

February 3, 2010

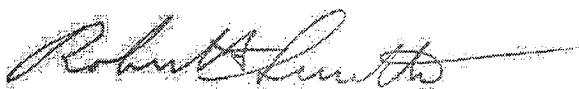
To Whom It May Concern:

I have review the Shively Labs shop order file number 27795 for our 6810-2R-SS-DA Directional Antenna System manufactured for WBPR.

I understand that WICN is mounting an antenna on the same tower above the WBPR Directional Antenna System. The photos of the tower indicate that there is a coax cable support structure in the center of the tower. If the coax feed cable for the WICN antenna is placed on this cable support structure there will be no measurable change in the directional pattern of the WBPR antenna system

If you have any questions or need more information, please call me.

Robert A. Surette



Director of Sales Engineering



Proposal Number	C-03860
Date	Dec 04, 2009
Call Letters	WICN
Location	Worcester, MA
Customer	WICN Public Radio
Antenna Type	DCRH
Frequency	90.5 MHz
Drawing #	25R

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PATTERN CERTIFICATION

Method of Measurement

The azimuth pattern for WICN, Dielectric Document Sketch #25R, was measured in the following manner.

A single 4.4 to 1 scale model "DCRH" bay radiator was mounted on a similarly scaled model of the tower according to information provided to Dielectric by the customer; refer to Dielectric Document Sketch #25R. The antenna under test, all parasitics, all known tower appurtenances, and the tower section were rotated through 360 degrees while receiving a signal at the appropriate frequency from a linear cavity-backed source antenna. Both the horizontal and vertical polarization azimuth patterns were measured in an anechoic test range.

The transmit and scale model antennas are mounted at identical elevations and at opposite ends of the chamber. A Hewlett Packard model 8752C network analyzer was used to supply the RF signal to the source antenna at 4.4 times the fundamental FM frequency and to receive the signal intercepted by the antenna under test. The received signal was converted to a relative level, referenced to the source. This level was stored on a computer acting as the master controller. The computer controls the measurement system via IEEE-488 control bus through a GPIB card.

Statement of Qualifications

Jon Hanson is an Electrical Engineer here at Dielectric. He received a BS in Electrical Engineering from the North Dakota State University in 2004. He has 2 years experience in RF antenna engineering and has been employed by Dielectric Communications since 2008.

Signed by:

Jon Hanson
2/24/10

Date:

2/24/10



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FM AZIMUTH PATTERN APPROVAL

The azimuth pattern of the horizontal polarization and vertical polarization as supplied by Dielectric in the document labeled "Pattern 25R", is acknowledged as acceptable. We understand that Dielectric does not guarantee or predict signal strength in any particular location.

WICN PUBLIC RADIO
(Customer's name)

By: DONALD M. DEMARSH
(Name typed or printed)

Title: OPERATIONS MANAGER

Donald M. Demarsh
(Signature)

Proposal Number
Date
Call Letters
Location
Customer
Antenna Type
Frequency
Drawing #

