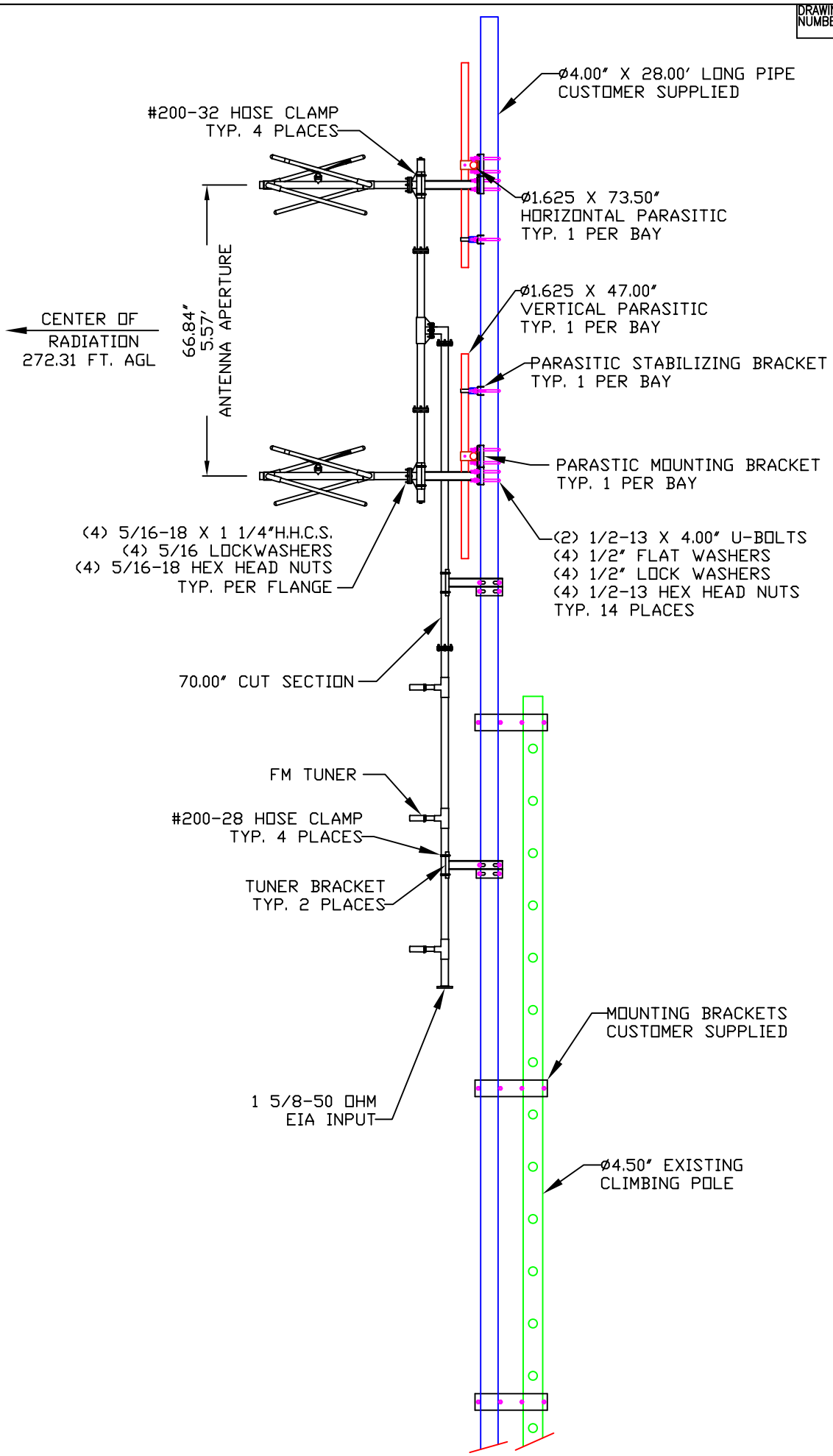
Line Type	1 5/8-50 OHM AIR	**HJ7-50A**
Attenuation per 100 ft.	0.194	**dB/100ft**
Line Length (LL)	295.28	**ft.**
Total Line Attenuation	0.57	**dB**
Line Efficiency (LE)	87.64	**%**
Line Loss (LPL)	0.47	**kW**
Antenna Input Power (AIP)	3.34	**kW**
Req'd. Transmitter Output Power	3.81	**kW**

