Compliance with Special Operating Conditions or Restrictions

Special Condition #1

The applicant in coordination with other users of the site is committed to reducing power or ceasing operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic fields in excess of FCC guidelines.

Special Condition #2

No action required at licensing.

Special Conditions #3, #4, #5 and #7

See attached directional antenna report of test, certification of directional antenna installation, and certification of directional antenna orientation.

Special Condition #6

See attached map which demonstrates compliance with section 73.315 considering the measured directional antenna pattern as set forth in the antenna manufacturer's directional antenna report of test.

Special Condition #8

The applicant recognizes that the program tests cannot commence and the instant license application will not be granted until program tests commence and a license application is granted for WLAW (Facility ID No. 53960) on Channel 248A with the facilities specified in outstanding Construction Permit LMS File No. 0000086872 (filed October, 2019; granted December 12, 2019). Note that the WLAW Construction Permit referenced in Special Condition #8 (FCC File No. BPH-20190418AAB) was superseded by the WLAW October, 2019, modification of construction permit application.

Shively Labs®
a division of Howell Laboratories,Inc.

P. O. Box 389, 188 Harrison Rd.
Bridgton, Maine 04009 USA
(207) 647-3327
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S.O. 36371

Report of Test 6016-2/3-DA

for

RADIO LICENSE HOLDING CBC, LLC

WLAV 96.9 MHz GRAND RAPIDS, MI

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a Test 6016-2/3-DA to meet the needs of WLAV and to comply with the requirements of the FCC construction permit, file number BPH-20190501AAA. This test characterizes only the radiation characteristics of the antenna when mounted on the tower as described. It does not represent or imply any guarantee of specific coverage which can be influenced by factors beyond the scope of this test.

RESULTS:

The following Figures are the results of the measurements from our pattern range:

Figure 1A - Measured Azimuth Pattern with the FCC Composite
Figure 1B - Measured Composite Azimuth Pattern with the FCC Composite
Figure 1C - Tabulation of the Horizontal Polarization for the Measured Azimuth Pattern
Figure 1D - Tabulation of the Vertical Polarization for the Measured Azimuth Pattern
Figure 1E - Tabulation of the Measured Composite Azimuth Pattern
Figure 1F - Tabulation of the FCC Composite

The calculated elevation pattern of the antenna is shown in Figure 3.

Construction permit file number BPH-20190501AAA indicates that the Horizontal radiation component shall not exceed 43 kW at any azimuth and is restricted to the following values at the azimuths specified:

220 Degrees True: 1.75 kilowatts

From Figure 1A, the maximum radiation of the Horizontal component occurs at 075 Degrees True to 078 Degrees. At the restricted azimuth of 220 Degrees True the Horizontal component is 15.49 dB down from the maximum of 43 kW, or 1.21 kW.

The R.M.S. of the Horizontal component is 0.630. The total Horizontal power gain is 3.430. The R.M.S. of the Vertical component is 0.602 The total Vertical power gain is 2.967. See Figure 4 for calculations. The R.M.S. of the FCC composite pattern is 0.744. The R.M.S. of the measured composite pattern is 0.652. Eighty-five percent (85%) of the original authorized FCC composite pattern is 0.6324. Therefore this pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

One level of the Test 6016-2/3-DA was mounted on a tower of precise scale to the tower at the WLAV site. The spacing of the antenna to the tower was varied to achieve the horizontal and vertical pattern shown in Figure 1A. See Figure 2 for mechanical details.

METHOD OF MEASUREMENT:

As allowed by the construction permit, file number BPH-20190501AAA, a single level of the Test 6016-2/3-DA was set up on the Shively Labs scale model antenna pattern measuring range. A scale of 4.5:1 was used.

EQUIPMENT:

The 4.5:1 scale model pattern range consists of a wooden rotating pedestal equipped with a position indicator. The scale model bay is placed on the top of this pedestal and is used in the transmission mode at approximately 20 feet above ground level. The receiving corner reflector is spaced 50 feet away from the rotating pedestal at the same level above ground as the transmitting model. The transmitting and receiving signals are carried to a control building by means of RG-9/U double shielded coax cable.

The control building is equipped with:

Hewlett Packard Model 4395-A Network Analyzer

PC Based Controller

Output Standard Printer or 'pdf'

All testing is carried out in strict accordance with approved procedures under our ISO9001.

TEST PROCEDURES:

The receiving antenna system is mounted so that the horizontal and vertical azimuth patterns are measured independently. The network analyzer was set to 436.05 MHz Calibrated pads are used to check the linearity of the measuring system. For example, 6 dB padding yields a scale reading of 50 from an unpadded reading of 100 in voltage. From the recorded patterns, the R.M.S. values are calculated and recorded as shown in Figure 1A.

Respectfully submitted by:

