

Law Offices
Putbrese Hunsaker & Trent, P.C.

A Professional Corporation
200 S. Church Street
Woodstock, Virginia 22664

Tel: (540) 459-7646
Fax: (540) 459-7656
Website:
www.phtpclaw.com

John C. Trent

Of Counsel:

Cary S. Tepper*

Keith E. Putbrese (Retired)

David M. Hunsaker

(1944-2002)

*Not Admitted in Virginia

July 27, 2021

Via E-mail Only

Marlene H. Dortch, Secretary
Federal Communications Commission
45 L. Street NE
Washington DC 20554

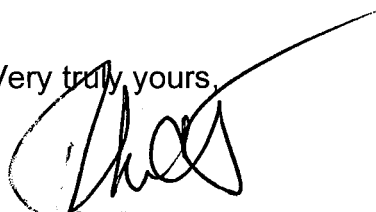
Re: Radio Station WJYM (AM), Bowling Green, Ohio (FAC# 31170)
FCC Form 302-AM Proof of Performance - Moment of Method
Proof Application

Dear Madam Secretary:

On behalf of Family Worship Center Church, Inc., the Licensee of Radio Station WJYM (AM), Bowling Green, Ohio ("WJYM") please find attached hereto an FCC Form 302-AM Moment of Method Proof Application. This submission is required as a result of the installation of Licensee's new FM Translator W295DB on one of WJYM towers. Please take note that this Application is FEE EXEMPT and as such is being filed thru the Office of the Secretary.

Should there be any questions regarding this submission, please contact this Office at (540) 459-7646.

Very truly yours,



John C. Trent

Enclosure

cc w/enc: Nazifa Sawez, Assistant Chief, FCC Audio Division

FOR
FCC
USE
ONLY

FCC 302-AM
APPLICATION FOR AM
BROADCAST STATION LICENSE

(Please read instructions before filling out form.)

FOR COMMISSION USE ONLY

FILE NO.

SECTION I - APPLICANT FEE INFORMATION

1. PAYOR NAME (Last, First, Middle Initial)

Family Worship Center Church, Inc.

MAILING ADDRESS (Line 1) (Maximum 35 characters)

8919 World Ministry Avenue

MAILING ADDRESS (Line 2) (Maximum 35 characters)

P.O. Box 262550

CITY

Baton Rouge

STATE OR COUNTRY (if foreign address)

LA

ZIP CODE

70810

TELEPHONE NUMBER (include area code)

(225) 768-3102

CALL LETTERS

WJYM

OTHER FCC IDENTIFIER (If applicable)

31170

2. A. Is a fee submitted with this application?

☐

Yes

☒

No

B. If No, indicate reason for fee exemption (see 47 C.F.R. Section

☐

Governmental Entity

☒

Noncommercial educational licensee

☐

Other (Please explain):

C. If Yes, provide the following information:

Enter in Column (A) the correct Fee Type Code for the service you are applying for. Fee Type Codes may be found in the "Mass Media Services Fee Filing Guide." Column (B) lists the Fee Multiple applicable for this application. Enter fee amount due in Column (C).

(A)

FEE TYPE CODE		

(B)

FEE MULTIPLE			
0	0	0	1

(C)

FEE DUE FOR FEE TYPE CODE IN COLUMN (A)
\$ N/A

FOR FCC USE ONLY

--

To be used only when you are requesting concurrent actions which result in a requirement to list more than one Fee Type Code.

(A)

--	--	--

(B)

0	0	0	1
---	---	---	---

(C)

\$ N/A

FOR FCC USE ONLY

--

ADD ALL AMOUNTS SHOWN IN COLUMN C,
AND ENTER THE TOTAL HERE.
THIS AMOUNT SHOULD EQUAL YOUR ENCLOSED
REMITTANCE.

TOTAL AMOUNT
REMITTED WITH THIS
APPLICATION

\$ N/A

FOR FCC USE ONLY

--

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT Family Worship Center Church, Inc.		
MAILING ADDRESS 8919 World Ministry Ave, P.O. Box 262550Baton Rouge		
CITY Baton Rouge	STATE LA	ZIP CODE 70810

2. This application is for:

- ☐ Commercial
 ☒ Noncommercial
☒ AM Directional
 ☐ AM Non-Directional

Call letters WJYM	Community of License Bowling Green, OH	Construction Permit File No. N/A	Modification of Construction Permit File No(s). N/A	Expiration Date of Last Construction Permit N/A
----------------------	---	-------------------------------------	---	---

3. Is the station now operating pursuant to automatic program test authority in accordance with 47 C.F.R. Section 73.1620?

☐ Yes ☐ No

If No, explain in an Exhibit.

Exhibit No.
N/A

4. Have all the terms, conditions, and obligations set forth in the above described construction permit been fully met?

☐ Yes ☐ No

If No, state exceptions in an Exhibit.

Exhibit No.
N/A

5. Apart from the changes already reported, has any cause or circumstance arisen since the grant of the underlying construction permit which would result in any statement or representation contained in the construction permit application to be now incorrect?

☐ Yes ☐ No

If Yes, explain in an Exhibit.

Exhibit No.
N/A

6. Has the permittee filed its Ownership Report (FCC Form 323) or ownership certification in accordance with 47 C.F.R. Section 73.3615(b)?

☐ Yes ☐ No

☒ Does not apply

If No, explain in an Exhibit.

Exhibit No.

7. Has an adverse finding been made or an adverse final action been taken by any court or administrative body with respect to the applicant or parties to the application in a civil or criminal proceeding, brought under the provisions of any law relating to the following: any felony; mass media related antitrust or unfair competition; fraudulent statements to another governmental unit; or discrimination?

☐ Yes ☒ No

If the answer is Yes, attach as an Exhibit a full disclosure of the persons and matters involved, including an identification of the court or administrative body and the proceeding (by dates and file numbers), and the disposition of the litigation. Where the requisite information has been earlier disclosed in connection with another application or as required by 47 U.S.C. Section 1.65(c), the applicant need only provide: (i) an identification of that previous submission by reference to the file number in the case of an application, the call letters of the station regarding which the application or Section 1.65 information was filed, and the date of filing; and (ii) the disposition of the previously reported matter.

Exhibit No.

8. Does the applicant, or any party to the application, have a petition on file to migrate to the expanded band (1605-1705 kHz) or a permit or license either in the existing band or expanded band that is held in combination (pursuant to the 5 year holding period allowed) with the AM facility proposed to be modified herein?

☐ Yes ☒ No

If Yes, provide particulars as an Exhibit.

Exhibit No.

The APPLICANT hereby waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because use of the same, whether by license or otherwise, and requests and authorization in accordance with this application. (See Section 304 of the Communications Act of 1934, as amended).

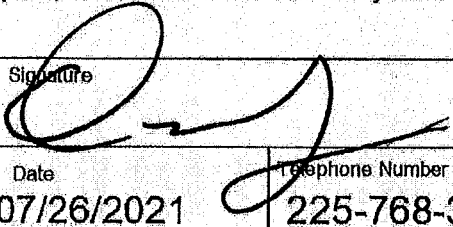
The APPLICANT acknowledges that all the statements made in this application and attached exhibits are considered material representations and that all the exhibits are a material part hereof and are incorporated herein as set out in full in

CERTIFICATION

1. By checking Yes, the applicant certifies, that, in the case of an individual applicant, he or she is not subject to a denial of federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. Section 862, or, in the case of a non-individual applicant (e.g., corporation, partnership or other unincorporated association), no party to the application is subject to a denial of federal benefits that includes FCC benefits pursuant to that section. For the definition of a "party" for these purposes, see 47 C.F.R. Section 1.2002(b).

☒ Yes ☐ No

2. I certify that the statements in this application are true, complete, and correct to the best of my knowledge and belief, and are made in good faith.

Name Donnie Swaggart	Signature 	
Title Vice President	Date 07/26/2021	Telephone Number 225-768-3102

WILLFUL FALSE STATEMENTS ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION

FCC NOTICE TO INDIVIDUALS REQUIRED BY THE PRIVACY ACT AND THE PAPERWORK REDUCTION ACT

The solicitation of personal information requested in this application is authorized by the Communications Act of 1934, as amended. The Commission will use the information provided in this form to determine whether grant of the application is in the public interest. In reaching that determination, or for law enforcement purposes, it may become necessary to refer personal information contained in this form to another government agency. In addition, all information provided in this form will be available for public inspection. If information requested on the form is not provided, the application may be returned without action having been taken upon it or its processing may be delayed while a request is made to provide the missing information. Your response is required to obtain the requested authorization.

Public reporting burden for this collection of information is estimated to average 639 hours and 53 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, can be sent to the Federal Communications Commission, Records Management Branch, Paperwork Reduction Project (3060-0627), Washington, D. C. 20554. Do NOT send completed forms to this address.

THE FOREGOING NOTICE IS REQUIRED BY THE PRIVACY ACT OF 1974, P.L. 93-579, DECEMBER 31, 1974, 5 U.S.C. 552a(e)(3), AND THE PAPERWORK REDUCTION ACT OF 1980, P.L. 96-511, DECEMBER 11, 1980, 44 U.S.C. 3507.

SECTION III - LICENSE APPLICATION ENGINEERING DATA

Name of Applicant

Family Worship Center Church, Inc.

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)



Station License



Direct Measurement of Power

Moment Method Proof

1. Facilities authorized in construction permit

Call Sign	File No. of Construction Permit (if applicable)	Frequency (kHz)	Hours of Operation	Power in kilowatts	
WJYM		730	Unlimited	Night 1.0 kW	Day 0.359 kW

2. Station location

State Ohio	City or Town Bowling Green
---------------	-------------------------------

3. Transmitter location

State OH	County Wood	City or Town Perrysburg	Street address (or other identification) 8761 Fremont Pike Rd.
-------------	----------------	----------------------------	--

4. Main studio location

State LA	County East Baton Rouge	City or Town Baton Rouge	Street address (or other identification) 8919 World Ministry Ave.
-------------	----------------------------	-----------------------------	---

5. Remote control point location (specify only if authorized directional antenna)

State LA	County East Baton Rouge	City or Town Baton Rouge	Street address (or other identification) 8919 World Ministry Ave.
-------------	----------------------------	-----------------------------	---

6. Has type-approved stereo generating equipment been installed?



Yes



No

7. Does the sampling system meet the requirements of 47 C.F.R. Section 73.68?



Yes



No



Not Applicable

Attach as an Exhibit a detailed description of the sampling system as installed.

Exhibit No.
See Ex 2.10

8. Operating constants:

RF common point or antenna current (in amperes) without modulation for night system 2.79 amperes		RF common point or antenna current (in amperes) without modulation for day system 4.65 amperes	
Measured antenna or common point resistance (in ohms) at operating frequency Night 50 ohms	Day 50 ohms	Measured antenna or common point reactance (in ohms) at operating frequency Night -j5 ohms	Day -j5 ohms

Antenna indications for directional operation

Towers WJYM Twr#/FCC Twr#/ASR	Antenna monitor Phase reading(s) in degrees		Antenna monitor sample current ratio(s)		Antenna base currents	
	Night	Day	Night	Day	Night	Day
T1(NE) / T4 / ASR 1247091	109.7	109.7	0.929	0.929	N/A	N/A
T2(SE) / T3 / ASR 1247090	0.0	0.0	1.000	1.000	N/A	N/A
T3(SW) / T1 / ASR 1247089	5.7	5.7	0.849	0.849	N/A	N/A
T4(NW) / T2 / ASR 1247092	116.9	116.9	0.987	0.987	N/A	N/A

Manufacturer and type of antenna monitor:

Potomac Instruments AM-19D (210)

SECTION III - Page 2

9. Description of antenna system ((f directional antenna is used, the information requested below should be given for each element of the array. Use separate sheets if necessary.)

Type Radiator Uniform Cross Section Steel Towers mounted on base piers and insulators	Overall height in meters of radiator above base insulator, or above base, if grounded. (T1-4) - 86.7	Overall height in meters above ground (without obstruction lighting) (T1-4) - 87.2	Overall height in meters above ground (include obstruction lighting) (T1-4) - 88.1	If antenna is either top loaded or sectionalized, describe fully in an Exhibit. <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">Exhibit No.</div>
---	--	---	---	---

Excitation ☒ Series ☐ Shunt

Geographic coordinates to nearest second. For directional antenna give coordinates of center of array. For single vertical radiator give tower location.

North Latitude 41 ° 31 ' 57 "	West Longitude 83 ° 33 ' 55 "
-------------------------------	-------------------------------

If not fully described above, attach as an Exhibit further details and dimensions including any other antenna mounted on tower and associated isolation circuits.

Exhibit No.

Also, if necessary for a complete description, attach as an Exhibit a sketch of the details and dimensions of ground system.

Exhibit No.
See Discussion

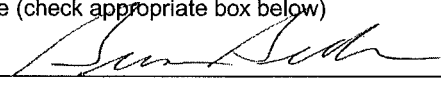
10. In what respect, if any, does the apparatus constructed differ from that described in the application for construction permit or in the permit?

MOM proof of Performance and Exhibits to relicense the existing directional array of WJYM.

11. Give reasons for the change in antenna or common point resistance.

N/A

I certify that I represent the applicant in the capacity indicated below and that I have examined the foregoing statement of technical information and that it is true to the best of my knowledge and belief.

