

WFJO (FM)

Engineering Exhibit, FCC Form 302 Application for License
Construction Permit #BMPH- 20110602ABX

June 13, 2011

Satisfaction of Special operating conditions or restrictions:

- 1 The permittee/ licensee in coordination with other users of this site agrees to reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic fields in access of FCC guidelines.
- 2 The permittee/ licensee acknowledges that this is a 73.215 contour protection grant.
- 3 A complete proof of performance from the antenna manufacturer is attached to this form 302 as exhibit A.
- 4 An affidavit from a licensed surveyor is attached to this form 302 as exhibit B
- 5 An affidavit from a qualified engineer that the antenna system installation was overseen by a qualified engineer is attached as exhibit C.
- 6 An exhibit demonstrating that the measured directional pattern complies with the appropriate community coverage provisions is attached as exhibit D.
- 7 The relative field strength of neither the measured horizontally nor vertically polarized radiation component exceed at any azimuth the value indicated on the composite pattern authorized by the construction permit. The measured plots are included in the proof of performance.



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
WFJO, Jacksonville Beach, Florida***

April 20, 2011

Electronics Research Inc. is providing a custom fabricated antenna system that is specially designed to meet the FCC requirements and the general needs of radio station WFJO.

The antenna is the ERI model 1092-1CP-DA configuration. The circular polarized system consists of one bay using two driven circular polarized radiating element and one horizontal parasitic element placed one-quarter wave above and below the bay. The antenna was mounted on the North 41 degrees East tower face with bracketry to provide an antenna orientation of North 56 degrees East. The antenna was tested on a 7' face tower, which is the structure the station plans to use to support the array. All tests were performed on a frequency of 92.5 megahertz, which is the center of the FM broadcast channel assigned to WFJO.

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 Proposed For WFJO, Jacksonville Beach, Florida

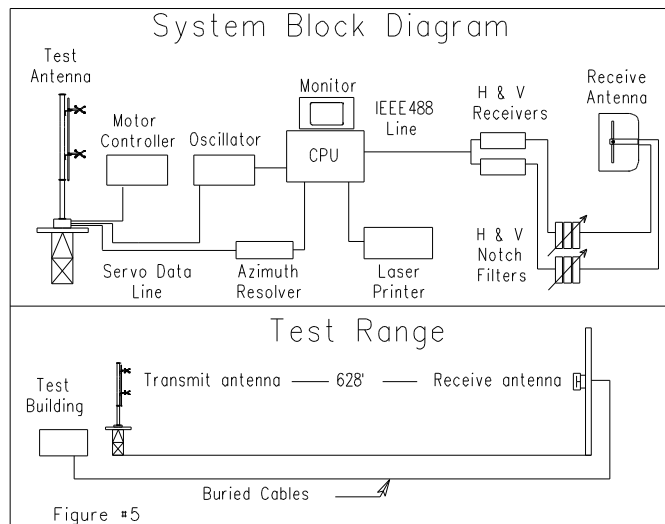
(Continued)

DESCRIPTION OF THE TEST PROCEDURE

The test antenna consisted of a full-scale model of the complete circular polarized system with the associated horizontal parasitic element. The elements and brackets that were used in this test are electrically equivalent to those that will be supplied with the antenna.

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 7' 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.



Directional Antenna System

Proposed For

WFJO, Jacksonville Beach, Florida

(Continued)

A broadband horizontal and vertical dipole system, located approximately 628 feet from the test antenna, was used to receive the emitted test signals. 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 Heliac 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 coordinated graph paper in a clockwise direction. Both horizontal and vertical components were recorded separately.

CONCLUSIONS

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

The 1092-1CP-DA array is to be mounted on the North 41 degrees East tower face of the 7' face tower at a bearing of North 56 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 components 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 1.7 kilowatts (2.304 dBk).

Directional Antenna System
Proposed For
WFJO, Jacksonville Beach, Florida

(Continued)

The power at North 230-240 degrees East does not exceed 0.064 kilowatts (-11.938 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 than 85% of the filed composite pattern.

The clear vertical length of the structure required to support the antenna is 20 feet.

