



Broadcast Antennas & Transmission Systems

SYSTEMS WITH RELIABILITY, LP

619 Industrial Park Road, Ebensburg, PA 15931

Phone 814.472.5436 Fax 814.472.5552 www.swr-rf.com

Certified Proof of Performance

Customer: Saga Communications of NC, LLC

Date: 3/10/2015

Antenna Model: FMECR/1 - PLUS - TA - 100.3

Frequencies Tested: 100.3 MHz (+/- 200 KHz)

Return Loss @ Fc: -34.431 dB

Shop Order No.: 15057

Input: 7-16 DIN Female

A reading of -17.7 dB is indicative of a 1.3:1 VSWR. The component specified has met or exceeds this 1.3:1 VSWR performance specification.

Computer / Vector Network Analyzer plots are enclosed to verify antenna performance.

Test Performed by:

Robert Laskowski
Technician

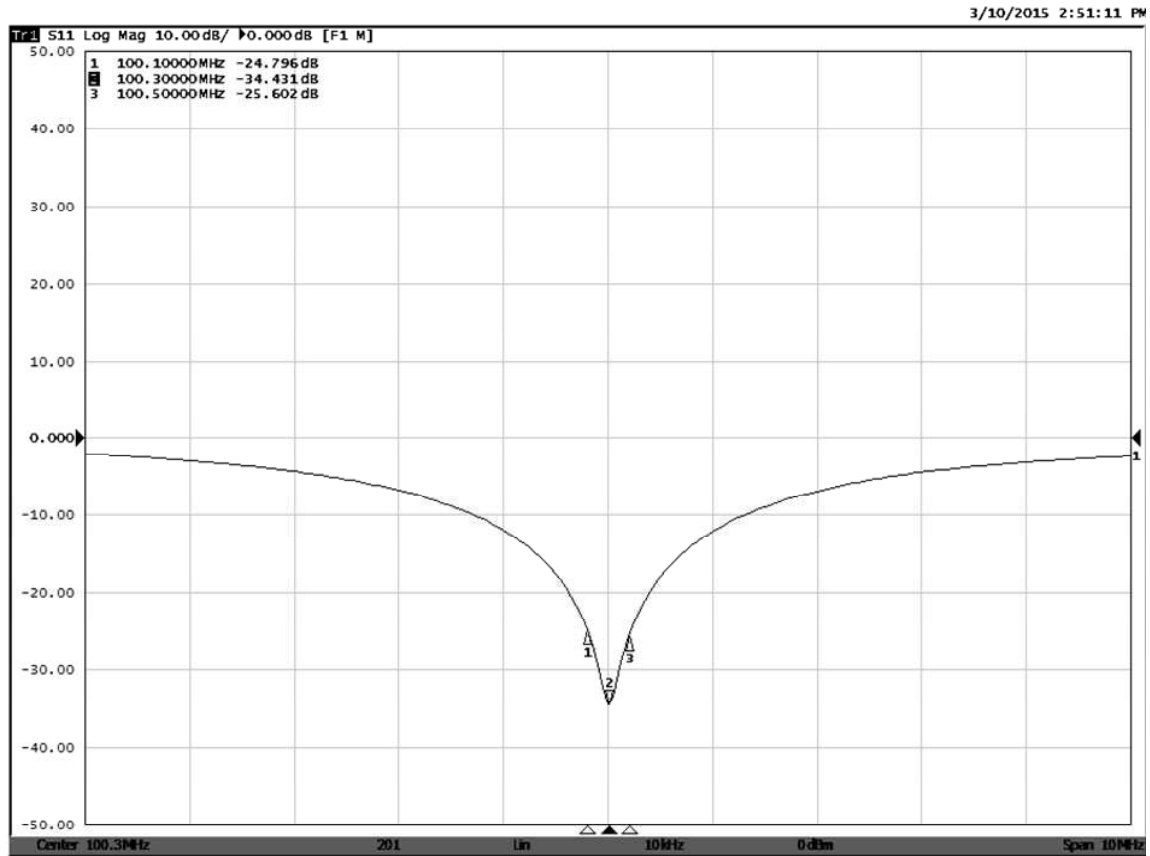


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Plot 1: Return Loss

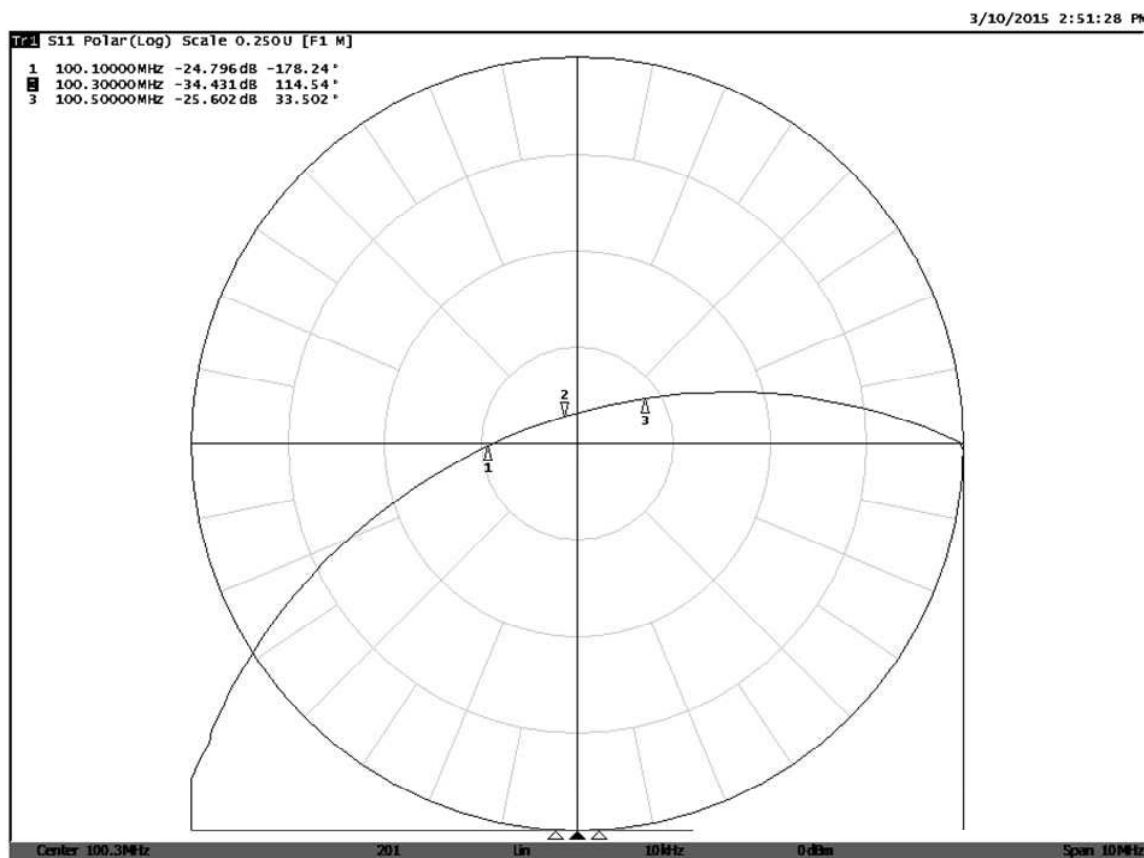


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Plot 2: Polar

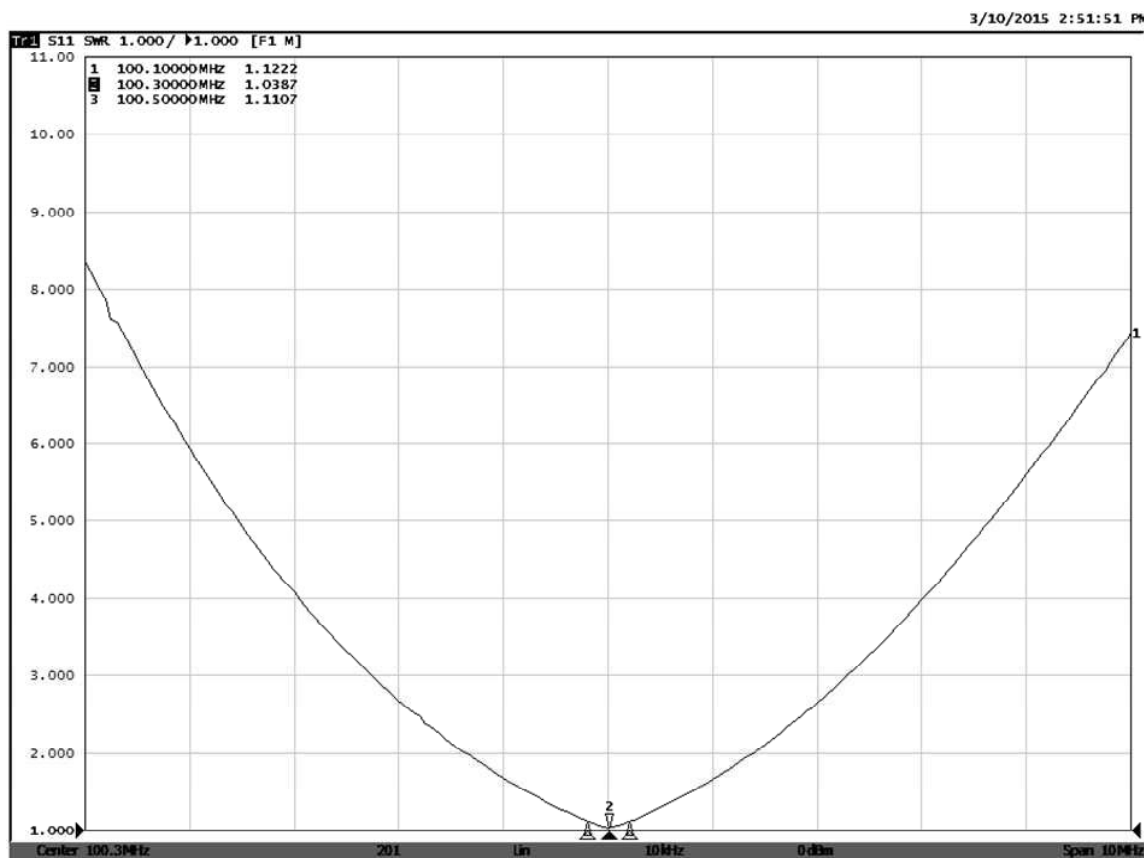


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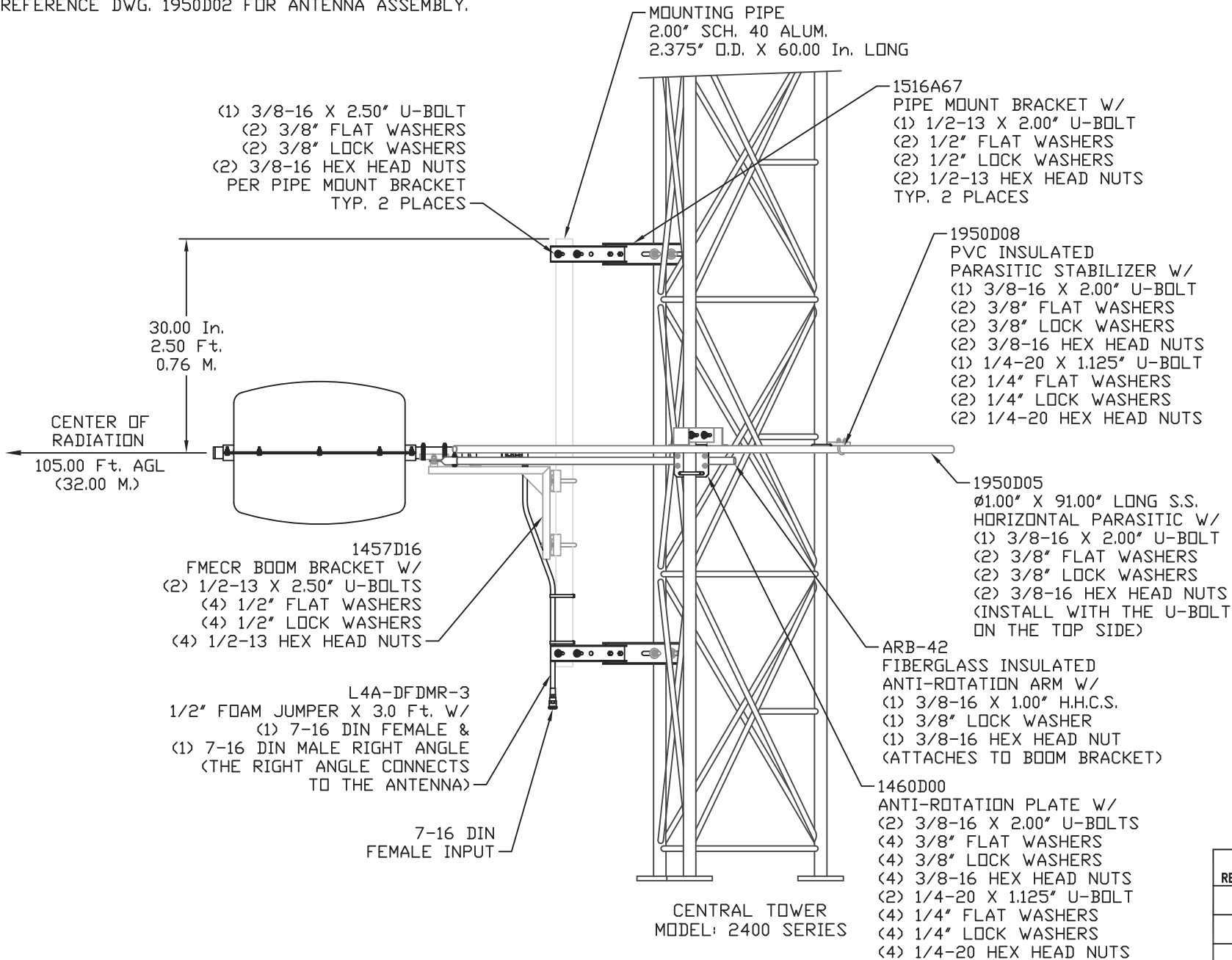
Plot 3: VSWR

NOTES:

1. REFERENCE DWG. 1950D01 FOR ANTENNA ORIENTATION
2. REFERENCE DWG. 1950D02 FOR ANTENNA ASSEMBLY.

DRAWING
NUMBER:

1950D00



REVISION RECORD

REV	APPROVAL	DATE

DRAWING
NUMBER:

1950D00



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

TITLE:

FMECR/1-PLUS-TA, FREQ. 100.3
W262CO, ASHEVILLE, NC

MATERIAL:

SIZE

A

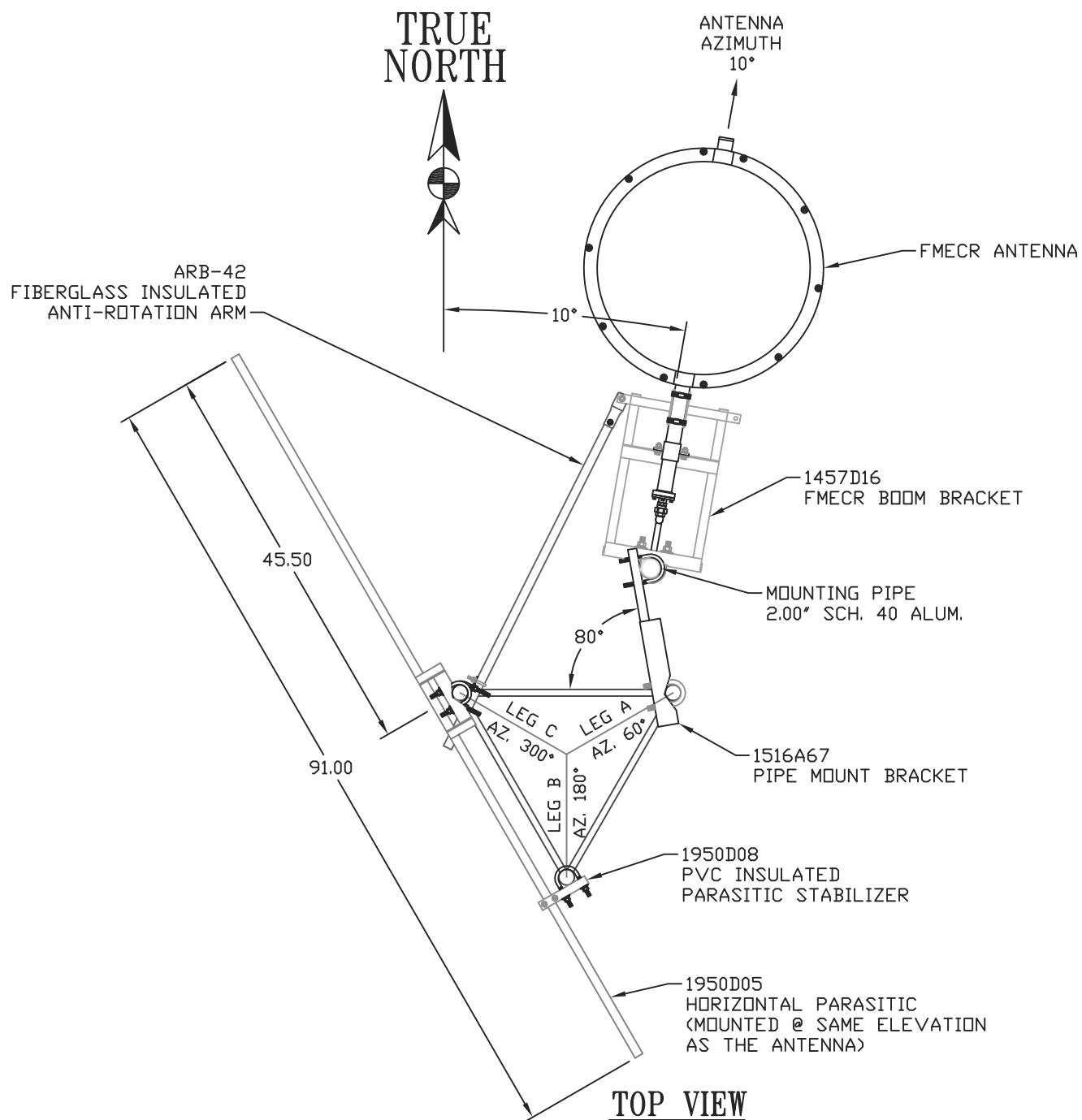
PARTS MADE BY THIS DRAWING

SCALE: NTS

NAME: RAC

DATE: 3/10/15

SHEET 1 OF 1



REVISION RECORD		
REV	APPROVAL	DATE
DRAWING NUMBER: 1950D01		
SCALE: NTS	NAME: RAC	DATE: 3/10/15 SHEET 1 OF 1



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

