

ENGINEERING REPORT

METOHOD OF MOMENTS LICENSE TO COVER

**WPON(AM) – Walled Lake, MI
1460 kHz – Facility ID#: 22045**

File: BP-20180516AAA

September 2019

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Broadcast Engineering Consultants
Coldwater, MI 49036

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CERTIFICATION OF ENGINEERS

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

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

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

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

MUNN-REESE

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

By



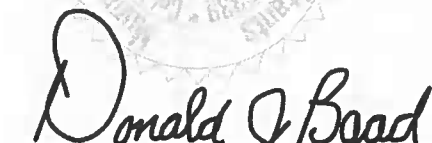
Richard Grzebik, Staff Engineer

By



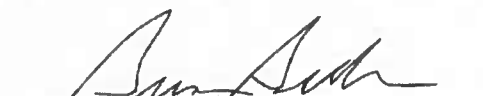
Edmond R. Trombley, Staff Engineer

By



Donald J. Baad, Staff Engineer

By



Bruce Bellamy, Owner/Engineer

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Coldwater, MI 49036

Discussion

The firm of Munn-Reese, Coldwater, MI, was retained to prepare an Antenna Proof of Performance under the Moment Method rules found in §73.151(c). This report supplies technical support for a license application to cover modified facilities under the Moment Method rules for WPON, Walled Lake, MI (Facility ID # 22045) as authorized under Construction Permit: BP-20180516AAA. A concurrent 301-AM application for this facility is being filed to correct the array parameters to conform with the as-built survey of the tower locations. The construction permit authorizes operation of 0.670 kW daytime and 0.580 kW nighttime. The site is a common site for the new facilities of WPON and WCXI and consists of seven towers. The WPON daytime array utilizes four of these towers and the WPON nighttime uses three of these towers. Filters are employed at the tower bases to isolate the ATU outputs of each station from those of the other, and at the transmitter input to the WPON phasor to isolate the transmitters and avoid development of excessive spurious intermodulation products. Towers 3 (NE) and 4 (E) are not used in the WPON arrays have been detuned at 1460 kHz. Tower 7 (EC) is not used in the WPON daytime array and Towers 1 (NW) and 5 (SW) are not used in the WPON nighttime array. These towers are detuned when not in use.

This facility will operate at 0.67 kW daytime using a four tower directional array and 0.58 kW using a three tower directional array. This proof of performance is being filed with the Form 302-AM license application.

Self-impedance measurements, measurements of transmission lines and sample line lengths and related measurements were made at each tower with the other towers "floating" in an open circuit configuration as set forth in §73.151(c)(1). Measurements were made using an HP 8753C Network Analyzer in conjunction with an ENI 350L RF Amplifier and Tunwall Radio Directional Coupler in a calibrated setup designed for AM measurements. The measurements were made at the output jack of each ATU. This same jack was opened to "float" the unused towers. The results of these measurements are shown in **Exhibit 1.10**, along with the dimensions of the individual towers.

The WPON array does not employ any isocouplers or other shunt elements across the base of the tower that need to be included in the model. A capacitance of approximately 50 pf was used to represent the base insulator and any stray capacitance near each tower base. At 1460 kHz, this capacitance can be modeled by a shunt reactance of $-j\ 2180$ ohms.

Individual printouts from Au Contraire, Version 1.030, are shown for the modeling of each tower in **Exhibits 1.11 - 1.17**. The base impedance predicted by the Mininec software was adjusted by first combining the predicted base impedance with the assumed parallel shunt reactance and then adding the assumed series reactance to represent the series path between the base of the tower and the ATU output jack. The results of these calculations are shown in the "Adjusted Model" columns of **Exhibit 1.10**. The circuit diagram and formulas used to calculate these adjusted values are shown at the end of the exhibit.

Discussion (continued)

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

The modeled tower parameters were used, along with the theoretical field parameters, to generate predicted drive points and base parameters using the moment method software as specified in §73.151(c)(2)(i). The computed data is shown in **Exhibit 1.20** for the day pattern and **Exhibit 1.30** for the night pattern. The predicted base current and phases were adjusted to reflect the presence of the assumed shunt reactance at each tower. These adjusted values are shown in the "ATU Output" column of **Exhibit 1.20** and **Exhibit 1.30**. The "ATU Output" magnitudes and phases were normalized to produce the "Mininec Model" "Ratio" and "Phase" shown in the upper middle portion of each exhibit. Supporting exhibits consisting of the array summary for each pattern are shown in **Exhibit 1.21** and **Exhibit 1.31**, respectively.

Exhibit 2.10 is the post construction site survey. **Exhibit 2.11** is the post construction verification of array geometry. Not all of the tower locations were within the limits specified in DA09-230. Thus, a From 301-AM is being filed concurrently to modify the spacing and orientation to the post-construction survey. Some operation parameter changes are also requested to the assure the direction patterns continue to meet the requirements of their respective allocations.

Exhibit 3.10 shows the details and verification of the sample system. The sample lines are RFS LCF 12-50J cable. This cable is listed with a velocity factor of 0.88. The measured sample line lengths were within one electrical degree.

The open circuit impedance of each line was also measured using the procedure described in §73.151(c)(2)(i). Good agreement was found, and the measured values, shown in **Exhibit 3.10**, are well within the two ohm tolerance.

The Delta TCT-3 current sensing transformers were removed from the ATU panels and compared using the network analyzer. The results of these measurements are also shown in **Exhibit 3.10**. The magnitudes and phases were within the ± 2 percent and ± 0.5 degrees specified by the manufacturer.

As a final step, the impedance of each sample line was again measured from the antenna monitor end with the sample transformer attached at the ATU end. The results are also shown in **Exhibit 3.10**.

Discussion (continued)

The antenna monitor employed at WPON(AM) is a Gorman-Redlich Model CRM. The antenna monitors are used for the diplexed operation of WPON(AM) with WCXI(AM) and are equipped with the appropriate filtering to reject the influence of full power operation of the other station. The monitors were tested on site to confirm the effectiveness of the filtering. Before tuning the array, the Field Engineers checked the calibration of the antenna monitor. They used a "T" connector with equal length cables to confirm each of the inputs had a Loop of 1.0 and a Phase of 0° when fed the same signal as the reference tower. This measurement verified that the antenna monitor was operating within the manufacturers stated tolerances on all inputs.

Each of the arrays was tuned by the field engineers to well within the allowed tolerances to the parameters generated by the moment method modeling software. Impedance matching at the antenna tuning units was adjusted where appropriate.

The licensed common point impedance for each pattern has been set to 50 ohms resistance and $-j$ 5 ohms reactance. This value allows the transmitter to operate with minimum reflected power.

The ground system consists of 120 buried copper radials, extending 64.61 meters in length, about the base of the WCXI(AM) towers that are common to the WPON arrays. Radials around the three remaining WPON(AM) towers need only be 51.33 meters in length. Radials will run the entire length except where shortened to terminate at property boundaries or at transverse copper straps running midway between the towers. The material used for the radials is #10 AWG, soft drawn copper wire.

The modeling of the arrays was performed by Donald J. Baad and Richard P. Grzebiak, Staff Engineers with this office. Field tuning work was performed by Richard P. Grzebiak and Edmond R. Trombley, Staff Engineers with this office. Field strength measurement reference points were located and measured by Richard P. Grzebiak. Spurious Emissions measurements and report was by Edmond R. Trombley.

Exhibit 1.10

Page 1 of 2

Moment Method Modeling Data Summary Sheet

WPON - Walled Lake, MI

Modeling Software: Au Contraire - Version 1.030

Station: WPON - Walled Lake, MI

Freq (kHz) 1460

$$\frac{X}{C/1.76} = \frac{104.1}{360}$$

$$X = 59.4m$$

Self-Impedances:
Measured

| Twr | Open | | Electrical Ht (°) | Number of Faces | Face Width (in) | Equiv Radius (m) |
|--------|--------|--------|----------------------|--------------------|--------------------|---------------------|
| | R | X | | | | |
| 1 (NW) | 115.5 | 173 | 104.1° | 3 | 24 | 0.291 |
| 2 (NC) | 102.5 | 193.85 | 104.1° | 3 | 24 | 0.291 |
| 3 (NE) | 123.4 | 176.9 | 104.1° | 3 | 24 | 0.291 |
| 4 (E) | 99.83 | 183.42 | 104.1° | 3 | 24 | 0.291 |
| 5 (SW) | 105.3 | 170.38 | 104.1° | 3 | 24 | 0.291 |
| 6 (SE) | 108.95 | 183.5 | 104.1° | 3 | 24 | 0.291 |
| 7 (EC) | 92.8 | 167.95 | 104.1° | 3 | 24 | 0.291 |

Model Check

| Twr | Adjusted | | Number Segments |
|--------|----------|-----------|--------------------|
| | Ht(°) | Radius(m) | |
| 1 (NW) | 110.2° | 0.291 | 20 |
| 2 (NC) | 113.3° | 0.291 | 20 |
| 3 (NE) | 112.7° | 0.291 | 20 |
| 4 (E) | 111.1° | 0.291 | 20 |
| 5 (SW) | 108.9° | 0.291 | 20 |
| 6 (SE) | 111.2° | 0.291 | 20 |
| 7 (EC) | 110.5° | 0.291 | 20 |

| Twr | Mininec | | Shunt X | Series X | Adjusted Model | |
|--------|---------|---------|------------|-------------|----------------|--------|
| | R | X | | | R | X |
| 1 (NW) | 101.404 | 138.218 | -2180 | 3.3831.0 | 115.31 | 172.85 |
| 2 (NC) | 87.675 | 166.301 | -2180 | 1.9618.0 | 102.56 | 193.57 |
| 3 (NE) | 106.652 | 156.805 | -2180 | 1.6415.0 | 123.48 | 177.45 |
| 4 (E) | 86.155 | 145.791 | -2180 | 3.4932.0 | 98.77 | 184.06 |
| 5 (SW) | 93.229 | 127.105 | -2180 | 4.3640.0 | 104.91 | 170.21 |
| 6 (SE) | 94.837 | 147.606 | -2180 | 3.2730.0 | 108.88 | 183.25 |
| 7 (EC) | 80.980 | 138.592 | -2180 | 2.6124.0 | 92.20 | 168.34 |

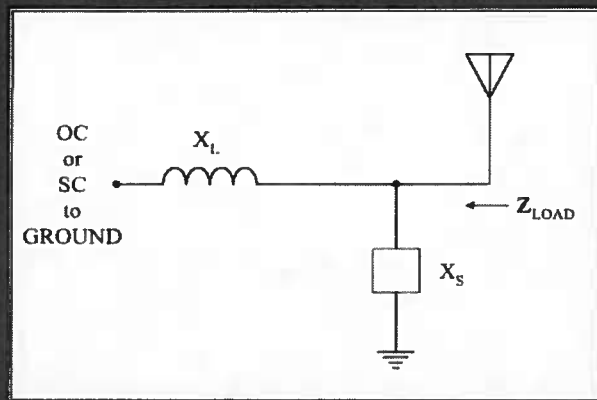
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Moment Method Modeling Data Summary Sheet

