

DIRECTIONAL ANTENNA EXHIBIT

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The University of Akron
Akron, OH

WZIP is licensed to operate on Channel 201 (88.1 MHz) with a maximum effective radiated power of 7.5 kilowatts at 250 meters above average terrain using a three bay Shively 6810-3D-DA circularly polarized nondirectional antenna. This antenna was recently replaced with a new Shively 6810-3D-DA directional antenna, which is an exact replacement which has the same exact directional characteristics. Pursuant to Section 73.1690(c)(2) of the FCC Rules, WZIP has commenced program tests with this replacement antenna at its full licensed effective radiated power of 7.5 kilowatts.

The pattern information required by Section 73.1690(c)(2)(i) of the FCC Rules was extracted from the manufacturer's 1997 proof of performance (pattern modeling) on the original antenna which is being replaced with this new identical antenna. This pattern certification, including a description of the procedures and equipment which were utilized and the measured antenna patterns in both the horizontal and vertical polarizations is included as a separate attachment to this exhibit.

Table 1.0 presents a tabulation of the measured radiation pattern data, in both the horizontal and vertical polarizations, in relation to the presently authorized WZIP composite envelope pattern. As shown in this table, the measured radiation in both polarizations is totally encompassed by the authorized composite pattern, as required by Section 73.316(c)(2) of the FCC Rules.

The maximum effective radiated power is 7.5 kilowatts in the horizontal polarization and 7.35 kilowatts in the vertical polarization. The RMS of the horizontally polarized relative field pattern is 0.680, while that of the vertically polarized relative field

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pattern is 0.650. The composite measured pattern RMS is 0.677, or 95.4% of the RMS of the authorized envelope pattern (0.710).

No other antennas are mounted within or in close proximity to the aperture of this antenna. Furthermore, there is no platform or other similar structure at the top of this tower which could possibly distort the directional pattern of this antenna.

Section 73.1690(c)(2)(iv) of the FCC Rules requires that a certification from a licensed surveyor be submitted to establish that the antenna has been oriented at the proper azimuth. This certification is contained in the Appendix to this exhibit. Also included in this Appendix is the required engineer's certification verifying that the antenna was installed in compliance with the drawings supplied by the manufacturer.

Figure 1.0 is a map exhibit depicting the predicted 60 dBu contour for the measured composite pattern in relation to the boundaries of Akron, Ohio. This exhibit clearly documents that the constructed facilities provide 60 dBu service all of Akron, easily complying with the requirements of Section 73.515 of the FCC Rules, which requires that this contour encompass at least 50% of a noncommercial educational FM station's community of license.

TABLE 1.0

WZIP MEASURED AND
LICENSED DIRECTIONAL PATTERNS
The University of Akron
Akron, OH

<u>Azimuth</u> <u>(Degrees)</u>	Licensed Pattern (Relative Field)	<u>Measured Pattern</u>	
		Horizontal Polarization (Relative Field)	Vertical Polarization (Relative Field)
0	0.260	0.175	0.130
10	0.325	0.165	0.120
20	0.400	0.160	0.220
30	0.500	0.200	0.400
40	0.625	0.435	0.480
45	0.645	0.500	0.500
50	0.670	0.540	0.525
60	0.670	0.610	0.565
70	0.670	0.645	0.610
80	0.700	0.685	0.660
90	0.740	0.715	0.715
100	0.780	0.740	0.755
110	0.820	0.760	0.785
120	0.820	0.780	0.795
130	0.840	0.810	0.800
135	0.850	0.835	0.810
140	0.860	0.850	0.825
150	1.000	0.900	0.860
160	1.000	0.960	0.870
170	1.000	1.000	0.880
180	1.000	1.000	0.860

TABLE 1.0 (cont'd)

<u>Azimuth (Degrees)</u>	Authorized Pattern (Relative Field)	<u>Measured Pattern</u>	
		Horizontal Polarization (Relative Field)	Vertical Polarization (Relative Field)
190	1.000	1.000	0.820
200	1.000	1.000	0.825
210	1.000	1.000	0.900
220	1.000	1.000	0.990
230	1.000	0.970	0.970
236	1.000	0.890	0.910
240	0.925	0.840	0.870
250	0.735	0.695	0.700
260	0.585	0.540	0.475
270	0.465	0.430	0.385
280	0.370	0.330	0.350
290	0.295	0.250	0.250
300	0.235	0.205	0.140
310	0.190	0.170	0.006
315	0.178	0.165	0.004
320	0.178	0.155	0.004
330	0.178	0.150	0.006
340	0.190	0.155	0.100
350	0.220	0.165	0.130

RMS of authorized envelope pattern = 0.710

RMS of horizontally polarized measured pattern = 0.680

RMS of vertically polarized measured pattern = 0.650

RMS of composite measured pattern = 0.677 (95.4% of authorized envelope pattern)



60 dBu
(COMPOSITE MEASURED PATTERN)

WZIP

AKRON CITY
LIMITS

CARL E. SMITH CONSULTING ENGINEERS
2324 N. CLEVE-MASS RD., BOX 807
BATH, OHIO 44210-0807
330/659-4440

FIG. 1.0
PREDICTED WZIP 60 dBu CONTOUR
(COMPOSITE MEASURED PATTERN)
The University of Akron
Akron, OH

APPENDIX
CERTIFICATIONS REGARDING
ANTENNA INSTALLATION

CULP SURVEYING, L.L.C.

3323 SPRING VALLEY RD. AKRON, OHIO 44333
(330) 659-4044 or (330) 815-3765

February 9, 2021

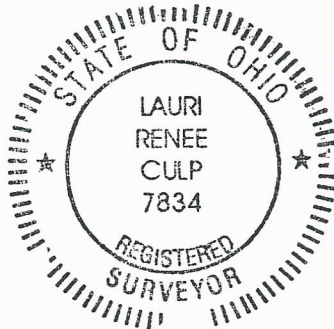
Warmus and Associates, Inc.
P.O. Box 897
2324 N. Cleveland-Massillon Road
Bath, Ohio 44210-0807

Re: Antenna Alignment – Copley, Ohio

Gentlemen:

This is to certify that, following the completion of the modifications undertaken by your firm, the antenna for WZIP Radio is installed with the antenna boom oriented at 160° True, as specified by the antenna manufacturer.

If you have any questions, please contact me.



Sincerely,

Lauri R. Culp
Registered Surveyor No. 7834

ENGINEERING AFFIDAVIT

State of Ohio)
) ss:
County of Summit)

I, Brian M. Warmus, being duly sworn, depose and state that I am graduate electrical engineer and a member of the Firm of "Carl E. Smith Consulting Engineers" located at 2324 North Cleveland-Massillon Road in the Township of Bath, County of Summit, State of Ohio, and that I have extensive experience in the installation of FM broadcast antennas, both directional and nondirectional. I personally supervised the installation of the replacement Shively 6810-3D-DA directional antenna for WZIP and further inspected the completed installation. This antenna was installed in compliance with the drawings supplied by the antenna manufacturer detailing the configuration which was utilized in the pattern modeling.


Brian M. Warmus

Subscribed and sworn to before me on **March 4, 2012**.

Nancy A. Adams
Notary Public

/SEAL/

**Nancy A. Adams, Notary Public
Residence - Cuyahoga County
State Wide Jurisdiction, Ohio
My Commission Expires Sept. 27, 2025**