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September 22, 2021

FILED BY E-MAIL PURSUANT TO
Public Notice, *Audio Division Announces Procedures Related to Coronavirus*, DA 20-266,
rel. March 13, 2020, addressed to Mr. James Bradshaw, Senior Deputy Chief
(james.bradshaw@fcc.gov); and Nazifa Sawez, Esq. (nazifa.sawez@fcc.gov)

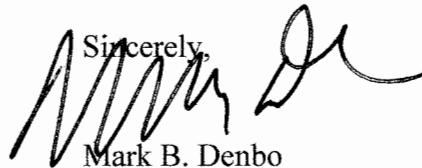
Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
9050 Junction Drive
Annapolis Junction, MD 20701

**Re: Relevant Radio, Inc.
Application for License Modification
WVNJ(AM), Oakland, New Jersey (Facility No. 68956)**

Dear Ms. Dortch:

Transmitted herewith, by the undersigned counsel to Relevant Radio, Inc., is an application filed on FCC Form 302-AM for consent to the modification of non-commercial educational AM station WVNJ, Oakland, New Jersey (Facility No. 68956). Because this is an application being filed by a non-commercial educational broadcast station, no Commission filing fee is accompanying this request.

Please direct any questions regarding this matter to the undersigned.

Sincerely,


Mark B. Denbo
Counsel to Relevant Radio, Inc.

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)

Relevant Radio, Inc.

MAILING ADDRESS (Line 1) (Maximum 35 characters)

680 Barclay Boulevard

MAILING ADDRESS (Line 2) (Maximum 35 characters)

CITY

Lincolnshire

STATE OR COUNTRY (if foreign address)

IL

ZIP CODE

60069

TELEPHONE NUMBER (include area code)

877-291-0123

CALL LETTERS

WVNJ

OTHER FCC IDENTIFIER (If applicable)

Facility No. 68956

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)
\$

FOR FCC USE ONLY

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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)

\$

FOR FCC USE ONLY

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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

\$

FOR FCC USE ONLY

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SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT Relevant Radio, Inc.		
MAILING ADDRESS 680 Barclay Boulevard		
CITY Lincolnshire	STATE IL	ZIP CODE 60069

2. This application is for:

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

Call letters WVNJ	Community of License Oakland, NJ	Construction Permit File No. N/A	Modification of Construction Permit File No(s). N/A	Expiration Date of Last Construction Permit N/A
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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

If No, explain in an Exhibit.

☒ Does not apply

Exhibit No.
N/A

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.
N/A

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.
N/A

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 Fr. Francis J. Hoffman	Signature <i>Francis J. Hoffman</i>	
Title Executive Director	Date <i>9/21/2021</i>	Telephone Number 877-291-0123

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

RELEVANT RADIO, INC

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)



Station License



Direct Measurement of Power

1. Facilities authorized in construction permit

Call Sign	File No. of Construction Permit (if applicable)	Frequency (kHz)	Hours of Operation	Power in kilowatts	
WVNJ	NA MOM STA	1160	UNLIMITED	Night 2.5	Day 20

2. Station location

State NEW JERSEY	City or Town OAKLAND
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3. Transmitter location

State NJ	County BERGEN	City or Town OAKLAND	Street address (or other identification) SKYLINE DRIVE
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4. Main studio location

State	County	City or Town	Street address (or other identification)
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5. Remote control point location (specify only if authorized directional antenna)

State IL	County LAKE	City or Town LINCOLNSHIRE	Street address (or other identification) 680 BARCLAY BLVD
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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.

8. Operating constants:

RF common point or antenna current (in amperes) without modulation for night system 7.3	RF common point or antenna current (in amperes) without modulation for day system 20.5
Measured antenna or common point resistance (in ohms) at operating frequency Night 50 Day 50	Measured antenna or common point reactance (in ohms) at operating frequency Night j0 Day j0

Antenna indications for directional operation

Towers	Antenna monitor Phase reading(s) in degrees		Antenna monitor sample current ratio(s)		Antenna base currents	
	Night	Day	Night	Day	Night	Day
1	0.0	0.0	1.000	1.000		
2	133.2	110.4	0.686	1.159		
3	73.3	118.7	0.320	0.675		
4	NA	16.1	NA	1.172		

Manufacturer and type of antenna monitor: **POTOMAC INSTRUMENTS AM1901**

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	Overall height in meters of radiator above base insulator, or above base, if grounded. 54.9 #1,2,4; 60 #3	Overall height in meters above ground (without obstruction lighting) 55.8 #1,2,4; 61 #3	Overall height in meters above ground (include obstruction lighting) 55.8 #1,2,4; 61 #3	If antenna is either top loaded or sectionalized, describe fully in an Exhibit. <div>Exhibit No.</div>
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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 °	03 '	23 "	West Longitude	74 °	14 '	58 "
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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.

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

NO CHANGE FROM STA INFORMATION

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

ANTENNAS REMOVED FROM TOWER 2

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) Clarence M. Beverage	Signature (check appropriate box) 
Address (include ZIP Code) Communications Technologies, Inc. 23 Binsted Drive Medford, NJ 08055	Date September 8, 2021 Telephone No. (Include Area Code) 609-451-5296

☐ Technical Director

☐ Registered Professional Engineer

☐ Chief Operator

☐ Technical Consultant

☒ Other (specify) Broadcast Engineering Consultant

ENGINEERING STATEMENT
APPLICATION FOR CHANGE IN MOMENT METHOD MODELING
LICENSED OPERATING PARAMETERS
WVNJ(AM) 1160 kHz
20 kW DA-D, 2.5 kW DA-N
OAKLAND, NEW JERSEY
TABLE OF CONTENTS
SEPTEMBER 2021

ENGINEERING STATEMENT

FORMS: FCC FORM 302-AM, SECTION III

EXHIBITS:

- I. MoM detail for towers driven individually.
- II. Derivation of full-time DA-Day directional operating parameters.
- III. Derivation of full-time DA-Night directional operating parameters.

TABLES:

- 1. Wire Model Data.
- 2. Measured and calculated tower self-impedance data.
- 3. DA-Day Current and Phase Calculations.
- 4. DA-Night Current and Phase Calculations.
- 5. Common point and power values.
- 6. Sampling system description.
- 7. Sample line lengths.
- 8. Sample line characteristic impedance.

FIGURES:

- 1 - 4. Circuit Models for Towers 1 - 4 Base – other towers floating.
- 5 - 8. Circuit Model for Towers 1- 4 Base – DA-Day directional.
- 9 - 11. Circuit Model for Towers 1- 3 Base – DA-Night directional.

APPENDIX:

- 1. Reference Field Strength Measurements

ENGINEERING STATEMENT
APPLICATION FOR CHANGE IN MOMENT METHOD MODELING
LICENSED OPERATING PARAMETERS

WVNJ(AM) 1160 kHz

20 kW DA-D, 2.5 kW DA-N

OAKLAND, NEW JERSEY

SUMMARY

The following engineering statement has been prepared on behalf of **Relevant Radio, Inc.** (“**Relevant**”) licensee of standard broadcast station WVNJ. The WVNJ facilities described herein were originally licensed under FCC File Number BMML-20170501ACS. When the MoM license application was filed two microwave dishes were mounted at the top of tower #2. Those dishes have been removed but the isolation device at the tower base and the cables on the tower remain. When the self-impedance of all four towers in the array were measured all towers but tower #2 were well within the required tolerance as reflected below:

	Tower 1		Tower 2		Tower 3		Tower 4	
	R	X	R	X	R	X	R	X
License self impedance	27.45	-2.148	34.49	24.91	79.25	188.8	29.36	2.76
Plus tolerance *	30.548	-0.23392	37.8696	27.9064	84.42	198.352	32.5344	4.8704
Minus tolerance *	24.352	-4.06208	31.1104	21.9136	74.08	179.248	26.1856	0.6496
Self after antenna removal	27.644	-2.947	33.064	13.142	78.905	187.052	28.938	2.408

This application is being filed to reflect slightly modified MoM parameters for the Day and Night directional antenna system operation. WVNJ is currently operating under STA BSTA-20210409AAD authorizing parameters at variance while the MoM process is undertaken. The STA request indicated that a MoM license would be filed and the STA expires on October 11, 2021.

The applicant requests authorization to operate the WVNJ antenna system using computer modeling and sample system verification as provided for in the Second Report and Order in MM Docket No. 93-177 released September 26, 2008 pending grant of the license application submitted herein. The rules specify that the directional antenna parameters be set to the operating parameters determined by the moment method

without deviation. That operation has been completed and this statement is being submitted, along with Section III of FCC Form 302-AM, specifying the calculated MoM parameters for licensed operation.

METHOD OF MOMENTS MODEL – SELF IMPEDANCE ANALYSIS

In an effort to model the antenna system as accurately as possible, detailed mechanical data was obtained from the licensee and FCC tower registration data and is summarized below:

Four uniform cross section guyed towers are used for the day system, and three of the same towers are used for night operation. The tower structures are not registered. Towers 1, 3, and 4 are 15" (.38 M) face, effective radius of .219 M, tower 2 is 17" (.43 M), effective radius .248 M. Towers 1, 2, and 4 have 54.85 M of steel, tower three is 60.02 M of steel. Tower 3 is top loaded with 25.3° of the top set of guy wires. All four towers are on concrete piers approximately 2' (.6 M) high. The base insulators for towers 1, 3, and 4 are 6", the tower 2 base insulator is 13".

The choice of calculating engine and software implementation chosen for this filing is the ACSModel Version 1.024 employing MININEC3. The circuit analysis software employed is WCAP Professional Version 1.1.10.

The wire model data are compiled in Table 1. The values there comply with the 73.151 requirement that the radius of the wire model cylinder be within 80 and 150 percent of the radius of a circle with a circumference equal to the sum of the faces, that the height be between 75 and 125 percent of the physical length and that no segment be greater than 10 electrical degrees.

Table 2 is a summary of measured and calculated self-impedance, circuit model data and calculated tolerances. The tower measured base self-impedances, with all other towers floating, as measured at the J plug, are listed in Table 2. The Mininec tower models for self-impedance determination, with all other towers floating, may be found in Exhibit I. A circuit model has been constructed for each tower to account for shunt and series reactance across the tower base. All calculations have been made employing WCAP Professional version 1.1.10 as seen in Figures 1 - 4 for self-impedance. The measured and calculated self-impedance values are well within the tolerance specified in 73.151(c)(2)(ii) as seen in Table 2.

METHOD OF MOMENTS MODEL – BASE OPERATING PARAMETERS

The modeled tower array was employed, as constructed for the derivation of self-impedance, for the determination of DA directional operating parameters. The FCC theoretical values were converted to base excitation values. The base driving point parameters for the DA-Day directional array are on Exhibit II page 5. The base driving point parameters for the DA-Night directional array are on Exhibit III page 5.

The calculated base operating parameters and the phase monitor parameters as adjusted and reflected on Form 302-AM, attached, are found on Table(s) 3 & 4 for Day and Night. The calculated MoM base operating parameters are found on Exhibit II & III for the DA-Day and Night directional operation.

DIRECT MEASUREMENT OF POWER

Common point impedance as measured, and common point currents, are listed in Table 5. This data is found on Section III FCC Form 302-AM attached.

SAMPLING SYSTEM

The sampling system equipment is summarized in Table 6. Delta TCT3 toroids, were tested for accuracy by removing the units from the tuning units at the base of each tower and placing the devices in series on the same conductor in the transmitter building. The sample devices were then measured when connected to the phase monitor with coax jumpers having exact equal electrical length.

The sampling device accuracy is well within the manufacturer tolerance of $\pm 2\%$ in magnitude and ± 3 degrees in phase. Phase monitor accuracy was confirmed by feeding the tower inputs through a splitter and equal length jumpers to confirm equal magnitude and phase on each tower. There were no observable errors.

Impedance and electrical length for each of the four sample lines were measured. The measurement was made at the transmitter building with the sample lines unterminated on the tuning unit end. The results are in Table 7.

It may be seen that the sample lines are essentially equal in length at the specified frequencies. The sample system meets the rule requirement that the sample lines be equal to within one degree.

The impedance of the sample lines was determined by measuring the open circuit impedance 45 degrees above and below the resonant length of the sample lines. The measured data is presented below. The impedance is determined using the formula:

$$Z_o = ((R_{12} + X_{12})^{1/2} \times (R_{22} + X_{22})^{1/2})^{1/2}$$

The results are tabulated in Table 8. The characteristic impedance of the transmission lines is within the allowable tolerance of 2 ohms.

Sampling system impedance was measured with each of the sampling lines terminated in its respective toroid sampling device. Impedance was measured by connecting each sample line directly to the measurement device.

GROUND SYSTEM

The ground system consists of 120 equally-spaced, buried, copper wire radials, around the base of each tower, each 64 meters in length except where foreshortened where intersecting radials are shortened and bonded to a transverse copper strap midway between adjacent towers.

REFERENCE FIELD STRENGTH MEASUREMENTS

Reference field strength measurements were taken by William P. Weeks. The measurement data appears in Appendix 1.

CONCLUSION

All adjustments, measurements and field work were undertaken under by William P. Weeks in coordination with the affiant.

The foregoing was prepared on behalf of **Relevant Radio, Inc.** by Clarence M. Beverage of *Communications Technologies, Inc.*, Medford, New Jersey, whose qualifications are a matter of record with the Federal Communications Commission. The statements herein are true and correct of his own knowledge, except such statements made on information and belief, and as to these statements he believes them to be true and correct.



Clarence M. Beverage
Communications Technologies, Inc.
Medford, New Jersey

September 8, 2021

EXHIBIT 1

MoM DETAIL FOR TOWERS DRIVEN INDIVIDUALLY

 ACSModel
 (MININEC 3.1 Core)
 01-17-2017 11:59:55

WVNJ
 ND #1
 FINAL

Frequency = 1.160 MHz Wavelength = 258.44828 Meters

No. of Wires: 7

Wire No. 1	Coordinates		Radius	End Connection	No. of Segments
X	Y	Z			
0	0	0		-1	
0	0	57.14579	0.182	0	20
Wire No. 2	Coordinates		Radius	End Connection	No. of Segments
X	Y	Z			
4.744243	-58.96539	0		-2	
4.744243	-58.96539	60.94282	0.2474	0	20
Wire No. 3	Coordinates		Radius	End Connection	No. of Segments
X	Y	Z			
-136.5171	-75.0509	0		-3	
-136.5171	-75.0509	63.17625	0.2062	0	17
Wire No. 4	Coordinates		Radius	End Connection	No. of Segments
X	Y	Z			
-136.5171	-75.0509	63.17625		3	
-125.1882	-75.05125	48.07138	0.0125	0	5
Wire No. 5	Coordinates		Radius	End Connection	No. of Segments
X	Y	Z			
-136.5171	-75.0509	63.17625		3	
-142.1812	-65.23979	48.07138	0.0125	0	5
Wire No. 6	Coordinates		Radius	End Connection	No. of Segments
X	Y	Z			
-136.5171	-75.0509	63.17625		3	
-142.1819	-84.86169	48.07138	0.0125	0	5
Wire No. 7	Coordinates		Radius	End Connection	No. of Segments
X	Y	Z			
-128.93	-18.34946	0		-7	
-128.93	-18.34946	58.86877	0.182	0	20

**** ANTENNA GEOMETRY ****

Wire No. 1	Coordinates		Radius	Connection	Pulse
X	Y	Z		End1 End2	No.
0	0	0	0.182	-1 1	1
0	0	2.857289	0.182	1 1	2
0	0	5.714579	0.182	1 1	3
0	0	8.571868	0.182	1 1	4
0	0	11.42916	0.182	1 1	5
0	0	14.28645	0.182	1 1	6
0	0	17.14374	0.182	1 1	7
0	0	20.00103	0.182	1 1	8
0	0	22.85831	0.182	1 1	9
0	0	25.7156	0.182	1 1	10
0	0	28.5729	0.182	1 1	11

0	0	31.43018	0.182	1	1	12
0	0	34.28747	0.182	1	1	13
0	0	37.14476	0.182	1	1	14
0	0	40.00205	0.182	1	1	15
0	0	42.85934	0.182	1	1	16
0	0	45.71663	0.182	1	1	17
0	0	48.57392	0.182	1	1	18
0	0	51.43121	0.182	1	1	19
0	0	54.28849	0.182	1	0	20

Wire No.	2	Coordinates			Connection Pulse		
X		Y	Z	Radius	End1	End2	No.
4.744243		-58.96539	0	0.2474	-2	2	21
4.744243		-58.96539	3.047141	0.2474	2	2	22
4.744243		-58.96539	6.094282	0.2474	2	2	23
4.744243		-58.96539	9.141423	0.2474	2	2	24
4.744243		-58.96539	12.18856	0.2474	2	2	25
4.744243		-58.96539	15.23571	0.2474	2	2	26
4.744243		-58.96539	18.28285	0.2474	2	2	27
4.744243		-58.96539	21.32999	0.2474	2	2	28
4.744243		-58.96539	24.37713	0.2474	2	2	29
4.744243		-58.96539	27.42427	0.2474	2	2	30
4.744243		-58.96539	30.47141	0.2474	2	2	31
4.744243		-58.96539	33.51855	0.2474	2	2	32
4.744243		-58.96539	36.56569	0.2474	2	2	33
4.744243		-58.96539	39.61283	0.2474	2	2	34
4.744243		-58.96539	42.65998	0.2474	2	2	35
4.744243		-58.96539	45.70712	0.2474	2	2	36
4.744243		-58.96539	48.75426	0.2474	2	2	37
4.744243		-58.96539	51.8014	0.2474	2	2	38
4.744243		-58.96539	54.84854	0.2474	2	2	39
4.744243		-58.96539	57.89568	0.2474	2	0	40

Wire No.	3	Coordinates			Connection Pulse		
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	0	0.2062	-3	3	41
-136.5171		-75.0509	3.71625	0.2062	3	3	42
-136.5171		-75.0509	7.432499	0.2062	3	3	43
-136.5171		-75.0509	11.14875	0.2062	3	3	44
-136.5171		-75.0509	14.865	0.2062	3	3	45
-136.5171		-75.0509	18.58125	0.2062	3	3	46
-136.5171		-75.0509	22.2975	0.2062	3	3	47
-136.5171		-75.0509	26.01375	0.2062	3	3	48
-136.5171		-75.0509	29.73	0.2062	3	3	49
-136.5171		-75.0509	33.44625	0.2062	3	3	50
-136.5171		-75.0509	37.1625	0.2062	3	3	51
-136.5171		-75.0509	40.87875	0.2062	3	3	52
-136.5171		-75.0509	44.595	0.2062	3	3	53
-136.5171		-75.0509	48.31125	0.2062	3	3	54
-136.5171		-75.0509	52.0275	0.2062	3	3	55
-136.5171		-75.0509	55.74374	0.2062	3	3	56
-136.5171		-75.0509	59.46	0.2062	3	0	57

