

FOR  
FCC  
USE  
ONLY

**COPY**

**FCC 302-AM  
APPLICATION FOR AM  
BROADCAST STATION LICENSE**

(Please read instructions before filling out form.)

FOR COMMISSION USE ONLY

FILE NO *BMM-L-2066221-AM*

**SECTION I - APPLICANT FEE INFORMATION**

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

**GENESIS COMMUNICATIONS OF TAMPA BAY, INC.**

MAILING ADDRESS (Line 1) (Maximum 35 characters)

**POST OFFICE BOX 25434**

MAILING ADDRESS (Line 2) (Maximum 35 characters)

CITY  
**TAMPA**

STATE OR COUNTRY (if foreign address)  
**FLORIDA**

ZIP CODE  
**33622**

TELEPHONE NUMBER (include area code)  
**813-281-1140**

CALL LETTERS  
**WMGG**

OTHER FCC IDENTIFIER (If applicable)  
**FACILITY ID NUMBER 67135**

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)<br>FEE TYPE<br>CODE | (B)<br>FEE MULTIPLE | (C)<br>FEE DUE FOR FEE<br>TYPE CODE IN<br>COLUMN (A) | FOR FCC USE ONLY |
|-------------------------|---------------------|--|------------------|
| <b>M M R</b>            | <b>0 0 0 1</b>      | <b>\$ 690.00</b>                                     |                  |

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)            | (C)              | FOR FCC USE ONLY |
|--------------|----------------|------------------|------------------|
| <b>M O R</b> | <b>0 0 0 1</b> | <b>\$ 790.00</b> |                  |

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

| TOTAL AMOUNT<br>REMITTED WITH THIS<br>APPLICATION | FOR FCC USE ONLY |
|---|------------------|
| <b>\$ 1,480.00</b>                                |                  |

|   |                  |                   |
|---|------------------|-------------------|
| <b>SECTION II - APPLICANT INFORMATION</b>                         |                  |                   |
| 1. NAME OF APPLICANT<br>GENESIS COMMUNICATIONS OF TAMPA BAY, INC. |                  |                   |
| MAILING ADDRESS<br>POST OFFICE BOX 25434                          |                  |                   |
| CITY<br>TAMPA   | STATE<br>FLORIDA | ZIP CODE<br>33622 |

2. This application is for:
- Commercial       Noncommercial
- AM Directional       AM Non-Directional

|                      |                                    |  |   |  |
|----------------------|------------------------------------|--|---|--|
| Call letters<br>WMGG | Community of License<br>EGYPT LAKE | Construction Permit File No.<br>BP-20120808ABK | Modification of Construction Permit File No(s). | Expiration Date of Last Construction Permit<br>JUNE 19, 2016 |
|----------------------|------------------------------------|--|---|--|

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.<br>DIRECTIONAL ANTENNA |
|------------------------------------|

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. |
|-------------|

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. |
|-------------|

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.    |

7. Has an adverse finding been made or an adverse final action been taken by any court or administrative body with respect to the applicant or parties to the application in a civil or criminal proceeding, brought under the provisions of any law relating to the following: any felony; mass media related antitrust or unfair competition; fraudulent statements to another governmental unit; or discrimination?  Yes  No

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

|             |
|-------------|
| Exhibit No. |
|-------------|

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

Yes  No

If Yes, provide particulars as an Exhibit.

Exhibit No.

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

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

**CERTIFICATION**

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

Yes  No

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

|                                   |                          |   |
|-----------------------------------|--------------------------|---|
| Name<br><b>BRUCE C. MADURI</b>    | Signature<br><b>COPY</b> |   |
| Title<br><b>PRESIDENT AND CEO</b> | Date<br><b>6/18/2016</b> | Telephone Number<br><b>813-281-1040</b> |

**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

**GENESIS COMMUNICATIONS OF TAMPA BAY, 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<br>(if applicable) | Frequency<br>(kHz) | Hours of Operation | Power in kilowatts |            |
|-------------|--|--------------------|--------------------|--------------------|------------|
|             |  |                    |                    | Night              | Day        |
| <b>WMGG</b> | <b>BP-20120808ABK</b>                              | <b>1470</b>        | <b>Unlimited</b>   | <b>0.8</b>         | <b>2.8</b> |

**2. Station location**

|                         |                                   |
|-------------------------|-----------------------------------|
| State<br><b>Florida</b> | City or Town<br><b>Egypt Lake</b> |
|-------------------------|-----------------------------------|

**3. Transmitter location**

|                    |                               |                              |  |
|--------------------|-------------------------------|------------------------------|--|
| State<br><b>FL</b> | County<br><b>Hillsborough</b> | City or Town<br><b>Tampa</b> | Street address<br>(or other identification)<br><b>3325 W. Sligh Ave.</b> |
|--------------------|-------------------------------|------------------------------|--|

**4. Main studio location**

|                    |                           |                              |   |
|--------------------|---------------------------|------------------------------|---|
| State<br><b>FL</b> | County<br><b>Pinellas</b> | City or Town<br><b>Largo</b> | Street address<br>(or other identification)<br><b>800 8th Ave. SE</b> |
|--------------------|---------------------------|------------------------------|---|

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

|                    |                           |                              |   |
|--------------------|---------------------------|------------------------------|---|
| State<br><b>FL</b> | County<br><b>Pinellas</b> | City or Town<br><b>Largo</b> | Street address<br>(or other identification)<br><b>800 8th Ave. SE</b> |
|--------------------|---------------------------|------------------------------|---|

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.  
**ENG**

**8. Operating constants:**

|   |  |
|---|--|
| RF common point or antenna current (in amperes) without modulation for night system<br><b>4.16</b>                | RF common point or antenna current (in amperes) without modulation for day system<br><b>7.78</b>                 |
| Measured antenna or common point resistance (in ohms) at operating frequency<br>Night <b>50.0</b> Day <b>50.0</b> | Measured antenna or common point reactance (in ohms) at operating frequency<br>Night <b>-5.0</b> Day <b>-5.0</b> |

**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 |
|              | <b>1(NW)</b>                                | <b>7.5</b>   |   | <b>.813</b>  |                       |     |
| <b>2(SE)</b> | <b>0.0</b>                                  | <b>160.3</b> | <b>1.000</b>                            | <b>.530</b>  |                       |     |
| <b>3(C)</b>  | <b>-177.0</b>                               | <b>0.0</b>   | <b>.968</b>                             | <b>1.000</b> |                       |     |
|              |   |              |   |              |                       |     |
|              |   |              |   |              |                       |     |

Manufacturer and type of antenna monitor:

**Potomac Instruments 1901-5**

**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<br><b>Guyed Tower</b> | Overall height in meters of radiator above base insulator, or above base, if grounded.<br><b>70.1</b> | Overall height in meters above ground (without obstruction lighting)<br><b>70.9 towers 1/2, 71.0 tower 3</b> | Overall height in meters above ground (include obstruction lighting)<br><b>70.9 towers 1/2, 71.0 tower 3</b> | If antenna is either top loaded or sectionalized, describe fully in an Exhibit.<br><div style="border: 1px solid black; padding: 2px;">Exhibit No.<br/><b>ENG</b></div> |
|-------------------------------------|---|--|--|---|

Excitation  Series  Shunt

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

|  |  |
|--|--|
| North Latitude <b>28</b> ° <b>00</b> ' <b>42</b> " | West Longitude <b>82</b> ° <b>29</b> ' <b>53</b> " |
|--|--|

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.  
**ENG**

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

Exhibit No.  
**ENG**

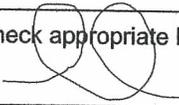
10. In what respect, if any, does the apparatus constructed differ from that described in the application for construction permit or in the permit?

**Tower number changed to actual**

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

**New Construction**

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)<br><b>Kurt Gorman</b>   | Signature (check appropriate box below)<br> |
| Address (include ZIP Code)<br><b>Phasetek Inc.</b><br><b>550 California Rd., Unit 11</b><br><b>Quakertown, PA 18951</b> | Date<br><b>June, 17, 2016</b>   |
|   | Telephone No. (Include Area Code)<br><b>215-536-6648</b>  |

- Technical Director
- Chief Operator
- Other (specify)
- Registered Professional Engineer
- Technical Consultant

**ENGINEERING STATEMENT CONCERNING**

**APPLICATION FOR LICENSE INFORMATION**

**EMPLOYING MOMENT METHOD MODELING**

**WMGG, 1470 KHZ, DA-2**

**EGYPT LAKE, FLORIDA**

**JUNE, 2016**

***PHASETEK INC.***  
**ENGINEERING STATEMENT CONCERNING  
APPLICATION FOR LICENSE INFORMATION  
EMPLOYING MOMENT METHOD MODELING  
WMGG, 1470 KHZ, DA-2  
EGYPT LAKE, FLORIDA  
JUNE, 2016**

**TABLE OF CONTENTS**

**302-AM**

**ENGINEERING STATEMENT**

|                   |   |
|-------------------|---|
| <b>FIGURE 1:</b>  | <b>ANTENNA SYSTEM AS ADJUSTED</b>                         |
| <b>FIGURE 2:</b>  | <b>SAMPLING SYSTEM DESCRIPTION/MEASUREMENTS</b>           |
| <b>FIGURE 3:</b>  | <b>TOWER IMPEDANCE MEASUREMENTS VS. MODELED</b>           |
| <b>FIGURE 4:</b>  | <b>MOMENT MODEL PARAMETERS</b>                            |
| <b>FIGURE 5:</b>  | <b>MOMENT MODEL SUMMARY FOR INDIVIDUAL TOWERS</b>         |
| <b>FIGURE 6:</b>  | <b>MOMENT MODEL ARRAY SYNTHESIS (DIRECTIONAL DAY)</b>     |
| <b>FIGURE 7:</b>  | <b>MOMENT MODEL SUMMARY FOR DIRECTIONAL DAY MODE</b>      |
| <b>FIGURE 8:</b>  | <b>MOMENT MODEL ARRAY SYNTHESIS (DIRECTIONAL – NIGHT)</b> |
| <b>FIGURE 9:</b>  | <b>MOMENT MODEL SUMMARY FOR DIRECTIONAL NIGHT MODE</b>    |
| <b>FIGURE 10:</b> | <b>DERIVED DIRECTIONAL PARAMETERS</b>                     |
| <b>FIGURE 11:</b> | <b>TOWER BASE CIRCUIT ANALYSIS DESCRIPTION</b>            |
| <b>FIGURE 12:</b> | <b>CIRCUIT ANALYSIS FOR INDIVIDUAL TOWERS</b>             |
| <b>FIGURE 13:</b> | <b>CIRCUIT ANALYSIS FOR DIRECTIONAL DAY MODE</b>          |
| <b>FIGURE 14:</b> | <b>CIRCUIT ANALYSIS FOR DIRECTIONAL NIGHT MODE</b>        |
| <b>FIGURE 15:</b> | <b>REFERENCE FIELD INTENSITY MEASUREMENTS</b>             |
| <b>FIGURE 16:</b> | <b>CERTIFIED ARRAY GEOMETRY SURVEY</b>                    |
| <b>FIGURE 17:</b> | <b>SPURIOUS FREQUENCY MEASUREMENTS</b>                    |
| <b>FIGURE 18:</b> | <b>TOWER #3 CURRENT DISTRIBUTION MEASUREMENTS</b>         |

# ***PHASETEK INC.***

## **ENGINEERING STATEMENT CONCERNING APPLICATION FOR LICENSE INFORMATION EMPLOYING MOMENT METHOD MODELING WMGG, 1470 KHZ, DA-2 EGYPT LAKE, FLORIDA JUNE, 2016**

### **SUMMARY**

Adjustment of the Antenna System and a Proof of Performance employing Moment Method Modeling were performed on Radio Station WMGG, 1470 KHz, Egypt Lake, Florida, after installation of Antenna Phasing and diplexing equipment. WMGG holds Construction Permit Number: BP-20120808ABK to change transmitter site. This report was prepared on behalf of Genesis Communications of Tampa Bay, Inc. licensee of Radio Station WMGG.