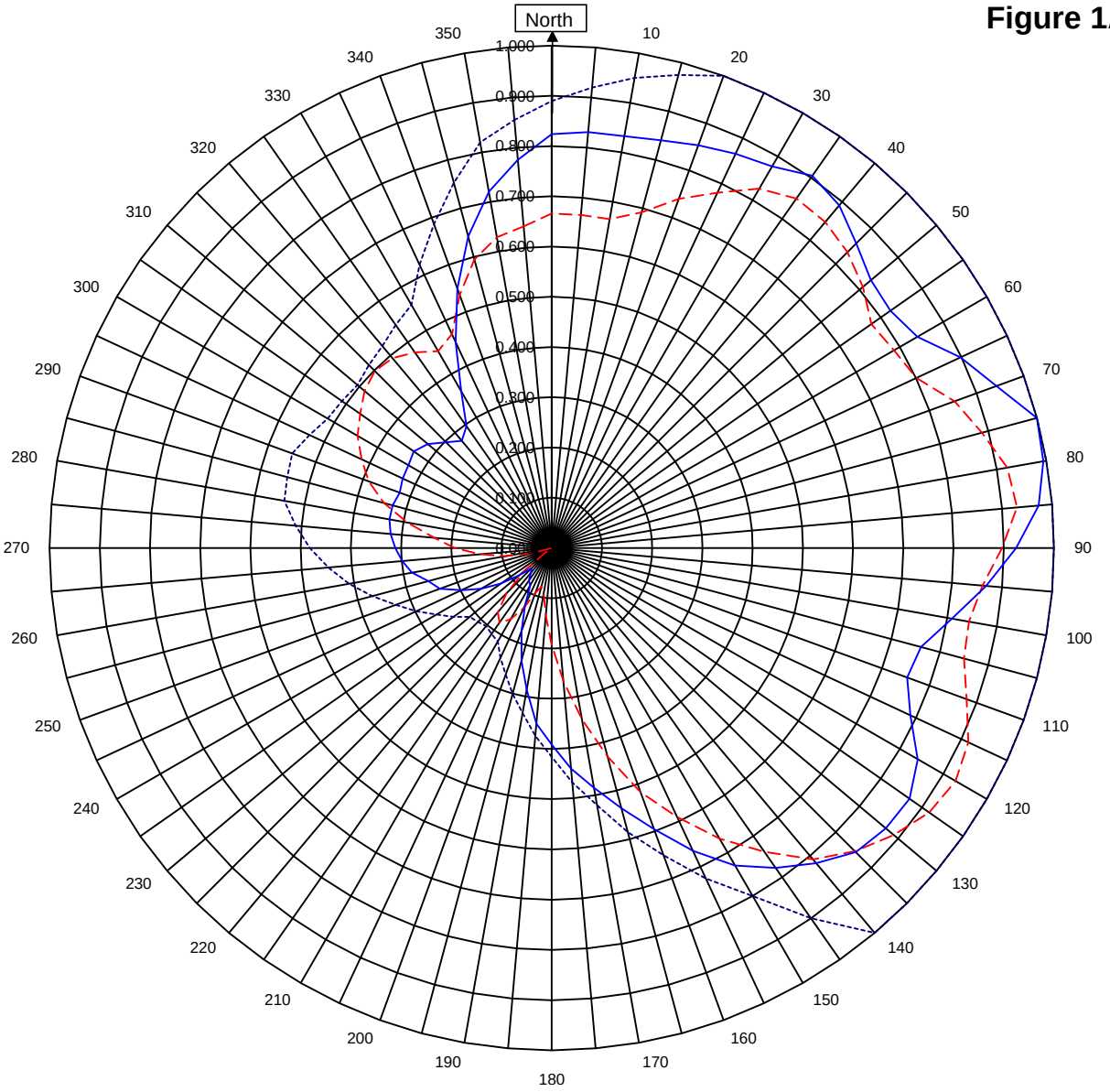
Angela Gillespie

Vice President, Shively Labs
S/O 36371
June 28, 2019

Shively Labs

Shively Labs, a division of Howell Laboratories, Inc. Bridgton, ME (207)647-3327

Figure 1A



WLAV Grand Rapids, MI

36371

April 22, 2019

Horizontal RMS	0.630
Vertical RMS	0.602
H/V Composite RMS	0.652
FCC Composite RMS	0.744

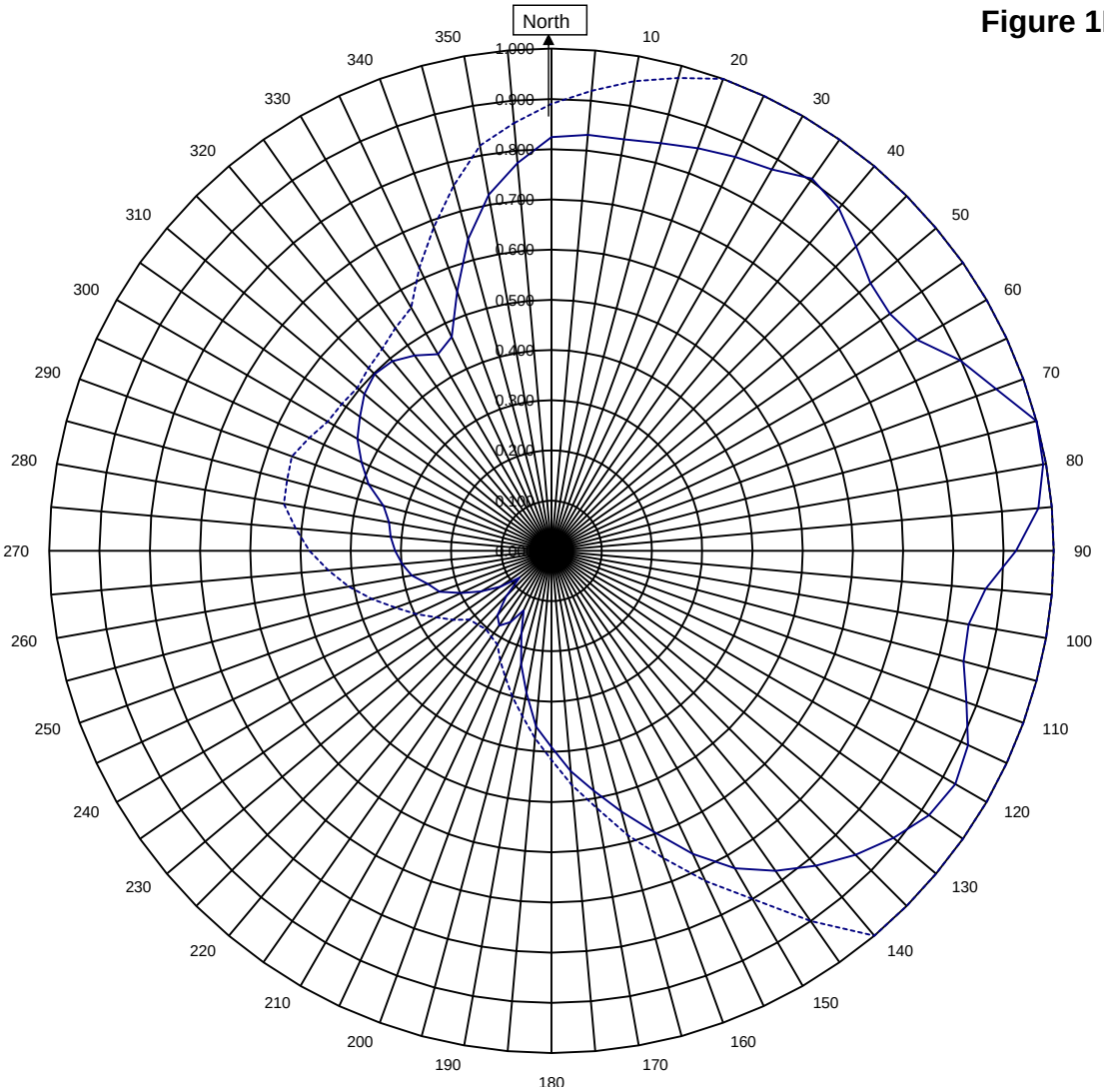
Frequency	96.9 / 436.05 mHz
Plot	Relative Field
Scale	4.5 : 1
	Panel bearings 37° 124° 309°(-6dB)