C-03860
Dec 04, 2009
WICN
Worcester, MA
WICN Public Radio
DCRH
90.5 MHz
25R

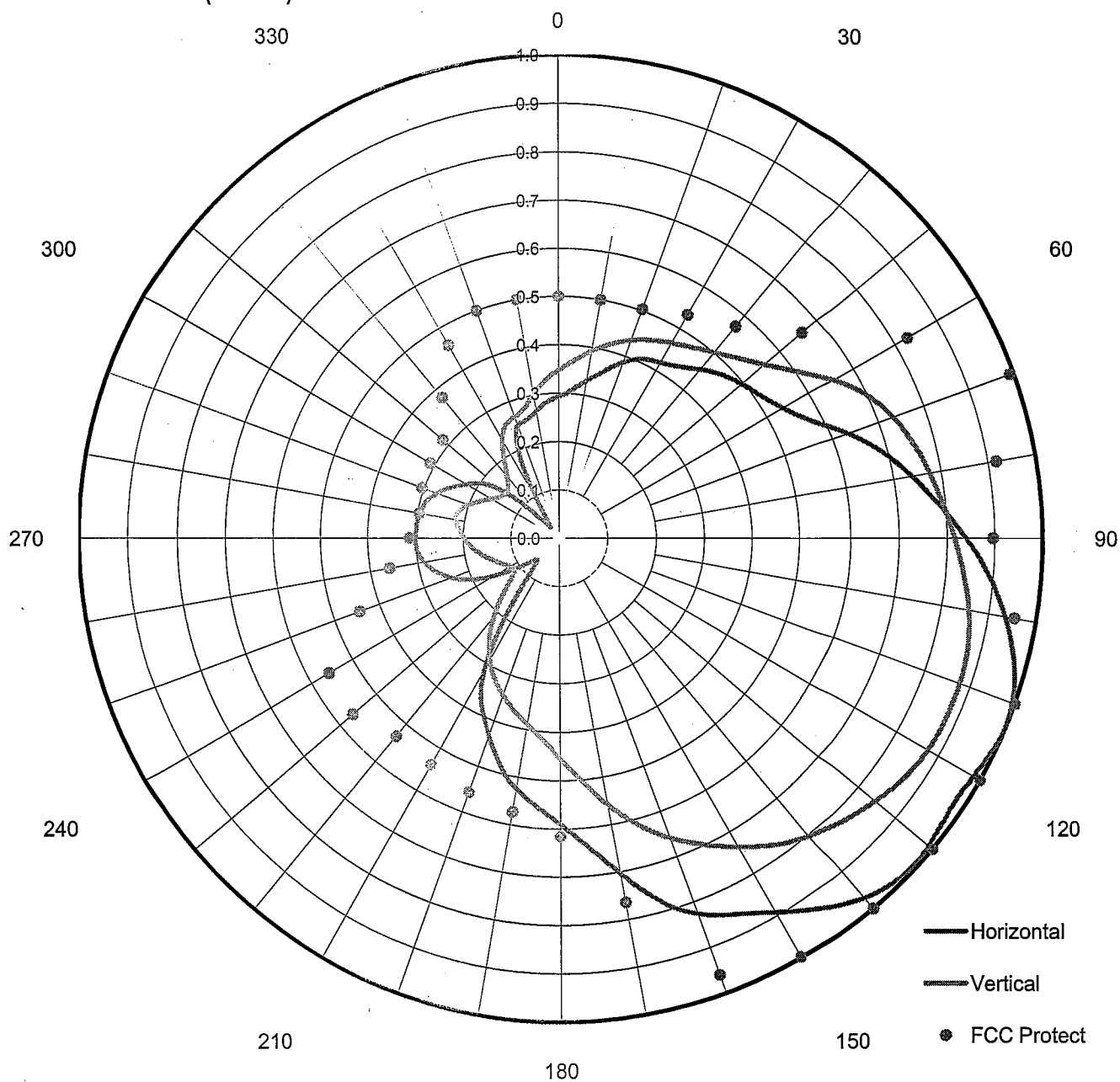
AZIMUTH PATTERN

85.3% Ccov 52.1% Hrms - 47.9% Vrms

Gain 3.21 (5.07 dB) HPOL
2.91 (4.64 dB) HPOL

Calculated / Measured

Measured





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TABULATION OF HORIZONTAL AZIMUTH PATTERN

Angle	Field	dBk	ERP kW
0	0.293	-10.249	0.094
10	0.330	-9.216	0.120
20	0.386	-7.854	0.164
30	0.419	-7.142	0.193
40	0.455	-6.426	0.228
50	0.495	-5.694	0.270
60	0.538	-4.970	0.318
70	0.633	-3.558	0.441
80	0.739	-2.213	0.601
90	0.839	-1.111	0.774
100	0.935	-0.170	0.962
110	0.995	0.370	1.089
120	0.984	0.274	1.065
130	0.990	0.327	1.078
140	0.972	0.167	1.039
150	0.892	-0.579	0.875
160	0.826	-1.246	0.751
170	0.703	-2.647	0.544
180	0.591	-4.154	0.384
190	0.525	-5.183	0.303
200	0.433	-6.856	0.206
210	0.314	-9.647	0.108
220	0.092	-20.310	0.009
230	0.075	-22.085	0.006
240	0.155	-15.779	0.026
250	0.240	-11.982	0.063
260	0.287	-10.428	0.091
270	0.300	-10.044	0.099
280	0.295	-10.190	0.096
290	0.272	-10.895	0.081
300	0.223	-12.620	0.055
310	0.153	-15.892	0.026
320	0.034	-28.956	0.001
330	0.087	-20.796	0.008
340	0.248	-11.697	0.068
350	0.268	-11.023	0.079