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.

A handwritten signature in black ink, appearing to read "Tom Scharf". The signature is fluid and cursive, with a large initial "T" and a stylized "S".

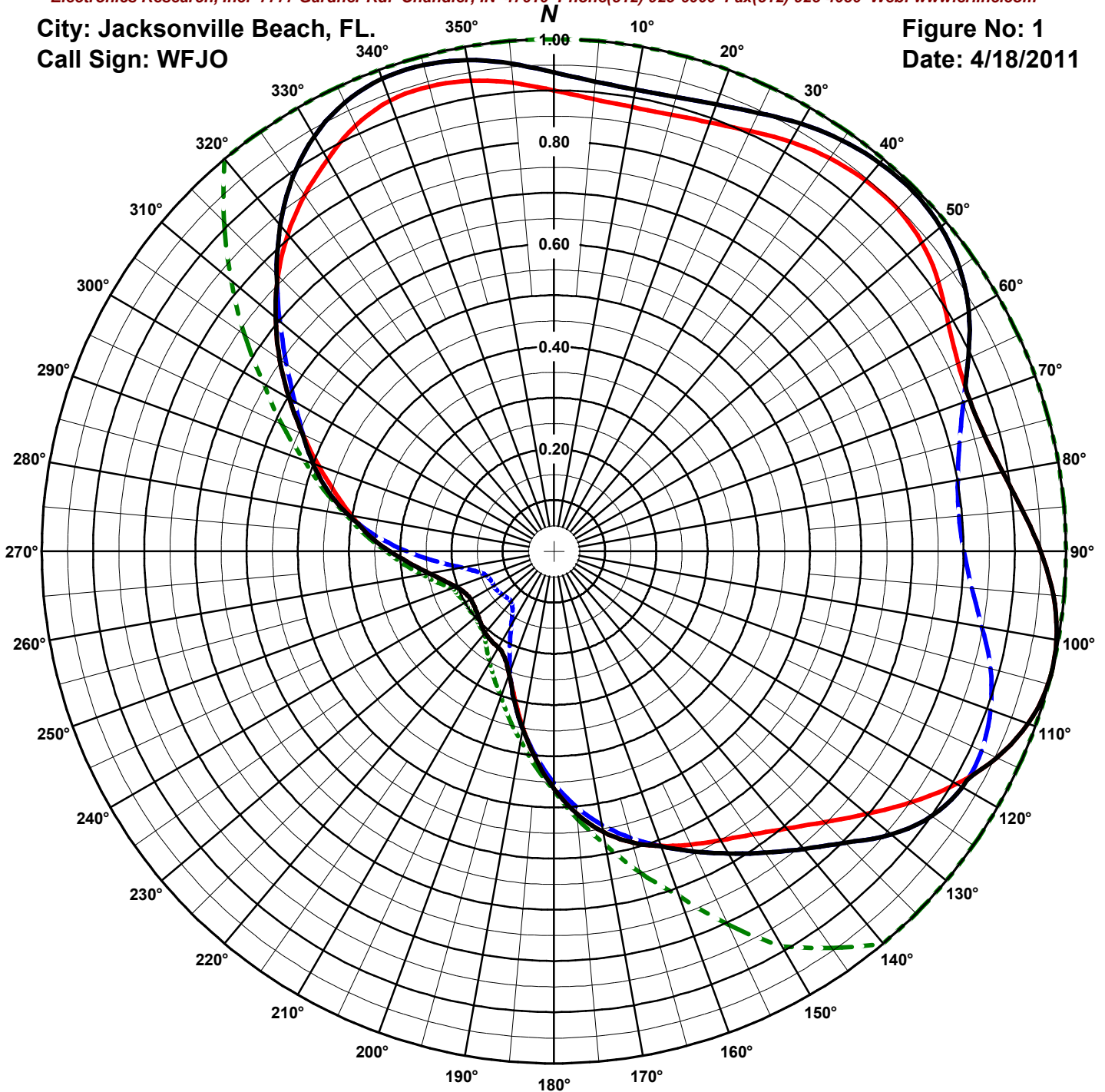
The Microsoft Word document on file electronically at Electronic Research, Inc. governs the specifications, scope, and configuration of the product described. All other representations whether verbal, printed, or electronic are subordinate to the master copy of this document on file at ERI.