Antenna Model	6016-2-3-DA
Pattern Type	Directional Azimuth

Shively Labs

Shively Labs, a division of Howell Laboratories, Inc. Bridgton, ME (207)647-3327

Figure 1B



WLAV Grand Rapids, MI

36371

April 22, 2019

_____H/VComposite RMS	0.652
……..FCC Composite RMS	0.744

Frequency	96.9 / 436.05 mHz
Plot	Relative Field
Scale	4.5 : 1
	See Figure 2 for Mechanical Details

Antenna Model	6016-2-3-DA
Pattern Type	Directional H/V Composite

Figure 1C

Tabulation of Horizontal Azimuth Pattern
WLAV Grand Rapids, MI

Additional Azimuths	
75	1.000
78	1.000

Azimuth	Rel Field	Azimuth	Rel Field
0	0.824	180	0.391
10	0.832	190	0.287
20	0.853	200	0.176
30	0.877	210	0.086
40	0.890	220	0.065
45	0.857	225	0.057
50	0.830	230	0.083
60	0.841	240	0.162
70	0.942	250	0.237
80	0.994	260	0.282
90	0.925	270	0.312
100	0.809	280	0.328
110	0.753	290	0.322
120	0.842	300	0.330
130	0.868	310	0.322
135	0.856	315	0.298
140	0.819	320	0.279
150	0.730	330	0.361
160	0.596	340	0.550
170	0.485	350	0.720

Figure 1D

Tabulation of Vertical Azimuth Pattern
WLAV Grand Rapids, MI

Azimuth	Rel Field	Azimuth	Rel Field
0	0.666	180	0.192
10	0.665	190	0.092
20	0.739	200	0.094
30	0.826	210	0.164
40	0.847	220	0.168
45	0.833	225	0.128
50	0.809	230	0.071
60	0.787	240	0.000
70	0.854	250	0.000
80	0.921	260	0.096
90	0.896	270	0.193
100	0.843	280	0.292
110	0.879	290	0.388
120	0.928	300	0.446
130	0.889	310	0.486
135	0.854	315	0.498
140	0.809	320	0.493
150	0.668	330	0.453
160	0.517	340	0.536
170	0.347	350	0.628