Wire No.	4	Coordinates			Connection Pulse		
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	63.17625	0.0125	3	4	58
-134.2513		-75.05097	60.15527	0.0125	4	4	59
-131.9855		-75.05104	57.1343	0.0125	4	4	60
-129.7197		-75.05111	54.11333	0.0125	4	4	61
-127.454		-75.05118	51.09235	0.0125	4	0	62

Wire No.	5	Coordinates			Connection Pulse		
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	63.17625	0.0125	3	5	63
-137.6499		-73.08868	60.15527	0.0125	5	5	64
-138.7827		-71.12646	57.1343	0.0125	5	5	65
-139.9156		-69.16424	54.11333	0.0125	5	5	66
-141.0484		-67.20201	51.09235	0.0125	5	0	67

Wire No.	6	Coordinates			Connection Pulse		
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X	Y	Z	Radius	End1	End2	No.
-136.5171	-75.0509	63.17625	0.0125	3	6	68
-137.65	-77.01306	60.15527	0.0125	6	6	69
-138.783	-78.97522	57.1343	0.0125	6	6	70
-139.916	-80.93738	54.11333	0.0125	6	6	71
-141.0489	-82.89954	51.09235	0.0125	6	0	72

Wire No.	7	Coordinates		Connection	Pulse	
X	Y	Z	Radius	End1	End2	No.
-128.93	-18.34946	0	0.182	-7	7	73
-128.93	-18.34946	2.943439	0.182	7	7	74
-128.93	-18.34946	5.886878	0.182	7	7	75
-128.93	-18.34946	8.830317	0.182	7	7	76
-128.93	-18.34946	11.77376	0.182	7	7	77
-128.93	-18.34946	14.71719	0.182	7	7	78
-128.93	-18.34946	17.66063	0.182	7	7	79
-128.93	-18.34946	20.60407	0.182	7	7	80
-128.93	-18.34946	23.54751	0.182	7	7	81
-128.93	-18.34946	26.49095	0.182	7	7	82
-128.93	-18.34946	29.43439	0.182	7	7	83
-128.93	-18.34946	32.37783	0.182	7	7	84
-128.93	-18.34946	35.32127	0.182	7	7	85
-128.93	-18.34946	38.2647	0.182	7	7	86
-128.93	-18.34946	41.20814	0.182	7	7	87
-128.93	-18.34946	44.15158	0.182	7	7	88
-128.93	-18.34946	47.09502	0.182	7	7	89
-128.93	-18.34946	50.03846	0.182	7	7	90
-128.93	-18.34946	52.9819	0.182	7	7	91
-128.93	-18.34946	55.92533	0.182	7	0	92

Sources: 1
Pulse No., Voltage Magnitude, Phase (Degrees): 1, 867.4, -49.1

Number of Loads: 3
Pulse No., Resistance, Reactance: 21, 0, -10000
Pulse No., Resistance, Reactance: 41, 0, -10000
Pulse No., Resistance, Reactance: 73, 0, -10000

***** SOURCE DATA *****
Pulse 1 Voltage = (568.1164, -655.4691j)
Current = (18.9601, 1.1771j)
Impedance = (27.711, -36.291j)
Power = 5000.0 Watts

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

Wire No.	1 :				
Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)	
1	18.9601	1.1771	18.9966	3.5525	
2	18.616	0.9201	18.6387	2.8296	
3	18.2806	0.7532	18.2961	2.3593	
4	17.879	0.6107	17.8895	1.9564	
5	17.4031	0.485	17.4099	1.5965	
6	16.8505	0.3729	16.8546	1.2676	
7	16.221	0.2727	16.2233	0.9631	
8	15.5158	0.1837	15.5169	0.6784	
9	14.7365	0.1055	14.7369	0.4103	
10	13.8853	0.0379	13.8854	0.1565	
11	12.9649	-0.0192	12.9649	-0.085	
12	11.9779	-0.066	11.9781	-0.3158	
13	10.9271	-0.1025	10.9276	-0.5373	
14	9.8153	-0.1286	9.8161	-0.7507	
15	8.6446	-0.1444	8.6458	-0.9569	
16	7.4168	-0.1498	7.4183	-1.1569	
17	6.132	-0.1447	6.1337	-1.3515	
18	4.7871	-0.1288	4.7888	-1.5417	
19	3.3722	-0.1018	3.3738	-1.7287	
20	1.859	-0.0622	1.8601	-1.9156	

E	0.0	0.0	0.0	0.0
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Wire No. 2 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
21	-0.0229	-0.0373	0.0438	-121.5314
22	-0.1436	-0.2347	0.2752	-121.4604
23	-0.2143	-0.3519	0.412	-121.3435
24	-0.2698	-0.4455	0.5209	-121.2022
25	-0.3138	-0.5214	0.6086	-121.0416
26	-0.348	-0.5822	0.6783	-120.8644
27	-0.3732	-0.6292	0.7316	-120.6727
28	-0.3901	-0.6632	0.7694	-120.4679
29	-0.3992	-0.6845	0.7924	-120.2515
30	-0.4008	-0.6936	0.8011	-120.0246
31	-0.3953	-0.6906	0.7958	-119.7886
32	-0.3831	-0.6759	0.7769	-119.5447
33	-0.3645	-0.6497	0.7449	-119.2944
34	-0.3398	-0.6121	0.7001	-119.0389
35	-0.3094	-0.5633	0.6427	-118.7798
36	-0.2736	-0.5035	0.573	-118.5185
37	-0.2325	-0.4326	0.4911	-118.2564
38	-0.1862	-0.3504	0.3968	-117.9949
39	-0.1345	-0.2559	0.2891	-117.7345
40	-0.0764	-0.1468	0.1655	-117.4729
E	0.0	0.0	0.0	0.0

Wire No. 3 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
41	-0.0127	0.032	0.0344	111.7013
42	-0.0829	0.2087	0.2246	111.6682
43	-0.1276	0.322	0.3464	111.6163
44	-0.1637	0.4145	0.4457	111.555
45	-0.1934	0.4914	0.5281	111.487
46	-0.2175	0.5547	0.5958	111.4135
47	-0.2365	0.6053	0.6499	111.3358
48	-0.2505	0.6439	0.6909	111.2549
49	-0.2598	0.6707	0.7193	111.1717
50	-0.2646	0.6861	0.7354	111.0876
51	-0.2651	0.6905	0.7397	111.0042
52	-0.2617	0.6845	0.7328	110.9238
53	-0.2547	0.6688	0.7157	110.8497
54	-0.2447	0.6446	0.6895	110.7869
55	-0.2321	0.6129	0.6554	110.7418
56	-0.2174	0.5745	0.6143	110.7232
57	-0.2008	0.5301	0.5668	110.7431
J	-0.1825	0.48	0.5135	110.8204

Wire No. 4 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	-0.0551	0.1734	0.1819	107.6381
59	-0.0459	0.147	0.154	107.332
60	-0.0346	0.1138	0.1189	106.9045
61	-0.0229	0.0779	0.0812	106.3718
62	-0.0114	0.0405	0.042	105.7201
E	0.0	0.0	0.0	0.0

Wire No. 5 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	-0.06	0.1583	0.1693	110.7692
64	-0.0507	0.1326	0.142	110.9341
65	-0.039	0.101	0.1083	111.1148
66	-0.0265	0.068	0.0729	111.2973
67	-0.0136	0.0346	0.0372	111.4821
E	0.0	0.0	0.0	0.0

Wire No. 6 :				
Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	-0.0673	0.1483	0.1628	114.4297
69	-0.0579	0.123	0.1359	115.2018
70	-0.0455	0.0926	0.1032	116.1805
71	-0.0318	0.0616	0.0693	117.3145
72	-0.0169	0.0309	0.0352	118.625
E	0.0	0.0	0.0	0.0

Wire No. 7 :				
Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
73	-0.0192	0.0109	0.022	150.4689
74	-0.1062	0.0602	0.1221	150.4442
75	-0.1602	0.091	0.1843	150.4038
76	-0.2035	0.1158	0.2341	150.3549
77	-0.2387	0.1361	0.2747	150.2988
78	-0.2669	0.1526	0.3074	150.2362
79	-0.2887	0.1655	0.3328	150.1673
80	-0.3044	0.1751	0.3512	150.0922
81	-0.3143	0.1814	0.3629	150.0108
82	-0.3185	0.1844	0.368	149.9231
83	-0.3171	0.1843	0.3668	149.829
84	-0.3102	0.1811	0.3592	149.7282
85	-0.2981	0.1747	0.3455	149.6207
86	-0.2806	0.1653	0.3257	149.5063
87	-0.258	0.1527	0.2998	149.3848
88	-0.2304	0.137	0.268	149.2561
89	-0.1976	0.1182	0.2302	149.12
90	-0.1596	0.096	0.1863	148.976
91	-0.1161	0.0703	0.1357	148.8235
92	-0.066	0.0402	0.0772	148.6599
E	0.0	0.0	0.0	0.0

***** BASE OPERATING PARAMETERS *****

Twr.	Ratio	Phase
1	1.000	0.0
2	0.002	-125.1
3	0.002	108.1
4	0.001	146.9

EXHIBIT 1 CONTINUED

MoM DETAIL FOR TOWERS DRIVEN INDIVIDUALLY

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*****
          ACSModel
        (MININEC 3.1 Core)
      08-11-2021      14:28:06
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WVNJ
ND #2 2021
FINAL

Frequency = 1.160 MHz Wavelength = 258.44828 Meters

No. of Wires: 7

Wire No. 1	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
0	0	0		-1		
0	0	57.14579	0.182	0	20	
Wire No. 2	Coordinates			End Connection	No. of Segments	
X	Y	Z	Radius			
4.744243	-58.96539	0		-2		
4.744243	-58.96539	60.94282	0.2	0	20	
Wire No. 3	Coordinates			End Connection	No. of Segments	
X	Y	Z	Radius			
-136.5171	-75.0509	0		-3		
-136.5171	-75.0509	63.17625	0.2062	0	17	
Wire No. 4	Coordinates			End Connection	No. of Segments	
X	Y	Z	Radius			
-136.5171	-75.0509	63.17625		3		
-125.1882	-75.05125	48.07138	0.0125	0	5	
Wire No. 5	Coordinates			End Connection	No. of Segments	
X	Y	Z	Radius			
-136.5171	-75.0509	63.17625		3		
-142.1812	-65.23979	48.07138	0.0125	0	5	
Wire No. 6	Coordinates			End Connection	No. of Segments	
X	Y	Z	Radius			
-136.5171	-75.0509	63.17625		3		
-142.1819	-84.86169	48.07138	0.0125	0	5	
Wire No. 7	Coordinates			End Connection	No. of Segments	
X	Y	Z	Radius			
-128.93	-18.34946	0		-7		
-128.93	-18.34946	58.86877	0.182	0	20	

**** ANTENNA GEOMETRY ****

Wire No. 1	Coordinates			Radius	Connection Pulse		
X	Y	Z		End1	End2	No.	
0	0	0	0.182	-1	1	1	
0	0	2.857289	0.182	1	1	2	
0	0	5.714579	0.182	1	1	3	
0	0	8.571868	0.182	1	1	4	
0	0	11.42916	0.182	1	1	5	
0	0	14.28645	0.182	1	1	6	
0	0	17.14374	0.182	1	1	7	
0	0	20.00103	0.182	1	1	8	
0	0	22.85831	0.182	1	1	9	
0	0	25.7156	0.182	1	1	10	

0	0	28.5729	0.182	1	1	11
0	0	31.43018	0.182	1	1	12
0	0	34.28747	0.182	1	1	13
0	0	37.14476	0.182	1	1	14
0	0	40.00205	0.182	1	1	15
0	0	42.85934	0.182	1	1	16
0	0	45.71663	0.182	1	1	17
0	0	48.57392	0.182	1	1	18
0	0	51.43121	0.182	1	1	19
0	0	54.28849	0.182	1	0	20

Wire No.	2	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
4.744243		-58.96539	0	0.2	-2	2	21
4.744243		-58.96539	3.047141	0.2	2	2	22
4.744243		-58.96539	6.094282	0.2	2	2	23
4.744243		-58.96539	9.141423	0.2	2	2	24
4.744243		-58.96539	12.18856	0.2	2	2	25
4.744243		-58.96539	15.23571	0.2	2	2	26
4.744243		-58.96539	18.28285	0.2	2	2	27
4.744243		-58.96539	21.32999	0.2	2	2	28
4.744243		-58.96539	24.37713	0.2	2	2	29
4.744243		-58.96539	27.42427	0.2	2	2	30
4.744243		-58.96539	30.47141	0.2	2	2	31
4.744243		-58.96539	33.51855	0.2	2	2	32
4.744243		-58.96539	36.56569	0.2	2	2	33
4.744243		-58.96539	39.61283	0.2	2	2	34
4.744243		-58.96539	42.65998	0.2	2	2	35
4.744243		-58.96539	45.70712	0.2	2	2	36
4.744243		-58.96539	48.75426	0.2	2	2	37
4.744243		-58.96539	51.8014	0.2	2	2	38
4.744243		-58.96539	54.84854	0.2	2	2	39
4.744243		-58.96539	57.89568	0.2	2	0	40

Wire No.	3	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	0	0.2062	-3	3	41
-136.5171		-75.0509	3.71625	0.2062	3	3	42
-136.5171		-75.0509	7.432499	0.2062	3	3	43
-136.5171		-75.0509	11.14875	0.2062	3	3	44
-136.5171		-75.0509	14.865	0.2062	3	3	45
-136.5171		-75.0509	18.58125	0.2062	3	3	46
-136.5171		-75.0509	22.2975	0.2062	3	3	47
-136.5171		-75.0509	26.01375	0.2062	3	3	48
-136.5171		-75.0509	29.73	0.2062	3	3	49
-136.5171		-75.0509	33.44625	0.2062	3	3	50
-136.5171		-75.0509	37.1625	0.2062	3	3	51
-136.5171		-75.0509	40.87875	0.2062	3	3	52
-136.5171		-75.0509	44.595	0.2062	3	3	53
-136.5171		-75.0509	48.31125	0.2062	3	3	54
-136.5171		-75.0509	52.0275	0.2062	3	3	55
-136.5171		-75.0509	55.74374	0.2062	3	3	56
-136.5171		-75.0509	59.46	0.2062	3	0	57

Wire No.	4	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	63.17625	0.0125	3	4	58
-134.2513		-75.05097	60.15527	0.0125	4	4	59
-131.9855		-75.05104	57.1343	0.0125	4	4	60
-129.7197		-75.05111	54.11333	0.0125	4	4	61
-127.454		-75.05118	51.09235	0.0125	4	0	62

Wire No.	5	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	63.17625	0.0125	3	5	63
-137.6499		-73.08868	60.15527	0.0125	5	5	64
-138.7827		-71.12646	57.1343	0.0125	5	5	65
-139.9156		-69.16424	54.11333	0.0125	5	5	66
-141.0484		-67.20201	51.09235	0.0125	5	0	67

Wire No.	6	Coordinates			Radius	Connection Pulse		
X	Y	Z			End1	End2	No.	
-136.5171	-75.0509	63.17625		0.0125	3	6	68	
-137.65	-77.01306	60.15527		0.0125	6	6	69	
-138.783	-78.97522	57.1343		0.0125	6	6	70	
-139.916	-80.93738	54.11333		0.0125	6	6	71	
-141.0489	-82.89954	51.09235		0.0125	6	0	72	

Wire No.	7	Coordinates			Radius	Connection Pulse		
X	Y	Z			End1	End2	No.	
-128.93	-18.34946	0		0.182	-7	7	73	
-128.93	-18.34946	2.943439		0.182	7	7	74	
-128.93	-18.34946	5.886878		0.182	7	7	75	
-128.93	-18.34946	8.830317		0.182	7	7	76	
-128.93	-18.34946	11.77376		0.182	7	7	77	
-128.93	-18.34946	14.71719		0.182	7	7	78	
-128.93	-18.34946	17.66063		0.182	7	7	79	
-128.93	-18.34946	20.60407		0.182	7	7	80	
-128.93	-18.34946	23.54751		0.182	7	7	81	
-128.93	-18.34946	26.49095		0.182	7	7	82	
-128.93	-18.34946	29.43439		0.182	7	7	83	
-128.93	-18.34946	32.37783		0.182	7	7	84	
-128.93	-18.34946	35.32127		0.182	7	7	85	
-128.93	-18.34946	38.2647		0.182	7	7	86	
-128.93	-18.34946	41.20814		0.182	7	7	87	
-128.93	-18.34946	44.15158		0.182	7	7	88	
-128.93	-18.34946	47.09502		0.182	7	7	89	
-128.93	-18.34946	50.03846		0.182	7	7	90	
-128.93	-18.34946	52.9819		0.182	7	7	91	
-128.93	-18.34946	55.92533		0.182	7	0	92	

Sources: 1
Pulse No., Voltage Magnitude, Phase (Degrees): 21, 599.4, -7.0

Number of Loads: 3
Pulse No., Resistance, Reactance: 1, 0, -10000
Pulse No., Resistance, Reactance: 41, 0, -10000
Pulse No., Resistance, Reactance: 73, 0, -10000

***** SOURCE DATA *****
Pulse 21 Voltage = (594.9093, -73.0952j)
Current = (16.9615, 1.2391j)
Impedance = (34.575, -6.835j)
Power = 5000.0 Watts

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

Wire No.	1 :				
Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)	
1	-0.0198	-0.0335	0.0389	-120.638	
2	-0.1081	-0.183	0.2125	-120.585	
3	-0.1622	-0.2753	0.3196	-120.4982	
4	-0.2049	-0.3493	0.405	-120.3933	
5	-0.239	-0.4095	0.4741	-120.2739	
6	-0.2658	-0.4578	0.5294	-120.1419	
7	-0.2859	-0.4953	0.5719	-119.9983	
8	-0.2997	-0.5224	0.6023	-119.844	
9	-0.3075	-0.5396	0.6211	-119.6798	
10	-0.3096	-0.5471	0.6286	-119.5062	
11	-0.3062	-0.5451	0.6252	-119.3239	
12	-0.2975	-0.5338	0.6111	-119.1336	
13	-0.2838	-0.5133	0.5866	-118.9359	
14	-0.2653	-0.4839	0.5518	-118.7317	
15	-0.2421	-0.4455	0.507	-118.5216	
16	-0.2145	-0.3982	0.4523	-118.3065	
17	-0.1826	-0.3421	0.3878	-118.0873	
18	-0.1464	-0.2769	0.3132	-117.8646	
19	-0.1057	-0.2018	0.2278	-117.6389	

