



SYSTEMS WITH RELIABILITY, LLP
BROADCAST ANTENNAS AND TRANSMISSION LINE

PATTERN CERTIFICATION

DIRECTIONAL FM ANTENNA WYFG

April 2, 2010

Station	: WYFG
Location	: Gaffney, SC
Frequency	: 91.1 MHz
Channel	: 216C1
Antenna Model	: FMP5 4-4-4 DA
Maximum Antenna Gain	
Vertical	: 4.852 / 6.859 dB
Horizontal	: 4.852 / 6.859 dB

ANTENNA DESCRIPTION

A custom designed **FMP5 4-4-4 DA** antenna was used to produce the required directional azimuth pattern. Each antenna bay consists of a circularly polarized dipole-radiating element enclosed in a radome attached to a panel grid. The array is comprised of four bays, three around configuration, that are spaced a full wavelength apart and mounted to a tower with an uneven power distributed feed system and skewed to certain azimuth points to produce the required azimuth pattern

DESCRIPTION OF TEST PROCEDURE

A third-scale model antenna was first used to generate single bay Horizontal and Vertical azimuth patterns. The resulting azimuth patterns were then used to computer-generate a final composite azimuth pattern that would satisfy the DA pattern on file with the FCC. The full scale antenna was then fabricated and a 1 bay 3 around configuration was placed on our test range to verify the computer-generated results. The antenna was placed 20 ft. high on a platform and carefully spaced apart according to the antenna's final mounting scenario. All feed cables were properly grounded during the pattern testing. Horizontal and vertical azimuth patterns were generated by varying the amount of power and phasing to each feed cable in the array and skewing the panels to certain azimuth points to ultimately obtain the submitted directional azimuth patterns.

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 91.1 MHz. The antenna under test was rotated in a clockwise direction. A gain reference was taken using a dipole tuned to 91.1 MHz. Nowhere, does the received signal exceed a maximum to minimum ratio of 15 dB.

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TEST RESULTS

The attached calculations verify that the **RMS** value of this antenna is **95.12 %** of the **RMS** value of the pattern authorized in the related construction permit **BPED-20070801CWG**. The vertical component **RMS** value is **0.649**. The horizontal component **RMS** value is **0.649**. The circular polarized component **RMS** value is **0.685**.

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

Measured vertical polarized directivity:	2.376 / 3.758 dB
Measured horizontal polarized directivity:	2.372 / 3.751 dB
Measured circular polarized pattern directivity:	2.134 / 3.292 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:

V-Pol. Gain =	(2.376)(.4996)(4.088)	= 4.852 / 6.859 dB
H-Pol. Gain =	(2.372)(.5004)(4.088)	= 4.852 / 6.859 dB

INSTALLATION AND MOUNTING

The antenna is to be mounted in accordance with the supplied drawings. The antenna center of radiation is to be **113 meters** (370.75 ft.) above ground level. The antenna aperture is **32.39 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 system's orientation and the mounting details are described in the following drawings:

DRAWING NO.	TITLE
12301D0	ANTENNA ELEVATION
12301D1	ANTENNA ORIENTATION
12301D2-4	PANEL ASSEMBLY DETAILS
12301D5-9	ANTENNA AND PIPE MOUNTING DETAILS
12301D10-11	FEED SYSTEM SCHEMATIC AND LAYOUT
2105A10	TEST RANGE SCHEMATIC

The array shall be mounted according to **DWG. 12301D0**. The antenna elements shall be aligned at the same heading as in **DWG. 12301D1**. The panel mounting detail assembly is shown in **DWG. 12301D2** through **DWG. 12301D4**. All mounting brackets shall be mounted as in **DWG. 12301D5** through **DWG. 12301D9**. All of the feed system shall be mounted in accordance with **DWG. 12301D10** and **DWG. 12301D11** to ensure the azimuth pattern is radiating properly.

DOCUMENT EXHIBITS

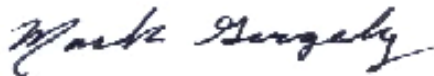
The following exhibits are included as part of this Certificate of Compliance:

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
Exhibit 6	RMS Calculations
Exhibit 7	Drawings

TEST EQUIPMENT

Network Analyzer	:	Hewlett Packard Model # 8753C Serial Number: 08753 – 69138 Calibrated 4/28/09, SWR, Inc.
Computer	:	Pentium 3, 450 MHz, Range Program
Printer	:	Hewlett-Packard Laser Jet 6L
Positioner	:	Orbit Positioner Calibrated 1/12/10, SWR, Inc.

Prepared by:



Mark A. Gergely
Electrical Engineer
Systems With Reliability LLP

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 WYFG -FM, Gaffney (city of license), SC
(state), during the installation of the WYFG -FM directional antenna.
- 3.) I certify that the WYFG -FM directional antenna has been oriented at the proper azimuths as authorized in the construction permit (FCC File Number BPED-20070801CWG).

Sign _____

Dated: _____mm/dd/yy

Engineer's Declaration

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

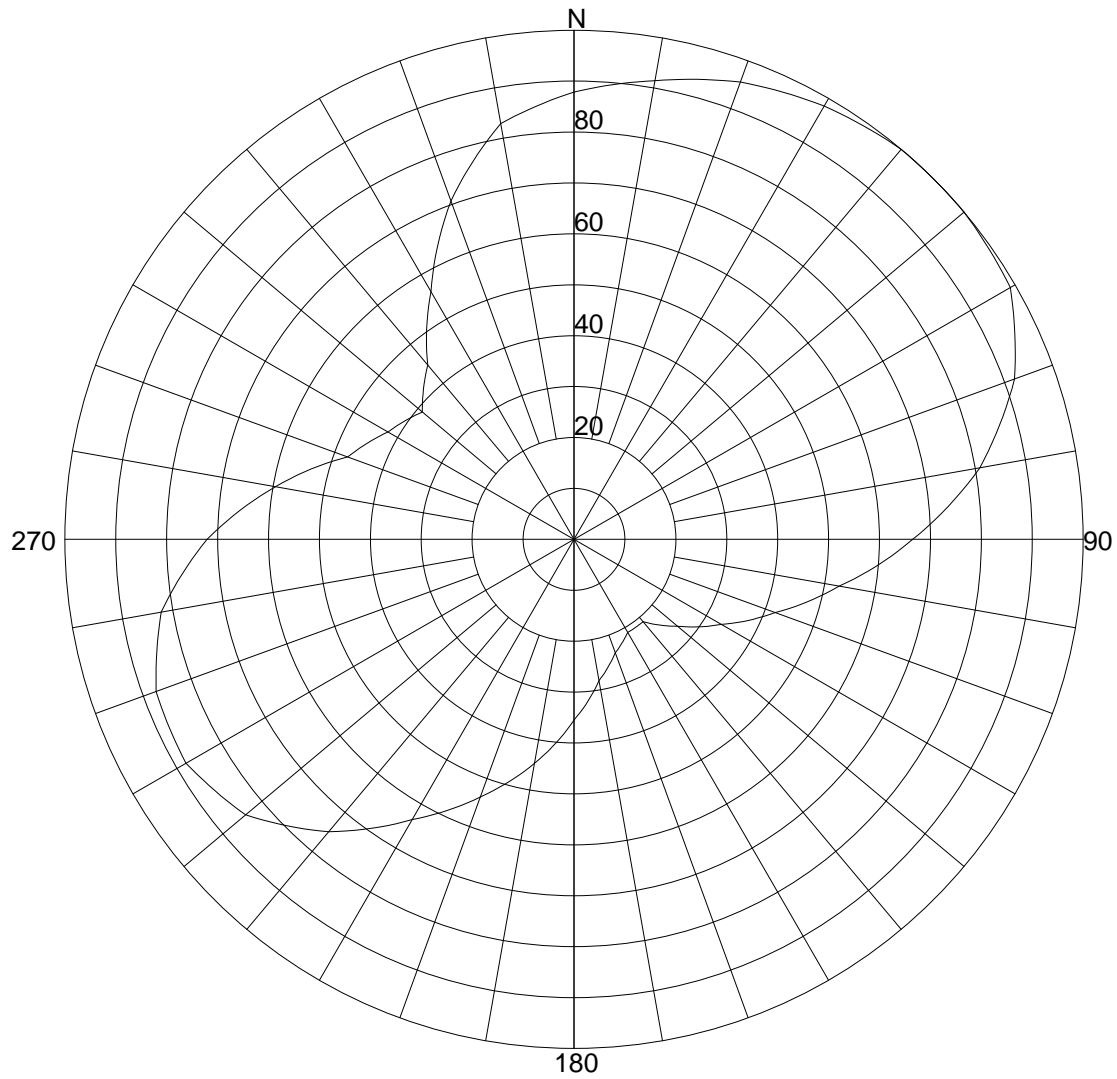
- 1.) I am the holder of a valid General Radio Telephone Operators License, Number _____ (FCC License No.)
- 2.) I have been a member of the Society of Broadcast Engineer's since _____ (year)
- 3.) That I have been employed as a technical consultant with the firm of:

_____ (firm name), of
_____ (city state)
- 4.) That _____ (Firm's Name) was retained by
_____ (Permit tee's Name) for the purpose of preparing its application for the construction permit of WYFG -FM Gaffney (City), South Carolina (State), from which the underlying Construction Permit (FCC File Number BPED-20070801CWG) was granted by the Commission.
- 5.) That I am familiar with the terms and conditions of the WYFG -FM Construction Permit.
- 6.) I hereby certify that I have overseen the installation of the WYFG -FM directional antenna and that the installation was complete to the manufacturer's instructions.

Sign _____

Dated: _____ mm/dd/yy

Exhibit 1: Circular Polarized Azimuth Pattern



Azimuth Pattern

Systems With Reliability

Scale: Linear

Unit: Relative Field

CLIENT: WYFG, Bible Broadcasting Network

Date: 3/2/2010

ANTENNA TYPE: FMP5 4-4-4 DA

FREQUENCY: 91.1 MHz

PATTERN POL.: Circular

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.1338 / 3.292dB

PATTERN RMS: 0.685

Relative Field Tabulation(Azimuth)

Azimuth Heading	Normalized Field(dB)	Azimuth Heading	Normalized Field(dB)
0	.8786 (-1.124)	180	.3550 (-8.995)
5	.8967 (-0.948)	185	.4009 (-7.94)
10	.9147 (-0.774)	190	.4467 (-7)
15	.9353 (-0.581)	195	.4927 (-6.149)
20	.9559 (-0.392)	200	.5386 (-5.375)
25	.9694 (-0.27)	205	.5872 (-4.624)
30	.9828 (-0.151)	210	.6358 (-3.934)
35	.9914 (-0.075)	215	.6928 (-3.188)
40	1.0000 (0)	220	.7498 (-2.501)
45	1.0000 (0)	225	.7959 (-1.983)
50	1.0000 (0)	230	.8419 (-1.495)
55	.9948 (-0.045)	235	.8609 (-1.301)
60	.9896 (-0.091)	240	.8799 (-1.111)
65	.9553 (-0.398)	245	.8767 (-1.143)
70	.9209 (-0.716)	250	.8734 (-1.176)
75	.8652 (-1.258)	255	.8484 (-1.428)
80	.8095 (-1.836)	260	.8233 (-1.689)
85	.7374 (-2.646)	265	.7720 (-2.248)
90	.6653 (-3.54)	270	.7207 (-2.845)
95	.5971 (-4.48)	275	.6579 (-3.637)
100	.5288 (-5.534)	280	.5951 (-4.508)
105	.4746 (-6.474)	285	.5341 (-5.448)
110	.4203 (-7.529)	290	.4730 (-6.503)
115	.3772 (-8.47)	295	.4475 (-6.984)
120	.3340 (-9.525)	300	.4220 (-7.494)
125	.2998 (-10.465)	305	.4055 (-7.84)
130	.2655 (-11.519)	310	.3890 (-8.201)
135	.2383 (-12.459)	315	.4180 (-7.576)
140	.2110 (-13.514)	320	.4470 (-6.994)
145	.2110 (-13.514)	325	.5045 (-5.943)
150	.2110 (-13.514)	330	.5620 (-5.005)
155	.2240 (-12.995)	335	.6345 (-3.951)
160	.2370 (-12.505)	340	.7070 (-3.012)
165	.2595 (-11.717)	345	.7681 (-2.292)
170	.2820 (-10.995)	350	.8292 (-1.627)
175	.3185 (-9.938)	355	.8539 (-1.372)

