Technical Exhibit

Clear Channel Broadcasting Licenses LLC
WQNS – 105.1 Mhz
Woodfin, NC (FID 41008)

302-FM to cover
Construction Permit # BPH-20140919ADQ

Summary

This application seeks to cover Construction Permit BPH-20140919ADQl WQNS–105.1 Mhz Woodfin, NC (FID 41008).

Facilities:

WQNS (FM) will utilize a ERI LPX-4C-DA directional FM antenna, mounted on the 335 degrees true tower face of a 24" face triangular tower. The antenna is mounted on Tower #4 of the WWNC AM DA Array. Tower #4 is a guyed tower and the FM antenna is mounted with a center of radiation of 94 meters above ground level WQNS will operate with an maximum ERP of (H & V) of 6 kW.

The facility was constructed in compliance with all special conditions as defined in Construction Permit BPH-20140919ADQl. The details of those special conditions results are in the following pages. Clear Channel Broadcasting Licenses Inc. seeks program test authority for WQNS.

Benjamin H Brinitzer
Technical Director
Clear Channel Broadcasting licenses LLC

Special Conditions #4, #8 & #9

Complete Proof of Performance

Manufacturers Engineering Statement

ELECTRONICS RESEARCH, INC. ERI®

Electronics Research, Inc. 7777 Gardner Rd. Chandler, IN 47610 Phone (812) 925-6000 Fax (812) 925-4030 http://www.eriinc.com/

Directional Antenna System for WQNS, Woodfin, North Carolina

March 26, 2015

Electronics Research Inc. is providing modifications to an existing antenna system that is specially designed to meet the FCC requirements and the general needs of radio station WQNS.

The antenna is the ERI model LPX-4C-DA configuration. The circular polarized system consists of 4 full-wavelength spaced bays using one driven circular polarized radiating element, one horizontal parasitic element placed one quarter wave above and below each bay and two vertical parasitic elements per bay. The antenna was mounted on the North 335 degrees East tower face with bracketry to provide an antenna orientation of North 335 degrees East. The antenna was tested on a 24" face tower, which is the structure the station plans to use to support the array. All tests were performed on a frequency of 105.1 megahertz, which is the center of the FM broadcast channel assigned to WQNS.

Pattern measurements were made on a sixty-acre antenna pattern range that is owned and operated by Electronics Research, Inc. The tests were performed under the direction of Thomas B. Silliman, president of Electronics Research, Inc. Mr. Silliman has the Bachelor of Electrical Engineering and the Master of Electrical Engineering degrees from Cornell University and is a registered professional engineer in the states of Indiana, Maryland and Minnesota.

Directional Antenna System
For
WQNS, Woodfin, North Carolina

(Continued)

DESCRIPTION OF THE TEST PROCEDURE

The test antenna consisted of two bay levels of the circular polarized system with the associated horizontal and vertical parasitic elements. The elements and brackets that were used in this test are electrically equivalent to those that will be supplied with the antenna. A section of 1 5/8 inch o.d. rigid coaxial line was used to feed the test antenna, and a section of 1 5/8 inch o.d. rigid outer conductor only was attached above the test antenna. The lines were properly grounded during all tests.

The power distribution and phase relationship to the antenna elements was adjusted in order to achieve the directional radiation patterns for both horizontal and vertical polarization components.

The proof-of-performance was accomplished using a 24" face tower with identical dimension and configuration including all braces, ladders, conduits, coaxial lines and other appurtenances that are included in the actual aperture at which the antenna will be installed. The structure was erected vertically on a turntable mounted on a non-metallic building with the antenna centered vertically on the structure, making the center of radiation of the test approximately 30 feet above ground. The turntable is equipped with a motor drive and a US Digital angle position indicator. The resolution of this angle position indicator is one-hundredth of a degree.

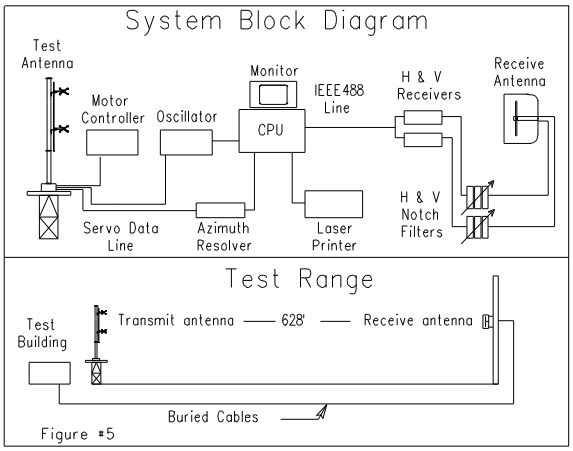


Figure #5

The antenna under test was operated in the transmitting mode and fed from a HP8657D signal generator. The frequency of the signal source was set at 105.1 MHz and was constantly monitored by a Rohde & Schwarz ESVD measuring receiver.

A broadband horizontal and vertical dipole system, located approximately 628 feet from the test antenna, was used to receive the emitted test signals.

(Continued)

The dipole system was mounted at the same height above terrain as the center of the antenna under test. The signals received by the dipole system were fed to the test building by way of two buried Heliax cables to a Rohde & Schwarz measuring receiver. This data was interfaced to a laser jet printer by means of a computer system. Relative field strength was plotted as a function of azimuth.

The measurements were performed by rotating the test antenna in a counter-clockwise direction and plotting the received signal on polar co-ordinated graph paper in a clockwise direction. Both horizontal and vertical components were recorded separately.

CONCLUSIONS

The circular polarized system consists of 4 full-wavelength spaced bays using one driven circular polarized radiating element, one horizontal parasitic element placed one quarter wave above and below each bay and two vertical parasitic elements per bay. The power distribution and phase relationship will be fixed when the antenna is manufactured. Proper maintenance of the elements should be all that is required to maintain the pattern in adjustment.

The LPX-4C-DA array is to be mounted on the North 335 degrees East tower face of the 24" face tower at a bearing of North 335 degrees East. Blue prints provided with the antenna will show the proper antenna orientation alignment. The antenna alignment procedure should be directed by a licensed surveyor as prescribed by the FCC.

Figure #1 represents the measured individual horizontal and vertical components, the composite maximum of either the horizontal or vertical component at any azimuth and the FCC filed envelope pattern. The horizontal plane relative field list for the composite pattern and the individual H & V components are shown as Figure #1 & 1A respectively. The actual measured pattern does not exceed the authorized FCC composite pattern at any azimuth. A calculated vertical plane relative field pattern is shown on Figure #3 attached. The power in the maximum will reach 6 kilowatts (7.782 dBk).

The power at North 90-100 degrees East does not exceed 4.541 kilowatts (6.572 dBk).

Directional Antenna System
For
WQNS, Woodfin, North Carolina

(Continued)

The power at North 160 degrees East does not exceed 1.808 kilowatts (2.572 dBk).

The RMS of the vertically polarized horizontal plane component does not exceed the RMS of the horizontally polarized horizontal plane component.

The composite horizontal and vertical maximum relative field pattern obtained from the measured data as shown on Figure #1 has an RMS that is greater that 85% of the filed composite pattern.

The clear vertical length of the structure required to support the antenna is 42 feet 11 inches.

The directional antenna should not be mounted on the top of an antenna tower that includes a top-mounted platform larger than the cross-sectional area of the tower in the horizontal plane. No obstructions other than those that are specified by the blue prints supplied with the antenna are to be mounted within 75 ft. horizontally of the system. The vertical distance to the nearest obstruction should be a minimum of 10 ft. from the directional antenna. Metallic guy wires should be a minimum distance of forty feet horizontally from the antenna.

ELECTRONICS RESEARCH, INC.

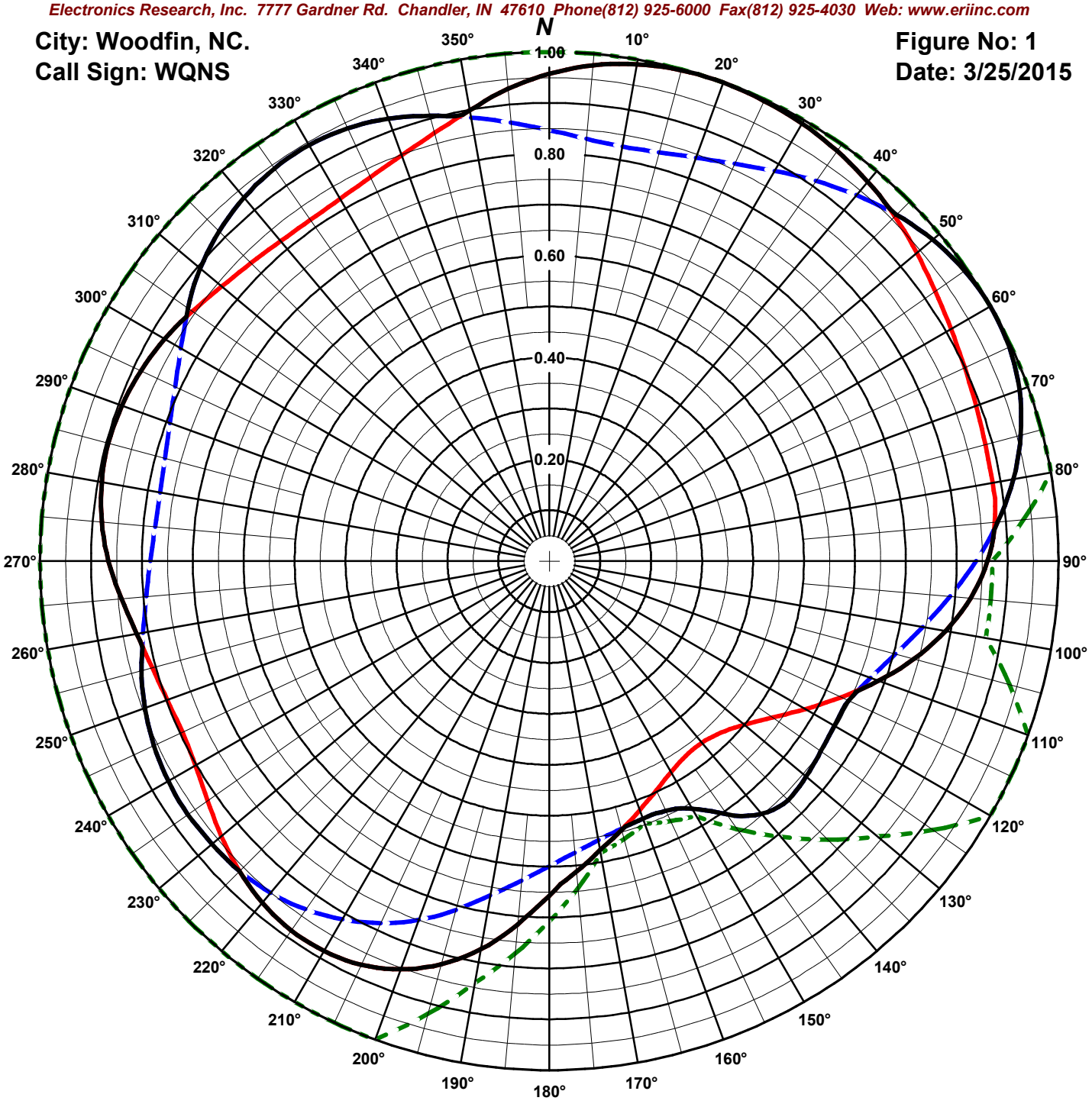
Tom Schaaf

ERI® Horizontal Plane Relative Field Pattern

Electronics Research, Inc. 7777 Gardner Rd. Chandler, IN 47610 Phone(812) 925-6000 Fax(812) 925-4030 Web: www.eriinc.com

City: Woodfin, NC.
Call Sign: WQNS

Figure No: 1
Date: 3/25/2015



Antenna Orientation: 335° True

Frequency: 105.1 MHz
Antenna Type: LPX-4C-DA

Antenna Mounting: Standard
Tower Type: 24" Pirod

HORIZONTAL	VERTICAL	COMPOSITE	FCC ENVELOPE
RMS: .821	RMS: .813	RMS: .853	RMS: .941
Maximum: 1 @ 18°	Maximum: 1 @ 61°	Maximum: 1 @ 18°	Maximum: 1 @ 0°
Minimum: .465 @ 142°	Minimum: .537 @ 158°	Minimum: .537 @ 158°	Minimum: .549 @ 160°

Measured patterns of the horizontal and vertical components. The composite pattern shows the maximum of either the H or V azimuth values. This patterns is greater than 85% of the FCC filed composite pattern BPH-20140919ADQ.