Figure 1E

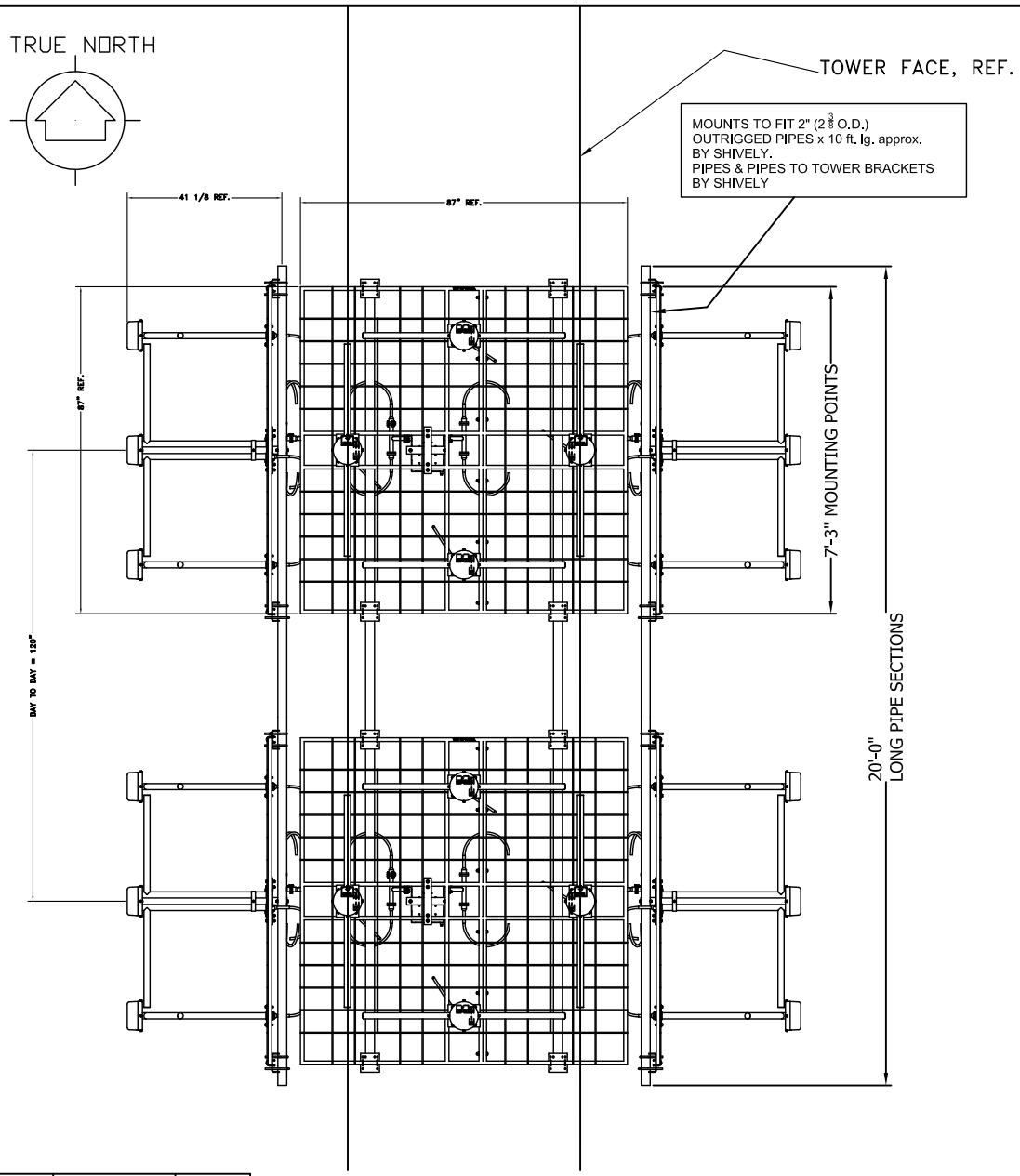
Tabulation of Composite Azimuth Pattern
WLAV Grand Rapids, MI

Azimuth	Rel Field	Azimuth	Rel Field
0	0.824	180	0.391
10	0.832	190	0.287
20	0.853	200	0.176
30	0.877	210	0.164
40	0.890	220	0.168
45	0.857	225	0.128
50	0.830	230	0.083
60	0.841	240	0.162
70	0.942	250	0.237
80	0.994	260	0.282
90	0.925	270	0.312
100	0.843	280	0.328
110	0.879	290	0.388
120	0.928	300	0.446
130	0.889	310	0.486
135	0.856	315	0.498
140	0.819	320	0.493
150	0.730	330	0.453
160	0.596	340	0.550
170	0.485	350	0.720

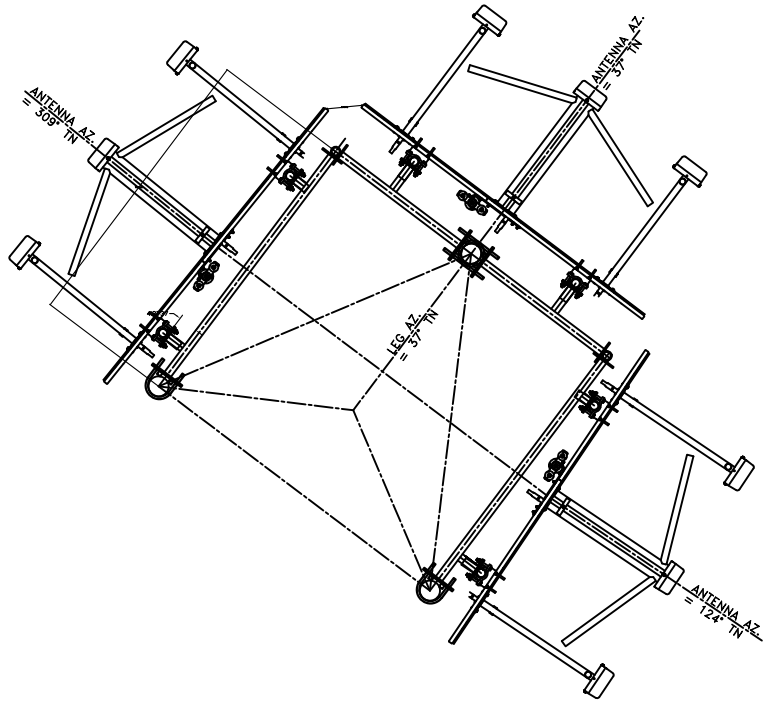
Figure 1F

Tabulation of FCC Directional Composite
WLAV Grand Rapids, MI

Azimuth	Rel Field	Azimuth	Rel Field
0	0.890	180	0.416
10	0.950	190	0.334
20	1.000	200	0.268
30	1.000	210	0.215
40	1.000	220	0.203
50	1.000	230	0.213
60	1.000	240	0.265
70	1.000	250	0.330
80	1.000	260	0.410
90	1.000	270	0.482
100	1.000	280	0.541
110	1.000	290	0.550
120	1.000	300	0.515
130	1.000	310	0.505
140	1.000	320	0.525
150	0.800	330	0.559
160	0.651	340	0.686
170	0.520	350	0.820