Systems With Reliability

CLIENT: WYFG, Bible Broadcasting Network

Date: 3/2/2010

ANTENNA TYPE: FMP5 4-4-4 DA

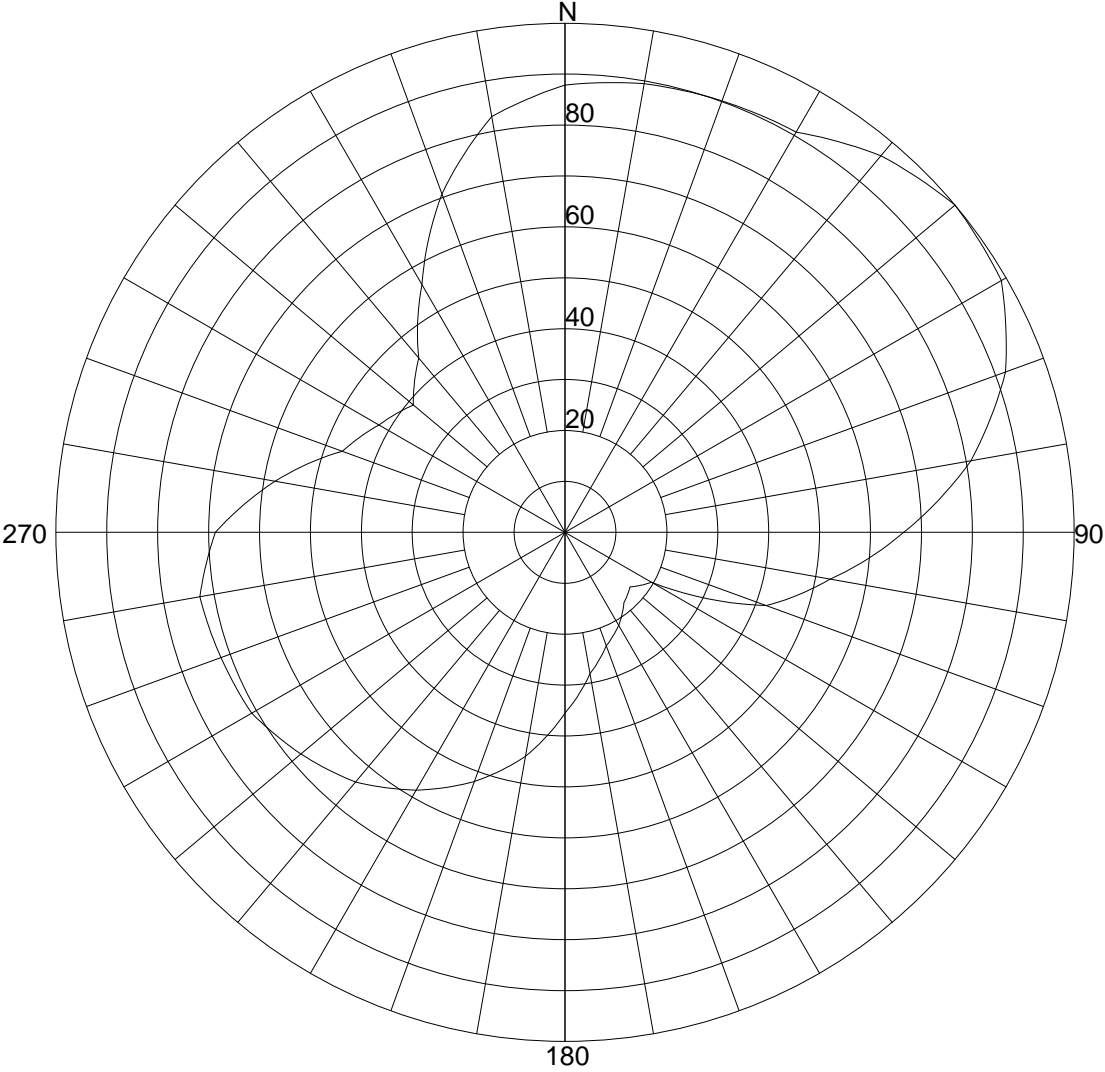
FREQUENCY: 91.1 MHz

PATTERN POL.: Circular

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.1338 / 3.292dB

PATTERN RMS: 0.685



Azimuth Pattern

Systems With Reliability

Scale: Linear
Unit: Relative Field

CLIENT: WYFG, Bible Broadcasting Network	Date: 3/2/2010
ANTENNA TYPE: FMP5 4-4-4	
FREQUENCY: 91.1 MHz	
PATTERN POL.: Horizontal	CIRCULARITY(+/-dB):
AZ. DIRECTIVITY: 2.3719 / 3.751dB	PATTERN RMS: 0.649

Relative Field Tabulation(Azimuth)

Azimuth Heading	Normalized Field(dB)	Azimuth Heading	Normalized Field(dB)
0	.8786 (-1.124)	180	.3550 (-8.995)
5	.8867 (-1.044)	185	.4009 (-7.94)
10	.8948 (-0.965)	190	.4467 (-7)
15	.8984 (-0.931)	195	.4839 (-6.306)
20	.9019 (-0.897)	200	.5210 (-5.663)
25	.9049 (-0.868)	205	.5529 (-5.148)
30	.9078 (-0.84)	210	.5847 (-4.661)
35	.9367 (-0.568)	215	.6125 (-4.259)
40	.9656 (-0.304)	220	.6402 (-3.874)
45	.9828 (-0.151)	225	.6588 (-3.626)
50	1.0000 (0)	230	.6773 (-3.384)
55	.9948 (-0.045)	235	.6939 (-3.174)
60	.9896 (-0.091)	240	.7105 (-2.969)
65	.9553 (-0.398)	245	.7147 (-2.918)
70	.9209 (-0.716)	250	.7189 (-2.867)
75	.8652 (-1.258)	255	.7236 (-2.81)
80	.8095 (-1.836)	260	.7283 (-2.754)
85	.7374 (-2.646)	265	.7075 (-3.005)
90	.6653 (-3.54)	270	.6867 (-3.265)
95	.5971 (-4.48)	275	.6325 (-3.979)
100	.5288 (-5.534)	280	.5782 (-4.758)
105	.4746 (-6.474)	285	.5219 (-5.649)
110	.4203 (-7.529)	290	.4655 (-6.642)
115	.3082 (-10.223)	295	.4438 (-7.057)
120	.1961 (-14.15)	300	.4220 (-7.494)
125	.1814 (-14.827)	305	.4055 (-7.84)
130	.1667 (-15.561)	310	.3890 (-8.201)
135	.1735 (-15.217)	315	.4180 (-7.576)
140	.1802 (-14.885)	320	.4470 (-6.994)
145	.1956 (-14.173)	325	.5045 (-5.943)
150	.2110 (-13.514)	330	.5620 (-5.005)
155	.2240 (-12.995)	335	.6345 (-3.951)
160	.2370 (-12.505)	340	.7070 (-3.012)
165	.2595 (-11.717)	345	.7681 (-2.292)
170	.2820 (-10.995)	350	.8292 (-1.627)
175	.3185 (-9.938)	355	.8539 (-1.372)

Systems With Reliability

CLIENT: *WYFG, Bible Broadcasting Network*

Date: 3/2/2010

ANTENNA TYPE: FMP5 4-4-4

FREQUENCY: 91.1 MHz

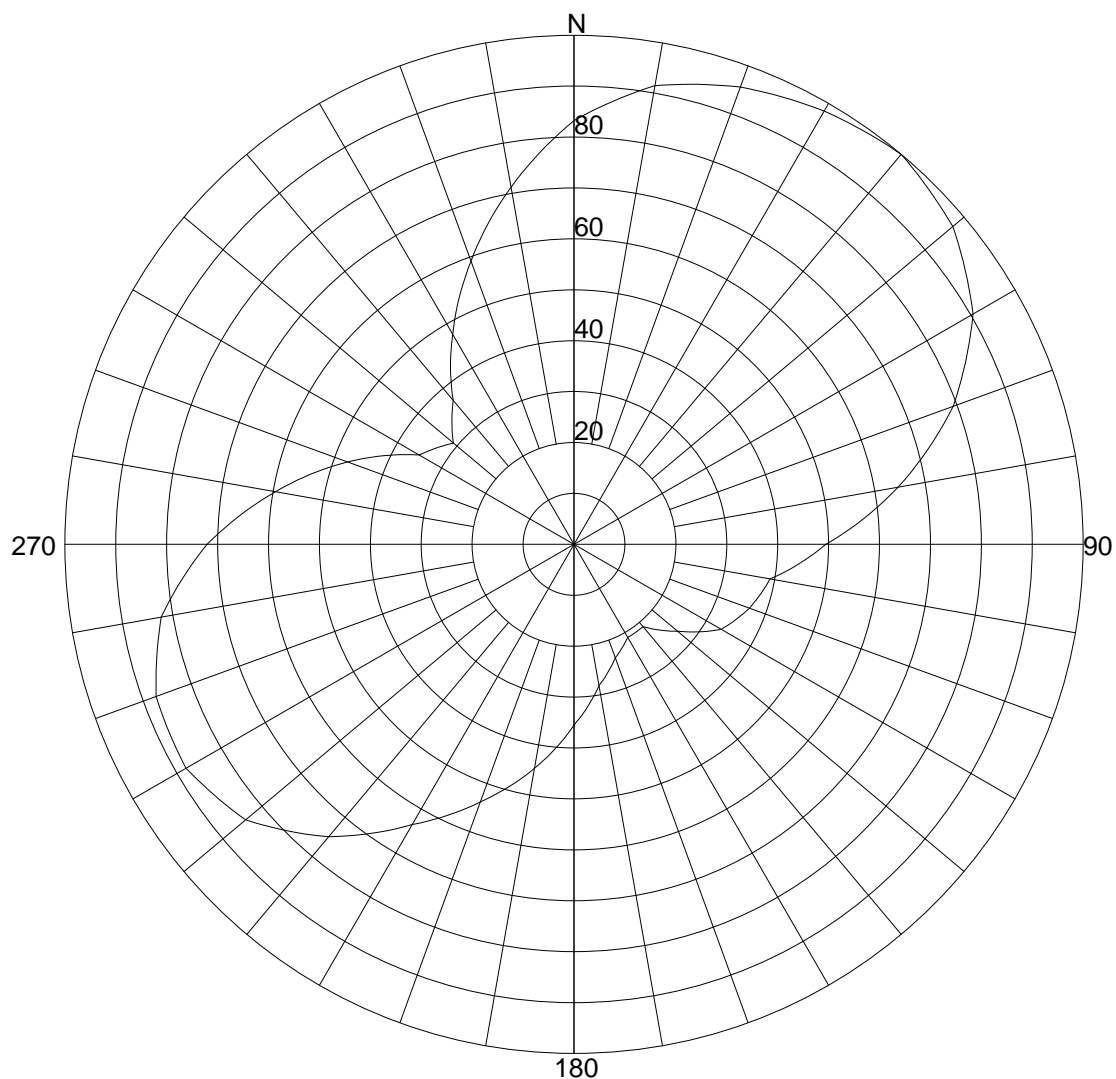
PATTERN POL.: Horizontal

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.3719 / 3.751dB

PATTERN RMS: 0.649

Exhibit 3: Measured V-Pol Azimuth Pattern



Azimuth Pattern

Scale: Linear

Unit: Relative Field

Systems With Reliability

CLIENT: WYFG, Bible Broadcasting Network

Date: 3/2/2010

ANTENNA TYPE: FMP5 4-4-4

FREQUENCY: 91.1 MHz

PATTERN POL.: Vertical

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.37555 / 3.758dB

PATTERN RMS: 0.649

Relative Field Tabulation(Azimuth)

Azimuth Heading	Normalized Field(dB)	Azimuth Heading	Normalized Field(dB)
0	.8322 (-1.595)	180	.3550 (-8.995)
5	.8735 (-1.175)	185	.4009 (-7.94)
10	.9147 (-0.774)	190	.4467 (-7)
15	.9353 (-0.581)	195	.4927 (-6.149)
20	.9559 (-0.392)	200	.5386 (-5.375)
25	.9694 (-0.27)	205	.5872 (-4.624)
30	.9828 (-0.151)	210	.6358 (-3.934)
35	.9914 (-0.075)	215	.6928 (-3.188)
40	1.0000 (0)	220	.7498 (-2.501)
45	.9857 (-0.126)	225	.7959 (-1.983)
50	.9713 (-0.253)	230	.8419 (-1.495)
55	.9382 (-0.555)	235	.8609 (-1.301)
60	.9050 (-0.867)	240	.8799 (-1.111)
65	.8488 (-1.424)	245	.8767 (-1.143)
70	.7925 (-2.02)	250	.8734 (-1.176)
75	.7193 (-2.862)	255	.8484 (-1.428)
80	.6461 (-3.794)	260	.8233 (-1.689)
85	.5704 (-4.877)	265	.7720 (-2.248)
90	.4946 (-6.115)	270	.7207 (-2.845)
95	.4430 (-7.073)	275	.6579 (-3.637)
100	.3913 (-8.15)	280	.5951 (-4.508)
105	.3790 (-8.428)	285	.5341 (-5.448)
110	.3666 (-8.716)	290	.4730 (-6.503)
115	.3503 (-9.111)	295	.4119 (-7.705)
120	.3340 (-9.525)	300	.3507 (-9.101)
125	.2998 (-10.465)	305	.3300 (-9.63)
130	.2655 (-11.519)	310	.3093 (-10.192)
135	.2383 (-12.459)	315	.3392 (-9.391)
140	.2110 (-13.514)	320	.3691 (-8.657)
145	.2110 (-13.514)	325	.4228 (-7.478)
150	.2110 (-13.514)	330	.4764 (-6.441)
155	.2240 (-12.995)	335	.5341 (-5.448)
160	.2370 (-12.505)	340	.5917 (-4.558)
165	.2595 (-11.717)	345	.6521 (-3.714)
170	.2820 (-10.995)	350	.7125 (-2.944)
175	.3185 (-9.938)	355	.7724 (-2.244)