ERI® Horizontal Plane Relative Field Pattern

Electronics Research, Inc. 7777 Gardner Rd. Chandler, IN 47610 Phone(812) 925-6000 Fax(812) 925-4030 Web: www.eriinc.com

Figure# 1 **Date: 3/25/2015**
Station: WQNS **Antenna: LPX-4C-DA**
Location: Woodfin, NC. **Antenna Orientation: 335° True**
Frequency: 105.1 MHz **Number of Bays: 4**

Azimuth	Envelope			Polarization	Azimuth	Envelope			Polarization
	Field	kW	dBk	Maximum		Field	kW	dBk	Maximum
0°	0.957	5.498	7.402	Max H (and or) V	180°	0.657	2.592	4.136	Max H (and or) V
5°	0.977	5.730	7.582	Max H (and or) V	185°	0.717	3.081	4.887	Max H (and or) V
10°	0.991	5.893	7.703	Max H (and or) V	190°	0.774	3.595	5.557	Max H (and or) V
15°	0.999	5.982	7.768	Max H (and or) V	195°	0.820	4.030	6.053	Max H (and or) V
20°	1.000	5.999	7.780	Max H (and or) V	200°	0.853	4.366	6.401	Max H (and or) V
25°	0.998	5.971	7.760	Max H (and or) V	205°	0.875	4.589	6.618	Max H (and or) V
30°	0.992	5.908	7.714	Max H (and or) V	210°	0.884	4.691	6.712	Max H (and or) V
35°	0.984	5.811	7.642	Max H (and or) V	215°	0.885	4.696	6.717	Max H (and or) V
40°	0.973	5.680	7.544	Max H (and or) V	220°	0.876	4.607	6.634	Max H (and or) V
45°	0.963	5.560	7.450	Max H (and or) V	225°	0.861	4.444	6.477	Max H (and or) V
50°	0.982	5.789	7.626	Max H (and or) V	230°	0.864	4.481	6.514	Max H (and or) V
55°	0.995	5.941	7.738	Max H (and or) V	235°	0.867	4.507	6.539	Max H (and or) V
60°	1.000	6.000	7.781	Max H (and or) V	240°	0.864	4.479	6.512	Max H (and or) V
65°	0.996	5.956	7.750	Max H (and or) V	245°	0.857	4.404	6.439	Max H (and or) V
70°	0.982	5.791	7.628	Max H (and or) V	250°	0.845	4.285	6.319	Max H (and or) V
75°	0.958	5.510	7.411	Max H (and or) V	255°	0.829	4.121	6.150	Max H (and or) V
80°	0.925	5.135	7.106	Max H (and or) V	260°	0.823	4.059	6.084	Max H (and or) V
85°	0.884	4.689	6.711	Max H (and or) V	265°	0.843	4.269	6.303	Max H (and or) V
90°	0.860	4.440	6.473	Max H (and or) V	270°	0.866	4.495	6.527	Max H (and or) V
95°	0.831	4.139	6.169	Max H (and or) V	275°	0.882	4.666	6.690	Max H (and or) V
100°	0.790	3.747	5.736	Max H (and or) V	280°	0.892	4.778	6.792	Max H (and or) V
105°	0.741	3.298	5.182	Max H (and or) V	285°	0.896	4.821	6.831	Max H (and or) V
110°	0.687	2.835	4.526	Max H (and or) V	290°	0.893	4.783	6.797	Max H (and or) V
115°	0.649	2.525	4.022	Max H (and or) V	295°	0.885	4.697	6.718	Max H (and or) V
120°	0.647	2.508	3.994	Max H (and or) V	300°	0.872	4.565	6.595	Max H (and or) V
125°	0.651	2.541	4.050	Max H (and or) V	305°	0.866	4.500	6.532	Max H (and or) V
130°	0.659	2.602	4.153	Max H (and or) V	310°	0.895	4.801	6.814	Max H (and or) V
135°	0.664	2.642	4.219	Max H (and or) V	315°	0.917	5.041	7.025	Max H (and or) V
140°	0.648	2.521	4.016	Max H (and or) V	320°	0.932	5.213	7.171	Max H (and or) V
145°	0.607	2.213	3.450	Max H (and or) V	325°	0.941	5.315	7.255	Max H (and or) V
150°	0.562	1.892	2.769	Max H (and or) V	330°	0.944	5.342	7.277	Max H (and or) V
155°	0.541	1.757	2.447	Max H (and or) V	335°	0.938	5.277	7.224	Max H (and or) V
160°	0.538	1.736	2.396	Max H (and or) V	340°	0.924	5.128	7.100	Max H (and or) V
165°	0.547	1.794	2.539	Max H (and or) V	345°	0.905	4.919	6.919	Max H (and or) V
170°	0.576	1.988	2.985	Max H (and or) V	350°	0.899	4.851	6.858	Max H (and or) V
175°	0.612	2.248	3.519	Max H (and or) V	355°	0.931	5.201	7.161	Max H (and or) V

Horizontal Polarization:
Maximum: 3.036 (4.823 dB)
Horizontal Plane: 3.036 (4.823 dB)
Maximum ERP: 6.000 kW

Vertical Polarization:
Maximum: 3.036 (4.823 dB)
Horizontal Plane: 3.036 (4.823 dB)
Maximum ERP: 6.000 kW

Total Input Power: 1.976 kW
Reference: WQNS1M.FIG

This list shows the the maximum azimuth values of either the horizontal or

ERI® Horizontal Plane Relative Field Pattern

Electronics Research, Inc. 7777 Gardner Rd. Chandler, IN 47610 Phone(812) 925-6000 Fax(812) 925-4030 Web: www.eriinc.com

Figure# 1A **Date: 3/25/2015**
Station: WQNS **Antenna: LPX-4C-DA**
Location: Woodfin, NC. **Antenna Orientation: 335° True**
Frequency: 105.1 MHz **Number of Bays: 4**

Azimuth	Horizontal			Vertical			Azimuth	Horizontal			Vertical		
	Field	kW	dBk	Field	kW	dBk		Field	kW	dBk	Field	kW	dBk
0°	0.957	5.498	7.402	0.846	4.297	6.332	180°	0.657	2.592	4.136	0.599	2.155	3.335
5°	0.977	5.730	7.582	0.833	4.160	6.190	185°	0.717	3.081	4.887	0.630	2.381	3.768
10°	0.991	5.893	7.703	0.827	4.102	6.130	190°	0.774	3.595	5.557	0.667	2.668	4.262
15°	0.999	5.982	7.768	0.831	4.146	6.177	195°	0.820	4.030	6.053	0.710	3.021	4.801
20°	1.000	5.999	7.780	0.843	4.267	6.301	200°	0.853	4.366	6.401	0.750	3.375	5.283
25°	0.998	5.971	7.760	0.861	4.449	6.482	205°	0.875	4.589	6.618	0.784	3.692	5.672
30°	0.992	5.908	7.714	0.885	4.701	6.722	210°	0.884	4.691	6.712	0.813	3.962	5.979
35°	0.984	5.811	7.642	0.912	4.990	6.981	215°	0.885	4.696	6.717	0.835	4.181	6.212
40°	0.973	5.680	7.544	0.938	5.283	7.229	220°	0.876	4.607	6.634	0.851	4.342	6.377
45°	0.959	5.517	7.417	0.963	5.560	7.450	225°	0.861	4.444	6.477	0.861	4.443	6.477
50°	0.942	5.324	7.262	0.982	5.789	7.626	230°	0.840	4.237	6.270	0.864	4.481	6.514
55°	0.925	5.134	7.104	0.995	5.941	7.738	235°	0.819	4.028	6.051	0.867	4.507	6.539
60°	0.911	4.979	6.972	1.000	6.000	7.781	240°	0.803	3.867	5.874	0.864	4.479	6.512
65°	0.900	4.858	6.865	0.996	5.956	7.750	245°	0.795	3.788	5.784	0.857	4.404	6.439
70°	0.892	4.770	6.785	0.982	5.791	7.628	250°	0.798	3.821	5.822	0.845	4.285	6.319
75°	0.886	4.714	6.734	0.958	5.510	7.411	255°	0.807	3.911	5.923	0.829	4.121	6.150
80°	0.884	4.689	6.711	0.925	5.135	7.106	260°	0.823	4.059	6.084	0.810	3.933	5.948
85°	0.878	4.629	6.655	0.884	4.689	6.711	265°	0.843	4.269	6.303	0.794	3.786	5.781
90°	0.860	4.440	6.473	0.838	4.211	6.244	270°	0.866	4.495	6.527	0.783	3.683	5.662
95°	0.831	4.139	6.169	0.790	3.747	5.737	275°	0.882	4.666	6.690	0.777	3.624	5.592
100°	0.790	3.747	5.736	0.745	3.326	5.220	280°	0.892	4.778	6.792	0.776	3.610	5.574
105°	0.741	3.298	5.182	0.704	2.972	4.730	285°	0.896	4.821	6.831	0.781	3.658	5.632
110°	0.687	2.835	4.526	0.671	2.701	4.315	290°	0.893	4.783	6.797	0.792	3.768	5.761
115°	0.633	2.400	3.803	0.649	2.525	4.022	295°	0.885	4.697	6.718	0.811	3.942	5.958
120°	0.581	2.024	3.061	0.647	2.508	3.994	300°	0.872	4.565	6.595	0.835	4.185	6.217
125°	0.536	1.722	2.359	0.651	2.541	4.050	305°	0.855	4.390	6.425	0.866	4.500	6.532
130°	0.500	1.501	1.765	0.659	2.602	4.153	310°	0.839	4.227	6.260	0.895	4.801	6.814
135°	0.477	1.363	1.346	0.664	2.642	4.219	315°	0.828	4.111	6.140	0.917	5.041	7.025
140°	0.466	1.303	1.149	0.648	2.521	4.016	320°	0.821	4.040	6.064	0.932	5.213	7.171
145°	0.467	1.311	1.175	0.607	2.213	3.450	325°	0.818	4.014	6.036	0.941	5.315	7.255
150°	0.479	1.374	1.381	0.562	1.892	2.769	330°	0.822	4.051	6.076	0.944	5.342	7.277
155°	0.497	1.482	1.709	0.541	1.757	2.447	335°	0.832	4.150	6.181	0.938	5.277	7.224
160°	0.520	1.624	2.107	0.538	1.736	2.396	340°	0.848	4.314	6.349	0.924	5.128	7.100
165°	0.547	1.794	2.539	0.544	1.776	2.495	345°	0.870	4.546	6.576	0.905	4.919	6.919
170°	0.576	1.988	2.985	0.556	1.857	2.688	350°	0.899	4.851	6.858	0.885	4.695	6.717
175°	0.612	2.248	3.519	0.575	1.982	2.971	355°	0.931	5.201	7.161	0.864	4.484	6.517

Horizontal Polarization:
Maximum: 3.036 (4.823 dB)
Horizontal Plane: 3.036 (4.823 dB)
Maximum ERP: 6.000 kW

Vertical Polarization:
Maximum: 3.036 (4.823 dB)
Horizontal Plane: 3.036 (4.823 dB)
Maximum ERP: 6.000 kW

Total Input Power: 1.976 kW
Reference: WQNS1M.FIG

This list shows the azimuth values for the horizontal and vertical components.