### **SITE MODIFICATIONS**

The WMGG Transmitter site is that as currently licensed for Radio Station WTMP, 1150 KHz. New Transmission Lines, Sampling Lines, and Antenna Phasing and Branching equipment have been installed. All Towers remain unchanged. A License Application employing Moment Method Modeling as set forth in Section 73.151(C) has been done to cover the Radio Station WMGG Construction Permit and license under the new rules. In addition, a separate direct measurement of power application will be filed for Radio Station WTMP. The actual tower numbering reflects tower #1 as the northwest tower, tower #2 the southeast tower, and tower #3 the center tower. This differs from the construction permit. Towers #2 and #3 are used for Daytime operation and all towers are used for Nighttime operation.

### **REFERENCE POINTS**

Reference Points were measured at pattern minima and maxima for the Directional modes of operation. These Points and their measured field intensity are shown in Figure 15.

### **SPECIAL OPERATING CONDITIONS #2 AND #3**

All towers and grounding remain as previously licensed for WTMP, 1150 kHz, however, new operating parameters are specified due to system modifications. Verification of no spurious products from the two operating stations was performed. Tower #3 (center) has guy wire top-loading. Measurement of the current distribution was performed to verify the effective electrical height. This data is included in Figure 18.

# ***PHASETEK INC.***

## **ENGINEERING STATEMENT CONCERNING APPLICATION FOR LICENSE INFORMATION EMPLOYING MOMENT METHOD MODELING WMGG, 1470 KHZ, DA-2 EGYPT LAKE, FLORIDA JUNE, 2016**

### **SPURIOUS EMISSIONS**

Due to the common usage of the Transmitter site by both radio Stations WMGG, 1470 KHz and WTMP, 1150 KHz, filtering has been installed and adjusted at all Towers to prevent interaction and spurious radiation products. Figure 17 shows measurement of any spurious radiation products. The “reject” 1470 kHz Filters (located in the WTMP equipment) measure greater than 40,000 ohms, and are not included in the circuit model.

### **METHOD OF MOMENTS DETAIL**

All Moment Method Modeling was done with Expert MININEC Broadcast Professional, Version 23. One wire was used to represent each Tower with an additional three wires to represent guy wire top-loading on tower #3 (center). Towers were driven individually to verify the Model compared to measured impedance data. Once the Model was verified, both the Day and Night Directional Antenna Systems were computed. For Directional modes, the complex voltage values for sources located at ground level were computed. These sources produce current moment sums for each Tower that, when normalized, equate to the Theoretical Field Parameters for each respective Tower.

### **MEASURING EQUIPMENT AND PERSONNEL**

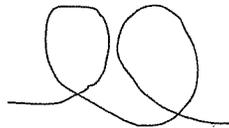
All Tower Resistance and Reactance measurements were made with a Delta Electronics OIB-3 Operating Impedance Bridge and HP8753ES network analyzer with a Tunwall directional coupler. Before use, tests of known impedances were made to verify operation. All Field Intensity Measurements were made with a Potomac Instruments Field Intensity Meter, model 4100, Serial Number 249, calibrated on January 21, 2016. The meter was calibrated by Potomac Instruments, Frederick, Maryland. All measurements were taken by Phasetek Inc. personnel supervised by Kurt Gorman of Phasetek Inc.

***PHASETEK INC.***

**ENGINEERING STATEMENT CONCERNING  
APPLICATION FOR LICENSE INFORMATION  
EMPLOYING MOMENT METHOD MODELING  
WMGG, 1470 KHZ, DA-2  
EGYPT LAKE, FLORIDA  
JUNE, 2016**

**CONCLUSION**

It is believed that the WMGG Antenna System has been constructed and adjusted in accordance with all applicable Commission rules and regulations. The foregoing was prepared on behalf of Genesis Communications of Tampa Bay, Inc., under the immediate supervision of Kurt Gorman, Phasetek Inc., Quakertown, Pennsylvania, whose qualifications are a matter of record with the Federal Communications Commission. The statements herein are true and correct of his knowledge, except such statements made on information and belief, and as to these statements he believes them to be true and correct.



---

**Kurt Gorman, President  
Phasetek Inc.  
Quakertown, Pennsylvania**

## FIGURE 1

### ANTENNA SYSTEM AS ADJUSTED

**APPLICATION FOR LICENSE INFORMATION  
EMPLOYING MOMENT METHOD MODELING  
WMGG, 1470 KHZ, DA-2  
EGYPT LAKE, FLORIDA  
JUNE, 2016**

#### ANTENNA SYSTEM DESCRIPTION

1. The Antenna System consists of three (3), uniform, guyed, vertical steel transmitting Towers. All Towers stand 70.1M (123.7°) above their Base Insulators. The Towers are arranged with Tower 3 as a reference; Tower 1 is spaced 81.2° on a bearing of 344.0°T. Tower 2 is spaced 81.2° on a bearing of 164.0°T. Tower 3 incorporates guy wire top-loading at 29.7° electrical length. Tower 3 supports a RPU antenna. The feed for this Antenna is connected to the base and not brought across the base insulator. Towers 1 and 2 have aviation obstruction lighting. The lighting circuits are isolated at the base with a choke for each tower.
2. The Ground System for each Tower consists of (120) buried copper Radials, 59.7M in length, except where they intersect with copper transverse straps between Towers or property boundaries. In addition, (120) 15.2M copper radials are interspersed at the base of each tower. Copper strap connects all Towers to the main Transmitter grounding point.
3. The Sampling System consists of three (3), P600-206-3 Voltage Sampling Units. The Voltage Sampling Units are at the tower output of each Antenna Tuning Unit. These sampling units are connected to a Potomac Instruments 1901-5 Antenna Monitor via three (3) equal lengths of RFS, LCF12-50J, 1/2" phase stabilized foam coaxial cable.
4. Tower registration numbers:  
Tower 1: 1040048  
Tower 2: 1040049  
Tower 3: 1030544

**FIGURE 1  
ANTENNA SYSTEM AS ADJUSTED**

**APPLICATION FOR LICENSE INFORMATION  
EMPLOYING MOMENT METHOD MODELING  
CONTINUED  
WMGG, 1470 KHZ, DA-2  
EGYPT LAKE, FLORIDA  
JUNE, 2016**

**ANTENNA SYSTEM DESCRIPTION – Continued**

**DIRECTIONAL OPERATION (DAY)**

**COMMON POINT**

**Impedance = 50.0 – j 5.0 Ohms  
Current = 7.78 Amperes  
Power = 3,024 Watts**

**DIRECTIONAL OPERATION (NIGHT)**

**COMMON POINT**

**Impedance = 50.0 – j 5.0 Ohms  
Current = 4.16 Amperes  
Power = 864 Watts**

**Directional Antenna Monitor indications are within  $\pm 5\%$  and  $\pm 3^\circ$  of the modeled TCT values.**

**FIGURE 2**  
**WMGG SAMPLING SYSTEM DESCRIPTION/MEASUREMENTS**

**APPLICATION FOR LICENSE INFORMATION**  
**EMPLOYING MOMENT METHOD MODELING**  
**WMGG, 1470 KHZ, DA-2**  
**EGYPT LAKE, FLORIDA**  
**JUNE, 2016**

**SAMPLING SYSTEM DESCRIPTION**

The Sampling System consists of Phasetek Inc. model number P600-206-3 Voltage Sampling Units (VSU) mounted at the base of each Tower. The sampling devices are connected to the Antenna Monitor with equal lengths of RFS LCF12-50J, ½" foam cable. The Antenna Monitor is a Potomac Instruments Model 1901-5, Serial Number 716.

**SAMPLE LINE MEASUREMENTS**

Impedance measurements were made of the Antenna Sampling Lines using a HP8753ES Network Analyzer and Tunwall directional coupler. Measurements were done with the lines open circuited and then connected to the TCT's.

The table below shows the frequencies above and below the carrier frequency where resonance, defined as zero reactance corresponding with low resistance, was found. Frequencies of resonance occur at odd multiples of 90 degrees electrical length, the Sample Line length at the resonant frequency above the carrier frequency, which is the closest one to the carrier frequency, was found to be 270 electrical degrees. The electrical length at carrier frequency appearing in the table below was calculated by ratioing the frequencies.

**SAMPLE LINE MEASUREMENTS**

|                | <b>Resonant Frequency (KHz) below 1470 KHz</b> | <b>Resonant Frequency (KHz) above 1470 KHz</b> | <b>Calculated Electrical Length (deg) at 1470 KHz</b> | <b>Measured Impedance (ohms) Connected to VSU @ 1470 KHz</b> |
|----------------|--|--|---|--|
| <b>Tower 1</b> | 589.50   | 1780.0   | 223.0   | 51.45 +j 0.25  |
| <b>Tower 2</b> | 591.25   | 1784.0   | 222.5   | 51.07 +j 0.37  |
| <b>Tower 3</b> | 590.00   | 1779.0   | 223.1   | 51.81 +j 0.71  |

**FIGURE 2**  
**WMGG SAMPLING SYSTEM DESCRIPTION/MEASUREMENTS**

**APPLICATION FOR LICENSE INFORMATION**  
**EMPLOYING MOMENT METHOD MODELING**

**CONTINUED**

**WMGG, 1470 KHZ, DA-2**  
**EGYPT LAKE, FLORIDA**  
**JUNE, 2016**

**SAMPLE LINE MEASUREMENTS (CONTINUED)**

To determine the characteristic impedance values of the Sample Lines, open-circuited measurements were made with frequencies offset to produce  $\pm 45$  degrees of electrical length from resonance. The characteristic impedance was calculated using the following formula, where  $R_1 + j X_1$  and  $R_2 + j X_2$  are the measured impedances at the +45 and -45 degree offset frequencies, respectively:

$$Z_0 = ((R_1^2 + X_1^2)^{1/2} \cdot (R_2^2 + X_2^2)^{1/2})^{1/2}$$

| Tower | + 45 Degree Offset Frequency (kHz) | + 45 Degree Measured Impedance (Ohms) | - 45 Degree Offset Frequency (kHz) | - 45 Degree Measured Impedance (Ohms) | Calculated Characteristic Impedance (Ohms) |
|-------|------------------------------------|---------------------------------------|------------------------------------|---------------------------------------|--|
| 1     | 2076.7                             | 9.9 +j 48.6                           | 1483.3                             | 9.2 -j 48.4                           | 49.43                                      |
| 2     | 2081.4                             | 9.9 +j 48.5                           | 1486.6                             | 9.1 -j 48.4                           | 49.37                                      |
| 3     | 2075.6                             | 9.8 +j 48.6                           | 1482.4                             | 9.2 -j 48.5                           | 49.47                                      |

**SAMPLING VSU MEASUREMENTS**

Measurements of the Phasetek Inc. Model P600-206-3 voltage sampling units were performed by a Hewlett Packard 8752A, Network Analyzer. Measurements are normalized to Tower #3 (Day reference) and are within the manufacturer's rating of  $\pm 2.0\%$  and  $\pm 2.0^\circ$ .