TITLE: FMECR/1-PLUS-TA, FREQ. 100.3
W262CO, ASHEVILLE, NC

MATERIAL: ANTENNA ORIENTATION
FROM TRUE NORTH

SIZE
A

PARTS MADE BY THIS DRAWING

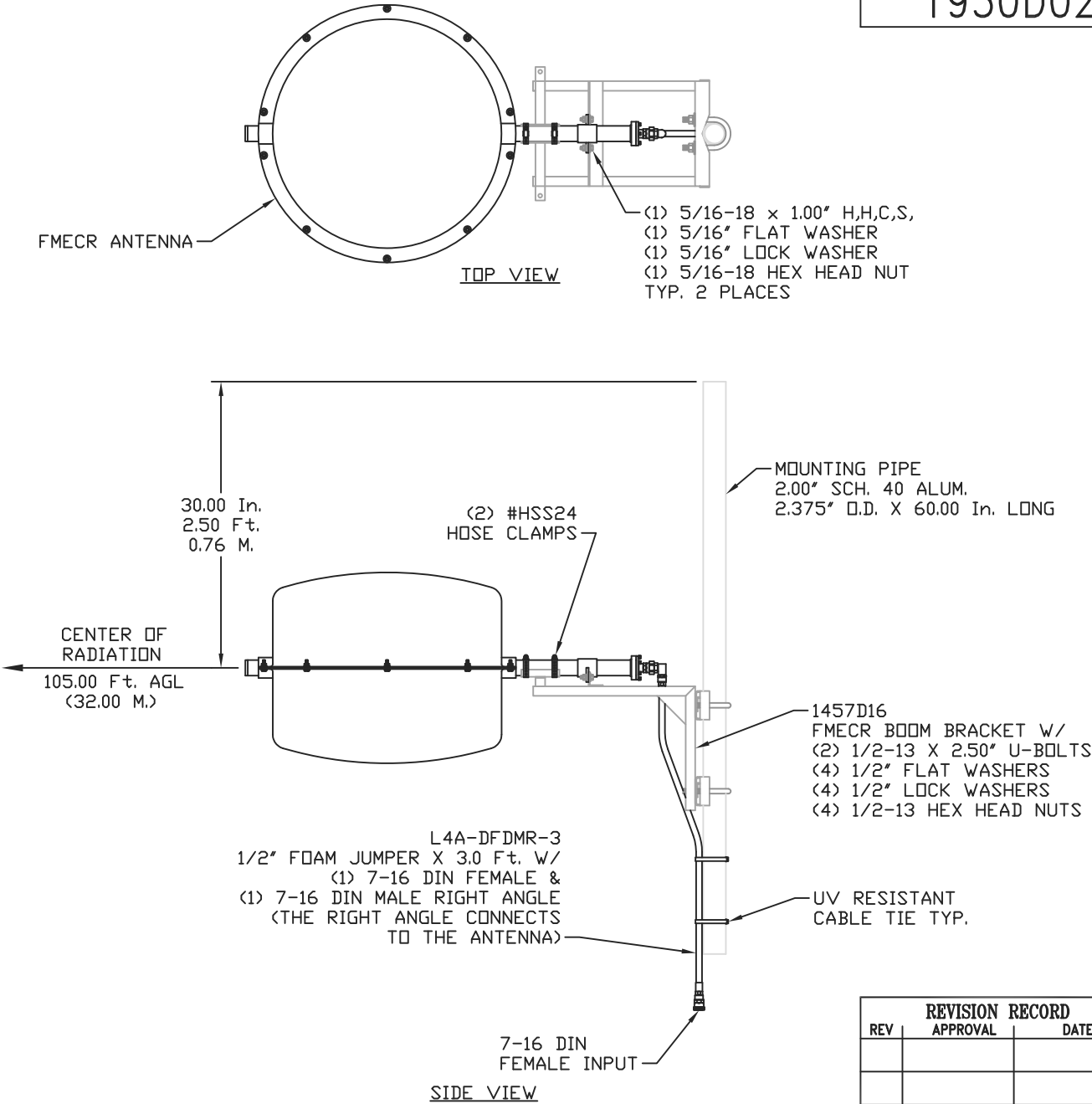
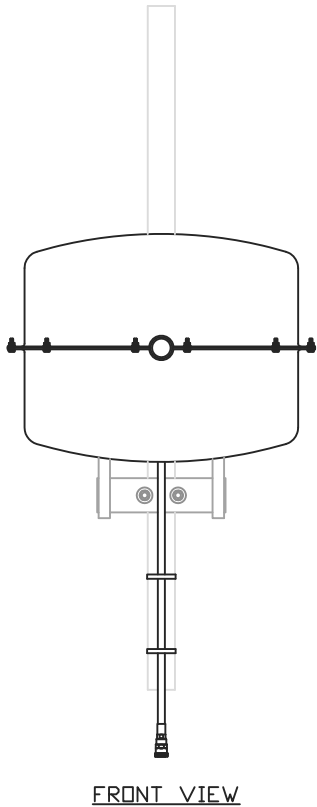
SCALE: NTS

NAME: RAC

DATE: 3/10/15

SHEET 1 OF 1

NOTE:



REVISION RECORD		
REV	APPROVAL	DATE
DRAWING NUMBER: 1950D02		



SYSTEMS WITH RELIABILITY, LP

Broadcast Antenna & Transmission Systems

SYSTEM DATA SHEET

Customer	W262CO - Saga Communications
Contact	Gary Robinson
Location	Asheville, NC
Antenna Model	FMECR/1-PLUS-TA
Channel / Frequency	100.3 MHz

ELECTRICAL SPECIFICATION

Polarization Type	Circular
Polarization Ratio	
H-Pol. (PRH)	50.000 %
V-Pol. (PRV)	50.000 %
Elevation Directivity (ED)	0.883
Azimuth Directivity (AD) H-Pol.	(Composite) 1.383
Azimuth Directivity (AD) V-Pol.	(Composite) 1.383
Antenna Efficiency	100.000 %
Antenna Gain (GH)	
H-Pol. (GH)	0.611
V-Pol. (GV)	0.611
dB Gain (AG)	
H-Pol (AGH)	-2.142
V-Pol (AGV)	-2.142
ERP	
H-Pol. (ERPH)	0.250 kW
V-Pol. (ERPV)	0.250 kW

MECHANICAL SPECIFICATION

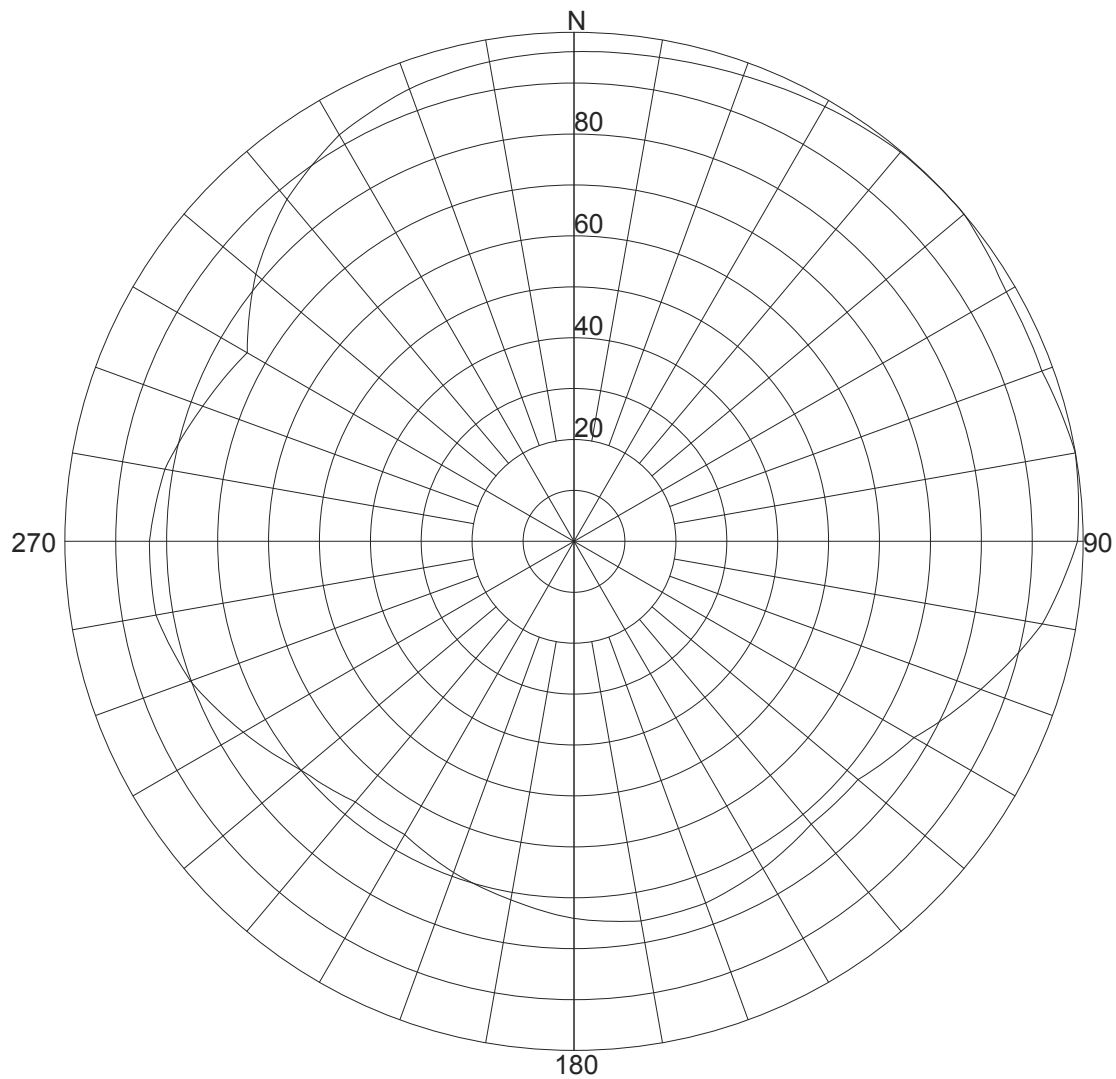
No. Of Bays	1
Antenna Aperture	0.00 ft. 0.00 m
Antenna Total Length	5.00 ft. 1.52 m
Center of Radiation AGL	105.00 ft. 32.00 m
Antenna Weight (W/O Brackets, Directors)	72.00 lbs. 32.73 kg
Windload (50/33) / CaAc	210.00 lbs. 50/33PSF 6.00 ft^2

Mechanical Specifications will be certified upon final construction and testing.

Note: Given values can be used for planning system.