ERI® Vertical Plane Relative Field Pattern

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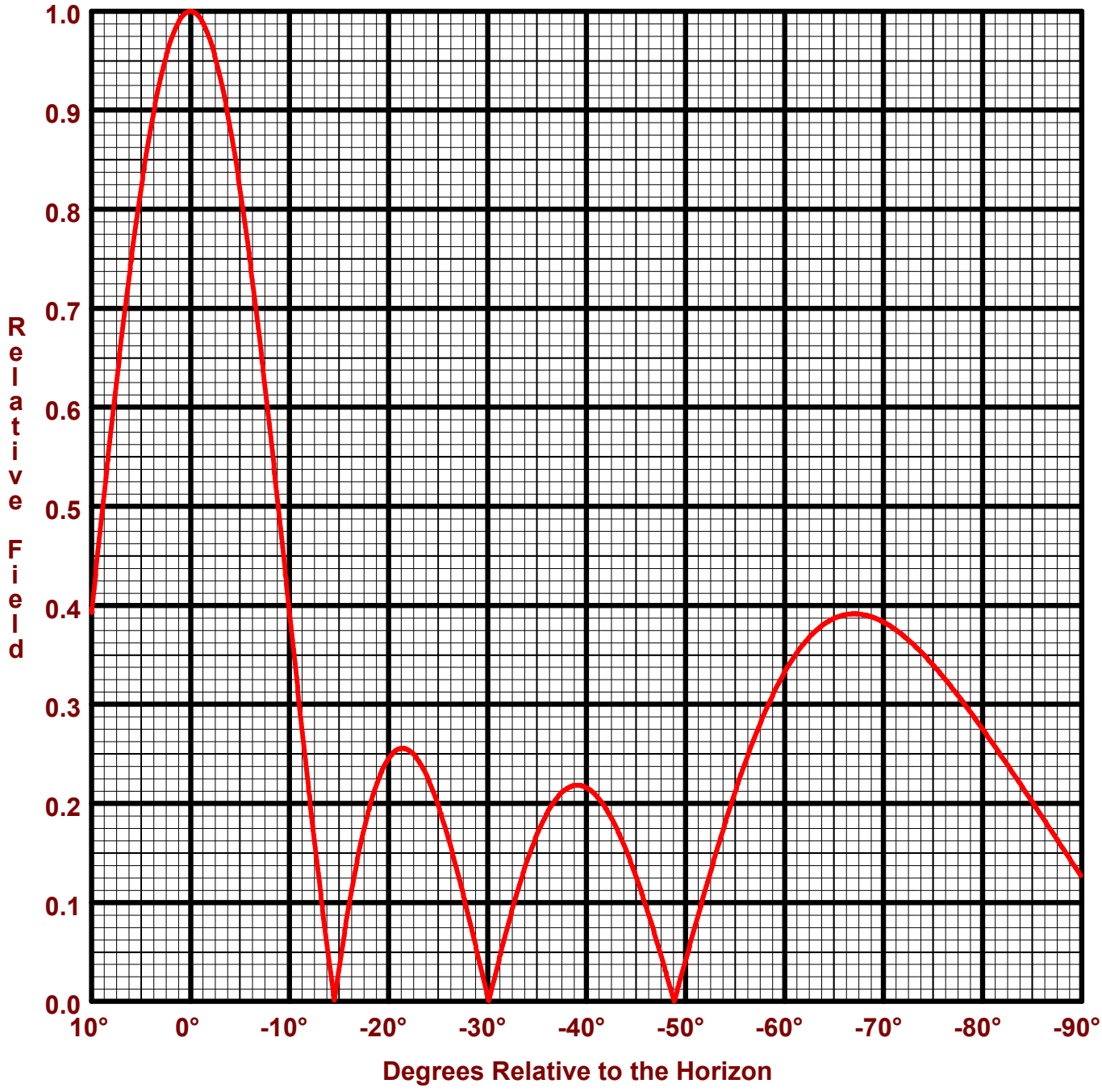
Figure No: 3
Call Sign: WQNS
Location: Woodfin, NC.
Frequency: 105.1 MHz
4 bay LPX-4C-DA antenna

Date: 3/25/2015
H/V Power Ratio: 1
1 Wave-length Spacing
0° Beam Tilt
0% First Null Fill



Horizontal Polarization:
Maximum: 3.036 (4.823 dB)
Horizontal Plane: 3.036 (4.823 dB)
Maximum ERP: 6.000 kW

Vertical Polarization:
Maximum: 3.036 (4.823 dB)
Horizontal Plane: 3.036 (4.823 dB)
Maximum ERP: 6.000 kW

Directional Antenna System
for
WQNS, Woodfin, North Carolina

(Continued)

ANTENNA SPECIFICATIONS

Antenna Type:	LPX-4C-DA
Frequency:	105.1 MHz
Number of Bays:	Four

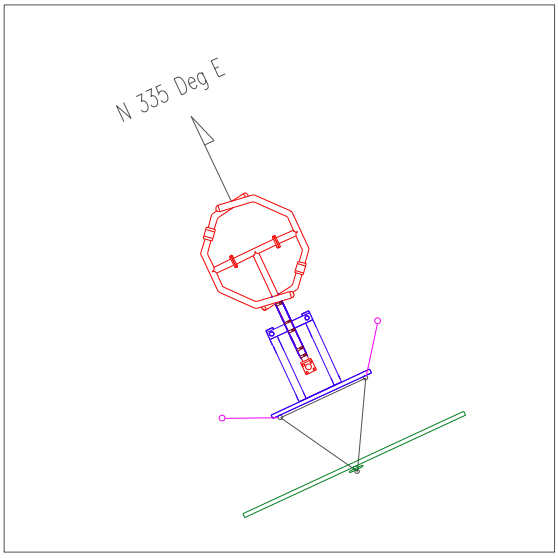
MECHANICAL SPECIFICATIONS

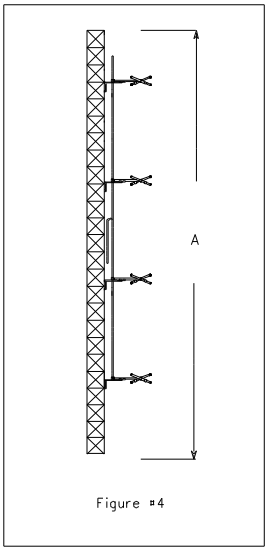
Mounting:	Standard
System length:	31 ft 7 in
Aperture length required:	42 ft 11 in
Orientation:	335° true

Input flange to the antenna 3 1/8” female.

ELECTRICAL SPECIFICATIONS
(For directional use)

Maximum horizontal ERP:	6.000 kW (7.782 dBk)
Horizontal maximum power gain:	3.036 (4.823 dB)
Maximum vertical ERP:	6.000 kW (7.782 dBk)
Vertical maximum power gain:	3.036 (4.823 dB)
Total input power:	1.976 kW (2.958 dBk)





Special Condition #5

Professional Surveyor Statement

C. O. HAMPTON & COMPANY

PROFESSIONAL LAND SURVEYORS

P. O. Box 1751
Fletcher, North Carolina 28732
email c_hampton@morrisbb.net

Charles O. Hampton, Jr., PLS,GSI

Telephone 828/684-7417

August 6, 2015

Chris Karb
Engineering Department
Clear Channel Radio
13 Summerlin Road
Asheville, NC 28806

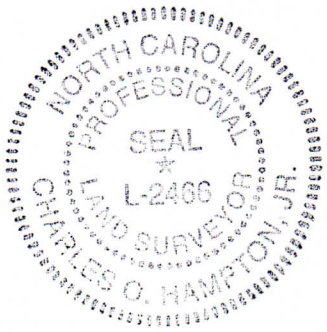
Re: Antenna array, Tower 4, WQNS – FM Station 105.1 MHz

Dear Chris,

This letter serves as my certification that the orientation of the above referenced antenna array is within the angular tolerance as defined the LPX-4C Parasites Installation Details as shown on Sheet 1 of 1, Drawing Number IA31288B-1, produced by Electronic Research Inc. This certification is based on field observations made under my direction and supervision August 3, 2015.

Witness My Hand and Seal this the 6th Day of August 2015.

Charles O. Hampton Jr. PLS



Special Condition #6

Qualified Engineers Installation Affidavit

(formally Clear Channel)

Benjamin Brinitzer
Regional Vice President Engineering

Wednesday, July 29, 2015
Antenna Installation Statement

Benjamin Hans Brinitzer, CPBE,AMD does hereby certify the WQNS FM (FID # 41008) Directional Antenna ERI LPX-4C-DA was correctly installed as called for under the Construction Permit # BPH-20140919ADQ and to the manufacturers specifications.

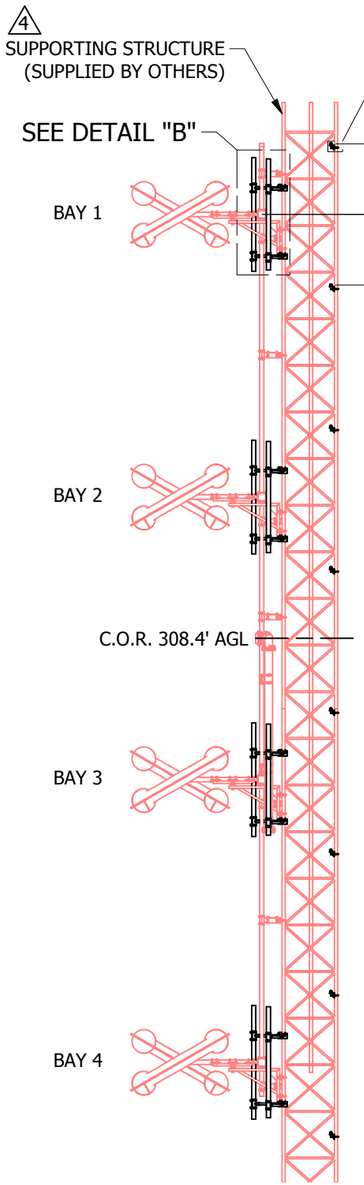
Mr. Brinitzer was present and observed the unpacking, assembly and erection of the ERI LPX antenna per directions provided by the manufacturer. The antenna was orientated using supplied fixed azimuth mounts assembled per the instructions and diagrams provided by the manufacturer.

Mr. Brinitzer's credentials are a matter of public record with the FCC and include more than 33 years of continuous broadcast engineering field work, including managing major RF projects. He has filed many applications with the FCC for his employers over the past 33 years. Mr. Brinitzer is certified as a Professional Broadcast Engineer (CPBE) for Life, by the Society of Broadcast Engineers. He is an Associate Member of the AFFCE in good standing.

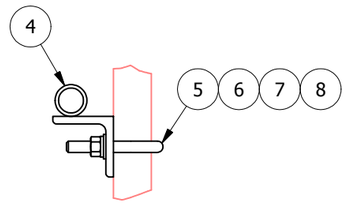
I, Benjamin Brinitzer attest the above to be true this 29th Day of July 2015.