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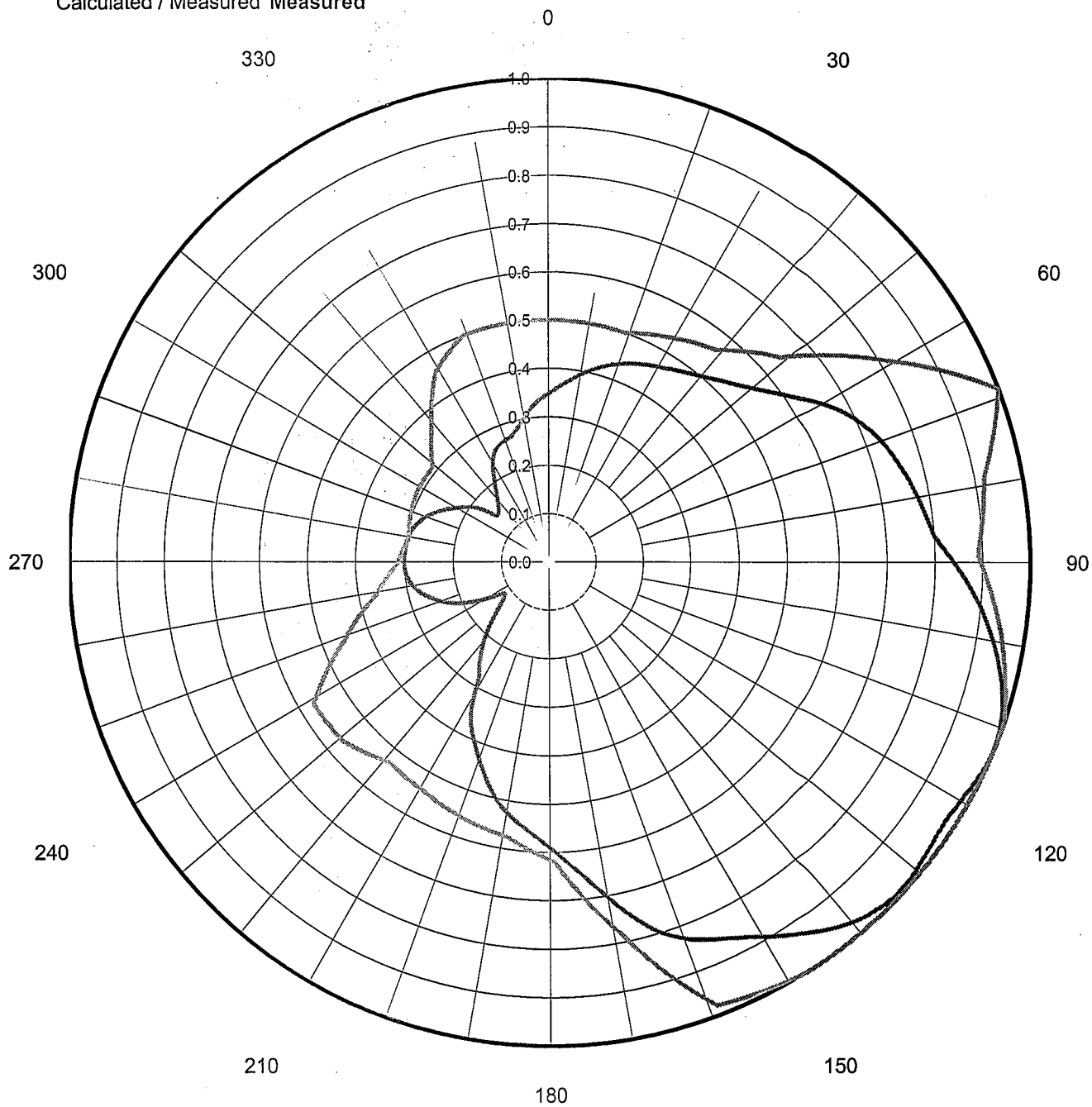
TABULATION OF VERTICAL AZIMUTH PATTERN