Systems With Reliability

CLIENT: *WYFG, Bible Broadcasting Network*

Date: 3/2/2010

ANTENNA TYPE: FMP5 4-4-4

FREQUENCY: 91.1 MHz

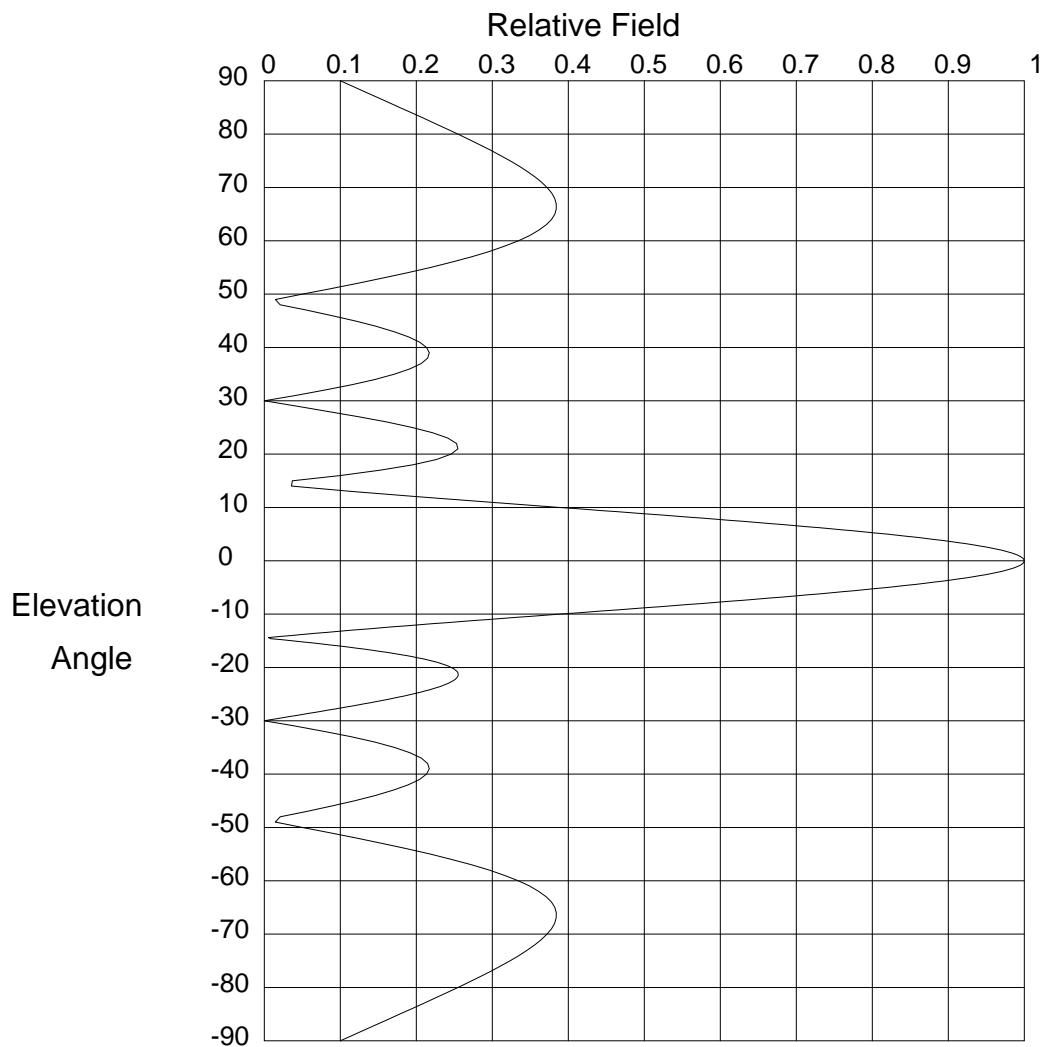
PATTERN POL.: Vertical

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.37555 / 3.758dB

PATTERN RMS: 0.649

Exhibit 4: Elevation Pattern



Elevation Pattern

Scale: Linear

Units: Field, Relative

Systems With Reliability

CLIENT: WYFG, Bible Broadcasting Network

Date: 3/29/2010

ANTENNA TYPE: FMP5 4-4-4 DA

FREQUENCY: 91.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 4.088/6.115 dBd

Beam Tilt (Deg.) : 0

DIRECTIVITY(Horiz): 4.088/6.115 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)
90.0	.10 (-20)	52.0	.122 (-18.296)	14.0	.036 (-28.925)
89.0	.116 (-18.733)	51.0	.087 (-21.259)	13.0	.116 (-18.677)
88.0	.131 (-17.628)	50.0	.051 (-25.907)	12.0	.203 (-13.829)
87.0	.147 (-16.648)	49.0	.015 (-36.679)	11.0	.295 (-10.601)
86.0	.163 (-15.769)	48.0	.021 (-33.591)	10.0	.389 (-8.198)
85.0	.178 (-14.973)	47.0	.055 (-25.123)	9.8	.408 (-7.785)
84.0	.194 (-14.247)	46.0	.088 (-21.083)	9.6	.427 (-7.391)
83.0	.209 (-13.581)	45.0	.119 (-18.507)	9.4	.446 (-7.015)
82.0	.225 (-12.967)	44.0	.146 (-16.7)	9.2	.465 (-6.656)
81.0	.24 (-12.4)	43.0	.17 (-15.39)	9.0	.484 (-6.311)
80.0	.255 (-11.875)	42.0	.19 (-14.446)	8.8	.502 (-5.981)
79.0	.269 (-11.39)	41.0	.204 (-13.798)	8.6	.521 (-5.665)
78.0	.284 (-10.941)	40.0	.214 (-13.409)	8.4	.539 (-5.362)
77.0	.298 (-10.528)	39.0	.217 (-13.261)	8.2	.558 (-5.071)
76.0	.311 (-10.149)	38.0	.215 (-13.353)	8.0	.576 (-4.792)
75.0	.323 (-9.803)	37.0	.207 (-13.7)	7.8	.594 (-4.524)
74.0	.335 (-9.491)	36.0	.192 (-14.331)	7.6	.612 (-4.266)
73.0	.346 (-9.212)	35.0	.172 (-15.306)	7.4	.63 (-4.019)
72.0	.356 (-8.968)	34.0	.146 (-16.728)	7.2	.647 (-3.782)
71.0	.365 (-8.759)	33.0	.115 (-18.8)	7.0	.664 (-3.554)
70.0	.372 (-8.587)	32.0	.08 (-21.983)	6.8	.681 (-3.335)
69.0	.378 (-8.453)	31.0	.041 (-27.75)	6.6	.698 (-3.125)
68.0	.382 (-8.359)	30.0	.00 (-50)	6.4	.714 (-2.924)
67.0	.384 (-8.309)	29.0	.042 (-27.509)	6.2	.73 (-2.731)
66.0	.384 (-8.305)	28.0	.084 (-21.504)	6.0	.746 (-2.546)
65.0	.382 (-8.352)	27.0	.125 (-18.095)	5.8	.761 (-2.368)
64.0	.378 (-8.452)	26.0	.162 (-15.813)	5.6	.776 (-2.199)
63.0	.371 (-8.611)	25.0	.195 (-14.205)	5.4	.791 (-2.036)
62.0	.362 (-8.836)	24.0	.222 (-13.076)	5.2	.805 (-1.881)
61.0	.349 (-9.134)	23.0	.242 (-12.335)	5.0	.819 (-1.733)
60.0	.334 (-9.515)	22.0	.253 (-11.938)	4.8	.833 (-1.591)
59.0	.317 (-9.989)	21.0	.255 (-11.878)	4.6	.846 (-1.457)
58.0	.296 (-10.571)	20.0	.246 (-12.177)	4.4	.858 (-1.329)
57.0	.273 (-11.282)	19.0	.226 (-12.899)	4.2	.87 (-1.207)
56.0	.247 (-12.148)	18.0	.196 (-14.173)	4.0	.882 (-1.092)
55.0	.219 (-13.205)	17.0	.153 (-16.282)	3.8	.893 (-0.983)
54.0	.188 (-14.511)	16.0	.10 (-19.974)	3.6	.904 (-0.88)
53.0	.156 (-16.155)	15.0	.037 (-28.661)	3.4	.914 (-0.783)

Systems With Reliability

Page 1 of 3

CLIENT: WYFG, Bible Broadcasting Network

Date: 3/29/2010

ANTENNA TYPE: FMP5 4-4-4 DA

FREQUENCY: 91.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 4.088/6.115 dBd

Beam Tilt (Deg.) : 0

DIRECTIVITY(Horiz): 4.088/6.115 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)
3.2	.923 (-0.692)	-4.4	.858 (-1.329)	-12.0	.203 (-13.829)
3.0	.933 (-0.607)	-4.6	.846 (-1.457)	-12.2	.186 (-14.626)
2.8	.941 (-0.528)	-4.8	.833 (-1.591)	-12.4	.168 (-15.493)
2.6	.949 (-0.454)	-5.0	.819 (-1.733)	-12.6	.151 (-16.444)
2.4	.956 (-0.386)	-5.2	.805 (-1.881)	-12.8	.133 (-17.497)
2.2	.963 (-0.324)	-5.4	.791 (-2.036)	-13.0	.116 (-18.677)
2.0	.97 (-0.268)	-5.6	.776 (-2.199)	-13.2	.10 (-20.021)
1.8	.975 (-0.216)	-5.8	.761 (-2.368)	-13.4	.083 (-21.584)
1.6	.981 (-0.171)	-6.0	.746 (-2.546)	-13.6	.067 (-23.455)
1.4	.985 (-0.131)	-6.2	.73 (-2.731)	-13.8	.051 (-25.792)
1.2	.989 (-0.096)	-6.4	.714 (-2.924)	-14.0	.036 (-28.925)
1.0	.992 (-0.067)	-6.6	.698 (-3.125)	-14.2	.021 (-33.736)
.8	.995 (-0.043)	-6.8	.681 (-3.335)	-14.4	.006 (-44.914)
.6	.997 (-0.024)	-7.0	.664 (-3.554)	-14.6	.009 (-41.043)
.4	.999 (-0.011)	-7.2	.647 (-3.782)	-14.8	.023 (-32.742)
.2	1.00 (-0.003)	-7.4	.63 (-4.019)	-15.0	.037 (-28.661)
.0	1.00 (0)	-7.6	.612 (-4.266)	-15.2	.05 (-25.959)
-.2	1.00 (-0.003)	-7.8	.594 (-4.524)	-15.4	.063 (-23.954)
-.4	.999 (-0.011)	-8.0	.576 (-4.792)	-15.6	.076 (-22.37)
-.6	.997 (-0.024)	-8.2	.558 (-5.071)	-15.8	.088 (-21.07)
-.8	.995 (-0.043)	-8.4	.539 (-5.362)	-16.0	.10 (-19.974)
-1.0	.992 (-0.067)	-8.6	.521 (-5.665)	-16.2	.112 (-19.034)
-1.2	.989 (-0.096)	-8.8	.502 (-5.981)	-16.4	.123 (-18.214)
-1.4	.985 (-0.131)	-9.0	.484 (-6.311)	-16.6	.133 (-17.493)
-1.6	.981 (-0.171)	-9.2	.465 (-6.656)	-16.8	.144 (-16.854)
-1.8	.975 (-0.216)	-9.4	.446 (-7.015)	-17.0	.153 (-16.282)
-2.0	.97 (-0.268)	-9.6	.427 (-7.391)	-17.2	.163 (-15.77)
-2.2	.963 (-0.324)	-9.8	.408 (-7.785)	-17.4	.172 (-15.308)
-2.4	.956 (-0.386)	-10.0	.389 (-8.198)	-17.6	.18 (-14.891)
-2.6	.949 (-0.454)	-10.2	.37 (-8.63)	-17.8	.188 (-14.514)
-2.8	.941 (-0.528)	-10.4	.351 (-9.085)	-18.0	.196 (-14.173)
-3.0	.933 (-0.607)	-10.6	.333 (-9.563)	-18.2	.203 (-13.864)
-3.2	.923 (-0.692)	-10.8	.314 (-10.068)	-18.4	.209 (-13.584)
-3.4	.914 (-0.783)	-11.0	.295 (-10.601)	-18.6	.215 (-13.331)
-3.6	.904 (-0.88)	-11.2	.276 (-11.166)	-18.8	.221 (-13.103)
-3.8	.893 (-0.983)	-11.4	.258 (-11.767)	-19.0	.226 (-12.899)
-4.0	.882 (-1.092)	-11.6	.24 (-12.407)	-19.2	.231 (-12.716)
-4.2	.87 (-1.207)	-11.8	.222 (-13.092)	-19.4	.236 (-12.553)

Systems With Reliability

Page 2 of 3

CLIENT: WYFG, Bible Broadcasting Network

Date: 3/29/2010

ANTENNA TYPE: FMP5 4-4-4 DA

FREQUENCY: 91.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 4.088/6.115 dBd