Name (Please Print or Type) Bruce Bellamy	Signature (check appropriate box below) 
Address (include ZIP Code) P.O. Box 220 Coldwater, MI 49036	Date 07/21/2021
	Telephone No. (Include Area Code) 517.278.7339

☐ Technical Director

☐ Registered Professional Engineer

☐ Chief Operator

☒ Technical Consultant

☐ Other (specify)

**MOMENT METHOD ANTENNA
PROOF OF PERFORMANCE**

WJYM – Bowling Green, OH

Facility ID # 31170

July 2021

COPYRIGHT 2021

MUNN-REESE

Broadcast Engineering Consultants
Coldwater, MI 49036

Table of Contents

Certification of Engineers

Discussion of Report

Exhibit 1.10 – Moment Method Modeling Data Summary Sheet

Exhibit 1.11 – FCC Tower 1 – SW – WJYM Tower 3 Model

Exhibit 1.12 – FCC Tower 2 – NW – WJYM Tower 4 Model

Exhibit 1.13 – FCC Tower 3 – SE – WJYM Tower 2 Model

Exhibit 1.14 – FCC Tower 4 – NE – WJYM Tower 1 Model

Exhibit 1.20 – Moment Method Array Parameter Sheet

Exhibit 1.21 – Moment Method Day Pattern Tabulation

Exhibit 1.22 – Moment Method Day Pattern Plot

Exhibit 2.10 – Sample System Verification

Exhibit 3.10 – Field Strength Measurement Reference Points

MUNN-REESE

Broadcast Engineering Consultants
Coldwater, MI 49036

CERTIFICATION OF ENGINEERS

The firm of Munn-Reese, Broadcast Engineering Consultants, with offices at 385 Airport Drive, Coldwater, Michigan, has been retained for the purpose of preparing the technical data forming this report.


Some of the data utilized in this report was taken from the FCC Secondary Database and data on file. While this information is believed accurate, errors or omissions in the database and file data are possible. This firm may not be held liable for damages as a result of such data errors or omissions. Other data utilized in this report is based on field measurements and/or observations made by the undersigned, or others under the supervision of the undersigned.


The report has been prepared by properly trained electronics specialists under the direction of the undersigned whose qualifications are a matter of record before the Federal Communications Commission.


I declare under penalty of the laws of perjury that the contents of this report are true and accurate to the best of my knowledge and belief.


MUNN-REESE

385 Airport Drive, PO Box 220
Coldwater, Michigan 49036
Telephone: 517-278-7339

By 
Richard Grzebiak, Staff Engineer

By 
Donald J. Baad, Staff Engineer

By 
Edmond R. Trombley, Staff Engineer

By 
Bruce Bellamy, Owner/Engineer

Discussion of Report

The Broadcast Engineering Consulting firm of Munn-Reese was retained to prepare an Antenna Proof of Performance under the Moment Method rules found in §73.151(c). This report supplies technical support for an application to relicense the existing WJYM, Bowling Green, OH (Facility ID # 31170) directional array under the new Moment Method rules. WJYM uses a four tower directional array operating at 1.0 kW during daytime hours. During nighttime hours the power is reduced to 0.359 kW using the same towers and parameters. Therefore, only the day pattern needs to be modeled and proofed.

WJYM recently replaced the Southwest tower to accommodate the mounting of an FM translator antenna. The new tower has a face of 24 inches. The other towers use an 18 inch face. The replacement tower was installed in the exact location of the previous tower. No changes were made to the geometry of the array. Therefore, a post construction survey is not required. The existing phasing and coupling equipment was not replaced but the existing sample loops were removed from the towers and toroidal current sampling transformers were installed at the output of each antenna tuning unit. No changes are requested in either the theoretical pattern or the theoretical parameters.

A point of clarification needs to be made about conflicting methods of numbering the towers in the WJYM array. The theoretical pattern and parameters listed in the FCC records use a different system of numbering the towers than has historically been used at the WJYM site. To provide clarification, the following chart is offered. In addition, many of the exhibits include "FCC Twr" and "WJYM Twr" numbers along with a location designation. In general, the modeling was performed using the FCC theoretical numbers. Measurements involving the sampling system were made using the WJYM tower numbers that the licensee is accustomed to using.

FCC Tower #	Location	WJYM Tower #
1	SW	3
2	NW	4
3	SE	2 (Ref)
4	NE	1

Self-impedance measurements were made at each tower with the other towers "floating" in an open circuit configuration as set forth in §73.151(c)(1). Measurements were made using an HP 8753C Network Analyzer with the Tunwall Radio Directional Couplers designed for AM measurements. The measurements were made at the output of each ATU. This output point was opened to "float" the unused towers. The results of these measurements are shown in **Exhibit 1.10**, along with the dimensions of the individual towers.

A capacitance of approximately 50 pf was used to represent the base insulators and any stray capacitance near each tower base. At 730 kHz this represents a shunt reactance of $-j 4360$ ohms. WJYM employs an LBA Cami 500 isolation coil across the

Discussion of Report

base insulator of the southwest tower (FCC Tower 1 – WJYM Tower 3) for the FM translator antenna mounted on the tower. LBA lists the AM impedance of this device as at least 2000 ohms. This minimum reactance of 2000 ohms placed in parallel with the base insulator shunt reactance creates a total shunt reactance of $+j\ 3695$ at this tower.

Au Contraire ACS Model software, Version 1.030, was used for the modeling. Individual printouts are shown for the modeling of each tower in **Exhibits 1.11 - 1.14**. The base impedance predicted by the Mininec based software was adjusted by first combining the predicted base impedance with the assumed parallel shunt reactance and then adding the assumed series reactance to represent the series path between the base of the tower and the ATU output. The results of these calculations are shown in the "Adjusted Model" columns of **Exhibit 1.10**. The circuit diagram and formulas used to calculate these adjusted values are shown at the end of the exhibit.

The predicted self impedance values were calibrated by altering the tower dimensions of the model within the limitations described in §73.151(c)(1)(i)-(ix). The "Model Check" portion of **Exhibit 1.10** confirms that each adjusted model is within the dimensional limitations. These cells are conditionally formatted to show green when the dimensions are within the limits and red when the limits are exceeded. The model for each tower was adjusted until the base resistance and reactance predicted by the moment method software adjusted for the assumed shunt and series reactance matched the measured data within the ± 2 ohms and ± 4 percent specified in §73.151(c)(2)(ii). The resulting values are shown in the "Adjusted Model" columns of **Exhibit 1.10**. These cells have also been conditionally formatted to indicate the acceptability of the predicted values.

The modeled tower parameters were used, along with the theoretical field parameters, to generate predicted drive points and base parameters using the moment method software as specified in §73.151(c)(2)(i). The computed data for the existing pattern is shown in **Exhibit 1.20**. The predicted base current and phases were adjusted to reflect the presence of the assumed shunt reactance at each tower. These adjusted values are shown in the "ATU Output" column of **Exhibit 1.20**. The "ATU Output" magnitudes and phases were normalized to produce the "Mininec Model" "Ratio" and "Phase" parameters shown in the upper middle portion of the exhibit. These are the operating parameters used on Form 302-AM. A supporting exhibit of the modeled pattern tabulation is shown in **Exhibit 1.21**. A polar plot of the modeled pattern has also been included in **Exhibit 1.22**.

Since this Moment Method proof is being filed to relicense an existing array, and no changes are requested in the theoretical pattern, WJYM qualifies for the exemption from a post construction survey as clarified in Public Notice DA 09-2340 (released October 29, 2009).

Exhibit 2.10 shows the details of the sample system. The sample lines are Cablewave FCC 12-50J cable. This cable is listed with a velocity factor of 0.88. When the field engineers measured the open circuit phase delay of these lines in accordance with

Discussion of Report

§73.151(c)(2)(i), they found the "Maximum Deviation" between the longest and shortest lines was 1.59° . After adjusting the line lengths, the "Maximum Deviation" was reduced to 0.31° which is within the permitted tolerance.

The open circuit impedance of each line was also measured using the procedure described in §73.151(c)(2)(i). Good agreement was found, and the measured values, shown in **Exhibit 2.10**, are within the two ohm tolerance.

The Delta TCT-3 current sensing transformers were removed from the ATU panels and compared using the network analyzer. The results of these measurements are also shown in **Exhibit 2.10**. The magnitudes and phases were within the tolerances specified by the manufacturer. These cells have also been conditionally formatted to indicate the acceptability of the measured values.

As a final step, the impedance of each sample line was again measured from the antenna monitor end with the sample transformer attached at the ATU end. The results are also shown in **Exhibit 2.10**.

WJYM uses a Potomac Instruments Model AM-19D (210) digital antenna monitor. Field Engineer Richard P. Grzebik checked the calibration using a "T" connector with equal length cables to confirm the other tower inputs had a Ratio of 1.000 and a Phase of 0° when fed the same signal as the reference tower.

Munn-Reese Field Engineers Richard P. Grzebik and Edmond R. Trombley tuned the array to the parameters generated by the moment method modeling software. The common point impedance for the array was maintained at 50 ohms resistance and -j 5 ohms reactance.

§73.151(c)(3) calls for the establishment of field strength measurement reference points along each pattern maxima and minima. These are shown in **Exhibit 3.10**. Each point includes the measured field strength value, the distance (in km) from the array, the NAD83 geographic coordinates and a brief description of the location.

The modeling of the arrays was performed by Donald J. Baad, Staff Engineer with this office. Field work was performed by and under the direction of Richard P. Grzebik and Edmond R. Trombley, Field and Staff Engineers with this office. Assistance was provided by Tyson Evans who is an employee of WJYM, Tony Evans and Ken Zuercher who are Contract Engineers for WJYM.

Moment Method Modeling Data Summary Sheet

WJYM - Bowling Green, OH

Modeling Software: Au Contraire - Version 1.030

Station: WJYM - Bowling Green, OH

Freq (kHz) 730

Self-Impedances:

Measured

FCC Twr #	Open R	X	Electrical Ht (°)	Number of Faces	Face Width (in)	Equiv Radius (m)	WJYM Twr #
1 (SW)	37.35	-8.04	76°	3	24	0.2911	3 (SW)
2 (NW)	33.18	13.19	76°	3	18	0.2183	4 (NW)
3 (SE)	30.19	10.96	76°	3	18	0.2183	2 (SE)
4 (NE)	30.64	7.83	76°	3	18	0.2183	1 (NE)

Model Check

FCC Twr #	Adjusted Ht(°)	Radius(m)	Number Segments
1 (SW)	85.0°	0.2387	20
2 (NW)	84.0°	0.2183	20
3 (SE)	82.0°	0.2183	20
4 (NE)	83.0°	0.2183	20

FCC Twr #	Mininec R	X	Shunt X	Series X	Adjusted Model R	X
1 (SW)	33.81	-8.31	3695	2.0	33.96	-6.02
2 (NW)	32.82	-14.33	-4360	28.0	32.60	13.47
3 (SE)	30.20	-25.85	-4360	37.0	29.85	11.09
4 (NE)	31.32	-20.20	-4360	28.0	31.03	7.67

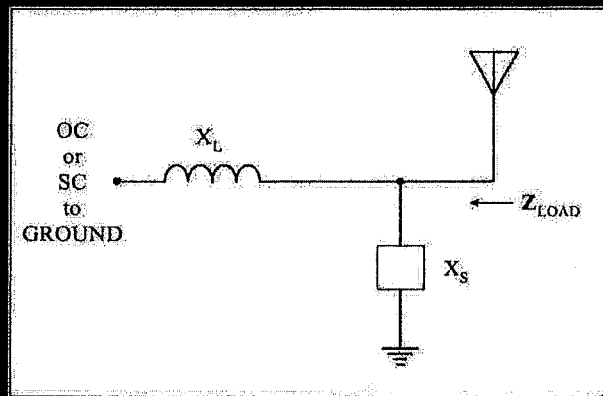
Munn-Reese

Broadcast Engineering Consultants
Coldwater, MI 49036

Moment Method Modeling Data Summary Sheet

WJYM - Bowling Green, OH

Added Series Inductance and Shunt Reactance Bases Open and Shorted



Added Series Inductance and Shunt Reactance Base Impedance Formulas

$$Z_{BASE} = R_B + jX_B$$

$$Z_{ATU} = R_A + jX_A$$

X_S = Shunt Reactance

X_L = Inductive Series Reactance

$$R_A = R_B X_S^2 / (R_B^2 + (X_B + X_S)^2)$$

$$X_A = +jX_S (R_B^2 + X_B^2 + X_B X_S) / (R_B^2 + (X_B + X_S)^2) + jX_L$$

Munn-Reese

Broadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.11
FCC Tower 1 – SW – WJYM Tower 3

 ACSModel
 (MININEC 3.1 Core)
 07-08-2021 09:08:26

WJYM-Day Array

Frequency = 0.730 MHz Wavelength = 410.68492 Meters

No. of Wires: 4

Wire No.	Coordinates	End	No. of
X	Y	Connection	Segments
0	0	-1	
0	0	0	20
Wire No. 2	Coordinates	End	No. of
X	Y	Connection	Segments
66.67966	53.61182	-2	
66.67966	53.61182	0	20
Wire No. 3	Coordinates	End	No. of
X	Y	Connection	Segments
-124.6463	197.7864	-3	
-124.6463	197.7864	0	20
Wire No. 4	Coordinates	End	No. of
X	Y	Connection	Segments
-57.99663	251.211	-4	
-57.99663	251.211	0	20

**** ANTENNA GEOMETRY ****

Wire No.	Coordinates	Radius	Connection	Pulse
X	Y	Z	End1 End2	No.
0	0	0	-1 1	1
0	0	4.848363	1 1	2
0	0	9.696727	1 1	3
0	0	14.54509	1 1	4
0	0	19.39345	1 1	5
0	0	24.24182	1 1	6
0	0	29.09018	1 1	7
0	0	33.93855	1 1	8
0	0	38.78691	1 1	9
0	0	43.63527	1 1	10
0	0	48.48363	1 1	11
0	0	53.332	1 1	12
0	0	58.18036	1 1	13
0	0	63.02872	1 1	14
0	0	67.87709	1 1	15
0	0	72.72545	1 1	16
0	0	77.57381	1 1	17
0	0	82.42218	1 1	18
0	0	87.27055	1 1	19
0	0	92.11891	1 0	20