_____
Benjamin Brinitzer CPBE AMD

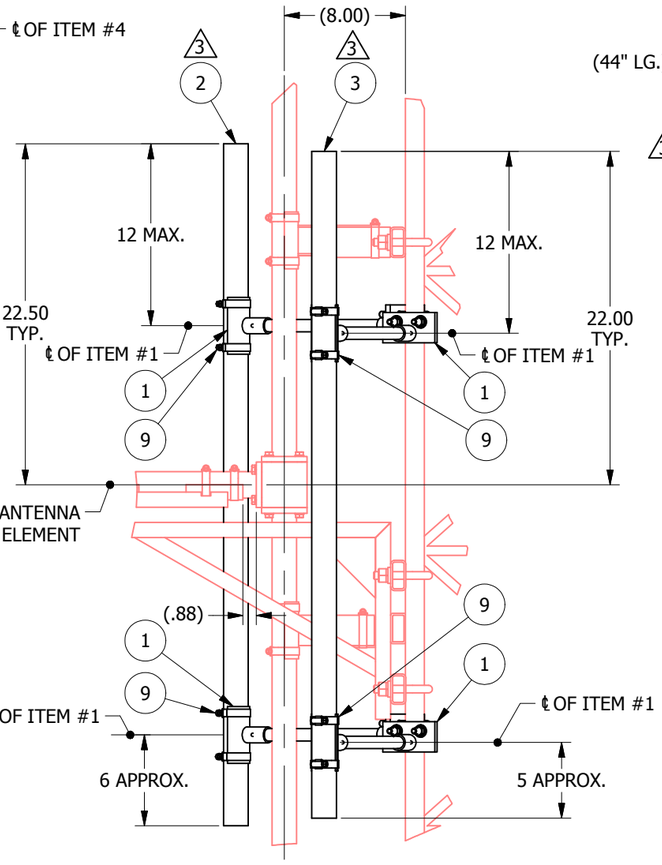
iHeart Media Inc.
801 Woodridge center Dr.♦ Charlotte NC 27604 Benb@iheartmedia.com ♦ Phone: 704-714-9489 ♦ Fax: 801-729-2218



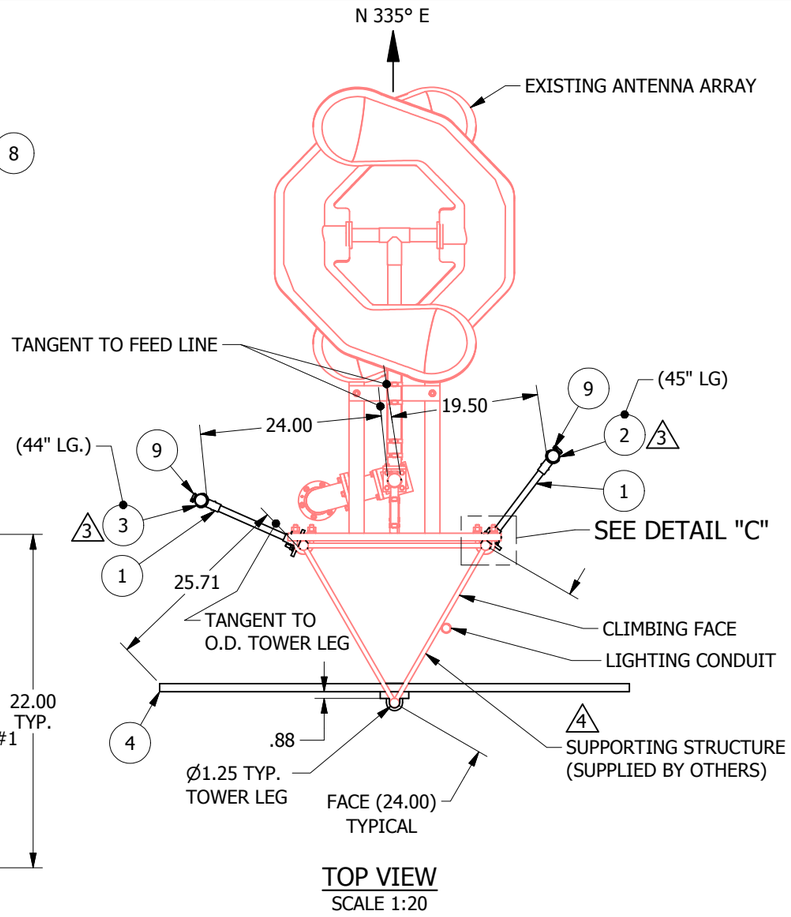
ELEVATION VIEW
SCALE 1:60



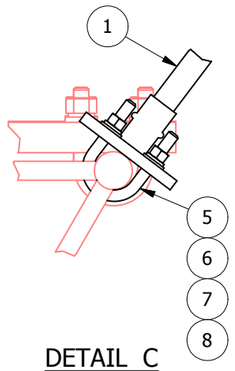
DETAIL A
(TYP. 8x)
SCALE 1:5



DETAIL B
(TYP. ALL BAYS)
SCALE 1:10



TOP VIEW
SCALE 1:20



DETAIL C
(TYP. 16x)
SCALE 1:5

NOTES:

1. HORIZONTAL DIRECTORS ARE 1/4 WAVE ABOVE AND BELOW EACH BAY.
2. HORIZONTAL DIRECTORS MAY HAVE TO BE ADJUSTED SLIGHTLY VERTICALLY (+/-) TO CLEAR ANY OBSTRUCTIONS BY 1".
3. THE VERTICAL DIRECTORS ARE MOUNTED AT BAY LEVEL.
4. THE SUPPORTING STRUCTURE SHOWN HEREON IS SUPPLIED BY OTHERS AND IS USED ONLY FOR ILLUSTRATION PURPOSES. ERI IS NOT RESPONSIBLE & DOES NOT WARRANTY ANY FIT-UP INTERFERENCE.
5. UNLESS OTHERWISE NOTED, ALL BOLTED CONNECTIONS SHALL INITIALLY BE BROUGHT TO A SNUG-TIGHT CONDITION WHERE JOINT TIGHTNESS IS ATTAINED WITH A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF AN IRONWORKER USING AN ORDINARY SPUD WRENCH TO BRING THE PLIES INTO FIRM CONTACT. A SYSTEMATIC APPROACH SHALL BE USED TO BRING THE JOINT INTO A SNUG-TIGHT CONDITION STARTING WITH THE MOST RIGID PART OF THE JOINT AND PROCEEDING TOWARD THE FREE EDGES.
6. FOR FINAL TIGHTENING, ERI RECOMMENDS AN ADDITIONAL 1/3 TURN BE APPLIED TO ALL BOLTS UP TO Ø3/4" OR TORQUED AN ADDITIONAL 150 FT-LBS FOR BOLTS OVER Ø3/4", UNLESS OTHERWISE NOTED. FINAL TIGHTENING OF ALL BOLTS SHOULD BE COMPLETED AFTER FINAL CONSTRUCTION OF THE STRUCTURE/ASSEMBLY. PLEASE NOTE, SPECIAL ATTENTION SHALL BE GIVEN TO TIGHTENING OF 1/2" DIAMETER A325 BOLTS, U-BOLTS, AND THREADED RODS AS TO PREVENT STRIPPING THE THREADS FROM OVER-TIGHTENING.

ITEM	QTY	PART NUMBER	DESCRIPTION
9	32	HC0028	#28 HOSE CLAMP SS FITS 1-1/4 TO 2-1/4
8	48	NU0616	3/8 - 16 SS HEX NUT, WAX COATED
7	48	WF06SS	3/8 in, SS FLAT WASHER
6	48	WL06SS	3/8 in, SS LOCK WASHER
5	24	UB0616-0175	3/8-16 X 1-3/4" C-C U-BOLT
4	8	BT31288B-9	HORIZONTAL DIRECTOR, 62.00" LONG
3	4	BT31288B-8	VERTICAL DIRECTOR, 45.00" LONG
2	4	BT31288B-7	VERTICAL DIRECTOR, 45.00" LONG
1	16	BT31288B-6	VERTICAL DIRECTOR BRACKET, 13.38" LONG

BILL OF MATERIAL

PROJECT NO.	31288B/3	
ERI APPROVAL	NAME	DATE
DRAWN BY	G.A.G.	4/1/2015
DRAFTING		
DESIGN MGR.	K. SCHARP	4/9/2015
ENG.		
MANUF.		
EXT. APPROVAL	T. SCHARF	4/9/2015

SUPERSEDES PART NO.

FILE NAME: IA31288B-1.idw

ELECTRONICS RESEARCH INC.
ESTABLISHED 1943
7777 GARDNER Rd.
CHANDLER, IN
47610-9219
PHONE: (812) 925-6000
FAX: (812) 925-4030

TITLE:
LPX-4C PARASITES INSTALLATION DETAILS
WOODFIN, NC
WQNS - FM STATION 105.1 MHz

SIZE	CAGE CODE	DWG NO.	REV.
B	OZNS1	IA31288B-1	

SCALE :	WEIGHT:	SHEET:
AS NOTED	N/A	1 OF 1

AISC CERTIFIED FABRICATOR

THIRD ANGLE PROJECTION

MATERIAL

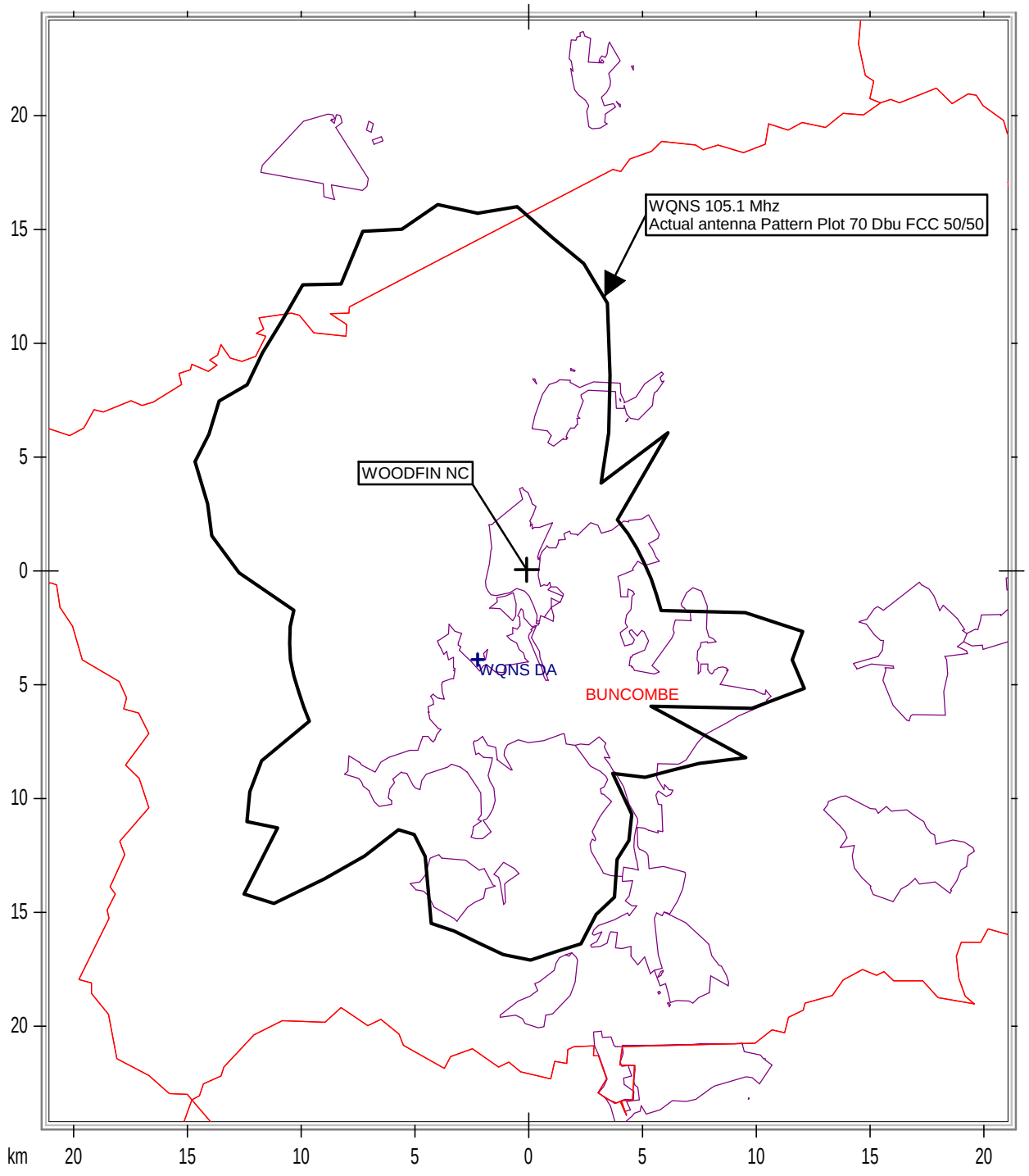
FINISH

TOLERANCES
OVERALL-NOT CUMULATIVE
UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES AND APPLICABLE AT 20°C (68°F)
INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994