20	-0.0596	-0.115	0.1295	-117.4081
E	0.0	0.0	0.0	0.0

Wire No. 2 :

Pulse	Real	Imaginary	Magnitude	Phase
No.	(Amps)	(Amps)	(Amps)	(Degrees)
21	16.9615	1.2391	17.0067	4.1781
22	16.8793	0.9485	16.9059	3.2161
23	16.7169	0.7607	16.7342	2.6054
24	16.4656	0.6007	16.4766	2.0895
25	16.1256	0.46	16.1322	1.634
26	15.6978	0.3348	15.7014	1.222
27	15.1838	0.2236	15.1855	0.8438
28	14.5858	0.1256	14.5864	0.4932
29	13.9063	0.0402	13.9063	0.1655
30	13.1479	-0.0328	13.148	-0.1429
31	12.3139	-0.0934	12.3142	-0.4346
32	11.4073	-0.1417	11.4082	-0.7119
33	10.4317	-0.1778	10.4332	-0.9767
34	9.39	-0.2017	9.3922	-1.2306
35	8.2854	-0.2133	8.2882	-1.475
36	7.12	-0.2127	7.1232	-1.7111
37	5.8948	-0.1997	5.8981	-1.9402
38	4.6075	-0.1741	4.6108	-2.1634
39	3.2494	-0.1352	3.2522	-2.3822
40	1.7939	-0.0815	1.7958	-2.6004
E	0.0	0.0	0.0	0.0

Wire No. 3 :

Pulse	Real	Imaginary	Magnitude	Phase
No.	(Amps)	(Amps)	(Amps)	(Degrees)
41	-0.0232	0.0268	0.0354	130.9089
42	-0.1512	0.1746	0.231	130.8766
43	-0.2328	0.2695	0.3561	130.8258
44	-0.2992	0.347	0.4582	130.7658
45	-0.3539	0.4115	0.5428	130.699
46	-0.3986	0.4647	0.6122	130.6267
47	-0.434	0.5073	0.6677	130.5499
48	-0.4606	0.5398	0.7096	130.4695
49	-0.4785	0.5626	0.7386	130.3867
50	-0.4883	0.5757	0.7549	130.3026
51	-0.4902	0.5797	0.7591	130.219
52	-0.4847	0.5748	0.7519	130.1382
53	-0.4726	0.5619	0.7342	130.0637
54	-0.4546	0.5417	0.7072	130.0003
55	-0.4316	0.5152	0.6721	129.9551
56	-0.4044	0.483	0.63	129.9366
57	-0.3733	0.4456	0.5813	129.9572
J	-0.3389	0.4033	0.5268	130.0359

Wire No. 4 :

Pulse	Real	Imaginary	Magnitude	Phase
No.	(Amps)	(Amps)	(Amps)	(Degrees)
J	-0.1114	0.1534	0.1896	125.9798
59	-0.0936	0.1309	0.1609	125.565
60	-0.0715	0.1021	0.1246	125.0074
61	-0.0482	0.0706	0.0855	124.3337
62	-0.0245	0.037	0.0444	123.5302
E	0.0	0.0	0.0	0.0

Wire No. 5 :

Pulse	Real	Imaginary	Magnitude	Phase
No.	(Amps)	(Amps)	(Amps)	(Degrees)
J	-0.1128	0.1254	0.1686	131.9638
64	-0.0951	0.1039	0.1409	132.4562
65	-0.0731	0.0782	0.107	133.0667
66	-0.0497	0.0519	0.0718	133.7627
67	-0.0256	0.026	0.0365	134.5586
E	0.0	0.0	0.0	0.0

Wire No. 6 :				
Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	-0.1147	0.1245	0.1693	132.6538
69	-0.097	0.1031	0.1416	133.2518
70	-0.0748	0.0775	0.1077	133.9961
71	-0.0511	0.0514	0.0725	134.8458
72	-0.0264	0.0257	0.0369	135.8167
E	0.0	0.0	0.0	0.0

Wire No. 7 :				
Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
73	-0.0155	0.0151	0.0217	135.7331
74	-0.086	0.0839	0.1202	135.7056
75	-0.1297	0.1268	0.1814	135.6608
76	-0.1647	0.1613	0.2305	135.6068
77	-0.1931	0.1895	0.2706	135.5453
78	-0.2159	0.2123	0.3028	135.477
79	-0.2335	0.2302	0.3279	135.4025
80	-0.2461	0.2434	0.3461	135.322
81	-0.254	0.2519	0.3578	135.2356
82	-0.2573	0.256	0.363	135.1435
83	-0.2561	0.2557	0.3619	135.0456
84	-0.2505	0.251	0.3546	134.942
85	-0.2406	0.242	0.3412	134.8326
86	-0.2264	0.2287	0.3218	134.7174
87	-0.2081	0.2111	0.2964	134.5962
88	-0.1857	0.1892	0.2651	134.469
89	-0.1592	0.163	0.2278	134.3356
90	-0.1286	0.1323	0.1845	134.1956
91	-0.0935	0.0967	0.1345	134.0483
92	-0.0531	0.0552	0.0766	133.8912
E	0.0	0.0	0.0	0.0

***** BASE OPERATING PARAMETERS *****

Twr.	Ratio	Phase
1	0.002	-124.8
2	1.000	0.0
3	0.002	126.7
4	0.001	131.6

EXHIBIT 1 CONTINUED

MoM DETAIL FOR TOWERS DRIVEN INDIVIDUALLY

 ACSModel
 (MININEC 3.1 Core)
 01-17-2017 11:51:07

WVNJ
 ND #3
 FINAL

Frequency = 1.160 MHz Wavelength = 258.44828 Meters

No. of Wires: 7

Wire No.	Coordinates		Radius	End Connection	No. of Segments
1	X Y Z				
0	0	0		-1	
0	0	57.14579	0.182	0	20
2	X Y Z				
4.744243	-58.96539	0		-2	
4.744243	-58.96539	60.94282	0.2474	0	20
3	X Y Z				
-136.5171	-75.0509	0		-3	
-136.5171	-75.0509	63.17625	0.2062	0	17
4	X Y Z				
-136.5171	-75.0509	63.17625		3	
-125.1882	-75.05125	48.07138	0.0125	0	5
5	X Y Z				
-136.5171	-75.0509	63.17625		3	
-142.1812	-65.23979	48.07138	0.0125	0	5
6	X Y Z				
-136.5171	-75.0509	63.17625		3	
-142.1819	-84.86169	48.07138	0.0125	0	5
7	X Y Z				
-128.93	-18.34946	0		-7	
-128.93	-18.34946	58.86877	0.182	0	20

**** ANTENNA GEOMETRY ****

Wire No.	Coordinates		Radius	Connection	Pulse
1	X Y Z			End1 End2	No.
0	0	0	0.182	-1 1	1
0	0	2.857289	0.182	1 1	2
0	0	5.714579	0.182	1 1	3
0	0	8.571868	0.182	1 1	4
0	0	11.42916	0.182	1 1	5
0	0	14.28645	0.182	1 1	6
0	0	17.14374	0.182	1 1	7
0	0	20.00103	0.182	1 1	8
0	0	22.85831	0.182	1 1	9
0	0	25.7156	0.182	1 1	10

0	0	28.5729	0.182	1	1	11
0	0	31.43018	0.182	1	1	12
0	0	34.28747	0.182	1	1	13
0	0	37.14476	0.182	1	1	14
0	0	40.00205	0.182	1	1	15
0	0	42.85934	0.182	1	1	16
0	0	45.71663	0.182	1	1	17
0	0	48.57392	0.182	1	1	18
0	0	51.43121	0.182	1	1	19
0	0	54.28849	0.182	1	0	20

Wire No.	2	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
4.744243		-58.96539	0	0.2474	-2	2	21
4.744243		-58.96539	3.047141	0.2474	2	2	22
4.744243		-58.96539	6.094282	0.2474	2	2	23
4.744243		-58.96539	9.141423	0.2474	2	2	24
4.744243		-58.96539	12.18856	0.2474	2	2	25
4.744243		-58.96539	15.23571	0.2474	2	2	26
4.744243		-58.96539	18.28285	0.2474	2	2	27
4.744243		-58.96539	21.32999	0.2474	2	2	28
4.744243		-58.96539	24.37713	0.2474	2	2	29
4.744243		-58.96539	27.42427	0.2474	2	2	30
4.744243		-58.96539	30.47141	0.2474	2	2	31
4.744243		-58.96539	33.51855	0.2474	2	2	32
4.744243		-58.96539	36.56569	0.2474	2	2	33
4.744243		-58.96539	39.61283	0.2474	2	2	34
4.744243		-58.96539	42.65998	0.2474	2	2	35
4.744243		-58.96539	45.70712	0.2474	2	2	36
4.744243		-58.96539	48.75426	0.2474	2	2	37
4.744243		-58.96539	51.8014	0.2474	2	2	38
4.744243		-58.96539	54.84854	0.2474	2	2	39
4.744243		-58.96539	57.89568	0.2474	2	0	40

Wire No.	3	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	0	0.2062	-3	3	41
-136.5171		-75.0509	3.71625	0.2062	3	3	42
-136.5171		-75.0509	7.432499	0.2062	3	3	43
-136.5171		-75.0509	11.14875	0.2062	3	3	44
-136.5171		-75.0509	14.865	0.2062	3	3	45
-136.5171		-75.0509	18.58125	0.2062	3	3	46
-136.5171		-75.0509	22.2975	0.2062	3	3	47
-136.5171		-75.0509	26.01375	0.2062	3	3	48
-136.5171		-75.0509	29.73	0.2062	3	3	49
-136.5171		-75.0509	33.44625	0.2062	3	3	50
-136.5171		-75.0509	37.1625	0.2062	3	3	51
-136.5171		-75.0509	40.87875	0.2062	3	3	52
-136.5171		-75.0509	44.595	0.2062	3	3	53
-136.5171		-75.0509	48.31125	0.2062	3	3	54
-136.5171		-75.0509	52.0275	0.2062	3	3	55
-136.5171		-75.0509	55.74374	0.2062	3	3	56
-136.5171		-75.0509	59.46	0.2062	3	0	57

Wire No.	4	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	63.17625	0.0125	3	4	58
-134.2513		-75.05097	60.15527	0.0125	4	4	59
-131.9855		-75.05104	57.1343	0.0125	4	4	60
-129.7197		-75.05111	54.11333	0.0125	4	4	61
-127.454		-75.05118	51.09235	0.0125	4	0	62

Wire No.	5	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	63.17625	0.0125	3	5	63
-137.6499		-73.08868	60.15527	0.0125	5	5	64
-138.7827		-71.12646	57.1343	0.0125	5	5	65
-139.9156		-69.16424	54.11333	0.0125	5	5	66
-141.0484		-67.20201	51.09235	0.0125	5	0	67

Wire No.	6	Coordinates			Connection	Pulse
X	Y	Z	Radius	End1	End2	No.
-136.5171	-75.0509	63.17625	0.0125	3	6	68
-137.65	-77.01306	60.15527	0.0125	6	6	69
-138.783	-78.97522	57.1343	0.0125	6	6	70
-139.916	-80.93738	54.11333	0.0125	6	6	71
-141.0489	-82.89954	51.09235	0.0125	6	0	72

Wire No.	7	Coordinates			Connection	Pulse
X	Y	Z	Radius	End1	End2	No.
-128.93	-18.34946	0	0.182	-7	7	73
-128.93	-18.34946	2.943439	0.182	7	7	74
-128.93	-18.34946	5.886878	0.182	7	7	75
-128.93	-18.34946	8.830317	0.182	7	7	76
-128.93	-18.34946	11.77376	0.182	7	7	77
-128.93	-18.34946	14.71719	0.182	7	7	78
-128.93	-18.34946	17.66063	0.182	7	7	79
-128.93	-18.34946	20.60407	0.182	7	7	80
-128.93	-18.34946	23.54751	0.182	7	7	81
-128.93	-18.34946	26.49095	0.182	7	7	82
-128.93	-18.34946	29.43439	0.182	7	7	83
-128.93	-18.34946	32.37783	0.182	7	7	84
-128.93	-18.34946	35.32127	0.182	7	7	85
-128.93	-18.34946	38.2647	0.182	7	7	86
-128.93	-18.34946	41.20814	0.182	7	7	87
-128.93	-18.34946	44.15158	0.182	7	7	88
-128.93	-18.34946	47.09502	0.182	7	7	89
-128.93	-18.34946	50.03846	0.182	7	7	90
-128.93	-18.34946	52.9819	0.182	7	7	91
-128.93	-18.34946	55.92533	0.182	7	0	92

Sources: 1
Pulse No., Voltage Magnitude, Phase (Degrees): 41, 1983.2, 70.1

Number of Loads: 3
Pulse No., Resistance, Reactance: 1, 0, -10000
Pulse No., Resistance, Reactance: 21, 0, -10000
Pulse No., Resistance, Reactance: 73, 0, -10000

***** SOURCE DATA *****
Pulse 41 Voltage = (674.4337, 1865.0181j)
Current = (11.2385, 1.2978j)
Impedance = (78.132, 156.926j)
Power = 5000.0 Watts

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

Wire No.	1 :				
Pulse	Real	Imaginary	Magnitude	Phase	
No.	(Amps)	(Amps)	(Amps)	(Degrees)	
1	-0.0085	0.0182	0.0201	115.0359	
2	-0.0465	0.0996	0.1099	115.0106	
3	-0.0699	0.1501	0.1655	114.9691	
4	-0.0885	0.1906	0.2101	114.919	
5	-0.1036	0.2237	0.2465	114.8619	
6	-0.1157	0.2504	0.2758	114.7988	
7	-0.125	0.2713	0.2987	114.7301	
8	-0.1316	0.2866	0.3154	114.656	
9	-0.1356	0.2965	0.3261	114.5768	
10	-0.1372	0.3012	0.331	114.4925	
11	-0.1364	0.3007	0.3302	114.4032	
12	-0.1333	0.295	0.3237	114.309	
13	-0.1278	0.2843	0.3117	114.2099	
14	-0.1202	0.2686	0.2942	114.1058	
15	-0.1103	0.2478	0.2713	113.9965	
16	-0.0983	0.2221	0.2428	113.8821	
17	-0.0842	0.1912	0.2089	113.7623	
18	-0.0679	0.1552	0.1694	113.6367	

19	-0.0493	0.1134	0.1237	113.5047
20	-0.028	0.0648	0.0706	113.3639
E	0.0	0.0	0.0	0.0

Wire No. 2 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
21	-0.016	0.0169	0.0233	133.3277
22	-0.1004	0.1066	0.1464	133.301
23	-0.1505	0.1599	0.2196	133.2571
24	-0.1905	0.2028	0.2782	133.2038
25	-0.2228	0.2377	0.3258	133.1429
26	-0.2486	0.2659	0.3641	133.0753
27	-0.2686	0.288	0.3938	133.0014
28	-0.2829	0.3042	0.4154	132.9215
29	-0.2917	0.3147	0.4291	132.8357
30	-0.2954	0.3196	0.4352	132.7441
31	-0.2939	0.3191	0.4338	132.6468
32	-0.2873	0.3131	0.425	132.5436
33	-0.2759	0.3018	0.4089	132.4347
34	-0.2597	0.2852	0.3857	132.3199
35	-0.2387	0.2633	0.3554	132.1991
36	-0.2131	0.2361	0.318	132.0721
37	-0.1829	0.2035	0.2736	131.9388
38	-0.1479	0.1654	0.2219	131.7986
39	-0.1079	0.1213	0.1623	131.6509
40	-0.0618	0.0699	0.0933	131.4925
E	0.0	0.0	0.0	0.0

Wire No. 3 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
41	11.2385	1.2978	11.3132	6.587
42	12.2404	0.9222	12.2751	4.3084
43	12.8173	0.6738	12.835	3.0094
44	13.2184	0.463	13.2265	2.0059
45	13.475	0.2788	13.4778	1.1851
46	13.6008	0.1171	13.6013	0.4933
47	13.6038	-0.0238	13.6039	-0.1001
48	13.49	-0.1447	13.4908	-0.6146
49	13.2653	-0.2461	13.2676	-1.0627
50	12.9364	-0.3281	12.9406	-1.4528
51	12.512	-0.391	12.5181	-1.7898
52	12.0037	-0.435	12.0115	-2.0755
53	11.4273	-0.4606	11.4366	-2.3084
54	10.8027	-0.4686	10.8129	-2.4836
55	10.1483	-0.4597	10.1587	-2.5939
56	9.4748	-0.4354	9.4848	-2.631
57	8.7843	-0.3967	8.7933	-2.586
J	8.0772	-0.3452	8.0846	-2.4472

Wire No. 4 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	2.6919	-0.1153	2.6943	-2.4526
59	2.3319	-0.0884	2.3335	-2.1705
60	1.8498	-0.0596	1.8507	-1.845
61	1.3008	-0.0342	1.3012	-1.5075
62	0.6938	-0.0141	0.694	-1.1616
E	0.0	0.0	0.0	0.0

Wire No. 5 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	2.6942	-0.1134	2.6965	-2.4095
64	2.3341	-0.0865	2.3357	-2.1228
65	1.8518	-0.0579	1.8527	-1.7921
66	1.3023	-0.0329	1.3027	-1.449
67	0.6948	-0.0133	0.6949	-1.0974
E	0.0	0.0	0.0	0.0

Wire No. 6 :				
Pulse	Real	Imaginary	Magnitude	Phase
No.	(Amps)	(Amps)	(Amps)	(Degrees)
J	2.6912	-0.1165	2.6937	-2.4794
69	2.3312	-0.0896	2.3329	-2.2
70	1.8492	-0.0606	1.8502	-1.8774
71	1.3003	-0.035	1.3008	-1.5426
72	0.6936	-0.0145	0.6937	-1.1994
E	0.0	0.0	0.0	0.0