WPON - Walled Lake, MI

Added Series Inductance and Shunt Reactance Bases Open and Shorted



Added Series Inductance and Shunt Reactance Base Impedance Formulas

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

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

X_S = Shunt Reactance

X_L = Inductive Series Reactance

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

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

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Exhibit 1.11 – Tower 1 (NW) Model

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*****
                        ACSModel
                      (MININEC 3.1 Core)
                    08-01-2019          13:52:30
*****

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WPON - Tower 1 (NW) - Model

Frequency = 1.460 MHz Wavelength = 205.34246 Meters

No. of Wires: 7

| Wire No. | Coordinates X Y Z | Radius | End Connection | No. of Segments |
|------------|---------------------------------------|--------|-------------------|--------------------|
| Wire No. 1 | 0 0 0 | | -1 | |
| | 0 0 62.85761 | 0.291 | 0 | 20 |
| Wire No. 2 | 29.21459 57.48561 0 | | -2 | |
| | 29.21459 57.48561 64.62584 | 0.291 | 0 | 20 |
| Wire No. 3 | 65.51537 111.1786 0 | | -3 | |
| | 65.51537 111.1786 64.2836 | 0.291 | 0 | 20 |
| Wire No. 4 | -1.572283 100.0864 0 | | -4 | |
| | -1.572283 100.0864 63.37096 | 0.291 | 0 | 20 |
| Wire No. 5 | -105.1341 14.06524 0 | | -5 | |
| | -105.1341 14.06524 62.11609 | 0.291 | 0 | 20 |
| Wire No. 6 | -76.04971 71.66562 0 | | -6 | |
| | -76.04971 71.66562 63.42801 | 0.291 | 0 | 20 |
| Wire No. 7 | -23.59468 64.58026 0 | | -7 | |
| | -23.59468 64.58026 63.02873 | 0.291 | 0 | 20 |

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Exhibit 1.11 – Tower 1 (NW) Model

**** ANTENNA GEOMETRY ****

| Wire No. | 1 | Coordinates | | | Connection | | Pulse |
|----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| 0 | | 0 | 0 | 0.291 | -1 | 1 | 1 |
| 0 | | 0 | 3.14288 | 0.291 | 1 | 1 | 2 |
| 0 | | 0 | 6.285761 | 0.291 | 1 | 1 | 3 |
| 0 | | 0 | 9.428641 | 0.291 | 1 | 1 | 4 |
| 0 | | 0 | 12.57152 | 0.291 | 1 | 1 | 5 |
| 0 | | 0 | 15.7144 | 0.291 | 1 | 1 | 6 |
| 0 | | 0 | 18.85728 | 0.291 | 1 | 1 | 7 |
| 0 | | 0 | 22.00016 | 0.291 | 1 | 1 | 8 |
| 0 | | 0 | 25.14304 | 0.291 | 1 | 1 | 9 |
| 0 | | 0 | 28.28592 | 0.291 | 1 | 1 | 10 |
| 0 | | 0 | 31.42881 | 0.291 | 1 | 1 | 11 |
| 0 | | 0 | 34.57169 | 0.291 | 1 | 1 | 12 |
| 0 | | 0 | 37.71457 | 0.291 | 1 | 1 | 13 |
| 0 | | 0 | 40.85744 | 0.291 | 1 | 1 | 14 |
| 0 | | 0 | 44.00033 | 0.291 | 1 | 1 | 15 |
| 0 | | 0 | 47.14321 | 0.291 | 1 | 1 | 16 |
| 0 | | 0 | 50.28609 | 0.291 | 1 | 1 | 17 |
| 0 | | 0 | 53.42897 | 0.291 | 1 | 1 | 18 |
| 0 | | 0 | 56.57185 | 0.291 | 1 | 1 | 19 |
| 0 | | 0 | 59.71473 | 0.291 | 1 | 0 | 20 |

| Wire No. | 2 | Coordinates | | | Connection | | Pulse |
|----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| 29.21459 | | 57.48561 | 0 | 0.291 | -2 | 2 | 21 |
| 29.21459 | | 57.48561 | 3.231292 | 0.291 | 2 | 2 | 22 |
| 29.21459 | | 57.48561 | 6.462584 | 0.291 | 2 | 2 | 23 |
| 29.21459 | | 57.48561 | 9.693876 | 0.291 | 2 | 2 | 24 |
| 29.21459 | | 57.48561 | 12.92517 | 0.291 | 2 | 2 | 25 |
| 29.21459 | | 57.48561 | 16.15646 | 0.291 | 2 | 2 | 26 |
| 29.21459 | | 57.48561 | 19.38775 | 0.291 | 2 | 2 | 27 |
| 29.21459 | | 57.48561 | 22.61904 | 0.291 | 2 | 2 | 28 |
| 29.21459 | | 57.48561 | 25.85034 | 0.291 | 2 | 2 | 29 |
| 29.21459 | | 57.48561 | 29.08163 | 0.291 | 2 | 2 | 30 |
| 29.21459 | | 57.48561 | 32.31292 | 0.291 | 2 | 2 | 31 |
| 29.21459 | | 57.48561 | 35.54421 | 0.291 | 2 | 2 | 32 |
| 29.21459 | | 57.48561 | 38.77551 | 0.291 | 2 | 2 | 33 |
| 29.21459 | | 57.48561 | 42.0068 | 0.291 | 2 | 2 | 34 |
| 29.21459 | | 57.48561 | 45.23809 | 0.291 | 2 | 2 | 35 |
| 29.21459 | | 57.48561 | 48.46938 | 0.291 | 2 | 2 | 36 |
| 29.21459 | | 57.48561 | 51.70067 | 0.291 | 2 | 2 | 37 |
| 29.21459 | | 57.48561 | 54.93196 | 0.291 | 2 | 2 | 38 |
| 29.21459 | | 57.48561 | 58.16326 | 0.291 | 2 | 2 | 39 |
| 29.21459 | | 57.48561 | 61.39455 | 0.291 | 2 | 0 | 40 |

| Wire No. | 3 | Coordinates | | | Connection | | Pulse |
|----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| 65.51537 | | 111.1786 | 0 | 0.291 | -3 | 3 | 41 |
| 65.51537 | | 111.1786 | 3.21418 | 0.291 | 3 | 3 | 42 |
| 65.51537 | | 111.1786 | 6.42836 | 0.291 | 3 | 3 | 43 |
| 65.51537 | | 111.1786 | 9.64254 | 0.291 | 3 | 3 | 44 |
| 65.51537 | | 111.1786 | 12.85672 | 0.291 | 3 | 3 | 45 |

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Exhibit 1.11 – Tower 1 (NW) Model

| | | | | | | |
|----------|----------|----------|-------|---|---|----|
| 65.51537 | 111.1786 | 16.0709 | 0.291 | 3 | 3 | 46 |
| 65.51537 | 111.1786 | 19.28508 | 0.291 | 3 | 3 | 47 |
| 65.51537 | 111.1786 | 22.49926 | 0.291 | 3 | 3 | 48 |
| 65.51537 | 111.1786 | 25.71344 | 0.291 | 3 | 3 | 49 |
| 65.51537 | 111.1786 | 28.92762 | 0.291 | 3 | 3 | 50 |
| 65.51537 | 111.1786 | 32.1418 | 0.291 | 3 | 3 | 51 |
| 65.51537 | 111.1786 | 35.35598 | 0.291 | 3 | 3 | 52 |
| 65.51537 | 111.1786 | 38.57016 | 0.291 | 3 | 3 | 53 |
| 65.51537 | 111.1786 | 41.78434 | 0.291 | 3 | 3 | 54 |
| 65.51537 | 111.1786 | 44.99852 | 0.291 | 3 | 3 | 55 |
| 65.51537 | 111.1786 | 48.2127 | 0.291 | 3 | 3 | 56 |
| 65.51537 | 111.1786 | 51.42688 | 0.291 | 3 | 3 | 57 |
| 65.51537 | 111.1786 | 54.64106 | 0.291 | 3 | 3 | 58 |
| 65.51537 | 111.1786 | 57.85524 | 0.291 | 3 | 3 | 59 |
| 65.51537 | 111.1786 | 61.06942 | 0.291 | 3 | 0 | 60 |

| Wire No. | 4 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -1.572283 | | 100.0864 | 0 | 0.291 | -4 | 4 | 61 |
| -1.572283 | | 100.0864 | 3.168548 | 0.291 | 4 | 4 | 62 |
| -1.572283 | | 100.0864 | 6.337096 | 0.291 | 4 | 4 | 63 |
| -1.572283 | | 100.0864 | 9.505644 | 0.291 | 4 | 4 | 64 |
| -1.572283 | | 100.0864 | 12.67419 | 0.291 | 4 | 4 | 65 |
| -1.572283 | | 100.0864 | 15.84274 | 0.291 | 4 | 4 | 66 |
| -1.572283 | | 100.0864 | 19.01129 | 0.291 | 4 | 4 | 67 |
| -1.572283 | | 100.0864 | 22.17984 | 0.291 | 4 | 4 | 68 |
| -1.572283 | | 100.0864 | 25.34838 | 0.291 | 4 | 4 | 69 |
| -1.572283 | | 100.0864 | 28.51693 | 0.291 | 4 | 4 | 70 |
| -1.572283 | | 100.0864 | 31.68548 | 0.291 | 4 | 4 | 71 |
| -1.572283 | | 100.0864 | 34.85403 | 0.291 | 4 | 4 | 72 |
| -1.572283 | | 100.0864 | 38.02258 | 0.291 | 4 | 4 | 73 |
| -1.572283 | | 100.0864 | 41.19112 | 0.291 | 4 | 4 | 74 |
| -1.572283 | | 100.0864 | 44.35967 | 0.291 | 4 | 4 | 75 |
| -1.572283 | | 100.0864 | 47.52822 | 0.291 | 4 | 4 | 76 |
| -1.572283 | | 100.0864 | 50.69677 | 0.291 | 4 | 4 | 77 |
| -1.572283 | | 100.0864 | 53.86532 | 0.291 | 4 | 4 | 78 |
| -1.572283 | | 100.0864 | 57.03387 | 0.291 | 4 | 4 | 79 |
| -1.572283 | | 100.0864 | 60.20242 | 0.291 | 4 | 0 | 80 |

| Wire No. | 5 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -105.1341 | | 14.06524 | 0 | 0.291 | -5 | 5 | 81 |
| -105.1341 | | 14.06524 | 3.105805 | 0.291 | 5 | 5 | 82 |
| -105.1341 | | 14.06524 | 6.211609 | 0.291 | 5 | 5 | 83 |
| -105.1341 | | 14.06524 | 9.317414 | 0.291 | 5 | 5 | 84 |
| -105.1341 | | 14.06524 | 12.42322 | 0.291 | 5 | 5 | 85 |
| -105.1341 | | 14.06524 | 15.52902 | 0.291 | 5 | 5 | 86 |
| -105.1341 | | 14.06524 | 18.63483 | 0.291 | 5 | 5 | 87 |
| -105.1341 | | 14.06524 | 21.74063 | 0.291 | 5 | 5 | 88 |
| -105.1341 | | 14.06524 | 24.84644 | 0.291 | 5 | 5 | 89 |
| -105.1341 | | 14.06524 | 27.95224 | 0.291 | 5 | 5 | 90 |
| -105.1341 | | 14.06524 | 31.05805 | 0.291 | 5 | 5 | 91 |
| -105.1341 | | 14.06524 | 34.16385 | 0.291 | 5 | 5 | 92 |
| -105.1341 | | 14.06524 | 37.26966 | 0.291 | 5 | 5 | 93 |
| -105.1341 | | 14.06524 | 40.37546 | 0.291 | 5 | 5 | 94 |