Angle	Field	dBk	ERP kW
0	0.347	-8.779	0.132
10	0.393	-7.698	0.170
20	0.435	-6.816	0.208
30	0.466	-6.218	0.239
40	0.501	-5.589	0.276
50	0.558	-4.653	0.343
60	0.654	-3.275	0.470
70	0.733	-2.284	0.591
80	0.776	-1.789	0.662
90	0.816	-1.352	0.732
100	0.857	-0.926	0.808
110	0.877	-0.726	0.846
120	0.875	-0.746	0.842
130	0.845	-1.049	0.785
140	0.803	-1.492	0.709
150	0.736	-2.249	0.596
160	0.659	-3.208	0.478
170	0.558	-4.653	0.343
180	0.454	-6.445	0.227
190	0.390	-7.765	0.167
200	0.345	-8.830	0.131
210	0.291	-10.308	0.093
220	0.213	-13.018	0.050
230	0.130	-17.307	0.019
240	0.117	-18.222	0.015
250	0.140	-16.664	0.022
260	0.171	-14.926	0.032
270	0.198	-13.653	0.043
280	0.218	-12.817	0.052
290	0.201	-13.522	0.044
300	0.163	-15.342	0.029
310	0.144	-16.419	0.023
320	0.167	-15.132	0.031
330	0.234	-12.202	0.060
340	0.267	-11.056	0.078
350	0.302	-9.986	0.100

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COMPOSITE AZIMUTH PATTERN

Calculated / Measured Measured





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TABULATION OF COMPOSITE AZIMUTH PATTERN

Angle	Field	dBk	Power kW	Input Power
0	0.347	-8.779	0.132	1.100
10	0.393	-7.698	0.170	1.100
20	0.435	-6.816	0.208	1.100
30	0.466	-6.218	0.239	1.100
40	0.501	-5.589	0.276	1.100
50	0.558	-4.653	0.343	1.100
60	0.654	-3.275	0.470	1.100
70	0.733	-2.284	0.591	1.100
80	0.776	-1.789	0.662	1.100
90	0.839	-1.111	0.774	1.100
100	0.935	-0.170	0.962	1.100
110	0.995	0.370	1.089	1.100
120	0.984	0.274	1.065	1.100
130	0.990	0.327	1.078	1.100
140	0.972	0.167	1.039	1.100
150	0.892	-0.579	0.875	1.100
160	0.826	-1.246	0.751	1.100
170	0.703	-2.647	0.544	1.100
180	0.591	-4.154	0.384	1.100
190	0.525	-5.183	0.303	1.100
200	0.433	-6.856	0.206	1.100
210	0.314	-9.647	0.108	1.100
220	0.213	-13.018	0.050	1.100
230	0.130	-17.307	0.019	1.100
240	0.155	-15.779	0.026	1.100
250	0.240	-11.982	0.063	1.100
260	0.287	-10.428	0.091	1.100
270	0.300	-10.044	0.099	1.100
280	0.295	-10.190	0.096	1.100
290	0.272	-10.895	0.081	1.100
300	0.223	-12.620	0.055	1.100
310	0.153	-15.892	0.026	1.100
320	0.167	-15.132	0.031	1.100
330	0.234	-12.202	0.060	1.100
340	0.267	-11.056	0.078	1.100
350	0.302	-9.986	0.100	1.100



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CUSTOMER GAIN SUMMARY

Azimuth Pattern Gain of Horizontal Polarization	3.21 (5.07 dB)
Elevation Pattern Gain Per Polarization	0.47 (-3.28 dB)
Peak Gain at Horizontal Polarization	1.51 (1.79 dB)