Wire No. 7 :				
Pulse	Real	Imaginary	Magnitude	Phase
No.	(Amps)	(Amps)	(Amps)	(Degrees)
73	-0.0192	-0.0359	0.0407	-118.1545
74	-0.1064	-0.1989	0.2255	-118.1454
75	-0.1604	-0.3001	0.3403	-118.13
76	-0.2036	-0.3812	0.4322	-118.1104
77	-0.2387	-0.4473	0.507	-118.0861
78	-0.2667	-0.5003	0.5669	-118.0564
79	-0.2881	-0.5414	0.6133	-118.0206
80	-0.3034	-0.5712	0.6468	-117.9776
81	-0.3128	-0.5901	0.6678	-117.9266
82	-0.3163	-0.5983	0.6767	-117.8665
83	-0.3142	-0.596	0.6738	-117.7965
84	-0.3066	-0.5836	0.6592	-117.7158
85	-0.2936	-0.5611	0.6332	-117.624
86	-0.2754	-0.5287	0.5961	-117.5205
87	-0.2522	-0.4865	0.548	-117.4052
88	-0.2242	-0.4347	0.4891	-117.278
89	-0.1913	-0.3732	0.4194	-117.1393
90	-0.1537	-0.3018	0.3387	-116.9892
91	-0.1112	-0.2198	0.2463	-116.8282
92	-0.0627	-0.125	0.1399	-116.6547
E	0.0	0.0	0.0	0.0

***** BASE OPERATING PARAMETERS *****

Twr.	Ratio	Phase
1	0.002	108.4
2	0.002	126.7
3	1.000	0.0
4	0.004	-124.7

EXHIBIT 1 - CONTINUED

MoM DETAIL FOR TOWERS DRIVEN INDIVIDUALLY

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*****
                        ACSModel
                      (MININEC 3.1 Core)
                   01-17-2017          11:48:06
*****
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WVNJ
ND #4
FINAL

Frequency = 1.160 MHz Wavelength = 258.44828 Meters

No. of Wires: 7

Wire No.	Coordinates		Radius	End Connection	No. of Segments
1	X Y Z				
	0 0 0			-1	
	0 0 57.14579		0.182	0	20
2	X Y Z				
	4.744243 -58.96539 0			-2	
	4.744243 -58.96539 60.94282		0.2474	0	20
3	X Y Z				
	-136.5171 -75.0509 0			-3	
	-136.5171 -75.0509 63.17625		0.2062	0	17
4	X Y Z				
	-136.5171 -75.0509 63.17625			3	
	-125.1882 -75.05125 48.07138		0.0125	0	5
5	X Y Z				
	-136.5171 -75.0509 63.17625			3	
	-142.1812 -65.23979 48.07138		0.0125	0	5
6	X Y Z				
	-136.5171 -75.0509 63.17625			3	
	-142.1819 -84.86169 48.07138		0.0125	0	5
7	X Y Z				
	-128.93 -18.34946 0			-7	
	-128.93 -18.34946 58.86877		0.182	0	20

**** ANTENNA GEOMETRY ****

Wire No.	Coordinates		Radius	Connection	Pulse
	X Y Z			End1 End2	No.
	0 0 0		0.182	-1 1	1
	0 0 2.857289		0.182	1 1	2
	0 0 5.714579		0.182	1 1	3
	0 0 8.571868		0.182	1 1	4
	0 0 11.42916		0.182	1 1	5
	0 0 14.28645		0.182	1 1	6
	0 0 17.14374		0.182	1 1	7
	0 0 20.00103		0.182	1 1	8
	0 0 22.85831		0.182	1 1	9
	0 0 25.7156		0.182	1 1	10
	0 0 28.5729		0.182	1 1	11

0	0	31.43018	0.182	1	1	12
0	0	34.28747	0.182	1	1	13
0	0	37.14476	0.182	1	1	14
0	0	40.00205	0.182	1	1	15
0	0	42.85934	0.182	1	1	16
0	0	45.71663	0.182	1	1	17
0	0	48.57392	0.182	1	1	18
0	0	51.43121	0.182	1	1	19
0	0	54.28849	0.182	1	0	20

Wire No.	2	Coordinates			Connection Pulse		
X		Y	Z	Radius	End1	End2	No.
4.744243		-58.96539	0	0.2474	-2	2	21
4.744243		-58.96539	3.047141	0.2474	2	2	22
4.744243		-58.96539	6.094282	0.2474	2	2	23
4.744243		-58.96539	9.141423	0.2474	2	2	24
4.744243		-58.96539	12.18856	0.2474	2	2	25
4.744243		-58.96539	15.23571	0.2474	2	2	26
4.744243		-58.96539	18.28285	0.2474	2	2	27
4.744243		-58.96539	21.32999	0.2474	2	2	28
4.744243		-58.96539	24.37713	0.2474	2	2	29
4.744243		-58.96539	27.42427	0.2474	2	2	30
4.744243		-58.96539	30.47141	0.2474	2	2	31
4.744243		-58.96539	33.51855	0.2474	2	2	32
4.744243		-58.96539	36.56569	0.2474	2	2	33
4.744243		-58.96539	39.61283	0.2474	2	2	34
4.744243		-58.96539	42.65998	0.2474	2	2	35
4.744243		-58.96539	45.70712	0.2474	2	2	36
4.744243		-58.96539	48.75426	0.2474	2	2	37
4.744243		-58.96539	51.8014	0.2474	2	2	38
4.744243		-58.96539	54.84854	0.2474	2	2	39
4.744243		-58.96539	57.89568	0.2474	2	0	40

Wire No.	3	Coordinates			Connection Pulse		
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	0	0.2062	-3	3	41
-136.5171		-75.0509	3.71625	0.2062	3	3	42
-136.5171		-75.0509	7.432499	0.2062	3	3	43
-136.5171		-75.0509	11.14875	0.2062	3	3	44
-136.5171		-75.0509	14.865	0.2062	3	3	45
-136.5171		-75.0509	18.58125	0.2062	3	3	46
-136.5171		-75.0509	22.2975	0.2062	3	3	47
-136.5171		-75.0509	26.01375	0.2062	3	3	48
-136.5171		-75.0509	29.73	0.2062	3	3	49
-136.5171		-75.0509	33.44625	0.2062	3	3	50
-136.5171		-75.0509	37.1625	0.2062	3	3	51
-136.5171		-75.0509	40.87875	0.2062	3	3	52
-136.5171		-75.0509	44.595	0.2062	3	3	53
-136.5171		-75.0509	48.31125	0.2062	3	3	54
-136.5171		-75.0509	52.0275	0.2062	3	3	55
-136.5171		-75.0509	55.74374	0.2062	3	3	56
-136.5171		-75.0509	59.46	0.2062	3	0	57

Wire No.	4	Coordinates			Connection Pulse		
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	63.17625	0.0125	3	4	58
-134.2513		-75.05097	60.15527	0.0125	4	4	59
-131.9855		-75.05104	57.1343	0.0125	4	4	60
-129.7197		-75.05111	54.11333	0.0125	4	4	61
-127.454		-75.05118	51.09235	0.0125	4	0	62

Wire No.	5	Coordinates			Connection Pulse		
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	63.17625	0.0125	3	5	63
-137.6499		-73.08868	60.15527	0.0125	5	5	64
-138.7827		-71.12646	57.1343	0.0125	5	5	65
-139.9156		-69.16424	54.11333	0.0125	5	5	66
-141.0484		-67.20201	51.09235	0.0125	5	0	67

Wire No.	6	Coordinates			Connection Pulse		
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X	Y	Z	Radius	End1	End2	No.
-136.5171	-75.0509	63.17625	0.0125	3	6	68
-137.65	-77.01306	60.15527	0.0125	6	6	69
-138.783	-78.97522	57.1343	0.0125	6	6	70
-139.916	-80.93738	54.11333	0.0125	6	6	71
-141.0489	-82.89954	51.09235	0.0125	6	0	72

Wire No.	7	Coordinates		Connection	Pulse	
X	Y	Z	Radius	End1	End2	No.
-128.93	-18.34946	0	0.182	-7	7	73
-128.93	-18.34946	2.943439	0.182	7	7	74
-128.93	-18.34946	5.886878	0.182	7	7	75
-128.93	-18.34946	8.830317	0.182	7	7	76
-128.93	-18.34946	11.77376	0.182	7	7	77
-128.93	-18.34946	14.71719	0.182	7	7	78
-128.93	-18.34946	17.66063	0.182	7	7	79
-128.93	-18.34946	20.60407	0.182	7	7	80
-128.93	-18.34946	23.54751	0.182	7	7	81
-128.93	-18.34946	26.49095	0.182	7	7	82
-128.93	-18.34946	29.43439	0.182	7	7	83
-128.93	-18.34946	32.37783	0.182	7	7	84
-128.93	-18.34946	35.32127	0.182	7	7	85
-128.93	-18.34946	38.2647	0.182	7	7	86
-128.93	-18.34946	41.20814	0.182	7	7	87
-128.93	-18.34946	44.15158	0.182	7	7	88
-128.93	-18.34946	47.09502	0.182	7	7	89
-128.93	-18.34946	50.03846	0.182	7	7	90
-128.93	-18.34946	52.9819	0.182	7	7	91
-128.93	-18.34946	55.92533	0.182	7	0	92

Sources: 1
Pulse No., Voltage Magnitude, Phase (Degrees): 73, 693.8, -33.3

Number of Loads: 3
Pulse No., Resistance, Reactance: 1, 0, -10000
Pulse No., Resistance, Reactance: 21, 0, -10000
Pulse No., Resistance, Reactance: 41, 0, -10000

***** SOURCE DATA *****
Pulse 73 Voltage = (579.6116, -381.3766j)
Current = (18.3075, 1.6027j)
Impedance = (29.609, -23.424j)
Power = 5000.0 Watts

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

Wire No.	1 :				
Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)	
1	-0.0188	0.01	0.0213	151.9305	
2	-0.1026	0.0548	0.1163	151.9053	
3	-0.1543	0.0825	0.175	151.864	
4	-0.1957	0.1049	0.2221	151.814	
5	-0.2294	0.1232	0.2604	151.757	
6	-0.2563	0.1381	0.2912	151.6938	
7	-0.2772	0.1497	0.3151	151.6246	
8	-0.2923	0.1584	0.3324	151.5498	
9	-0.3018	0.1641	0.3435	151.4695	
10	-0.3058	0.1669	0.3484	151.3837	
11	-0.3046	0.1668	0.3473	151.2925	
12	-0.2981	0.1639	0.3402	151.1959	
13	-0.2865	0.1582	0.3273	151.0939	
14	-0.2699	0.1497	0.3086	150.9863	
15	-0.2483	0.1384	0.2843	150.8732	
16	-0.2218	0.1242	0.2542	150.7543	
17	-0.1904	0.1072	0.2185	150.6295	
18	-0.154	0.0871	0.1769	150.4985	
19	-0.1122	0.0638	0.129	150.3607	
20	-0.0638	0.0365	0.0736	150.2135	

E	0.0	0.0	0.0	0.0
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Wire No. 2 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
21	-0.017	0.0163	0.0235	136.2791
22	-0.107	0.1025	0.1482	136.2504
23	-0.1604	0.1538	0.2223	136.2031
24	-0.203	0.195	0.2815	136.146
25	-0.2374	0.2286	0.3296	136.0808
26	-0.265	0.2558	0.3683	136.0085
27	-0.2862	0.277	0.3983	135.9298
28	-0.3014	0.2926	0.42	135.8449
29	-0.3108	0.3027	0.4339	135.7541
30	-0.3146	0.3075	0.4399	135.6575
31	-0.313	0.307	0.4384	135.5553
32	-0.306	0.3013	0.4294	135.4473
33	-0.2938	0.2904	0.4131	135.3337
34	-0.2765	0.2744	0.3896	135.2144
35	-0.2542	0.2534	0.3589	135.0892
36	-0.2269	0.2272	0.3211	134.958
37	-0.1947	0.1959	0.2762	134.8207
38	-0.1574	0.1592	0.2239	134.6766
39	-0.1148	0.1167	0.1638	134.5251
40	-0.0658	0.0673	0.0941	134.3628
E	0.0	0.0	0.0	0.0

Wire No. 3 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
41	-0.0337	-0.0583	0.0673	-120.0255
42	-0.2188	-0.3798	0.4383	-119.946
43	-0.3355	-0.5853	0.6747	-119.8212
44	-0.4288	-0.7525	0.8661	-119.674
45	-0.5042	-0.8907	1.0235	-119.5106
46	-0.5642	-1.0039	1.1516	-119.3348
47	-0.6101	-1.0938	1.2525	-119.1498
48	-0.6428	-1.1616	1.3275	-118.9587
49	-0.663	-1.2078	1.3779	-118.7648
50	-0.6717	-1.2334	1.4045	-118.5719
51	-0.6696	-1.2392	1.4085	-118.3845
52	-0.6578	-1.2263	1.3916	-118.2085
53	-0.6375	-1.1965	1.3557	-118.0515
54	-0.6104	-1.1516	1.3034	-117.9235
55	-0.5777	-1.094	1.2371	-117.8365
56	-0.5406	-1.0251	1.1589	-117.8045
57	-0.4998	-0.9462	1.07	-117.8439
J	-0.4558	-0.858	0.9715	-117.9776

Wire No. 4 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	-0.1565	-0.284	0.3242	-118.8575
59	-0.1336	-0.2387	0.2736	-119.2271
60	-0.1039	-0.1827	0.2102	-119.6175
61	-0.0713	-0.1236	0.1427	-119.9825
62	-0.037	-0.0632	0.0732	-120.3098
E	0.0	0.0	0.0	0.0

Wire No. 5 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	-0.2091	-0.2708	0.3421	-127.6785
64	-0.1845	-0.226	0.2917	-129.2305
65	-0.1495	-0.1713	0.2274	-131.1092
66	-0.1075	-0.1146	0.1571	-133.1632
67	-0.0587	-0.0579	0.0824	-135.3866
E	0.0	0.0	0.0	0.0

Wire No. 6 :

Pulse	Real	Imaginary	Magnitude	Phase
No.	(Amps)	(Amps)	(Amps)	(Degrees)
J	-0.0901	-0.3032	0.3163	-106.5576
69	-0.07	-0.2573	0.2667	-105.2088
70	-0.048	-0.1993	0.205	-103.5496
71	-0.0283	-0.1367	0.1396	-101.6911
72	-0.012	-0.0711	0.0721	-99.6166
E	0.0	0.0	0.0	0.0

Wire No. 7 :

Pulse	Real	Imaginary	Magnitude	Phase
No.	(Amps)	(Amps)	(Amps)	(Degrees)
73	18.3075	1.6027	18.3775	5.0031
74	18.084	1.3348	18.1332	4.2213
75	17.8258	1.1574	17.8634	3.7148
76	17.4894	1.0033	17.5182	3.2833
77	17.0705	0.8646	17.0923	2.8996
78	16.5682	0.738	16.5846	2.5505
79	15.9833	0.622	15.9954	2.2285
80	15.3175	0.5158	15.3261	1.9286
81	14.5728	0.419	14.5788	1.6471
82	13.7517	0.3316	13.7557	1.3813
83	12.8572	0.2534	12.8597	1.129
84	11.8922	0.1844	11.8937	0.8885
85	10.8599	0.1247	10.8606	0.6581
86	9.7632	0.0744	9.7635	0.4367
87	8.6048	0.0335	8.6049	0.2229
88	7.3867	0.0021	7.3867	0.0159
89	6.1094	-0.0198	6.1094	-0.1853
90	4.7704	-0.0318	4.7705	-0.3819
91	3.3601	-0.0337	3.3603	-0.575
92	1.8509	-0.0248	1.8511	-0.7678
E	0.0	0.0	0.0	0.0

***** BASE OPERATING PARAMETERS *****

Twr.	Ratio	Phase
1	0.001	146.9
2	0.001	131.3
3	0.004	-125.0
4	1.000	0.0

EXHIBIT II MoM DETAIL FOR DAYTIME OPERATING PARAMETERS

 ACSModel
 (MININEC 3.1 Core)
 08-11-2021 15:03:52

WVNI FCC DAY
 DAY AUGUST 2021

Frequency = 1.160 MHz Wavelength = 258.44828 Meters

No. of Wires: 7

Wire No. 1	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
0	0	0		-1		
0	0	57.14579	0.182	0	20	
Wire No. 2	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
4.744243	-58.96539	0		-2		
4.744243	-58.96539	60.94354	0.2	0	20	
Wire No. 3	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-136.5171	-75.0509	0		-3		
-136.5171	-75.0509	63.17625	0.2062	0	17	
Wire No. 4	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-136.5171	-75.0509	63.17625		3		
-125.1882	-75.05125	48.07138	0.0125	0	5	
Wire No. 5	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-136.5171	-75.0509	63.17625		3		
-142.1812	-65.23979	48.07138	0.0125	0	5	
Wire No. 6	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-136.5171	-75.0509	63.17625		3		
-142.1819	-84.86169	48.07138	0.0125	0	5	
Wire No. 7	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-128.93	-18.34946	0		-7		
-128.93	-18.34946	58.86877	0.182	0	20	

**** ANTENNA GEOMETRY ****

Wire No. 1	Coordinates			Radius	Connection Pulse		
X	Y	Z		End1	End2	No.	
0	0	0	0.182	-1	1	1	
0	0	2.857289	0.182	1	1	2	
0	0	5.714579	0.182	1	1	3	
0	0	8.571868	0.182	1	1	4	
0	0	11.42916	0.182	1	1	5	
0	0	14.28645	0.182	1	1	6	
0	0	17.14374	0.182	1	1	7	
0	0	20.00103	0.182	1	1	8	
0	0	22.85831	0.182	1	1	9	
0	0	25.7156	0.182	1	1	10	
0	0	28.5729	0.182	1	1	11	

0	0	31.43018	0.182	1	1	12
0	0	34.28747	0.182	1	1	13
0	0	37.14476	0.182	1	1	14
0	0	40.00205	0.182	1	1	15
0	0	42.85934	0.182	1	1	16
0	0	45.71663	0.182	1	1	17
0	0	48.57392	0.182	1	1	18
0	0	51.43121	0.182	1	1	19
0	0	54.28849	0.182	1	0	20