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Exhibit 1.11 – Tower 1 (NW) Model

| | | | | | | |
|-----------|----------|----------|-------|---|---|-----|
| -105.1341 | 14.06524 | 43.48127 | 0.291 | 5 | 5 | 95 |
| -105.1341 | 14.06524 | 46.58707 | 0.291 | 5 | 5 | 96 |
| -105.1341 | 14.06524 | 49.69287 | 0.291 | 5 | 5 | 97 |
| -105.1341 | 14.06524 | 52.79868 | 0.291 | 5 | 5 | 98 |
| -105.1341 | 14.06524 | 55.90449 | 0.291 | 5 | 5 | 99 |
| -105.1341 | 14.06524 | 59.01029 | 0.291 | 5 | 0 | 100 |

| Wire No. | 6 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -76.04971 | | 71.66562 | 0 | 0.291 | -6 | 6 | 101 |
| -76.04971 | | 71.66562 | 3.1714 | 0.291 | 6 | 6 | 102 |
| -76.04971 | | 71.66562 | 6.342801 | 0.291 | 6 | 6 | 103 |
| -76.04971 | | 71.66562 | 9.5142 | 0.291 | 6 | 6 | 104 |
| -76.04971 | | 71.66562 | 12.6856 | 0.291 | 6 | 6 | 105 |
| -76.04971 | | 71.66562 | 15.857 | 0.291 | 6 | 6 | 106 |
| -76.04971 | | 71.66562 | 19.0284 | 0.291 | 6 | 6 | 107 |
| -76.04971 | | 71.66562 | 22.1998 | 0.291 | 6 | 6 | 108 |
| -76.04971 | | 71.66562 | 25.3712 | 0.291 | 6 | 6 | 109 |
| -76.04971 | | 71.66562 | 28.5426 | 0.291 | 6 | 6 | 110 |
| -76.04971 | | 71.66562 | 31.714 | 0.291 | 6 | 6 | 111 |
| -76.04971 | | 71.66562 | 34.8854 | 0.291 | 6 | 6 | 112 |
| -76.04971 | | 71.66562 | 38.0568 | 0.291 | 6 | 6 | 113 |
| -76.04971 | | 71.66562 | 41.2282 | 0.291 | 6 | 6 | 114 |
| -76.04971 | | 71.66562 | 44.3996 | 0.291 | 6 | 6 | 115 |
| -76.04971 | | 71.66562 | 47.57101 | 0.291 | 6 | 6 | 116 |
| -76.04971 | | 71.66562 | 50.7424 | 0.291 | 6 | 6 | 117 |
| -76.04971 | | 71.66562 | 53.91381 | 0.291 | 6 | 6 | 118 |
| -76.04971 | | 71.66562 | 57.08521 | 0.291 | 6 | 6 | 119 |
| -76.04971 | | 71.66562 | 60.2566 | 0.291 | 6 | 0 | 120 |

| Wire No. | 7 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -23.59468 | | 64.58026 | 0 | 0.291 | -7 | 7 | 121 |
| -23.59468 | | 64.58026 | 3.151436 | 0.291 | 7 | 7 | 122 |
| -23.59468 | | 64.58026 | 6.302873 | 0.291 | 7 | 7 | 123 |
| -23.59468 | | 64.58026 | 9.454309 | 0.291 | 7 | 7 | 124 |
| -23.59468 | | 64.58026 | 12.60575 | 0.291 | 7 | 7 | 125 |
| -23.59468 | | 64.58026 | 15.75718 | 0.291 | 7 | 7 | 126 |
| -23.59468 | | 64.58026 | 18.90862 | 0.291 | 7 | 7 | 127 |
| -23.59468 | | 64.58026 | 22.06005 | 0.291 | 7 | 7 | 128 |
| -23.59468 | | 64.58026 | 25.21149 | 0.291 | 7 | 7 | 129 |
| -23.59468 | | 64.58026 | 28.36293 | 0.291 | 7 | 7 | 130 |
| -23.59468 | | 64.58026 | 31.51436 | 0.291 | 7 | 7 | 131 |
| -23.59468 | | 64.58026 | 34.6658 | 0.291 | 7 | 7 | 132 |
| -23.59468 | | 64.58026 | 37.81724 | 0.291 | 7 | 7 | 133 |
| -23.59468 | | 64.58026 | 40.96867 | 0.291 | 7 | 7 | 134 |
| -23.59468 | | 64.58026 | 44.12011 | 0.291 | 7 | 7 | 135 |
| -23.59468 | | 64.58026 | 47.27155 | 0.291 | 7 | 7 | 136 |
| -23.59468 | | 64.58026 | 50.42298 | 0.291 | 7 | 7 | 137 |
| -23.59468 | | 64.58026 | 53.57442 | 0.291 | 7 | 7 | 138 |
| -23.59468 | | 64.58026 | 56.72585 | 0.291 | 7 | 7 | 139 |
| -23.59468 | | 64.58026 | 59.8773 | 0.291 | 7 | 0 | 140 |

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Exhibit 1.11 – Tower 1 (NW) Model

Sources: 1

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

Number of Loads: 6

Pulse No., Resistance, Reactance: 21 , 0 , -2180

Pulse No., Resistance, Reactance: 41 , 0 , -2180

Pulse No., Resistance, Reactance: 61 , 0 , -2180

Pulse No., Resistance, Reactance: 81 , 0 , -2180

Pulse No., Resistance, Reactance: 101 , 0 , -2180

Pulse No., Resistance, Reactance: 121 , 0 , -2180

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

Pulse 1 Voltage = (1.0, 0.0j)
 Current = (0.0035, -0.0047j)
 Impedance = (101.404, 138.218j)
 Power = 0.001725 Watts

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

Wire No. 1 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 1 | 0.0035 | -0.0047 | 0.0058 | -53.7341 |
| 2 | 0.0034 | -0.0054 | 0.0064 | -57.613 |
| 3 | 0.0034 | -0.0058 | 0.0067 | -59.6028 |
| 4 | 0.0034 | -0.0061 | 0.0069 | -61.1259 |
| 5 | 0.0033 | -0.0063 | 0.0071 | -62.3662 |
| 6 | 0.0032 | -0.0064 | 0.0071 | -63.4152 |
| 7 | 0.0031 | -0.0064 | 0.0071 | -64.3243 |
| 8 | 0.0029 | -0.0063 | 0.007 | -65.1263 |
| 9 | 0.0028 | -0.0062 | 0.0068 | -65.8437 |
| 10 | 0.0026 | -0.006 | 0.0066 | -66.4927 |
| 11 | 0.0024 | -0.0058 | 0.0063 | -67.0857 |
| 12 | 0.0023 | -0.0055 | 0.0059 | -67.632 |
| 13 | 0.002 | -0.0051 | 0.0055 | -68.1392 |
| 14 | 0.0018 | -0.0047 | 0.005 | -68.6134 |
| 15 | 0.0016 | -0.0042 | 0.0045 | -69.0596 |
| 16 | 0.0014 | -0.0036 | 0.0039 | -69.4821 |
| 17 | 0.0011 | -0.003 | 0.0032 | -69.8847 |
| 18 | 0.0009 | -0.0024 | 0.0026 | -70.2709 |
| 19 | 0.0006 | -0.0017 | 0.0018 | -70.6446 |
| 20 | 0.0003 | -0.001 | 0.001 | -71.0146 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.11 – Tower 1 (NW) Model

Wire No. 2 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 21 | -0.0001 | 0.0001 | 0.0002 | 145.7439 |
| 22 | -0.0004 | 0.0002 | 0.0004 | 145.7374 |
| 23 | -0.0005 | 0.0003 | 0.0006 | 145.725 |
| 24 | -0.0006 | 0.0004 | 0.0007 | 145.709 |
| 25 | -0.0007 | 0.0005 | 0.0008 | 145.6901 |
| 26 | -0.0007 | 0.0005 | 0.0009 | 145.6686 |
| 27 | -0.0008 | 0.0005 | 0.0009 | 145.6443 |
| 28 | -0.0008 | 0.0006 | 0.001 | 145.6172 |
| 29 | -0.0008 | 0.0006 | 0.001 | 145.5872 |
| 30 | -0.0008 | 0.0006 | 0.001 | 145.5541 |
| 31 | -0.0008 | 0.0006 | 0.001 | 145.5178 |
| 32 | -0.0008 | 0.0006 | 0.001 | 145.478 |
| 33 | -0.0008 | 0.0005 | 0.0009 | 145.4345 |
| 34 | -0.0007 | 0.0005 | 0.0009 | 145.3871 |
| 35 | -0.0007 | 0.0005 | 0.0008 | 145.3354 |
| 36 | -0.0006 | 0.0004 | 0.0007 | 145.2793 |
| 37 | -0.0005 | 0.0003 | 0.0006 | 145.2182 |
| 38 | -0.0004 | 0.0003 | 0.0005 | 145.1519 |
| 39 | -0.0003 | 0.0002 | 0.0003 | 145.0794 |
| 40 | -0.0002 | 0.0001 | 0.0002 | 144.9988 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 3 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 41 | 0.0001 | 0.0 | 0.0001 | 16.9845 |
| 42 | 0.0003 | 0.0001 | 0.0003 | 16.9663 |
| 43 | 0.0004 | 0.0001 | 0.0004 | 16.9317 |
| 44 | 0.0005 | 0.0002 | 0.0005 | 16.8881 |
| 45 | 0.0006 | 0.0002 | 0.0006 | 16.8379 |
| 46 | 0.0006 | 0.0002 | 0.0007 | 16.7823 |
| 47 | 0.0007 | 0.0002 | 0.0007 | 16.722 |
| 48 | 0.0007 | 0.0002 | 0.0007 | 16.6575 |
| 49 | 0.0007 | 0.0002 | 0.0008 | 16.5892 |
| 50 | 0.0007 | 0.0002 | 0.0008 | 16.5174 |
| 51 | 0.0007 | 0.0002 | 0.0008 | 16.4423 |
| 52 | 0.0007 | 0.0002 | 0.0007 | 16.3638 |
| 53 | 0.0007 | 0.0002 | 0.0007 | 16.2822 |
| 54 | 0.0006 | 0.0002 | 0.0007 | 16.1972 |
| 55 | 0.0006 | 0.0002 | 0.0006 | 16.1088 |
| 56 | 0.0005 | 0.0001 | 0.0005 | 16.0167 |
| 57 | 0.0004 | 0.0001 | 0.0005 | 15.9206 |
| 58 | 0.0004 | 0.0001 | 0.0004 | 15.82 |
| 59 | 0.0003 | 0.0001 | 0.0003 | 15.7141 |
| 60 | 0.0001 | 0.0 | 0.0002 | 15.6 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.11 – Tower 1 (NW) Model