Munn-Reese
 Broadcast Engineering Consultants
 Coldwater, MI 49036

Exhibit 1.11
FCC Tower 1 – SW – WJYM Tower 3

Wire No.	2	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
66.67966		53.61182	0	0.2183	-2	2	21
66.67966		53.61182	4.791324	0.2183	2	2	22
66.67966		53.61182	9.582648	0.2183	2	2	23
66.67966		53.61182	14.37397	0.2183	2	2	24
66.67966		53.61182	19.1653	0.2183	2	2	25
66.67966		53.61182	23.95662	0.2183	2	2	26
66.67966		53.61182	28.74795	0.2183	2	2	27
66.67966		53.61182	33.53927	0.2183	2	2	28
66.67966		53.61182	38.33059	0.2183	2	2	29
66.67966		53.61182	43.12192	0.2183	2	2	30
66.67966		53.61182	47.91324	0.2183	2	2	31
66.67966		53.61182	52.70457	0.2183	2	2	32
66.67966		53.61182	57.49589	0.2183	2	2	33
66.67966		53.61182	62.28721	0.2183	2	2	34
66.67966		53.61182	67.07854	0.2183	2	2	35
66.67966		53.61182	71.86986	0.2183	2	2	36
66.67966		53.61182	76.66119	0.2183	2	2	37
66.67966		53.61182	81.45251	0.2183	2	2	38
66.67966		53.61182	86.24384	0.2183	2	2	39
66.67966		53.61182	91.03516	0.2183	2	0	40

Wire No.	3	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-124.6463		197.7864	0	0.2183	-3	3	41
-124.6463		197.7864	4.677245	0.2183	3	3	42
-124.6463		197.7864	9.35449	0.2183	3	3	43
-124.6463		197.7864	14.03174	0.2183	3	3	44
-124.6463		197.7864	18.70898	0.2183	3	3	45
-124.6463		197.7864	23.38622	0.2183	3	3	46
-124.6463		197.7864	28.06347	0.2183	3	3	47
-124.6463		197.7864	32.74072	0.2183	3	3	48
-124.6463		197.7864	37.41796	0.2183	3	3	49
-124.6463		197.7864	42.09521	0.2183	3	3	50
-124.6463		197.7864	46.77245	0.2183	3	3	51
-124.6463		197.7864	51.4497	0.2183	3	3	52
-124.6463		197.7864	56.12694	0.2183	3	3	53
-124.6463		197.7864	60.80419	0.2183	3	3	54
-124.6463		197.7864	65.48143	0.2183	3	3	55
-124.6463		197.7864	70.15868	0.2183	3	3	56
-124.6463		197.7864	74.83592	0.2183	3	3	57
-124.6463		197.7864	79.51317	0.2183	3	3	58
-124.6463		197.7864	84.19041	0.2183	3	3	59
-124.6463		197.7864	88.86765	0.2183	3	0	60

Wire No.	4	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-57.99663		251.211	0	0.2183	-4	4	61
-57.99663		251.211	4.734284	0.2183	4	4	62
-57.99663		251.211	9.468569	0.2183	4	4	63
-57.99663		251.211	14.20285	0.2183	4	4	64
-57.99663		251.211	18.93714	0.2183	4	4	65
-57.99663		251.211	23.67142	0.2183	4	4	66
-57.99663		251.211	28.40571	0.2183	4	4	67

Exhibit 1.11**FCC Tower 1 – SW – WJYM Tower 3**

-57.99663	251.211	33.13999	0.2183	4	4	68
-57.99663	251.211	37.87428	0.2183	4	4	69
-57.99663	251.211	42.60856	0.2183	4	4	70
-57.99663	251.211	47.34285	0.2183	4	4	71
-57.99663	251.211	52.07713	0.2183	4	4	72
-57.99663	251.211	56.81141	0.2183	4	4	73
-57.99663	251.211	61.5457	0.2183	4	4	74
-57.99663	251.211	66.27998	0.2183	4	4	75
-57.99663	251.211	71.01427	0.2183	4	4	76
-57.99663	251.211	75.74855	0.2183	4	4	77
-57.99663	251.211	80.48283	0.2183	4	4	78
-57.99663	251.211	85.21712	0.2183	4	4	79
-57.99663	251.211	89.95141	0.2183	4	0	80

Sources: 1

Pulse No., Voltage Magnitude, Phase (Degrees): 1, 1.0, 0.0

Number of Loads: 3

Pulse No., Resistance, Reactance: 21 , 0 , -4360

Pulse No., Resistance, Reactance: 41 , 0 , -4360

Pulse No., Resistance, Reactance: 61 , 0 , -4360

***** SOURCE DATA *****

Pulse 1 Voltage = (1.0, 0.0j)
 Current = (0.0279, 0.0069j)
 Impedance = (33.806, -8.31j)
 Power = 0.013947 Watts

***** CURRENT DATA *****

Wire No. 1 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
1	0.0279	0.0069	0.0287	13.8111
2	0.0278	0.0064	0.0285	12.9704
3	0.0276	0.0061	0.0282	12.4139
4	0.0272	0.0058	0.0278	11.9415
5	0.0267	0.0054	0.0272	11.5226
6	0.026	0.0051	0.0265	11.1427
7	0.0251	0.0048	0.0256	10.7934
8	0.0242	0.0045	0.0246	10.469
9	0.023	0.0041	0.0234	10.1654
10	0.0218	0.0038	0.0221	9.8795
11	0.0204	0.0035	0.0207	9.6087
12	0.0189	0.0031	0.0192	9.3511
13	0.0173	0.0028	0.0175	9.105
14	0.0156	0.0024	0.0157	8.8688
15	0.0137	0.0021	0.0139	8.6414
16	0.0118	0.0017	0.0119	8.4215
17	0.0097	0.0014	0.0098	8.2082
18	0.0076	0.0011	0.0077	8.0003
19	0.0053	0.0007	0.0054	7.7966
20	0.0029	0.0004	0.0029	7.594
E	0.0	0.0	0.0	0.0

Munn-ReeseBroadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.11
FCC Tower 1 – SW – WJYM Tower 3

Wire No. 2 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
21	0.0	-0.0002	0.0002	-105.9959
22	-0.0001	-0.0005	0.0005	-105.9323
23	-0.0002	-0.0006	0.0007	-105.8175
24	-0.0002	-0.0008	0.0008	-105.6754
25	-0.0003	-0.0009	0.0009	-105.512
26	-0.0003	-0.001	0.001	-105.3304
27	-0.0003	-0.0011	0.0011	-105.1322
28	-0.0003	-0.0011	0.0012	-104.9189
29	-0.0003	-0.0012	0.0012	-104.6914
30	-0.0003	-0.0012	0.0012	-104.4508
31	-0.0003	-0.0012	0.0012	-104.1981
32	-0.0003	-0.0011	0.0012	-103.9343
33	-0.0003	-0.0011	0.0011	-103.6604
34	-0.0002	-0.001	0.0011	-103.3778
35	-0.0002	-0.0009	0.001	-103.0877
36	-0.0002	-0.0008	0.0009	-102.7915
37	-0.0002	-0.0007	0.0007	-102.4907
38	-0.0001	-0.0006	0.0006	-102.1866
39	-0.0001	-0.0004	0.0004	-101.8803
40	0.0	-0.0002	0.0002	-101.5702
E	0.0	0.0	0.0	0.0

Wire No. 3 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
41	-0.0001	0.0001	0.0001	138.5502
42	-0.0002	0.0001	0.0002	138.527
43	-0.0002	0.0002	0.0003	138.4848
44	-0.0003	0.0003	0.0004	138.4324
45	-0.0003	0.0003	0.0005	138.372
46	-0.0004	0.0003	0.0005	138.3046
47	-0.0004	0.0004	0.0005	138.2305
48	-0.0004	0.0004	0.0006	138.1502
49	-0.0004	0.0004	0.0006	138.0637
50	-0.0004	0.0004	0.0006	137.9712
51	-0.0004	0.0004	0.0006	137.8727
52	-0.0004	0.0004	0.0006	137.7681
53	-0.0004	0.0004	0.0005	137.6576
54	-0.0004	0.0003	0.0005	137.5409
55	-0.0003	0.0003	0.0005	137.418
56	-0.0003	0.0003	0.0004	137.2888
57	-0.0003	0.0002	0.0004	137.1532
58	-0.0002	0.0002	0.0003	137.0107
59	-0.0002	0.0001	0.0002	136.8609
60	-0.0001	0.0001	0.0001	136.7016
E	0.0	0.0	0.0	0.0

Wire No. 4 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
61	0.0	0.0001	0.0001	117.4794
62	-0.0001	0.0002	0.0002	117.4553
63	-0.0001	0.0003	0.0003	117.4117

Munn-Reese

Broadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.11**FCC Tower 1 – SW – WJYM Tower 3**

64	-0.0002	0.0003	0.0004	117.3577
65	-0.0002	0.0004	0.0004	117.2958
66	-0.0002	0.0004	0.0005	117.2269
67	-0.0002	0.0005	0.0005	117.1517
68	-0.0003	0.0005	0.0006	117.0706
69	-0.0003	0.0005	0.0006	116.9838
70	-0.0003	0.0005	0.0006	116.8915
71	-0.0003	0.0005	0.0006	116.7939
72	-0.0003	0.0005	0.0006	116.6909
73	-0.0002	0.0005	0.0005	116.5825
74	-0.0002	0.0005	0.0005	116.4688
75	-0.0002	0.0004	0.0005	116.3497
76	-0.0002	0.0004	0.0004	116.2249
77	-0.0002	0.0003	0.0004	116.0942
78	-0.0001	0.0003	0.0003	115.9574
79	-0.0001	0.0002	0.0002	115.8137
80	-0.0001	0.0001	0.0001	115.661
E	0.0	0.0	0.0	0.0

Munn-ReeseBroadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.12
FCC Tower 2 – NW – WJYM Tower 4

 ACSModel
 (MININEC 3.1 Core)
 07-08-2021 09:12:34

WJYM-Day Array

Frequency = 0.730 MHz Wavelength = 410.68492 Meters

No. of Wires: 4

Wire No. 1	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
0	0	0			-1	
0	0	96.96727	0.2387	0		20

Wire No. 2	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
66.67966	53.61182	0			-2	
66.67966	53.61182	95.82648	0.2183	0		20

Wire No. 3	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-124.6463	197.7864	0			-3	
-124.6463	197.7864	93.5449	0.2183	0		20

Wire No. 4	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-57.99663	251.211	0			-4	
-57.99663	251.211	94.68569	0.2183	0		20

**** ANTENNA GEOMETRY ****

Wire No. 1	Coordinates			Radius	Connection		Pulse
X	Y	Z		End1	End2	No.	
0	0	0	0.2387	-1	1	1	
0	0	4.848363	0.2387	1	1	2	
0	0	9.696727	0.2387	1	1	3	
0	0	14.54509	0.2387	1	1	4	
0	0	19.39345	0.2387	1	1	5	
0	0	24.24182	0.2387	1	1	6	
0	0	29.09018	0.2387	1	1	7	
0	0	33.93855	0.2387	1	1	8	
0	0	38.78691	0.2387	1	1	9	
0	0	43.63527	0.2387	1	1	10	
0	0	48.48363	0.2387	1	1	11	
0	0	53.332	0.2387	1	1	12	
0	0	58.18036	0.2387	1	1	13	
0	0	63.02872	0.2387	1	1	14	
0	0	67.87709	0.2387	1	1	15	
0	0	72.72545	0.2387	1	1	16	
0	0	77.57381	0.2387	1	1	17	
0	0	82.42218	0.2387	1	1	18	
0	0	87.27055	0.2387	1	1	19	
0	0	92.11891	0.2387	1	0	20	

Munn-Reese
 Broadcast Engineering Consultants
 Coldwater, MI 49036

Exhibit 1.12
FCC Tower 2 – NW – WJYM Tower 4

Wire No.	2	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
66.67966		53.61182	0	0.2183	-2	2	21
66.67966		53.61182	4.791324	0.2183	2	2	22
66.67966		53.61182	9.582648	0.2183	2	2	23
66.67966		53.61182	14.37397	0.2183	2	2	24
66.67966		53.61182	19.1653	0.2183	2	2	25
66.67966		53.61182	23.95662	0.2183	2	2	26
66.67966		53.61182	28.74795	0.2183	2	2	27
66.67966		53.61182	33.53927	0.2183	2	2	28
66.67966		53.61182	38.33059	0.2183	2	2	29
66.67966		53.61182	43.12192	0.2183	2	2	30
66.67966		53.61182	47.91324	0.2183	2	2	31
66.67966		53.61182	52.70457	0.2183	2	2	32
66.67966		53.61182	57.49589	0.2183	2	2	33
66.67966		53.61182	62.28721	0.2183	2	2	34
66.67966		53.61182	67.07854	0.2183	2	2	35
66.67966		53.61182	71.86986	0.2183	2	2	36
66.67966		53.61182	76.66119	0.2183	2	2	37
66.67966		53.61182	81.45251	0.2183	2	2	38
66.67966		53.61182	86.24384	0.2183	2	2	39
66.67966		53.61182	91.03516	0.2183	2	0	40