**FIGURE 2**  
**WMGG SAMPLING SYSTEM DESCRIPTION/MEASUREMENTS**

**APPLICATION FOR LICENSE INFORMATION**  
**EMPLOYING MOMENT METHOD MODELING**  
**CONTINUED**  
**WMGG, 1470 KHZ, DA-2**  
**EGYPT LAKE, FLORIDA**  
**JUNE, 2016**

**SAMPLING VSU MEASUREMENTS CONT'D**

| <b>TOWER</b> | <b>VSU SERIAL #</b> | <b>MAGNITUDE</b> | <b>PHASE</b>     |
|--------------|---------------------|------------------|------------------|
| 1            | 14701               | 1.004            | 0.1 <sup>o</sup> |
| 2            | 14702               | 1.006            | 0.3 <sup>o</sup> |
| 3            | 14703               | 1.000            | 0.0 <sup>o</sup> |

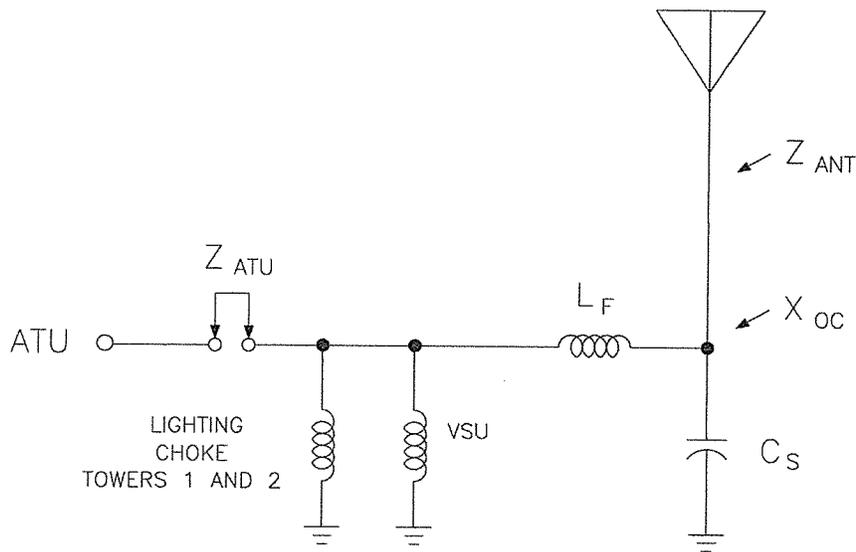
**ANTENNA MONITOR MEASUREMENT**

Measurement of the Potomac Instruments Model 1901-5 Antenna Monitor was performed to verify calibration. A single RF Voltage was applied to the Day Reference Input (Tower #3) and each other Input by use of a "T" divider and equal electrical length coaxial cables. This yields the following:

| <b>Tower</b> | <b>Ratio</b> | <b>Phase</b>     |
|--------------|--------------|------------------|
| 1            | 1.001        | 0.4 <sup>o</sup> |
| 2            | 1.000        | 0.2 <sup>o</sup> |
| 3            | 1.000        | 0.0 <sup>o</sup> |

The above is within the manufacturer's rating of  $\pm 1.0\%$  and  $\pm 1.0^{\circ}$ .

**FIGURE 3**  
**WMGG TOWER IMPEDANCE MEASUREMENTS COMPARED TO**  
**METHOD OF MOMENTS MODEL**  
**APPLICATION FOR LICENSE INFORMATION**  
**EMPLOYING MOMENT METHOD MODELING**  
**WMGG, 1470 KHZ, DA-2**  
**EGYPT LAKE, FLORIDA**  
**JUNE, 2016**



| TOWER | Specified<br>$C_s$ (pf) | Measured<br>$L_F$ ( $\mu$ H) | Measured<br>$X_F$ ( $\Omega$ ) | Modeled<br>$Z_{ANT}$ ( $\Omega$ ) | Modeled<br>$Z_{ATU}$ ( $\Omega$ ) | Measured<br>$Z_{ATU}$ ( $\Omega$ ) |
|-------|-------------------------|------------------------------|--------------------------------|-----------------------------------|-----------------------------------|------------------------------------|
| 1     | 15                      | 3.14                         | +j29.0                         | 255.3 +j 411.1                    | 217.3 +j 414.0                    | 220.0 +j 421.0                     |
| 2     | 15                      | 3.03                         | +j28.0                         | 255.5 +j 411.5                    | 217.6 +j 413.6                    | 221.0 +j 420.0                     |
| 3     | 10                      | 1.62                         | +j15.0                         | 641.2 +j 634.1                    | 711.4 +j 644.2                    | 690.0 +j 622.0                     |

| Tower | Calculated $X_{OC}$ ( $\Omega$ ) |
|-------|----------------------------------|
| 1     | + j 5,622.4                      |
| 2     | + j 5,619.2                      |
| 3     | -j 12,141.2                      |

**FIGURE 4  
WMGG MOMENT MODEL PARAMETERS**

**APPLICATION FOR LICENSE INFORMATION  
EMPLOYING MOMENT METHOD MODELING  
WMGG, 1470 KHZ, DA-2  
EGYPT LAKE, FLORIDA  
JUNE, 2016**

| <b>Tower #</b> | <b>Wire #</b> | <b># of Segments</b> | <b>Base Node</b> |
|----------------|---------------|----------------------|------------------|
| 1              | 1             | 15                   | 1                |
| 2              | 2             | 15                   | 16               |
| 3              | 3-6           | 24                   | 31               |

| <b>Tower #</b> | <b>Physical Height Degrees</b> | <b>Modeled Height Degrees</b> | <b>Modeled Radius Meters</b> | <b>% of Equivalent Radius</b> |
|----------------|--------------------------------|-------------------------------|------------------------------|-------------------------------|
| 1              | 123.7                          | 136.0                         | .145                         | 100.0                         |
| 2              | 123.7                          | 136.0                         | .145                         | 100.0                         |
| 3              | 123.7 + TL                     | 119.0 + TL                    | .218                         | 100.0                         |

All Towers are uniform cross section, guyed with Base Insulator. Towers are 1 and 2 are three (3) sided, 12" face width. Tower 3 is three (3) sided, 18" face width.

Base Insulators for towers 1 and 2 are manufactured by Lapp Insulators, with an assumed capacity of 15pf (-j7,217.9 ohms @ 1470 kHz). Tower #3 base insulator is manufactured by Austin insulators, with an assumed capacity of 10pf (-j10,826.9 ohms @ 1470 kHz).

Tower 3 guy wire top-loading modeled at 100% actual length.

Towers have Phasetek Inc. 3 wire lighting choke. These measure +j3,237.3 ohms @ 1470 kHz. Voltage Sampling Units measure +j100,000.0 ohms @ 1470 kHz. These are in parallel with lighting chokes at towers 1 and 2.

## FIGURE 5 WMGG MOMENT SUMMARY FOR INDIVIDUAL TOWERS

### WMGG TOWER 1 (OTHERS OPEN)

#### GEOMETRY

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

| wire | caps | Distance | Angle | Z    | radius | segs |
|------|------|----------|-------|------|--------|------|
| 1    | none | 81.2     | 344.  | 0    | .145   | 15   |
|      |      | 81.2     | 344.  | 136. |        |      |
| 2    | none | 81.2     | 164.  | 0    | .145   | 15   |
|      |      | 81.2     | 164.  | 136. |        |      |
| 3    | none | 0        | 0     | 0    | .218   | 15   |
|      |      | 0        | 0     | 119. |        |      |
| 4    | none | 0        | 0     | 119. | .03    | 3    |
|      |      | 21.      | 30.   | 98.  |        |      |
| 5    | none | 0        | 0     | 119. | .03    | 3    |
|      |      | 21.      | 150.  | 98.  |        |      |
| 6    | none | 0        | 0     | 119. | .03    | 3    |
|      |      | 21.      | 270.  | 98.  |        |      |

Number of wires = 6  
current nodes = 54

| Individual wires<br>segment length<br>radius | minimum |         | maximum |        |
|--|---------|---------|---------|--------|
|  | wire    | value   | wire    | value  |
|  | 3       | 7.93333 | 4       | 9.8995 |
|  | 4       | .03     | 3       | .218   |

#### ELECTRICAL DESCRIPTION

##### Frequencies (MHz)

| no. | lowest | step | no. of<br>steps | segment length (wavelengths)<br>minimum | maximum  |
|-----|--------|------|-----------------|---|----------|
| 1   | 1.47   | 0    | 1               | .022037                                 | .0274986 |

##### Sources

| source | node | sector | magnitude | phase | type    |
|--------|------|--------|-----------|-------|---------|
| 1      | 1    | 1      | 1.        | 0     | voltage |

##### Lumped loads

| load | node | resistance<br>(ohms) | reactance<br>(ohms) | inductance<br>(mH) | capacitance<br>(uF) | passive<br>circuit |
|------|------|----------------------|---------------------|--------------------|---------------------|--------------------|
| 1    | 16   | 0                    | 5,619.2             | 0                  | 0                   | 0                  |
| 2    | 31   | 0                    | -12,141.2           | 0                  | 0                   | 0                  |

#### IMPEDANCE

normalization = 50.

| freq<br>(MHz)                | resist<br>(ohms) | react<br>(ohms) | imped<br>(ohms) | phase<br>(deg) | VSWR   | S11<br>dB | S12<br>dB |
|------------------------------|------------------|-----------------|-----------------|----------------|--------|-----------|-----------|
| source = 1; node 1, sector 1 |                  |                 |                 |                |        |           |           |
| 1.47                         | 255.33           | 411.09          | 483.93          | 58.2           | 18.485 | -.94068   | -7.105    |

#### IMPEDANCE

normalization = 50.

| freq<br>(MHz)                | resist<br>(ohms) | react<br>(ohms) | imped<br>(ohms) | phase<br>(deg) | VSWR   | S11<br>dB | S12<br>dB |
|------------------------------|------------------|-----------------|-----------------|----------------|--------|-----------|-----------|
| source = 1; node 1, sector 1 |                  |                 |                 |                |        |           |           |
| .81                          | 51.              | 55.39           | 75.294          | 47.4           | 2.8531 | -6.3583   | -1.1424   |

WMGG TOWER 2 (OTHERS OPEN)

GEOMETRY

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

| wire | caps | Distance | Angle | Z    | radius | segs |
|------|------|----------|-------|------|--------|------|
| 1    | none | 81.2     | 344.  | 0    | .145   | 15   |
|      |      | 81.2     | 344.  | 136. |        |      |
| 2    | none | 81.2     | 164.  | 0    | .145   | 15   |
|      |      | 81.2     | 164.  | 136. |        |      |
| 3    | none | 0        | 0     | 0    | .218   | 15   |
|      |      | 0        | 0     | 119. |        |      |
| 4    | none | 0        | 0     | 119. | .03    | 3    |
|      |      | 21.      | 30.   | 98.  |        |      |
| 5    | none | 0        | 0     | 119. | .03    | 3    |
|      |      | 21.      | 150.  | 98.  |        |      |
| 6    | none | 0        | 0     | 119. | .03    | 3    |
|      |      | 21.      | 270.  | 98.  |        |      |

Number of wires = 6  
 current nodes = 54

| Individual wires<br>segment length<br>radius | minimum |         | maximum |        |
|--|---------|---------|---------|--------|
|  | wire    | value   | wire    | value  |
|  | 3       | 7.93333 | 4       | 9.8995 |
|  | 4       | .03     | 3       | .218   |

ELECTRICAL DESCRIPTION

Frequencies (MHz)

| no. | frequency |      | no. of<br>steps | segment length (wavelengths) |          |
|-----|-----------|------|-----------------|------------------------------|----------|
|     | lowest    | step |                 | minimum                      | maximum  |
| 1   | 1.47      | 0    | 1               | .022037                      | .0274986 |

Sources

| source | node | sector | magnitude | phase | type    |
|--------|------|--------|-----------|-------|---------|
| 1      | 16   | 1      | 1.        | 0     | voltage |

Lumped loads

| load | node | resistance<br>(ohms) | reactance<br>(ohms) | inductance<br>(mH) | capacitance<br>(uF) | passive<br>circuit |
|------|------|----------------------|---------------------|--------------------|---------------------|--------------------|
| 1    | 1    | 0                    | 5,622.4             | 0                  | 0                   | 0                  |
| 2    | 31   | 0                    | -12,141.2           | 0                  | 0                   | 0                  |