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: Jacksonville Beach, FL.
Call Sign: WFJO

Figure No: 1
Date: 4/18/2011



Frequency: 92.5 MHz

Antenna Type: 1092-1CP-DA

Antenna Mounting: Custom

Tower Type: 7' Tower

HORIZONTAL

RMS: .717

Maximum: 1 @ 103°

Minimum: .187 @ 239°

VERTICAL

RMS: .717

Maximum: .993 @ 44°

Minimum: .128 @ 223°

COMPOSITE

RMS: .737

Maximum: 1 @ 103°

Minimum: .187 @ 239°

FCC ENVELOPE

RMS: .799

Maximum: 1 @ 0°

Minimum: .2 @ 230°

Measured patterns of the horizontal and vertical components. The composite pattern shows the maximum of either the H or V azimuth values. This pattern is greater than 85% of the FCC filed composite pattern BMPH-20110215AAI.

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: 4/18/2011

Station: WFJO

Antenna: 1092-1CP-DA

Location: Jacksonville Beach, FL.

Antenna Orientation: 56° True

Frequency: 92.5 MHz

Number of Bays: 1

Azimuth	Envelope			Polarization	Azimuth	Envelope			Polarization
	Field	kW	dBk	Maximum		Field	kW	dBk	Maximum
0°	0.935	1.486	1.721	Vertical	180°	0.464	0.365	-4.374	Horizontal
5°	0.921	1.441	1.588	Vertical	185°	0.407	0.282	-5.503	Horizontal
10°	0.916	1.425	1.538	Vertical	190°	0.351	0.210	-6.787	Vertical
15°	0.919	1.435	1.570	Vertical	195°	0.301	0.154	-8.134	Vertical
20°	0.929	1.466	1.661	Vertical	200°	0.255	0.111	-9.564	Horizontal
25°	0.944	1.516	1.808	Vertical	205°	0.228	0.089	-10.525	Horizontal
30°	0.964	1.580	1.987	Vertical	210°	0.217	0.080	-10.978	Horizontal
35°	0.980	1.632	2.127	Vertical	215°	0.213	0.077	-11.112	Horizontal
40°	0.990	1.665	2.214	Vertical	220°	0.209	0.074	-11.310	Horizontal
45°	0.993	1.676	2.242	Vertical	225°	0.201	0.069	-11.630	Horizontal
50°	0.986	1.651	2.179	Vertical	230°	0.194	0.064	-11.954	Horizontal
55°	0.966	1.588	2.008	Vertical	235°	0.189	0.061	-12.168	Horizontal
60°	0.935	1.487	1.724	Vertical	240°	0.187	0.060	-12.238	Horizontal
65°	0.893	1.355	1.320	Vertical	245°	0.192	0.063	-12.038	Horizontal
70°	0.864	1.269	1.035	Horizontal	250°	0.203	0.070	-11.535	Horizontal
75°	0.871	1.289	1.103	Horizontal	255°	0.222	0.084	-10.775	Horizontal
80°	0.890	1.347	1.292	Horizontal	260°	0.248	0.104	-9.823	Horizontal
85°	0.919	1.434	1.567	Horizontal	265°	0.280	0.134	-8.740	Horizontal
90°	0.951	1.536	1.864	Horizontal	270°	0.320	0.175	-7.581	Horizontal
95°	0.979	1.628	2.118	Horizontal	275°	0.363	0.224	-6.497	Horizontal
100°	0.996	1.688	2.273	Horizontal	280°	0.407	0.282	-5.496	Vertical
105°	0.999	1.697	2.297	Horizontal	285°	0.458	0.356	-4.485	Vertical
110°	0.985	1.650	2.174	Horizontal	290°	0.500	0.426	-3.709	Vertical
115°	0.954	1.547	1.895	Horizontal	295°	0.541	0.497	-3.034	Horizontal
120°	0.921	1.442	1.588	Vertical	300°	0.597	0.605	-2.181	Horizontal
125°	0.901	1.379	1.395	Vertical	305°	0.654	0.727	-1.388	Horizontal
130°	0.860	1.257	0.994	Vertical	310°	0.709	0.855	-0.678	Horizontal
135°	0.805	1.101	0.416	Vertical	315°	0.765	0.996	-0.018	Vertical
140°	0.759	0.979	-0.093	Vertical	320°	0.831	1.175	0.699	Vertical
145°	0.718	0.877	-0.568	Vertical	325°	0.890	1.346	1.290	Vertical
150°	0.681	0.789	-1.030	Vertical	330°	0.936	1.489	1.729	Vertical
155°	0.647	0.711	-1.483	Vertical	335°	0.967	1.588	2.009	Vertical
160°	0.613	0.639	-1.945	Vertical	340°	0.982	1.639	2.144	Vertical
165°	0.588	0.589	-2.302	Horizontal	345°	0.983	1.643	2.156	Vertical
170°	0.557	0.527	-2.785	Horizontal	350°	0.974	1.612	2.073	Vertical
175°	0.515	0.450	-3.467	Horizontal	355°	0.956	1.554	1.915	Vertical