Wire No.	3	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-124.6463		197.7864	0	0.2183	-3	3	41
-124.6463		197.7864	4.677245	0.2183	3	3	42
-124.6463		197.7864	9.35449	0.2183	3	3	43
-124.6463		197.7864	14.03174	0.2183	3	3	44
-124.6463		197.7864	18.70898	0.2183	3	3	45
-124.6463		197.7864	23.38622	0.2183	3	3	46
-124.6463		197.7864	28.06347	0.2183	3	3	47
-124.6463		197.7864	32.74072	0.2183	3	3	48
-124.6463		197.7864	37.41796	0.2183	3	3	49
-124.6463		197.7864	42.09521	0.2183	3	3	50
-124.6463		197.7864	46.77245	0.2183	3	3	51
-124.6463		197.7864	51.4497	0.2183	3	3	52
-124.6463		197.7864	56.12694	0.2183	3	3	53
-124.6463		197.7864	60.80419	0.2183	3	3	54
-124.6463		197.7864	65.48143	0.2183	3	3	55
-124.6463		197.7864	70.15868	0.2183	3	3	56
-124.6463		197.7864	74.83592	0.2183	3	3	57
-124.6463		197.7864	79.51317	0.2183	3	3	58
-124.6463		197.7864	84.19041	0.2183	3	3	59
-124.6463		197.7864	88.86765	0.2183	3	0	60

Wire No.	4	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-57.99663		251.211	0	0.2183	-4	4	61
-57.99663		251.211	4.734284	0.2183	4	4	62
-57.99663		251.211	9.468569	0.2183	4	4	63
-57.99663		251.211	14.20285	0.2183	4	4	64
-57.99663		251.211	18.93714	0.2183	4	4	65
-57.99663		251.211	23.67142	0.2183	4	4	66
-57.99663		251.211	28.40571	0.2183	4	4	67

Munn-Reese
Broadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.12
FCC Tower 2 – NW – WJYM Tower 4

-57.99663	251.211	33.13999	0.2183	4	4	68
-57.99663	251.211	37.87428	0.2183	4	4	69
-57.99663	251.211	42.60856	0.2183	4	4	70
-57.99663	251.211	47.34285	0.2183	4	4	71
-57.99663	251.211	52.07713	0.2183	4	4	72
-57.99663	251.211	56.81141	0.2183	4	4	73
-57.99663	251.211	61.5457	0.2183	4	4	74
-57.99663	251.211	66.27998	0.2183	4	4	75
-57.99663	251.211	71.01427	0.2183	4	4	76
-57.99663	251.211	75.74855	0.2183	4	4	77
-57.99663	251.211	80.48283	0.2183	4	4	78
-57.99663	251.211	85.21712	0.2183	4	4	79
-57.99663	251.211	89.95141	0.2183	4	0	80

Sources: 1

Pulse No., Voltage Magnitude, Phase (Degrees): 21, 1.0, 0.0

Number of Loads: 3

Pulse No., Resistance, Reactance: 1, 0, 3695

Pulse No., Resistance, Reactance: 41, 0, -4360

Pulse No., Resistance, Reactance: 61, 0, -4360

```
***** SOURCE DATA *****
Pulse 21   Voltage = (1.0, 0.0j)
           Current = (0.0256, 0.0112j)
           Impedance = (32.815, -14.33j)
           Power = 0.012797 Watts
```

```
***** CURRENT DATA *****
```

Wire No. 1 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
1	0.0	0.0002	0.0002	84.7385
2	0.0	-0.0001	0.0001	-94.9806
3	0.0	-0.0003	0.0003	-94.8538
4	0.0	-0.0005	0.0005	-94.6647
5	0.0	-0.0006	0.0006	-94.4504
6	-0.0001	-0.0007	0.0007	-94.2163
7	-0.0001	-0.0008	0.0008	-93.9647
8	-0.0001	-0.0009	0.0009	-93.6972
9	-0.0001	-0.0009	0.0009	-93.415
10	-0.0001	-0.0009	0.0009	-93.1193
11	0.0	-0.0009	0.0009	-92.8114
12	0.0	-0.0009	0.0009	-92.4926
13	0.0	-0.0009	0.0009	-92.1644
14	0.0	-0.0009	0.0009	-91.8282
15	0.0	-0.0008	0.0008	-91.4858
16	0.0	-0.0007	0.0007	-91.1389
17	0.0	-0.0006	0.0006	-90.7895
18	0.0	-0.0005	0.0005	-90.4392
19	0.0	-0.0004	0.0004	-90.0894
20	0.0	-0.0002	0.0002	-89.7383
E	0.0	0.0	0.0	0.0

Exhibit 1.12
FCC Tower 2 – NW – WJYM Tower 4

Wire No. 2 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
21	0.0256	0.0112	0.0279	23.5904
22	0.0255	0.0107	0.0277	22.8049
23	0.0253	0.0104	0.0274	22.2781
24	0.025	0.01	0.0269	21.8292
25	0.0245	0.0096	0.0263	21.4299
26	0.0238	0.0092	0.0255	21.067
27	0.0231	0.0087	0.0247	20.7327
28	0.0222	0.0083	0.0237	20.4216
29	0.0212	0.0078	0.0225	20.1301
30	0.02	0.0072	0.0213	19.8552
31	0.0187	0.0067	0.0199	19.5946
32	0.0174	0.0061	0.0184	19.3464
33	0.0159	0.0055	0.0168	19.1091
34	0.0143	0.0049	0.0151	18.8813
35	0.0126	0.0043	0.0133	18.6617
36	0.0108	0.0036	0.0114	18.4493
37	0.009	0.003	0.0094	18.2432
38	0.007	0.0023	0.0073	18.0422
39	0.0049	0.0016	0.0052	17.8451
40	0.0027	0.0009	0.0028	17.6493
E	0.0	0.0	0.0	0.0

Wire No. 3 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
41	-0.0001	0.0	0.0001	143.4851
42	-0.0002	0.0001	0.0002	143.4615
43	-0.0002	0.0002	0.0003	143.4187
44	-0.0003	0.0002	0.0004	143.3657
45	-0.0003	0.0003	0.0004	143.3046
46	-0.0004	0.0003	0.0005	143.2366
47	-0.0004	0.0003	0.0005	143.1623
48	-0.0004	0.0003	0.0005	143.0819
49	-0.0004	0.0003	0.0006	142.9956
50	-0.0004	0.0003	0.0006	142.9037
51	-0.0004	0.0003	0.0006	142.8062
52	-0.0004	0.0003	0.0005	142.7031
53	-0.0004	0.0003	0.0005	142.5945
54	-0.0004	0.0003	0.0005	142.4803
55	-0.0004	0.0003	0.0005	142.3604
56	-0.0003	0.0002	0.0004	142.2347
57	-0.0003	0.0002	0.0003	142.103
58	-0.0002	0.0002	0.0003	141.965
59	-0.0002	0.0001	0.0002	141.8201
60	-0.0001	0.0001	0.0001	141.666
E	0.0	0.0	0.0	0.0

Wire No. 4 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
61	-0.0001	0.0	0.0001	148.9773
62	-0.0002	0.0001	0.0002	148.9533
63	-0.0003	0.0002	0.0003	148.9099

Munn-Reese

Broadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.12
FCC Tower 2 – NW – WJYM Tower 4

64	-0.0003	0.0002	0.0004	148.8561
65	-0.0004	0.0002	0.0004	148.7941
66	-0.0004	0.0003	0.0005	148.7251
67	-0.0005	0.0003	0.0005	148.6494
68	-0.0005	0.0003	0.0006	148.5676
69	-0.0005	0.0003	0.0006	148.4797
70	-0.0005	0.0003	0.0006	148.3859
71	-0.0005	0.0003	0.0006	148.2862
72	-0.0005	0.0003	0.0006	148.1807
73	-0.0005	0.0003	0.0005	148.0694
74	-0.0004	0.0003	0.0005	147.9522
75	-0.0004	0.0002	0.0005	147.829
76	-0.0004	0.0002	0.0004	147.6998
77	-0.0003	0.0002	0.0004	147.5642
78	-0.0002	0.0002	0.0003	147.4221
79	-0.0002	0.0001	0.0002	147.2728
80	-0.0001	0.0001	0.0001	147.1141
E	0.0	0.0	0.0	0.0

Exhibit 1.13 **FCC Tower 3 – SE – WJYM Tower 2**

 ACSModel
 (MININEC 3.1 Core)
 07-08-2021 09:37:36

WJYM-Day Array

Frequency = 0.730 MHz Wavelength = 410.68492 Meters

No. of Wires: 4

Wire No. 1	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
0	0	0			-1	
0	0	96.96727	0.2387	0		20
Wire No. 2	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
66.67966	53.61182	0		-2		
66.67966	53.61182	95.82648	0.2183	0		20
Wire No. 3	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-124.6463	197.7864	0		-3		
-124.6463	197.7864	93.5449	0.2183	0		20
Wire No. 4	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-57.99663	251.211	0		-4		
-57.99663	251.211	94.68569	0.2183	0		20

**** ANTENNA GEOMETRY ****

Wire No. 1	Coordinates			Radius	Connection		Pulse
X	Y	Z		End1	End2	No.	
0	0	0	0.2387	-1	1	1	
0	0	4.848363	0.2387	1	1	2	
0	0	9.696727	0.2387	1	1	3	
0	0	14.54509	0.2387	1	1	4	
0	0	19.39345	0.2387	1	1	5	
0	0	24.24182	0.2387	1	1	6	
0	0	29.09018	0.2387	1	1	7	
0	0	33.93855	0.2387	1	1	8	
0	0	38.78691	0.2387	1	1	9	
0	0	43.63527	0.2387	1	1	10	
0	0	48.48363	0.2387	1	1	11	
0	0	53.332	0.2387	1	1	12	
0	0	58.18036	0.2387	1	1	13	
0	0	63.02872	0.2387	1	1	14	
0	0	67.87709	0.2387	1	1	15	
0	0	72.72545	0.2387	1	1	16	
0	0	77.57381	0.2387	1	1	17	
0	0	82.42218	0.2387	1	1	18	
0	0	87.27055	0.2387	1	1	19	
0	0	92.11891	0.2387	1	0	20	

Munn-Reese

Broadcast Engineering Consultants
 Coldwater, MI 49036

Exhibit 1.13
FCC Tower 3 – SE – WJYM Tower 2

Wire No.	2	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
66.67966		53.61182	0	0.2183	-2	2	21
66.67966		53.61182	4.791324	0.2183	2	2	22
66.67966		53.61182	9.582648	0.2183	2	2	23
66.67966		53.61182	14.37397	0.2183	2	2	24
66.67966		53.61182	19.1653	0.2183	2	2	25
66.67966		53.61182	23.95662	0.2183	2	2	26
66.67966		53.61182	28.74795	0.2183	2	2	27
66.67966		53.61182	33.53927	0.2183	2	2	28
66.67966		53.61182	38.33059	0.2183	2	2	29
66.67966		53.61182	43.12192	0.2183	2	2	30
66.67966		53.61182	47.91324	0.2183	2	2	31
66.67966		53.61182	52.70457	0.2183	2	2	32
66.67966		53.61182	57.49589	0.2183	2	2	33
66.67966		53.61182	62.28721	0.2183	2	2	34
66.67966		53.61182	67.07854	0.2183	2	2	35
66.67966		53.61182	71.86986	0.2183	2	2	36
66.67966		53.61182	76.66119	0.2183	2	2	37
66.67966		53.61182	81.45251	0.2183	2	2	38
66.67966		53.61182	86.24384	0.2183	2	2	39
66.67966		53.61182	91.03516	0.2183	2	0	40

Wire No.	3	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-124.6463		197.7864	0	0.2183	-3	3	41
-124.6463		197.7864	4.677245	0.2183	3	3	42
-124.6463		197.7864	9.35449	0.2183	3	3	43
-124.6463		197.7864	14.03174	0.2183	3	3	44
-124.6463		197.7864	18.70898	0.2183	3	3	45
-124.6463		197.7864	23.38622	0.2183	3	3	46
-124.6463		197.7864	28.06347	0.2183	3	3	47
-124.6463		197.7864	32.74072	0.2183	3	3	48
-124.6463		197.7864	37.41796	0.2183	3	3	49
-124.6463		197.7864	42.09521	0.2183	3	3	50
-124.6463		197.7864	46.77245	0.2183	3	3	51
-124.6463		197.7864	51.4497	0.2183	3	3	52
-124.6463		197.7864	56.12694	0.2183	3	3	53
-124.6463		197.7864	60.80419	0.2183	3	3	54
-124.6463		197.7864	65.48143	0.2183	3	3	55
-124.6463		197.7864	70.15868	0.2183	3	3	56
-124.6463		197.7864	74.83592	0.2183	3	3	57
-124.6463		197.7864	79.51317	0.2183	3	3	58
-124.6463		197.7864	84.19041	0.2183	3	3	59
-124.6463		197.7864	88.86765	0.2183	3	0	60

Wire No.	4	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-57.99663		251.211	0	0.2183	-4	4	61
-57.99663		251.211	4.734284	0.2183	4	4	62
-57.99663		251.211	9.468569	0.2183	4	4	63
-57.99663		251.211	14.20285	0.2183	4	4	64
-57.99663		251.211	18.93714	0.2183	4	4	65
-57.99663		251.211	23.67142	0.2183	4	4	66
-57.99663		251.211	28.40571	0.2183	4	4	67

Munn-Reese

Broadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.13
FCC Tower 3 – SE – WJYM Tower 2

-57.99663	251.211	33.13999	0.2183	4	4	68
-57.99663	251.211	37.87428	0.2183	4	4	69
-57.99663	251.211	42.60856	0.2183	4	4	70
-57.99663	251.211	47.34285	0.2183	4	4	71
-57.99663	251.211	52.07713	0.2183	4	4	72
-57.99663	251.211	56.81141	0.2183	4	4	73
-57.99663	251.211	61.5457	0.2183	4	4	74
-57.99663	251.211	66.27998	0.2183	4	4	75
-57.99663	251.211	71.01427	0.2183	4	4	76
-57.99663	251.211	75.74855	0.2183	4	4	77
-57.99663	251.211	80.48283	0.2183	4	4	78
-57.99663	251.211	85.21712	0.2183	4	4	79
-57.99663	251.211	89.95141	0.2183	4	0	80