IMPEDANCE

normalization = 50.

| freq<br>(MHz)                 | resist<br>(ohms) | react<br>(ohms) | imped<br>(ohms) | phase<br>(deg) | VSWR   | S11<br>dB | S12<br>dB |
|-------------------------------|------------------|-----------------|-----------------|----------------|--------|-----------|-----------|
| source = 1; node 16, sector 1 |                  |                 |                 |                |        |           |           |
| 1.47                          | 255.54           | 411.46          | 484.35          | 58.2           | 18.503 | -.93979   | -7.1089   |

WMGG TOWER 3 (OTHERS OPEN)

GEOMETRY

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

| wire | caps | Distance | Angle | Z    | radius | segs |
|------|------|----------|-------|------|--------|------|
| 1    | none | 81.2     | 344.  | 0    | .145   | 15   |
|      |      | 81.2     | 344.  | 136. |        |      |
| 2    | none | 81.2     | 164.  | 0    | .145   | 15   |
|      |      | 81.2     | 164.  | 136. |        |      |
| 3    | none | 0        | 0     | 0    | .218   | 15   |
|      |      | 0        | 0     | 119. |        |      |
| 4    | none | 0        | 0     | 119. | .03    | 3    |
|      |      | 21.      | 30.   | 98.  |        |      |
| 5    | none | 0        | 0     | 119. | .03    | 3    |
|      |      | 21.      | 150.  | 98.  |        |      |
| 6    | none | 0        | 0     | 119. | .03    | 3    |
|      |      | 21.      | 270.  | 98.  |        |      |

Number of wires = 6  
 current nodes = 54

| Individual wires<br>segment length<br>radius | minimum |         | maximum |        |
|--|---------|---------|---------|--------|
|  | wire    | value   | wire    | value  |
|  | 3       | 7.93333 | 4       | 9.8995 |
|  | 4       | .03     | 3       | .218   |

ELECTRICAL DESCRIPTION

Frequencies (MHz)

| no.    | frequency | step | no. of steps | segment length (wavelengths) |
|--------|-----------|------|--------------|------------------------------|
| lowest |           |      |              | minimum maximum              |
| 1      | 1.47      | 0    | 1            | .022037 .0274986             |

Sources

| source | node | sector | magnitude | phase | type    |
|--------|------|--------|-----------|-------|---------|
| 1      | 31   | 1      | 1.        | 0     | voltage |

Lumped loads

| load | node | resistance (ohms) | reactance (ohms) | inductance (mH) | capacitance (uF) | passive circuit |
|------|------|-------------------|------------------|-----------------|------------------|-----------------|
| 1    | 1    | 0                 | 5,622.4          | 0               | 0                | 0               |
| 2    | 16   | 0                 | 5,619.2          | 0               | 0                | 0               |

IMPEDANCE

normalization = 50.

| freq (MHz)                    | resist (ohms) | react (ohms) | imped (ohms) | phase (deg) | VSWR   | S11 dB  | S12 dB  |
|-------------------------------|---------------|--------------|--------------|-------------|--------|---------|---------|
| source = 1; node 31, sector 1 |               |              |              |             |        |         |         |
| 1.47                          | 641.19        | 634.05       | 901.74       | 44.7        | 25.402 | -.68423 | -8.3635 |

**FIGURE 6**  
**WMGG MOMENT MODEL ARRAY SYNTHESIS**  
**(DIRECTIONAL – DAY)**

**APPLICATION FOR LICENSE INFORMATION**  
**EMPLOYING MOMENT METHOD MODELING**  
**WMGG, 1470 KHZ, DA-2**  
**EGYPT LAKE, FLORIDA**  
**JUNE, 2016**

WMGG DAY

MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 1.47 MHz

| tower | field ratio<br>magnitude | phase (deg) |
|-------|--------------------------|-------------|
| 1     | 0                        | 0           |
| 2     | .702                     | 151.        |
| 3     | 1.                       | 0           |

VOLTAGES AND CURRENTS - rms

| source node | voltage<br>magnitude | phase (deg) | current<br>magnitude | phase (deg) |
|-------------|----------------------|-------------|----------------------|-------------|
| 1           | 417.612              | 359.        | 1.11885              | 86.3        |
| 16          | 1,079.82             | 240.5       | 2.31748              | 151.5       |
| 31          | 2,149.16             | 79.8        | 1.49385              | 48.2        |

Sum of square of source currents = 17.7082  
Total power = 2,800. watts

TOWER ADMITTANCE MATRIX

| admittance | real (mhos) | imaginary (mhos) |
|------------|-------------|------------------|
| Y(1, 1)    | .00139117   | -.00147466       |
| Y(1, 2)    | .000254028  | -.000368871      |
| Y(1, 3)    | .000815961  | .000154772       |
| Y(2, 1)    | .000254034  | -.000368871      |
| Y(2, 2)    | .0013914    | -.0014741        |
| Y(2, 3)    | .000816309  | .000153969       |
| Y(3, 1)    | .000816461  | .000155068       |
| Y(3, 2)    | .000816789  | .000154299       |
| Y(3, 3)    | .000949699  | -.000275072      |

TOWER IMPEDANCE MATRIX

| impedance | real (ohms) | imaginary (ohms) |
|-----------|-------------|------------------|
| Z(1, 1)   | 261.624     | 397.957          |
| Z(1, 2)   | -190.387    | -41.3431         |
| Z(1, 3)   | 82.3816     | -294.493         |
| Z(2, 1)   | -190.387    | -41.3496         |
| Z(2, 2)   | 261.801     | 398.31           |
| Z(2, 3)   | 81.8516     | -294.759         |
| Z(3, 1)   | 82.2622     | -294.318         |
| Z(3, 2)   | 81.711      | -294.594         |
| Z(3, 3)   | 624.705     | 660.625          |

**FIGURE 7**  
**WMGG MOMENT MODEL SUMMARY FOR**  
**DIRECTIONAL DAY MODE**

**APPLICATION FOR LICENSE INFORMATION**  
**WMGG, 1470 KHZ, DA-2**  
**EGYPT LAKE, FLORIDA**  
**JUNE, 2016**  
**EMPLOYING MOMENT METHOD MODELING**

WMGG DAY

**GEOMETRY**

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

| wire | caps | Distance | Angle | Z    | radius | segs |
|------|------|----------|-------|------|--------|------|
| 1    | none | 81.2     | 344.  | 0    | .145   | 15   |
|      |      | 81.2     | 344.  | 136. |        |      |
| 2    | none | 81.2     | 164.  | 0    | .145   | 15   |
|      |      | 81.2     | 164.  | 136. |        |      |
| 3    | none | 0        | 0     | 0    | .218   | 15   |
|      |      | 0        | 0     | 119. |        |      |
| 4    | none | 0        | 0     | 119. | .03    | 3    |
|      |      | 21.      | 30.   | 98.  |        |      |
| 5    | none | 0        | 0     | 119. | .03    | 3    |
|      |      | 21.      | 150.  | 98.  |        |      |
| 6    | none | 0        | 0     | 119. | .03    | 3    |
|      |      | 21.      | 270.  | 98.  |        |      |

Number of wires = 6  
 current nodes = 54

|                  | minimum    | maximum    |
|------------------|------------|------------|
| Individual wires | wire value | wire value |
| segment length   | 3 7.93333  | 4 9.8995   |
| radius           | 4 .03      | 3 .218     |

**ELECTRICAL DESCRIPTION**

Frequencies (MHZ)

| no.    | frequency | step | no. of | segment length | (wavelengths) |
|--------|-----------|------|--------|----------------|---------------|
| lowest |           |      | steps  | minimum        | maximum       |
| 1      | 1.47      | 0    | 1      | .022037        | .0274986      |

**Sources**

| source | node | sector | magnitude | phase | type    |
|--------|------|--------|-----------|-------|---------|
| 1      | 16   | 1      | 1,527.09  | 240.5 | voltage |
| 2      | 31   | 1      | 3,039.38  | 79.8  | voltage |

**Lumped loads**

| load | node | resistance | reactance | inductance | capacitance | passive |
|------|------|------------|-----------|------------|-------------|---------|
|      |      | (ohms)     | (ohms)    | (mH)       | (uF)        | circuit |
| 1    | 1    | 0          | 372.84    | 0          | 0           | 0       |

**IMPEDANCE**

normalization = 50.

| freq                          | resist  | react  | imped  | phase | VSWR   | S11      | S12     |
|-------------------------------|---------|--------|--------|-------|--------|----------|---------|
| (MHZ)                         | (ohms)  | (ohms) | (ohms) | (deg) |        | dB       | dB      |
| source = 1; node 16, sector 1 |         |        |        |       |        |          |         |
| 1.47                          | 8.8828  | 465.03 | 465.11 | 88.9  | 492.7  | -3.5E-02 | -20.923 |
| source = 2; node 31, sector 1 |         |        |        |       |        |          |         |
| 1.47                          | 1,229.7 | 762.76 | 1,447. | 31.8  | 34.067 | -.51007  | -9.5541 |

CURRENT rms  
 Frequency = 1.47 MHz  
 Input power = 2,800. watts  
 Efficiency = 100. %  
 coordinates in degrees