Wire No.	2	Coordinates			Connection Pulse		
X		Y	Z	Radius	End1	End2	No.
4.744243		-58.96539	0	0.2	-2	2	21
4.744243		-58.96539	3.047177	0.2	2	2	22
4.744243		-58.96539	6.094354	0.2	2	2	23
4.744243		-58.96539	9.141531	0.2	2	2	24
4.744243		-58.96539	12.18871	0.2	2	2	25
4.744243		-58.96539	15.23589	0.2	2	2	26
4.744243		-58.96539	18.28306	0.2	2	2	27
4.744243		-58.96539	21.33024	0.2	2	2	28
4.744243		-58.96539	24.37742	0.2	2	2	29
4.744243		-58.96539	27.42459	0.2	2	2	30
4.744243		-58.96539	30.47177	0.2	2	2	31
4.744243		-58.96539	33.51895	0.2	2	2	32
4.744243		-58.96539	36.56612	0.2	2	2	33
4.744243		-58.96539	39.6133	0.2	2	2	34
4.744243		-58.96539	42.66048	0.2	2	2	35
4.744243		-58.96539	45.70766	0.2	2	2	36
4.744243		-58.96539	48.75483	0.2	2	2	37
4.744243		-58.96539	51.80201	0.2	2	2	38
4.744243		-58.96539	54.84919	0.2	2	2	39
4.744243		-58.96539	57.89636	0.2	2	0	40

Wire No.	3	Coordinates			Connection Pulse		
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	0	0.2062	-3	3	41
-136.5171		-75.0509	3.71625	0.2062	3	3	42
-136.5171		-75.0509	7.432499	0.2062	3	3	43
-136.5171		-75.0509	11.14875	0.2062	3	3	44
-136.5171		-75.0509	14.865	0.2062	3	3	45
-136.5171		-75.0509	18.58125	0.2062	3	3	46
-136.5171		-75.0509	22.2975	0.2062	3	3	47
-136.5171		-75.0509	26.01375	0.2062	3	3	48
-136.5171		-75.0509	29.73	0.2062	3	3	49
-136.5171		-75.0509	33.44625	0.2062	3	3	50
-136.5171		-75.0509	37.1625	0.2062	3	3	51
-136.5171		-75.0509	40.87875	0.2062	3	3	52
-136.5171		-75.0509	44.595	0.2062	3	3	53
-136.5171		-75.0509	48.31125	0.2062	3	3	54
-136.5171		-75.0509	52.0275	0.2062	3	3	55
-136.5171		-75.0509	55.74374	0.2062	3	3	56
-136.5171		-75.0509	59.46	0.2062	3	0	57

Wire No.	4	Coordinates			Connection Pulse		
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	63.17625	0.0125	3	4	58
-134.2513		-75.05097	60.15527	0.0125	4	4	59
-131.9855		-75.05104	57.1343	0.0125	4	4	60
-129.7197		-75.05111	54.11333	0.0125	4	4	61
-127.454		-75.05118	51.09235	0.0125	4	0	62

Wire No.	5	Coordinates			Connection Pulse		
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	63.17625	0.0125	3	5	63
-137.6499		-73.08868	60.15527	0.0125	5	5	64
-138.7827		-71.12646	57.1343	0.0125	5	5	65
-139.9156		-69.16424	54.11333	0.0125	5	5	66
-141.0484		-67.20201	51.09235	0.0125	5	0	67

Wire No.	6	Coordinates			Connection Pulse		
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X	Y	Z	Radius	End1	End2	No.
-136.5171	-75.0509	63.17625	0.0125	3	6	68
-137.65	-77.01306	60.15527	0.0125	6	6	69
-138.783	-78.97522	57.1343	0.0125	6	6	70
-139.916	-80.93738	54.11333	0.0125	6	6	71
-141.0489	-82.89954	51.09235	0.0125	6	0	72

Wire No.	7	Coordinates		Connection	Pulse	
X	Y	Z	Radius	End1	End2	No.
-128.93	-18.34946	0	0.182	-7	7	73
-128.93	-18.34946	2.943439	0.182	7	7	74
-128.93	-18.34946	5.886878	0.182	7	7	75
-128.93	-18.34946	8.830317	0.182	7	7	76
-128.93	-18.34946	11.77376	0.182	7	7	77
-128.93	-18.34946	14.71719	0.182	7	7	78
-128.93	-18.34946	17.66063	0.182	7	7	79
-128.93	-18.34946	20.60407	0.182	7	7	80
-128.93	-18.34946	23.54751	0.182	7	7	81
-128.93	-18.34946	26.49095	0.182	7	7	82
-128.93	-18.34946	29.43439	0.182	7	7	83
-128.93	-18.34946	32.37783	0.182	7	7	84
-128.93	-18.34946	35.32127	0.182	7	7	85
-128.93	-18.34946	38.2647	0.182	7	7	86
-128.93	-18.34946	41.20814	0.182	7	7	87
-128.93	-18.34946	44.15158	0.182	7	7	88
-128.93	-18.34946	47.09502	0.182	7	7	89
-128.93	-18.34946	50.03846	0.182	7	7	90
-128.93	-18.34946	52.9819	0.182	7	7	91
-128.93	-18.34946	55.92533	0.182	7	0	92

Sources: 4

Pulse No., Voltage Magnitude, Phase (Degrees): 1, 1018.1, -35.1
Pulse No., Voltage Magnitude, Phase (Degrees): 21, 386.9, 31.2
Pulse No., Voltage Magnitude, Phase (Degrees): 41, 1701.9, -150.5
Pulse No., Voltage Magnitude, Phase (Degrees): 73, 1029.3, -6.3

Number of Loads: 0

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

Pulse 1 Voltage = (833.3134, -584.9541j)
Current = (20.0467, 1.3318j)
Impedance = (39.456, -31.801j)
Power = 7963.08 Watts

Pulse 21 Voltage = (331.0616, 200.2152j)
Current = (-9.5964, 21.264j)
Impedance = (1.985, -16.465j)
Power = 540.19 Watts

Pulse 41 Voltage = (-1481.1542, -838.2769j)
Current = (-7.3844, 11.5591j)
Impedance = (6.632, 123.901j)
Power = 623.83 Watts

Pulse 73 Voltage = (1023.143, -112.4159j)
Current = (22.1363, 8.0312j)
Impedance = (39.216, -19.306j)
Power = 10872.9 Watts

Total Power = 19999.999 Watts

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

Wire No. 1 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
1	20.0467	1.3318	20.0909	3.8009
2	19.731	0.9563	19.7541	2.7749
3	19.4058	0.7159	19.419	2.1126
4	19.0043	0.5142	19.0113	1.5497

5	18.5196	0.3398	18.5227	1.0511
6	17.9497	0.1879	17.9507	0.5996
7	17.2949	0.056	17.295	0.1856
8	16.5565	-0.057	16.5566	-0.1973
9	15.7366	-0.1521	15.7374	-0.5538
10	14.8377	-0.2298	14.8395	-0.8874
11	13.8626	-0.2906	13.8657	-1.2011
12	12.8144	-0.3349	12.8187	-1.497
13	11.6961	-0.3629	11.7017	-1.7772
14	10.5107	-0.375	10.5174	-2.0433
15	9.2609	-0.3715	9.2683	-2.297
16	7.9485	-0.3525	7.9563	-2.5395
17	6.5737	-0.3183	6.5814	-2.7722
18	5.1334	-0.2687	5.1405	-2.9964
19	3.6172	-0.2031	3.6229	-3.2137
20	1.9945	-0.1195	1.9981	-3.4278
E	0.0	0.0	0.0	0.0

Wire No. 2 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
21	-9.5964	21.264	23.3291	114.2896
22	-9.4728	21.0455	23.0791	114.233
23	-9.3323	20.7709	22.7711	114.1942
24	-9.15	20.3992	22.3574	114.1586
25	-8.9238	19.9269	21.8338	114.1241
26	-8.6533	19.3537	21.2001	114.0899
27	-8.339	18.681	20.4577	114.0555
28	-7.9821	17.9108	19.6089	114.0206
29	-7.5839	17.0459	18.6569	113.9848
30	-7.1462	16.0898	17.6054	113.9482
31	-6.6708	15.0459	16.4583	113.9107
32	-6.1596	13.9181	15.2201	113.8722
33	-5.6146	12.7103	13.8952	113.8326
34	-5.0378	11.4265	12.4878	113.7921
35	-4.4311	10.0701	11.0019	113.7507
36	-3.7958	8.6438	9.4405	113.7084
37	-3.1328	7.1484	7.8048	113.6652
38	-2.441	5.5816	6.092	113.6212
39	-1.7161	3.9325	4.2906	113.5763
40	-0.9444	2.169	2.3657	113.53
E	0.0	0.0	0.0	0.0

Wire No. 3 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
41	-7.3844	11.5591	13.7165	122.5719
42	-7.828	12.3488	14.6209	122.371
43	-8.0675	12.7891	15.121	122.244
44	-8.2149	13.078	15.4441	122.1349
45	-8.285	13.2406	15.619	122.0352
46	-8.2843	13.2879	15.6588	121.9414
47	-8.2174	13.2266	15.5714	121.8517
48	-8.0878	13.0619	15.3631	121.7654
49	-7.8994	12.799	15.0405	121.6824
50	-7.6567	12.4442	14.6111	121.6031
51	-7.3652	12.0054	14.0846	121.5285
52	-7.0323	11.4935	13.4742	121.4602
53	-6.6678	10.9234	12.7977	121.4005
54	-6.2839	10.3138	12.0773	121.3527
55	-5.8914	9.6817	11.3334	121.321
56	-5.4967	9.037	10.5774	121.3097
57	-5.1004	8.3809	9.8109	121.3236
J	-4.7021	7.713	9.0333	121.3682

Wire No. 4 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	-1.5925	2.579	3.031	121.6947
59	-1.3889	2.239	2.6347	121.8117

60	-1.1099	1.7809	2.0984	121.9338
61	-0.7863	1.256	1.4818	122.0475
62	-0.4224	0.6721	0.7938	122.1507
E	0.0	0.0	0.0	0.0

Wire No. 5 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	-1.6335	2.5746	3.0491	122.3941
64	-1.4287	2.2346	2.6523	122.5937
65	-1.146	1.7766	2.1141	122.823
66	-0.8151	1.2523	1.4942	123.0599
67	-0.4399	0.6697	0.8012	123.3019
E	0.0	0.0	0.0	0.0

Wire No. 6 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	-1.4762	2.5594	2.9546	119.9746
69	-1.2773	2.2198	2.5611	119.9171
70	-1.012	1.7633	2.0331	119.8526
71	-0.7107	1.2417	1.4308	119.7862
72	-0.3786	0.6633	0.7637	119.7168
E	0.0	0.0	0.0	0.0

Wire No. 7 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
73	22.1363	8.0312	23.5482	19.9412
74	22.0245	7.5442	23.2808	18.9081
75	21.8109	7.1887	22.965	18.2419
76	21.4831	6.8466	22.5477	17.6768
77	21.0409	6.5038	22.0232	17.1765
78	20.4854	6.1551	21.3901	16.7235
79	19.8185	5.7983	20.6493	16.3077
80	19.0428	5.4326	19.8025	15.9226
81	18.1611	5.0582	18.8524	15.5634
82	17.1769	4.6754	17.8019	15.2266
83	16.0939	4.285	16.6546	14.9092
84	14.9159	3.8878	15.4143	14.6091
85	13.6469	3.4847	14.0848	14.3242
86	12.2908	3.0765	12.67	14.0531
87	10.851	2.6641	11.1732	13.7942
88	9.33	2.2479	9.597	13.5463
89	7.7286	1.8281	7.9419	13.3081
90	6.0436	1.404	6.2045	13.0784
91	4.263	0.9729	4.3726	12.8557
92	2.3515	0.5272	2.4099	12.6362
E	0.0	0.0	0.0	0.0

***** BASE OPERATING PARAMETERS *****

Twr.	Ratio	Phase
1	1.000	0.0
2	1.161	110.5
3	0.683	118.8
4	1.172	16.1

EXHIBIT III

MoM DETAIL FOR NIGHTTIME OPERATING PARAMETERS

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*****
                        ACSModel
                    (MININEC 3.1 Core)
                   08-11-2021      15:26:07
*****
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WVNJ FCC NIGHT
NIGHT LICENSE AUGUST 2021

Frequency = 1.160 MHz Wavelength = 258.44828 Meters

No. of Wires: 7

Wire No. 1	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
0	0	0		-1		
0	0	57.14579	0.182	0		20
Wire No. 2	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
4.744243	-58.96539	0		-2		
4.744243	-58.96539	60.94354	0.2	0		20
Wire No. 3	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-136.5171	-75.0509	0		-3		
-136.5171	-75.0509	63.17625	0.2062	0		17
Wire No. 4	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-136.5171	-75.0509	63.17625		3		
-125.1882	-75.05125	48.07138	0.0125	0		5
Wire No. 5	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-136.5171	-75.0509	63.17625		3		
-142.1812	-65.23979	48.07138	0.0125	0		5
Wire No. 6	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-136.5171	-75.0509	63.17625		3		
-142.1819	-84.86169	48.07138	0.0125	0		5
Wire No. 7	Coordinates			Radius	End Connection	No. of Segments
X	Y	Z				
-128.93	-18.34946	0		-7		
-128.93	-18.34946	58.86877	0.182	0		20

**** ANTENNA GEOMETRY ****

Wire No. 1	Coordinates			Radius	Connection Pulse		
X	Y	Z			End1	End2	No.
0	0	0	0.182		-1	1	1
0	0	2.857289	0.182		1	1	2
0	0	5.714579	0.182		1	1	3
0	0	8.571868	0.182		1	1	4
0	0	11.42916	0.182		1	1	5
0	0	14.28645	0.182		1	1	6
0	0	17.14374	0.182		1	1	7

0	0	20.00103	0.182	1	1	8
0	0	22.85831	0.182	1	1	9
0	0	25.7156	0.182	1	1	10
0	0	28.5729	0.182	1	1	11
0	0	31.43018	0.182	1	1	12
0	0	34.28747	0.182	1	1	13
0	0	37.14476	0.182	1	1	14
0	0	40.00205	0.182	1	1	15
0	0	42.85934	0.182	1	1	16
0	0	45.71663	0.182	1	1	17
0	0	48.57392	0.182	1	1	18
0	0	51.43121	0.182	1	1	19
0	0	54.28849	0.182	1	0	20

Wire No.	2	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
4.744243		-58.96539	0	0.2	-2	2	21
4.744243		-58.96539	3.047177	0.2	2	2	22
4.744243		-58.96539	6.094354	0.2	2	2	23
4.744243		-58.96539	9.141531	0.2	2	2	24
4.744243		-58.96539	12.18871	0.2	2	2	25
4.744243		-58.96539	15.23589	0.2	2	2	26
4.744243		-58.96539	18.28306	0.2	2	2	27
4.744243		-58.96539	21.33024	0.2	2	2	28
4.744243		-58.96539	24.37742	0.2	2	2	29
4.744243		-58.96539	27.42459	0.2	2	2	30
4.744243		-58.96539	30.47177	0.2	2	2	31
4.744243		-58.96539	33.51895	0.2	2	2	32
4.744243		-58.96539	36.56612	0.2	2	2	33
4.744243		-58.96539	39.6133	0.2	2	2	34
4.744243		-58.96539	42.66048	0.2	2	2	35
4.744243		-58.96539	45.70766	0.2	2	2	36
4.744243		-58.96539	48.75483	0.2	2	2	37
4.744243		-58.96539	51.80201	0.2	2	2	38
4.744243		-58.96539	54.84919	0.2	2	2	39
4.744243		-58.96539	57.89636	0.2	2	0	40

Wire No.	3	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	0	0.2062	-3	3	41
-136.5171		-75.0509	3.71625	0.2062	3	3	42
-136.5171		-75.0509	7.432499	0.2062	3	3	43
-136.5171		-75.0509	11.14875	0.2062	3	3	44
-136.5171		-75.0509	14.865	0.2062	3	3	45
-136.5171		-75.0509	18.58125	0.2062	3	3	46
-136.5171		-75.0509	22.2975	0.2062	3	3	47
-136.5171		-75.0509	26.01375	0.2062	3	3	48
-136.5171		-75.0509	29.73	0.2062	3	3	49
-136.5171		-75.0509	33.44625	0.2062	3	3	50
-136.5171		-75.0509	37.1625	0.2062	3	3	51
-136.5171		-75.0509	40.87875	0.2062	3	3	52
-136.5171		-75.0509	44.595	0.2062	3	3	53
-136.5171		-75.0509	48.31125	0.2062	3	3	54
-136.5171		-75.0509	52.0275	0.2062	3	3	55
-136.5171		-75.0509	55.74374	0.2062	3	3	56
-136.5171		-75.0509	59.46	0.2062	3	0	57

Wire No.	4	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.
-136.5171		-75.0509	63.17625	0.0125	3	4	58
-134.2513		-75.05097	60.15527	0.0125	4	4	59
-131.9855		-75.05104	57.1343	0.0125	4	4	60
-129.7197		-75.05111	54.11333	0.0125	4	4	61
-127.454		-75.05118	51.09235	0.0125	4	0	62

Wire No.	5	Coordinates			Connection		Pulse
X		Y	Z	Radius	End1	End2	No.