FRONT VIEW OF PANELS



TOP VIEW
7' FACE TOWER

AZIMUTH	ATTENUATION	PHASE
73°	0 db	0°
124°	0 db	0°
309°	0 db	0°

ANTENNA AZIMUTHS = 37°, 124°, 309° TN

SHIVELY LABS
A DIVISION OF HOWELL LABORATORIES INC., BRIDGTON, MAINE

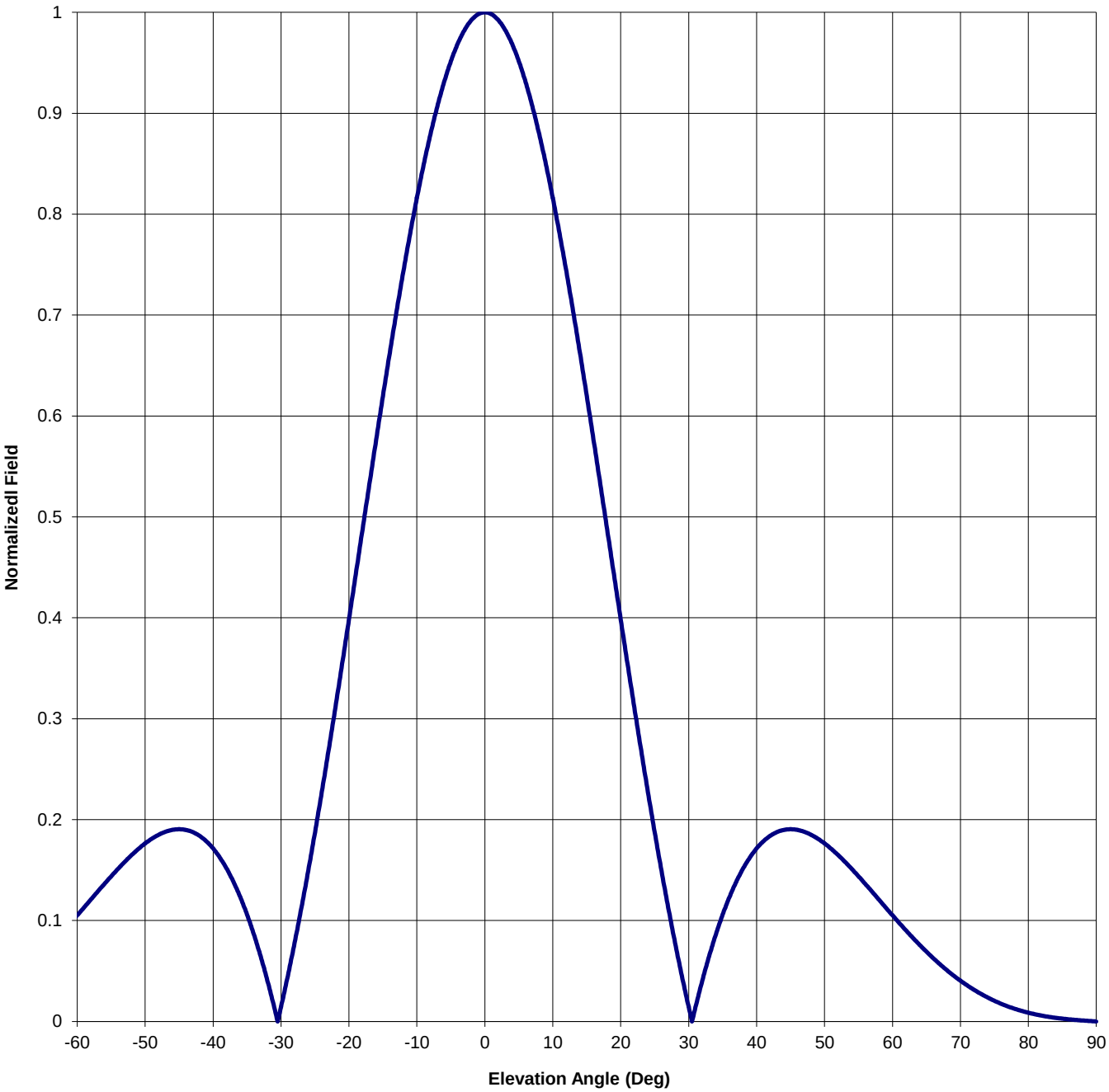
SHOP ORDER:	FREQUENCY:	SCALE:	DRAWN BY:
65902	96.9 Mhz	N.T.S.	ASP
			APPROVED BY:

TITLE: MODEL–6016–2/3–DIRECTIONAL ANTENNA

DATE: 4/5/19

FIGURE 2

Antenna Mfg.:	**Shively Labs**			**Date:**	**4/26/2019**
Antenna Type:	**6016-2/3-DA**				
Station:	**WLAV**	**Beam Tilt**	**0**		
Frequency:	**96.9**	**Gain (Max)**	**3.430**	**5.353**	**dB**
Channel #:	**245**	**Gain (Horizon)**	**3.430**	**5.353**	**dB**
Figure:	**Fig 3 Horiz**				