Horizontal Polarization:

Maximum: 0.853 (-0.693 dB)

Horizontal Plane: 0.853 (-0.693 dB)

Maximum ERP: 1.700 kW

Vertical Polarization:

Maximum: 0.840 (-0.755 dB)

Horizontal Plane: 0.840 (-0.755 dB)

Maximum ERP: 1.676 kW

Total Input Power: 1.994 kW

Reference: WFJO2M.FIG

This list shows the the maximum azimuth values of either the horizontal or vertical components.

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: 4/18/2011

Station: WFJO

Antenna: 1092-1CP-DA

Location: Jacksonville Beach, FL.

Antenna Orientation: 56° True

Frequency: 92.5 MHz

Number of Bays: 1

Azimuth	Horizontal			Vertical			Azimuth	Horizontal			Vertical		
	Field	kW	dBk	Field	kW	dBk		Field	kW	dBk	Field	kW	dBk
0°	0.900	1.376	1.387	0.935	1.486	1.721	180°	0.464	0.365	-4.374	0.452	0.348	-4.584
5°	0.887	1.337	1.260	0.921	1.441	1.588	185°	0.407	0.282	-5.503	0.402	0.274	-5.615
10°	0.881	1.319	1.203	0.916	1.425	1.538	190°	0.350	0.208	-6.824	0.351	0.210	-6.787
15°	0.883	1.325	1.222	0.919	1.435	1.570	195°	0.297	0.150	-8.245	0.301	0.154	-8.134
20°	0.891	1.350	1.303	0.929	1.466	1.661	200°	0.255	0.111	-9.564	0.251	0.107	-9.707
25°	0.905	1.394	1.442	0.944	1.516	1.808	205°	0.228	0.089	-10.525	0.204	0.071	-11.485
30°	0.923	1.450	1.612	0.964	1.580	1.987	210°	0.217	0.080	-10.978	0.166	0.047	-13.279
35°	0.938	1.494	1.744	0.980	1.632	2.127	215°	0.213	0.077	-11.112	0.141	0.034	-14.711
40°	0.946	1.521	1.821	0.990	1.665	2.214	220°	0.209	0.074	-11.310	0.130	0.029	-15.444
45°	0.947	1.526	1.835	0.993	1.676	2.242	225°	0.201	0.069	-11.630	0.128	0.028	-15.524
50°	0.938	1.495	1.747	0.986	1.651	2.179	230°	0.194	0.064	-11.954	0.131	0.029	-15.321
55°	0.917	1.428	1.548	0.966	1.588	2.008	235°	0.189	0.061	-12.168	0.134	0.031	-15.137
60°	0.889	1.345	1.287	0.935	1.487	1.724	240°	0.187	0.060	-12.238	0.135	0.031	-15.098
65°	0.871	1.289	1.102	0.893	1.355	1.320	245°	0.192	0.063	-12.038	0.135	0.031	-15.064
70°	0.864	1.269	1.035	0.851	1.231	0.904	250°	0.203	0.070	-11.535	0.140	0.033	-14.781
75°	0.871	1.289	1.103	0.820	1.143	0.581	255°	0.222	0.084	-10.775	0.154	0.040	-13.967
80°	0.890	1.347	1.292	0.801	1.090	0.376	260°	0.248	0.104	-9.823	0.183	0.057	-12.455