-136.5171	-75.0509	63.17625	0.0125	3	5	63
-137.6499	-73.08868	60.15527	0.0125	5	5	64
-138.7827	-71.12646	57.1343	0.0125	5	5	65
-139.9156	-69.16424	54.11333	0.0125	5	5	66
-141.0484	-67.20201	51.09235	0.0125	5	0	67

Wire No.	6	Coordinates			Connection Pulse		
X	Y	Z	Radius	End1	End2	No.	
-136.5171	-75.0509	63.17625	0.0125	3	6	68	
-137.65	-77.01306	60.15527	0.0125	6	6	69	
-138.783	-78.97522	57.1343	0.0125	6	6	70	
-139.916	-80.93738	54.11333	0.0125	6	6	71	
-141.0489	-82.89954	51.09235	0.0125	6	0	72	

Wire No.	7	Coordinates			Connection Pulse		
X	Y	Z	Radius	End1	End2	No.	
-128.93	-18.34946	0	0.182	-7	7	73	
-128.93	-18.34946	2.943439	0.182	7	7	74	
-128.93	-18.34946	5.886878	0.182	7	7	75	
-128.93	-18.34946	8.830317	0.182	7	7	76	
-128.93	-18.34946	11.77376	0.182	7	7	77	
-128.93	-18.34946	14.71719	0.182	7	7	78	
-128.93	-18.34946	17.66063	0.182	7	7	79	
-128.93	-18.34946	20.60407	0.182	7	7	80	
-128.93	-18.34946	23.54751	0.182	7	7	81	
-128.93	-18.34946	26.49095	0.182	7	7	82	
-128.93	-18.34946	29.43439	0.182	7	7	83	
-128.93	-18.34946	32.37783	0.182	7	7	84	
-128.93	-18.34946	35.32127	0.182	7	7	85	
-128.93	-18.34946	38.2647	0.182	7	7	86	
-128.93	-18.34946	41.20814	0.182	7	7	87	
-128.93	-18.34946	44.15158	0.182	7	7	88	
-128.93	-18.34946	47.09502	0.182	7	7	89	
-128.93	-18.34946	50.03846	0.182	7	7	90	
-128.93	-18.34946	52.9819	0.182	7	7	91	
-128.93	-18.34946	55.92533	0.182	7	0	92	

Sources: 4

Pulse No., Voltage Magnitude, Phase (Degrees): 1, 493.8, -43.1
Pulse No., Voltage Magnitude, Phase (Degrees): 21, 112.0, 10.9
Pulse No., Voltage Magnitude, Phase (Degrees): 41, 729.1, 147.9
Pulse No., Voltage Magnitude, Phase (Degrees): 73, 167.6, -9.1

Number of Loads: 1

Pulse No., Resistance, Reactance: 73, 0, -10000

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

Pulse 1 Voltage = (360.2396, -337.6895j)
Current = (13.386, 0.6421j)
Impedance = (25.643, -26.457j)
Power = 2302.66 Watts

Pulse 21 Voltage = (110.0241, 21.2015j)
Current = (-6.6456, 6.3989j)
Impedance = (-6.997, -9.928j)
Power = -297.753825 Watts

Pulse 41 Voltage = (-617.3998, 387.8882j)
Current = (1.0624, 4.2442j)
Impedance = (51.738, 158.418j)
Power = 495.19 Watts

Pulse 73 Voltage = (165.5118, -26.4305j)
Current = (-0.001, 0.0007j)
Impedance = (-121875.453, -64766.276j)
Power = -0.089872 Watts

Total Power = 2500.000 Watts

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

Wire No. 1 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
1	13.386	0.6421	13.4013	2.7464
2	13.1988	0.4796	13.2075	2.0809
3	12.9963	0.3749	13.0017	1.6523
4	12.7401	0.2865	12.7433	1.2882
5	12.4262	0.2094	12.4279	0.9656
6	12.0536	0.1417	12.0544	0.6733
7	11.6226	0.0822	11.6229	0.405
8	11.1343	0.0304	11.1343	0.1563
9	10.59	-0.014	10.59	-0.0758
10	9.9914	-0.0512	9.9915	-0.2935
11	9.3405	-0.0813	9.3408	-0.4988
12	8.6392	-0.1045	8.6398	-0.6932
13	7.8897	-0.1209	7.8907	-0.878
14	7.094	-0.1305	7.0952	-1.0542
15	6.2538	-0.1335	6.2552	-1.2229
16	5.3704	-0.1298	5.3719	-1.3849
17	4.4438	-0.1196	4.4454	-1.5412
18	3.472	-0.1026	3.4735	-1.6924
19	2.4477	-0.0786	2.4489	-1.8398
20	1.3503	-0.0468	1.3512	-1.9857
E	0.0	0.0	0.0	0.0

Wire No. 2 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
21	-6.6456	6.3989	9.2255	136.0835
22	-6.6167	6.3281	9.1556	136.277
23	-6.5544	6.2424	9.0514	136.3967
24	-6.4564	6.1281	8.9016	136.4945
25	-6.3228	5.984	8.7055	136.5772
26	-6.1542	5.8099	8.4634	136.6484
27	-5.9512	5.6062	8.176	136.7099
28	-5.7149	5.3736	7.8445	136.7632
29	-5.4463	5.1128	7.4701	136.8092
30	-5.1467	4.8248	7.0546	136.8487
31	-4.8173	4.5108	6.5995	136.8824
32	-4.4597	4.1718	6.1068	136.9107
33	-4.0753	3.809	5.5782	136.9343
34	-3.6654	3.4236	5.0156	136.9536
35	-3.2314	3.0166	4.4207	136.9689
36	-2.7744	2.5889	3.7947	136.9807
37	-2.2948	2.1407	3.1382	136.9893
38	-1.7919	1.6712	2.4503	136.9951
39	-1.2624	1.1773	1.7261	136.9983
40	-0.6962	0.6492	0.9519	136.9994
E	0.0	0.0	0.0	0.0

Wire No. 3 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
41	1.0624	4.2442	4.3752	75.9469
42	1.2739	4.5747	4.7488	74.4389
43	1.4034	4.7619	4.9644	73.5795
44	1.5025	4.8886	5.1142	72.9155
45	1.5776	4.965	5.2096	72.3724
46	1.6315	4.9957	5.2554	71.9146
47	1.6654	4.9836	5.2545	71.5219
48	1.6803	4.9307	5.2091	71.1817
49	1.677	4.839	5.1214	70.8855

50	1.6565	4.7111	4.9938	70.6278
51	1.6197	4.5499	4.8296	70.4054
52	1.5682	4.3598	4.6333	70.2172
53	1.5039	4.1465	4.4108	70.064
54	1.4296	3.917	4.1698	69.9489
55	1.3477	3.6781	3.9172	69.8766
56	1.2597	3.4335	3.6573	69.8524
57	1.1663	3.1838	3.3907	69.8819
J	1.0677	2.9291	3.1176	69.9725

Wire No. 4 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	0.3518	0.9794	1.0406	70.2419
59	0.3016	0.8496	0.9016	70.4542
60	0.2364	0.6751	0.7153	70.6982
61	0.1642	0.4756	0.5032	70.9508
62	0.0865	0.2542	0.2685	71.2096
E	0.0	0.0	0.0	0.0

Wire No. 5 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	0.3597	0.9793	1.0433	69.8345
64	0.3092	0.8495	0.9041	70.0002
65	0.2432	0.675	0.7174	70.1889
66	0.1695	0.4754	0.5047	70.3819
67	0.0896	0.254	0.2694	70.5765
E	0.0	0.0	0.0	0.0

Wire No. 6 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	0.3563	0.9704	1.0337	69.8406
69	0.3058	0.841	0.8949	70.0146
70	0.24	0.6675	0.7093	70.22
71	0.1669	0.4696	0.4984	70.4374
72	0.088	0.2507	0.2656	70.6643
E	0.0	0.0	0.0	0.0

Wire No. 7 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
73	-0.001	0.0007	0.0012	142.9403
74	-0.0174	-0.0711	0.0732	-103.7445
75	-0.0277	-0.1158	0.1191	-103.4332
76	-0.0359	-0.1516	0.1558	-103.3334
77	-0.0427	-0.1808	0.1857	-103.2964
78	-0.0482	-0.2042	0.2098	-103.288
79	-0.0526	-0.2224	0.2285	-103.2957
80	-0.0558	-0.2356	0.2421	-103.3138
81	-0.0579	-0.244	0.2508	-103.3392
82	-0.0589	-0.2478	0.2547	-103.3699
83	-0.0589	-0.247	0.2539	-103.405
84	-0.0578	-0.2418	0.2486	-103.4436
85	-0.0557	-0.2322	0.2388	-103.4854
86	-0.0526	-0.2185	0.2247	-103.5299
87	-0.0485	-0.2007	0.2064	-103.5772
88	-0.0434	-0.1788	0.184	-103.6271
89	-0.0373	-0.1531	0.1576	-103.68
90	-0.0302	-0.1234	0.127	-103.736
91	-0.022	-0.0895	0.0921	-103.7958
92	-0.0125	-0.0507	0.0522	-103.8606
E	0.0	0.0	0.0	0.0

***** BASE OPERATING PARAMETERS *****

Twr.	Ratio	Phase
1	1.000	0.0
2	0.688	133.3
3	0.326	73.2
4	0.000	140.2

Table 1 Day: Wire Model Data

Tower	1	2	3	4
Actual Radius, Meters	0.219	0.248	0.219	0.219
Model Radius, Meters	0.182	0.2	0.2062	0.182
Percentage of Actual radius	83.1%	80.6%	94.2%	83.1%
FCC Height, Meters	54.85	54.85	60.02	54.85
Model Height, Meters	57.146	60.943	63.176	58.869
Percentage of Actual Height	104.2%	111.1%	105.3%	107.3%
Number of Segments	20	20	17	20

Table 2: Measured and Calculated Self Impedances

Tower	1	2	3	4
Measured self impedance R at ATU	27.45	33.06	79.25	29.36
Measured self impedance X at ATU	-2.148	13.1	188.8	2.76
Shunt capacitance pf	16	20	16	16
Series Inductance uh	4.6	4.2	4.3	3.6
Shunt Inductance uh		12350		
Shunt Inductance uh	2470	2470	2470	2470
Modeled self impedance R at ATU	27.5	34.48	79.39	29.45
Modeled self impedance X at ATU	-2.658	13.48	188.8	2.825
Resistance Tolerance, ohms, \pm	3.10	3.32	5.17	3.17
Reactance Tolerance, ohms, \pm	2.09	2.52	9.55	2.11

Table 3: DA-Day Current and Phase Calculations

	Circuit Model		Corrections to Modeled Values to Derive Antenna Monitor Values		Modeled Base		Antenna Monitor	
	Ratio	Phase	Ratio	Phase	Ratio	Phase	Ratio	Phase
1	0.996	-0.138	1.004	0.138	1.000	0.0	1.000	0.0
2	0.998	-0.009	1.002	0.009	1.161	110.5	1.159	110.4
3	1.006	-0.022	0.994	0.022	0.683	118.8	0.675	118.7
4	0.997	-0.137	1.003	0.137	1.172	16.1	1.172	16.1

Table 4: DA-Night Current and Phase Calculations

	Circuit Model		Corrections to Modeled Values to Derive Antenna Monitor Values		Modeled Base		Antenna Monitor	
	Ratio	Phase	Ratio	Phase	Ratio	Phase	Ratio	Phase
1	0.997	-0.090	1.003	0.090	1.000	0.0	1.000	0.0
2	0.998	0.032	1.002	-0.032	0.688	133.3	0.686	133.2
3	1.008	-0.183	0.992	0.183	0.326	73.2	0.320	73.3

Table 5: Common Point

Common Point Impedance Measured with	Delta CPB1A SN 858
Common Point Current Measured with	Delta 20/40A scale, TCT1 SN 8388
Measured Day Common Point Resistance	50
Measured Day Common Point Reactance	0
Day Power, KW	20
Day Common Point Current,, Amperes	20.2
Measured Night Common Point Resistance	50
Measured Night Common Point Reactance	0
Night Power, KW	2.5
Night Common Point Current,, Amperes	7.3

Table 6: Sample System Devices

Tower	Device	Serial	Ratio	Phase	Impedance at Sample Port	Impedance Through Sample Line
1	Delta TCT3	15982	1	2	50.4 +j1.65	51.36 -j.06
2	Delta TCT3	15984	0.998	0	50.32 +j1.79	51.3 +j.08
3	Delta TCT3	15987	0.994	-0.2	49.98 +j1.51	51.39 -j.12
4	Delta TCT3	15986	0.999	-0.2	50.97 +j1.45	51.39 +j.03
Sample Lines are:		3/8", copper clad aluminum center, foam dielectric, corrugated copper outer				
Phase Monitor is:		Potomac Instruments AM1901				

Table 7: Sample Line Lengths

Carrier Frequency, KHz	1160				
Velocity Factor	0.88				
Tower	1	2	3	4	
Odd Quarter Wave Below Carrier	1.75	1.75	1.75	1.75	
Open Circuit Resonant Frequency, KHz	1112.4	1112.4	1112.4	1111.8	
Resultant Length, Feet	1361.58	1361.58	1361.58	1362.31	
Resultant Length, Degrees at Carrier	657.0	657.0	657.0	657.3	
Odd Quarter Wave Above Carrier	2.25	2.25	2.25	2.25	
Open Circuit Resonant Frequency, KHz	1432.1	1433.1	1432.1	1432	
Resultant Length, Feet	1359.80	1358.85	1359.80	1359.89	
Resultant Length, Degrees at Carrier	656.1	655.6	656.1	656.1	
Average Length at Carrier, Degrees	656.5	656.3	656.5	656.7	

Table 8: Sample Line Characteristic Impedance

Tower	+1/8 from 5/4 Wave, Frequency, kHz	Measured Resistance	Measured Reactance	-1/8 from 5/4 wave, Frequency, kHz	Measured Resistance	Measured Reactance	Calculated Impedance by Formula
1	1192	16.14	47.44	1033	13.99	-47.83	49.97
2	1192	16.12	48.2	1033	14.31	-48.72	50.80
3	1192	16.54	47.53	1033	14.15	-47.26	49.83
4	1192	16.79	48.81	1032	14.65	-49.48	51.61

FIGURE – 1 WCAP - WVNJ TOWER #1 DAY NON-DIRECTIONAL

WCAP OUTPUT AT FREQUENCY: 1.160 MHz

NODE VOLTAGES

Node: 1 454.7520 \angle -52.7323° V
 Node: 2 276.3394 \angle -5.5192° V
 Node: 3 454.7520 \angle -52.7324° V
 Node: 4 454.8125 \angle -52.7223° V
 Node: 5 276.2398 \angle -5.5212° V

WCAP PART			CURRENT IN		CURRENT OUT	
WCAP PART			BRANCH	VOLTAGE	BRANCH	CURRENT
R 2→5	0.01000000	0.10 \angle	0.000° V	10.00 \angle	0.000° A	
L 5→4	4.60000000	335.32 \angle	90.087° V	10.00 \angle	0.087° A	
R 4→1	0.01000000	0.10 \angle	0.087° V	10.00 \angle	0.087° A	
C 3→0	0.00001600	454.75 \angle	-52.732° V	0.05 \angle	37.268° A	
R 1→0	27.71100000	454.75 \angle	-52.732° V	9.96 \angle	-0.097° A	
R 1→3	0.01000000	0.01 \angle	37.268° V	0.05 \angle	37.268° A	
L 5→0	2470.00000000	276.24 \angle	-5.521° V	0.02 \angle	-95.521° A	
WCAP PART			FROM IMPEDANCE		TO IMPEDANCE	
R 2→5	0.01000000	27.51 - j	2.658	27.50 - j	2.658	
L 5→4	4.60000000	27.49 - j	2.699	27.49 - j	36.226	
R 4→1	0.01000000	27.49 - j	36.226	27.48 - j	36.226	
C 3→0	0.00001600	0.01 - j	8575.159	0.00 + j	0.000	
R 1→0	27.71100000	27.71 - j	36.291	0.00 + j	0.000	
R 1→3	0.01000000	0.01 - j	8575.159	-0.00 - j	8575.159	
L 5→0	2470.00000000	-0.00 + j	18002.583	0.00 + j	0.000	

WCAP INPUT DATA:

1.1600 0.00000000 0
 I 10.00000000 0 2 0.00000000
 R 0.01000000 2 5 0.00000000
 L 4.60000000 5 4 0.00000000
 R 0.01000000 4 1 0.00000000
 C 0.00001600 3 0
 R 27.71100000 1 0 -36.29100000
 R 0.01000000 1 3 0.00000000
 L 2470.00000000 5 0 0.00000000

Center Frequency: 1.16 MHz

Frequency Range: ± 0 kHz

Frequency Step: 0 kHz

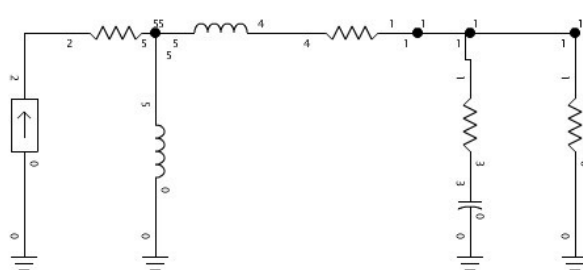


FIGURE 2 - WCAP - WVNJ TOWER #2 NON-DIRECTIONAL

WCAP - WVNJ TOWER #2 ND AUGUST 2021

WCAP OUTPUT AT FREQUENCY: 1.160 MHz

NODE VOLTAGES

Node: 1 370.1861 \angle 21.3458° V
 Node: 2 351.8504 \angle -11.3392° V
 Node: 3 351.8504 \angle -11.3391° V
 Node: 4 370.0930 \angle 21.3514° V
 Node: 5 370.0930 \angle 21.3514° V
 Node: 6 351.8504 \angle -11.3391° V
 Node: 8 351.9483 \angle -11.3359° V

WCAP PART			CURRENT IN		CURRENT OUT	
WCAP PART	BRANCH	VOLTAGE	VOLTAGE		CURRENT	
R	1→5	0.01000000	0.10 \angle	0.000° V	10.00 \angle	0.000° A
L	5→8	2.80000000	203.93 \angle	90.110° V	9.99 \angle	0.110° A
C	2→0	0.00002000	351.85 \angle	-11.339° V	0.05 \angle	78.661° A
R	6→0	34.57500000	351.85 \angle	-11.339° V	9.98 \angle	-0.157° A
L	4→0	2470.00000000	370.09 \angle	21.351° V	0.02 \angle	-68.649° A
R	6→3	0.01000000	0.00 \angle	-101.339° V	0.00 \angle	-101.339° A
L	3→0	12350.00000000	351.85 \angle	-11.339° V	0.00 \angle	-101.339° A
R	5→4	0.01000000	0.00 \angle	-68.649° V	0.02 \angle	-68.649° A
R	6→2	0.01000000	0.01 \angle	78.661° V	0.05 \angle	78.661° A
R	8→6	0.01000000	0.10 \angle	0.110° V	9.99 \angle	0.110° A

WCAP PART			FROM IMPEDANCE		TO IMPEDANCE	
R	1→5	0.01000000	34.48 + j	13.475	34.47 + j	13.475
L	5→8	2.80000000	34.52 + j	13.419	34.52 - j	6.989
C	2→0	0.00002000	0.00 - j	6860.127	0.00 + j	0.000
R	6→0	34.57500000	34.57 - j	6.835	0.00 + j	0.000
L	4→0	2470.00000000	0.00 + j	18002.583	0.00 + j	0.000
R	6→3	0.01000000	0.01 + j	90012.913	0.00 + j	90012.913
L	3→0	12350.00000000	0.00 + j	90012.913	0.00 + j	0.000
R	5→4	0.01000000	0.01 + j	18002.583	0.01 + j	18002.583
R	6→2	0.01000000	0.01 - j	6860.127	0.00 - j	6860.127
R	8→6	0.01000000	34.52 - j	6.989	34.51 - j	6.989

WCAP INPUT DATA:

	1.1600	0.00000000	0
I	10.00000000	0	1
R	0.01000000	1	5
L	2.80000000	5	8
C	0.00002000	2	0
R	34.57500000	6	0
L	2470.00000000	4	0
R	0.01000000	6	3
L	12350.00000000	3	0
R	0.01000000	5	4
R	0.01000000	6	2
R	0.01000000	8	6

Center Frequency: 1.16 MHz

Frequency Range: ± 0 kHz

Frequency Step: 0 kHz

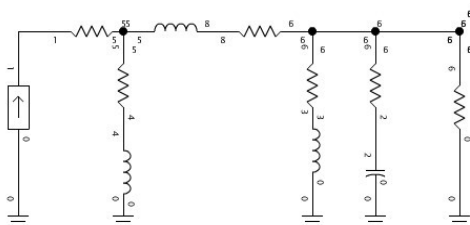


FIGURE 3 - WCAP - WVNJ TOWER #3 NON-DIRECTIONAL

WCAP - WVNJ TOWER #3 ND
WCAP OUTPUT AT FREQUENCY: 1.160 MHz

NODE VOLTAGES

Node: 1 1766.9007 \angle 63.2553° V
Node: 2 2048.1435 \angle 67.1920° V
Node: 3 1766.9007 \angle 63.2552° V
Node: 4 1766.9456 \angle 63.2524° V
Node: 5 2048.1047 \angle 67.1946° V

WCAP PART		CURRENT IN		CURRENT OUT	
WCAP PART		BRANCH	VOLTAGE	BRANCH	CURRENT
R	2→5	0.01000000	0.10 \angle 0.000° V	10.00 \angle 0.000° A	
L	5→4	4.30000000	310.12 \angle 90.255° V	9.90 \angle 0.255° A	
R	4→1	0.01000000	0.10 \angle 0.255° V	9.90 \angle 0.255° A	
C	3→0	0.00001600	1766.90 \angle 63.255° V	0.21 \angle 153.255° A	
R	1→0	78.13200000	1766.90 \angle 63.255° V	10.08 \angle -0.276° A	
R	1→3	0.01000000	0.00 \angle 153.255° V	0.21 \angle 153.255° A	
L	5→0	2470.00000000	2048.10 \angle 67.195° V	0.11 \angle -22.805° A	
WCAP PART		FROM IMPEDANCE		TO IMPEDANCE	
R	2→5	0.01000000	79.40 + j 188.800	79.39 + j 188.800	
L	5→4	4.30000000	81.08 + j 190.439	81.08 + j 159.099	
R	4→1	0.01000000	81.08 + j 159.099	81.07 + j 159.099	
C	3→0	0.00001600	0.00 - j 8575.159	0.00 + j 0.000	
R	1→0	78.13200000	78.13 + j 156.926	0.00 + j 0.000	
R	1→3	0.01000000	0.01 - j 8575.159	-0.01 - j 8575.159	
L	5→0	2470.00000000	0.00 + j 18002.583	0.00 + j 0.000	

WCAP INPUT DATA:

	1.1600	0.00000000	0
I	10.00000000	0	2
R	0.01000000	2	5
L	4.30000000	5	4
R	0.01000000	4	1
C	0.00001600	3	0
R	78.13200000	1	0
R	0.01000000	1	3
L	2470.00000000	5	0

Center Frequency: 1.16 MHz

Frequency Range: ± 0 kHz

Frequency Step: 0 kHz

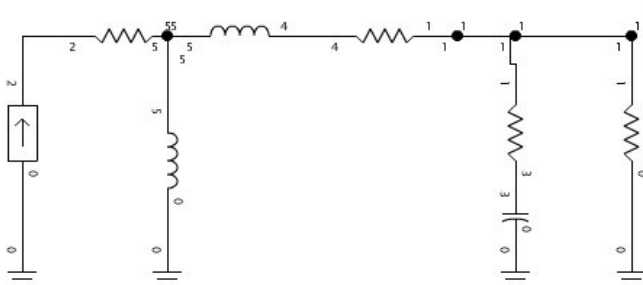


FIGURE 4 - WCAP - WVNJ TOWER #4 NON-DIRECTIONAL

WCAP OUTPUT AT FREQUENCY: 1.160 MHz

NODE VOLTAGES

Node: 1 376.4523 \angle -38.4515° V Node:
 2 295.9351 \angle 5.4773° V Node: 3
 376.4523 \angle -38.4515° V
 Node: 4 376.5305 \angle -38.4420° V
 Node: 5 295.8355 \angle 5.4791° V

	WCAP PART		CURRENT IN		CURRENT OUT	
	WCAP PART		BRANCH VOLTAGE		BRANCH CURRENT	
R	2→5	0.01000000	0.10 \angle 0.000° V		10.00 \angle 0.000° A	
L	5→4	3.60000000	262.34 \angle 90.094° V		10.00 \angle 0.094° A	
R	4→1	0.01000000	0.10 \angle 0.094° V		10.00 \angle 0.094° A	
C	3→0	0.00001600	376.45 \angle -38.452° V		0.04 \angle 51.548° A	
R	1→0	29.60900000	376.45 \angle -38.451° V		9.97 \angle -0.104° A	
R	1→3	0.01000000	0.00 \angle 51.548° V		0.04 \angle 51.548° A	
L	5→0	2470.00000000	295.84 \angle 5.479° V		0.02 \angle -84.521° A	
	WCAP PART		FROM IMPEDANCE		TO IMPEDANCE	
R	2→5	0.01000000	29.46 + j 2.825		29.45 + j 2.825 L	
	5→4	3.60000000	29.46 + j 2.777		29.46 - j 23.462	
R	4→1	0.01000000	29.46 - j 23.462		29.45 - j 23.462	
C	3→0	0.00001600	0.00 - j 8575.159		0.00 + j 0.000	
R	1→0	29.60900000	29.61 - j 23.424		0.00 + j 0.000	
R	1→3	0.01000000	0.01 - j 8575.159		-0.01 - j 8575.159 L	
	5→0	2470.00000000	0.00 + j 18002.583		0.00 + j 0.000	

WCAP INPUT DATA:

1.1600 0.00000000 0
 I 10.00000000 0 2 0.00000000
 R 0.01000000 2 5 0.00000000
 L 3.60000000 5 4 0.00000000
 R 0.01000000 4 1 0.00000000
 C 0.00001600 3 0
 R 29.60900000 1 0 -23.42400000
 R 0.01000000 1 3 0.00000000
 L 2470.00000000 5 0 0.00000000

Center Frequency: 1.16 MHz

Frequency Range: ± 0 kHz

Frequency Step: 0 kHz

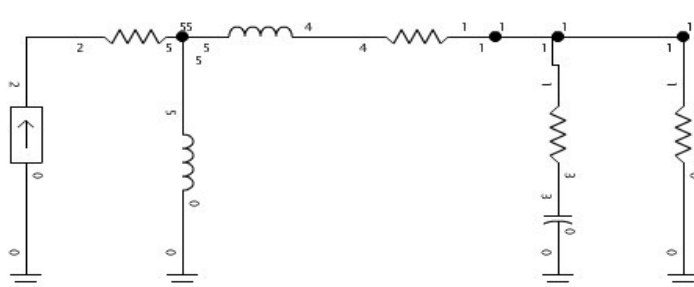


FIGURE 5 - WCAP - WVNJ TOWER #1 DAY DIRECTIONAL

WCAP OUTPUT AT FREQUENCY: 1.160 MHz

NODE VOLTAGES

Node: 1 504.8135 \angle -39.0157° V
 Node: 2 392.0857 \angle 2.5496° V
 Node: 3 504.8135 \angle -39.0157° V
 Node: 4 504.8910 \angle -39.0085° V
 Node: 5 391.9858 \angle 2.5503° V

WCAP PART			CURRENT IN		CURRENT OUT	
WCAP PART			BRANCH VOLTAGE		BRANCH CURRENT	
R	2→5	0.01000000	0.10 \angle	0.000° V	10.00 \angle	0.000° A
L	5→4	4.60000000	335.24 \angle	90.125° V	10.00 \angle	0.125° A
R	4→1	0.01000000	0.10 \angle	0.125° V	10.00 \angle	0.125° A
C	3→0	0.00001600	504.81 \angle	-39.016° V	0.06 \angle	50.984° A
R	1→0	39.44900000	504.81 \angle	-39.016° V	9.96 \angle	-0.138° A
R	1→3	0.01000000	0.01 \angle	50.984° V	0.06 \angle	50.984° A
L	5→0	2470.00000000	391.99 \angle	2.550° V	0.02 \angle	-87.450° A
WCAP PART			FROM IMPEDANCE		TO IMPEDANCE	
R	2→5	0.01000000	39.17 + j	1.744	39.16 + j	1.744
L	5→4	4.60000000	39.17 + j	1.659	39.17 - j	31.868
R	4→1	0.01000000	39.17 - j	31.868	39.16 - j	31.868
C	3→0	0.00001600	0.00 - j	8575.159	0.00 + j	0.000
R	1→0	39.44900000	39.45 - j	31.806	0.00 + j	0.000
R	1→3	0.01000000	0.01 - j	8575.159	0.00 - j	8575.159
L	5→0	2470.00000000	0.00 + j	18002.583	0.00 + j	0.000

WCAP INPUT DATA:

1.1600 0.00000000 0
 I 10.00000000 0 2 0.00000000
 R 0.01000000 2 5 0.00000000
 L 4.60000000 5 4 0.00000000
 R 0.01000000 4 1 0.00000000
 C 0.00001600 3 0
 R 39.44900000 1 0 -31.80600000
 R 0.01000000 1 3 0.00000000
 L 2470.00000000 5 0 0.00000000

Center Frequency: 1.16 MHz

Frequency Range: ± 0 kHz

Frequency Step: 0 kHz

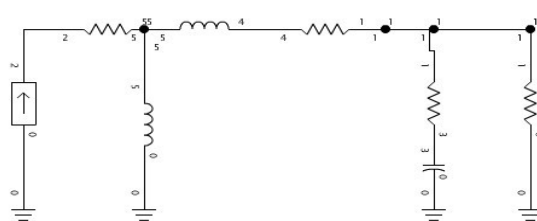


FIGURE 6 - WCAP - WVNJ TOWER #2 DAY DIRECTIONAL 08112021

WCAP - WVNJ TOWER #2 DAY DIRECTIONAL 082021

WCAP OUTPUT AT FREQUENCY: 1.160 MHz

NODE VOLTAGES

Node: 1 44.5040 \angle 63.3620° V
 Node: 2 165.4388 \angle -83.1347° V
 Node: 3 165.4388 \angle -83.1346° V
 Node: 4 44.4593 \angle 63.4772° V
 Node: 5 44.4593 \angle 63.4772° V
 Node: 6 165.4388 \angle -83.1346° V
 Node: 8 165.4507 \angle -83.1003° V

WCAP PART			CURRENT IN		CURRENT OUT	
WCAP	PART		BRANCH VOLTAGE		BRANCH CURRENT	
R	1→5	0.01000000	0.10 \angle	0.000° V	10.00 \angle	0.000° A
L	5→8	2.80000000	204.03 \angle	90.006° V	10.00 \angle	0.006° A
C	2→0	0.00002000	165.44 \angle	-83.135° V	0.02 \angle	6.865° A
R	6→0	1.98500000	165.44 \angle	-83.135° V	9.98 \angle	-0.009° A
L	4→0	2470.00000000	44.46 \angle	63.477° V	0.00 \angle	-26.523° A
R	6→3	0.01000000	0.00 \angle	-173.135° V	0.00 \angle	-173.135° A
L	3→0	12350.00000000	165.44 \angle	-83.135° V	0.00 \angle	-173.135° A
R	5→4	0.01000000	0.00 \angle	-26.523° V	0.00 \angle	-26.523° A
R	6→2	0.01000000	0.00 \angle	6.865° V	0.02 \angle	6.865° A
R	8→6	0.01000000	0.10 \angle	0.006° V	10.00 \angle	0.006° A
WCAP PART			FROM IMPEDANCE		TO IMPEDANCE	
R	1→5	0.01000000	2.00 + j	3.978	1.99 + j	3.978
L	5→8	2.80000000	1.99 + j	3.979	1.99 - j	16.429
C	2→0	0.00002000	0.00 - j	6860.127	0.00 + j	0.000
R	6→0	1.98500000	1.99 - j	16.465	0.00 + j	0.000
L	4→0	2470.00000000	0.00 + j	18002.583	0.00 + j	0.000
R	6→3	0.01000000	0.01 + j	90012.913	0.01 + j	90012.913
L	3→0	12350.00000000	-0.00 + j	90012.913	0.00 + j	0.000
R	5→4	0.01000000	0.01 + j	18002.583	0.00 + j	18002.583
R	6→2	0.01000000	0.01 - j	6860.127	0.00 - j	6860.127
R	8→6	0.01000000	1.99 - j	16.429	1.98 - j	16.429

WCAP INPUT DATA:

	1.1600	0.00000000	0
I	10.00000000	0	1
R	0.01000000	1	5
L	2.80000000	5	8
C	0.00002000	2	0
R	1.98500000	6	0
L	2470.00000000	4	0
R	0.01000000	6	3
L	12350.00000000	3	0
R	0.01000000	5	4
R	0.01000000	6	2
R	0.01000000	8	6

Center Frequency: 1.16 MHz

Frequency Range: ± 0 kHz

Frequency Step: 0 kHz

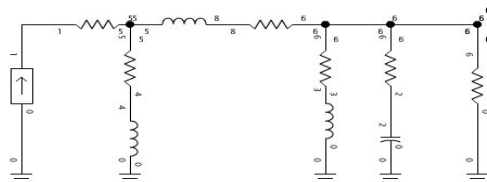


FIGURE 7 - WCAP - WVNJ TOWER #3 DAY DIRECTIONAL

WCAP OUTPUT AT FREQUENCY: 1.160 MHz

NODE VOLTAGES

Node: 1 1247.9792 \angle 87.0517° V
 Node: 2 1558.3482 \angle 87.6361° V
 Node: 3 1247.9792 \angle 87.0517° V
 Node: 4 1247.9843 \angle 87.0472° V
 Node: 5 1558.3441 \angle 87.6398° V

WCAP PART			CURRENT IN		CURRENT OUT	
WCAP PART			BRANCH VOLTAGE		BRANCH CURRENT	
R	2→5	0.01000000	0.10 \angle	0.000° V	10.00 \angle	0.000° A
L	5→4	4.30000000	310.69 \angle	90.021° V	9.91 \angle	0.021° A
R	4→1	0.01000000	0.10 \angle	0.021° V	9.91 \angle	0.021° A
C	3→0	0.00001600	1247.98 \angle	87.052° V	0.15 \angle	177.052° A
R	1→0	6.33300000	1247.98 \angle	87.052° V	10.06 \angle	-0.022° A
R	1→3	0.01000000	0.00 \angle	177.052° V	0.15 \angle	177.052° A
L	5→0	2470.00000000	1558.34 \angle	87.640° V	0.09 \angle	-2.360° A
WCAP PART			FROM IMPEDANCE		TO IMPEDANCE	
R	2→5	0.01000000	6.43 + j	155.702	6.42 + j	155.702
L	5→4	4.30000000	6.53 + j	157.058	6.53 + j	125.718
R	4→1	0.01000000	6.53 + j	125.718	6.52 + j	125.718 ^C
C	3→0	0.00001600	0.01 - j	8575.159	0.00 + j	0.000
R	1→0	6.33300000	6.33 + j	123.906	0.00 + j	0.000
R	1→3	0.01000000	0.01 - j	8575.159	0.00 - j	8575.159
L	5→0	2470.00000000	-0.00 + j	18002.583	0.00 + j	0.000
WCAP INPUT DATA:						
	1.1600	0.00000000	0			
I	10.00000000	0	2	0.00000000		
R	0.01000000	2	5	0.00000000		
L	4.30000000	5	4	0.00000000		
R	0.01000000	4	1	0.00000000		
C	0.00001600	3	0			
R	6.33300000	1	0	123.90600000		
R	0.01000000	1	3	0.00000000		
L	2470.00000000	5	0	0.00000000		

Center Frequency: 1.16 MHz

Frequency Range: ± 0 kHz

Frequency Step: 0 kHz

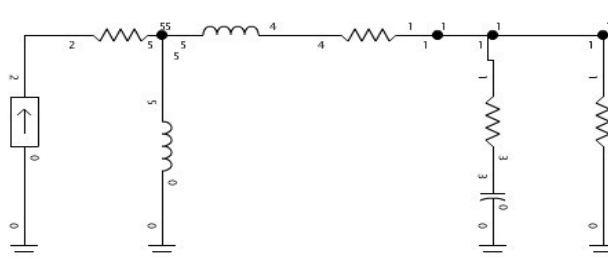


FIGURE 8 - WCAP - WVNJ TOWER #4 DAY DIRECTIONAL

WCAP OUTPUT AT FREQUENCY: 1.160 MHz

NODE VOLTAGES

Node: 1 435.9360 \angle -26.3493° V
 Node: 2 396.2931 \angle 9.9975° V
 Node: 3 435.9360 \angle -26.3494° V
 Node: 4 436.0255 \angle -26.3435° V
 Node: 5 396.1947 \angle 10.0000° V

	WCAP PART	WCAP PART	CURRENT IN BRANCH VOLTAGE		CURRENT OUT BRANCH CURRENT	
R	2→5	0.01000000	0.10 \angle	0.000° V	10.00 \angle	0.000° A
L	5→4	3.60000000	262.29 \angle	90.124° V	10.00 \angle	0.124° A
R	4→1	0.01000000	0.10 \angle	0.124° V	10.00 \angle	0.124° A
C	3→0	0.00001600	435.94 \angle	-26.349° V	0.05 \angle	63.651° A
R	1→0	39.21400000	435.94 \angle	-26.349° V	9.97 \angle	-0.137° A
R	1→3	0.01000000	0.01 \angle	63.651° V	0.05 \angle	63.651° A
L	5→0	2470.00000000	396.19 \angle	10.000° V	0.02 \angle	-80.000° A

	WCAP PART		FROM IMPEDANCE		TO IMPEDANCE	
R	2→5	0.01000000	39.03 + j	6.880	39.02 + j	6.880
L	5→4	3.60000000	39.05 + j	6.798	39.05 - j	19.441
R	4→1	0.01000000	39.05 - j	19.441	39.04 - j	19.441
C	3→0	0.00001600	0.00 - j	8575.159	0.00 + j	0.000
R	1→0	39.21400000	39.21 - j	19.306	0.00 + j	0.000
R	1→3	0.01000000	0.01 - j	8575.159	0.01 - j	8575.159
L	5→0	2470.00000000	0.00 + j	18002.583	0.00 + j	0.000