| current<br>no. | X        | Y        | Z       | mag<br>(amps) | phase<br>(deg) | real<br>(amps) | imaginary<br>(amps) |
|----------------|----------|----------|---------|---------------|----------------|----------------|---------------------|
| GND            | 78.0545  | 22.3818  | 0       | 1.11675       | 87.5           | .04938         | 1.11565             |
| 2              | 78.0545  | 22.3818  | 9.06667 | .787198       | 87.6           | .0329341       | .786508             |
| 3              | 78.0545  | 22.3818  | 18.1333 | .547894       | 88.2           | .0169778       | .547631             |
| 4              | 78.0545  | 22.3818  | 27.2    | .34089        | 90.1           | -3.53E-04      | .34089              |
| 5              | 78.0545  | 22.3818  | 36.2667 | .16144        | 96.5           | -.018259       | .160405             |
| 6              | 78.0545  | 22.3818  | 45.3333 | .0359261      | 171.3          | -.035509       | 5.46E-03            |
| 7              | 78.0545  | 22.3818  | 54.4    | .133278       | 247.6          | -.0507723      | -.123228            |
| 8              | 78.0545  | 22.3818  | 63.4667 | .233248       | 254.4          | -.0628225      | -.224629            |
| 9              | 78.0545  | 22.3818  | 72.5333 | .306124       | 256.6          | -.0706901      | -.29785             |
| 10             | 78.0545  | 22.3818  | 81.6    | .350183       | 257.8          | -.0737683      | -.342325            |
| 11             | 78.0545  | 22.3818  | 90.6667 | .365037       | 258.6          | -.0718682      | -.357892            |
| 12             | 78.0545  | 22.3818  | 99.7333 | .350902       | 259.3          | -.0652032      | -.34479             |
| 13             | 78.0545  | 22.3818  | 108.8   | .308388       | 259.9          | -.0543006      | -.30357             |
| 14             | 78.0545  | 22.3818  | 117.867 | .238135       | 260.4          | -.0398188      | -.234782            |
| 15             | 78.0545  | 22.3818  | 126.933 | .13976        | 260.8          | -.0222405      | -.137979            |
| END            | 78.0545  | 22.3818  | 136.    | 0             | 0              | 0              | 0                   |
| GND            | -78.0545 | -22.3818 | 0       | 2.33821       | 151.6          | -2.05669       | 1.11231             |
| 17             | -78.0545 | -22.3818 | 9.06667 | 3.16775       | 151.3          | -2.77885       | 1.52075             |
| 18             | -78.0545 | -22.3818 | 18.1333 | 3.69989       | 151.2          | -3.24216       | 1.78257             |
| 19             | -78.0545 | -22.3818 | 27.2    | 4.0876        | 151.1          | -3.57975       | 1.97327             |
| 20             | -78.0545 | -22.3818 | 36.2667 | 4.34809       | 151.1          | -3.80648       | 2.10157             |
| 21             | -78.0545 | -22.3818 | 45.3333 | 4.486         | 151.1          | -3.92623       | 2.17001             |
| 22             | -78.0545 | -22.3818 | 54.4    | 4.50328       | 151.1          | -3.94058       | 2.17978             |
| 23             | -78.0545 | -22.3818 | 63.4667 | 4.40219       | 151.           | -3.85138       | 2.13218             |
| 24             | -78.0545 | -22.3818 | 72.5333 | 4.18644       | 151.           | -3.66182       | 2.02913             |
| 25             | -78.0545 | -22.3818 | 81.6    | 3.86164       | 151.           | -3.37682       | 1.87333             |
| 26             | -78.0545 | -22.3818 | 90.6667 | 3.43534       | 150.9          | -3.00304       | 1.66832             |
| 27             | -78.0545 | -22.3818 | 99.7333 | 2.91663       | 150.9          | -2.54858       | 1.41827             |
| 28             | -78.0545 | -22.3818 | 108.8   | 2.31536       | 150.9          | -2.02222       | 1.12762             |
| 29             | -78.0545 | -22.3818 | 117.867 | 1.64011       | 150.8          | -1.43168       | .800146             |
| 30             | -78.0545 | -22.3818 | 126.933 | .892369       | 150.7          | -.778504       | .436182             |
| END            | -78.0545 | -22.3818 | 136.    | 0             | 0              | 0              | 0                   |
| GND            | 0        | 0        | 0       | 1.49584       | 48.            | 1.00113        | 1.11143             |
| 32             | 0        | 0        | 7.93333 | 2.85348       | 16.2           | 2.74082        | .793886             |
| 33             | 0        | 0        | 15.8667 | 3.9304        | 8.4            | 3.88827        | .573914             |
| 34             | 0        | 0        | 23.8    | 4.84652       | 4.5            | 4.83144        | .38192              |
| 35             | 0        | 0        | 31.7333 | 5.61513       | 2.2            | 5.61117        | .2109               |
| 36             | 0        | 0        | 39.6667 | 6.23976       | .5             | 6.23948        | .0591738            |
| 37             | 0        | 0        | 47.6    | 6.7199        | 359.4          | 6.7195         | -.0731865           |
| 38             | 0        | 0        | 55.5333 | 7.05461       | 358.5          | 7.05217        | -.18556             |
| 39             | 0        | 0        | 63.4667 | 7.24433       | 357.8          | 7.23903        | -.27725             |
| 40             | 0        | 0        | 71.4    | 7.29226       | 357.3          | 7.28396        | -.34773             |
| 41             | 0        | 0        | 79.3333 | 7.20552       | 356.8          | 7.19459        | -.396814            |
| 42             | 0        | 0        | 87.2667 | 6.99765       | 356.5          | 6.98474        | -.42483             |
| 43             | 0        | 0        | 95.2    | 6.69062       | 356.3          | 6.67661        | -.432813            |
| 44             | 0        | 0        | 103.133 | 6.31365       | 356.2          | 6.29949        | -.422592            |
| 45             | 0        | 0        | 111.067 | 5.89382       | 356.1          | 5.88046        | -.396606            |
| J3             | 0        | 0        | 119.    | 5.50898       | 356.2          | 5.49707        | -.362025            |
| 2J1            | 0        | 0        | 119.    | 1.81791       | 356.9          | 1.81532        | -.0970395           |
| 47             | 6.06218  | -3.5     | 112.    | 1.35195       | 357.5          | 1.35065        | -.059157            |
| 48             | 12.1244  | -7.      | 105.    | .737722       | 358.1          | .73732         | -.0243613           |
| END            | 18.1865  | -10.5    | 98.     | 0             | 0              | 0              | 0                   |
| 2J1            | 0        | 0        | 119.    | 1.8654        | 355.2          | 1.85891        | -.155495            |
| 50             | -6.06218 | -3.5     | 112.    | 1.39408       | 355.4          | 1.38963        | -.111364            |
| 51             | -12.1244 | -7.      | 105.    | .765094       | 355.6          | .762843        | -.0586453           |
| END            | -18.1865 | -10.5    | 98.     | 0             | 0              | 0              | 0                   |
| 2J1            | 0        | 0        | 119.    | 1.82614       | 356.6          | 1.82285        | -.109491            |
| 53             | 0        | 7.       | 112.    | 1.35894       | 357.           | 1.35713        | -.0700999           |
| 54             | 0        | 14.      | 105.    | .741884       | 357.6          | .741222        | -.0313176           |
| END            | 0        | 21.      | 98.     | 0             | 0              | 0              | 0                   |

**FIGURE 8**  
**WMGG MOMENT MODEL ARRAY SYNTHESIS**  
**(DIRECTIONAL – NIGHT)**

**APPLICATION FOR LICENSE INFORMATION**  
**EMPLOYING MOMENT METHOD MODELING**  
**WMGG, 1470 KHZ, DA-2**  
**EGYPT LAKE, FLORIDA**  
**JUNE, 2016**

WMGG NIGHT

MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 1.47 MHz

| tower | field ratio |             |
|-------|-------------|-------------|
|       | magnitude   | phase (deg) |
| 1     | 1.06        | 199.        |
| 2     | 1.28        | 194.        |
| 3     | 1.          | 0           |

VOLTAGES AND CURRENTS - rms

| source node | voltage   |             | current   |             |
|-------------|-----------|-------------|-----------|-------------|
|             | magnitude | phase (deg) | magnitude | phase (deg) |
| 1           | 864.021   | 281.7       | 1.89564   | 207.9       |
| 16          | 1,068.78  | 273.9       | 2.27697   | 206.7       |
| 31          | 1,080.61  | 98.6        | .789885   | 324.        |

Sum of square of source currents = 18.804

Total power = 800. watts

TOWER ADMITTANCE MATRIX

| admittance | real (mhos) | imaginary (mhos) |
|------------|-------------|------------------|
| Y(1, 1)    | .00139117   | -.00147466       |
| Y(1, 2)    | .000254028  | -.000368871      |
| Y(1, 3)    | .000815961  | .000154772       |
| Y(2, 1)    | .000254034  | -.000368871      |
| Y(2, 2)    | .0013914    | -.0014741        |
| Y(2, 3)    | .000816309  | .000153969       |
| Y(3, 1)    | .000816461  | .000155068       |
| Y(3, 2)    | .000816789  | .000154299       |
| Y(3, 3)    | .000949699  | -.000275072      |

TOWER IMPEDANCE MATRIX

| impedance | real (ohms) | imaginary (ohms) |
|-----------|-------------|------------------|
| Z(1, 1)   | 261.624     | 397.957          |
| Z(1, 2)   | -190.387    | -41.3431         |
| Z(1, 3)   | 82.3816     | -294.493         |
| Z(2, 1)   | -190.387    | -41.3496         |
| Z(2, 2)   | 261.801     | 398.31           |
| Z(2, 3)   | 81.8516     | -294.759         |
| Z(3, 1)   | 82.2622     | -294.318         |
| Z(3, 2)   | 81.711      | -294.594         |
| Z(3, 3)   | 624.705     | 660.625          |

**FIGURE 9**  
**WMGG MOMENT MODEL SUMMARY FOR**  
**DIRECTIONAL NIGHT MODE**

**APPLICATION FOR LICENSE INFORMATION**  
**EMPLOYING MOMENT METHOD MODELING**  
**WMGG, 1470 KHZ, DA-2**  
**EGYPT LAKE, FLORIDA**  
**JUNE, 2016**

GEOMETRY  
 WMGG NIGHT

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

| wire | caps | Distance | Angle | Z    | radius | segs |
|------|------|----------|-------|------|--------|------|
| 1    | none | 81.2     | 344.  | 0    | .145   | 15   |
|      |      | 81.2     | 344.  | 136. |        |      |
| 2    | none | 81.2     | 164.  | 0    | .145   | 15   |
|      |      | 81.2     | 164.  | 136. |        |      |
| 3    | none | 0        | 0     | 0    | .218   | 15   |
|      |      | 0        | 0     | 119. |        |      |
| 4    | none | 0        | 0     | 119. | .03    | 3    |
|      |      | 21.      | 30.   | 98.  |        |      |
| 5    | none | 0        | 0     | 119. | .03    | 3    |
|      |      | 21.      | 150.  | 98.  |        |      |
| 6    | none | 0        | 0     | 119. | .03    | 3    |
|      |      | 21.      | 270.  | 98.  |        |      |

Number of wires = 6  
 current nodes = 54

| Individual wires<br>segment length<br>radius | minimum |         | maximum |        |
|--|---------|---------|---------|--------|
|  | wire    | value   | wire    | value  |
|  | 3       | 7.93333 | 4       | 9.8995 |
|  | 4       | .03     | 3       | .218   |

**ELECTRICAL DESCRIPTION**

Frequencies (MHZ)

| no. | frequency | step | no. of steps | segment length (wavelengths) | minimum  | maximum |
|-----|-----------|------|--------------|------------------------------|----------|---------|
| 1   | 1.47      | 0    | 1            | .022037                      | .0274986 |         |

Sources

| source | node | sector | magnitude | phase | type    |
|--------|------|--------|-----------|-------|---------|
| 1      | 1    | 1      | 1,221.91  | 281.7 | voltage |
| 2      | 16   | 1      | 1,511.49  | 273.9 | voltage |
| 3      | 31   | 1      | 1,528.21  | 98.6  | voltage |

IMPEDANCE

normalization = 50.

| freq<br>(MHZ)                 | resist<br>(ohms) | react<br>(ohms) | imped<br>(ohms) | phase<br>(deg) | VSWR   | S11<br>dB | S12<br>dB |
|-------------------------------|------------------|-----------------|-----------------|----------------|--------|-----------|-----------|
| source = 1; node 1, sector 1  |                  |                 |                 |                |        |           |           |
| 1.47                          | 126.97           | 437.75          | 455.79          | 73.8           | 33.087 | -.5252    | -9.4346   |
| source = 2; node 16, sector 1 |                  |                 |                 |                |        |           |           |
| 1.47                          | 181.84           | 432.73          | 469.39          | 67.2           | 24.467 | -.71041   | -8.2131   |
| source = 3; node 31, sector 1 |                  |                 |                 |                |        |           |           |
| 1.47                          | -960.13          | 974.54          | 1,368.1         | 134.6          | ****   | ****      | ****      |