Wire No. 4 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 61 | 0.0 | 0.0001 | 0.0001 | 71.8154 |
| 62 | 0.0001 | 0.0003 | 0.0003 | 71.7852 |
| 63 | 0.0001 | 0.0004 | 0.0004 | 71.7278 |
| 64 | 0.0002 | 0.0005 | 0.0005 | 71.6563 |
| 65 | 0.0002 | 0.0006 | 0.0006 | 71.5752 |
| 66 | 0.0002 | 0.0006 | 0.0007 | 71.4874 |
| 67 | 0.0002 | 0.0007 | 0.0007 | 71.3949 |
| 68 | 0.0002 | 0.0007 | 0.0007 | 71.2992 |
| 69 | 0.0002 | 0.0007 | 0.0008 | 71.2017 |
| 70 | 0.0002 | 0.0007 | 0.0008 | 71.1033 |
| 71 | 0.0002 | 0.0007 | 0.0008 | 71.0049 |
| 72 | 0.0002 | 0.0007 | 0.0007 | 70.907 |
| 73 | 0.0002 | 0.0007 | 0.0007 | 70.81 |
| 74 | 0.0002 | 0.0006 | 0.0007 | 70.714 |
| 75 | 0.0002 | 0.0006 | 0.0006 | 70.619 |
| 76 | 0.0002 | 0.0005 | 0.0005 | 70.5247 |
| 77 | 0.0002 | 0.0004 | 0.0005 | 70.4305 |
| 78 | 0.0001 | 0.0003 | 0.0004 | 70.3359 |
| 79 | 0.0001 | 0.0003 | 0.0003 | 70.2395 |
| 80 | 0.0001 | 0.0001 | 0.0002 | 70.1385 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 5 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 81 | 0.0 | 0.0001 | 0.0001 | 72.7101 |
| 82 | 0.0001 | 0.0002 | 0.0002 | 72.6875 |
| 83 | 0.0001 | 0.0003 | 0.0003 | 72.6439 |
| 84 | 0.0001 | 0.0003 | 0.0004 | 72.5887 |
| 85 | 0.0001 | 0.0004 | 0.0004 | 72.5244 |
| 86 | 0.0001 | 0.0004 | 0.0005 | 72.4523 |
| 87 | 0.0001 | 0.0005 | 0.0005 | 72.3732 |
| 88 | 0.0002 | 0.0005 | 0.0005 | 72.2875 |
| 89 | 0.0002 | 0.0005 | 0.0005 | 72.1955 |
| 90 | 0.0002 | 0.0005 | 0.0005 | 72.0973 |
| 91 | 0.0002 | 0.0005 | 0.0005 | 71.9929 |
| 92 | 0.0002 | 0.0005 | 0.0005 | 71.8825 |
| 93 | 0.0001 | 0.0005 | 0.0005 | 71.7659 |
| 94 | 0.0001 | 0.0004 | 0.0004 | 71.643 |
| 95 | 0.0001 | 0.0004 | 0.0004 | 71.5138 |
| 96 | 0.0001 | 0.0003 | 0.0004 | 71.3779 |
| 97 | 0.0001 | 0.0003 | 0.0003 | 71.235 |
| 98 | 0.0001 | 0.0002 | 0.0003 | 71.0845 |
| 99 | 0.0001 | 0.0002 | 0.0002 | 70.9255 |
| 100 | 0.0 | 0.0001 | 0.0001 | 70.754 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.11 – Tower 1 (NW) Model

Wire No. 6 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 101 | 0.0001 | 0.0001 | 0.0001 | 58.091 |
| 102 | 0.0001 | 0.0002 | 0.0003 | 58.0663 |
| 103 | 0.0002 | 0.0003 | 0.0004 | 58.0191 |
| 104 | 0.0002 | 0.0004 | 0.0004 | 57.9597 |
| 105 | 0.0003 | 0.0004 | 0.0005 | 57.8915 |
| 106 | 0.0003 | 0.0005 | 0.0005 | 57.8162 |
| 107 | 0.0003 | 0.0005 | 0.0006 | 57.735 |
| 108 | 0.0003 | 0.0005 | 0.0006 | 57.6488 |
| 109 | 0.0003 | 0.0005 | 0.0006 | 57.5582 |
| 110 | 0.0003 | 0.0005 | 0.0006 | 57.4638 |
| 111 | 0.0003 | 0.0005 | 0.0006 | 57.3658 |
| 112 | 0.0003 | 0.0005 | 0.0006 | 57.2646 |
| 113 | 0.0003 | 0.0005 | 0.0006 | 57.1602 |
| 114 | 0.0003 | 0.0005 | 0.0005 | 57.0527 |
| 115 | 0.0003 | 0.0004 | 0.0005 | 56.942 |
| 116 | 0.0002 | 0.0004 | 0.0004 | 56.8279 |
| 117 | 0.0002 | 0.0003 | 0.0004 | 56.71 |
| 118 | 0.0002 | 0.0003 | 0.0003 | 56.5878 |
| 119 | 0.0001 | 0.0002 | 0.0002 | 56.4602 |
| 120 | 0.0001 | 0.0001 | 0.0001 | 56.3239 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 7 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 121 | -0.0001 | 0.0001 | 0.0001 | 133.2547 |
| 122 | -0.0002 | 0.0002 | 0.0003 | 133.2511 |
| 123 | -0.0003 | 0.0003 | 0.0004 | 133.2437 |
| 124 | -0.0004 | 0.0004 | 0.0005 | 133.2335 |
| 125 | -0.0004 | 0.0004 | 0.0006 | 133.22 |
| 126 | -0.0005 | 0.0005 | 0.0007 | 133.2028 |
| 127 | -0.0005 | 0.0005 | 0.0007 | 133.1811 |
| 128 | -0.0005 | 0.0005 | 0.0007 | 133.1544 |
| 129 | -0.0005 | 0.0005 | 0.0008 | 133.1218 |
| 130 | -0.0005 | 0.0006 | 0.0008 | 133.0829 |
| 131 | -0.0005 | 0.0005 | 0.0007 | 133.0372 |
| 132 | -0.0005 | 0.0005 | 0.0007 | 132.984 |
| 133 | -0.0005 | 0.0005 | 0.0007 | 132.9232 |
| 134 | -0.0004 | 0.0005 | 0.0006 | 132.8543 |
| 135 | -0.0004 | 0.0004 | 0.0006 | 132.7772 |
| 136 | -0.0004 | 0.0004 | 0.0005 | 132.6915 |
| 137 | -0.0003 | 0.0003 | 0.0004 | 132.5972 |
| 138 | -0.0002 | 0.0003 | 0.0004 | 132.494 |
| 139 | -0.0002 | 0.0002 | 0.0003 | 132.3813 |
| 140 | -0.0001 | 0.0001 | 0.0001 | 132.2566 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Exhibit 1.12 – Tower 2 (NC) Model

3

 ACSModel
 (MININEC 3.1 Core)
 08-01-2019 13:55:14

WPON - Tower 2 (NC) Model

Frequency = 1.460 MHz Wavelength = 205.34246 Meters

No. of Wires: 7

| Wire No. | Coordinates X Y Z | Radius | End Connection | No. of Segments |
|------------|-----------------------------|--------|-------------------|--------------------|
| Wire No. 1 | 0 0 0 | 0.291 | -1 | 20 |
| | 0 0 62.85761 | 0.291 | 0 | 20 |
| Wire No. 2 | 29.21459 57.48561 0 | 0.291 | -2 | 20 |
| | 29.21459 57.48561 64.62584 | 0.291 | 0 | 20 |
| Wire No. 3 | 65.51537 111.1786 0 | 0.291 | -3 | 20 |
| | 65.51537 111.1786 64.2836 | 0.291 | 0 | 20 |
| Wire No. 4 | -1.572283 100.0864 0 | 0.291 | -4 | 20 |
| | -1.572283 100.0864 63.37096 | 0.291 | 0 | 20 |
| Wire No. 5 | -105.1341 14.06524 0 | 0.291 | -5 | 20 |
| | -105.1341 14.06524 62.11609 | 0.291 | 0 | 20 |
| Wire No. 6 | -76.04971 71.66562 0 | 0.291 | -6 | 20 |
| | -76.04971 71.66562 63.42801 | 0.291 | 0 | 20 |
| Wire No. 7 | -23.59468 64.58026 0 | 0.291 | -7 | 20 |
| | -23.59468 64.58026 63.02873 | 0.291 | 0 | 20 |