Sources: 1

Pulse No., Voltage Magnitude, Phase (Degrees): 41, 1.0, 0.0

Number of Loads: 3

Pulse No., Resistance, Reactance: 1 , 0 , 3695

Pulse No., Resistance, Reactance: 21 , 0 , -4360

Pulse No., Resistance, Reactance: 61 , 0 , -4360

***** SOURCE DATA *****

Pulse 41 Voltage = (1.0, 0.0j)
 Current = (0.0191, 0.0164j)
 Impedance = (30.203, -25.852j)
 Power = 0.009555 Watts

***** CURRENT DATA *****

Wire No. 1 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
1	0.0001	0.0	0.0001	-13.7801
2	0.0	0.0	0.0001	166.117
3	-0.0001	0.0	0.0001	166.0706
4	-0.0002	0.0001	0.0002	166.0014
5	-0.0003	0.0001	0.0003	165.9228
6	-0.0003	0.0001	0.0003	165.8368
7	-0.0003	0.0001	0.0004	165.7438
8	-0.0004	0.0001	0.0004	165.6443
9	-0.0004	0.0001	0.0004	165.5385
10	-0.0004	0.0001	0.0004	165.4263
11	-0.0004	0.0001	0.0004	165.3079
12	-0.0004	0.0001	0.0004	165.1833
13	-0.0004	0.0001	0.0004	165.0523
14	-0.0004	0.0001	0.0004	164.9151
15	-0.0003	0.0001	0.0004	164.7714
16	-0.0003	0.0001	0.0003	164.6211
17	-0.0003	0.0001	0.0003	164.464
18	-0.0002	0.0001	0.0002	164.2998
19	-0.0002	0.0	0.0002	164.1277
20	-0.0001	0.0	0.0001	163.9452
E	0.0	0.0	0.0	0.0

Exhibit 1.13
FCC Tower 3 – SE – WJYM Tower 2

Wire No. 2 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
21	-0.0001	0.0	0.0001	160.4203
22	-0.0002	0.0001	0.0002	160.3953
23	-0.0003	0.0001	0.0003	160.3502
24	-0.0003	0.0001	0.0003	160.2945
25	-0.0004	0.0001	0.0004	160.2304
26	-0.0004	0.0001	0.0004	160.1591
27	-0.0004	0.0002	0.0005	160.0811
28	-0.0005	0.0002	0.0005	159.9969
29	-0.0005	0.0002	0.0005	159.9066
30	-0.0005	0.0002	0.0005	159.8105
31	-0.0005	0.0002	0.0005	159.7085
32	-0.0005	0.0002	0.0005	159.6007
33	-0.0004	0.0002	0.0005	159.4872
34	-0.0004	0.0002	0.0005	159.3679
35	-0.0004	0.0001	0.0004	159.2427
36	-0.0003	0.0001	0.0004	159.1114
37	-0.0003	0.0001	0.0003	158.974
38	-0.0002	0.0001	0.0003	158.83
39	-0.0002	0.0001	0.0002	158.6787
40	-0.0001	0.0	0.0001	158.5181
E	0.0	0.0	0.0	0.0

Wire No. 3 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
41	0.0191	0.0164	0.0252	40.5607
42	0.0191	0.0159	0.0248	39.8456
43	0.0189	0.0155	0.0244	39.364
44	0.0186	0.0151	0.024	38.9515
45	0.0183	0.0146	0.0234	38.5833
46	0.0178	0.014	0.0227	38.2473
47	0.0172	0.0134	0.0219	37.9367
48	0.0166	0.0128	0.0209	37.6469
49	0.0158	0.0121	0.0199	37.3746
50	0.015	0.0113	0.0188	37.1171
51	0.014	0.0105	0.0175	36.8725
52	0.013	0.0097	0.0162	36.6391
53	0.0119	0.0088	0.0148	36.4154
54	0.0107	0.0078	0.0133	36.2002
55	0.0095	0.0069	0.0117	35.9925
56	0.0081	0.0059	0.01	35.7913
57	0.0067	0.0048	0.0083	35.5957
58	0.0053	0.0037	0.0064	35.4048
59	0.0037	0.0026	0.0045	35.2174
60	0.002	0.0014	0.0025	35.0309
E	0.0	0.0	0.0	0.0

Wire No. 4 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
61	0.0	-0.0001	0.0001	-79.0104
62	0.0001	-0.0004	0.0004	-78.9375
63	0.0001	-0.0005	0.0005	-78.8055

Munn-Reese

Broadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.13
FCC Tower 3 – SE – WJYM Tower 2

64	0.0001	-0.0006	0.0007	-78.6422
65	0.0002	-0.0007	0.0008	-78.4545
66	0.0002	-0.0008	0.0008	-78.2461
67	0.0002	-0.0009	0.0009	-78.0192
68	0.0002	-0.0009	0.0009	-77.7755
69	0.0002	-0.0009	0.001	-77.5164
70	0.0002	-0.001	0.001	-77.2432
71	0.0002	-0.0009	0.001	-76.9571
72	0.0002	-0.0009	0.0009	-76.6595
73	0.0002	-0.0009	0.0009	-76.3518
74	0.0002	-0.0008	0.0008	-76.0355
75	0.0002	-0.0008	0.0008	-75.7121
76	0.0002	-0.0007	0.0007	-75.3832
77	0.0002	-0.0006	0.0006	-75.0506
78	0.0001	-0.0005	0.0005	-74.7157
79	0.0001	-0.0003	0.0003	-74.3797
80	0.0001	-0.0002	0.0002	-74.041
E	0.0	0.0	0.0	0.0

Exhibit 1.14 **FCC Tower 4 – NE – WJYM Tower 1**

ACSModel

(MININEC 3.1 Core)

07-08-2021

09:39:27

WJYM-Day Array

Frequency = 0.730 MHz Wavelength = 410.68492 Meters

No. of Wires: 4

Wire No. 1	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
0	0	0			-1	
0	0	96.96727	0.2387	0		20

Wire No. 2	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
66.67966	53.61182	0			-2	
66.67966	53.61182	95.82648	0.2183	0		20

Wire No. 3	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-124.6463	197.7864	0			-3	
-124.6463	197.7864	93.5449	0.2183	0		20

Wire No. 4	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-57.99663	251.211	0			-4	
-57.99663	251.211	94.68569	0.2183	0		20

**** ANTENNA GEOMETRY ****

Wire No. 1	Coordinates			Radius	Connection		Pulse
X	Y	Z		End1	End2	No.	
0	0	0	0.2387	-1	1	1	
0	0	4.848363	0.2387	1	1	2	
0	0	9.696727	0.2387	1	1	3	
0	0	14.54509	0.2387	1	1	4	
0	0	19.39345	0.2387	1	1	5	
0	0	24.24182	0.2387	1	1	6	
0	0	29.09018	0.2387	1	1	7	
0	0	33.93855	0.2387	1	1	8	
0	0	38.78691	0.2387	1	1	9	
0	0	43.63527	0.2387	1	1	10	
0	0	48.48363	0.2387	1	1	11	
0	0	53.332	0.2387	1	1	12	
0	0	58.18036	0.2387	1	1	13	
0	0	63.02872	0.2387	1	1	14	
0	0	67.87709	0.2387	1	1	15	
0	0	72.72545	0.2387	1	1	16	
0	0	77.57381	0.2387	1	1	17	
0	0	82.42218	0.2387	1	1	18	
0	0	87.27055	0.2387	1	1	19	
0	0	92.11891	0.2387	1	0	20	

Munn-Reese

Broadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.14
FCC Tower 4 – NE – WJYM Tower 1

Wire No.	2	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
66.67966		53.61182	0	0.2183	-2	2	21
66.67966		53.61182	4.791324	0.2183	2	2	22
66.67966		53.61182	9.582648	0.2183	2	2	23
66.67966		53.61182	14.37397	0.2183	2	2	24
66.67966		53.61182	19.1653	0.2183	2	2	25
66.67966		53.61182	23.95662	0.2183	2	2	26
66.67966		53.61182	28.74795	0.2183	2	2	27
66.67966		53.61182	33.53927	0.2183	2	2	28
66.67966		53.61182	38.33059	0.2183	2	2	29
66.67966		53.61182	43.12192	0.2183	2	2	30
66.67966		53.61182	47.91324	0.2183	2	2	31
66.67966		53.61182	52.70457	0.2183	2	2	32
66.67966		53.61182	57.49589	0.2183	2	2	33
66.67966		53.61182	62.28721	0.2183	2	2	34
66.67966		53.61182	67.07854	0.2183	2	2	35
66.67966		53.61182	71.86986	0.2183	2	2	36
66.67966		53.61182	76.66119	0.2183	2	2	37
66.67966		53.61182	81.45251	0.2183	2	2	38
66.67966		53.61182	86.24384	0.2183	2	2	39
66.67966		53.61182	91.03516	0.2183	2	0	40

Wire No.	3	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-124.6463		197.7864	0	0.2183	-3	3	41
-124.6463		197.7864	4.677245	0.2183	3	3	42
-124.6463		197.7864	9.35449	0.2183	3	3	43
-124.6463		197.7864	14.03174	0.2183	3	3	44
-124.6463		197.7864	18.70898	0.2183	3	3	45
-124.6463		197.7864	23.38622	0.2183	3	3	46
-124.6463		197.7864	28.06347	0.2183	3	3	47
-124.6463		197.7864	32.74072	0.2183	3	3	48
-124.6463		197.7864	37.41796	0.2183	3	3	49
-124.6463		197.7864	42.09521	0.2183	3	3	50
-124.6463		197.7864	46.77245	0.2183	3	3	51
-124.6463		197.7864	51.4497	0.2183	3	3	52
-124.6463		197.7864	56.12694	0.2183	3	3	53
-124.6463		197.7864	60.80419	0.2183	3	3	54
-124.6463		197.7864	65.48143	0.2183	3	3	55
-124.6463		197.7864	70.15868	0.2183	3	3	56
-124.6463		197.7864	74.83592	0.2183	3	3	57
-124.6463		197.7864	79.51317	0.2183	3	3	58
-124.6463		197.7864	84.19041	0.2183	3	3	59
-124.6463		197.7864	88.86765	0.2183	3	0	60

Wire No.	4	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-57.99663		251.211	0	0.2183	-4	4	61
-57.99663		251.211	4.734284	0.2183	4	4	62
-57.99663		251.211	9.468569	0.2183	4	4	63
-57.99663		251.211	14.20285	0.2183	4	4	64
-57.99663		251.211	18.93714	0.2183	4	4	65
-57.99663		251.211	23.67142	0.2183	4	4	66
-57.99663		251.211	28.40571	0.2183	4	4	67

Munn-Reese

Broadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.14
FCC Tower 4 – NE – WJYM Tower 1

-57.99663	251.211	33.13999	0.2183	4	4	68
-57.99663	251.211	37.87428	0.2183	4	4	69
-57.99663	251.211	42.60856	0.2183	4	4	70
-57.99663	251.211	47.34285	0.2183	4	4	71
-57.99663	251.211	52.07713	0.2183	4	4	72
-57.99663	251.211	56.81141	0.2183	4	4	73
-57.99663	251.211	61.5457	0.2183	4	4	74
-57.99663	251.211	66.27998	0.2183	4	4	75
-57.99663	251.211	71.01427	0.2183	4	4	76
-57.99663	251.211	75.74855	0.2183	4	4	77
-57.99663	251.211	80.48283	0.2183	4	4	78
-57.99663	251.211	85.21712	0.2183	4	4	79
-57.99663	251.211	89.95141	0.2183	4	0	80

Sources: 1

Pulse No., Voltage Magnitude, Phase (Degrees): 61, 1.0, 0.0

Number of Loads: 3

Pulse No., Resistance, Reactance: 1 , 0 , 3695

Pulse No., Resistance, Reactance: 21 , 0 , -4360

Pulse No., Resistance, Reactance: 41 , 0 , -4360

***** SOURCE DATA *****

Pulse 61 Voltage = (1.0, 0.0j)
 Current = (0.0225, 0.0145j)
 Impedance = (31.32, -20.201j)
 Power = 0.011274 Watts

***** CURRENT DATA *****

Wire No. 1 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
1	0.0001	-0.0001	0.0001	-42.5745
2	0.0	0.0	0.0001	137.3217
3	-0.0001	0.0001	0.0001	137.275
4	-0.0002	0.0001	0.0002	137.2054
5	-0.0002	0.0002	0.0003	137.1267
6	-0.0002	0.0002	0.0003	137.0407
7	-0.0003	0.0003	0.0004	136.9482
8	-0.0003	0.0003	0.0004	136.8495
9	-0.0003	0.0003	0.0004	136.745
10	-0.0003	0.0003	0.0004	136.6348
11	-0.0003	0.0003	0.0004	136.5188
12	-0.0003	0.0003	0.0004	136.3973
13	-0.0003	0.0003	0.0004	136.2701
14	-0.0003	0.0003	0.0004	136.1373
15	-0.0003	0.0003	0.0004	135.9986
16	-0.0002	0.0002	0.0003	135.8539
17	-0.0002	0.0002	0.0003	135.7029
18	-0.0002	0.0002	0.0002	135.5453
19	-0.0001	0.0001	0.0002	135.3802
20	-0.0001	0.0001	0.0001	135.205
E	0.0	0.0	0.0	0.0