CURRENT rms

Frequency = 1.47 MHz  
 Input power = 800. watts  
 Efficiency = 100. %  
 coordinates in degrees

| current<br>no. | X        | Y        | Z       | mag<br>(amps) | phase<br>(deg) | real<br>(amps) | imaginary<br>(amps) |
|----------------|----------|----------|---------|---------------|----------------|----------------|---------------------|
| GND            | 78.0545  | 22.3818  | 0       | 1.89563       | 207.9          | -1.67583       | -.88601             |
| 2              | 78.0545  | 22.3818  | 9.06667 | 2.53437       | 203.6          | -2.32166       | -1.01634            |
| 3              | 78.0545  | 22.3818  | 18.1333 | 2.94677       | 201.8          | -2.73681       | -1.09241            |
| 4              | 78.0545  | 22.3818  | 27.2    | 3.24683       | 200.5          | -3.04047       | -1.13906            |
| 5              | 78.0545  | 22.3818  | 36.2667 | 3.44709       | 199.7          | -3.24626       | -1.15943            |
| 6              | 78.0545  | 22.3818  | 45.3333 | 3.55101       | 199.           | -3.35801       | -1.15475            |
| 7              | 78.0545  | 22.3818  | 54.4    | 3.56016       | 198.4          | -3.37745       | -1.12587            |
| 8              | 78.0545  | 22.3818  | 63.4667 | 3.47652       | 198.           | -3.30653       | -1.0738             |
| 9              | 78.0545  | 22.3818  | 72.5333 | 3.30317       | 197.6          | -3.14823       | -.999797            |
| 10             | 78.0545  | 22.3818  | 81.6    | 3.04466       | 197.3          | -2.90691       | -.905455            |
| 11             | 78.0545  | 22.3818  | 90.6667 | 2.70698       | 197.           | -2.58833       | -.792658            |
| 12             | 78.0545  | 22.3818  | 99.7333 | 2.29725       | 196.8          | -2.19934       | -.663497            |
| 13             | 78.0545  | 22.3818  | 108.8   | 1.8231        | 196.6          | -1.74733       | -.520112            |
| 14             | 78.0545  | 22.3818  | 117.867 | 1.29114       | 196.4          | -1.23869       | -.364266            |
| 15             | 78.0545  | 22.3818  | 126.933 | .702393       | 196.2          | -.674452       | -.196139            |
| END            | 78.0545  | 22.3818  | 136.    | 0             | 0              | 0              | 0                   |
| GND            | -78.0545 | -22.3818 | 0       | 2.27697       | 206.7          | -2.03421       | -1.02304            |
| 17             | -78.0545 | -22.3818 | 9.06667 | 3.04386       | 200.6          | -2.84839       | -1.0732             |
| 18             | -78.0545 | -22.3818 | 18.1333 | 3.54506       | 198.           | -3.37242       | -1.09279            |
| 19             | -78.0545 | -22.3818 | 27.2    | 3.9122        | 196.2          | -3.7566        | -1.09236            |
| 20             | -78.0545 | -22.3818 | 36.2667 | 4.15908       | 195.           | -4.01814       | -1.07356            |
| 21             | -78.0545 | -22.3818 | 45.3333 | 4.2893        | 194.           | -4.16196       | -1.03739            |
| 22             | -78.0545 | -22.3818 | 54.4    | 4.30448       | 193.2          | -4.19031       | -.984821            |
| 23             | -78.0545 | -22.3818 | 63.4667 | 4.20683       | 192.6          | -4.10567       | -.917002            |
| 24             | -78.0545 | -22.3818 | 72.5333 | 3.99999       | 192.1          | -3.9118        | -.835303            |
| 25             | -78.0545 | -22.3818 | 81.6    | 3.68937       | 191.6          | -3.61413       | -.741294            |
| 26             | -78.0545 | -22.3818 | 90.6667 | 3.28216       | 191.2          | -3.2198        | -.636738            |
| 27             | -78.0545 | -22.3818 | 99.7333 | 2.78694       | 190.8          | -2.73734       | -.523483            |
| 28             | -78.0545 | -22.3818 | 108.8   | 2.21291       | 190.5          | -2.17584       | -.403347            |
| 29             | -78.0545 | -22.3818 | 117.867 | 1.56801       | 190.2          | -1.54321       | -.277812            |
| 30             | -78.0545 | -22.3818 | 126.933 | .853444       | 189.9          | -.840663       | -.147145            |
| END            | -78.0545 | -22.3818 | 136.    | 0             | 0              | 0              | 0                   |
| GND            | 0        | 0        | 0       | .789885       | 324.           | .639041        | -.464268            |
| 32             | 0        | 0        | 7.93333 | 1.54777       | 347.7          | 1.51198        | -.330905            |
| 33             | 0        | 0        | 15.8667 | 2.10208       | 353.5          | 2.08847        | -.238782            |
| 34             | 0        | 0        | 23.8    | 2.56779       | 356.5          | 2.56289        | -.158645            |
| 35             | 0        | 0        | 31.7333 | 2.95671       | 358.3          | 2.95541        | -.0875467           |
| 36             | 0        | 0        | 39.6667 | 3.27178       | 359.6          | 3.27168        | -.0247698           |
| 37             | 0        | 0        | 47.6    | 3.51302       | .5             | 3.51289        | .0296824            |
| 38             | 0        | 0        | 55.5333 | 3.67992       | 1.2            | 3.67915        | .0755924            |
| 39             | 0        | 0        | 63.4667 | 3.77262       | 1.7            | 3.77094        | .11273              |
| 40             | 0        | 0        | 71.4    | 3.79263       | 2.1            | 3.79001        | .140961             |
| 41             | 0        | 0        | 79.3333 | 3.74367       | 2.5            | 3.74023        | .160312             |
| 42             | 0        | 0        | 87.2667 | 3.63269       | 2.7            | 3.62867        | .171045             |
| 43             | 0        | 0        | 95.2    | 3.47119       | 2.9            | 3.46684        | .173729             |
| 44             | 0        | 0        | 103.133 | 3.27439       | 3.             | 3.27001        | .169265             |
| 45             | 0        | 0        | 111.067 | 3.05642       | 3.             | 3.0523         | .158793             |
| J3             | 0        | 0        | 119.    | 2.8576        | 2.9            | 2.8539         | .145323             |

|     |          |       |      |         |     |         |          |
|-----|----------|-------|------|---------|-----|---------|----------|
| 2J1 | 0        | 0     | 119. | .947926 | 3.1 | .946538 | .0512763 |
| 47  | 6.06218  | -3.5  | 112. | .706442 | 2.8 | .705569 | .0351233 |
| 48  | 12.1244  | -7.   | 105. | .38627  | 2.6 | .385881 | .017347  |
| END | 18.1865  | -10.5 | 98.  | 0       | 0   | 0       | 0        |
| 2J1 | 0        | 0     | 119. | .964562 | 2.7 | .96348  | .0456653 |
| 50  | -6.06218 | -3.5  | 112. | .721789 | 2.4 | .721155 | .0302398 |
| 51  | -12.1244 | -7.   | 105. | .396945 | 2.1 | .396687 | .0143025 |
| END | -18.1865 | -10.5 | 98.  | 0       | 0   | 0       | 0        |
| 2J1 | 0        | 0     | 119. | .945125 | 2.9 | .943886 | .0483815 |
| 53  | 0        | 7.    | 112. | .703526 | 2.6 | .702778 | .0324515 |
| 54  | 0        | 14.   | 105. | .383851 | 2.3 | .383538 | .0154879 |
| END | 0        | 21.   | 98.  | 0       | 0   | 0       | 0        |

**FIGURE 10  
DERIVED DIRECTIONAL PARAMETERS**

**APPLICATION FOR LICENSE INFORMATION  
EMPLOYING MOMENT METHOD MODELING  
WMGG, 1470 KHZ, DA-2  
EGYPT LAKE, FLORIDA  
JUNE, 2016**

**DAY:**

| Tower  | Theoretical |        | Base Network Input Voltage |          | Normalized VSU |        |
|--------|-------------|--------|----------------------------|----------|----------------|--------|
|        | Field       | Phase  | Amplitude                  | Phase    | Amplitude      | Phase  |
| 1 (NW) |             |        | Detuned                    |          |                |        |
| 2 (SE) | .702        | 151.0° | 1142.79                    | -119.44° | .530           | 160.3° |
| 3 (C)  | 1.000       | 0.0°   | 2158.01                    | 80.30°   | 1.000          | 0.0°   |

**NIGHT:**

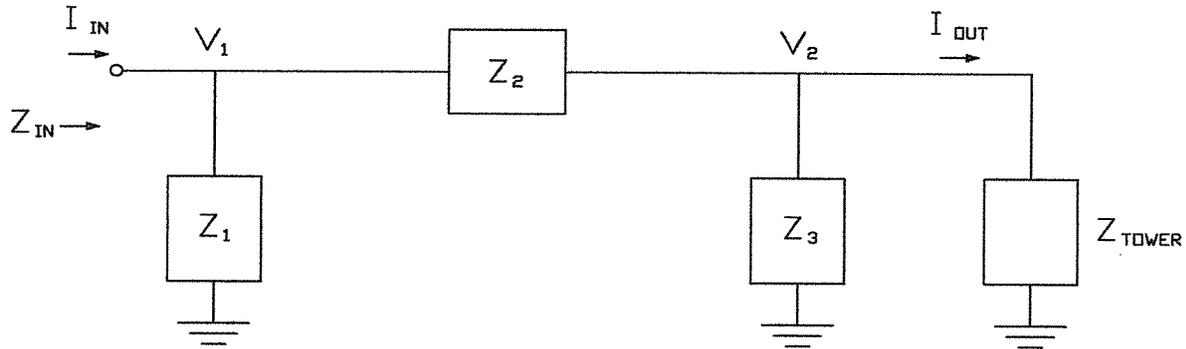
| Tower  | Theoretical |        | Base Network Input Voltage |         | Normalized VSU |         |
|--------|-------------|--------|----------------------------|---------|----------------|---------|
|        | Field       | Phase  | Amplitude                  | Phase   | Amplitude      | Phase   |
| 1 (NW) | 1.060       | 199.0° | 913.47                     | -77.34° | .813           | 7.5°    |
| 2 (SE) | 1.280       | 194.0° | 1123.68                    | -84.84° | 1.000          | 0.0°    |
| 3 (C)  | 1.000       | 0.0°   | 1087.58                    | 98.16°  | .968           | -177.0° |

**FIGURE 11**  
**WMGG TOWER BASE CIRCUIT ANALYSIS DESCRIPTION**

**APPLICATION FOR LICENSE INFORMATION**  
**EMPLOYING MOMENT METHOD MODELING**  
**WMGG, 1470 KHZ, DA-2**  
**EGYPT LAKE, FLORIDA**  
**JUNE, 2016**

**CIRCUIT ANALYSIS**

Circuit Analysis was performed on each Tower of the WMGG model. "Phasetek" nodal Circuit Analysis program was used to compute base model Input/Output voltages and currents. For the Directional modes, the calculated Mininec Tower Base Drive Voltage was used to determine the Base Network Input Voltage. This point is the location of the Sampling VSU. " $Z_1$ " represents the ATU Shunt impedance, " $Z_2$ " represents the Tower Feed impedance, and " $Z_3$ " represents the Tower Base Shunt impedance.