Beam Tilt (Deg.) : 0

DIRECTIVITY(Horiz): 4.088/6.115 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	.24 (-12.41)	-27.2	.117 (-18.664)	-54.0	.188 (-14.511)
-19.8	.243 (-12.285)	-27.4	.109 (-19.281)	-55.0	.219 (-13.205)
-20.0	.246 (-12.177)	-27.6	.101 (-19.954)	-56.0	.247 (-12.148)
-20.2	.249 (-12.087)	-27.8	.092 (-20.691)	-57.0	.273 (-11.282)
-20.4	.251 (-12.012)	-28.0	.084 (-21.504)	-58.0	.296 (-10.571)
-20.6	.253 (-11.952)	-28.2	.076 (-22.408)	-59.0	.317 (-9.989)
-20.8	.254 (-11.908)	-28.4	.067 (-23.424)	-60.0	.334 (-9.515)
-21.0	.255 (-11.878)	-28.6	.059 (-24.581)	-61.0	.349 (-9.134)
-21.2	.255 (-11.862)	-28.8	.051 (-25.921)	-62.0	.362 (-8.836)
-21.4	.255 (-11.861)	-29.0	.042 (-27.509)	-63.0	.371 (-8.611)
-21.6	.255 (-11.873)	-29.2	.034 (-29.455)	-64.0	.378 (-8.452)
-21.8	.254 (-11.899)	-29.4	.025 (-31.965)	-65.0	.382 (-8.352)
-22.0	.253 (-11.938)	-29.6	.017 (-35.502)	-66.0	.384 (-8.305)
-22.2	.251 (-11.99)	-29.8	.008 (-41.542)	-67.0	.384 (-8.309)
-22.4	.25 (-12.056)	-30.0	.00 (-50)	-68.0	.382 (-8.359)
-22.6	.247 (-12.136)	-31.0	.041 (-27.75)	-69.0	.378 (-8.453)
-22.8	.245 (-12.228)	-32.0	.08 (-21.983)	-70.0	.372 (-8.587)
-23.0	.242 (-12.335)	-33.0	.115 (-18.8)	-71.0	.365 (-8.759)
-23.2	.238 (-12.455)	-34.0	.146 (-16.728)	-72.0	.356 (-8.968)
-23.4	.235 (-12.588)	-35.0	.172 (-15.306)	-73.0	.346 (-9.212)
-23.6	.231 (-12.737)	-36.0	.192 (-14.331)	-74.0	.335 (-9.491)
-23.8	.226 (-12.899)	-37.0	.207 (-13.7)	-75.0	.323 (-9.803)
-24.0	.222 (-13.076)	-38.0	.215 (-13.353)	-76.0	.311 (-10.149)
-24.2	.217 (-13.269)	-39.0	.217 (-13.261)	-77.0	.298 (-10.528)
-24.4	.212 (-13.478)	-40.0	.214 (-13.409)	-78.0	.284 (-10.941)
-24.6	.206 (-13.703)	-41.0	.204 (-13.798)	-79.0	.269 (-11.39)
-24.8	.201 (-13.945)	-42.0	.19 (-14.446)	-80.0	.255 (-11.875)
-25.0	.195 (-14.205)	-43.0	.17 (-15.39)	-81.0	.24 (-12.4)
-25.2	.189 (-14.484)	-44.0	.146 (-16.7)	-82.0	.225 (-12.967)
-25.4	.182 (-14.783)	-45.0	.119 (-18.507)	-83.0	.209 (-13.581)
-25.6	.176 (-15.103)	-46.0	.088 (-21.083)	-84.0	.194 (-14.247)
-25.8	.169 (-15.446)	-47.0	.055 (-25.123)	-85.0	.178 (-14.973)
-26.0	.162 (-15.813)	-48.0	.021 (-33.591)	-86.0	.163 (-15.769)
-26.2	.155 (-16.207)	-49.0	.015 (-36.679)	-87.0	.147 (-16.648)
-26.4	.147 (-16.629)	-50.0	.051 (-25.907)	-88.0	.131 (-17.628)
-26.6	.14 (-17.082)	-51.0	.087 (-21.259)	-89.0	.116 (-18.733)
-26.8	.132 (-17.569)	-52.0	.122 (-18.296)	-90.0	.10 (-20)
-27.0	.125 (-18.095)	-53.0	.156 (-16.155)	90.0	.00 (-50)

Systems With Reliability

Page 3 of 3

CLIENT: WYFG, Bible Broadcasting Network

Date: 3/29/2010

ANTENNA TYPE: FMP5 4-4-4 DA

FREQUENCY: 91.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 4.088/6.115 dBd

Beam Tilt (Deg.) : 0

DIRECTIVITY(Horiz): 4.088/6.115 dBd

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

Exhibit 5: Antenna Data Sheet



SYSTEMS WITH RELIABILITY, LLP
BROADCAST ANTENNAS AND TRANSMISSION LINE

SYSTEM DATA SHEET

Customer	WYFG
Contact	Michael Raley
Location	Gaffney, SC
Antenna Model	FMP5 4-4-4 DA
Channel / Frequency	216C1/91.1 MHz

ELECTRICAL SPECIFICATIONS

Antenna Specifications:

	H-POL	dB	V. Pol.	dB
License ERP (KW)	100	20.000 dB	100	20.000 dB
FCC Limit Pattern Directivity	1.931	2.857 dB	1.931	2.857 dB
Elevation Directivity	4.088	6.115 dB	4.088	6.115 dB
Azimuth Directivity	2.372	3.751 dB	2.376	3.758 dB
Composite Pattern	2.134	3.292 dB	2.134	3.292 dB
Polarization Ratio	0.500	-3.007 dB	0.500	-3.014 dB
RMS Comp./RMS Limit	95.12 %			
Antenna Efficiency %	100	0	100	0
Power Ratio (Pol. Ratio X Efficiency)	0.5004	0	0.4996	0
Antenna Gain	4.852	6.859 dB	4.852	6.859 dB

Antenna Input Power (KW)	20.611 kW	13.141 (dBK)
--------------------------	-----------	--------------

Feed Line Specifications:

Line Type	HJ8-50B	3" Air 50 Ω
Attenuation Per 100 ft (dB)		0.137 dB
Line Length (ft) AGL + 45'		415.75 ft.
Total Line Attenuation (dB)		0.5696 dB
Line Efficiency		87.71 %
Power Input to the Line (KW)	23.499 kW	13.710 (dBK)

MECHANICAL SPECIFICATIONS

No. Of Bays	4	
Antenna Aperture	32.39 ft.	9.88 meter
Center of Radiation AGL	370.75 ft.	113.03 meter
Antenna Weight with Radomes	1865.00 lbs.	847.73 kg
Windload (50/33) with Radomes	3800.00 lbs.	Windload CaAc 115.00 ft^2

Prepared by:

David K. Edmiston Jr.

David K. Edmiston Jr.
SWR, LLP



SYSTEMS WITH RELIABILITY, INC.
Broadcast Antennas and Transmission Systems

WYFG Antenna RMS Comparison

PROPOSED ANTENNA

**Azimuth
Heading** **Relative
Field**

0	1.0000
10	1.0000
20	1.0000
30	1.0000
40	1.0000
50	1.0000
60	1.0000
70	1.0000
80	0.8410
90	0.6680
100	0.5310
110	0.4220
120	0.3350
130	0.2660
140	0.2110
150	0.2110
160	0.2370
170	0.2820
180	0.3550
190	0.4470
200	0.5620
210	0.7080
220	0.8910
230	0.9440
240	0.9440
250	0.9170
260	0.9170
270	0.7500
280	0.5960
290	0.4730
300	0.4220
310	0.3890
320	0.4470
330	0.5620
340	0.7080
350	0.8910

Sum of Relative Field Squared : **18.704**
Sum Divided by 36 (Readings) : **0.520**
Square Root : **0.721**

DESIGNED ANTENNA

**Azimuth
Heading** **Relative
Field**

0	0.8786
10	0.9147
20	0.9559
30	0.9828
40	1.0000
50	1.0000
60	0.9896
70	0.9209
80	0.8095
90	0.6653
100	0.5288
110	0.4203
120	0.3340
130	0.2655
140	0.2110
150	0.2110
160	0.2370
170	0.2820
180	0.3550
190	0.4467
200	0.5386
210	0.6358
220	0.7498
230	0.8419
240	0.8799
250	0.8734
260	0.8233
270	0.7207
280	0.5951
290	0.4730
300	0.4220
310	0.3890
320	0.4470
330	0.5620
340	0.7070
350	0.8292

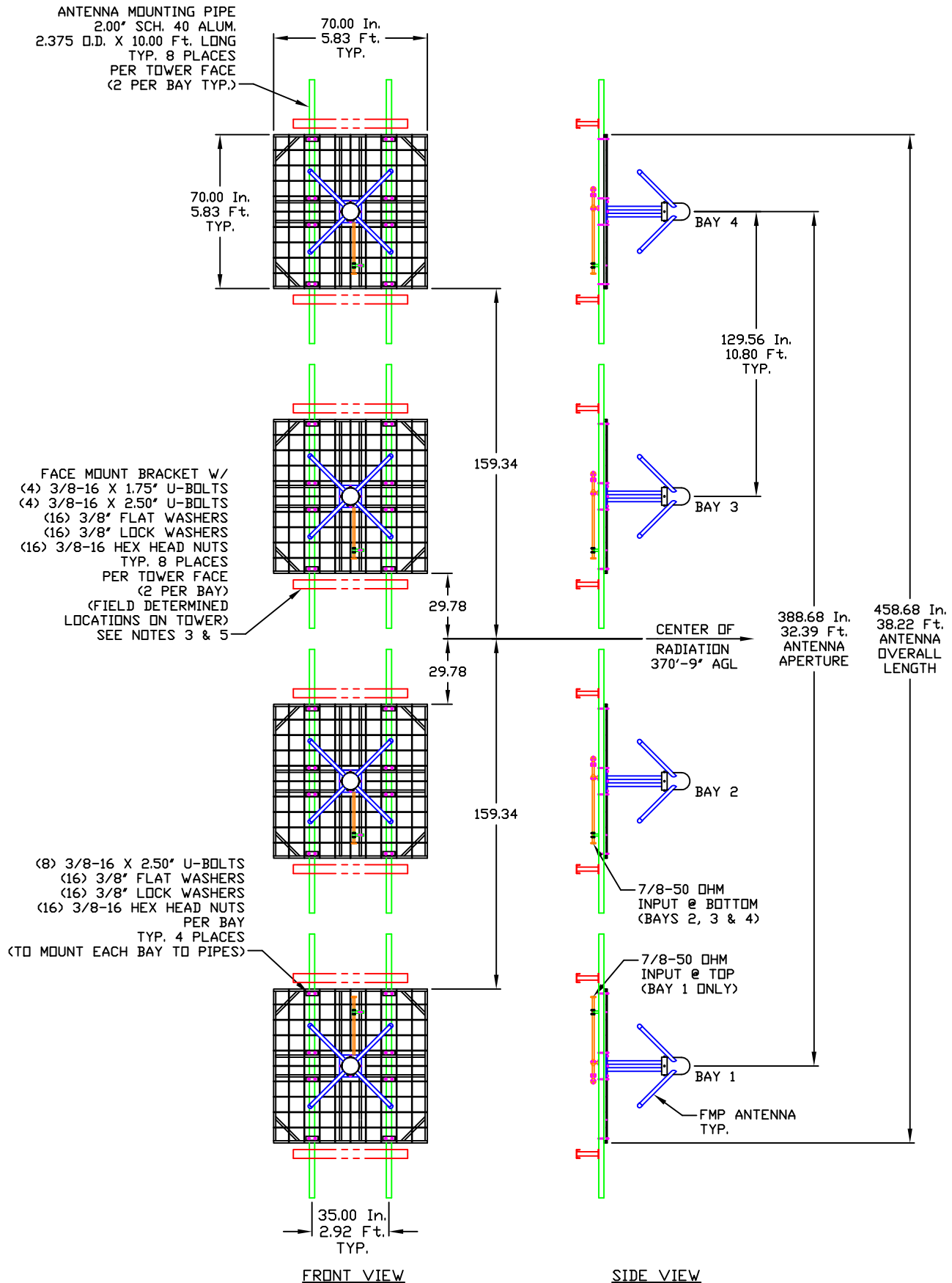
Sum of Relative Field Squared : **16.912**
Sum Divided by 36 (Readings) : **0.470**
Square Root : **0.685**

Percentage of Construction Permit Antenna Filled : **95.1%**

NOTES:

1. REFERENCE DWG. 1230ID1 FOR ANTENNA ORIENTATION.
2. REFERENCE DWGS. 1230ID2 THRU 1230ID6 FOR ANTENNA ASSEMBLY.
3. REFERENCE DWGS. 1230ID7 THRU 1230ID9 FOR FACE MOUNT BRACKET INSTALLATIONS.
4. REFERENCE DWG. 1230ID10 & 1230ID11 FOR FEED SYSTEM.
5. LOCATE THE FACE MOUNT BRACKETS AS CLOSE TO EACH BAY AS POSSIBLE DURING INSTALLATION.