Munn-Reese

Broadcast Engineering Consultants
 Coldwater, MI 49036

Exhibit 1.14
FCC Tower 4 – NE – WJYM Tower 1

Wire No. 2 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
21	-0.0001	0.0	0.0001	158.1889
22	-0.0002	0.0001	0.0002	158.1649
23	-0.0003	0.0001	0.0003	158.1216
24	-0.0003	0.0001	0.0004	158.068
25	-0.0004	0.0002	0.0004	158.0062
26	-0.0004	0.0002	0.0005	157.9372
27	-0.0005	0.0002	0.0005	157.8615
28	-0.0005	0.0002	0.0005	157.7793
29	-0.0005	0.0002	0.0006	157.6909
30	-0.0005	0.0002	0.0006	157.5963
31	-0.0005	0.0002	0.0006	157.4955
32	-0.0005	0.0002	0.0005	157.3885
33	-0.0005	0.0002	0.0005	157.2752
34	-0.0005	0.0002	0.0005	157.1557
35	-0.0004	0.0002	0.0005	157.0298
36	-0.0004	0.0002	0.0004	156.8974
37	-0.0003	0.0001	0.0003	156.7582
38	-0.0003	0.0001	0.0003	156.612
39	-0.0002	0.0001	0.0002	156.4581
40	-0.0001	0.0	0.0001	156.2944
E	0.0	0.0	0.0	0.0

Wire No. 3 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
41	0.0	-0.0001	0.0001	-86.734
42	0.0	-0.0004	0.0004	-86.6656
43	0.0	-0.0006	0.0006	-86.5419
44	0.0	-0.0007	0.0007	-86.3884
45	0.0001	-0.0008	0.0008	-86.2119
46	0.0001	-0.0009	0.0009	-86.0156
47	0.0001	-0.001	0.001	-85.8017
48	0.0001	-0.001	0.001	-85.5715
49	0.0001	-0.001	0.001	-85.3264
50	0.0001	-0.001	0.001	-85.0675
51	0.0001	-0.001	0.001	-84.7958
52	0.0001	-0.001	0.001	-84.5126
53	0.0001	-0.0009	0.001	-84.2191
54	0.0001	-0.0009	0.0009	-83.9165
55	0.0001	-0.0008	0.0008	-83.6063
56	0.0001	-0.0007	0.0007	-83.2898
57	0.0001	-0.0006	0.0006	-82.9686
58	0.0001	-0.0005	0.0005	-82.6441
59	0.0	-0.0004	0.0004	-82.3172
60	0.0	-0.0002	0.0002	-81.9863
E	0.0	0.0	0.0	0.0

Wire No. 4 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
61	0.0225	0.0145	0.0268	32.822
62	0.0225	0.0141	0.0265	32.0763
63	0.0223	0.0137	0.0262	31.5751

Munn-Reese

Broadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.14
FCC Tower 4 – NE – WJYM Tower 1

64	0.022	0.0133	0.0257	31.1468
65	0.0216	0.0128	0.0251	30.7651
66	0.021	0.0123	0.0244	30.4175
67	0.0203	0.0118	0.0235	30.0966
68	0.0195	0.0112	0.0225	29.7977
69	0.0186	0.0106	0.0214	29.517
70	0.0176	0.0099	0.0202	29.252
71	0.0165	0.0092	0.0189	29.0005
72	0.0153	0.0084	0.0175	28.7607
73	0.014	0.0076	0.016	28.5311
74	0.0126	0.0068	0.0143	28.3104
75	0.0111	0.0059	0.0126	28.0975
76	0.0096	0.0051	0.0108	27.8915
77	0.0079	0.0042	0.0089	27.6913
78	0.0062	0.0032	0.007	27.496
79	0.0043	0.0022	0.0049	27.3044
80	0.0024	0.0012	0.0027	27.1139
E	0.0	0.0	0.0	0.0

Exhibit 1.20**Moment Method Array Parameter Sheet****WJYM - Bowling Green, OH**

Modeling Software: Au Contraire - Version 1.030

Station: WJYM - Bowling Green, OH

Freq (kHz) 730

Day Pattern

FCC	Field Parameters		Mininec Model		WJYM
Twr #	Ratio	Phase	Ratio	Phase	Twr #
1 (SW)	0.909	7.0°	0.849	5.7°	3 (SW)
2 (NW)	1.000	120.0°	0.987	116.9°	4 (NW)
3 (SE)	1.000	0.0°	1.000	0.0°	2 (SE)
4 (NE)	0.909	113.0°	0.929	109.7°	1 (NE)

Mininec Model Data

FCC	Drive Point		Current		Shunt	ATU Output	
Twr #	R	X	Mag	Phase	X	Mag	Phase
1 (SW)	31.81	2.28	4.7003	-50.2°	3695	4.7034	-50.653°
2 (NW)	4.92	-21.78	5.4395	60.6°	-4360	5.4667	60.618°
3 (SE)	36.05	-17.63	5.5142	-56.8°	-4360	5.5367	-56.328°
4 (NE)	2.12	-34.70	5.1055	53.3°	-4360	5.1461	53.340°

Exhibit 1.20

Moment Method Array Parameter Sheet

WJYM - Bowling Green, OH

Formulas for Calculating ATU Output Current with Shunt Reactance

I_{ATU} = ATU Output Current for Unity Base Current at 0 Degrees

$Z_{BASE} = R_B + jX_B$

X_S = Shunt Reactance

$I_{ATU} \text{ Magnitude} = ((1.00 + X_B / X_S)^2 + (R_B / X_S)^2)^{1/2}$

$I_{ATU} \text{ Angle} = \arctan (-R_B / X_S) / (1 + X_B / X_S)$

Exhibit 1.21 **Moment Method Day Pattern Tabulation**

 ACSModel
 (MININEC 3.1 Core)
 07-08-2021 09:29:10

WJYM-Day Array

Frequency = 0.730 MHz Wavelength = 410.68492 Meters

No. of Wires: 4

Wire No.	Coordinates		End	No. of
X	Y	Z	Connection	Segments
0	0	0	-1	
0	0	96.96727	0	20
Wire No. 2	Coordinates		End	No. of
X	Y	Z	Connection	Segments
66.67966	53.61182	0	-2	
66.67966	53.61182	95.82648	0	20
Wire No. 3	Coordinates		End	No. of
X	Y	Z	Connection	Segments
-124.6463	197.7864	0	-3	
-124.6463	197.7864	93.5449	0	20
Wire No. 4	Coordinates		End	No. of
X	Y	Z	Connection	Segments
-57.99663	251.211	0	-4	
-57.99663	251.211	94.68569	0	20

**** ANTENNA GEOMETRY ****

Wire No.	Coordinates		Radius	Connection	Pulse
X	Y	Z		End1 End2	No.
0	0	0	0.2387	-1 1	1
0	0	4.848363	0.2387	1 1	2
0	0	9.696727	0.2387	1 1	3
0	0	14.54509	0.2387	1 1	4
0	0	19.39345	0.2387	1 1	5
0	0	24.24182	0.2387	1 1	6
0	0	29.09018	0.2387	1 1	7
0	0	33.93855	0.2387	1 1	8
0	0	38.78691	0.2387	1 1	9
0	0	43.63527	0.2387	1 1	10
0	0	48.48363	0.2387	1 1	11
0	0	53.332	0.2387	1 1	12
0	0	58.18036	0.2387	1 1	13
0	0	63.02872	0.2387	1 1	14
0	0	67.87709	0.2387	1 1	15
0	0	72.72545	0.2387	1 1	16
0	0	77.57381	0.2387	1 1	17
0	0	82.42218	0.2387	1 1	18
0	0	87.27055	0.2387	1 1	19
0	0	92.11891	0.2387	1 0	20

Munn-Reese
 Broadcast Engineering Consultants
 Coldwater, MI 49036

Exhibit 1.21
Moment Method Day Pattern Tabulation

Wire No. 2		Coordinates		Z	Radius	Connection		Pulse No.
X	Y					End1	End2	
66.67966	53.61182			0	0.2183	-2	2	21
66.67966	53.61182			4.791324	0.2183	2	2	22
66.67966	53.61182			9.582648	0.2183	2	2	23
66.67966	53.61182			14.37397	0.2183	2	2	24
66.67966	53.61182			19.1653	0.2183	2	2	25
66.67966	53.61182			23.95662	0.2183	2	2	26
66.67966	53.61182			28.74795	0.2183	2	2	27
66.67966	53.61182			33.53927	0.2183	2	2	28
66.67966	53.61182			38.33059	0.2183	2	2	29
66.67966	53.61182			43.12192	0.2183	2	2	30
66.67966	53.61182			47.91324	0.2183	2	2	31
66.67966	53.61182			52.70457	0.2183	2	2	32
66.67966	53.61182			57.49589	0.2183	2	2	33
66.67966	53.61182			62.28721	0.2183	2	2	34
66.67966	53.61182			67.07854	0.2183	2	2	35
66.67966	53.61182			71.86986	0.2183	2	2	36
66.67966	53.61182			76.66119	0.2183	2	2	37
66.67966	53.61182			81.45251	0.2183	2	2	38
66.67966	53.61182			86.24384	0.2183	2	2	39
66.67966	53.61182			91.03516	0.2183	2	0	40

Wire No. 3		Coordinates		Z	Radius	Connection		Pulse No.
X	Y					End1	End2	
-124.6463	197.7864			0	0.2183	-3	3	41
-124.6463	197.7864			4.677245	0.2183	3	3	42
-124.6463	197.7864			9.35449	0.2183	3	3	43
-124.6463	197.7864			14.03174	0.2183	3	3	44
-124.6463	197.7864			18.70898	0.2183	3	3	45
-124.6463	197.7864			23.38622	0.2183	3	3	46
-124.6463	197.7864			28.06347	0.2183	3	3	47
-124.6463	197.7864			32.74072	0.2183	3	3	48
-124.6463	197.7864			37.41796	0.2183	3	3	49
-124.6463	197.7864			42.09521	0.2183	3	3	50
-124.6463	197.7864			46.77245	0.2183	3	3	51
-124.6463	197.7864			51.4497	0.2183	3	3	52
-124.6463	197.7864			56.12694	0.2183	3	3	53
-124.6463	197.7864			60.80419	0.2183	3	3	54
-124.6463	197.7864			65.48143	0.2183	3	3	55
-124.6463	197.7864			70.15868	0.2183	3	3	56
-124.6463	197.7864			74.83592	0.2183	3	3	57
-124.6463	197.7864			79.51317	0.2183	3	3	58
-124.6463	197.7864			84.19041	0.2183	3	3	59
-124.6463	197.7864			88.86765	0.2183	3	0	60

Wire No. 4		Coordinates		Z	Radius	Connection		Pulse No.
X	Y					End1	End2	
-57.99663	251.211			0	0.2183	-4	4	61
-57.99663	251.211			4.734284	0.2183	4	4	62
-57.99663	251.211			9.468569	0.2183	4	4	63
-57.99663	251.211			14.20285	0.2183	4	4	64
-57.99663	251.211			18.93714	0.2183	4	4	65
-57.99663	251.211			23.67142	0.2183	4	4	66
-57.99663	251.211			28.40571	0.2183	4	4	67

Munn-Reese

Broadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.21
Moment Method Day Pattern Tabulation

-57.99663	251.211	33.13999	0.2183	4	4	68
-57.99663	251.211	37.87428	0.2183	4	4	69
-57.99663	251.211	42.60856	0.2183	4	4	70
-57.99663	251.211	47.34285	0.2183	4	4	71
-57.99663	251.211	52.07713	0.2183	4	4	72
-57.99663	251.211	56.81141	0.2183	4	4	73
-57.99663	251.211	61.5457	0.2183	4	4	74
-57.99663	251.211	66.27998	0.2183	4	4	75
-57.99663	251.211	71.01427	0.2183	4	4	76
-57.99663	251.211	75.74855	0.2183	4	4	77
-57.99663	251.211	80.48283	0.2183	4	4	78
-57.99663	251.211	85.21712	0.2183	4	4	79
-57.99663	251.211	89.95141	0.2183	4	0	80

Sources: 4

Pulse No., Voltage Magnitude, Phase (Degrees): 1, 149.9, -46.1
Pulse No., Voltage Magnitude, Phase (Degrees): 21, 121.5, -16.7
Pulse No., Voltage Magnitude, Phase (Degrees): 41, 221.3, -82.9
Pulse No., Voltage Magnitude, Phase (Degrees): 61, 177.5, -33.2

Number of Loads: 0

***** SOURCE DATA *****

Pulse 1 Voltage = (104.0165, -107.9588j)
Current = (3.0113, -3.6091j)
Impedance = (31.813, 2.277j)
Power = 351.43 Watts

Pulse 21 Voltage = (116.3359, -34.9444j)
Current = (2.6741, 4.7368j)
Impedance = (4.92, -21.782j)
Power = 72.79 Watts

Pulse 41 Voltage = (27.5317, -219.5757j)
Current = (3.0194, -4.6141j)
Impedance = (36.054, -17.626j)
Power = 548.13 Watts

Pulse 61 Voltage = (148.5215, -97.1459j)
Current = (3.0503, 4.0941j)
Impedance = (2.122, -34.696j)
Power = 27.66 Watts

Total Power = 1000.000 Watts

***** FAR FIELD *****

Zenith Angle : Initial, Increment, Number: 90.0, 0.0, 1
Azimuth Angle: Initial, Increment, Number: 0.0, 1.0, 360