Prepared by:

Kevin W. Rager
SWR, LP Engineering



Azimuth Pattern

Systems With Reliability LP

Scale: Linear

Unit: Relative Field

CLIENT: W262CO

Date: 3/3/2015

ANTENNA TYPE: FMECR/1-TA

FREQUENCY: 100.3 MHz

PATTERN POL.: Circular

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.38327 / 1.41dB

PATTERN RMS: 0.850

Relative Field Tabulation(Azimuth)

Azimuth Heading	Normalized Field(dB)	Azimuth Heading	Normalized Field(dB)
0	.9620 (-0.34)	180	.7410 (-2.6)
5	.9635 (-0.32)	185	.7280 (-2.76)
10	.9650 (-0.31)	190	.7150 (-2.91)
15	.9690 (-0.27)	195	.7035 (-3.05)
20	.9730 (-0.24)	200	.6920 (-3.2)
25	.9795 (-0.18)	205	.6785 (-3.37)
30	.9860 (-0.12)	210	.6650 (-3.54)
35	.9920 (-0.07)	215	.6665 (-3.52)
40	.9980 (-0.02)	220	.6680 (-3.5)
45	.9990 (-0.01)	225	.6835 (-3.31)
50	1.0000 (0)	230	.6990 (-3.11)
55	.9900 (-0.09)	235	.7245 (-2.8)
60	.9800 (-0.18)	240	.7500 (-2.5)
65	.9790 (-0.18)	245	.7760 (-2.2)
70	.9780 (-0.19)	250	.8020 (-1.92)
75	.9890 (-0.1)	255	.8180 (-1.74)
80	1.0000 (0)	260	.8340 (-1.58)
85	.9945 (-0.05)	265	.8340 (-1.58)
90	.9890 (-0.1)	270	.8340 (-1.58)
95	.9615 (-0.34)	275	.8250 (-1.67)
100	.9340 (-0.59)	280	.8160 (-1.77)
105	.8920 (-0.99)	285	.7960 (-1.98)
110	.8500 (-1.41)	290	.7760 (-2.2)
115	.8105 (-1.82)	295	.7585 (-2.4)
120	.7710 (-2.26)	300	.7410 (-2.6)
125	.7495 (-2.5)	305	.7785 (-2.17)
130	.7280 (-2.76)	310	.8160 (-1.77)
135	.7265 (-2.78)	315	.8465 (-1.45)
140	.7250 (-2.79)	320	.8770 (-1.14)
145	.7335 (-2.69)	325	.8995 (-0.92)
150	.7420 (-2.59)	330	.9220 (-0.71)
155	.7490 (-2.51)	335	.9340 (-0.59)
160	.7560 (-2.43)	340	.9460 (-0.48)
165	.7565 (-2.42)	345	.9515 (-0.43)
170	.7570 (-2.42)	350	.9570 (-0.38)
175	.7490 (-2.51)	355	.9595 (-0.36)

Systems With Reliability LP

CLIENT: W262CO

Date: 3/3/2015

ANTENNA TYPE: FMECR/1-TA

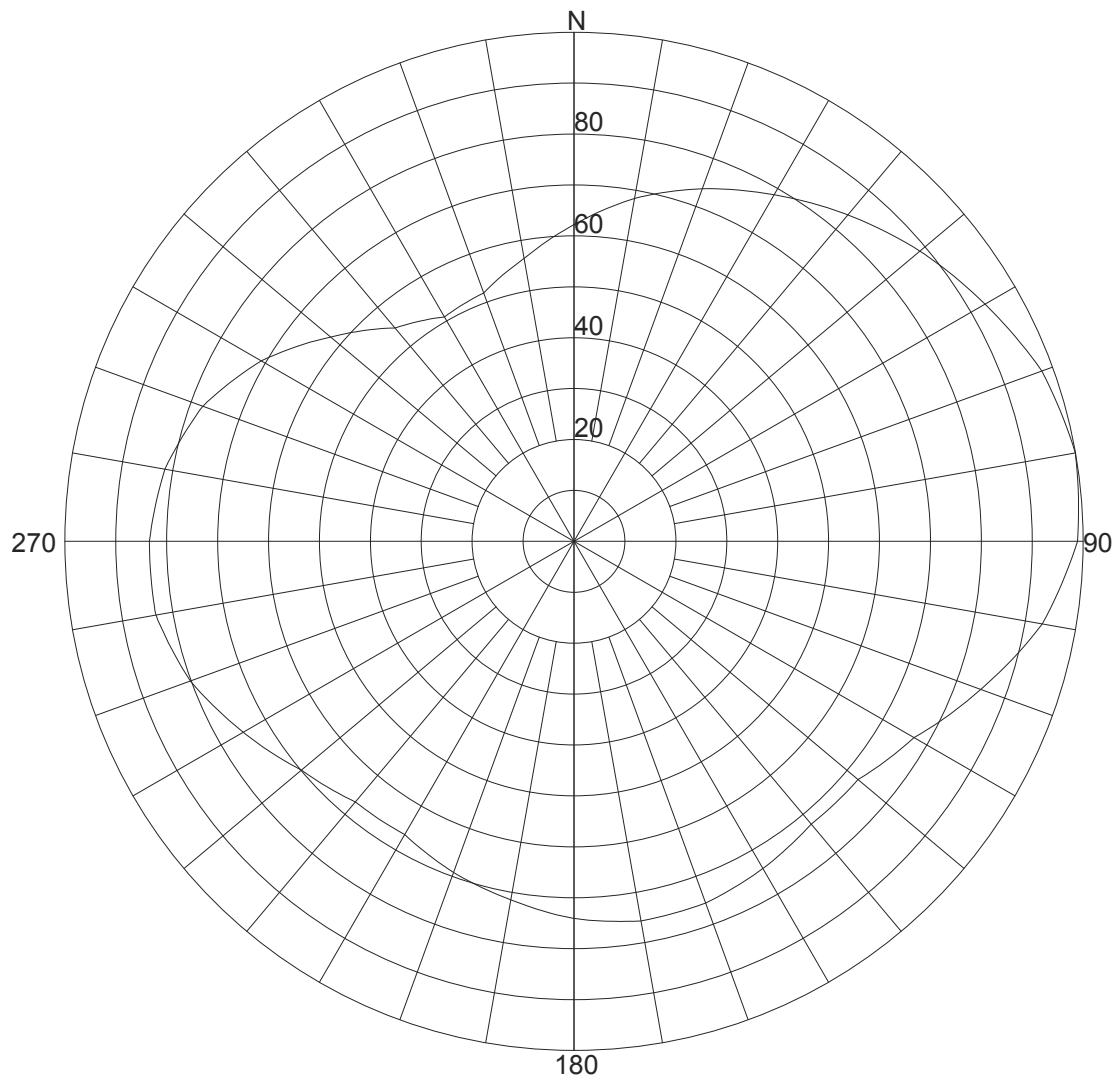
FREQUENCY: 100.3 MHz

PATTERN POL.: Circular

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.38327 / 1.41dB

PATTERN RMS: 0.850



Azimuth Pattern

Systems With Reliability LP

Scale: Linear

Unit: Relative Field

CLIENT: W262CO

Date: 3/3/2015

ANTENNA TYPE: FMECR/1-TA

FREQUENCY: 100.3 MHz

PATTERN POL.: Horizontal

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.70997 / 2.33dB

PATTERN RMS: 0.765

Relative Field Tabulation(Azimuth)