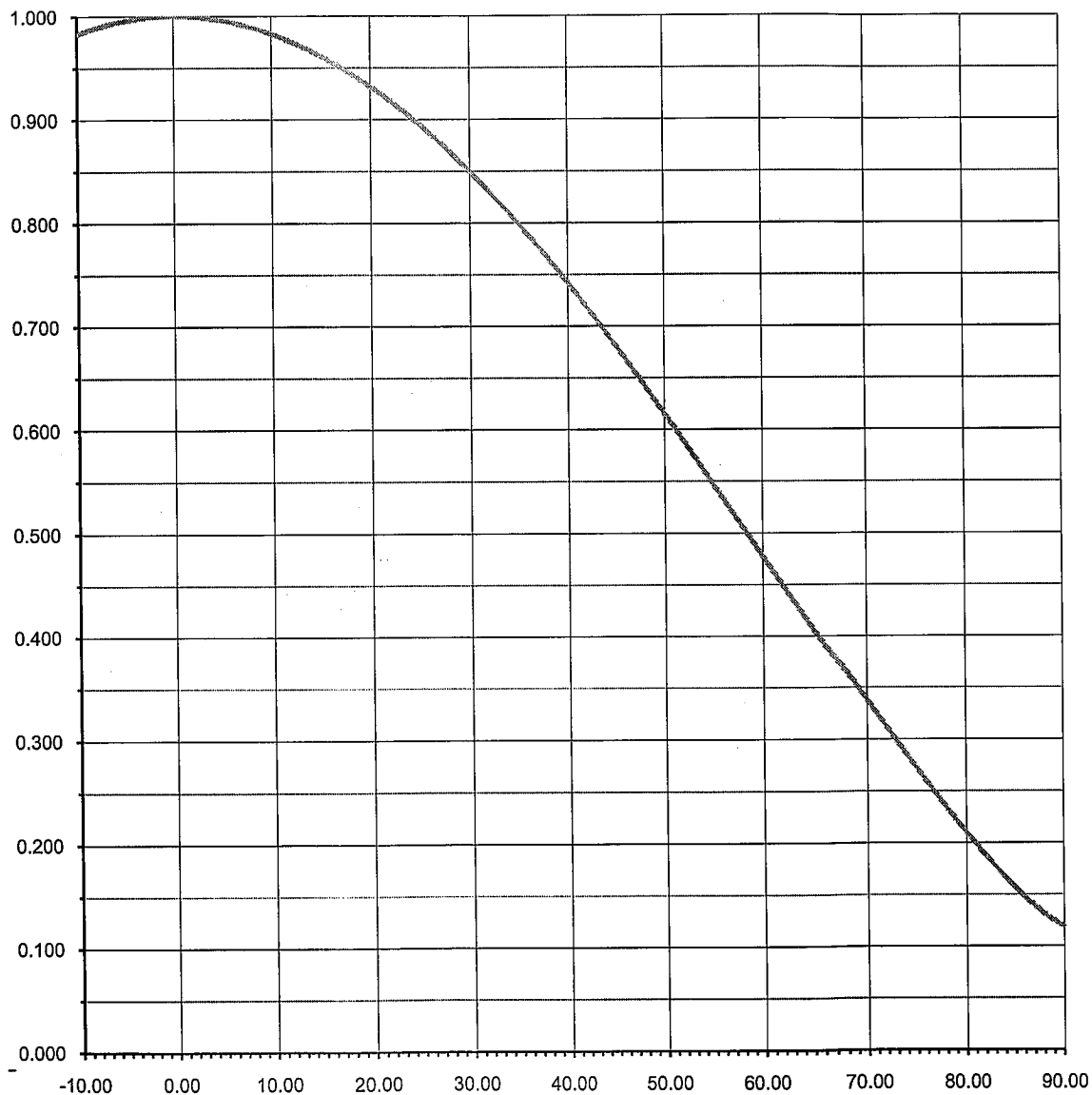


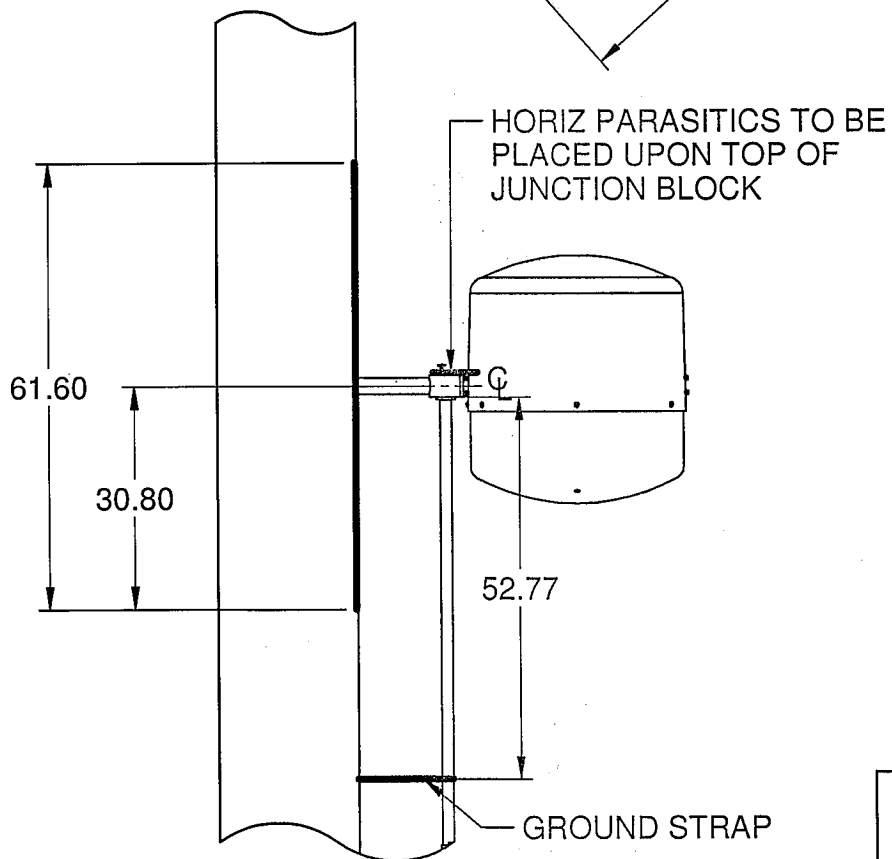