85°	0.919	1.434	1.567	0.794	1.072	0.301	265°	0.280	0.134	-8.740	0.229	0.089	-10.506
90°	0.951	1.536	1.864	0.801	1.090	0.372	270°	0.320	0.175	-7.581	0.287	0.140	-8.541
95°	0.979	1.628	2.118	0.819	1.140	0.568	275°	0.363	0.224	-6.497	0.349	0.207	-6.839
100°	0.996	1.688	2.273	0.849	1.224	0.878	280°	0.401	0.273	-5.636	0.407	0.282	-5.496
105°	0.999	1.697	2.297	0.883	1.324	1.219	285°	0.442	0.332	-4.785	0.458	0.356	-4.485
110°	0.985	1.650	2.174	0.908	1.400	1.462	290°	0.489	0.406	-3.913	0.500	0.426	-3.709
115°	0.954	1.547	1.895	0.921	1.443	1.592	295°	0.541	0.497	-3.034	0.541	0.497	-3.037
120°	0.908	1.402	1.468	0.921	1.442	1.588	300°	0.597	0.605	-2.181	0.585	0.581	-2.356
125°	0.854	1.238	0.929	0.901	1.379	1.395	305°	0.654	0.727	-1.388	0.637	0.690	-1.610
130°	0.798	1.082	0.343	0.860	1.257	0.994	310°	0.709	0.855	-0.678	0.699	0.830	-0.811
135°	0.748	0.951	-0.219	0.805	1.101	0.416	315°	0.761	0.986	-0.063	0.765	0.996	-0.018
140°	0.707	0.849	-0.710	0.759	0.979	-0.093	320°	0.808	1.111	0.456	0.831	1.175	0.699
145°	0.675	0.775	-1.107	0.718	0.877	-0.568	325°	0.849	1.224	0.878	0.890	1.346	1.290
150°	0.651	0.721	-1.419	0.681	0.789	-1.030	330°	0.884	1.328	1.232	0.936	1.489	1.729
155°	0.632	0.678	-1.685	0.647	0.711	-1.483	335°	0.917	1.429	1.550	0.967	1.588	2.009
160°	0.612	0.637	-1.957	0.613	0.639	-1.945	340°	0.936	1.491	1.733	0.982	1.639	2.144
165°	0.588	0.589	-2.302	0.579	0.570	-2.441	345°	0.940	1.502	1.766	0.983	1.643	2.156
170°	0.557	0.527	-2.785	0.542	0.500	-3.010	350°	0.933	1.479	1.700	0.974	1.612	2.073
175°	0.515	0.450	-3.467	0.500	0.426	-3.711	355°	0.918	1.433	1.563	0.956	1.554	1.915

Horizontal Polarization:

Maximum: 0.853 (-0.693 dB)

Horizontal Plane: 0.853 (-0.693 dB)

Maximum ERP: 1.700 kW

Vertical Polarization:

Maximum: 0.840 (-0.755 dB)

Horizontal Plane: 0.840 (-0.755 dB)

Maximum ERP: 1.676 kW

Total Input Power: 1.994 kW

Reference: WFJO2M.FIG

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

ERI[®] Vertical 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 No: 3

Call Sign: WFJO

Location: Jacksonville Beach, FL.