Exhibit 1.21
Moment Method Day Pattern Tabulation

***** PATTERN DATA *****
 Radial Distance = 1000 Meters
 Power Level = 1000.000 Watts
 Peak

Elev.	Azimuth	E (Theta)	
Angle	Angle	Mag (mV/m)	Phase (Deg)
0.0	0.0	1.0749	-109.4
0.0	1.0	2.8685	-111.0
0.0	2.0	4.8938	-110.0
0.0	3.0	7.1336	-108.5
0.0	4.0	9.5716	-106.8
0.0	5.0	12.1905	-105.0
0.0	6.0	14.9724	-103.1
0.0	7.0	17.8985	-101.3
0.0	8.0	20.9495	-99.4
0.0	9.0	24.1053	-97.4
0.0	10.0	27.3454	-95.5
0.0	11.0	30.6488	-93.6
0.0	12.0	33.9941	-91.6
0.0	13.0	37.3600	-89.7
0.0	14.0	40.7248	-87.7
0.0	15.0	44.0667	-85.8
0.0	16.0	47.3644	-83.8
0.0	17.0	50.5964	-81.9
0.0	18.0	53.7418	-79.9
0.0	19.0	56.7799	-78.0
0.0	20.0	59.6907	-76.0
0.0	21.0	62.4548	-74.1
0.0	22.0	65.0535	-72.2
0.0	23.0	67.4689	-70.2
0.0	24.0	69.6841	-68.3
0.0	25.0	71.6832	-66.4
0.0	26.0	73.4514	-64.5
0.0	27.0	74.9751	-62.6
0.0	28.0	76.2419	-60.7
0.0	29.0	77.2408	-58.8
0.0	30.0	77.9620	-56.9
0.0	31.0	78.3975	-55.0
0.0	32.0	78.5404	-53.2
0.0	33.0	78.3855	-51.3
0.0	34.0	77.9290	-49.5
0.0	35.0	77.1689	-47.7
0.0	36.0	76.1044	-45.8
0.0	37.0	74.7366	-44.0
0.0	38.0	73.0680	-42.3
0.0	39.0	71.1027	-40.5
0.0	40.0	68.8462	-38.8
0.0	41.0	66.3055	-37.0
0.0	42.0	63.4892	-35.3
0.0	43.0	60.4071	-33.6
0.0	44.0	57.0705	-32.0
0.0	45.0	53.4917	-30.3
0.0	46.0	49.6845	-28.7
0.0	47.0	45.6637	-27.1
0.0	48.0	41.4451	-25.5
0.0	49.0	37.0455	-24.0

Munn-Reese
 Broadcast Engineering Consultants
 Coldwater, MI 49036

Exhibit 1.21
Moment Method Day Pattern Tabulation

0.0	50.0	32.4825	-22.5
0.0	51.0	27.7747	-21.1
0.0	52.0	22.9413	-19.8
0.0	53.0	18.0020	-18.6
0.0	54.0	12.9775	-17.7
0.0	55.0	7.8906	-17.6
0.0	56.0	2.7798	-22.5
0.0	57.0	2.4695	179.9
0.0	58.0	7.6029	173.8
0.0	59.0	12.7440	173.7
0.0	60.0	17.8502	174.4
0.0	61.0	22.8985	175.4
0.0	62.0	27.8683	176.5
0.0	63.0	32.7396	177.7
0.0	64.0	37.4930	178.8
0.0	65.0	42.1100	180.0
0.0	66.0	46.5725	-178.9
0.0	67.0	50.8635	-177.8
0.0	68.0	54.9666	-176.7
0.0	69.0	58.8664	-175.6
0.0	70.0	62.5484	-174.5
0.0	71.0	65.9991	-173.5
0.0	72.0	69.2062	-172.5
0.0	73.0	72.1583	-171.5
0.0	74.0	74.8453	-170.5
0.0	75.0	77.2580	-169.6
0.0	76.0	79.3886	-168.7
0.0	77.0	81.2305	-167.8
0.0	78.0	82.7781	-167.0
0.0	79.0	84.0273	-166.2
0.0	80.0	84.9751	-165.4
0.0	81.0	85.6196	-164.6
0.0	82.0	85.9602	-163.9
0.0	83.0	85.9975	-163.2
0.0	84.0	85.7332	-162.6
0.0	85.0	85.1704	-161.9
0.0	86.0	84.3129	-161.3
0.0	87.0	83.1661	-160.8
0.0	88.0	81.7360	-160.2
0.0	89.0	80.0300	-159.7
0.0	90.0	78.0564	-159.3
0.0	91.0	75.8243	-158.8
0.0	92.0	73.3439	-158.4
0.0	93.0	70.6262	-158.0
0.0	94.0	67.6832	-157.7
0.0	95.0	64.5275	-157.4
0.0	96.0	61.1726	-157.1
0.0	97.0	57.6326	-156.8
0.0	98.0	53.9224	-156.6
0.0	99.0	50.0575	-156.4
0.0	100.0	46.0538	-156.2
0.0	101.0	41.9281	-156.0
0.0	102.0	37.6975	-155.8
0.0	103.0	33.3795	-155.7
0.0	104.0	28.9921	-155.5
0.0	105.0	24.5540	-155.3

Munn-Reese
Broadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.21
Moment Method Day Pattern Tabulation

0.0	106.0	20.0840	-155.1
0.0	107.0	15.6016	-154.6
0.0	108.0	11.1276	-153.8
0.0	109.0	6.6866	-151.7
0.0	110.0	2.3416	-141.0
0.0	111.0	2.2067	4.3
0.0	112.0	6.3972	15.8
0.0	113.0	10.5384	17.8
0.0	114.0	14.5625	18.5
0.0	115.0	18.4439	18.6
0.0	116.0	22.1610	18.6
0.0	117.0	25.6931	18.3
0.0	118.0	29.0196	18.0
0.0	119.0	32.1204	17.6
0.0	120.0	34.9753	17.2
0.0	121.0	37.5645	16.7
0.0	122.0	39.8683	16.1
0.0	123.0	41.8671	15.5
0.0	124.0	43.5415	14.8
0.0	125.0	44.8726	14.2
0.0	126.0	45.8415	13.4
0.0	127.0	46.4299	12.7
0.0	128.0	46.6195	11.9
0.0	129.0	46.3927	11.0
0.0	130.0	45.7321	10.1
0.0	131.0	44.6209	9.2
0.0	132.0	43.0426	8.3
0.0	133.0	40.9816	7.3
0.0	134.0	38.4223	6.3
0.0	135.0	35.3503	5.2
0.0	136.0	31.7515	4.1
0.0	137.0	27.6126	3.0
0.0	138.0	22.9211	1.7
0.0	139.0	17.6654	0.3
0.0	140.0	11.8349	-1.3
0.0	141.0	5.4223	-4.2
0.0	142.0	1.6266	-171.5
0.0	143.0	9.2176	178.4
0.0	144.0	17.4395	176.2
0.0	145.0	26.2787	174.6
0.0	146.0	35.7388	173.1
0.0	147.0	45.8234	171.6
0.0	148.0	56.5348	170.2
0.0	149.0	67.8739	168.7
0.0	150.0	79.8405	167.2
0.0	151.0	92.4331	165.7
0.0	152.0	105.6485	164.2
0.0	153.0	119.4822	162.7
0.0	154.0	133.9281	161.2
0.0	155.0	148.9786	159.6
0.0	156.0	164.6246	158.1
0.0	157.0	180.8553	156.5
0.0	158.0	197.6580	154.9
0.0	159.0	215.0189	153.2
0.0	160.0	232.9219	151.6
0.0	161.0	251.3497	149.9

Exhibit 1.21
Moment Method Day Pattern Tabulation

0.0	162.0	270.2831	148.2
0.0	163.0	289.7010	146.5
0.0	164.0	309.5809	144.8
0.0	165.0	329.8984	143.1
0.0	166.0	350.6276	141.3
0.0	167.0	371.7409	139.5
0.0	168.0	393.2089	137.8
0.0	169.0	415.0007	136.0
0.0	170.0	437.0841	134.2
0.0	171.0	459.4251	132.3
0.0	172.0	481.9883	130.5
0.0	173.0	504.7370	128.6
0.0	174.0	527.6332	126.8
0.0	175.0	550.6377	124.9
0.0	176.0	573.7100	123.0
0.0	177.0	596.8088	121.1
0.0	178.0	619.8916	119.2
0.0	179.0	642.9152	117.3
0.0	180.0	665.8357	115.4
0.0	181.0	688.6082	113.5
0.0	182.0	711.1879	111.5
0.0	183.0	733.5291	109.6
0.0	184.0	755.5860	107.7
0.0	185.0	777.3129	105.7
0.0	186.0	798.6637	103.8
0.0	187.0	819.5927	101.8
0.0	188.0	840.0545	99.8
0.0	189.0	860.0041	97.9
0.0	190.0	879.3969	95.9
0.0	191.0	898.1892	93.9
0.0	192.0	916.3381	92.0
0.0	193.0	933.8016	90.0
0.0	194.0	950.5390	88.0
0.0	195.0	966.5105	86.0
0.0	196.0	981.6782	84.1
0.0	197.0	996.0053	82.1
0.0	198.0	1009.4569	80.1
0.0	199.0	1021.9997	78.2
0.0	200.0	1033.6023	76.2
0.0	201.0	1044.2354	74.2
0.0	202.0	1053.8717	72.3
0.0	203.0	1062.4861	70.4
0.0	204.0	1070.0558	68.4
0.0	205.0	1076.5602	66.5
0.0	206.0	1081.9814	64.6
0.0	207.0	1086.3036	62.6
0.0	208.0	1089.5140	60.7
0.0	209.0	1091.6021	58.8
0.0	210.0	1092.5599	56.9
0.0	211.0	1092.3824	55.1
0.0	212.0	1091.0669	53.2
0.0	213.0	1088.6137	51.3
0.0	214.0	1085.0255	49.5
0.0	215.0	1080.3078	47.6
0.0	216.0	1074.4687	45.8
0.0	217.0	1067.5189	44.0

Munn-Reese

Broadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.21
Moment Method Day Pattern Tabulation

0.0	218.0	1059.4716	42.2
0.0	219.0	1050.3426	40.4
0.0	220.0	1040.1501	38.7
0.0	221.0	1028.9148	36.9
0.0	222.0	1016.6596	35.2
0.0	223.0	1003.4096	33.5
0.0	224.0	989.1922	31.8
0.0	225.0	974.0367	30.1
0.0	226.0	957.9744	28.4
0.0	227.0	941.0385	26.8
0.0	228.0	923.2638	25.2
0.0	229.0	904.6869	23.6
0.0	230.0	885.3457	22.0
0.0	231.0	865.2794	20.4
0.0	232.0	844.5288	18.9
0.0	233.0	823.1354	17.3
0.0	234.0	801.1419	15.8
0.0	235.0	778.5918	14.4
0.0	236.0	755.5292	12.9
0.0	237.0	731.9988	11.5
0.0	238.0	708.0458	10.1
0.0	239.0	683.7158	8.7
0.0	240.0	659.0541	7.3
0.0	241.0	634.1067	6.0
0.0	242.0	608.9189	4.7
0.0	243.0	583.5362	3.4
0.0	244.0	558.0036	2.2
0.0	245.0	532.3656	0.9
0.0	246.0	506.6662	-0.3
0.0	247.0	480.9487	-1.4
0.0	248.0	455.2556	-2.6
0.0	249.0	429.6287	-3.7
0.0	250.0	404.1086	-4.8
0.0	251.0	378.7349	-5.8
0.0	252.0	353.5461	-6.8
0.0	253.0	328.5796	-7.8
0.0	254.0	303.8714	-8.8
0.0	255.0	279.4561	-9.7
0.0	256.0	255.3672	-10.6
0.0	257.0	231.6363	-11.5
0.0	258.0	208.2940	-12.4
0.0	259.0	185.3691	-13.2
0.0	260.0	162.8888	-13.9
0.0	261.0	140.8790	-14.7
0.0	262.0	119.3639	-15.3
0.0	263.0	98.3660	-16.0
0.0	264.0	77.9063	-16.6
0.0	265.0	58.0042	-17.1
0.0	266.0	38.6778	-17.5
0.0	267.0	19.9444	-17.4
0.0	268.0	1.8628	-5.5
0.0	269.0	15.7073	158.7
0.0	270.0	32.5843	159.1
0.0	271.0	48.8230	158.9
0.0	272.0	64.4132	158.6
0.0	273.0	79.3474	158.3

Exhibit 1.21
Moment Method Day Pattern Tabulation

0.0	274.0	93.6199	158.1
0.0	275.0	107.2265	157.8
0.0	276.0	120.1640	157.6
0.0	277.0	132.4308	157.4
0.0	278.0	144.0266	157.2
0.0	279.0	154.9520	157.1
0.0	280.0	165.2089	156.9
0.0	281.0	174.8005	156.9
0.0	282.0	183.7308	156.8
0.0	283.0	192.0050	156.8
0.0	284.0	199.6290	156.8
0.0	285.0	206.6100	156.9
0.0	286.0	212.9559	157.0
0.0	287.0	218.6752	157.1
0.0	288.0	223.7777	157.3
0.0	289.0	228.2734	157.5
0.0	290.0	232.1735	157.7
0.0	291.0	235.4894	157.9
0.0	292.0	238.2336	158.2
0.0	293.0	240.4188	158.6
0.0	294.0	242.0585	158.9
0.0	295.0	243.1667	159.3
0.0	296.0	243.7577	159.7
0.0	297.0	243.8466	160.2
0.0	298.0	243.4485	160.7
0.0	299.0	242.5794	161.2
0.0	300.0	241.2553	161.8
0.0	301.0	239.4927	162.4
0.0	302.0	237.3085	163.0
0.0	303.0	234.7198	163.7
0.0	304.0	231.7442	164.4
0.0	305.0	228.3993	165.1
0.0	306.0	224.7031	165.8
0.0	307.0	220.6739	166.6
0.0	308.0	216.3302	167.4
0.0	309.0	211.6907	168.3
0.0	310.0	206.7742	169.2
0.0	311.0	201.5997	170.1
0.0	312.0	196.1865	171.0
0.0	313.0	190.5540	172.0
0.0	314.0	184.7216	173.0
0.0	315.0	178.7089	174.0
0.0	316.0	172.5356	175.1
0.0	317.0	166.2214	176.2
0.0	318.0	159.7860	177.3
0.0	319.0	153.2494	178.4
0.0	320.0	146.6312	179.6
0.0	321.0	139.9512	-179.2
0.0	322.0	133.2292	-178.0
0.0	323.0	126.4847	-176.7
0.0	324.0	119.7371	-175.5
0.0	325.0	113.0059	-174.2
0.0	326.0	106.3101	-172.8
0.0	327.0	99.6686	-171.5
0.0	328.0	93.1000	-170.1
0.0	329.0	86.6227	-168.7