1 PLACE DECIMAL ± .1
2 PLACE DECIMAL ± .03
3 PLACE DECIMAL ± .010
ANGULAR ± .5°
FRACTIONAL ± 1/16"

Special Condition #7

Principle Community Coverage Certification Map



Clear Channel Broadcasting Licenses

County Borders State Borders City Borders

Special Condition #10

WWNC AM Method of Moments Results

Engineering Statement – WWNC Measurements

Following installation of the WQNS directional FM antenna, base impedance measurements were made at each of the four WWNC towers with the other towers floated, in the same manner as used in the moment method proof underlying the current WWNC license. The new measured base resistance and reactance values were found to vary by less than +/- 2 ohms and +/- 4 percent from the values modeled in the proof as shown in the following table.

TOWER	ZIN (MODEL) from 2014 Proof	ZIN (MEASURED) 2014	ZIN (MEASURED) 7/2015
1	18.1 -j75.8Ω	19.1 -j75.8Ω	19.8 -j75.9Ω
2	20.7 -j67.1Ω	21.8 -j68.8Ω	21.9 -j70.2Ω
3	17.8 -j78.9Ω	18.0 -j78.9Ω	18.4 -j77.7Ω
4	18.1 -j61.3Ω	18.5 -j59.6Ω	18.8 -j58.1Ω

The daytime non-directional base impedance with the other towers detuned was measured and the base resistance was found to be unchanged from the licensed value of 19.0 ohms.

All of the measurements were made by the undersigned on July 29 ,2015 with an Agilent Technologies Model 4396B vector network analyzer with external directional coupler in a calibrated measurement system.

Randall L. Mullinax
July 31, 2015

Special Condition #11

WKJV AM Computer model Proof Results

TECHNICAL EXHIBIT

PREDICTED IMPACT
OF FM TRANSMITTING ANTENNA CHANGE
ON THE WKJV NIGHTTIME
DIRECTIONAL ANTENNA PATTERN
RADIO STATION WQNS(FM)
WOODFIN, NORTH CAROLINA

May 27, 2015

CH 286A 105.1 MHZ 6.0 KW 62 M

PREDICTED IMPACT
OF FM TRANSMITTING ANTENNA CHANGE
ON THE WKJV NIGHTTIME
DIRECTIONAL ANTENNA PATTERN
RADIO STATION WQNS(FM)
WOODFIN, NORTH CAROLINA
CH 286A 105.1 MHZ 6.0 KW 62 M

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	Executive Summary
Item 1	Tabulation of Before and After Radial Field Strengths
Item 2	Sketch Showing FM Antenna Modeling Assumptions Before Change
Item 3	Sketch Showing FM Antenna Modeling Assumptions After Change
Item 4	Method of Moments Model Details for WKJV Nighttime Directional Antenna Before FM Antenna Change - Open Circuit Assumption
Item 5	Method of Moments Model Details for WKJV Nighttime Directional Antenna After FM Antenna Change – Open Circuit Assumption
Item 6	Method of Moments Model Details for WKJV Nighttime Directional Antenna Before FM Antenna Change – Short Circuit Assumption
Item 7	Method of Moments Model Details for WKJV Nighttime Directional Antenna After FM Antenna Change – Short Circuit Assumption
Appendix A	FM Antenna Details Before Change
Appendix B	FM Antenna Details After Change

Executive Summary – WQNS(FM)

Information regarding a study of the potential impact of changing the WQNS(FM) transmitting antenna, as authorized by construction permit BPH-20140919ADQ, on the nighttime directional antenna pattern of nearby AM station WKJV is included herein. The FM antenna is on a tower of the array that is employed by the nighttime directional antenna system of AM station WWNC. The WKJV array is located 1.54 kilometers from the new WQNS(FM) transmitter site at an azimuth of 54.6 degrees true. Condition 11 of the WQNS(FM) construction permit requires that no adverse impact be caused to the directional antenna pattern of WKJV. The study indicates that there will be no adverse impact. No detuning network for the WKJV frequency is required by the WQNS(FM) tower.

To examine the situation with regard to the potential for effects on the WKJV far field radiation pattern, a Method of Moments computer study was run using a model of the nighttime array with voltage sources calculated to produce the authorized directional antenna pattern. Two models were run – one with the existing FM antenna side mounted on the upper 33 feet of the tower and another with the new FM antenna in its place. Both models were run with both open circuit and short circuit assumptions at the tower base to evaluate the worst case of the two insofar as alteration of the WKJV nighttime directional antenna pattern is concerned.

To evaluate the effect of the FM antenna, the modeling considered the changes in far-field radiation in the specified monitor point directions of the WKJV license. This is in keeping with the same principle that is employed when before-and-after field strength measurements are run and it allows the use of appropriate simplifying assumptions when a worst-case approach is employed. In order to have far-field radiation values at distances well beyond the distance of the new WQNS(FM) tower from WKJV, they were calculated at a distance of 10 kilometers and then converted to their corresponding values at 1 kilometer to comport with the standard for defining directional antenna radiation patterns. For worst-case radiation calculations, no ground loss was assumed between the two transmitter sites or for the propagation paths to the locations for which far-field calculations were performed.

The modeling assumptions for the subject tower are within the range allowed for Method of Moments modeling in a directional antenna proof of performance – with the radius based directly on the 24 inch face width tower and the height equal to the tower's physical height. Generic assumptions were used for the WKJV array towers as the analysis is not sensitive to them. Expert MININEC Broadcast Professional Version 14.5 was used for the modeling.

As can be seen from the before-after tabulation and Method of Moments modeling details on the following pages, the installation of the new WQNS(FM) antenna on the existing

WWNC array tower will have no material impact on the nighttime directional antenna radiation pattern of WKJV. No radiation level increase capable of being proven with field strength measurements, given the rated accuracy of field strength meters, was found.

Ronald D. Rackley, P.E.
du Treil, Lundin & Rackley, Inc.
201 Fletcher Avenue
Sarasota, Florida 34237
(941) 329 6008
ron@dlr.com

May 27, 2015

Item 1

Tabulation of Before and After Radial Field Strengths – WQNS(FM)

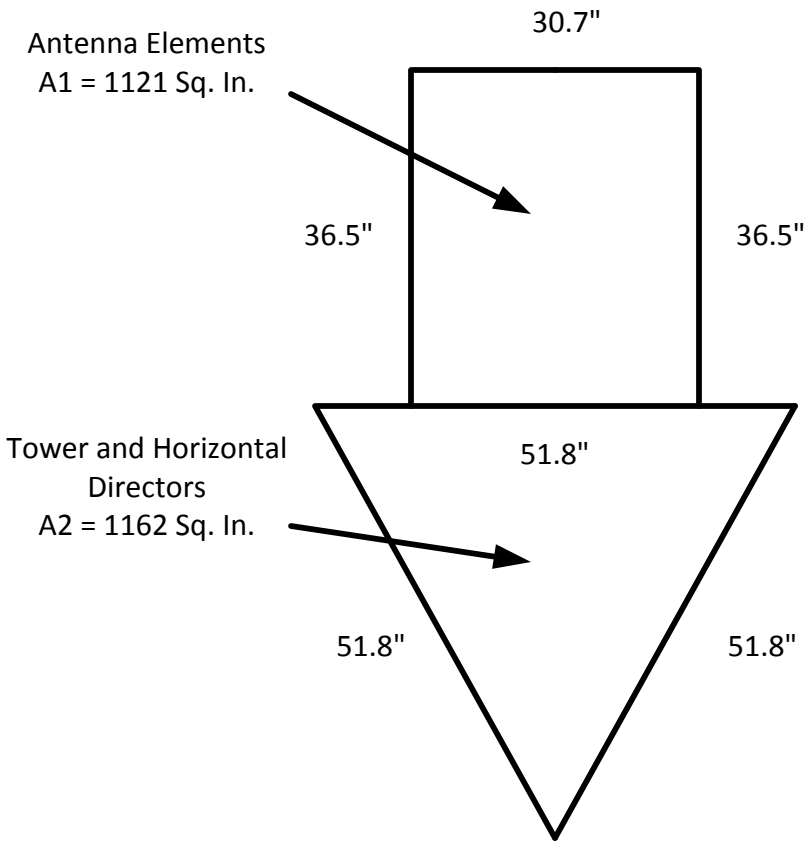
(Field Values at 1.0 KM, Unattenuated)

WKJV Night DA with Open Circuit Assumption for WQNS(FM) Tower

Radial (Deg. T.)	Before (mV/m)	After (mV/m)	Increase (mV/m)	Standard (mV/m)
12	32.9	33.1	0.2	50.5
40	125.3	125.5	0.2	132.3
63	98.0	97.9	--	108.8
181	101.1	100.9	--	140.5
219	72.6	72.5	--	77.1
302	52.6	52.3	--	58.8
337	85.0	85.1	0.1	89.4

WKJV Night DA with Short Circuit Assumptions for WQNS(FM) Tower

Radial (Deg. T.)	Before (mV/m)	After (mV/m)	Increase (mV/m)	Standard (mV/m)
12	34.9	35.0	0.1	50.5
40	125.6	125.6	--	132.3
63	99.7	99.7	--	108.8
181	100.0	99.8	--	140.5
219	70.3	70.2	--	77.1
302	51.1	51.0	--	58.8
337	83.3	83.2	--	89.4