Antenna Mfg.: Shively Labs **Date:** 4/26/2019

Antenna Type: 6016-2/3-DA

Station: WLAV **Beam Tilt** 0

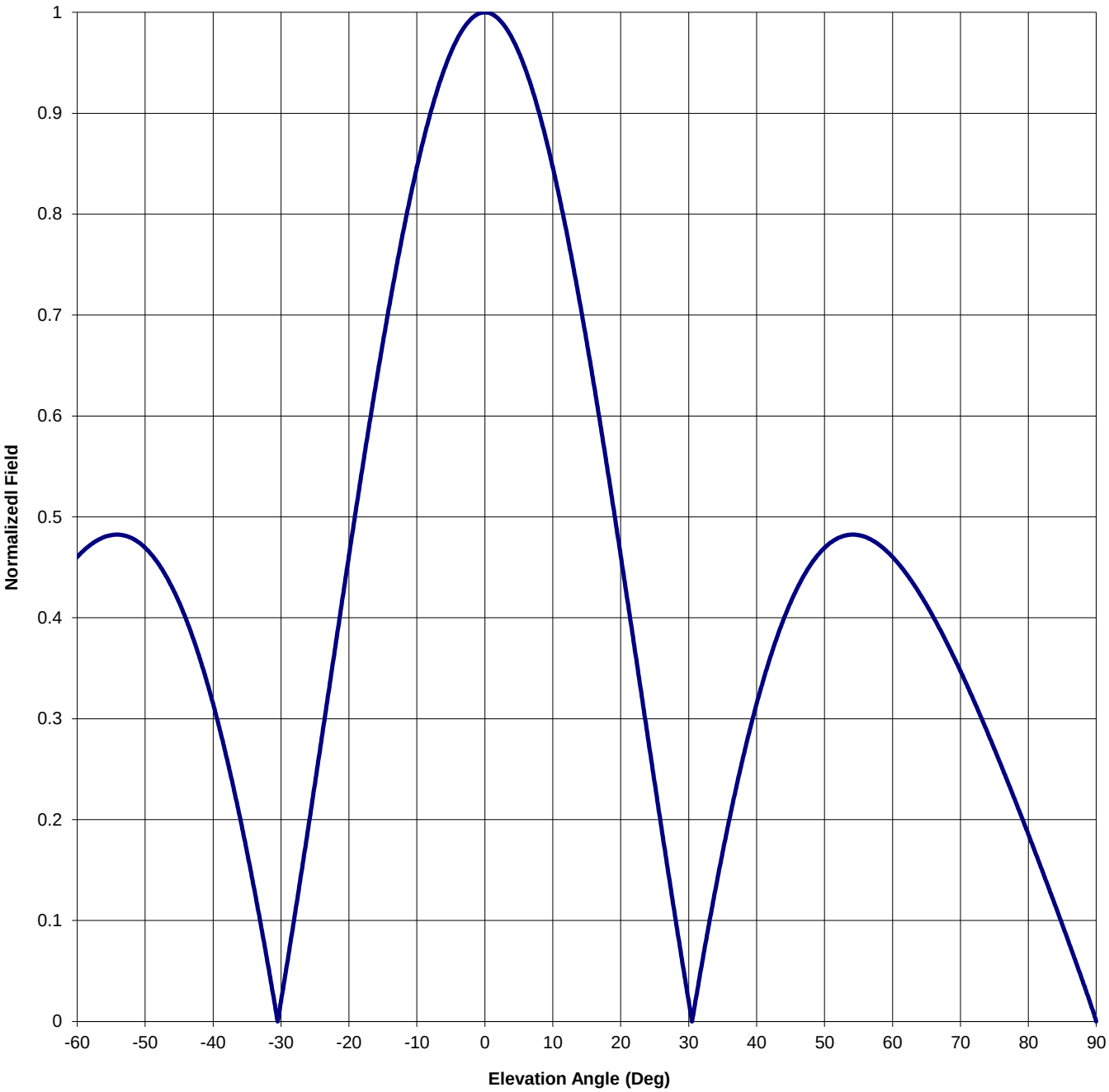
Frequency: 96.9 **Gain (Max)** 3.430 5.353 dB

Channel #: 245 **Gain (Horizon)** 3.430 5.353 dB

Figure: Fig 3 Horiz

Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field
-90	0.000	-44	0.190	0	1.000	46	0.190
-89	0.000	-43	0.188	1	0.998	47	0.188
-88	0.001	-42	0.184	2	0.992	48	0.185
-87	0.001	-41	0.179	3	0.982	49	0.181
-86	0.002	-40	0.171	4	0.969	50	0.176
-85	0.003	-39	0.162	5	0.952	51	0.171
-84	0.004	-38	0.151	6	0.931	52	0.165
-83	0.005	-37	0.138	7	0.907	53	0.158
-82	0.006	-36	0.123	8	0.879	54	0.151
-81	0.007	-35	0.106	9	0.849	55	0.144
-80	0.009	-34	0.086	10	0.816	56	0.136
-79	0.010	-33	0.064	11	0.781	57	0.129
-78	0.013	-32	0.040	12	0.743	58	0.121
-77	0.015	-31	0.014	13	0.703	59	0.113
-76	0.018	-30	0.014	14	0.662	60	0.105
-75	0.021	-29	0.045	15	0.620	61	0.098
-74	0.024	-28	0.078	16	0.576	62	0.090
-73	0.027	-27	0.113	17	0.532	63	0.083
-72	0.031	-26	0.149	18	0.488	64	0.076
-71	0.036	-25	0.188	19	0.443	65	0.069
-70	0.040	-24	0.227	20	0.399	66	0.063
-69	0.045	-23	0.269	21	0.354	67	0.057
-68	0.051	-22	0.311	22	0.311	68	0.051
-67	0.057	-21	0.354	23	0.269	69	0.045
-66	0.063	-20	0.399	24	0.227	70	0.040
-65	0.069	-19	0.443	25	0.188	71	0.036
-64	0.076	-18	0.488	26	0.149	72	0.031
-63	0.083	-17	0.532	27	0.113	73	0.027
-62	0.090	-16	0.576	28	0.078	74	0.024
-61	0.098	-15	0.620	29	0.045	75	0.021
-60	0.105	-14	0.662	30	0.014	76	0.018
-59	0.113	-13	0.703	31	0.014	77	0.015
-58	0.121	-12	0.743	32	0.040	78	0.013
-57	0.129	-11	0.781	33	0.064	79	0.010
-56	0.136	-10	0.816	34	0.086	80	0.009
-55	0.144	-9	0.849	35	0.106	81	0.007
-54	0.151	-8	0.879	36	0.123	82	0.006
-53	0.158	-7	0.907	37	0.138	83	0.005
-52	0.165	-6	0.931	38	0.151	84	0.004
-51	0.171	-5	0.952	39	0.162	85	0.003
-50	0.176	-4	0.969	40	0.171	86	0.002
-49	0.181	-3	0.982	41	0.179	87	0.001
-48	0.185	-2	0.992	42	0.184	88	0.001
-47	0.188	-1	0.998	43	0.188	89	0.000
-46	0.190	0	1.000	44	0.190	90	0.000
-45	0.190			45	0.190		