Exhibit 1.12 – Tower 2 (NC) Model

**** ANTENNA GEOMETRY ****

| Wire No. | 1 | Coordinates | | | Connection | | Pulse |
|----------|---|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 0 | 0 | 0 | 0.291 | -1 | 1 | 1 | |
| 0 | 0 | 3.14288 | 0.291 | 1 | 1 | 2 | |
| 0 | 0 | 6.285761 | 0.291 | 1 | 1 | 3 | |
| 0 | 0 | 9.428641 | 0.291 | 1 | 1 | 4 | |
| 0 | 0 | 12.57152 | 0.291 | 1 | 1 | 5 | |
| 0 | 0 | 15.7144 | 0.291 | 1 | 1 | 6 | |
| 0 | 0 | 18.85728 | 0.291 | 1 | 1 | 7 | |
| 0 | 0 | 22.00016 | 0.291 | 1 | 1 | 8 | |
| 0 | 0 | 25.14304 | 0.291 | 1 | 1 | 9 | |
| 0 | 0 | 28.28592 | 0.291 | 1 | 1 | 10 | |
| 0 | 0 | 31.42881 | 0.291 | 1 | 1 | 11 | |
| 0 | 0 | 34.57169 | 0.291 | 1 | 1 | 12 | |
| 0 | 0 | 37.71457 | 0.291 | 1 | 1 | 13 | |
| 0 | 0 | 40.85744 | 0.291 | 1 | 1 | 14 | |
| 0 | 0 | 44.00033 | 0.291 | 1 | 1 | 15 | |
| 0 | 0 | 47.14321 | 0.291 | 1 | 1 | 16 | |
| 0 | 0 | 50.28609 | 0.291 | 1 | 1 | 17 | |
| 0 | 0 | 53.42897 | 0.291 | 1 | 1 | 18 | |
| 0 | 0 | 56.57185 | 0.291 | 1 | 1 | 19 | |
| 0 | 0 | 59.71473 | 0.291 | 1 | 0 | 20 | |

| Wire No. | 2 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 29.21459 | 57.48561 | 0 | 0.291 | -2 | 2 | 21 | |
| 29.21459 | 57.48561 | 3.231292 | 0.291 | 2 | 2 | 22 | |
| 29.21459 | 57.48561 | 6.462584 | 0.291 | 2 | 2 | 23 | |
| 29.21459 | 57.48561 | 9.693876 | 0.291 | 2 | 2 | 24 | |
| 29.21459 | 57.48561 | 12.92517 | 0.291 | 2 | 2 | 25 | |
| 29.21459 | 57.48561 | 16.15646 | 0.291 | 2 | 2 | 26 | |
| 29.21459 | 57.48561 | 19.38775 | 0.291 | 2 | 2 | 27 | |
| 29.21459 | 57.48561 | 22.61904 | 0.291 | 2 | 2 | 28 | |
| 29.21459 | 57.48561 | 25.85034 | 0.291 | 2 | 2 | 29 | |
| 29.21459 | 57.48561 | 29.08163 | 0.291 | 2 | 2 | 30 | |
| 29.21459 | 57.48561 | 32.31292 | 0.291 | 2 | 2 | 31 | |
| 29.21459 | 57.48561 | 35.54421 | 0.291 | 2 | 2 | 32 | |
| 29.21459 | 57.48561 | 38.77551 | 0.291 | 2 | 2 | 33 | |
| 29.21459 | 57.48561 | 42.0068 | 0.291 | 2 | 2 | 34 | |
| 29.21459 | 57.48561 | 45.23809 | 0.291 | 2 | 2 | 35 | |
| 29.21459 | 57.48561 | 48.46938 | 0.291 | 2 | 2 | 36 | |
| 29.21459 | 57.48561 | 51.70067 | 0.291 | 2 | 2 | 37 | |
| 29.21459 | 57.48561 | 54.93196 | 0.291 | 2 | 2 | 38 | |
| 29.21459 | 57.48561 | 58.16326 | 0.291 | 2 | 2 | 39 | |
| 29.21459 | 57.48561 | 61.39455 | 0.291 | 2 | 0 | 40 | |

| Wire No. | 3 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 65.51537 | 111.1786 | 0 | 0.291 | -3 | 3 | 41 | |
| 65.51537 | 111.1786 | 3.21418 | 0.291 | 3 | 3 | 42 | |
| 65.51537 | 111.1786 | 6.42836 | 0.291 | 3 | 3 | 43 | |
| 65.51537 | 111.1786 | 9.64254 | 0.291 | 3 | 3 | 44 | |
| 65.51537 | 111.1786 | 12.85672 | 0.291 | 3 | 3 | 45 | |

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Exhibit 1.12 – Tower 2 (NC) Model

| | | | | | | |
|----------|----------|----------|-------|---|---|----|
| 65.51537 | 111.1786 | 16.0709 | 0.291 | 3 | 3 | 46 |
| 65.51537 | 111.1786 | 19.28508 | 0.291 | 3 | 3 | 47 |
| 65.51537 | 111.1786 | 22.49926 | 0.291 | 3 | 3 | 48 |
| 65.51537 | 111.1786 | 25.71344 | 0.291 | 3 | 3 | 49 |
| 65.51537 | 111.1786 | 28.92762 | 0.291 | 3 | 3 | 50 |
| 65.51537 | 111.1786 | 32.1418 | 0.291 | 3 | 3 | 51 |
| 65.51537 | 111.1786 | 35.35598 | 0.291 | 3 | 3 | 52 |
| 65.51537 | 111.1786 | 38.57016 | 0.291 | 3 | 3 | 53 |
| 65.51537 | 111.1786 | 41.78434 | 0.291 | 3 | 3 | 54 |
| 65.51537 | 111.1786 | 44.99852 | 0.291 | 3 | 3 | 55 |
| 65.51537 | 111.1786 | 48.2127 | 0.291 | 3 | 3 | 56 |
| 65.51537 | 111.1786 | 51.42688 | 0.291 | 3 | 3 | 57 |
| 65.51537 | 111.1786 | 54.64106 | 0.291 | 3 | 3 | 58 |
| 65.51537 | 111.1786 | 57.85524 | 0.291 | 3 | 3 | 59 |
| 65.51537 | 111.1786 | 61.06942 | 0.291 | 3 | 0 | 60 |

| Wire No. | 4 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -1.572283 | | 100.0864 | 0 | 0.291 | -4 | 4 | 61 |
| -1.572283 | | 100.0864 | 3.168548 | 0.291 | 4 | 4 | 62 |
| -1.572283 | | 100.0864 | 6.337096 | 0.291 | 4 | 4 | 63 |
| -1.572283 | | 100.0864 | 9.505644 | 0.291 | 4 | 4 | 64 |
| -1.572283 | | 100.0864 | 12.67419 | 0.291 | 4 | 4 | 65 |
| -1.572283 | | 100.0864 | 15.84274 | 0.291 | 4 | 4 | 66 |
| -1.572283 | | 100.0864 | 19.01129 | 0.291 | 4 | 4 | 67 |
| -1.572283 | | 100.0864 | 22.17984 | 0.291 | 4 | 4 | 68 |
| -1.572283 | | 100.0864 | 25.34838 | 0.291 | 4 | 4 | 69 |
| -1.572283 | | 100.0864 | 28.51693 | 0.291 | 4 | 4 | 70 |
| -1.572283 | | 100.0864 | 31.68548 | 0.291 | 4 | 4 | 71 |
| -1.572283 | | 100.0864 | 34.85403 | 0.291 | 4 | 4 | 72 |
| -1.572283 | | 100.0864 | 38.02258 | 0.291 | 4 | 4 | 73 |
| -1.572283 | | 100.0864 | 41.19112 | 0.291 | 4 | 4 | 74 |
| -1.572283 | | 100.0864 | 44.35967 | 0.291 | 4 | 4 | 75 |
| -1.572283 | | 100.0864 | 47.52822 | 0.291 | 4 | 4 | 76 |
| -1.572283 | | 100.0864 | 50.69677 | 0.291 | 4 | 4 | 77 |
| -1.572283 | | 100.0864 | 53.86532 | 0.291 | 4 | 4 | 78 |
| -1.572283 | | 100.0864 | 57.03387 | 0.291 | 4 | 4 | 79 |
| -1.572283 | | 100.0864 | 60.20242 | 0.291 | 4 | 0 | 80 |

| Wire No. | 5 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -105.1341 | | 14.06524 | 0 | 0.291 | -5 | 5 | 81 |
| -105.1341 | | 14.06524 | 3.105805 | 0.291 | 5 | 5 | 82 |
| -105.1341 | | 14.06524 | 6.211609 | 0.291 | 5 | 5 | 83 |
| -105.1341 | | 14.06524 | 9.317414 | 0.291 | 5 | 5 | 84 |
| -105.1341 | | 14.06524 | 12.42322 | 0.291 | 5 | 5 | 85 |
| -105.1341 | | 14.06524 | 15.52902 | 0.291 | 5 | 5 | 86 |
| -105.1341 | | 14.06524 | 18.63483 | 0.291 | 5 | 5 | 87 |
| -105.1341 | | 14.06524 | 21.74063 | 0.291 | 5 | 5 | 88 |
| -105.1341 | | 14.06524 | 24.84644 | 0.291 | 5 | 5 | 89 |
| -105.1341 | | 14.06524 | 27.95224 | 0.291 | 5 | 5 | 90 |
| -105.1341 | | 14.06524 | 31.05805 | 0.291 | 5 | 5 | 91 |
| -105.1341 | | 14.06524 | 34.16385 | 0.291 | 5 | 5 | 92 |
| -105.1341 | | 14.06524 | 37.26966 | 0.291 | 5 | 5 | 93 |
| -105.1341 | | 14.06524 | 40.37546 | 0.291 | 5 | 5 | 94 |

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Exhibit 1.12 – Tower 2 (NC) Model

| | | | | | | |
|-----------|----------|----------|-------|---|---|-----|
| -105.1341 | 14.06524 | 43.48127 | 0.291 | 5 | 5 | 95 |
| -105.1341 | 14.06524 | 46.58707 | 0.291 | 5 | 5 | 96 |
| -105.1341 | 14.06524 | 49.69287 | 0.291 | 5 | 5 | 97 |
| -105.1341 | 14.06524 | 52.79868 | 0.291 | 5 | 5 | 98 |
| -105.1341 | 14.06524 | 55.90449 | 0.291 | 5 | 5 | 99 |
| -105.1341 | 14.06524 | 59.01029 | 0.291 | 5 | 0 | 100 |

| Wire No. | 6 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -76.04971 | | 71.66562 | 0 | 0.291 | -6 | 6 | 101 |
| -76.04971 | | 71.66562 | 3.1714 | 0.291 | 6 | 6 | 102 |
| -76.04971 | | 71.66562 | 6.342801 | 0.291 | 6 | 6 | 103 |
| -76.04971 | | 71.66562 | 9.5142 | 0.291 | 6 | 6 | 104 |
| -76.04971 | | 71.66562 | 12.6856 | 0.291 | 6 | 6 | 105 |
| -76.04971 | | 71.66562 | 15.857 | 0.291 | 6 | 6 | 106 |
| -76.04971 | | 71.66562 | 19.0284 | 0.291 | 6 | 6 | 107 |
| -76.04971 | | 71.66562 | 22.1998 | 0.291 | 6 | 6 | 108 |
| -76.04971 | | 71.66562 | 25.3712 | 0.291 | 6 | 6 | 109 |
| -76.04971 | | 71.66562 | 28.5426 | 0.291 | 6 | 6 | 110 |
| -76.04971 | | 71.66562 | 31.714 | 0.291 | 6 | 6 | 111 |
| -76.04971 | | 71.66562 | 34.8854 | 0.291 | 6 | 6 | 112 |
| -76.04971 | | 71.66562 | 38.0568 | 0.291 | 6 | 6 | 113 |
| -76.04971 | | 71.66562 | 41.2282 | 0.291 | 6 | 6 | 114 |
| -76.04971 | | 71.66562 | 44.3996 | 0.291 | 6 | 6 | 115 |
| -76.04971 | | 71.66562 | 47.57101 | 0.291 | 6 | 6 | 116 |
| -76.04971 | | 71.66562 | 50.7424 | 0.291 | 6 | 6 | 117 |
| -76.04971 | | 71.66562 | 53.91381 | 0.291 | 6 | 6 | 118 |
| -76.04971 | | 71.66562 | 57.08521 | 0.291 | 6 | 6 | 119 |
| -76.04971 | | 71.66562 | 60.2566 | 0.291 | 6 | 0 | 120 |