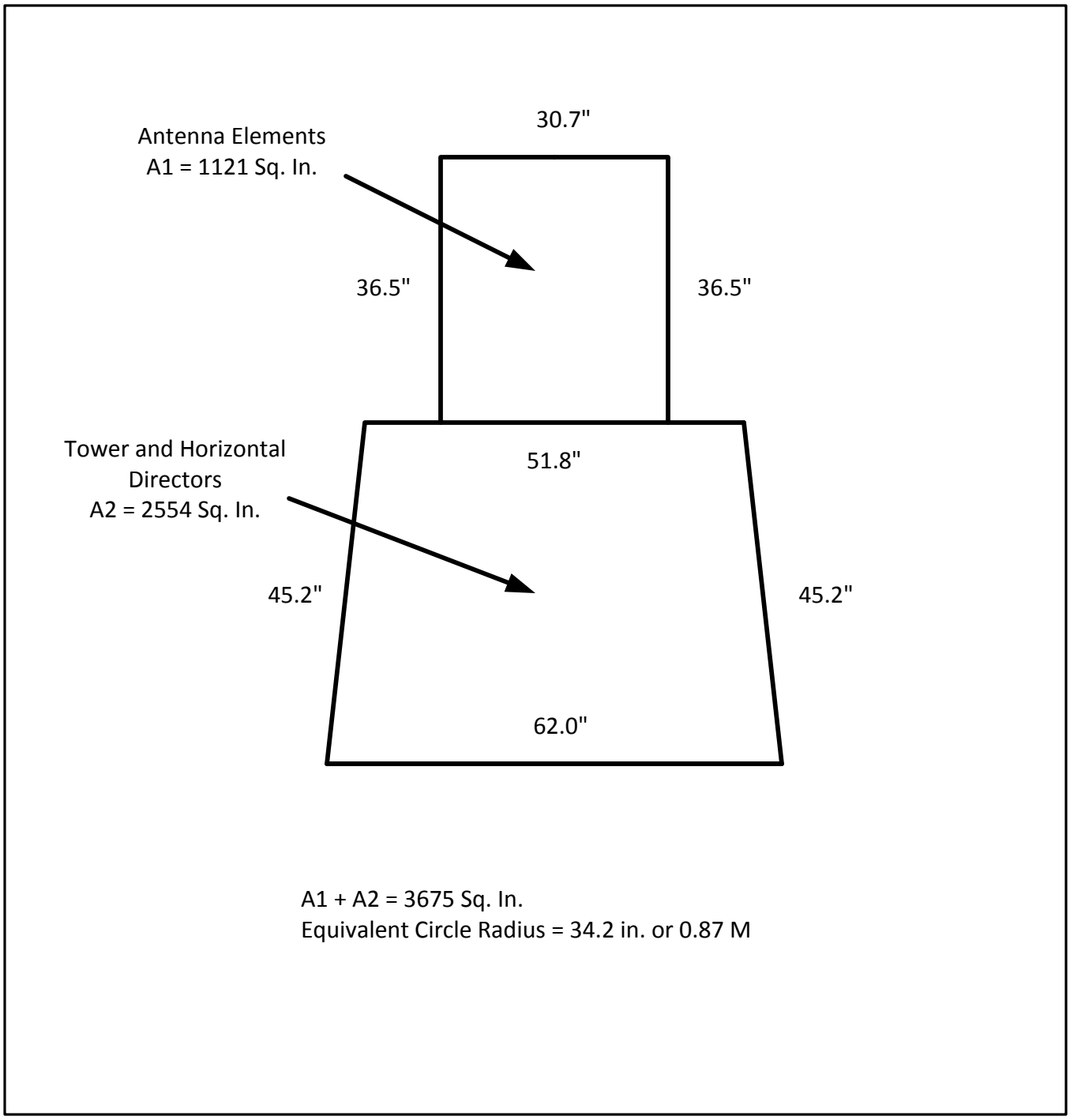


A1 + A2 = 2283 Sq. In.
Equivalent Circle Radius = 27 in. or 0.69 M

SKETCH SHOWING FM ANTENNA MODELING ASSUMPTIONS BEFORE CHANGE

RADIO STATION WQNS(FM)
WOODFIN, NORTH CAROLINA
CH 286A 105.1 MHZ 4.9 KW 62 M

du Treil, Lundin & Rackley, Inc.



A1 + A2 = 3675 Sq. In.
Equivalent Circle Radius = 34.2 in. or 0.87 M

SKETCH SHOWING FM ANTENNA MODELING ASSUMPTIONS AFTER CHANGE

RADIO STATION WQNS(FM)
WOODFIN, NORTH CAROLINA
CH 286A 105.1 MHZ 4.9 KW 62 M

du Treil, Lundin & Rackley, Inc.

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MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 1.38 MHz

tower	field ratio magnitude	phase (deg)
1	1.	54.
2	1.963	-101.9
3	1.963	101.9
4	1.	-54.

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	68.958	101.8	4.85308	55.2
11	301.073	330.	9.13133	259.3
21	417.168	187.2	8.85623	102.4
31	225.442	61.1	4.53263	303.4

Sum of square of source currents = 411.823
Total power = 1,000. watts

NOTE: The array synthesis calculations (above) were performed to solve for the base voltage drives required to produce the specified field parameters with the WKJV array towers alone. The following information is from the final model, which considered the effects of the WQNS(FM) tower as well.

GEOMETRY
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	135.	302.	0	.29	10
		135.	302.	89.9		
2	none	45.	302.	0	.29	10
		45.	302.	89.9		
3	none	45.	122.	0	.29	10
		45.	122.	89.9		
4	none	135.	122.	0	.29	10
		135.	122.	89.9		
5	none	2,552.	234.6	0	.29	20
		2,552.	234.6	145.		
6	none	2,552.	234.6	145.	.69	2
		2,552.	234.6	161.7		

Number of wires   = 6
          current nodes = 62

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	5	7.25	1	8.99
radius	1	.29	6	.69

ELECTRICAL DESCRIPTION
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.38	0	1	.0201389	.0249722

Sources

source	node	sector	magnitude	phase	type
1	1	1	97.5214	101.8	voltage
2	11	1	425.782	330.	voltage
3	21	1	589.964	187.2	voltage
4	31	1	318.822	61.1	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	41	1.E+06	0	0	0	0

RADIATION PATTERN rms
geographic coordinate system

Radial distance (meters) = 10,000.
Frequency = 1.38 MHz
Input power = 1,000. watts
Efficiency = 100. %

elevation angle	azimuth angle	E-theta mag (mv/m)	E-theta phase (deg)	E-phi mag (mv/m)	E-phi phase
0	12.	3.29085	273.5	0	0
0	40.	12.5343	91.1	0	0
0	63.	9.79753	269.4	0	0
0	181.	10.1148	268.7	0	0
0	219.	7.26242	88.9	0	0
0	302.	5.25557	87.4	0	0
0	337.	8.50042	270.7	0	0

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MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 1.38 MHz

tower	field ratio magnitude	phase (deg)
1	1.	54.
2	1.963	-101.9
3	1.963	101.9
4	1.	-54.

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	68.958	101.8	4.85308	55.2
11	301.073	330.	9.13133	259.3
21	417.168	187.2	8.85623	102.4
31	225.442	61.1	4.53263	303.4

Sum of square of source currents = 411.823
Total power = 1,000. watts

NOTE: The array synthesis calculations (above) were performed to solve for the base voltage drives required to produce the specified field parameters with the WKJV array towers alone. The following information is from the final model, which considered the effects of the WQNS(FM) tower as well.

GEOMETRY
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	135.	302.	0	.29	10
		135.	302.	89.9		
2	none	45.	302.	0	.29	10
		45.	302.	89.9		
3	none	45.	122.	0	.29	10
		45.	122.	89.9		
4	none	135.	122.	0	.29	10
		135.	122.	89.9		
5	none	2,552.	234.6	0	.29	20
		2,552.	234.6	145.		
6	none	2,552.	234.6	145.	.87	2
		2,552.	234.6	161.7		

Number of wires = 6
current nodes = 62

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	5	7.25	1	8.99
radius	1	.29	6	.87

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.38	0	1	.0201389	.0249722

Sources

source	node	sector	magnitude	phase	type
1	1	1	97.5214	101.8	voltage
2	11	1	425.782	330.	voltage
3	21	1	589.964	187.2	voltage
4	31	1	318.822	61.1	voltage

Lumped loads

		resistance	reactance	inductance	capacitance	passive
load	node	(ohms)	(ohms)	(mH)	(uF)	circuit
1	41	1.E+06	0	0	0	0

RADIATION PATTERN rms
geographic coordinate system

Radial distance (meters) = 10,000.
Frequency = 1.38 MHz
Input power = 1,000. watts
Efficiency = 100. %

elevation angle	azimuth angle	E-theta mag (mv/m)	phase (deg)	E-phi mag (mv/m)	phase
0	12.	3.31191	273.7	0	0
0	40.	12.5544	91.1	0	0
0	63.	9.79186	269.5	0	0
0	181.	10.0934	268.7	0	0
0	219.	7.24633	88.7	0	0
0	302.	5.23349	87.3	0	0
0	337.	8.5056	270.6	0	0

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MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 1.38 MHz

tower	field ratio magnitude	phase (deg)
1	1.	54.
2	1.963	-101.9
3	1.963	101.9
4	1.	-54.

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	68.958	101.8	4.85308	55.2
11	301.073	330.	9.13133	259.3
21	417.168	187.2	8.85623	102.4
31	225.442	61.1	4.53263	303.4

Sum of square of source currents = 411.823
Total power = 1,000. watts

NOTE: The array synthesis calculations (above) were performed to solve for the base voltage drives required to produce the specified field parameters with the WKJV array towers alone. The following information is from the final model, which considered the effects of the WQNS(FM) tower as well.

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Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	135.	302.	0	.29	10
		135.	302.	89.9		
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		45.	302.	89.9		
3	none	45.	122.	0	.29	10
		45.	122.	89.9		
4	none	135.	122.	0	.29	10
		135.	122.	89.9		
5	none	2,552.	234.6	0	.29	20
		2,552.	234.6	145.		
6	none	2,552.	234.6	145.	.69	2
		2,552.	234.6	161.7		

Number of wires = 6
current nodes = 62

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	5	7.25	1	8.99
radius	1	.29	6	.69

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.38	0	1	.0201389	.0249722

Sources

source	node	sector	magnitude	phase	type
1	1	1	97.5214	101.8	voltage
2	11	1	425.782	330.	voltage
3	21	1	589.964	187.2	voltage
4	31	1	318.822	61.1	voltage

RADIATION PATTERN rms
geographic coordinate system

Radial distance (meters) = 10,000.
Frequency = 1.38 MHz
Input power = 1,000. watts
Efficiency = 99.9997 %

elevation	azimuth	E-theta		E-phi	
angle	angle	mag (mv/m)	phase (deg)	mag (mv/m)	phase
0	12.	3.48774	271.2	0	0
0	40.	12.5553	90.2	0	0
0	63.	9.96908	270.2	0	0
0	181.	9.99614	269.7	0	0
0	219.	7.03314	89.4	0	0
0	302.	5.10836	89.3	0	0
0	337.	8.32591	269.8	0	0

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MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 1.38 MHz

tower	field ratio magnitude	phase (deg)
1	1.	54.
2	1.963	-101.9
3	1.963	101.9
4	1.	-54.

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	68.958	101.8	4.85308	55.2
11	301.073	330.	9.13133	259.3
21	417.168	187.2	8.85623	102.4
31	225.442	61.1	4.53263	303.4

Sum of square of source currents = 411.823
Total power = 1,000. watts

NOTE: The array synthesis calculations (above) were performed to solve for the base voltage drives required to produce the specified field parameters with the WKJV array towers alone. The following information is from the final model, which considered the effects of the WQNS(FM) tower as well.