Antenna Mfg.:	**Shively Labs**			**Date: 4/26/2019**
Antenna Type:	**6016-2/3-DA**			
Station:	**WLAV**	**Beam Tilt**	**0**	
Frequency:	**96.9**	**Gain (Max)**	**2.967**	**4.723 dB**
Channel #:	**245**	**Gain (Horizon)**	**2.967**	**4.723 dB**
Figure:	**Fig 3 Vert**			



Antenna Mfg.: Shively Labs **Date:** 4/26/2019

Antenna Type: 6016-2/3-DA

Station: WLAV **Beam Tilt** 0

Frequency: 96.9 **Gain (Max)** 2.967 4.723 dB

Channel #: 245 **Gain (Horizon)** 2.967 4.723 dB

Figure: Fig 3 Vert

Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field
-90	0.000	-44	0.399	0	1.000	46	0.430
-89	0.020	-43	0.381	1	0.998	47	0.442
-88	0.040	-42	0.361	2	0.994	48	0.453
-87	0.059	-41	0.339	3	0.986	49	0.462
-86	0.077	-40	0.315	4	0.974	50	0.469
-85	0.096	-39	0.289	5	0.960	51	0.475
-84	0.114	-38	0.261	6	0.943	52	0.479
-83	0.132	-37	0.232	7	0.923	53	0.481
-82	0.150	-36	0.201	8	0.900	54	0.482
-81	0.168	-35	0.168	9	0.875	55	0.482
-80	0.185	-34	0.133	10	0.846	56	0.480
-79	0.203	-33	0.097	11	0.816	57	0.477
-78	0.220	-32	0.059	12	0.783	58	0.473
-77	0.237	-31	0.020	13	0.748	59	0.467
-76	0.254	-30	0.020	14	0.712	60	0.460
-75	0.270	-29	0.062	15	0.673	61	0.453
-74	0.286	-28	0.104	16	0.633	62	0.444
-73	0.302	-27	0.148	17	0.592	63	0.434
-72	0.318	-26	0.192	18	0.549	64	0.424
-71	0.333	-25	0.236	19	0.506	65	0.413
-70	0.347	-24	0.281	20	0.462	66	0.401
-69	0.362	-23	0.327	21	0.417	67	0.388
-68	0.375	-22	0.372	22	0.372	68	0.375
-67	0.388	-21	0.417	23	0.327	69	0.362
-66	0.401	-20	0.462	24	0.281	70	0.347
-65	0.413	-19	0.506	25	0.236	71	0.333
-64	0.424	-18	0.549	26	0.192	72	0.318
-63	0.434	-17	0.592	27	0.148	73	0.302
-62	0.444	-16	0.633	28	0.104	74	0.286
-61	0.453	-15	0.673	29	0.062	75	0.270
-60	0.460	-14	0.712	30	0.020	76	0.254
-59	0.467	-13	0.748	31	0.020	77	0.237
-58	0.473	-12	0.783	32	0.059	78	0.220
-57	0.477	-11	0.816	33	0.097	79	0.203
-56	0.480	-10	0.846	34	0.133	80	0.185
-55	0.482	-9	0.875	35	0.168	81	0.168
-54	0.482	-8	0.900	36	0.201	82	0.150
-53	0.481	-7	0.923	37	0.232	83	0.132
-52	0.479	-6	0.943	38	0.261	84	0.114
-51	0.475	-5	0.960	39	0.289	85	0.096
-50	0.469	-4	0.974	40	0.315	86	0.077
-49	0.462	-3	0.986	41	0.339	87	0.059
-48	0.453	-2	0.994	42	0.361	88	0.040
-47	0.442	-1	0.998	43	0.381	89	0.020
-46	0.430	0	1.000	44	0.399	90	0.000
-45	0.415			45	0.415		

S.O. 36371 Figure 4

VALIDATION OF TOTAL POWER GAIN CALCULATION

WLAV	Grand Rapids, MI
MODEL	6016-2-3-DA

Elevation Gain of Antenna 1.301

Horizontal RMS value divided by the Vertical RMS value equals the Horiz. - Vert. Ratio

H RMS 0.630266 V RMS 0.601794 H/V Ratio 1.047

Elevation Gain of Horizontal Component 1.363

Elevation Gain of Vertical Component 1.242

Horizontal Azimuth Gain equals $1/(RMS)^2$. 2.517

Vertical Azimuth Gain equals $1/(RMS/Max\ Vert)^2$. 2.388

Max. Vertical 0.93

***Total Horizontal Power Gain is the Elevation Gain Times the Azimuth Gain**

Total Horizontal Power Gain = **3.430**

***Total Vertical Power Gain is the Elevation Gain Times the Azimuth Gain**

Total Vertical Power Gain = **2.967**

==========

ERP divided by Horizontal Power Gain equals Antenna Input Power

43 kW ERP Divided by H Gain 3.430 equals 12.536 kW H Antenna Input Power

Antenna Input Power times Vertical Power Gain equals Vertical ERP

12.536 kW Times V Gain 2.967 equals 37.191 kW V ERP

Maximum Value of the Vertical Component squared times the Maximum ERP equals the Vertical ERP

(0.93)^2 Times 43.00 Equals 37.191 kW Vertical ERP

NOTE: Calculating the ERP of the Vertical Component by two methods validates the total power gain calculations

CUMULUS

7-12-19

This is to certify that Shively antenna model number 6016-2/3 DA designed and fabricated by Shively for WLAV-FM Grand Rapids, MI was installed according to the manufactures documentation under a construction permit issued to Cumulus Media for station WLAV-FM. The antenna radiating elements were certified to be in alignment by an independent surveying firm, Roosien and Associates and is separately documented.