| Wire No. | 7 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -23.59468 | | 64.58026 | 0 | 0.291 | -7 | 7 | 121 |
| -23.59468 | | 64.58026 | 3.151436 | 0.291 | 7 | 7 | 122 |
| -23.59468 | | 64.58026 | 6.302873 | 0.291 | 7 | 7 | 123 |
| -23.59468 | | 64.58026 | 9.454309 | 0.291 | 7 | 7 | 124 |
| -23.59468 | | 64.58026 | 12.60575 | 0.291 | 7 | 7 | 125 |
| -23.59468 | | 64.58026 | 15.75718 | 0.291 | 7 | 7 | 126 |
| -23.59468 | | 64.58026 | 18.90862 | 0.291 | 7 | 7 | 127 |
| -23.59468 | | 64.58026 | 22.06005 | 0.291 | 7 | 7 | 128 |
| -23.59468 | | 64.58026 | 25.21149 | 0.291 | 7 | 7 | 129 |
| -23.59468 | | 64.58026 | 28.36293 | 0.291 | 7 | 7 | 130 |
| -23.59468 | | 64.58026 | 31.51436 | 0.291 | 7 | 7 | 131 |
| -23.59468 | | 64.58026 | 34.6658 | 0.291 | 7 | 7 | 132 |
| -23.59468 | | 64.58026 | 37.81724 | 0.291 | 7 | 7 | 133 |
| -23.59468 | | 64.58026 | 40.96867 | 0.291 | 7 | 7 | 134 |
| -23.59468 | | 64.58026 | 44.12011 | 0.291 | 7 | 7 | 135 |
| -23.59468 | | 64.58026 | 47.27155 | 0.291 | 7 | 7 | 136 |
| -23.59468 | | 64.58026 | 50.42298 | 0.291 | 7 | 7 | 137 |
| -23.59468 | | 64.58026 | 53.57442 | 0.291 | 7 | 7 | 138 |
| -23.59468 | | 64.58026 | 56.72585 | 0.291 | 7 | 7 | 139 |
| -23.59468 | | 64.58026 | 59.8773 | 0.291 | 7 | 0 | 140 |

Exhibit 1.12 – Tower 2 (NC) Model

Sources: 1

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

Number of Loads: 6

Pulse No., Resistance, Reactance: 1 , 0 ,-2180

Pulse No., Resistance, Reactance: 41 , 0 ,-2180

Pulse No., Resistance, Reactance: 61 , 0 ,-2180

Pulse No., Resistance, Reactance: 81 , 0 ,-2180

Pulse No., Resistance, Reactance: 101 , 0 ,-2180

Pulse No., Resistance, Reactance: 121 , 0 ,-2180

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

Pulse 21 Voltage = (1.0, 0.0j)
 Current = (0.0025, -0.0047j)
 Impedance = (87.675, 166.301j)
 Power = 0.001240 Watts

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

Wire No. 1 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 1 | -0.0001 | 0.0001 | 0.0001 | 136.9264 |
| 2 | -0.0003 | 0.0003 | 0.0004 | 136.918 |
| 3 | -0.0004 | 0.0004 | 0.0005 | 136.9018 |
| 4 | -0.0005 | 0.0004 | 0.0006 | 136.8815 |
| 5 | -0.0005 | 0.0005 | 0.0007 | 136.8583 |
| 6 | -0.0006 | 0.0005 | 0.0008 | 136.8327 |
| 7 | -0.0006 | 0.0006 | 0.0008 | 136.8053 |
| 8 | -0.0006 | 0.0006 | 0.0009 | 136.7763 |
| 9 | -0.0007 | 0.0006 | 0.0009 | 136.746 |
| 10 | -0.0007 | 0.0006 | 0.0009 | 136.7147 |
| 11 | -0.0006 | 0.0006 | 0.0009 | 136.6824 |
| 12 | -0.0006 | 0.0006 | 0.0009 | 136.6491 |
| 13 | -0.0006 | 0.0006 | 0.0008 | 136.6149 |
| 14 | -0.0006 | 0.0005 | 0.0008 | 136.5797 |
| 15 | -0.0005 | 0.0005 | 0.0007 | 136.5433 |
| 16 | -0.0005 | 0.0004 | 0.0006 | 136.5056 |
| 17 | -0.0004 | 0.0004 | 0.0005 | 136.4661 |
| 18 | -0.0003 | 0.0003 | 0.0004 | 136.4246 |
| 19 | -0.0002 | 0.0002 | 0.0003 | 136.3804 |
| 20 | -0.0001 | 0.0001 | 0.0002 | 136.3319 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.12 – Tower 2 (NC) Model

Wire No. 2 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 21 | 0.0025 | -0.0047 | 0.0053 | -62.2014 |
| 22 | 0.0025 | -0.0054 | 0.006 | -65.5385 |
| 23 | 0.0024 | -0.0058 | 0.0063 | -67.213 |
| 24 | 0.0024 | -0.0061 | 0.0066 | -68.4749 |
| 25 | 0.0024 | -0.0063 | 0.0067 | -69.4909 |
| 26 | 0.0023 | -0.0064 | 0.0068 | -70.3425 |
| 27 | 0.0022 | -0.0064 | 0.0068 | -71.075 |
| 28 | 0.0021 | -0.0064 | 0.0067 | -71.7173 |
| 29 | 0.002 | -0.0063 | 0.0066 | -72.2889 |
| 30 | 0.0019 | -0.0061 | 0.0064 | -72.804 |
| 31 | 0.0018 | -0.0058 | 0.0061 | -73.273 |
| 32 | 0.0016 | -0.0055 | 0.0057 | -73.7041 |
| 33 | 0.0015 | -0.0051 | 0.0053 | -74.1036 |
| 34 | 0.0013 | -0.0047 | 0.0049 | -74.4766 |
| 35 | 0.0011 | -0.0042 | 0.0043 | -74.8274 |
| 36 | 0.001 | -0.0037 | 0.0038 | -75.1594 |
| 37 | 0.0008 | -0.0031 | 0.0032 | -75.4759 |
| 38 | 0.0006 | -0.0024 | 0.0025 | -75.7796 |
| 39 | 0.0004 | -0.0017 | 0.0018 | -76.0736 |
| 40 | 0.0002 | -0.001 | 0.001 | -76.3649 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 3 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 41 | -0.0001 | 0.0001 | 0.0001 | 130.5566 |
| 42 | -0.0002 | 0.0003 | 0.0004 | 130.5468 |
| 43 | -0.0003 | 0.0004 | 0.0005 | 130.5282 |
| 44 | -0.0004 | 0.0005 | 0.0006 | 130.5049 |
| 45 | -0.0005 | 0.0005 | 0.0007 | 130.4783 |
| 46 | -0.0005 | 0.0006 | 0.0008 | 130.4489 |
| 47 | -0.0005 | 0.0006 | 0.0008 | 130.4175 |
| 48 | -0.0006 | 0.0006 | 0.0008 | 130.3843 |
| 49 | -0.0006 | 0.0007 | 0.0009 | 130.3496 |
| 50 | -0.0006 | 0.0007 | 0.0009 | 130.3136 |
| 51 | -0.0006 | 0.0007 | 0.0009 | 130.2765 |
| 52 | -0.0005 | 0.0006 | 0.0008 | 130.2382 |
| 53 | -0.0005 | 0.0006 | 0.0008 | 130.1989 |
| 54 | -0.0005 | 0.0006 | 0.0007 | 130.1585 |
| 55 | -0.0004 | 0.0005 | 0.0007 | 130.1167 |
| 56 | -0.0004 | 0.0005 | 0.0006 | 130.0733 |
| 57 | -0.0003 | 0.0004 | 0.0005 | 130.0281 |
| 58 | -0.0003 | 0.0003 | 0.0004 | 129.9806 |
| 59 | -0.0002 | 0.0002 | 0.0003 | 129.9302 |
| 60 | -0.0001 | 0.0001 | 0.0002 | 129.8751 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Exhibit 1.12 – Tower 2 (NC) Model

Wire No. 4 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 61 | -0.0001 | 0.0001 | 0.0001 | 148.917 |
| 62 | -0.0003 | 0.0002 | 0.0004 | 148.9093 |
| 63 | -0.0004 | 0.0003 | 0.0005 | 148.8948 |
| 64 | -0.0005 | 0.0003 | 0.0006 | 148.8771 |
| 65 | -0.0006 | 0.0004 | 0.0007 | 148.8579 |
| 66 | -0.0007 | 0.0004 | 0.0008 | 148.8383 |
| 67 | -0.0007 | 0.0004 | 0.0008 | 148.8191 |
| 68 | -0.0007 | 0.0005 | 0.0009 | 148.8012 |
| 69 | -0.0008 | 0.0005 | 0.0009 | 148.7853 |
| 70 | -0.0008 | 0.0005 | 0.0009 | 148.772 |
| 71 | -0.0008 | 0.0005 | 0.0009 | 148.7615 |
| 72 | -0.0007 | 0.0004 | 0.0009 | 148.7544 |
| 73 | -0.0007 | 0.0004 | 0.0008 | 148.7506 |
| 74 | -0.0007 | 0.0004 | 0.0008 | 148.7501 |
| 75 | -0.0006 | 0.0004 | 0.0007 | 148.7528 |
| 76 | -0.0005 | 0.0003 | 0.0006 | 148.7583 |
| 77 | -0.0005 | 0.0003 | 0.0005 | 148.766 |
| 78 | -0.0004 | 0.0002 | 0.0004 | 148.7755 |
| 79 | -0.0003 | 0.0002 | 0.0003 | 148.7858 |
| 80 | -0.0001 | 0.0001 | 0.0002 | 148.7961 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 5 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 81 | 0.0001 | 0.0 | 0.0001 | -18.7271 |
| 82 | 0.0002 | -0.0001 | 0.0002 | -18.7434 |
| 83 | 0.0003 | -0.0001 | 0.0003 | -18.7746 |
| 84 | 0.0004 | -0.0001 | 0.0004 | -18.8141 |
| 85 | 0.0004 | -0.0001 | 0.0004 | -18.8599 |
| 86 | 0.0005 | -0.0002 | 0.0005 | -18.9109 |
| 87 | 0.0005 | -0.0002 | 0.0005 | -18.9666 |
| 88 | 0.0005 | -0.0002 | 0.0005 | -19.0264 |
| 89 | 0.0005 | -0.0002 | 0.0006 | -19.0902 |
| 90 | 0.0005 | -0.0002 | 0.0006 | -19.1578 |
| 91 | 0.0005 | -0.0002 | 0.0006 | -19.229 |
| 92 | 0.0005 | -0.0002 | 0.0005 | -19.3038 |
| 93 | 0.0005 | -0.0002 | 0.0005 | -19.3823 |
| 94 | 0.0005 | -0.0002 | 0.0005 | -19.4644 |
| 95 | 0.0004 | -0.0002 | 0.0004 | -19.5504 |
| 96 | 0.0004 | -0.0001 | 0.0004 | -19.6405 |
| 97 | 0.0003 | -0.0001 | 0.0003 | -19.735 |
| 98 | 0.0003 | -0.0001 | 0.0003 | -19.8343 |
| 99 | 0.0002 | -0.0001 | 0.0002 | -19.9393 |
| 100 | 0.0001 | 0.0 | 0.0001 | -20.0528 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.12 – Tower 2 (NC) Model