GEOMETRY
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	135.	302.	0	.29	10
		135.	302.	89.9		
2	none	45.	302.	0	.29	10
		45.	302.	89.9		
3	none	45.	122.	0	.29	10
		45.	122.	89.9		
4	none	135.	122.	0	.29	10
		135.	122.	89.9		
5	none	2,552.	234.6	0	.29	20
		2,552.	234.6	145.		
6	none	2,552.	234.6	145.	.87	2
		2,552.	234.6	161.7		

Number of wires   = 6
          current nodes = 62

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	5	7.25	1	8.99
radius	1	.29	6	.87

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.38	0	1	.0201389	.0249722

Sources

source	node	sector	magnitude	phase	type
1	1	1	97.5214	101.8	voltage
2	11	1	425.782	330.	voltage
3	21	1	589.964	187.2	voltage
4	31	1	318.822	61.1	voltage

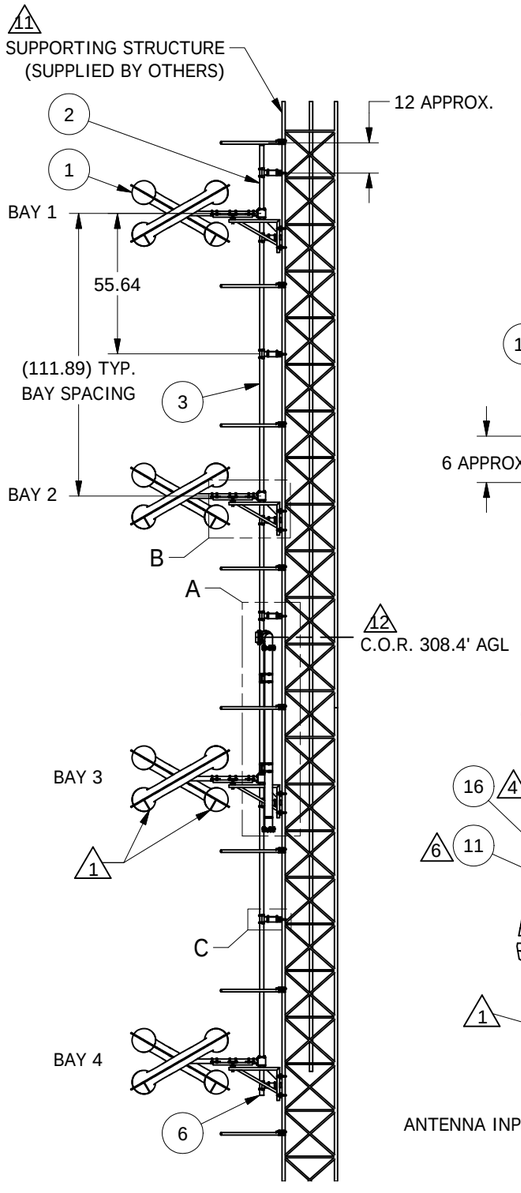
RADIATION PATTERN rms
geographic coordinate system

Radial distance (meters) = 10,000.
Frequency = 1.38 MHz
Input power = 1,000. watts
Efficiency = 100. %

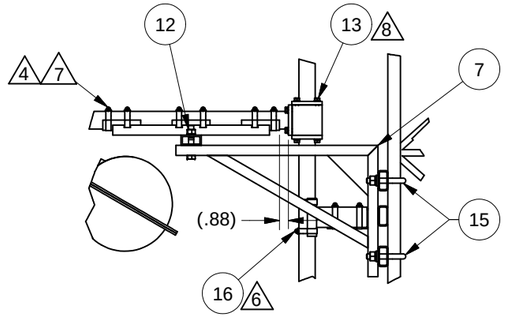
elevation	azimuth	E-theta		E-phi	
angle	angle	mag (mv/m)	phase (deg)	mag (mv/m)	phase
0	12.	3.50215	271.2	0	0
0	40.	12.5622	90.1	0	0
0	63.	9.9748	270.2	0	0
0	181.	9.98492	269.7	0	0
0	219.	7.01871	89.4	0	0
0	302.	5.09584	89.4	0	0
0	337.	8.32017	269.7	0	0

Appendix A

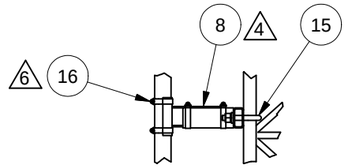
FM Antenna Details Before Change



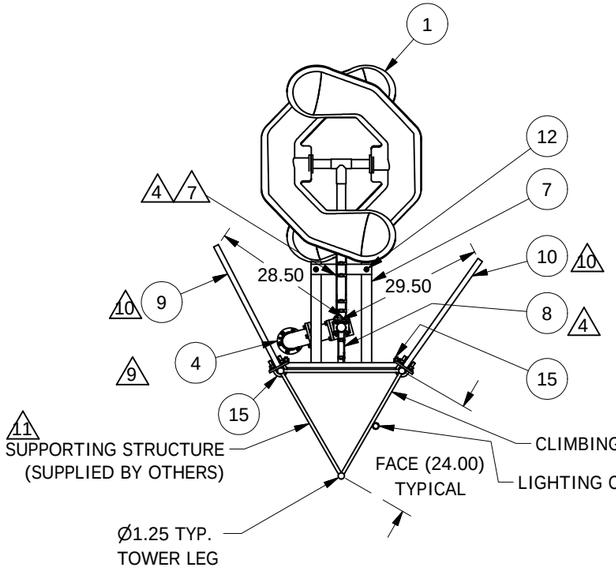
ELEVATION VIEW
SCALE 1:60



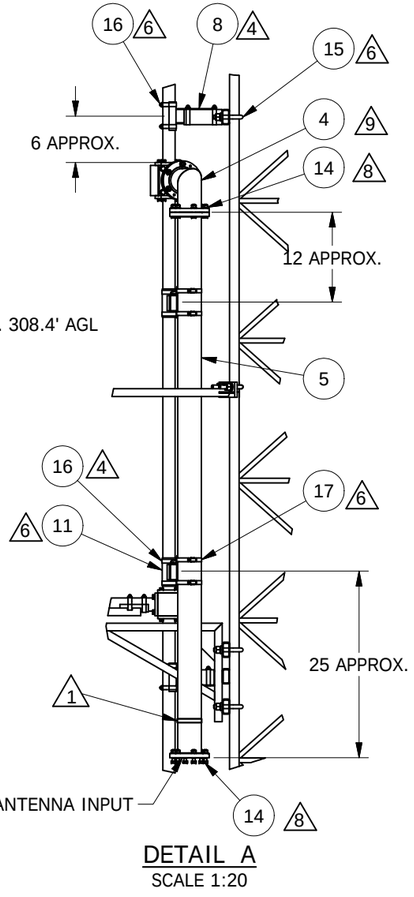
DETAIL B
TYPICAL ALL BAYS
SCALE 1:15



DETAIL C
TYPICAL BETWEEN BAYS
SCALE 1:15



TOP VIEW
SCALE 1:30



DETAIL A
SCALE 1:20

NOTES:

1. ALL RED BANDS DESIGNATE SIDE TO BE MOUNTED DOWNWARD.
2. ASSEMBLE ANTENNA SYSTEM BY MATING CORRESPONDING NUMBERS.
3. OVERALL LENGTH OF ANTENNA SYSTEM IS 32'-10" APPROXIMATE.
4. ENSURE TO PLUMB ANTENNA VERTICALLY BY LOOSENING HOSE CLAMPS ON PRE-CLAMPED SUPPORT SADDLES AND ADJUSTABLE LINE BRACKETS.
5. FINAL ORIENTATION TO BE DETERMINED BY STATION PERSONNEL.
6. HOSE CLAMPS USED TO SECURE LINE BRACKETS TO INTERBAY LINE.
7. HOSE CLAMPS USED TO SECURE ELEMENTS TO SADDLE BRACKETS.
8. APPLY 1/2 GREASE PACKET TO EACH O-RING.
9. CENTERFEED CAN BE ROTATED TO AVOID ANY OBSTRUCTIONS.
10. HORIZONTAL DIRECTORS ARE 1/4 WAVE ABOVE AND BELOW EACH BAY.
11. THE SUPPORTING STRUCTURE SHOWN HEREON IS SUPPLIED BY OTHERS AND IS USED ONLY FOR ILLUSTRATION PURPOSES. ERI IS NOT RESPONSIBLE & DOES NOT WARRANTY ANY FIT-UP INTERFERENCE.
12. C.O.R. IS 308.4' APPROXIMATE. ANTENNA MAY BE INSTALLED ± 3.0', AS NECESSARY TO AVOID FIT-UP INTERFERENCE WITH TOWER MEMBERS, ETC.
13. UNLESS OTHERWISE NOTED, ALL BOLTED CONNECTIONS SHALL INITIALLY BE BROUGHT TO A SNUG-TIGHT CONDITION WHERE JOINT TIGHTNESS IS ATTAINED WITH A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF AN IRONWORKER USING AN ORDINARY SPUD WRENCH TO BRING THE PLIES INTO FIRM CONTACT. A SYSTEMATIC APPROACH SHALL BE USED TO BRING THE JOINT INTO A SNUG-TIGHT CONDITION STARTING WITH THE MOST RIGID PART OF THE JOINT AND PROCEEDING TOWARD THE FREE EDGES.
14. FOR FINAL TIGHTENING, ERI RECOMMENDS AN ADDITIONAL 1/3 TURN BE APPLIED TO ALL BOLTS UP TO Ø3/4" OR TORQUED AN ADDITIONAL 150 FT-LBS FOR BOLTS OVER Ø3/4", UNLESS OTHERWISE NOTED. FINAL TIGHTENING OF ALL BOLTS SHOULD BE COMPLETED AFTER FINAL CONSTRUCTION OF THE STRUCTURE/ASSEMBLY. PLEASE NOTE, SPECIAL ATTENTION SHALL BE GIVEN TO TIGHTENING OF 1/2" DIAMETER A325 BOLTS, U-BOLTS, AND THREADED RODS AS TO PREVENT STRIPPING THE THREADS FROM OVER-TIGHTENING.

ITEM	QTY	PART NUMBER	DESCRIPTION
17	4	HC0048	#48 HOSE CLAMP, SS
16	20	HC0028	#28 HOSE CLAMP, SS
15	40	UB0813-0212GA	1/2-13 x 2-1/8" C-C GALV. UBOLT
14	2	RLA300-21	3-1/8" HARDWARE KIT
13	4	HWK1102	3" BLOCK BOLT KIT - 2 SIDES - O-RINGS
12	4	HWK0006	3" SADDLE, HARDWARE KIT
11	2	BT31288-5	LINE TO LINE BRACKET
10	8	BT31288-4	HORIZONTAL DIRECTOR 26.25" LONG
9	8	BT31288-3	HORIZONTAL DIRECTOR 27.25" LONG
8	4	BT31288-2	FACE TO LINE BRACKET
7	4	BT31288-1	20" FACE MOUNT ELEMENT BRACKET
6	1	CO0006	12" LINE STUB
5	1	CL3031	3-1/8"-6' MATCHING SECTION RFF/RFF
4	1	CL31288-108.89	1-5/8" CENTERFEED ASSY 3-1/8" INPUT
3	2	CL1061B-108.89	1-5/8" INTERBAY LINE ASSY SFF/SFF
2	1	CL1063B-26.47	1-5/8" QUARTER-WAVE STUB ASSY
1	4	AE-LPX1BR0	10" LPX ELMNT 1-5/8" LINE W/RADOMES

BILL OF MATERIAL

PROJECT NO.	31288/1	
ERI APPROVAL	NAME	DATE
DRAWN BY	G.A.G.	7/11/2013
DRAFTING	DLB	7/12/2013
DESIGN MGR.	GH	7/12/2013
ENG.		
MANUF.		
EXT. APPROVAL	T. SCHARF	7/15/2013

SUPERSEDES PART NO.