DRAWING NUMBER: 1230ID0



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

TITLE: FMP5/4-4-4-DA, FREQ. 91.1
WYFG, GAFFNEY, SC
MATERIAL: ANTENNA ELEVATION
TYP. PER ALL 3 FACES

SIZE: C
REV: 1
APPR: DKE
DATE: 4/16/10

ENGINEER:
SCALE: NTS
NAME: RAC
DATE: 3/17/10

DRAWING NUMBER: 1230ID0
SHEET 1 OF 1

DRAWING
NUMBER: 1230ID1



TOLERANCES		REVISION RECORD	
.X ±	.015	REV	APPROVAL DATE
.XX ±	.005		
.XXX ±	.002		
X/X ±	1/32		
DEG. ±	1/2		
UNLESS OTHERWISE SPECIFIED			
BY THIS DRAWING		DRAWING NUMBER: 12301D1	
NAME: RAC	DATE: 4/16/10	SHEET 1 OF 1	



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

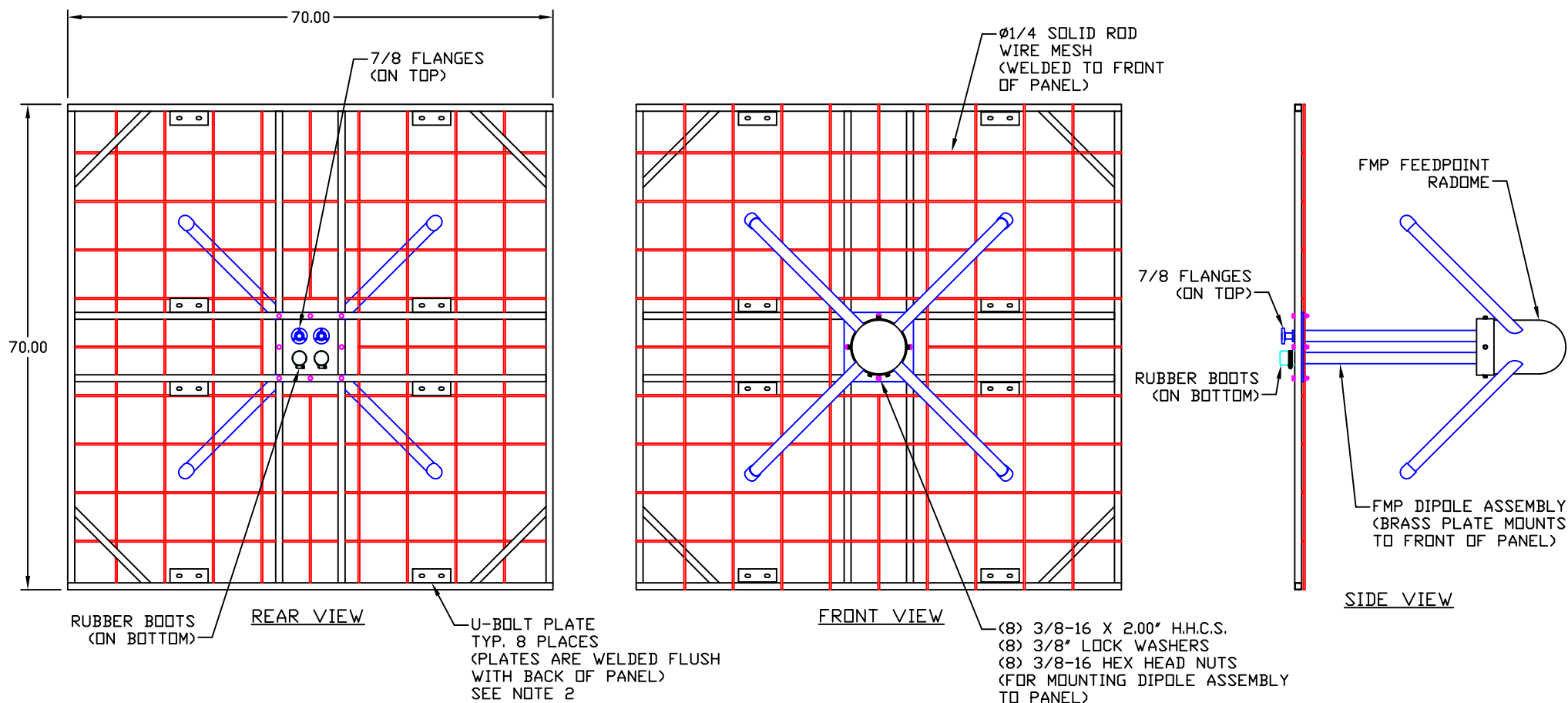
TITLE:	FMP5/4-4-4-DA, FREQ. 91.1 WYFG, GAFFNEY, SC
MATERIAL:	ANTENNA ORIENTATION FROM TRUE NORTH

NOTE:

1. THIS ASSEMBLY TYPICAL FOR ALL PANEL/DIPOLE ASSEMBLIES.
2. U-BOLT PLATES MUST BE ORIENTED VERTICALLY AS SHOWN.
3. REFERENCE DWGS. 1230ID0, 1230ID1 & 1230ID3 THRU 1230ID6 FOR ANTENNA INSTALLATION.
4. REFERENCE DWGS. 1230ID7 THRU 1230ID9 FOR MOUNTING BRACKET INSTALLATION.

DRAWING
NUMBER:

1230ID2



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

REVISION RECORD		
REV	APPROVAL	DATE
DRAWING NUMBER: 1230ID2		
SCALE: NTS	NAME: RAC	DATE: 4/16/10 SHEET 1 OF 1



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

TITLE: FMP5/4-4-4-DA, FREQ. 91.1
WYFG, GAFFNEY, SC
MATERIAL: PANEL/DIPOLE
ASSEMBLY

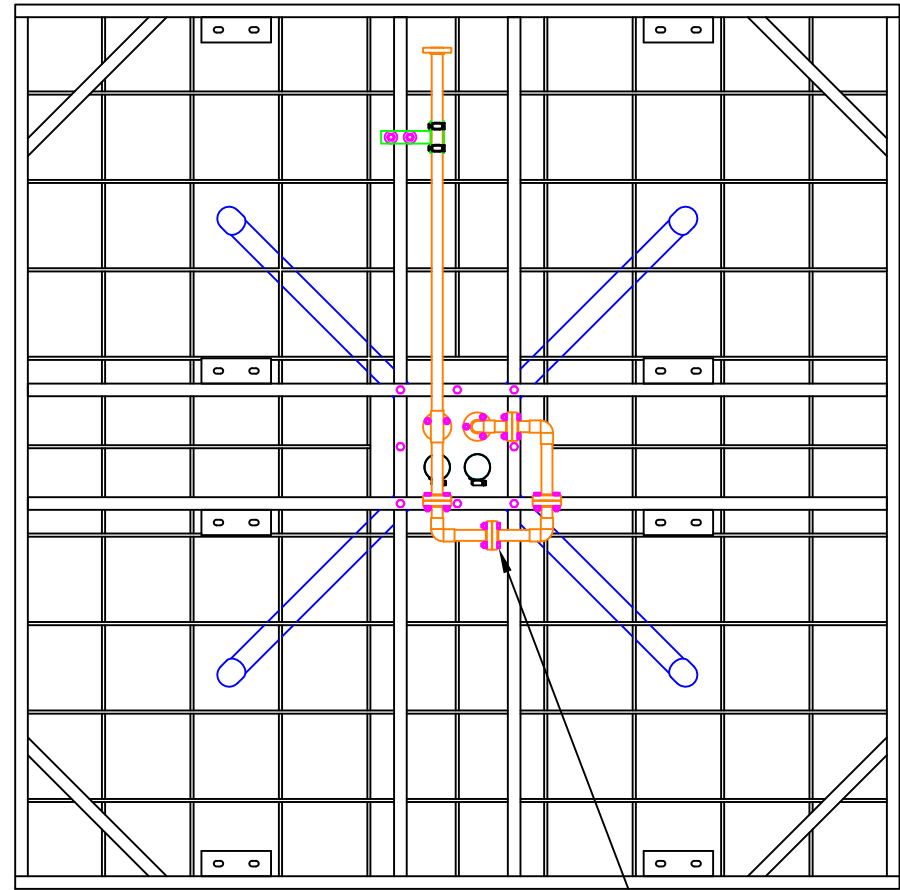
SIZE
A

PARTS MADE BY THIS DRAWING

NOTE:

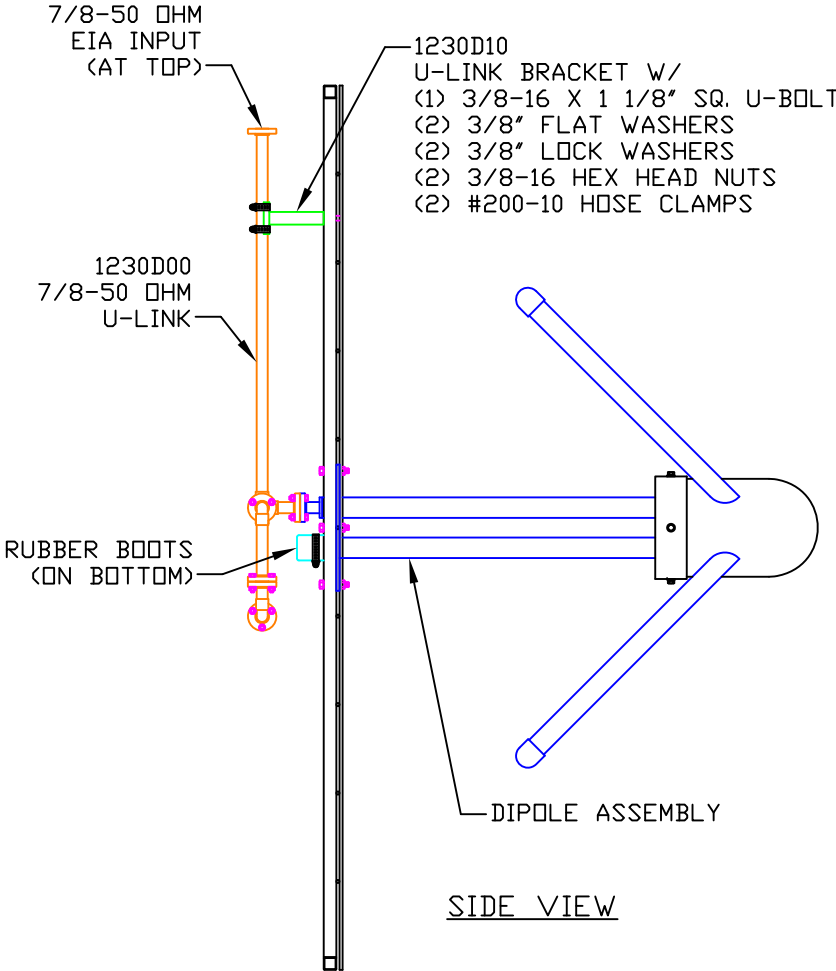
- 1. THIS ASSEMBLY USED FOR BAYS A1, B1 & C1.
- 2. THE U-LINKS & DIPOLE ASSEMBLIES ARE LABELED ACCORDINGLY.
- 3. INSTALL EACH U-LINK WITH THE CORRESPONDING LABELED DIPOLE ASSEMBLY.

DRAWING
NUMBER: 1230ID3



REAR VIEW

- (3) 1/4-20 X 1 1/4" H.H.C.S.
- (3) 1/4" LOCK WASHERS
- (3) 1/4-20 HEX HEAD NUTS
- (1) O-RING #2-215
- PER 7/8 FLANGE CONNECTION
- TYP. 6 PLACES



SIDE VIEW

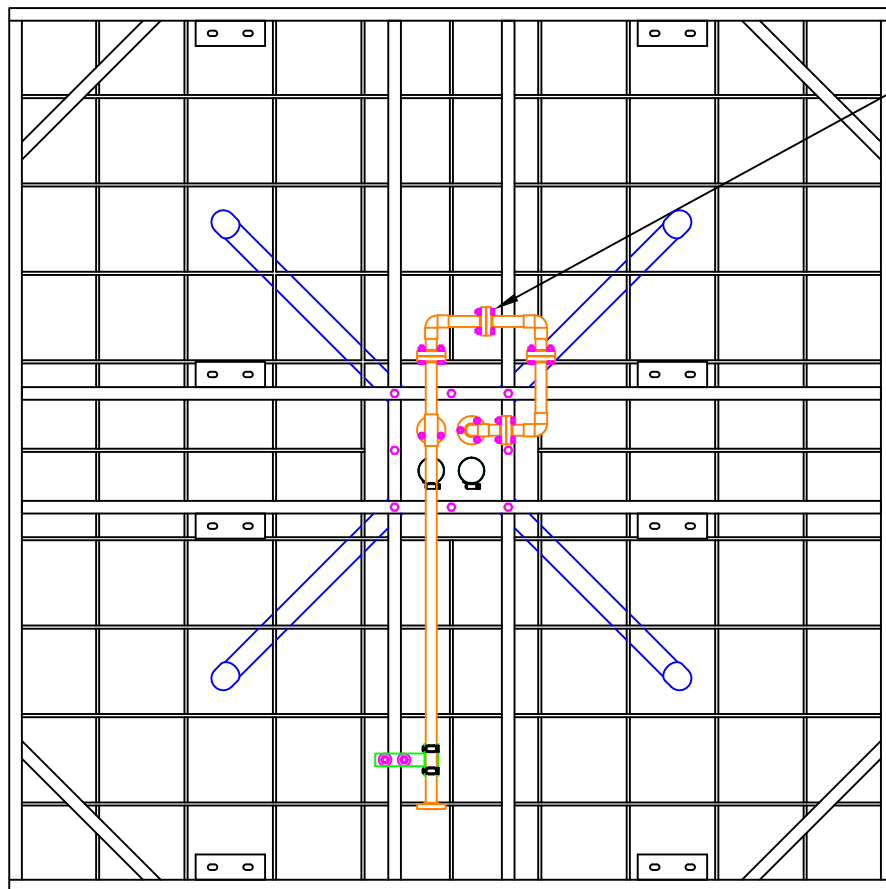
TOLERANCES		REVISION RECORD		
.X	± .015	REV	APPROVAL	DATE
.XX	± .005			
.XXX	± .002			
X/X	± 1/32			
DEG.	± 1/2			
UNLESS OTHERWISE SPECIFIED				
PARTS MADE BY THIS DRAWING		DRAWING NUMBER: 1230ID3		
SCALE: NTS	NAME: RAC	DATE: 4/16/10	SHEET 1 OF 1	

NOTE:

1. THIS ASSEMBLY USED FOR BAYS A2, A3, A4, B2, B3, B4, C2, C3 & C4.
2. THE U-LINKS & DIPOLE ASSEMBLIES ARE LABELED ACCORDINGLY.
3. INSTALL EACH U-LINK WITH THE CORRESPONDING LABELED DIPOLE ASSEMBLY.