Wire No. 6 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 101 | 0.0001 | 0.0001 | 0.0001 | 51.4746 |
| 102 | 0.0002 | 0.0002 | 0.0003 | 51.4531 |
| 103 | 0.0002 | 0.0003 | 0.0004 | 51.4119 |
| 104 | 0.0003 | 0.0004 | 0.0005 | 51.3602 |
| 105 | 0.0003 | 0.0004 | 0.0005 | 51.3007 |
| 106 | 0.0004 | 0.0005 | 0.0006 | 51.2351 |
| 107 | 0.0004 | 0.0005 | 0.0006 | 51.1643 |
| 108 | 0.0004 | 0.0005 | 0.0006 | 51.0891 |
| 109 | 0.0004 | 0.0005 | 0.0007 | 51.01 |
| 110 | 0.0004 | 0.0005 | 0.0007 | 50.9275 |
| 111 | 0.0004 | 0.0005 | 0.0007 | 50.8418 |
| 112 | 0.0004 | 0.0005 | 0.0006 | 50.7532 |
| 113 | 0.0004 | 0.0005 | 0.0006 | 50.6617 |
| 114 | 0.0004 | 0.0004 | 0.0006 | 50.5673 |
| 115 | 0.0003 | 0.0004 | 0.0005 | 50.4699 |
| 116 | 0.0003 | 0.0004 | 0.0005 | 50.3694 |
| 117 | 0.0003 | 0.0003 | 0.0004 | 50.2652 |
| 118 | 0.0002 | 0.0002 | 0.0003 | 50.157 |
| 119 | 0.0001 | 0.0002 | 0.0002 | 50.0437 |
| 120 | 0.0001 | 0.0001 | 0.0001 | 49.9223 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 7 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 121 | -0.0001 | 0.0001 | 0.0001 | 149.4956 |
| 122 | -0.0003 | 0.0002 | 0.0004 | 149.4906 |
| 123 | -0.0004 | 0.0003 | 0.0005 | 149.4811 |
| 124 | -0.0005 | 0.0003 | 0.0006 | 149.4696 |
| 125 | -0.0006 | 0.0003 | 0.0007 | 149.457 |
| 126 | -0.0006 | 0.0004 | 0.0008 | 149.4441 |
| 127 | -0.0007 | 0.0004 | 0.0008 | 149.4315 |
| 128 | -0.0007 | 0.0004 | 0.0008 | 149.4198 |
| 129 | -0.0007 | 0.0004 | 0.0009 | 149.4092 |
| 130 | -0.0007 | 0.0004 | 0.0009 | 149.4003 |
| 131 | -0.0007 | 0.0004 | 0.0008 | 149.3932 |
| 132 | -0.0007 | 0.0004 | 0.0008 | 149.3881 |
| 133 | -0.0007 | 0.0004 | 0.0008 | 149.3851 |
| 134 | -0.0006 | 0.0004 | 0.0007 | 149.3839 |
| 135 | -0.0006 | 0.0003 | 0.0007 | 149.3846 |
| 136 | -0.0005 | 0.0003 | 0.0006 | 149.3866 |
| 137 | -0.0004 | 0.0003 | 0.0005 | 149.3896 |
| 138 | -0.0003 | 0.0002 | 0.0004 | 149.3929 |
| 139 | -0.0003 | 0.0001 | 0.0003 | 149.3959 |
| 140 | -0.0001 | 0.0001 | 0.0002 | 149.3978 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.13 – Tower 3 (NE) Model

4

```

*****
ACSMoDel
(MININEC 3.1 Core)
08-01-2019      13:57:10
*****

```

WPON - Tower 3 (NE) Model

Frequency = 1.460 MHz Wavelength = 205.34246 Meters

No. of Wires: 7

| Wire No. | Coordinates X Y Z | Radius | End Connection | No. of Segments |
|------------|---------------------------------------|--------|-------------------|--------------------|
| Wire No. 1 | | | | |
| | 0 0 0 | | -1 | |
| | 0 0 62.85761 | 0.291 | 0 | 20 |
| Wire No. 2 | | | | |
| | 29.21459 57.48561 0 | | -2 | |
| | 29.21459 57.48561 64.62584 | 0.291 | 0 | 20 |
| Wire No. 3 | | | | |
| | 65.51537 111.1786 0 | | -3 | |
| | 65.51537 111.1786 64.2836 | 0.291 | 0 | 20 |
| Wire No. 4 | | | | |
| | -1.572283 100.0864 0 | | -4 | |
| | -1.572283 100.0864 63.37096 | 0.291 | 0 | 20 |
| Wire No. 5 | | | | |
| | -105.1341 14.06524 0 | | -5 | |
| | -105.1341 14.06524 62.11609 | 0.291 | 0 | 20 |
| Wire No. 6 | | | | |
| | -76.04971 71.66562 0 | | -6 | |
| | -76.04971 71.66562 63.42801 | 0.291 | 0 | 20 |
| Wire No. 7 | | | | |
| | -23.59468 64.58026 0 | | -7 | |
| | -23.59468 64.58026 63.02873 | 0.291 | 0 | 20 |

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Exhibit 1.13 – Tower 3 (NE) Model

**** ANTENNA GEOMETRY ****

| Wire No. | 1 | Coordinates | | | Connection | | Pulse |
|----------|---|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 0 | 0 | 0 | 0.291 | -1 | 1 | 1 | |
| 0 | 0 | 3.14288 | 0.291 | 1 | 1 | 2 | |
| 0 | 0 | 6.285761 | 0.291 | 1 | 1 | 3 | |
| 0 | 0 | 9.428641 | 0.291 | 1 | 1 | 4 | |
| 0 | 0 | 12.57152 | 0.291 | 1 | 1 | 5 | |
| 0 | 0 | 15.7144 | 0.291 | 1 | 1 | 6 | |
| 0 | 0 | 18.85728 | 0.291 | 1 | 1 | 7 | |
| 0 | 0 | 22.00016 | 0.291 | 1 | 1 | 8 | |
| 0 | 0 | 25.14304 | 0.291 | 1 | 1 | 9 | |
| 0 | 0 | 28.28592 | 0.291 | 1 | 1 | 10 | |
| 0 | 0 | 31.42881 | 0.291 | 1 | 1 | 11 | |
| 0 | 0 | 34.57169 | 0.291 | 1 | 1 | 12 | |
| 0 | 0 | 37.71457 | 0.291 | 1 | 1 | 13 | |
| 0 | 0 | 40.85744 | 0.291 | 1 | 1 | 14 | |
| 0 | 0 | 44.00033 | 0.291 | 1 | 1 | 15 | |
| 0 | 0 | 47.14321 | 0.291 | 1 | 1 | 16 | |
| 0 | 0 | 50.28609 | 0.291 | 1 | 1 | 17 | |
| 0 | 0 | 53.42897 | 0.291 | 1 | 1 | 18 | |
| 0 | 0 | 56.57185 | 0.291 | 1 | 1 | 19 | |
| 0 | 0 | 59.71473 | 0.291 | 1 | 0 | 20 | |

| Wire No. | 2 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 29.21459 | 57.48561 | 0 | 0.291 | -2 | 2 | 21 | |
| 29.21459 | 57.48561 | 3.231292 | 0.291 | 2 | 2 | 22 | |
| 29.21459 | 57.48561 | 6.462584 | 0.291 | 2 | 2 | 23 | |
| 29.21459 | 57.48561 | 9.693876 | 0.291 | 2 | 2 | 24 | |
| 29.21459 | 57.48561 | 12.92517 | 0.291 | 2 | 2 | 25 | |
| 29.21459 | 57.48561 | 16.15646 | 0.291 | 2 | 2 | 26 | |
| 29.21459 | 57.48561 | 19.38775 | 0.291 | 2 | 2 | 27 | |
| 29.21459 | 57.48561 | 22.61904 | 0.291 | 2 | 2 | 28 | |
| 29.21459 | 57.48561 | 25.85034 | 0.291 | 2 | 2 | 29 | |
| 29.21459 | 57.48561 | 29.08163 | 0.291 | 2 | 2 | 30 | |
| 29.21459 | 57.48561 | 32.31292 | 0.291 | 2 | 2 | 31 | |
| 29.21459 | 57.48561 | 35.54421 | 0.291 | 2 | 2 | 32 | |
| 29.21459 | 57.48561 | 38.77551 | 0.291 | 2 | 2 | 33 | |
| 29.21459 | 57.48561 | 42.0068 | 0.291 | 2 | 2 | 34 | |
| 29.21459 | 57.48561 | 45.23809 | 0.291 | 2 | 2 | 35 | |
| 29.21459 | 57.48561 | 48.46938 | 0.291 | 2 | 2 | 36 | |
| 29.21459 | 57.48561 | 51.70067 | 0.291 | 2 | 2 | 37 | |
| 29.21459 | 57.48561 | 54.93196 | 0.291 | 2 | 2 | 38 | |
| 29.21459 | 57.48561 | 58.16326 | 0.291 | 2 | 2 | 39 | |
| 29.21459 | 57.48561 | 61.39455 | 0.291 | 2 | 0 | 40 | |

| Wire No. | 3 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 65.51537 | 111.1786 | 0 | 0.291 | -3 | 3 | 41 | |
| 65.51537 | 111.1786 | 3.21418 | 0.291 | 3 | 3 | 42 | |
| 65.51537 | 111.1786 | 6.42836 | 0.291 | 3 | 3 | 43 | |
| 65.51537 | 111.1786 | 9.64254 | 0.291 | 3 | 3 | 44 | |
| 65.51537 | 111.1786 | 12.85672 | 0.291 | 3 | 3 | 45 | |