Frequency: 92.5 MHz

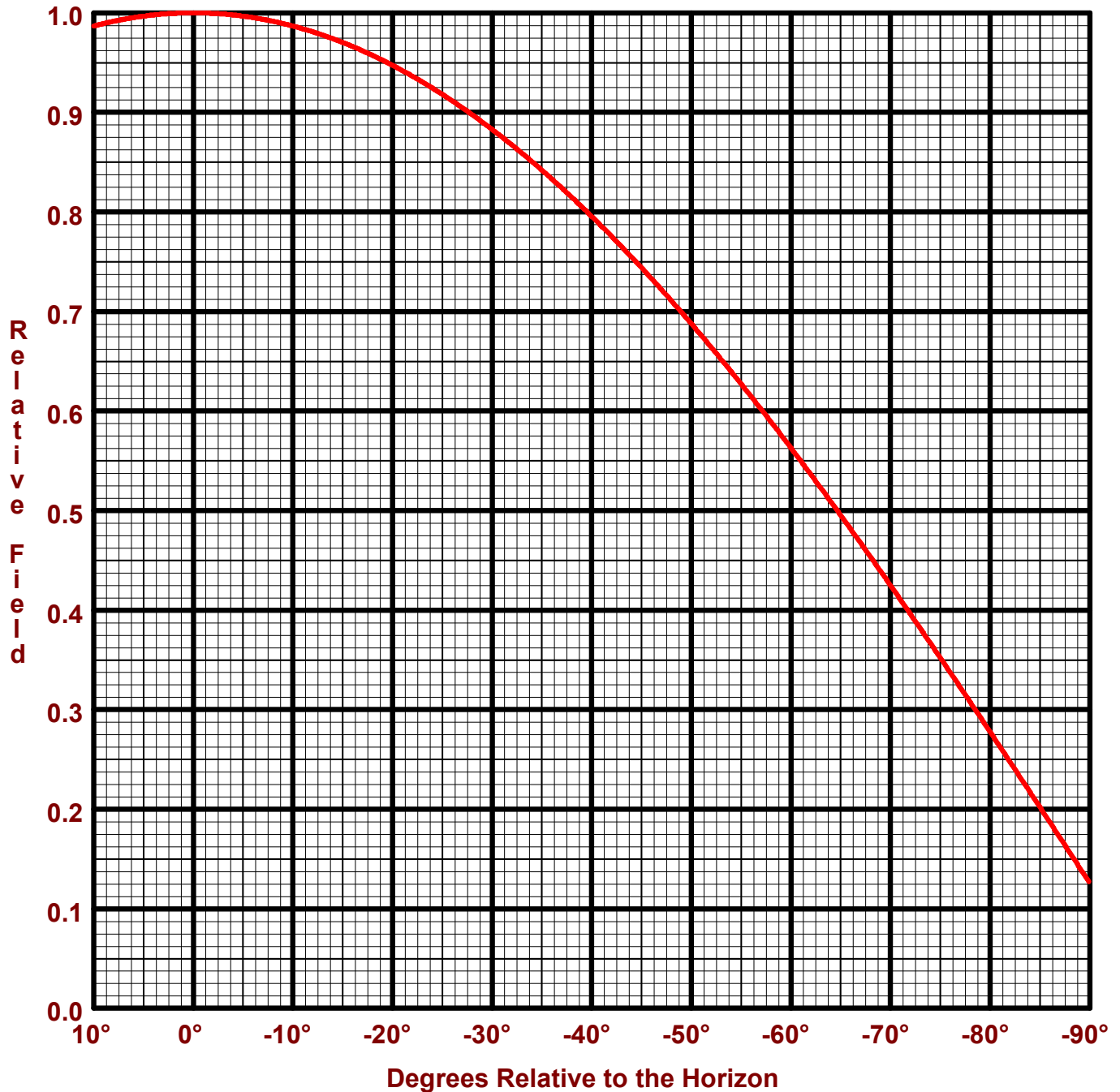
1 bay 1092-1CP-DA antenna

Date: 4/18/2011

1 Wave-length Spacing

0° Beam Tilt

0% First Null Fill



Horizontal Polarization:

Maximum: 0.853 (-0.693 dB)

Horizontal Plane: 0.853 (-0.693 dB)

Maximum ERP: 1.700 kW

Vertical Polarization:

Maximum: 0.840 (-0.755 dB)

Horizontal Plane: 0.840 (-0.755 dB)

Maximum ERP: 1.676 kW

Directional Antenna System for WFJO, Jacksonville Beach, Florida

(Continued)

ANTENNA SPECIFICATIONS

Antenna Type:	1092-1CP-DA
Frequency:	95.5MHz
Number of Bays:	One

MECHANICAL SPECIFICATIONS

Mounting:	Custom
System length:	10 ft
Aperture length required:	20 ft
Orientation:	56° true
Input flange to the antenna 1 5/8" female.	