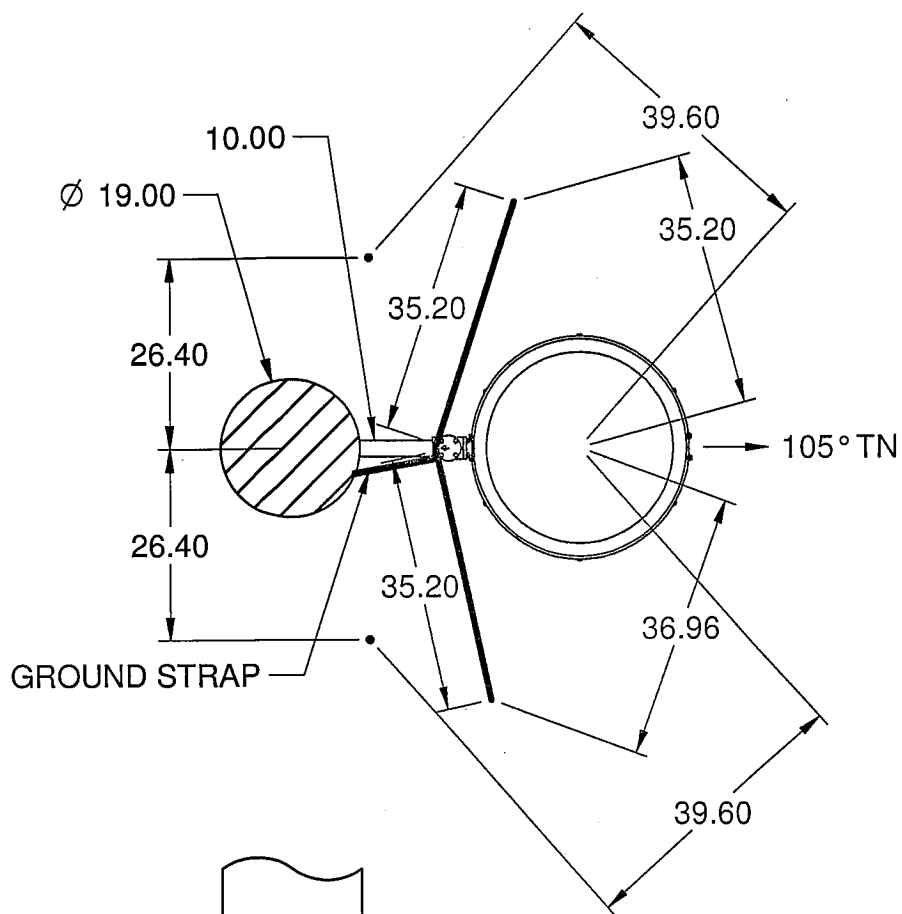
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ELEVATION PATTERN