DRAWING
NUMBER:

1230ID4



REAR VIEW

(3) 1/4-20 X 1 1/4" H.H.C.S.
(3) 1/4" LOCK WASHERS
(3) 1/4-20 HEX HEAD NUTS
(1) O-RING #2-215
PER 7/8 FLANGE CONNECTION
TYP. 6 PLACES

RUBBER BOOTS
(ON BOTTOM)

1230D00
7/8-50 OHM
U-LINK

7/8-50 OHM
EIA INPUT
(AT BOTTOM)

DIPOLE ASSEMBLY

1230D10
U-LINK BRACKET W/
(1) 3/8-16 X 1 1/8" SQ. U-BOLT
(2) 3/8" FLAT WASHERS
(2) 3/8" LOCK WASHERS
(2) 3/8-16 HEX HEAD NUTS
(2) #200-10 HOSE CLAMPS

SIDE VIEW

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:

U-LINK INSTALLATION
FOR BAYS 2, 3 & 4 PANELS

MATERIAL:

SIZE

A

PARTS MADE BY THIS DRAWING

SCALE: NTS

NAME: RAC

DATE: 4/16/10

SHEET 1 OF 1

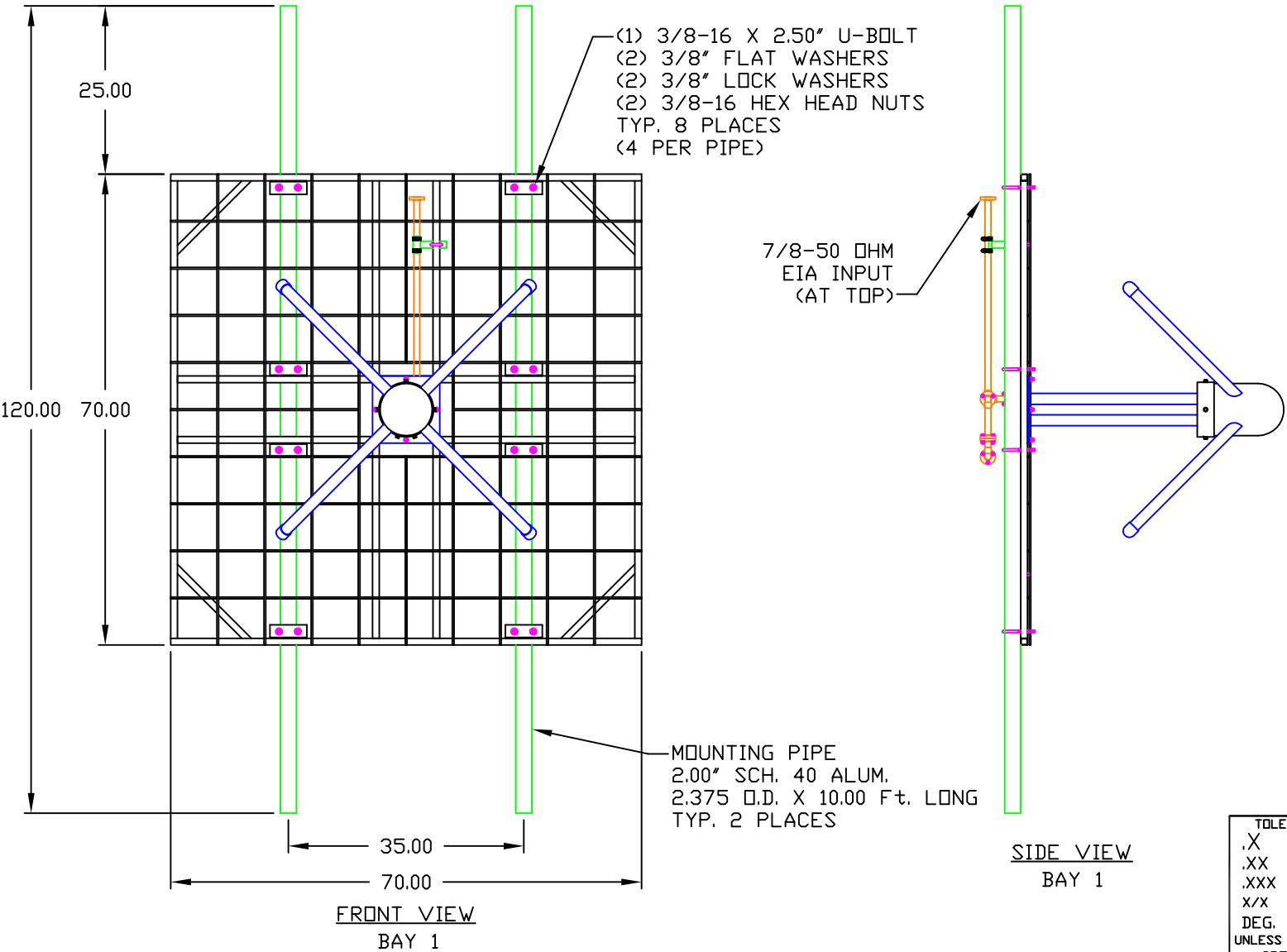
DRAWING
NUMBER:

1230ID4

NOTE:

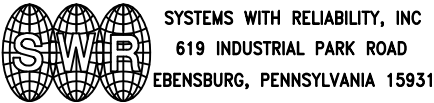
- 1. THIS ASSEMBLY USED FOR BAYS A1, B1 & C1.
- 2. REFERENCE DWGS. 1230ID0 THRU 1230ID4 FOR ANTENNA INSTALLATION.
- 3. REFERENCE DWGS. 1230ID7 THRU 1230ID9 FOR FACE MOUNT BRACKET INSTALLATION.

DRAWING
NUMBER: 1230ID5



SIDE VIEW
BAY 1

TOLERANCES		REVISION RECORD		
.X	± .015	REV	APPROVAL	DATE
.XX	± .005			
.XXX	± .002			
X/X	± 1/32			
DEG.	± 1/2			
UNLESS OTHERWISE SPECIFIED				
		DRAWING NUMBER: 1230ID5		
PARTS MADE BY THIS DRAWING		SHEET 1 OF 1		
SCALE: NTS	NAME: RAC	DATE: 4/16/10		



TITLE: FMP5/4-4-4-DA, FREQ. 91.1
WYFG, GAFFNEY, SC
MATERIAL: BAY 1
ANTENNA/PIPE INSTALLATION

SIZE

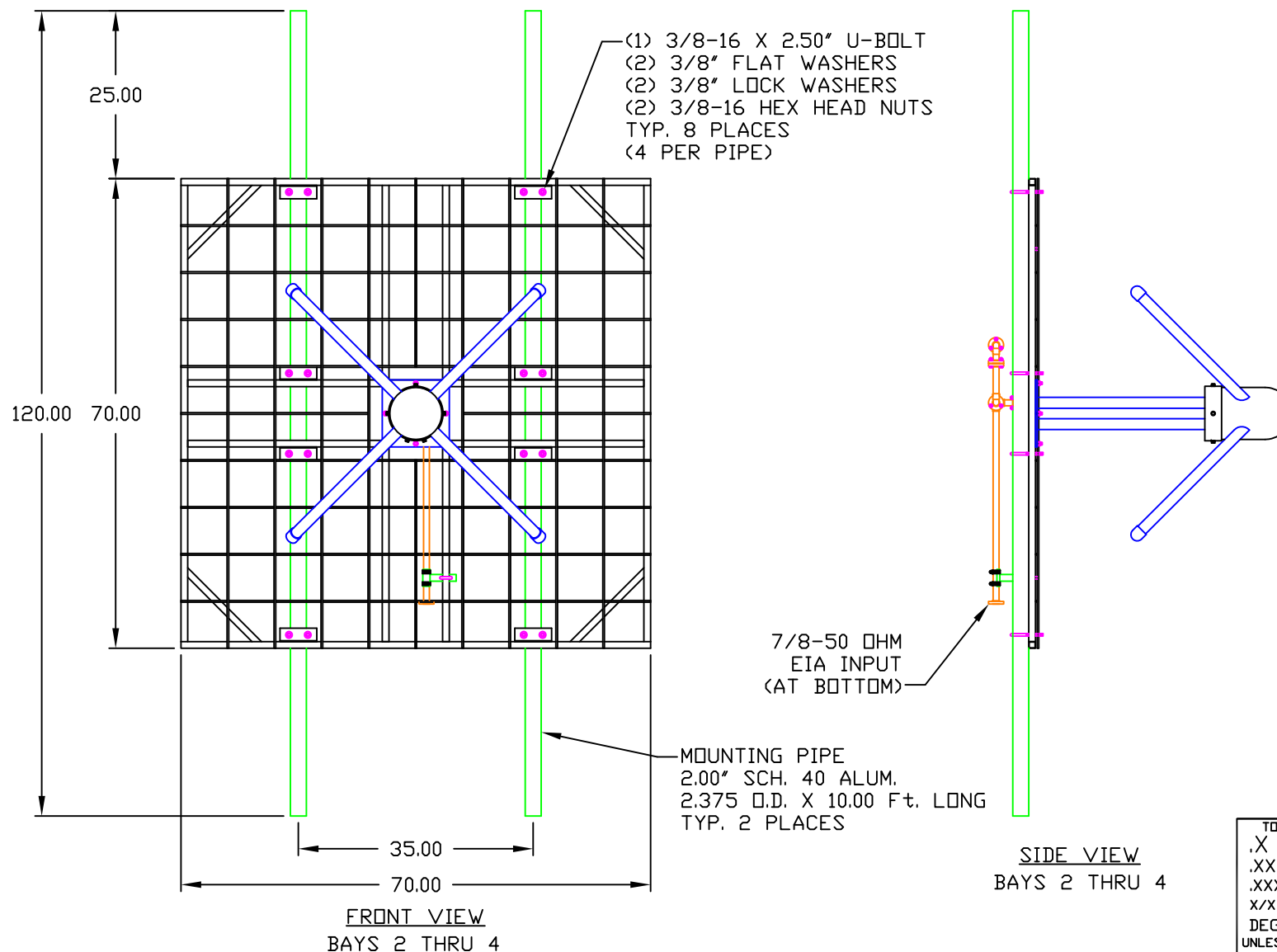
A

NOTE:

1. THIS ASSEMBLY USED FOR BAYS A2,A3, A4, B2, B3, B4, C2, C3 & C4.
2. REFERENCE DWGS. 1230ID0 THRU 1230ID4 FOR ANTENNA INSTALLATION.
3. REFERENCE DWGS. 1230ID7 THRU 1230ID9 FOR FACE MOUNT BRACKET INSTALLATION.