Munn-Reese

Broadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.21
Moment Method Day Pattern Tabulation

0.0	330.0	80.2546	-167.3
0.0	331.0	74.0131	-165.8
0.0	332.0	67.9155	-164.4
0.0	333.0	61.9783	-162.9
0.0	334.0	56.2175	-161.4
0.0	335.0	50.6486	-159.8
0.0	336.0	45.2864	-158.3
0.0	337.0	40.1450	-156.7
0.0	338.0	35.2377	-155.1
0.0	339.0	30.5771	-153.5
0.0	340.0	26.1749	-151.9
0.0	341.0	22.0419	-150.3
0.0	342.0	18.1879	-148.6
0.0	343.0	14.6219	-146.9
0.0	344.0	11.3515	-145.3
0.0	345.0	8.3836	-143.6
0.0	346.0	5.7238	-142.0
0.0	347.0	3.3765	-140.5
0.0	348.0	1.3451	-139.5
0.0	349.0	0.3701	48.1
0.0	350.0	1.7644	46.3
0.0	351.0	2.8413	47.6
0.0	352.0	3.6019	49.3
0.0	353.0	4.0492	51.0
0.0	354.0	4.1875	52.6
0.0	355.0	4.0224	54.3
0.0	356.0	3.5610	55.9
0.0	357.0	2.8115	57.3
0.0	358.0	1.7838	57.9
0.0	359.0	0.4949	50.8

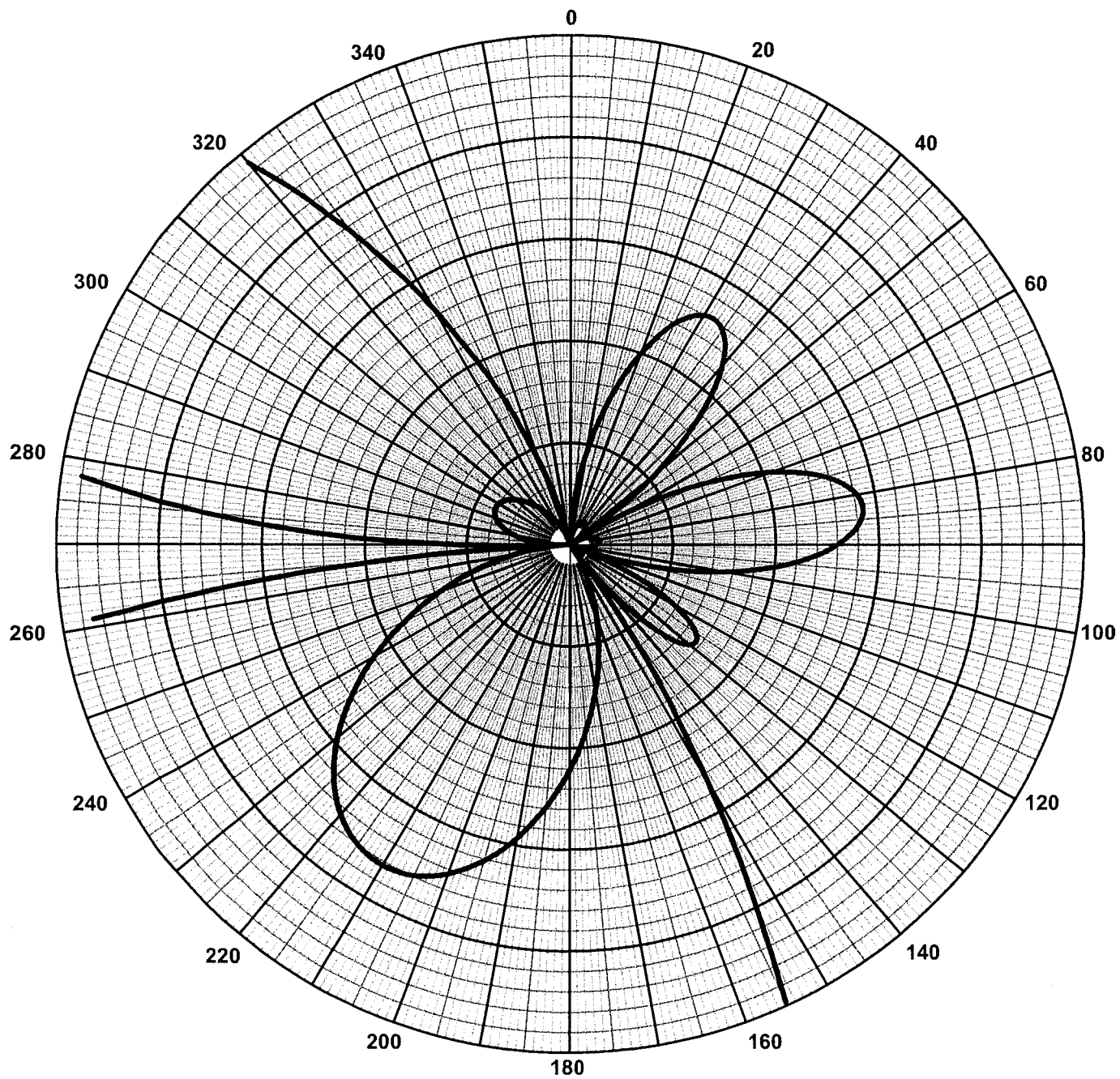


Exhibit 2.10 - Sample System Verification WJYM - Bowling Green, OH

WJYM - Bowling Green, OH

Carrier Freq (kHz) 730

Sample Line

Manufacturer	Model	Velocity Factor (0.xx)	Design Length (feet)	Full Wave Freq (kHz)
Cablewave	FCC 12-50J	0.88	600	1442.6

Theoretical Calculations

Resonant Frequency (kHz)	90°	270°	450°	630°
Distance from Carrier (kHz)	360.6	1081.9	1803.2	2524.5
	-369.4	351.9	1073.2	1794.5

Initial Measurements (Before Trimming Line Lengths)

Sample Lines	Selected Resonance (Electrical °)	Measured Freq at Resonance (MHz)	Line Length at Carrier Freq (Electrical °)	Maximum Deviation	ave on
WJYM Twr 1 (NE)	270°	0.98978	199.1°	1.59°	
WJYM Twr 2 (SE)	270°	0.98236	200.6°		
WJYM Twr 3 (SW)	270°	0.99019	199.1°		
WJYM Twr 4 (NW)	270°	0.9851	200.1°		

Final Measurements (After Trimming Line Lengths)

Measurement Date: 7/7/2021

Sample Lines	Selected Resonance (Electrical °)	Measured Freq at Resonance (MHz)	Line Length at Carrier Freq (Electrical °)	Maximum Deviation
WJYM Twr 1 (NE)	270°	0.98445	200.2°	0.31°
WJYM Twr 2 (SE)	270°	0.98292	200.5°	
WJYM Twr 3 (SW)	270°	0.98385	200.3°	
WJYM Twr 4 (NW)	270°	0.9832	200.5°	

Exhibit 2.10 - Sample System Verification WJYM - Bowling Green, OH

Sample Line Impedance Measurements

 Measurement Date: **7/7/2021**

+45° Frequency		Measured		Line Impedance		Avg ±45° Impedance		Maximum Deviation	ave on
Sample Lines	(MHz)	Resistance	Reactance						
WJYM Twr 1 (NE)	1.14853	5.34	47.75		48.05	48.56		1.82	
WJYM Twr 2 (SE)	1.14674	6.38	49.67		50.08	50.37			
WJYM Twr 3 (SW)	1.14783	5.84	49.89		50.23	50.08			
WJYM Twr 4 (NW)	1.14707	6.18	49.91		50.29	50.39			

-45° Frequency

Sample Lines	(MHz)	Measured Resistance	Measured Reactance	Line Impedance
WJYM Twr 1 (NE)	0.82038	3.93	-48.93	49.09
WJYM Twr 2 (SE)	0.81910	4.61	-50.45	50.66
WJYM Twr 3 (SW)	0.81988	3.92	-49.77	49.92
WJYM Twr 4 (NW)	0.81933	4.18	-50.31	50.48

Sampling Devices

 Measurement Date: **3/10/2021**

Location	Manufacturer	Model	Serial Number	Magnitude	Phase
WJYM Twr 1 (NE)	Delta	TCT-3	2029	0.9965	0.620
WJYM Twr 2 (SE)	Delta	TCT-3	196	0.9991	0.075
WJYM Twr 3 (SW)	Delta	TCT-3	15433	0.9940	0.120
WJYM Twr 4 (NW)	Delta	TCT-3	15445	1.0000	0.000
Spare	Delta	TCT-3	15426	0.9956	0.0056

ref torroid

Sample Line Measurements with Sampling Devices Attached

 Measurement Date: **7/7/2021**

Sample Line	Frequency (MHz)	Measured Resistance	Measured Reactance	Impedance Magnitude	ave on
WJYM Twr 1 (NE)	730	50.80	2.900	50.88	
WJYM Twr 2 (SE)	730	52.80	2.880	52.88	
WJYM Twr 3 (SW)	730	51.78	1.900	51.81	
WJYM Twr 4 (NW)	730	52.86	1.39	52.88	

Munn-Reese

 Broadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 3.10 - WJYM Day Field Strength Measurement Reference Points

WJYM - Bowling Green, OH									
Day Directional Pattern									
Radial:	56.5°	7/8/2021	Distance km	NAD83		FILM-21 s/n 1123 - Calibrated 03/31/1986, see note below			
Point #	mV/m			North Latitude	West Longitude	Description			
1	1.65		5.61	41-33-37.3 N	83-30-32.6 W	S. of 28120 Blue Grass Dr driveway			
2	1.55		5.83	41-33-41.2 N	83-30-24.7 W	Across rd from 5733 Blue Grass Dr driveway			
3	1.24		8.22	41-34-23.7 N	83-28-58.7 W	4472 Ayers Rd. Western side of property			
Radial:	110.5°	7/8/2021	Distance km	NAD83					
Point #	mV/m			North Latitude	West Longitude	Description			
1	8.2		3.26	41-31-20.3	83-31-43.0	Tracy Rd (321), 0.23 mile N of Freemont Pike			
3	4.7		6.46	41-30-44.1	83-29-33.9	Luckey Rd (11) 0.1 km N of Stony Ridge KOA driveway			
4	3.8		8.95	41-30-15.8	83-27-53.2	Troy Blvd entrance on road at mail boxes			
Radial:	142.0°	7/8/2021	Distance km	NAD83					
Point #	mV/m			North Latitude	West Longitude	Description			
1	3.9		7.22	41-28-53.0	83-30-42.8	Stony Ridge Rd (10), 0.27 km N of Dowling Rd (17)			
2	3.45		10.66	41-27-25.3	83-29-11.5	Gibert Rd (20), 0.5 km E of Luckey Rd (11)			
3	1.8		15.02	41-25-33.8	83-27-15.5	Pemberville Rd (15), 0.2 km S of Sugar Ridge Rd			
Radial:	210.5°	7/8-9/2021	Distance km	NAD83		Point 1-2 taken on 8th, 3 taken on the 9th.			
Point #	mV/m			North Latitude	West Longitude	Description			
1	102		5.15	41-29-33.5	83-35-47.8	Reitz Rd, 0.34 km W of Carter Rd			
2	67		7.03	41-28-40.9	83-36-29.1	Dowling Rd (17), 0.13 km E of Dunbridge Rd (92)			
3	39.5		11.45	41-26-37.6	83-38-05.9	12312 Devils Hole Rd (61) at driveway			

Exhibit 3.10 - WJYM Day Field Strength Measurement Reference Points

Radial:	268.0°	7/9/2021	NAD83	
Point #	mV/m	Distance km	North Latitude	West Longitude
1	5.9	4.28	41-31-52.3	83-36-59.2
2	2.4	7.67	41-31-48.4	83-39-25.3
3	2.4	8.87	41-31-47.0	83-40-17.2
Description Scheider Rd, 1.02 km N of Roachton Rd 1961 Coe Ct Int of River Ridge Way & Ridge Cross Rd				
Radial:	296.5°	7/9/2021	NAD83	
Point #	mV/m	Distance km	North Latitude	West Longitude
1	27.0	4.36	41-33-00.0	83-36-43.2
2	19.0	5.64	41-33-18.4	83-37-32.6
3	17.3	6.33	41-33-28.4	83-37-59.5
Description 509 Willow Ln 115 E 6th St 239 W 2nd St				
Radial:	359.5°	7/9/2021	NAD83	
Point #	mV/m	Distance km	North Latitude	West Longitude
1	4.2	7.12	41-35-48.1	83-33-57.5
2	3.7	7.52	41-36-01.1	83-33-57.7
3	3.2	8.65	41-36-37.7	83-33-58.1
Description 640 Marilyn Dr 1117 Lewis Ave 308 Lorraine Pl				
Center of WJYM Array in NAD83 41-31-57.2 N, 83-33-54.8 W				
Note: FIM-21 s/n 1123 calibrated 03/31/1986 readings tests were compared to FIM-41 s/n 1149 that was factory calibrated on 06/24/2021, and FIM-21 was found to be in proper calibration tolerance to the recently calibrated FIM-41				