FILE NAME: IA31288-1.idw

ELECTRONICS RESEARCH INC.
ESTABLISHED 1943
7777 GARDNER Rd.
CHANDLER, IN
47610-9219
PHONE: (812) 925-6000
FAX: (812) 925-4030

TITLE:
LPX-4C INSTALLATION DETAILS
WOODFIN, NC
WQNS - FM STATION 105.1 MHz

SIZE	CAGE CODE	DWG NO.	REV.
B	OZNS1	IA31288-1	

SCALE :	WEIGHT:	SHEET:
AS NOTED	N/A	1 OF 1

AISC CERTIFIED FABRICATOR

THIRD ANGLE PROJECTION

MATERIAL

FINISH

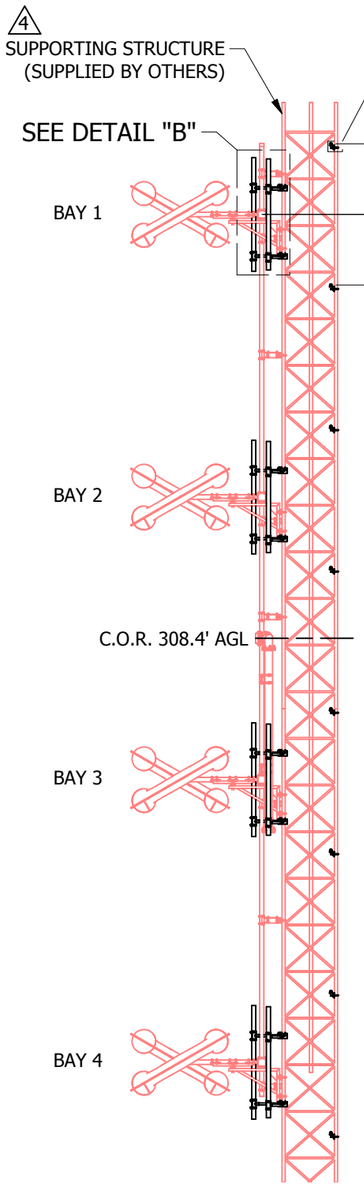
TOLERANCES
OVERALL-NOT CUMULATIVE
UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES AND APPLICABLE AT 20°C (68°F)
INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994

1 PLACE DECIMAL ± .1
2 PLACE DECIMAL ± .03
3 PLACE DECIMAL ± .010
ANGULAR ± .5°
FRACTIONAL ± 1/16"

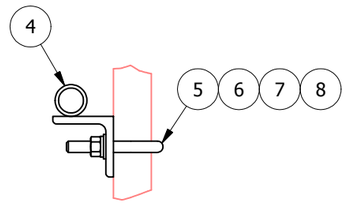
C:\Workspace\Designs\31288\1\IA31288-1.idwggott7/11/2013

Appendix B

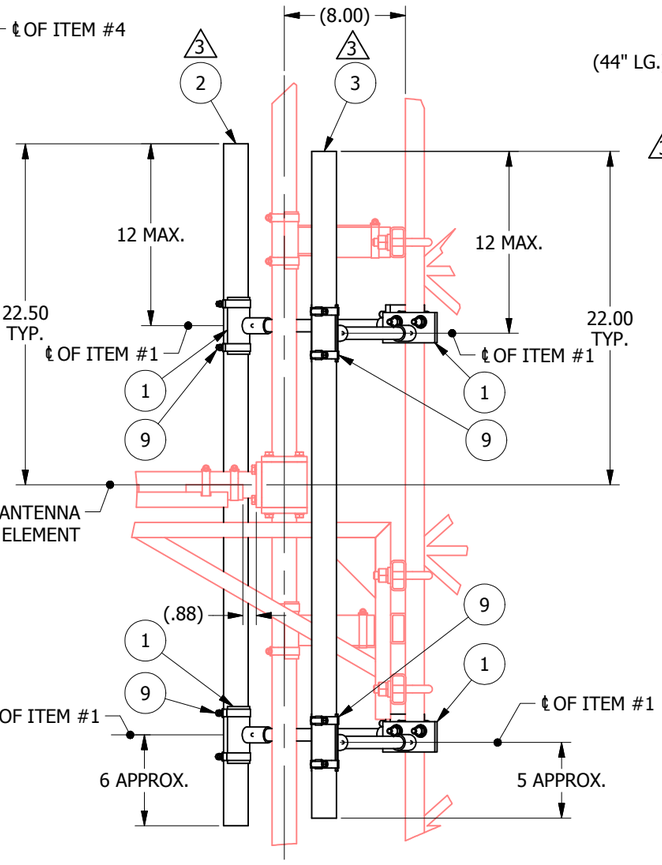
FM Antenna Details After Change



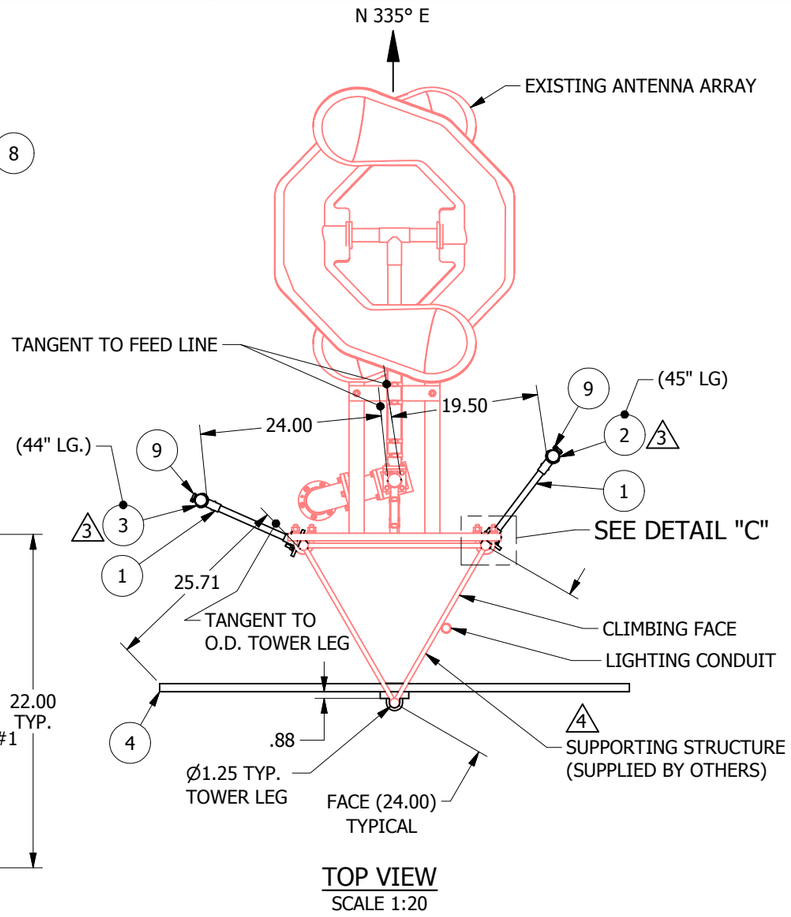
ELEVATION VIEW
SCALE 1:60



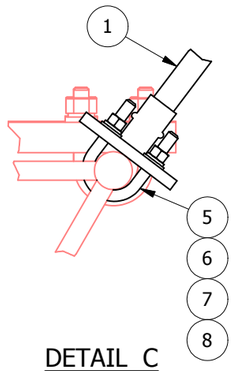
DETAIL A
(TYP. 8x)
SCALE 1:5



DETAIL B
(TYP. ALL BAYS)
SCALE 1:10



TOP VIEW
SCALE 1:20



DETAIL C
(TYP. 16x)
SCALE 1:5

NOTES:

1. HORIZONTAL DIRECTORS ARE 1/4 WAVE ABOVE AND BELOW EACH BAY.
2. HORIZONTAL DIRECTORS MAY HAVE TO BE ADJUSTED SLIGHTLY VERTICALLY (+/-) TO CLEAR ANY OBSTRUCTIONS BY 1".
3. THE VERTICAL DIRECTORS ARE MOUNTED AT BAY LEVEL.
4. THE SUPPORTING STRUCTURE SHOWN HEREON IS SUPPLIED BY OTHERS AND IS USED ONLY FOR ILLUSTRATION PURPOSES. ERI IS NOT RESPONSIBLE & DOES NOT WARRANTY ANY FIT-UP INTERFERENCE.
5. UNLESS OTHERWISE NOTED, ALL BOLTED CONNECTIONS SHALL INITIALLY BE BROUGHT TO A SNUG-TIGHT CONDITION WHERE JOINT TIGHTNESS IS ATTAINED WITH A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF AN IRONWORKER USING AN ORDINARY SPUD WRENCH TO BRING THE PLIES INTO FIRM CONTACT. A SYSTEMATIC APPROACH SHALL BE USED TO BRING THE JOINT INTO A SNUG-TIGHT CONDITION STARTING WITH THE MOST RIGID PART OF THE JOINT AND PROCEEDING TOWARD THE FREE EDGES.
6. FOR FINAL TIGHTENING, ERI RECOMMENDS AN ADDITIONAL 1/3 TURN BE APPLIED TO ALL BOLTS UP TO Ø3/4" OR TORQUED AN ADDITIONAL 150 FT-LBS FOR BOLTS OVER Ø3/4", UNLESS OTHERWISE NOTED. FINAL TIGHTENING OF ALL BOLTS SHOULD BE COMPLETED AFTER FINAL CONSTRUCTION OF THE STRUCTURE/ASSEMBLY. PLEASE NOTE, SPECIAL ATTENTION SHALL BE GIVEN TO TIGHTENING OF 1/2" DIAMETER A325 BOLTS, U-BOLTS, AND THREADED RODS AS TO PREVENT STRIPPING THE THREADS FROM OVER-TIGHTENING.

ITEM	QTY	PART NUMBER	DESCRIPTION
9	32	HC0028	#28 HOSE CLAMP SS FITS 1-1/4 TO 2-1/4
8	48	NU0616	3/8 - 16 SS HEX NUT, WAX COATED
7	48	WF06SS	3/8 in, SS FLAT WASHER
6	48	WL06SS	3/8 in, SS LOCK WASHER
5	24	UB0616-0175	3/8-16 X 1-3/4" C-C U-BOLT
4	8	BT31288B-9	HORIZONTAL DIRECTOR, 62.00" LONG
3	4	BT31288B-8	VERTICAL DIRECTOR, 45.00" LONG
2	4	BT31288B-7	VERTICAL DIRECTOR, 45.00" LONG
1	16	BT31288B-6	VERTICAL DIRECTOR BRACKET, 13.38" LONG

BILL OF MATERIAL

PROJECT NO.	31288B/3	
ERI APPROVAL	NAME	DATE
DRAWN BY	G.A.G.	4/1/2015
DRAFTING		
DESIGN MGR.	K. SCHARP	4/9/2015
ENG.		
MANUF.		
EXT. APPROVAL	T. SCHARF	4/9/2015

SUPERSEDES PART NO.

FILE NAME: IA31288B-1.idw

ELECTRONICS RESEARCH INC.
ESTABLISHED 1943
7777 GARDNER Rd.
CHANDLER, IN
47610-9219
PHONE: (812) 925-6000
FAX: (812) 925-4030

TITLE:
LPX-4C PARASITES INSTALLATION DETAILS
WOODFIN, NC
WQNS - FM STATION 105.1 MHz

SIZE	CAGE CODE	DWG NO.	REV.
B	OZNS1	IA31288B-1	

SCALE :	WEIGHT:	SHEET:
AS NOTED	N/A	1 OF 1

AISC CERTIFIED FABRICATOR

THIRD ANGLE PROJECTION

MATERIAL

FINISH

TOLERANCES
OVERALL-NOT CUMULATIVE
UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES AND APPLICABLE AT 20°C (68°F)
INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994

1 PLACE DECIMAL ± .1
2 PLACE DECIMAL ± .03
3 PLACE DECIMAL ± .010
ANGULAR ± .5°
FRACTIONAL ± 1/16"