DRAWING
NUMBER:

1230ID6



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

REVISION RECORD		
REV	APPROVAL	DATE
DRAWING NUMBER: 1230ID6		
SCALE: NTS	NAME: RAC	DATE: 4/16/10 SHEET 1 OF 1



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

TITLE: FMP5/4-4-4-DA, FREQ. 91.1
WYFG, GAFFNEY, SC
MATERIAL: BAYS 2 THRU 4
ANTENNA/PIPE INSTALLATION

SIZE
A

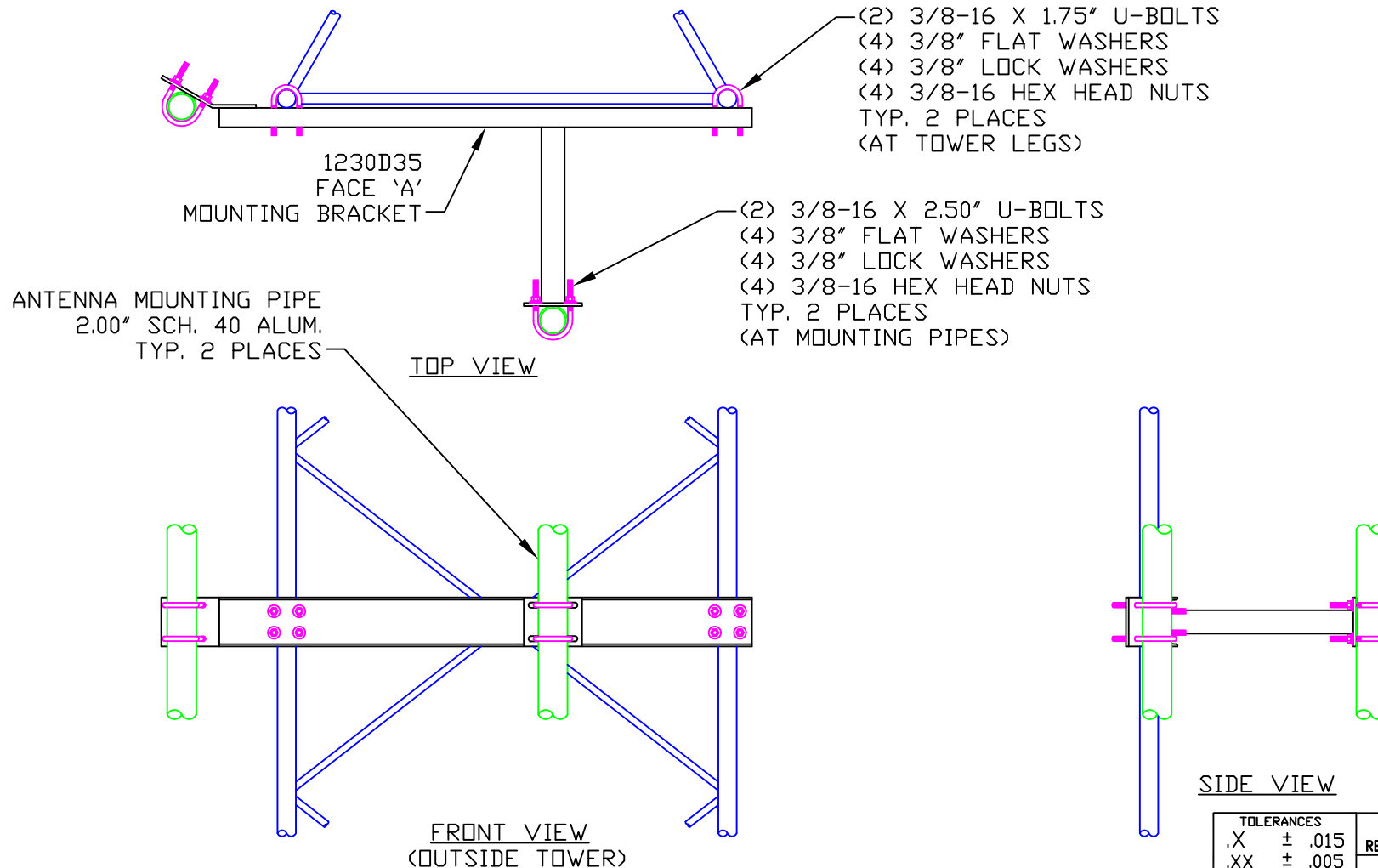
PARTS MADE BY THIS DRAWING

NOTE:

DRAWING
NUMBER:

1230ID7

1. THIS BRACKET REQUIRED (8) PLACES TOTAL TO MOUNT FACE 'A' ANTENNAS.
2. MOUNT (1) BRACKET ABOVE & BELOW EACH ANTENNA TYPICAL.
3. THE LOCATIONS ON THE TOWER TO BE FIELD DETERMINED.
4. REFERENCE DWG. 1230ID0, 1230ID5 & 1230ID6 FOR ANTENNA/PIPE INSTALLATION.
5. REFERENCE DWG. 1230ID1 FOR FACE 'A' ORIENTATION.



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

TITLE: FMP5/4-4-4-DA, FREQ. 91.1
WYFG, GAFFNEY, SC
MATERIAL: FACE 'A'
BRACKET INSTALLATION

SIZE

A

PARTS MADE BY THIS DRAWING

SCALE: NTS

NAME: RAC

DATE: 4/16/10

SHEET 1 OF 1

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

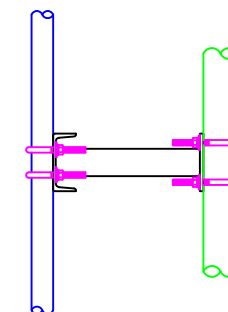
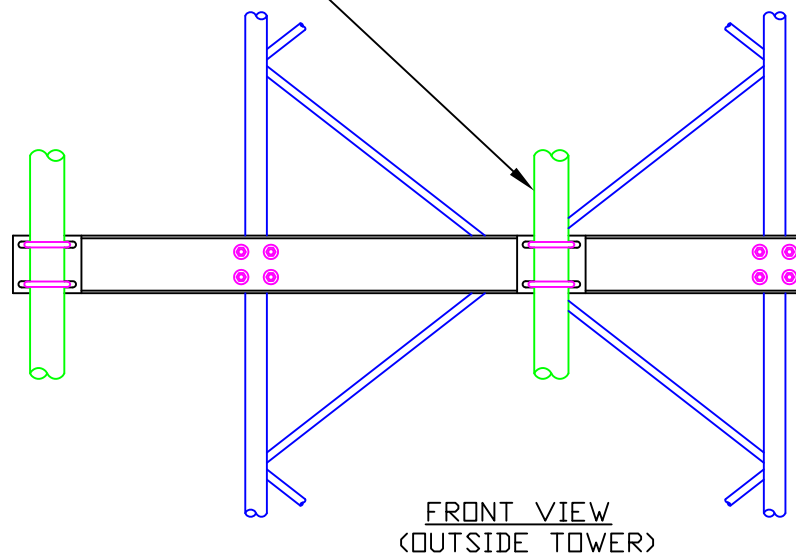
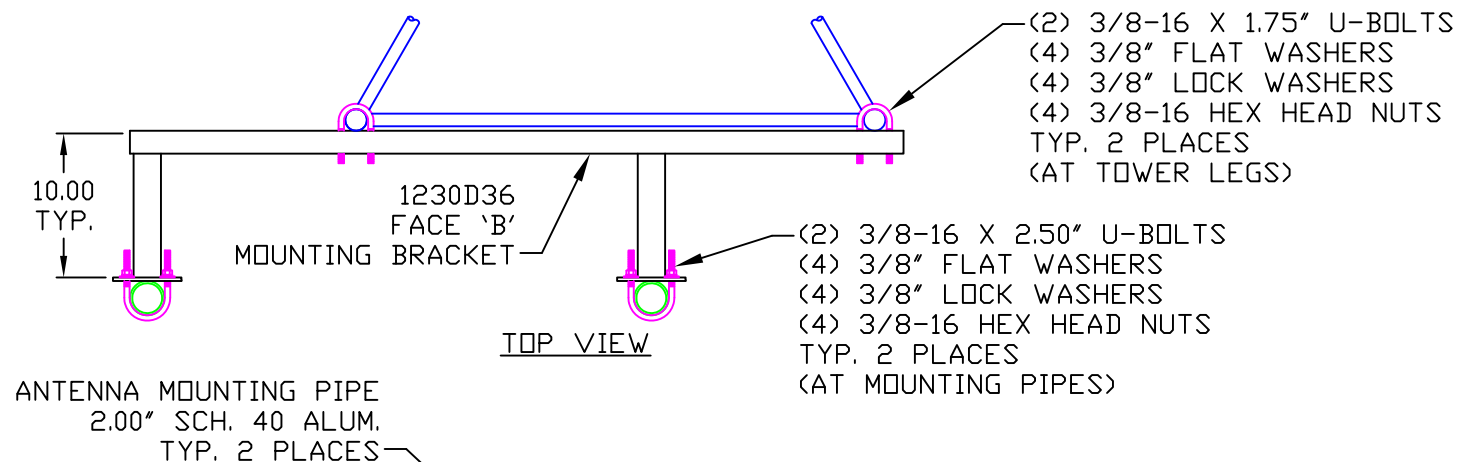
REVISION RECORD		
REV	APPROVAL	DATE
DRAWING NUMBER: 1230ID7		

NOTE:

DRAWING
NUMBER:

1230ID8

1. THIS BRACKET REQUIRED (8) PLACES TOTAL TO MOUNT FACE 'B' ANTENNAS.
2. MOUNT (1) BRACKET ABOVE & BELOW EACH ANTENNA TYPICAL.
3. THE LOCATIONS ON THE TOWER TO BE FIELD DETERMINED.
4. REFERENCE DWGS. 1230ID0, 1230ID5 & 1230ID6 FOR ANTENNA/PIPE INSTALLATION.
5. REFERENCE DWG. 1230ID1 FOR FACE 'B' ORIENTATION.



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: FMP5/4-4-4-DA, FREQ. 91.1
WYFG, GAFFNEY, SC
MATERIAL: FACE 'B'
BRACKET INSTALLATION

SIZE
A

PARTS MADE BY THIS DRAWING

SCALE: NTS

NAME: RAC

DATE: 4/16/10

SHEET 1 OF 1

DRAWING
NUMBER:

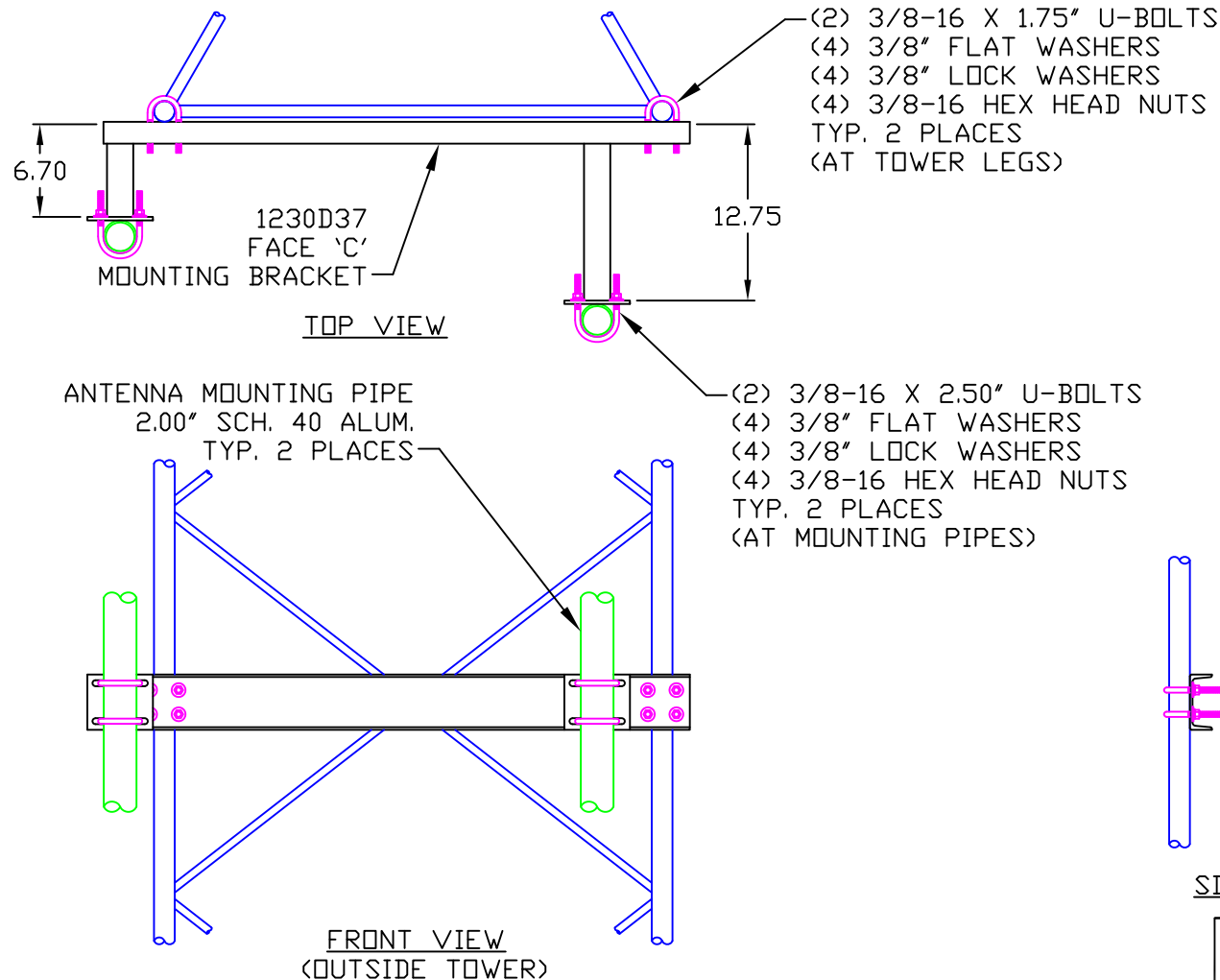
1230ID8

NOTE:

DRAWING
NUMBER:

1230ID9

1. THIS BRACKET REQUIRED (8) PLACES TOTAL TO MOUNT FACE 'C' ANTENNAS.
2. MOUNT (1) BRACKET ABOVE & BELOW EACH ANTENNA TYPICAL.
3. THE LOCATIONS ON THE TOWER TO BE FIELD DETERMINED.
4. REFERENCE DWGS. 1230ID0, 1230ID5 & 1230ID6 FOR ANTENNA/PIPE INSTALLATION.
5. REFERENCE DWG. 1230ID1 FOR FACE 'C' ORIENTATION.