The installation was supervised by Dave Grant, Director of Engineering, Cumulus Media Grand Rapids. I have been a broadcast engineer for forty two years and hold a SBE Senior Broadcast Engineer certification. I have personally been involved with the installation of numerous FM antennas.

Sincerely,

Dave Grant
Director of Engineering, Great Lakes Region
Cumulus Media Inc.
60 Monroe Center NW
Grand Rapids, MI 49503

Roosien & Associates, P.L.L.C.
SURVEYING AND ENGINEERING

July 19, 2019

Cumulus
Dave Grant
60 Monroe Center NW
Grand Rapids MI 49503

RE: GVSU Campus, Allendale MI

This letter is to certify the alignment of the FM Antenna (WLAV) placed on the existing self-supported lattice tower located off Pierce Street on the GVSU Campus in Allendale, Michigan.

The 3 antenna panels were oriented to North azimuths of 37°, 124° and 309° based on NAD83 datum, using both RTK GPS units and conventional surveying equipment.

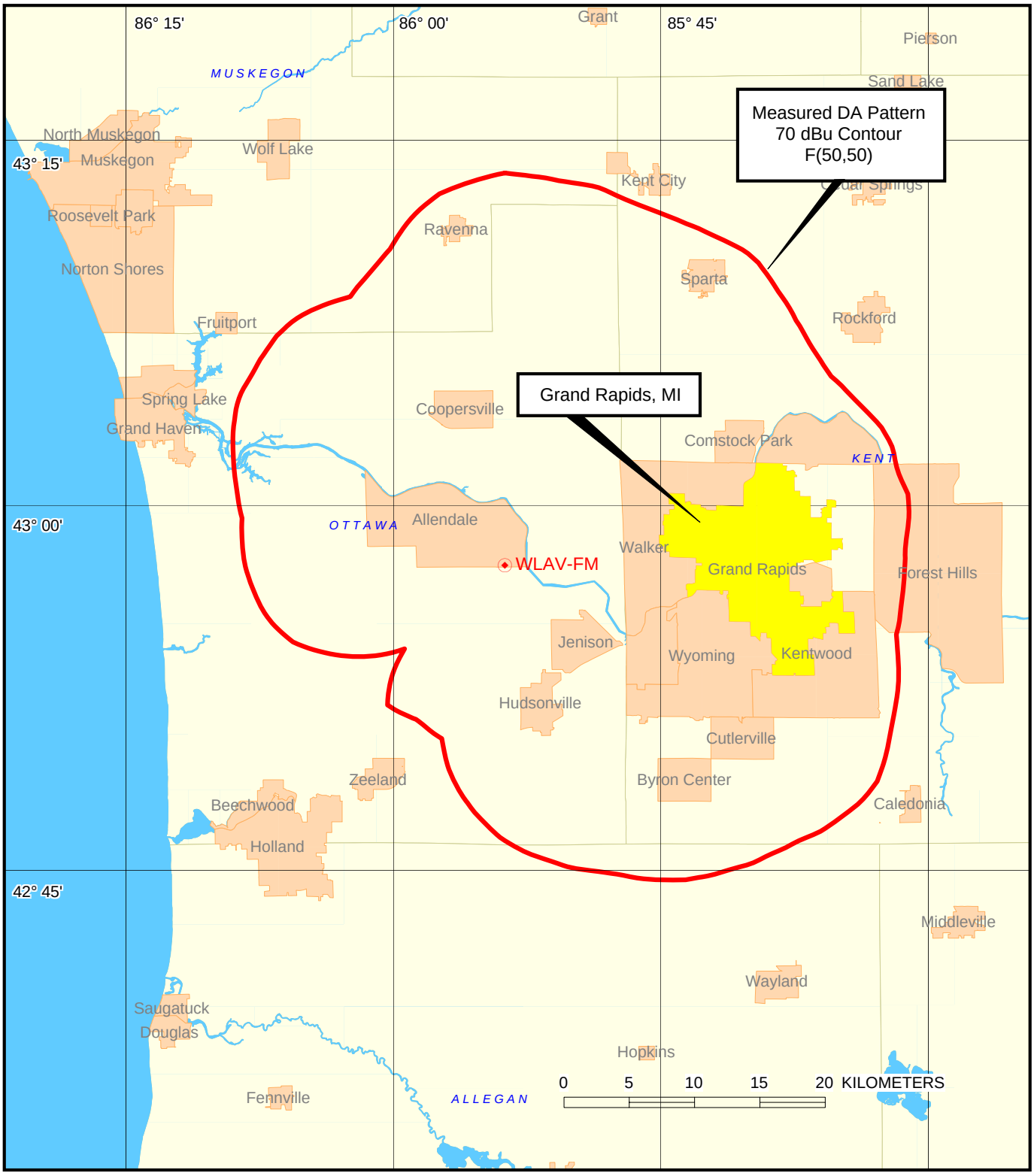
Sincerely,

Kevin Roosien, PS #31604

5055 Plainfield Avenue NE, Grand Rapids, MI 49525 · Phone (616) 361-7220 · Fax (616) 361-1822 · Email mail@roosien-assoc.com

The 70 dBu contour depicted encompasses all of Grand Rapids, MI, the WLAV-FM community of license, demonstrating compliance with Section 73.315 of the FCC Rules.

EXHIBIT A



SECTION 73.315 STUDY
WLAV-FM, GRAND RAPIDS, MICHIGAN
MEASURED DIRECTIONAL ANTENNA PATTERN
CP: CH. 245B, 43 kW ERP (DA-MAX), 160 m HAAT
JANUARY, 2020

Consulting Engineers
CTJC
CARL T. JONES CORPORATION