Azimuth Heading	Normalized Field(dB)	Azimuth Heading	Normalized Field(dB)
0	.6220 (-4.12)	180	.7410 (-2.6)
5	.6530 (-3.7)	185	.7280 (-2.76)
10	.6840 (-3.3)	190	.7150 (-2.91)
15	.7105 (-2.97)	195	.7035 (-3.05)
20	.7370 (-2.65)	200	.6920 (-3.2)
25	.7615 (-2.37)	205	.6785 (-3.37)
30	.7860 (-2.09)	210	.6650 (-3.54)
35	.8115 (-1.81)	215	.6665 (-3.52)
40	.8370 (-1.55)	220	.6680 (-3.5)
45	.8620 (-1.29)	225	.6835 (-3.31)
50	.8870 (-1.04)	230	.6990 (-3.11)
55	.9095 (-0.82)	235	.7245 (-2.8)
60	.9320 (-0.61)	240	.7500 (-2.5)
65	.9550 (-0.4)	245	.7760 (-2.2)
70	.9780 (-0.19)	250	.8020 (-1.92)
75	.9890 (-0.1)	255	.8180 (-1.74)
80	1.0000 (0)	260	.8340 (-1.58)
85	.9945 (-0.05)	265	.8340 (-1.58)
90	.9890 (-0.1)	270	.8340 (-1.58)
95	.9615 (-0.34)	275	.8250 (-1.67)
100	.9340 (-0.59)	280	.8160 (-1.77)
105	.8920 (-0.99)	285	.7960 (-1.98)
110	.8500 (-1.41)	290	.7760 (-2.2)
115	.8105 (-1.82)	295	.7425 (-2.59)
120	.7710 (-2.26)	300	.7090 (-2.99)
125	.7495 (-2.5)	305	.6665 (-3.52)
130	.7280 (-2.76)	310	.6240 (-4.1)
135	.7265 (-2.78)	315	.5855 (-4.65)
140	.7250 (-2.79)	320	.5470 (-5.24)
145	.7335 (-2.69)	325	.5280 (-5.55)
150	.7420 (-2.59)	330	.5090 (-5.87)
155	.7490 (-2.51)	335	.5140 (-5.78)
160	.7560 (-2.43)	340	.5190 (-5.7)
165	.7565 (-2.42)	345	.5415 (-5.33)
170	.7570 (-2.42)	350	.5640 (-4.97)
175	.7490 (-2.51)	355	.5930 (-4.54)