ELECTRICAL SPECIFICATIONS (For directional use)

Maximum horizontal ERP:	1.700 kW (2.304 dBk)
Horizontal maximum power gain:	0.853 (-0.693 dB)
Maximum vertical ERP:	1.676 kW (2.243 dBk)
Vertical maximum power gain:	0.840 (-0.755 dB)
Total input power:	1.994 kW (2.997 dBk)

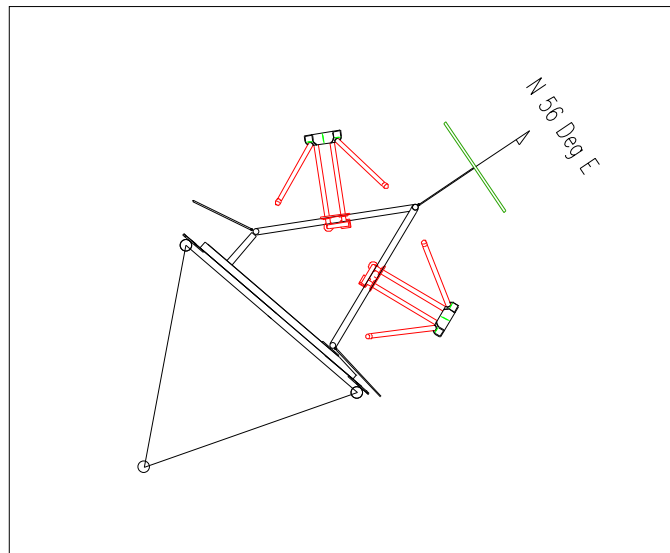


Exhibit B

ADVANCED LAND SURVEYING AND MAPPING, INC.

GPS And Conventional Survey Services


ANTENNA INSTALLATION CERTIFICATION Project No: 108-0189 WFJO Site

Date: May 31, 2011

WFJO/Straight Way Radio
Attn: Chris McMurray
9090 Hogan Road
Jacksonville, Florida 32216

RE: **WFJO Site**
Located at : 8541 Newton Road
Jacksonville, Florida 32216

On May 31st, 2011 Advanced Land Surveying and Mapping, Inc. located the installed Electronics Research, Inc. Model 1092-CP-DA antenna panels for WFJO located at 8541 Newton Road Jacksonville, Florida 32216. We have confirmed that per the construction drawings provided the mounting bar for elements "A" and "B" should have a direction of N 81° E of True North. We have found this to be N 81° E of True North, with an error of less than 1°.



Kirk B. Mitchell P.S.M.
Florida Professional Land Surveyor No. 5682
Certificate of Authorization No. L.B. 6885
NOT VALID WITHOUT THE SIGNATURE AND ORIGINAL RAISED
SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER.

P.O. Box 560698
Orlando, FL 32856-0698

Phone: (407) 509-2305
Fax: (407) 233-0579

**Goldman Engineering Management
Dallas, Texas.**

WFJO (FM)- EXHIBIT C

Engineering Certification, WFJO Directional Antenna System
Pursuant to BMPH-20110602ABX

June 13, 2011

This is a certification that the WFJO directional antenna system as authorized in BMPH-20110602ABX was installed properly and following the instructions provided by ERI Electronics, the manufacturer of the directional antenna.

The antenna was installed under my direct supervision and to the best of my knowledge and belief, the antenna is in full compliance with the instructions and diagrams as provided by ERI for the model 1092-1CP-DA directional antenna and to the best of my knowledge the installation complies with the terms of the construction permit.

I certify that the above is true and accurate. My qualifications are a matter of record with the commission.

Sincerely

A handwritten signature in cursive script, appearing to read "Bertram S. Goldman".

Bertram S. Goldman

Exhibit D

WFJO Community of License Theoretical Vs. Measured Antenna Pattern