## FIGURE 12 WMGG CIRCUIT ANALYSIS FOR INDIVIDUAL TOWERS

CUSTOMER : WMGG  
NETWORK ID : TOWER 1 (OTHERS OPEN)

FREQUENCY : 1470.00 kHz  
 ATU SHUNT IMPEDANCE (R,X) : 0.00, 3131.50 OHMS  
 TOWER FEED IMPEDANCE (R,X) : 0.00, 29.00 OHMS  
 TOWER SHUNT IMPEDANCE (R,X) : 0.00, -7217.90 OHMS  
 TOWER IMPEDANCE (R,X) : 255.33, 411.09 OHMS

| NODE | TO | NODE   | IMPEDANCE (OHMS) |         |
|------|----|--------|------------------|---------|
|      |    |        | R                | X       |
| 1    |    | GROUND | 0.00             | 3131.50 |
| 2    |    | GROUND | 286.70           | 425.16  |
| 1    |    | 2      | 0.00             | 29.00   |

| NODE | VOLTAGE   |       |
|------|-----------|-------|
|      | MAGNITUDE | PHASE |
| 1    | 100.00    | 0.00  |
| 2    | 95.48     | -1.73 |

|                          | REAL   | IMAGINARY | MAGNITUDE | PHASE  |
|--------------------------|--------|-----------|-----------|--------|
| INPUT IMPEDANCE (OHMS) : | 217.28 | 414.01    | 467.57    | 62.31  |
| INPUT CURRENT (AMPS) :   | 0.10   | -0.19     | 0.21      | -62.31 |
| OUTPUT CURRENT (AMPS) :  | 0.10   | -0.17     | 0.20      | -59.89 |

INPUT/OUTPUT CURRENT RATIO = 1.0840  
 INPUT/OUTPUT PHASE = -2.42 DEGREES

CUSTOMER : WMGG  
 NETWORK ID : TOWER 2 (OTHERS OPEN)

FREQUENCY : 1470.00 kHz  
 ATU SHUNT IMPEDANCE (R,X) : 0.00, 3131.50 OHMS  
 TOWER FEED IMPEDANCE (R,X) : 0.00, 28.00 OHMS  
 TOWER SHUNT IMPEDANCE (R,X) : 0.00, -7217.90 OHMS  
 TOWER IMPEDANCE (R,X) : 255.54, 411.46 OHMS

| NODE | TO | NODE   | IMPEDANCE (OHMS) |         |
|------|----|--------|------------------|---------|
|      |    |        | R                | X       |
| 1    |    | GROUND | 0.00             | 3131.50 |
| 2    |    | GROUND | 286.96           | 425.56  |
| 1    |    | 2      | 0.00             | 28.00   |

| NODE | VOLTAGE   |       |
|------|-----------|-------|
|      | MAGNITUDE | PHASE |
| 1    | 100.00    | 0.00  |
| 2    | 95.63     | -1.67 |

|                          | REAL   | IMAGINARY | MAGNITUDE | PHASE  |
|--------------------------|--------|-----------|-----------|--------|
| INPUT IMPEDANCE (OHMS) : | 217.55 | 413.59    | 467.32    | 62.26  |
| INPUT CURRENT (AMPS) :   | 0.10   | -0.19     | 0.21      | -62.26 |
| OUTPUT CURRENT (AMPS) :  | 0.10   | -0.17     | 0.20      | -59.83 |

INPUT/OUTPUT CURRENT RATIO = 1.0838  
 INPUT/OUTPUT PHASE = -2.43 DEGREES

CUSTOMER : WMGG  
 NETWORK ID : TOWER 3 (OTHERS OPEN)

FREQUENCY : 1470.00 kHz  
 ATU SHUNT IMPEDANCE (R,X) : 0.00,100000.00 OHMS  
 TOWER FEED IMPEDANCE (R,X) : 0.00, 15.00 OHMS  
 TOWER SHUNT IMPEDANCE (R,X) : 0.00,-10826.90 OHMS  
 TOWER IMPEDANCE (R,X) : 641.19, 634.05 OHMS

| NODE | TO | NODE   | IMPEDANCE (OHMS) |           |
|------|----|--------|------------------|-----------|
|      |    |        | R                | X         |
| 1    |    | GROUND | 0.00             | 100000.00 |
| 2    |    | GROUND | 720.59           | 628.16    |
| 1    |    | 2      | 0.00             | 15.00     |

| NODE | VOLTAGE   |       |
|------|-----------|-------|
|      | MAGNITUDE | PHASE |
| 1    | 100.00    | 0.00  |
| 2    | 98.97     | -0.67 |

|                          | REAL   | IMAGINARY | MAGNITUDE | PHASE  |
|--------------------------|--------|-----------|-----------|--------|
| INPUT IMPEDANCE (OHMS) : | 711.37 | 644.15    | 959.67    | 42.16  |
| INPUT CURRENT (AMPS) :   | 0.08   | -0.07     | 0.10      | -42.16 |
| OUTPUT CURRENT (AMPS) :  | 0.08   | -0.08     | 0.11      | -45.35 |

INPUT/OUTPUT CURRENT RATIO = 0.9494  
 INPUT/OUTPUT PHASE = 3.19 DEGREES

**FIGURE 13**  
**WMGG CIRCUIT ANALYSIS FOR DIRECTIONAL DAY MODE**

CUSTOMER : WMGG  
 NETWORK ID : TOWER 2 DAY

FREQUENCY : 1470.00 kHz  
 ATU SHUNT IMPEDANCE (R,X) : 0.00, 3131.50 OHMS  
 TOWER FEED IMPEDANCE (R,X) : 0.00, 29.00 OHMS  
 TOWER SHUNT IMPEDANCE (R,X) : 0.00, -7217.90 OHMS  
 TOWER IMPEDANCE (R,X) : 8.88, 465.11 OHMS

| NODE | TO | NODE   | IMPEDANCE (OHMS) |         |
|------|----|--------|------------------|---------|
|      |    |        | R                | X       |
| 1    |    | GROUND | 0.00             | 3131.50 |
| 2    |    | GROUND | 10.15            | 497.13  |
| 1    |    | 2      | 0.00             | 29.00   |

| NODE | VOLTAGE   |         |
|------|-----------|---------|
|      | MAGNITUDE | PHASE   |
| 1    | 1142.79   | -119.44 |
| 2    | 1079.82   | 240.50  |

|                          | REAL  | IMAGINARY | MAGNITUDE | PHASE  |
|--------------------------|-------|-----------|-----------|--------|
| INPUT IMPEDANCE (OHMS) : | 7.44  | 450.47    | 450.53    | 89.05  |
| INPUT CURRENT (AMPS) :   | -2.23 | 1.21      | 2.54      | 151.51 |
| OUTPUT CURRENT (AMPS) :  | -2.04 | 1.10      | 2.32      | 151.59 |

INPUT/OUTPUT CURRENT RATIO = 1.0928  
 INPUT/OUTPUT PHASE = -0.08 DEGREES

CUSTOMER : WMGG  
NETWORK ID : TOWER 3 DAY

FREQUENCY : 1470.00 kHz  
ATU SHUNT IMPEDANCE (R,X) : 0.00,100000.00 OHMS  
TOWER FEED IMPEDANCE (R,X) : 0.00, 15.00 OHMS  
TOWER SHUNT IMPEDANCE (R,X) : 0.00,-10826.90 OHMS  
TOWER IMPEDANCE (R,X) :1229.70, 762.76 OHMS

| NODE | TO | NODE   | IMPEDANCE (OHMS) |           |
|------|----|--------|------------------|-----------|
|      |    |        | R                | X         |
| 1    |    | GROUND | 0.00             | 100000.00 |
| 2    |    | GROUND | 1402.23          | 649.24    |
| 1    |    | 2      | 0.00             | 15.00     |

| NODE | VOLTAGE   |       |
|------|-----------|-------|
|      | MAGNITUDE | PHASE |
| 1    | 2158.01   | 80.30 |
| 2    | 2149.16   | 79.80 |

|                          | REAL    | IMAGINARY | MAGNITUDE | PHASE |
|--------------------------|---------|-----------|-----------|-------|
| INPUT IMPEDANCE (OHMS) : | 1383.51 | 679.13    | 1541.21   | 26.15 |
| INPUT CURRENT (AMPS) :   | 0.82    | 1.14      | 1.40      | 54.16 |
| OUTPUT CURRENT (AMPS) :  | 0.99    | 1.10      | 1.49      | 47.99 |

INPUT/OUTPUT CURRENT RATIO = 0.9428  
INPUT/OUTPUT PHASE = 6.17 DEGREES

**FIGURE 14**  
**WMGG CIRCUIT ANALYSIS FOR DIRECTIONAL NIGHT MODE**

CUSTOMER : WMGG  
 NETWORK ID : TOWER 1 NIGHT

FREQUENCY : 1470.00 kHz  
 ATU SHUNT IMPEDANCE (R,X) : 0.00, 3131.50 OHMS  
 TOWER FEED IMPEDANCE (R,X) : 0.00, 29.00 OHMS  
 TOWER SHUNT IMPEDANCE (R,X) : 0.00, -7217.90 OHMS  
 TOWER IMPEDANCE (R,X) : 126.97, 437.75 OHMS

| NODE | TO | NODE   | IMPEDANCE (OHMS) |         |
|------|----|--------|------------------|---------|
|      |    |        | R                | X       |
| 1    |    | GROUND | 0.00             | 3131.50 |
| 2    |    | GROUND | 143.84           | 463.32  |
| 1    |    | 2      | 0.00             | 29.00   |

| NODE | VOLTAGE   |        |
|------|-----------|--------|
|      | MAGNITUDE | PHASE  |
| 1    | 913.47    | -77.34 |
| 2    | 864.02    | 281.70 |

|                          | REAL   | IMAGINARY | MAGNITUDE | PHASE   |
|--------------------------|--------|-----------|-----------|---------|
| INPUT IMPEDANCE (OHMS) : | 107.25 | 429.69    | 442.87    | 75.99   |
| INPUT CURRENT (AMPS) :   | -1.84  | -0.93     | 2.06      | -153.33 |
| OUTPUT CURRENT (AMPS) :  | -1.68  | -0.89     | 1.90      | -152.13 |

INPUT/OUTPUT CURRENT RATIO = 1.0881  
 INPUT/OUTPUT PHASE = -1.20 DEGREES

CUSTOMER : WMGG  
NETWORK ID : TOWER 2 NIGHT

FREQUENCY : 1470.00 KHZ  
ATU SHUNT IMPEDANCE (R,X) : 0.00, 3131.50 OHMS  
TOWER FEED IMPEDANCE (R,X) : 0.00, 28.00 OHMS  
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -7217.90 OHMS  
TOWER IMPEDANCE (R,X) : 181.84, 432.73 OHMS

| NODE | TO | NODE   | IMPEDANCE (OHMS) |         |
|------|----|--------|------------------|---------|
|      |    |        | R                | X       |
| 1    |    | GROUND | 0.00             | 3131.50 |
| 2    |    | GROUND | 205.63           | 454.82  |
| 1    |    | 2      | 0.00             | 28.00   |

| NODE | VOLTAGE   |        |
|------|-----------|--------|
|      | MAGNITUDE | PHASE  |
| 1    | 1123.68   | -84.84 |
| 2    | 1068.78   | 273.90 |

|                          | REAL   | IMAGINARY | MAGNITUDE | PHASE   |
|--------------------------|--------|-----------|-----------|---------|
| INPUT IMPEDANCE (OHMS) : | 153.86 | 427.07    | 453.94    | 70.19   |
| INPUT CURRENT (AMPS) :   | -2.24  | -1.05     | 2.48      | -155.03 |
| OUTPUT CURRENT (AMPS) :  | -2.03  | -1.02     | 2.28      | -153.31 |

INPUT/OUTPUT CURRENT RATIO = 1.0871  
INPUT/OUTPUT PHASE = -1.72 DEGREES

CUSTOMER : WMGG  
 NETWORK ID : TOWER 3 NIGHT

FREQUENCY : 1470.00 kHz  
 ATU SHUNT IMPEDANCE (R,X) : 0.00,100000.00 OHMS  
 TOWER FEED IMPEDANCE (R,X) : 0.00, 15.00 OHMS  
 TOWER SHUNT IMPEDANCE (R,X) : 0.00,-10826.90 OHMS  
 TOWER IMPEDANCE (R,X) :-960.13, 974.54 OHMS

| NODE | TO | NODE   | IMPEDANCE (OHMS) |           |
|------|----|--------|------------------|-----------|
|      |    |        | R                | X         |
| 1    |    | GROUND | 0.00             | 100000.00 |
| 2    |    | GROUND | -1148.56         | 959.01    |
| 1    |    | 2      | 0.00             | 15.00     |

| NODE | VOLTAGE   |       |
|------|-----------|-------|
|      | MAGNITUDE | PHASE |
| 1    | 1087.58   | 98.16 |
| 2    | 1080.61   | 98.60 |

|                          | REAL     | IMAGINARY | MAGNITUDE | PHASE  |
|--------------------------|----------|-----------|-----------|--------|
| INPUT IMPEDANCE (OHMS) : | -1126.36 | 977.42    | 1491.32   | 139.05 |
| INPUT CURRENT (AMPS) :   | 0.55     | -0.48     | 0.73      | -40.89 |
| OUTPUT CURRENT (AMPS) :  | 0.64     | -0.46     | 0.79      | -35.97 |