Systems With Reliability LP

CLIENT: W262CO

Date: 3/3/2015

ANTENNA TYPE: FMECR/1-TA

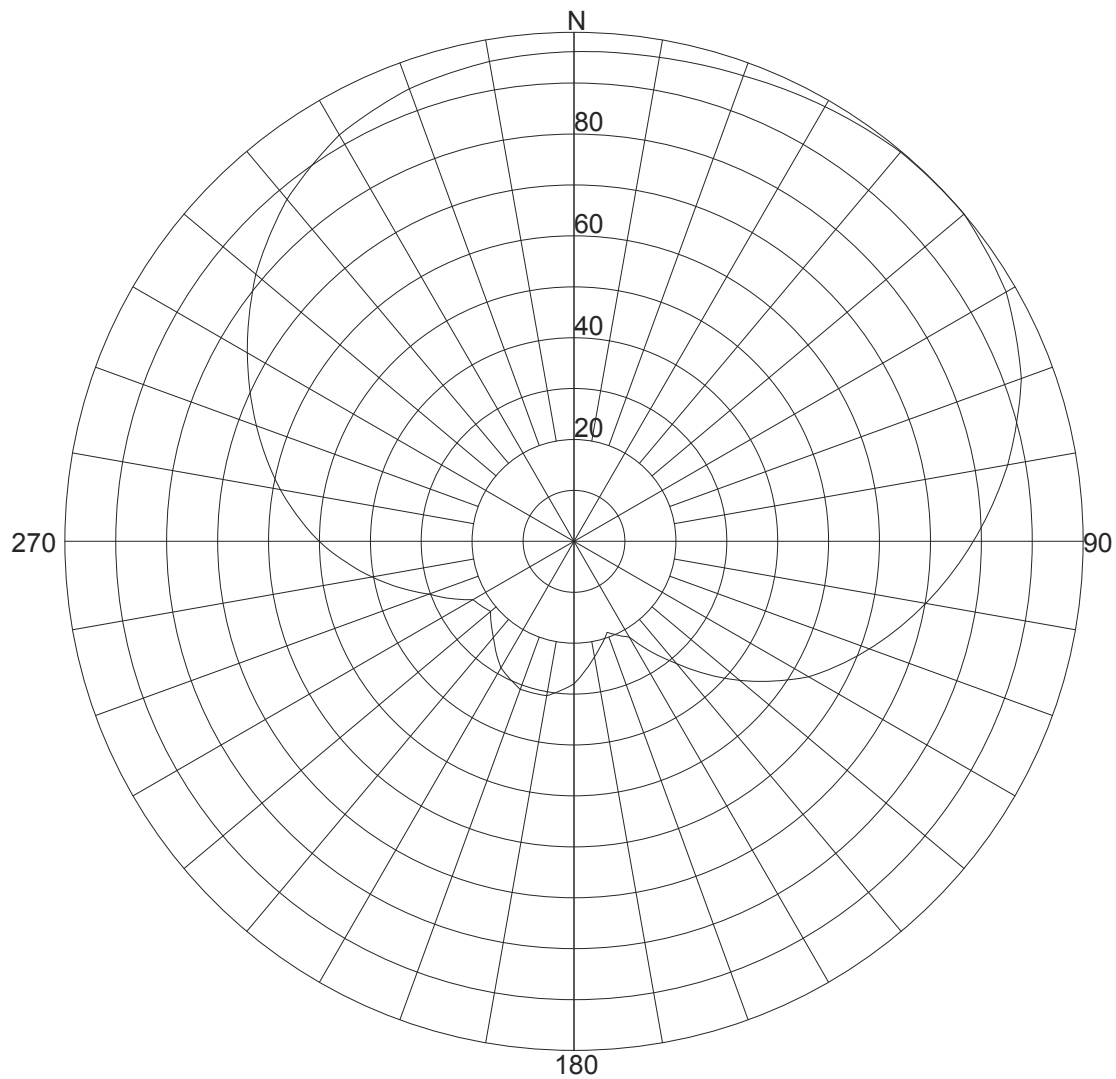
FREQUENCY: 100.3 MHz

PATTERN POL.: Horizontal

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 1.70997 / 2.33dB

PATTERN RMS: 0.765



Azimuth Pattern

Systems With Reliability LP

Scale: Linear

Unit: Relative Field

CLIENT: W262CO

Date: 3/3/2015

ANTENNA TYPE: FMECR/1-TA

FREQUENCY: 100.3 MHz

PATTERN POL.: Vertical

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.12216 / 3.27dB

PATTERN RMS: 0.686

Relative Field Tabulation(Azimuth)

Azimuth Heading	Normalized Field(dB)	Azimuth Heading	Normalized Field(dB)
0	.9620 (-0.34)	180	.2800 (-11.06)
5	.9635 (-0.32)	185	.2940 (-10.63)
10	.9650 (-0.31)	190	.3080 (-10.23)
15	.9690 (-0.27)	195	.3085 (-10.21)
20	.9730 (-0.24)	200	.3090 (-10.2)
25	.9795 (-0.18)	205	.2980 (-10.52)
30	.9860 (-0.12)	210	.2870 (-10.84)
35	.9920 (-0.07)	215	.2665 (-11.49)
40	.9980 (-0.02)	220	.2460 (-12.18)
45	.9990 (-0.01)	225	.2300 (-12.77)
50	1.0000 (0)	230	.2140 (-13.39)
55	.9900 (-0.09)	235	.2215 (-13.09)
60	.9800 (-0.18)	240	.2290 (-12.8)
65	.9575 (-0.38)	245	.2660 (-11.5)
70	.9350 (-0.58)	250	.3030 (-10.37)
75	.9000 (-0.92)	255	.3530 (-9.04)
80	.8650 (-1.26)	260	.4030 (-7.89)
85	.8250 (-1.67)	265	.4520 (-6.9)
90	.7850 (-2.1)	270	.5010 (-6)
95	.7430 (-2.58)	275	.5435 (-5.3)
100	.7010 (-3.09)	280	.5860 (-4.64)
105	.6595 (-3.62)	285	.6250 (-4.08)
110	.6180 (-4.18)	290	.6640 (-3.56)
115	.5750 (-4.81)	295	.7025 (-3.07)
120	.5320 (-5.48)	300	.7410 (-2.6)
125	.4785 (-6.4)	305	.7785 (-2.17)
130	.4250 (-7.43)	310	.8160 (-1.77)
135	.3690 (-8.66)	315	.8465 (-1.45)
140	.3130 (-10.09)	320	.8770 (-1.14)
145	.2650 (-11.54)	325	.8995 (-0.92)
150	.2170 (-13.27)	330	.9220 (-0.71)
155	.2035 (-13.83)	335	.9340 (-0.59)
160	.1900 (-14.42)	340	.9460 (-0.48)
165	.2100 (-13.56)	345	.9515 (-0.43)
170	.2300 (-12.77)	350	.9570 (-0.38)
175	.2550 (-11.87)	355	.9595 (-0.36)

Systems With Reliability LP

CLIENT: W262CO

Date: 3/3/2015

ANTENNA TYPE: FMECR/1-TA

FREQUENCY: 100.3 MHz

PATTERN POL.: Vertical

CIRCULARITY(+/-dB):

AZ. DIRECTIVITY: 2.12216 / 3.27dB

PATTERN RMS: 0.686



SYSTEMS WITH RELIABILITY, INC.
Broadcast Antennas and Transmission Systems

W262CO Antenna RMS Comparison

PROPOSED ANTENNA

Azimuth Heading	Relative Field
0	1
10	1
20	1
30	1
40	1
50	1
60	1
70	1
80	1
90	1
100	1
110	1
120	1
130	1
140	1
150	0.94
160	0.94
170	0.87
180	0.9
190	1
200	1
210	1
220	1
230	1
240	1
250	1
260	1
270	1
280	0.86
290	0.78
300	0.8
310	0.85
320	1
330	1
340	1
350	1

DESIGNED ANTENNA

Azimuth Heading	Relative Field
0	0.962
10	0.965
20	0.973
30	0.986
40	0.998
50	1
60	0.98
70	0.978
80	1
90	0.989
100	0.934
110	0.85
120	0.771
130	0.728
140	0.725
150	0.742
160	0.756
170	0.757
180	0.741
190	0.715
200	0.692
210	0.665
220	0.668
230	0.699
240	0.75
250	0.802
260	0.834
270	0.834
280	0.816
290	0.776
300	0.741
310	0.816
320	0.877
330	0.922
340	0.946
350	0.957

Sum of Relative Field Squared : 34.045
Sum Divided by 36 (Readings) : 0.946
Square Root : 0.972

Sum of Relative Field Squared : 26.033
Sum Divided by 36 (Readings) : 0.723
Square Root : 0.850

Percentage of Construction Permit Antenna Filled :

87.4%