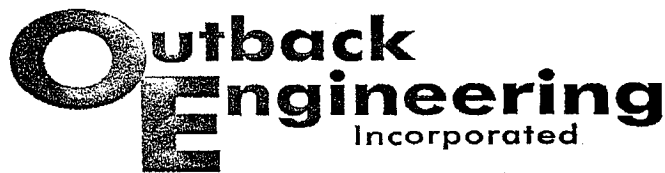
RMS Gain at Main Lobe 0.47 -(3.28 dB)
Per Polarization
Calculated / Measured Calculated

Beam Tilt 0.00 deg
Frequency 90.5 MHz





WICN 90.5
DCRH1ERD
PATTERN 25



165 East Grove Street
Middleborough, MA 02346

Tel # 508-946-9231

Fax # 508-947-8873

Civil Engineers + Land Surveyors + Wetland Scientists + Soils Laboratory

February 1, 2010

Donald DeMarsh
Operations Manager
WICN Public Radio
50 Portland St
Worcester, MA 01608

Subject: WICN Directional FM Broadcast Antenna
Paxton, Massachusetts

Dear Mr. DeMarsh,

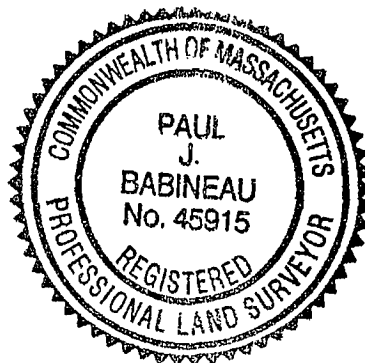
On February 1, 2010, representatives of Outback Engineering, Inc. observed the installation of the FM broadcasting antenna for WICN, Worcester, Massachusetts, at its antenna site in Paxton, Massachusetts.

Outback Engineering certifies that the antenna was aimed in accordance with the manufacturer's installation drawing toward an azimuth of 105 degrees with respect to true north.

Very Truly Yours,

A handwritten signature in black ink, appearing to read "Paul J. Babineau", with a stylized flourish at the end.

Paul J. Babineau, P. L. S.





February 3, 2010

Federal Communications Commission
Washington, DC

REGUARDING: WICN Construction Permit BMPED-20091203AHI

This letter is to certify that the construction has been completed as authorized in the construction permit BMPED-20091203AHI. Antenna design and construction was completed by Dielectric as directed by Jeff Reynolds of *duTreil, Lundin & Rackley, Inc.* Consulting Engineers, to comply with FCC rules and regulations. The constructed antenna was then installed by Hampden Communications in accordance with instructions from Dielectric on mounting and orientation. Outback Engineering, Inc., Professional Surveyor was engaged to identify the correct azimuth for the antenna to be oriented. After construction, the surveyor had confirmed the azimuth as directed by Dielectric.

We herby certify that the construction permit BMPED-20091203AHI has been completed in accordance with all FCC rules and regulations.

Regards,

Donald M. DeMarsh
Operations Manager
WICN Public Radio

Richard Kenadek
Contract Engineer
FCC License # PG-1-11731