INPUT/OUTPUT CURRENT RATIO = 0.9233  
 INPUT/OUTPUT PHASE = -4.91 DEGREES

**FIGURE 15**  
**WMGG DAY REFERENCE POINT MEASUREMENTS – JUNE 16, 2016**

| <u>Radial</u> |   | <u>Dist</u><br><u>km</u> | <u>mV/m</u> | <u>Time</u> | <u>CO-ORD NAD27</u> |              |                                      | <u>Description</u> |
|---------------|---|--------------------------|-------------|-------------|---------------------|--------------|--------------------------------------|--------------------|
|               |   |                          |             |             | <u>Deg</u>          | <u>Min</u>   | <u>Sec</u>                           |                    |
| <b>95°</b>    | 1 | 1.12                     | 90.5        | 1754        | N 28 00 38.8        | W 82 29 12.1 | Off 6901 Tampania                    |                    |
|               | 2 | 1.40                     | 91.5        | 1746        | N 28 00 38.7        | W 82 29 01.8 | Sligh and Armenia, Amscot Lot        |                    |
|               | 3 | 1.53                     | 34.1        | 1750        | N 28 00 38.1        | W 82 28 57.0 | 6902 Howard Ave.                     |                    |
| <b>164°</b>   | 1 | 1.46                     | 112         | 1822        | N 27 59 56.6        | W 82 29 38.0 | 3110 Henry                           |                    |
|               | 2 | 1.61                     | 102         | 1818        | N 27 59 51.7        | W 82 29 36.7 | Opposite 3107 Rio Vista              |                    |
|               | 3 | 1.80                     | 78.6        | 1814        | N 27 59 46.0        | W 82 29 34.4 | Hillsborough and Macdill NW corner   |                    |
| <b>233°</b>   | 1 | 1.17                     | 102         | 1833        | N 28 00 18.8        | W 82 30 27.2 | Jehovahs Witness lot at East end     |                    |
|               | 2 | 1.55                     | 84.6        | 1837        | N 28 00 11.4        | W 82 30 38.3 | Hanna east of Hale Smith at sidewalk |                    |
|               | 3 | 1.68                     | 92.6        | 1840        | N 28 00 09.4        | W 82 30 42.1 | 6016 N. Clark                        |                    |

**FIGURE 15 CONTINUED**  
**WMGG DAY REFERENCE POINT MEASUREMENTS – JUNE 16, 2016**

| <u>Radial</u> |   | <u>Dist</u><br><u>km</u> | <u>mV/m</u> | <u>Time</u> | <i>CO-ORD NAD27</i> |            |            | <u>Description</u>                         |
|---------------|---|--------------------------|-------------|-------------|---------------------|------------|------------|--|
|               |   |                          |             |             | <u>Deg</u>          | <u>Min</u> | <u>Sec</u> |  |
| 344°          | 1 | 1.17                     | 289         | 1904        | N 28 01 18.4        |            |            | Edna west of Himes at first driveway South |
|               |   |                          |             |             | W 82 30 03.4        |            |            |  |
|               | 2 | 1.60                     | 201         | 1851        | N 28 01 31.9        |            |            | Waters, Dollar Tree lot at light pole      |
|               |   |                          |             |             | W 82 30 08.8        |            |            |  |
|               | 3 | 1.99                     | 233         | 1859        | N 28 01 43.5        |            |            | Humphrey east of Dale Mabry at gate        |
|               |   |                          |             |             | W 82 30 14.6        |            |            |  |

## FIGURE 15 CONTINUED

### WMGG NIGHT REFERENCE POINT MEASUREMENTS – JUNE 16, 2016

| <u>Radial</u> |   | <u>Dist</u><br><u>km</u> | <u>mV/m</u> | <u>Time</u> | <i>CO-ORD NAD27</i> |            |              | <u>Description</u>                    |
|---------------|---|--------------------------|-------------|-------------|---------------------|------------|--------------|---------------------------------------|
|               |   |                          |             |             | <u>Deg</u>          | <u>Min</u> | <u>Sec</u>   |                                       |
| <b>22.5°</b>  | 1 | 1.15                     | 77.5        | 1030        | N 28<br>W 82        | 01<br>29   | 16.5<br>37.3 | Driveway 3204 Sitka                   |
|               | 2 | 1.80                     | 28.8        | 1044        | N 28<br>W 82        | 01<br>29   | 36.2<br>28.3 | Gomez and Xanthus, SE corner          |
|               | 3 | 1.86                     | 27.1        | 1051        | N 28<br>W 82        | 01<br>29   | 38.5<br>28.5 | Gomez East side, opposite pole 130460 |
| <b>77°</b>    | 1 | 1.05                     | 226         | 1059        | N 28<br>W 82        | 00<br>29   | 49.4<br>15.7 | Hamilton and Poller, North side       |
|               | 2 | 1.28                     | 139         | 1108        | N 28<br>W 82        | 00<br>29   | 51.5<br>07.4 | Armenia east side parking lot         |
|               | 3 | 1.36                     | 121         | 1104        | N 28<br>W 82        | 00<br>29   | 52.4<br>04.6 | 7303 Coarsey                          |
| <b>130.5°</b> | 1 | 1.75                     | 32.5        | 1119        | N 28<br>W 82        | 00<br>29   | 04.5<br>04.9 | Armenia and Idlewild, NW corner       |
|               | 2 | 1.84                     | 47.5        | 1123        | N 28<br>W 82        | 00<br>29   | 03.7<br>00.8 | 2312 Idlewild                         |
|               | 3 | 2.26                     | 26.0        | 1127        | N 27<br>W 82        | 59<br>28   | 54.4<br>49.7 | Opposite 5613 Albany                  |

**FIGURE 15 CONTINUED**

**WMGG NIGHT REFERENCE POINT MEASUREMENTS – JUNE 16, 2016**

| <u>Radial</u> |             | <u>Dist</u><br><u>km</u> | <u>mV/m</u> | <u>Time</u> | <i>CO-ORD NAD27</i> |            |                            | <u>Description</u>            |
|---------------|-------------|--------------------------|-------------|-------------|---------------------|------------|----------------------------|-------------------------------|
|               |             |                          |             |             | <u>Deg</u>          | <u>Min</u> | <u>Sec</u>                 |                               |
| <b>197.5°</b> | 1           | 0.96                     | 80.0        | 1148        | N 28 00             | 12.8       | Himes and Paris, SE corner |                               |
|               |             |                          |             |             | W 82 30             | 03.3       |                            |                               |
|               | 2           | 1.17                     | 82.5        | 1145        | N 28 00             | 05.6       | 3603 Idlewild              |                               |
|               |             |                          |             |             | W 82 30             | 05.1       |                            |                               |
|               | 3           | 1.81                     | 59.0        | 1138        | N 27 59             | 46.0       | Hillsboro Ave, Walmart lot |                               |
|               |             |                          |             |             | W 82 30             | 13.0       |                            |                               |
|               | <b>251°</b> | 1                        | 1.46        | 186         | 1159                | N 28 00    | 25.7                       | 6606 Clark                    |
|               |             |                          |             |             |                     | W 82 30    | 43.4                       |                               |
|               |             | 2                        | 1.62        | 167         | 1203                | N 28 00    | 25.6                       | Lois and Lambright, NW corner |
| W 82 30       |             |                          |             |             |                     | 49.5       |                            |                               |
| 3             |             | 1.83                     | 150         | 1207        | N 28 00             | 22.3       | 6413 Hubert                |                               |
|               |             |                          |             |             | W 82 30             | 56.7       |                            |                               |
| <b>305.5°</b> |             | 1                        | 1.02        | 88.0        | 1221                | N 28 01    | 01.2                       | Opposite 7512 Church Ave.     |
|               |             |                          |             |             |                     | W 82 30    | 23.7                       |                               |
|               |             | 2                        | 1.19        | 75.5        | 1225                | N 28 01    | 08.7                       | Richard and Kirby, SW corner  |
|               | W 82 30     |                          |             |             |                     | 29.1       |                            |                               |
|               | 3           | 2.04                     | 38.5        | 1233        | N 28 01             | 20.9       | 8113 Thatcher              |                               |
|               |             |                          |             |             | W 82 30             | 53.3       |                            |                               |

**FIGURE 16  
CERTIFIED ARRAY GEOMETRY**



June 16, 2016

Laura Maduri  
Genesis Communications  
PO Box 25434  
Tampa, FL 33622

Re: 3325 W Sligh Ave, Radio Transmittal Antenna Site

Dear Laura:

Per your Job Order with American Surveying Inc, of June 14, 2016; I sent a fieldcrew to the site mentioned above to measure your Antenna Towers with the goal of establishing their relationship to True North utilizing GPS Equipment and Conventional Surveying Equipment.

Our measurements are based on the National Geodetic Survey, NAD 83, Florida State Plane Coordinate Geometry Base, Florida West Zone.

Our measurements show that the Central Tower is located N 15°43'00"W, (Azimuth 344.283333°) 151.10 ft horizontally from the southernmost tower.  
From Central Tower to the northernmost tower we measure N 15°38'06"W, (Azimuth 344.365000°) 150.48 ft horizontally.

Overall from the southernmost tower to the northernmost tower we measure N 15°40'33"W, (Azimuth 344.324166°) 301.58 ft horizontally.

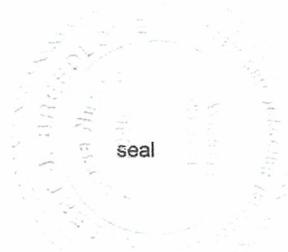
Our measurements were taken to the center of each towers support base by measuring to the corners of each support base and calculating the exact center of each base which we were told by Max Anduze would be the best and safest way to obtain the towers location.

I hope this satisfies your needs.

Thank you for your business.

Respectfully,

Robert J Breedlove, PSM #7040  
Vice President / Senior Project Manager



4847 North Florida Avenue  
Tampa, Florida 33603

Telephone: 813-234-0103  
Facsimile: 813-234-0108

**FIGURE 17**  
**WMGG SPURIOUS RADIATION MEASUREMENTS**  
**JUNE, 2016**  
**WTMP (1150 KHZ), 10.0 KW DAY MODE**  
**WMGG (1470 KHZ), 2.8 KW DAY MODE**

| <u>Frequency (kHz)</u> | <u>Field Intensity (mV/M)</u> | <u>Attenuation (dB) relative to</u> |             |
|------------------------|-------------------------------|-------------------------------------|-------------|
|                        |                               | <u>WTMP</u>                         | <u>WMGG</u> |
| 1150                   | 400                           | --                                  | --          |
| 1470                   | 243                           | --                                  | --          |
| 510                    | <.01                          | >92.0                               | >87.7       |
| 640                    | .012                          | 90.5                                | 86.1        |
| 830                    | .018                          | 86.9                                | 82.6        |
| 1790                   | .024                          | 84.4                                | 80.1        |
| 1980                   | .014                          | 89.1                                | 84.8        |
| 2110                   | .012                          | 90.5                                | 86.1        |
| 2620                   | .015                          | 88.5                                | 84.4        |
| 3770                   | <.01                          | >92.0                               | >87.7       |
| 4090                   | <.01                          | >92.0                               | >87.7       |
| 4920                   | .012                          | 90.5                                | 86.1        |

Above taken with Potomac Instruments, FIM-41, 1.01 km from the Antenna on a bearing of 302°T.

Above readings meet required attenuation of 77.5dB (WMGG Day) and 80.0dB (WTMP Day).

**FIGURE 18**  
**CURRENT DISTRIBUTION MEASUREMENTS**

**WMGG TOWER 3**