WCAP INPUT DATA:

	1.1600	0.00000000	0
I	10.00000000	0	2
R	0.01000000	2	5
L	3.60000000	5	4
R	0.01000000	4	1
C	0.00001600	3	0
R	39.21400000	1	0
R	0.01000000	1	3
L	2470.00000000	5	0

Center Frequency: 1.16 MHz

Frequency Range: ± 0 kHz

Frequency Step: 0 kHz

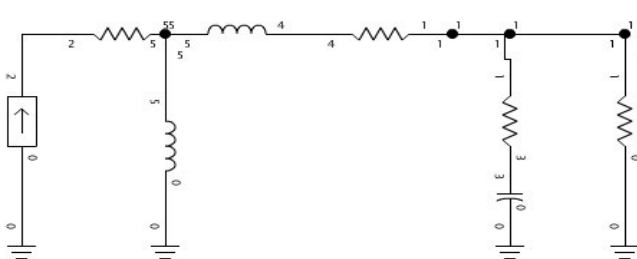


FIGURE 9 - WCAP - WVNJ TOWER #1 NIGHT DIRECTIONAL

WCAP OUTPUT AT FREQUENCY: 1.160 MHz

NODE VOLTAGES

Node: 1 368.5486 \angle -45.7269° V
 Node: 2 266.6912 \angle 15.4954° V
 Node: 3 368.5486 \angle -45.7270° V
 Node: 4 368.6183 \angle -45.7158° V
 Node: 5 266.5949 \angle 15.5012° V

WCAP PART		CURRENT IN		CURRENT OUT	
WCAP PART		BRANCH VOLTAGE		BRANCH CURRENT	
R 2→5	0.01000000	0.10 \angle 0.000° V	10.00 \angle 0.000° A	L	
5→4	4.60000000	335.14 \angle 90.082° V	10.00 \angle 0.082° A		
R 4→1	0.01000000	0.10 \angle 0.082° V	10.00 \angle 0.082° A		
C 3→0	0.00001600	368.55 \angle -45.727° V	0.04 \angle 44.273° A		
R 1→0	25.85900000	368.55 \angle -45.727° V	9.97 \angle -0.090° A		
R 1→3	0.01000000	0.00 \angle 44.273° V	0.04 \angle 44.273° A		
L 5→0	2470.00000000	266.59 \angle 15.501° V	0.01 \angle -74.499° A		
WCAP PART		FROM IMPEDANCE		TO IMPEDANCE	
R 2→5	0.01000000	25.70 + j 7.125	25.69 + j 7.125		
L 5→4	4.60000000	25.71 + j 7.091	25.71 - j 26.436		
R 4→1	0.01000000	25.71 - j 26.436	25.70 - j 26.436		
C 3→0	0.00001600	0.00 - j 8575.159	0.00 + j 0.000		
R 1→0	25.85900000	25.86 - j 26.440	0.00 + j 0.000		
R 1→3	0.01000000	0.01 - j 8575.159	-0.00 - j 8575.159		
L 5→0	2470.00000000	0.00 + j 18002.583	0.00 + j 0.000		

WCAP INPUT DATA:

1.1600 0.00000000 0
 I 10.00000000 0 2 0.00000000
 R 0.01000000 2 5 0.00000000
 L 4.60000000 5 4 0.00000000
 R 0.01000000 4 1 0.00000000
 C 0.00001600 3 0
 R 25.85900000 1 0 -26.44000000
 R 0.01000000 1 3 0.00000000
 L 2470.00000000 5 0 0.00000000

Center Frequency: 1.16 MHz

Frequency Range: ± 0 kHz

Frequency Step: 0 kHz

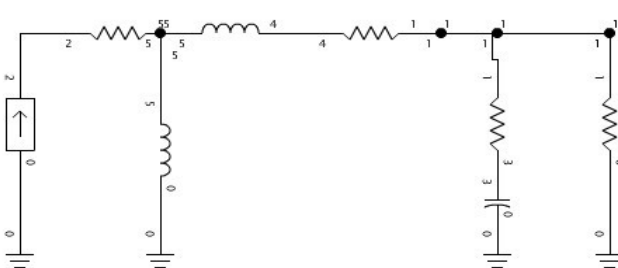


FIGURE 10 - WCAP - WVNJ TOWER #2 NIGHT DIRECTIONAL

WCAP - WVNJ TOWER #2 DA-N APRIL 2021
WCAP OUTPUT AT FREQUENCY: 1.160 MHz

NODE VOLTAGES

```
Node: 1 120.8775 ∠ 125.0195° V
Node: 2 125.9744 ∠ -123.5628° V
Node: 3 125.9744 ∠ -123.5627° V
Node: 4 120.9349 ∠ 125.0583° V
Node: 5 120.9349 ∠ 125.0583° V
Node: 6 125.9744 ∠ -123.5627° V
Node: 8 125.9192 ∠ -123.5248° V
```

WCAP PART			CURRENT IN		CURRENT OUT	
WCAP PART			BRANCH	VOLTAGE	BRANCH	CURRENT
R	1→5	0.01000000	0.10 ∠	0.000° V	10.00 ∠	0.000° A
L	5→8	2.80000000	203.97 ∠	89.978° V	9.99 ∠	-0.022° A
C	2→0	0.00002000	125.97 ∠	-123.563° V	0.02 ∠	-33.563° A
R	6→0	-6.98400000	125.97 ∠	-123.563° V	9.98 ∠	0.032° A
L	4→0	2470.00000000	120.93 ∠	125.058° V	0.01 ∠	35.058° A
R	6→3	0.01000000	0.00 ∠	146.437° V	0.00 ∠	146.437° A
L	3→0	12350.00000000	125.97 ∠	-123.563° V	0.00 ∠	146.437° A
R	5→4	0.01000000	0.01 ∠	35.058° V	0.01 ∠	35.058° A
R	6→2	0.01000000	0.00 ∠	-33.563° V	0.02 ∠	-33.563° A
R	8→6	0.01000000	0.10 ∠	-0.022° V	9.99 ∠	-0.022° A
WCAP PART			FROM IMPEDANCE		TO IMPEDANCE	
R	1→5	0.01000000	-6.94 + j	9.899	-6.95 + j	9.899
L	5→8	2.80000000	-6.95 + j	9.902	-6.95 - j	10.506
C	2→0	0.00002000	0.01 - j	6860.127	0.00 + j	0.000
R	6→0	-6.98400000	-6.98 - j	10.514	0.00 + j	0.000
L	4→0	2470.00000000	0.00 + j	18002.583	0.00 + j	0.000
R	6→3	0.01000000	0.01 + j	90012.913	-0.01 + j	90012.913
L	3→0	12350.00000000	-0.01 + j	90012.913	0.00 + j	0.000
R	5→4	0.01000000	0.01 + j	18002.583	-0.00 + j	18002.583
R	6→2	0.01000000	0.01 - j	6860.127	0.01 - j	6860.127
R	8→6	0.01000000	-6.95 - j	10.506	-6.96 - j	10.506

WCAP INPUT DATA:

```
1.1600 0.00000000 0
I 10.00000000 0 1 0.00000000
R 0.01000000 1 5 0.00000000
L 2.80000000 5 8 0.00000000
C 0.00002000 2 0
R -6.98400000 6 0 -10.51400000
L 2470.00000000 4 0 0.00000000
R 0.01000000 6 3 0.00000000
L 12350.00000000 3 0 0.00000000
R 0.01000000 5 4 0.00000000
R 0.01000000 6 2 0.00000000
R 0.01000000 8 6 0.00000000
```

Center Frequency: 1.16 MHz

Frequency Range: ±0 kHz

Frequency Step: 0 kHz

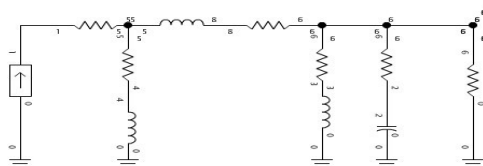


FIGURE 11 - WCAP - WVNJ TOWER #3 NIGHT DIRECTIONAL

WCAP OUTPUT AT FREQUENCY: 1.160 MHz

NODE VOLTAGES

Node: 1 1675.2783 \angle 70.7912° V
 Node: 2 1970.5554 \angle 73.7800° V
 Node: 3 1675.2783 \angle 70.7911° V
 Node: 4 1675.3111 \angle 70.7880° V
 Node: 5 1970.5275 \angle 73.7828° V

WCAP PART			CURRENT IN		CURRENT OUT	
WCAP PART			BRANCH VOLTAGE		BRANCH CURRENT	
R	2→5	0.01000000	0.10 \angle	0.000° V	10.00 \angle	0.000° A
L	5→4	4.30000000	310.11 \angle	90.177° V	9.89 \angle	0.177° A
R	4→1	0.01000000	0.10 \angle	0.177° V	9.89 \angle	0.177° A
C	3→0	0.00001600	1675.28 \angle	70.791° V	0.20 \angle	160.791° A
R	1→0	54.15900000	1675.28 \angle	70.791° V	10.08 \angle	-0.192° A
R	1→3	0.01000000	0.00 \angle	160.791° V	0.20 \angle	160.791° A
L	5→0	2470.00000000	1970.53 \angle	73.783° V	0.11 \angle	-16.217° A
WCAP PART			FROM IMPEDANCE		TO IMPEDANCE	
R	2→5	0.01000000	55.04 + j	189.212	55.03 + j	189.212
L	5→4	4.30000000	56.21 + j	191.048	56.21 + j	159.708
R	4→1	0.01000000	56.21 + j	159.708	56.20 + j	159.708
C	3→0	0.00001600	0.00 - j	8575.159	0.00 + j	0.000
R	1→0	54.15900000	54.16 + j	157.136	0.00 + j	0.000
R	1→3	0.01000000	0.01 - j	8575.159	-0.00 - j	8575.159
L	5→0	2470.00000000	0.00 + j	18002.583	0.00 + j	0.000

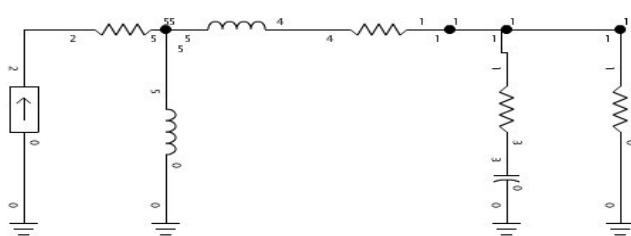
WCAP INPUT DATA:

1.1600 0.00000000 0
 I 10.00000000 0 2 0.00000000
 R 0.01000000 2 5 0.00000000
 L 4.30000000 5 4 0.00000000
 R 0.01000000 4 1 0.00000000
 C 0.00001600 3 0
 R 54.15900000 1 0 157.13600000
 R 0.01000000 1 3 0.00000000
 L 2470.00000000 5 0 0.00000000

Center Frequency: 1.16 MHz

Frequency Range: ± 0 kHz

Frequency Step: 0 kHz



WVNJ
20 kW Day
Reference Field Strength Measurements
May 19, 2021

Radial	Point	Distance KM	2021 Tme	2021 Field mV/m	Coordinates (WGS84)		Description
24°	1	11.26	4:15 PM	0.52	41.149437	74.194032	End of Cranberry Road
	2	11.38	4:19 PM	0.48	41.15004852	74.19369001	At driveway of #2 Harriman
	3	11.55	4:23 PM	0.63	41.15144498	74.19286288	in field, 100' N of childrens playground
94°	1	5.44	2:04 PM	44	41.05304095	74.18430115	in front of #343 Campgaw
	2	7.71	2:12 PM	13	41.05159208	74.15717509	driveway of 92 Fuhman
	3	8.17	2:16 PM	16	41.05129899	74.15170243	driveway of St Paul's church
168.5°	1	3.46	2:34 PM	2.75	41.02597598	74.24080353	railroad side of parking lot
	2	4.07	2:38 PM	1.5	41.02059942	74.23935438	Walton & Walnut
	3	4.43	2:41 PM	1.05	41.01742635	74.23849926	94 McNamee
190.5°	1	3.83	3:10 PM	2.2	41.022617	74.256305	Riverside & Park
	2	4.59	2:48 PM	1.35	41.0158787	74.25899889	pull off opposite #90
	3	6.36	2:53 PM	0.29	41.00022476	74.26284068	Indian & Pine Lake
256.5°	1	3.22	3:34 PM	3.1	41.049856	74.285315	opposite #54 Grove
	2	3.46	3:31 PM	4.1	41.049391	74.287932	30' S of corner of Erie
	3	3.57	3:27 PM	2.1	41.048908	74.290797	52 Rhinesmith
302.5°	1	3.22	3:42 PM	2.35	41.07202898	74.28142843	corner of parking lot Prime 15
	2	5.83	3:47 PM	0.8	41.08463199	74.30770232	center of fire house parking lot
	3	6.41	3:50 PM	0.35	41.08743185	74.31354233	opposite #173 Magee

Note:

Transmitter North Latitude: 41.0564722

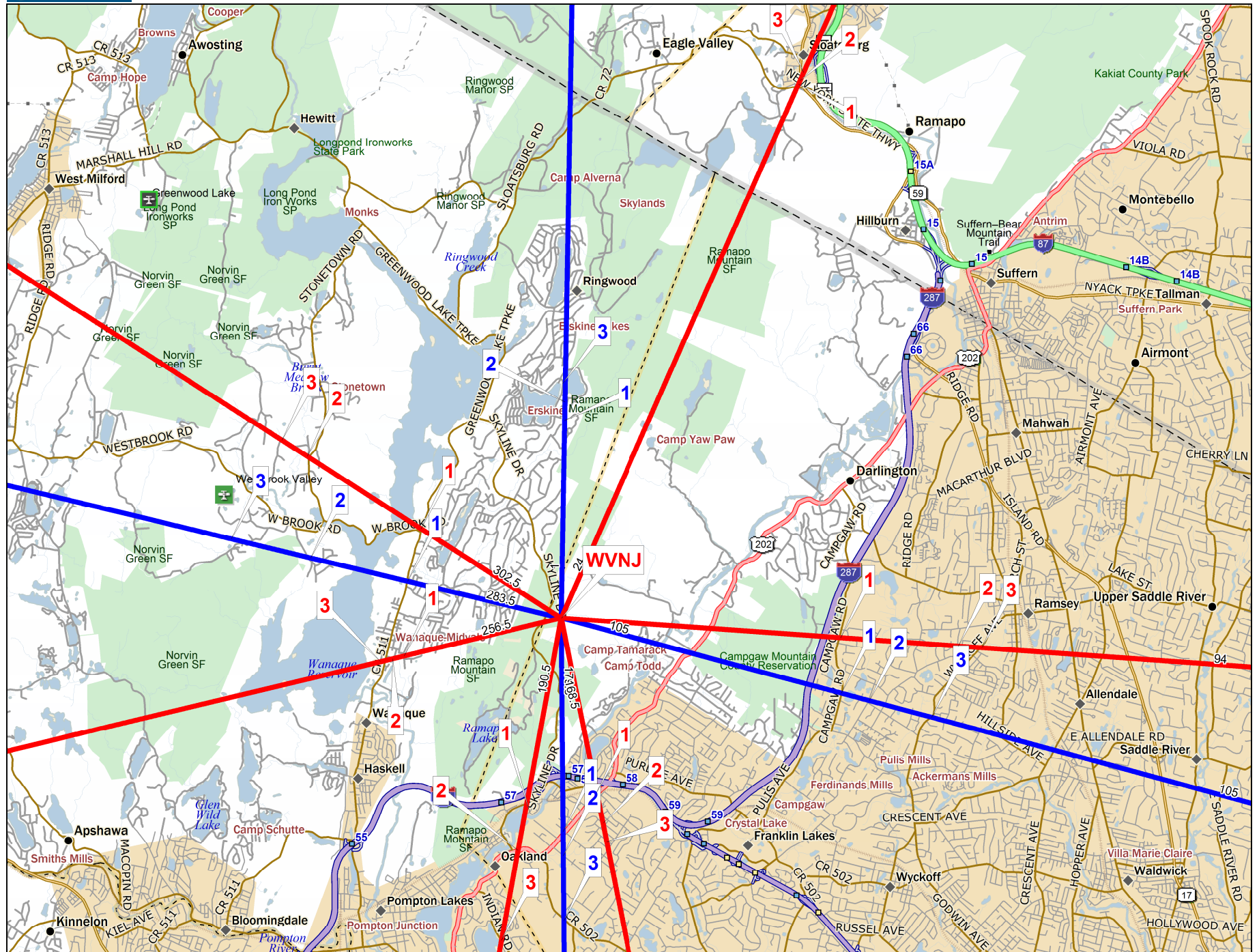
Transmitter West Longitude decimal degrees: 74.2490278

Measurements with FIM 41 SN 1918, calibrated 9/27/15 recently compared with other FM of recent calibration

Weather 5/16 partly cloudy 74 degrees. 5/19 clear 84 degrees

WVNJ
2.5 kW Night
Reference Field Strength Measurements
May 16, 2021

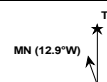
Radial	Point	Distance KM	2021Tme	2021 Field mV/m	Coordinates (WGS84)		Description
1°	1	3.83	4:14 PM	1.9	41.09091561	74.24823006	End of Laurel
	2	4.18	4:07 PM	1.6	41.09406318	74.24815712	24 Bellot
	3	4.54	4:04 PM	0.8	41.097303	74.248679	277 Lakeview
105°	1	5.63	2:55 PM	15	41.04334781	74.18417456	603 Campgaw
	2	6.24	2:59 PM	10	41.042073	74.17767	south end playground parking lot
	3	7.43	3:05 PM	8.1	41.03912069	74.16333027	opposite 595 Wyckoff
179.5°	1	4.15	2:23 PM	3.95	41.01914679	74.24859605	Bailey, 30' from corner
	2	4.62	2:29 PM	3.8	41.01491957	74.24854719	45 Grove
	3	5.87	2:34 PM	2.25	41.00367697	74.24841726	opposite 187 Long Hill
283.5°	1	3.06	3:32 PM	2.85	41.06289188	74.2845223	parking lot between bank and building
	2	4.99	3:40 PM	0.96	41.06693528	74.30691292	78 Townsend
	3	6.57	3:49 PM	0.29	41.07024219	74.32524512	parking lot near wood foot bridge



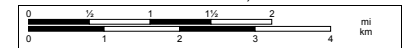
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Scale 1 : 100,000



1" = 1.58 mi

Data Zoom 11-0