MECHANICAL SPECIFICATION

No. Of Bays	2			
Antenna Aperture	5.57	**ft.**	1.70	**m**
Center of Radiation AGL	272.24	**ft.**	83.00	**m**
Antenna Weight	61.60	**lbs.**	28.00	**kg**
Windload (50/33)	73.63	**lbs.**	33.47	**kg**

Prepared by: Jason Duncan

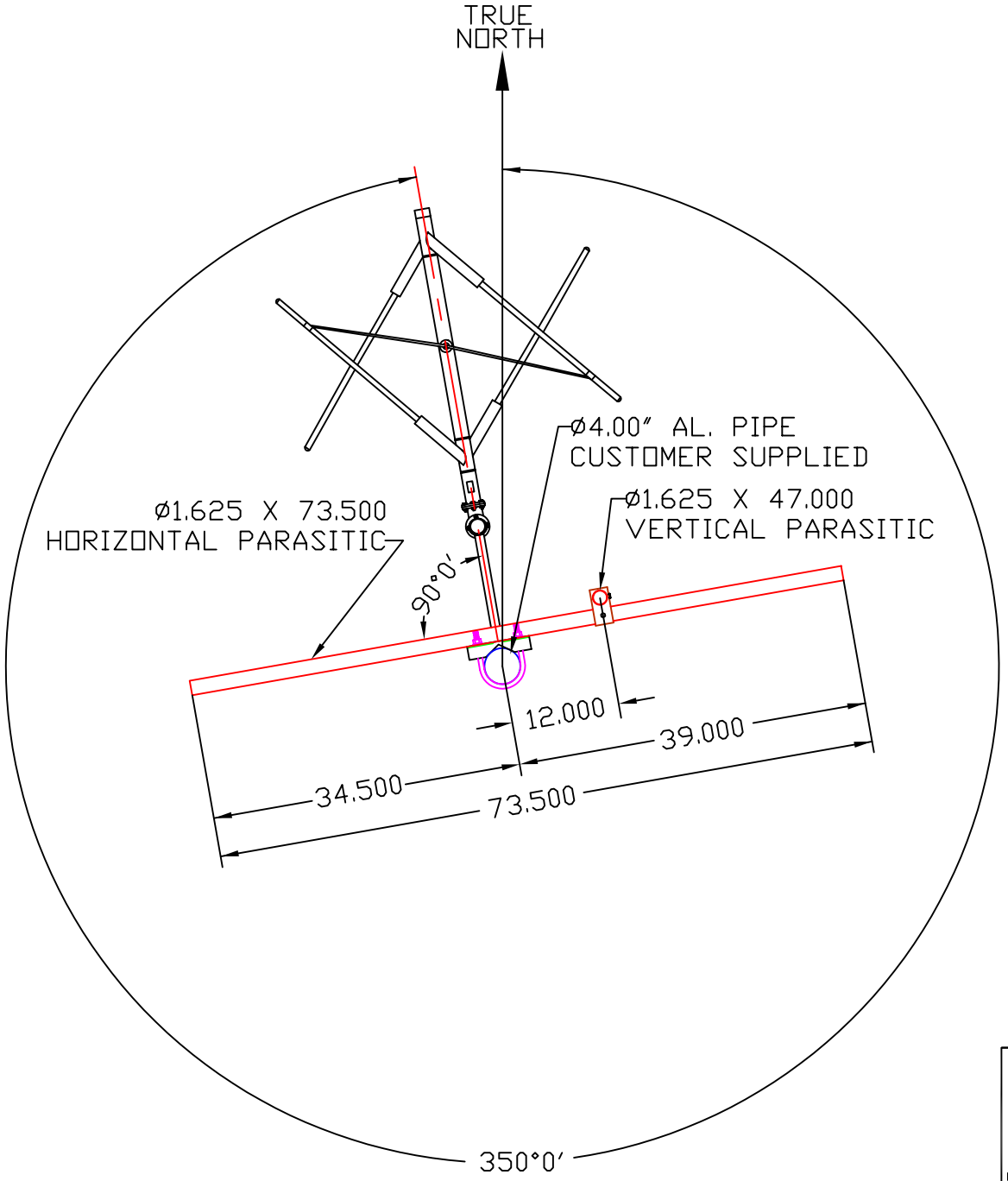
DRAWING NUMBER: 0025D00



SYSTEMS WITH RELIABILITY, INC 619 INDUSTRIAL PARK ROAD EBENSBURG, PENNSYLVANIA 15931	TITLE: FM3/2-HWS-DA, FREQ. 88.3 WIRP, PENNSUCO, FL MATERIAL:	SIZE C	REV	APPR.	DATE	ENGINEER:	DRAWING NUMBER: 0025D00
			1			SCALE: NTS	NAME: RAC
			2			DATE: 5/24/04	SHEET 1 OF 1
			3				

NOTE:

DRAWING NUMBER: 0025D01



TOLERANCES	
.X	± .015
.XX	± .005
.XXX	± .002
X/X	± 1/32
DEG.	± 1/2

UNLESS OTHERWISE SPECIFIED

REVISION RECORD

REV	APPROVAL	DATE

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

TITLE: FM3/2-HWS-DA, FREQ. 88.3, WIRP
PENNSUCO, FL

MATERIAL: ANTENNA
ORIENTATION

SIZE: A

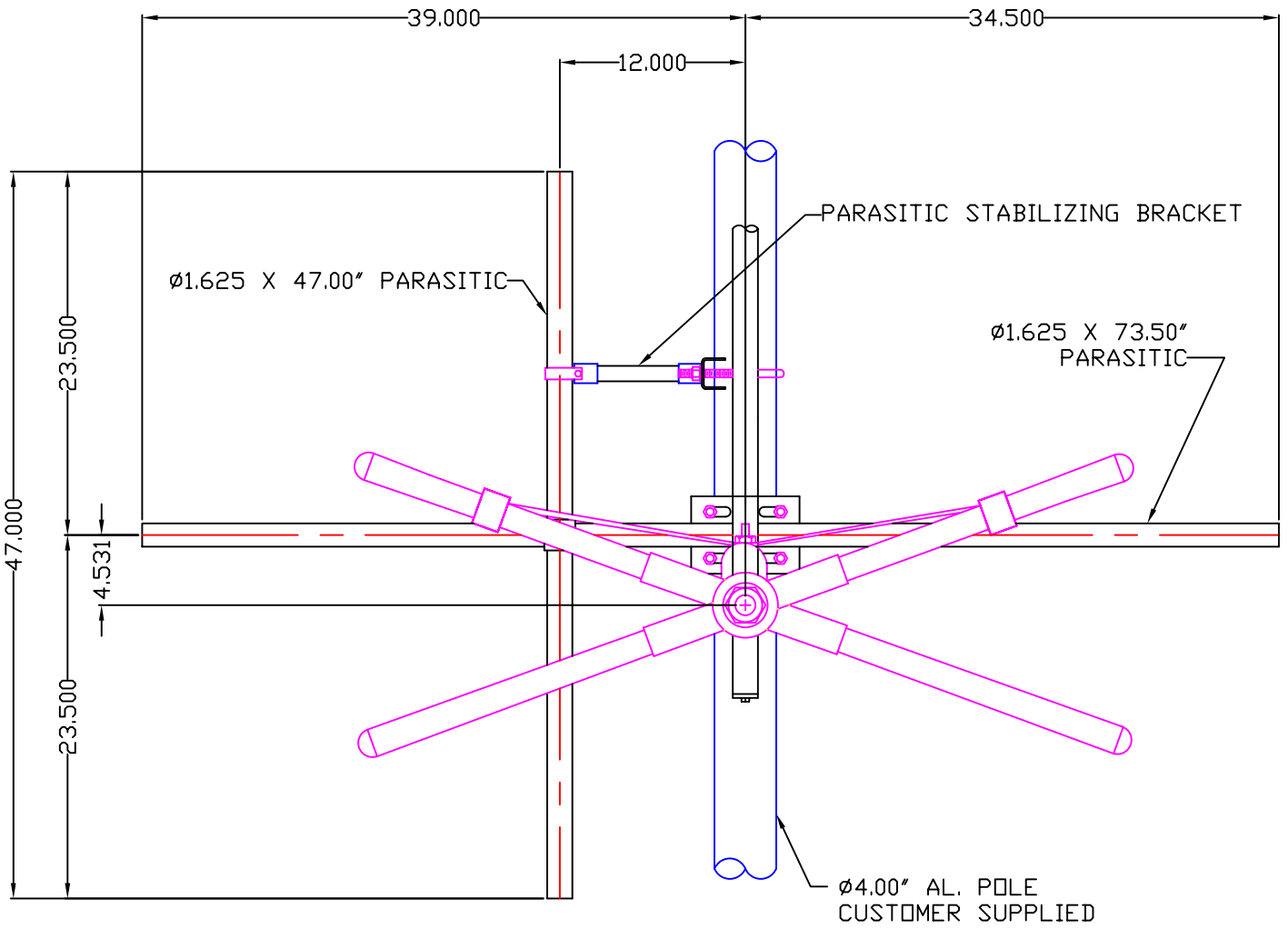
PARTS MADE BY THIS DRAWING

DRAWING NUMBER: 0025D01

SCALE: NTS | NAME: RAC | DATE: 5/24/04 | SHEET 1 OF 1

NOTE:

DRAWING NUMBER: 0025D02



TOLERANCES	
.X	± .015
.XX	± .005
.XXX	± .002
X/X	± 1/32
DEG.	± 1/2

UNLESS OTHERWISE SPECIFIED

REVISION RECORD		
REV	APPROVAL	DATE

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

TITLE: FM3/2-HWS-DA, FREQ. 88.3
WIRP, PENNSUCO, FL

MATERIAL: PARASITIC PLACEMENT
BAY 1

SIZE: A

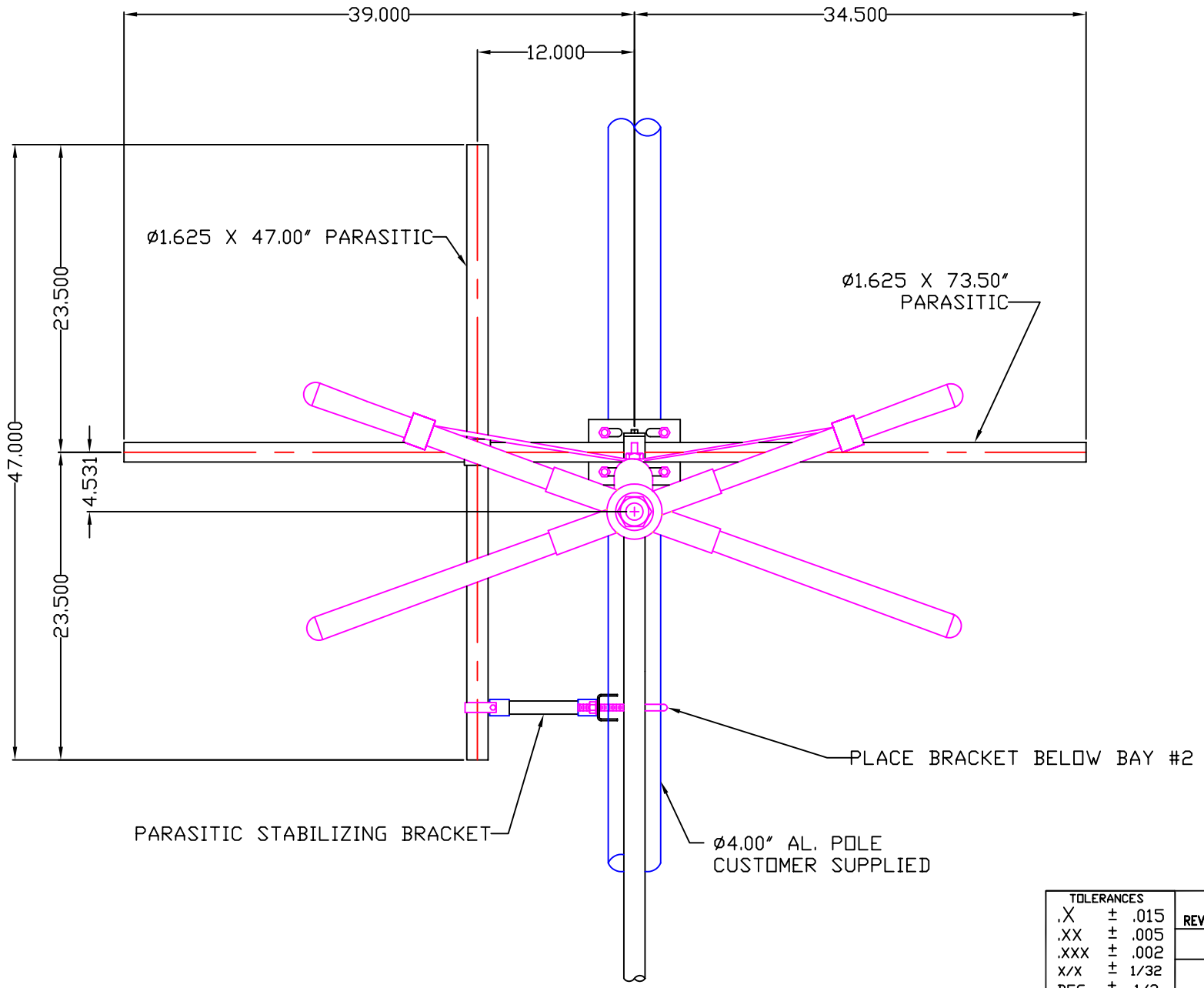
PARTS MADE BY THIS DRAWING

DRAWING NUMBER: 0025D02

SCALE: NTS | NAME: RAC | DATE: 5/24/04 | SHEET 1 OF 1

NOTE:

DRAWING NUMBER: 0025D03



TOLERANCES	
.X	± .015
.XX	± .005
.XXX	± .002
X/X	± 1/32
DEG.	± 1/2

UNLESS OTHERWISE SPECIFIED

REVISION RECORD

REV	APPROVAL	DATE

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

TITLE: FM3/2-HWS-DA, FREQ. 88.3
WIRP, PENNSUCO, FL

MATERIAL: PARASITIC PLACEMENT
BAY 2

SIZE: A

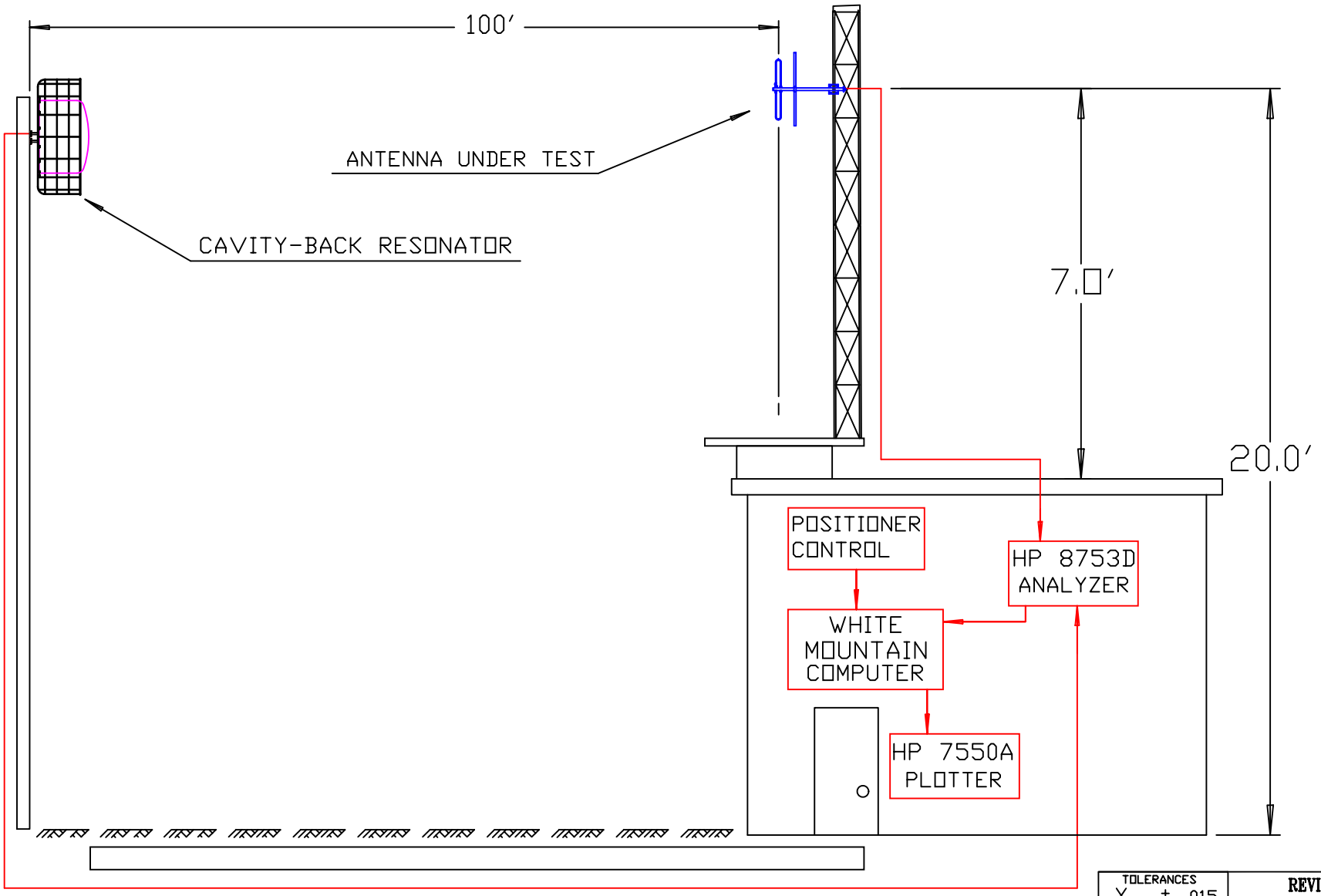
PARTS MADE BY THIS DRAWING

DRAWING NUMBER: 0025D03

SCALE: NTS | NAME: RAC | DATE: 5/24/04 | SHEET 1 OF 1

NOTE:

DRAWING NUMBER: 2105A10



TOLERANCES	
.X	± .015
.XX	± .005
.XXX	± .002
X/X	± 1/32
DEG.	± 1/2

UNLESS OTHERWISE SPECIFIED

REVISION RECORD

REV	APPROVAL	DATE
1		4/30/02

DRAWING NUMBER: 2105A10

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

TITLE: TEST RANGE SCHEMATIC

MATERIAL:

SIZE A

PARTS MADE BY THIS DRAWING

SCALE: NTS | NAME: JRM | DATE: 11/1/98 | SHEET 1 OF 1