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

REVISION RECORD		
REV	APPROVAL	DATE
DRAWING NUMBER: 1230ID9		
SCALE: NTS	NAME: RAC	DATE: 4/16/10
SHEET 1 OF 1		



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

TITLE: FMP5/4-4-4-DA, FREQ. 91.1
WYFG, GAFFNEY, SC
MATERIAL: FACE 'C'
BRACKET INSTALLATION

SIZE
A

PARTS MADE BY THIS DRAWING

SCALE: NTS

NAME: RAC

DATE: 4/16/10

SHEET 1 OF 1

NOTE:

FACE C
(4) PANELS
AZIMUTH: 250°

BAY 4

BAY 3

BAY 2

A 10x10 grid with a blue 'X' and an orange vertical line. The 'X' is formed by two blue lines intersecting at the center. The orange line is vertical and passes through the center of the grid.

BAY 1
INVERTED
U-LINKS

A diagram showing a 2D grid with a central white circle. Four blue lines radiate from the center to the corners of the grid. An orange line is also present, extending from the top edge of the grid towards the center.

A diagram of a 64x64 grid. A central white circle is located at the intersection of the 32nd and 33rd columns and the 32nd and 33rd rows. Four blue lines radiate from this circle to the corners of the grid. An orange line extends from the top edge of the grid, passing through the center of the grid, and ending at the top edge of the grid.








A diagram showing a 2D grid with a central white circle. Four blue lines radiate from the center to the corners of the grid. A red line extends upwards from the center, passing through the top edge of the grid.

3 1/8-50 0HM
EIA INPUT

NOTES:

1. ALL PANELS FED WITH HJ5-50A (7/8 AIR CABLES @ 20.00 Ft. LONG) W/ (2) 75AR (7/8 GAS PASS CONNECTORS).
2. EACH CABLE SUPPLIED W/ (1) SGL5-15B4 (SUREGROUND LDF5 GROUNDING KIT) & (2) 42396A-5 (7/8 STANDARD HANGERS).
3. REFERENCE DWG 1230ID9 FOR FEED SYSTEM ASSEMBLY.

LEGEND

SYMBOL	PART #	DESCRIPTION	QTY.
	TL-150026.0	1 5/8-50 OHM CUT SECTION @ 26.00 LONG	1
	150625	1 5/8-50 OHM ELBOW (EQUAL LEG 3.00 x 3.00)	1
	TL-150032.4-SP	1 5/8-50 OHM CUT SECTION 90° PHASE SECTION @ 32.40 LONG	1
	150636-3x29TF	1 5/8 TRANSFORMER ELBOW (UNEQUAL LEG 3.00 x 29.00)	2
	PD4W-150780	1 5/8 TO 7/8 (4 WAY POWER DIVIDER)	3
	PD3W-350150UE	3 1/8 TO 1 5/8 (3 WAY POWER DIVIDER) (UNEQUAL POWER DISTRIBUTION)	1
	FM10-TN-91.1	3 1/8-50 OHM EIA TUNER	1



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

TITLE:	FMP5/4-4-4-DA, FREQ. 91.1 WYFG, GAFFNEY, SC
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MATERIAL:	WHS, CRIPPLE FEED SYSTEM
-----------	--------------------------------

SIZE

C

REV	APPROVAL
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DATE	
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REV	A
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APPROVA

AL	DAT
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E	ENG
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ENGINEER:

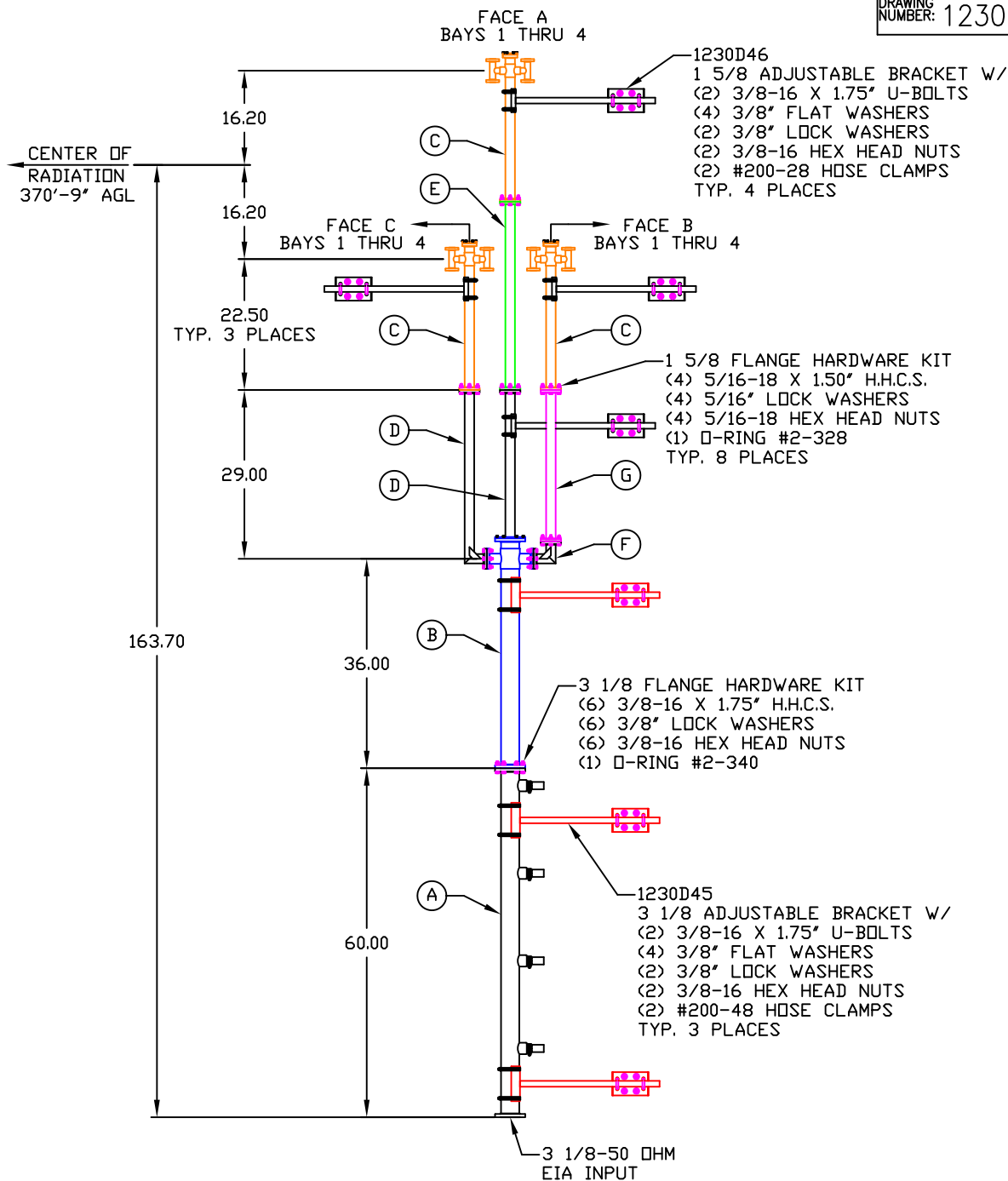
D

DRAWING LUMBER.

[illegible]

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1 |

**NOTES:**

1. ALL PANELS FED WITH HJ5-50A (7/8 AIR CABLES @ 20.00 Ft. LONG) W/ (2) 75AR (7/8 GAS PASS CONNECTORS).
2. EACH CABLE SUPPLIED W/ (1) SGL5-15B4 (SUREGROUND LDF5 GROUNDING KIT) & (2) 42396A-5 (7/8 STANDARD HANGERS).
3. ADJUSTABLE BRACKET LOCATIONS ON TOWER TO BE FIELD DETERMINED DURING INSTALLATION.

LEGEND

SYMBOL	PART #	DESCRIPTION	QTY.
(G)	TL-150026.0	1 5/8-50 OHM CUT SECTION @ 26.00 LONG	1
(F)	150625	1 5/8-50 OHM ELBOW (EQUAL LEG 3.00 x 3.00)	1
(E)	TL-150032.4-SP	1 5/8-50 OHM CUT SECTION 90° PHASE SECTION @ 32.40 LONG	1
(D)	150636-3x29TF	1 5/8 TRANSFORMER ELBOW (UNEQUAL LEG 3.00 x 29.00)	2
(C)	PD4W-150780	1 5/8 TO 7/8 (4 WAY POWER DIVIDER)	3
(B)	PD3W-350150UE	3 1/8 TO 1 5/8 (3 WAY POWER DIVIDER) (UNEQUAL POWER DISTRIBUTION)	1
(A)	FM10-TN-91.1	3 1/8-50 OHM EIA TUNER	1



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

TITLE: FMP5/4-4-4-DA, FREQ. 91.1
WYFG, GAFFNEY, SC
MATERIAL: POWER DIVIDER
LAYOUT

SIZE: C
REV: 1
APP: 2
DATE: 3

ENGINEER:

SCALE: NTS

NAME: RAC

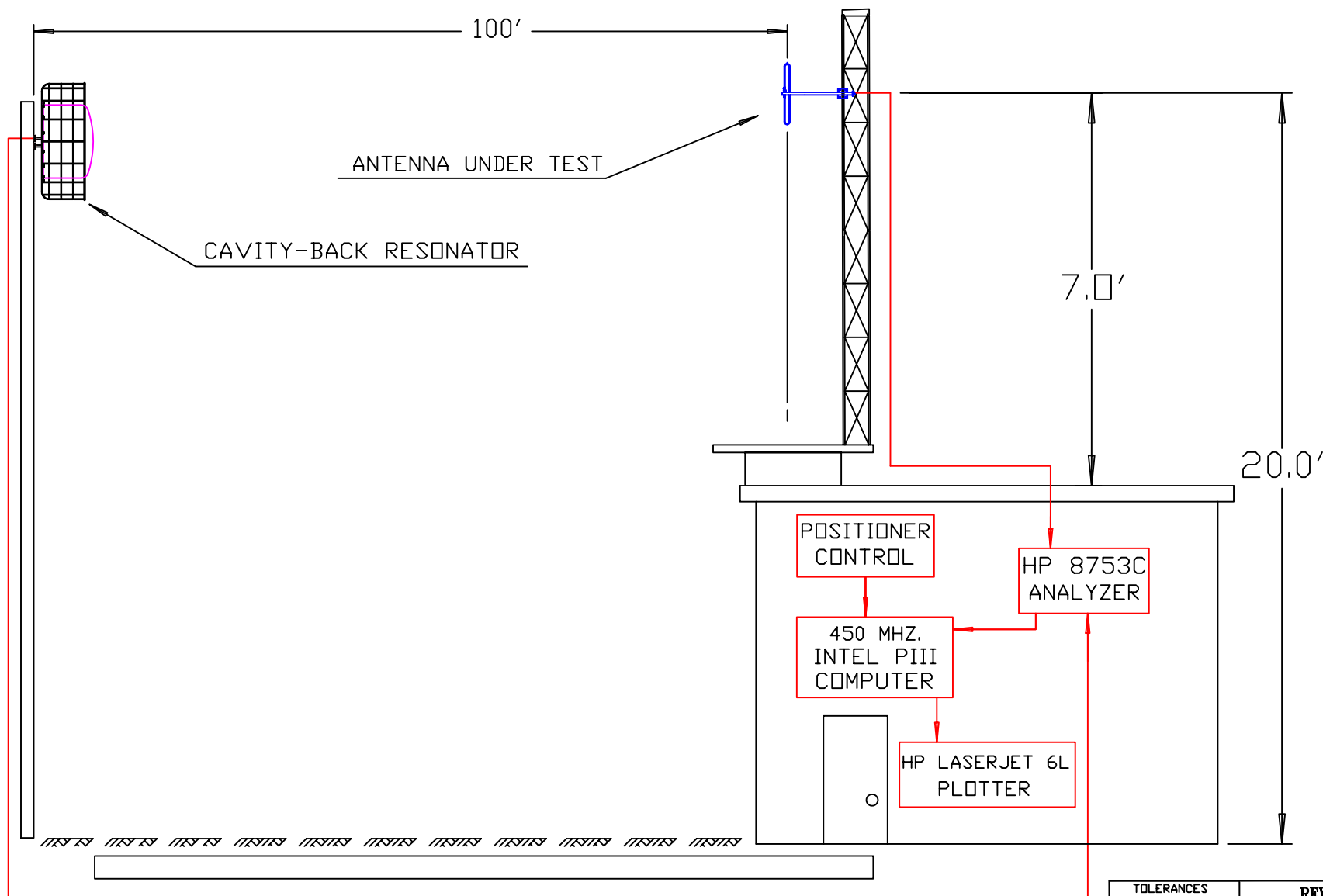
DATE: 4/16/10

SHEET 1 OF 1

DRAWING NUMBER: 1230ID11

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
2		10/7/05
1		4/30/02



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

DRAWING
NUMBER: 2105A10