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Exhibit 1.13 – Tower 3 (NE) Model

| | | | | | | |
|----------|----------|----------|-------|---|---|----|
| 65.51537 | 111.1786 | 16.0709 | 0.291 | 3 | 3 | 46 |
| 65.51537 | 111.1786 | 19.28508 | 0.291 | 3 | 3 | 47 |
| 65.51537 | 111.1786 | 22.49926 | 0.291 | 3 | 3 | 48 |
| 65.51537 | 111.1786 | 25.71344 | 0.291 | 3 | 3 | 49 |
| 65.51537 | 111.1786 | 28.92762 | 0.291 | 3 | 3 | 50 |
| 65.51537 | 111.1786 | 32.1418 | 0.291 | 3 | 3 | 51 |
| 65.51537 | 111.1786 | 35.35598 | 0.291 | 3 | 3 | 52 |
| 65.51537 | 111.1786 | 38.57016 | 0.291 | 3 | 3 | 53 |
| 65.51537 | 111.1786 | 41.78434 | 0.291 | 3 | 3 | 54 |
| 65.51537 | 111.1786 | 44.99852 | 0.291 | 3 | 3 | 55 |
| 65.51537 | 111.1786 | 48.2127 | 0.291 | 3 | 3 | 56 |
| 65.51537 | 111.1786 | 51.42688 | 0.291 | 3 | 3 | 57 |
| 65.51537 | 111.1786 | 54.64106 | 0.291 | 3 | 3 | 58 |
| 65.51537 | 111.1786 | 57.85524 | 0.291 | 3 | 3 | 59 |
| 65.51537 | 111.1786 | 61.06942 | 0.291 | 3 | 0 | 60 |

| Wire No. | 4 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -1.572283 | | 100.0864 | 0 | 0.291 | -4 | 4 | 61 |
| -1.572283 | | 100.0864 | 3.168548 | 0.291 | 4 | 4 | 62 |
| -1.572283 | | 100.0864 | 6.337096 | 0.291 | 4 | 4 | 63 |
| -1.572283 | | 100.0864 | 9.505644 | 0.291 | 4 | 4 | 64 |
| -1.572283 | | 100.0864 | 12.67419 | 0.291 | 4 | 4 | 65 |
| -1.572283 | | 100.0864 | 15.84274 | 0.291 | 4 | 4 | 66 |
| -1.572283 | | 100.0864 | 19.01129 | 0.291 | 4 | 4 | 67 |
| -1.572283 | | 100.0864 | 22.17984 | 0.291 | 4 | 4 | 68 |
| -1.572283 | | 100.0864 | 25.34838 | 0.291 | 4 | 4 | 69 |
| -1.572283 | | 100.0864 | 28.51693 | 0.291 | 4 | 4 | 70 |
| -1.572283 | | 100.0864 | 31.68548 | 0.291 | 4 | 4 | 71 |
| -1.572283 | | 100.0864 | 34.85403 | 0.291 | 4 | 4 | 72 |
| -1.572283 | | 100.0864 | 38.02258 | 0.291 | 4 | 4 | 73 |
| -1.572283 | | 100.0864 | 41.19112 | 0.291 | 4 | 4 | 74 |
| -1.572283 | | 100.0864 | 44.35967 | 0.291 | 4 | 4 | 75 |
| -1.572283 | | 100.0864 | 47.52822 | 0.291 | 4 | 4 | 76 |
| -1.572283 | | 100.0864 | 50.69677 | 0.291 | 4 | 4 | 77 |
| -1.572283 | | 100.0864 | 53.86532 | 0.291 | 4 | 4 | 78 |
| -1.572283 | | 100.0864 | 57.03387 | 0.291 | 4 | 4 | 79 |
| -1.572283 | | 100.0864 | 60.20242 | 0.291 | 4 | 0 | 80 |

| Wire No. | 5 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -105.1341 | | 14.06524 | 0 | 0.291 | -5 | 5 | 81 |
| -105.1341 | | 14.06524 | 3.105805 | 0.291 | 5 | 5 | 82 |
| -105.1341 | | 14.06524 | 6.211609 | 0.291 | 5 | 5 | 83 |
| -105.1341 | | 14.06524 | 9.317414 | 0.291 | 5 | 5 | 84 |
| -105.1341 | | 14.06524 | 12.42322 | 0.291 | 5 | 5 | 85 |
| -105.1341 | | 14.06524 | 15.52902 | 0.291 | 5 | 5 | 86 |
| -105.1341 | | 14.06524 | 18.63483 | 0.291 | 5 | 5 | 87 |
| -105.1341 | | 14.06524 | 21.74063 | 0.291 | 5 | 5 | 88 |
| -105.1341 | | 14.06524 | 24.84644 | 0.291 | 5 | 5 | 89 |
| -105.1341 | | 14.06524 | 27.95224 | 0.291 | 5 | 5 | 90 |
| -105.1341 | | 14.06524 | 31.05805 | 0.291 | 5 | 5 | 91 |
| -105.1341 | | 14.06524 | 34.16385 | 0.291 | 5 | 5 | 92 |
| -105.1341 | | 14.06524 | 37.26966 | 0.291 | 5 | 5 | 93 |
| -105.1341 | | 14.06524 | 40.37546 | 0.291 | 5 | 5 | 94 |

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Exhibit 1.13 – Tower 3 (NE) Model

| | | | | | | |
|-----------|----------|----------|-------|---|---|-----|
| -105.1341 | 14.06524 | 43.48127 | 0.291 | 5 | 5 | 95 |
| -105.1341 | 14.06524 | 46.58707 | 0.291 | 5 | 5 | 96 |
| -105.1341 | 14.06524 | 49.69287 | 0.291 | 5 | 5 | 97 |
| -105.1341 | 14.06524 | 52.79868 | 0.291 | 5 | 5 | 98 |
| -105.1341 | 14.06524 | 55.90449 | 0.291 | 5 | 5 | 99 |
| -105.1341 | 14.06524 | 59.01029 | 0.291 | 5 | 0 | 100 |

| Wire No. 6 | | Coordinates | | Radius | Connection | | Pulse |
|------------|----------|-------------|-------|--------|------------|------|-------|
| X | Y | Z | | | End1 | End2 | No. |
| -76.04971 | 71.66562 | 0 | 0.291 | -6 | 6 | | 101 |
| -76.04971 | 71.66562 | 3.1714 | 0.291 | 6 | 6 | | 102 |
| -76.04971 | 71.66562 | 6.342801 | 0.291 | 6 | 6 | | 103 |
| -76.04971 | 71.66562 | 9.5142 | 0.291 | 6 | 6 | | 104 |
| -76.04971 | 71.66562 | 12.6856 | 0.291 | 6 | 6 | | 105 |
| -76.04971 | 71.66562 | 15.857 | 0.291 | 6 | 6 | | 106 |
| -76.04971 | 71.66562 | 19.0284 | 0.291 | 6 | 6 | | 107 |
| -76.04971 | 71.66562 | 22.1998 | 0.291 | 6 | 6 | | 108 |
| -76.04971 | 71.66562 | 25.3712 | 0.291 | 6 | 6 | | 109 |
| -76.04971 | 71.66562 | 28.5426 | 0.291 | 6 | 6 | | 110 |
| -76.04971 | 71.66562 | 31.714 | 0.291 | 6 | 6 | | 111 |
| -76.04971 | 71.66562 | 34.8854 | 0.291 | 6 | 6 | | 112 |
| -76.04971 | 71.66562 | 38.0568 | 0.291 | 6 | 6 | | 113 |
| -76.04971 | 71.66562 | 41.2282 | 0.291 | 6 | 6 | | 114 |
| -76.04971 | 71.66562 | 44.3996 | 0.291 | 6 | 6 | | 115 |
| -76.04971 | 71.66562 | 47.57101 | 0.291 | 6 | 6 | | 116 |
| -76.04971 | 71.66562 | 50.7424 | 0.291 | 6 | 6 | | 117 |
| -76.04971 | 71.66562 | 53.91381 | 0.291 | 6 | 6 | | 118 |
| -76.04971 | 71.66562 | 57.08521 | 0.291 | 6 | 6 | | 119 |
| -76.04971 | 71.66562 | 60.2566 | 0.291 | 6 | 0 | | 120 |

| Wire No. 7 | | Coordinates | | Radius | Connection | | Pulse |
|------------|----------|-------------|-------|--------|------------|------|-------|
| X | Y | Z | | | End1 | End2 | No. |
| -23.59468 | 64.58026 | 0 | 0.291 | -7 | 7 | | 121 |
| -23.59468 | 64.58026 | 3.151436 | 0.291 | 7 | 7 | | 122 |
| -23.59468 | 64.58026 | 6.302873 | 0.291 | 7 | 7 | | 123 |
| -23.59468 | 64.58026 | 9.454309 | 0.291 | 7 | 7 | | 124 |
| -23.59468 | 64.58026 | 12.60575 | 0.291 | 7 | 7 | | 125 |
| -23.59468 | 64.58026 | 15.75718 | 0.291 | 7 | 7 | | 126 |
| -23.59468 | 64.58026 | 18.90862 | 0.291 | 7 | 7 | | 127 |
| -23.59468 | 64.58026 | 22.06005 | 0.291 | 7 | 7 | | 128 |
| -23.59468 | 64.58026 | 25.21149 | 0.291 | 7 | 7 | | 129 |
| -23.59468 | 64.58026 | 28.36293 | 0.291 | 7 | 7 | | 130 |
| -23.59468 | 64.58026 | 31.51436 | 0.291 | 7 | 7 | | 131 |
| -23.59468 | 64.58026 | 34.6658 | 0.291 | 7 | 7 | | 132 |
| -23.59468 | 64.58026 | 37.81724 | 0.291 | 7 | 7 | | 133 |
| -23.59468 | 64.58026 | 40.96867 | 0.291 | 7 | 7 | | 134 |
| -23.59468 | 64.58026 | 44.12011 | 0.291 | 7 | 7 | | 135 |
| -23.59468 | 64.58026 | 47.27155 | 0.291 | 7 | 7 | | 136 |
| -23.59468 | 64.58026 | 50.42298 | 0.291 | 7 | 7 | | 137 |
| -23.59468 | 64.58026 | 53.57442 | 0.291 | 7 | 7 | | 138 |
| -23.59468 | 64.58026 | 56.72585 | 0.291 | 7 | 7 | | 139 |
| -23.59468 | 64.58026 | 59.8773 | 0.291 | 7 | 0 | | 140 |

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Exhibit 1.13 – Tower 3 (NE) Model

Sources: 1

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

Number of Loads: 6

Pulse No., Resistance, Reactance: 1 , 0 , -2180

Pulse No., Resistance, Reactance: 21 , 0 , -2180

Pulse No., Resistance, Reactance: 61 , 0 , -2180

Pulse No., Resistance, Reactance: 81 , 0 , -2180

Pulse No., Resistance, Reactance: 101 , 0 , -2180

Pulse No., Resistance, Reactance: 121 , 0 , -2180

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

Pulse 41 Voltage = (1.0, 0.0j)
 Current = (0.003, -0.0044j)
 Impedance = (106.652, 156.805j)
 Power = 0.001483 Watts

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

Wire No. 1 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 1 | 0.0001 | 0.0 | 0.0001 | 15.1145 |
| 2 | 0.0003 | 0.0001 | 0.0003 | 15.0955 |
| 3 | 0.0004 | 0.0001 | 0.0004 | 15.059 |
| 4 | 0.0005 | 0.0001 | 0.0005 | 15.0131 |
| 5 | 0.0005 | 0.0001 | 0.0005 | 14.9599 |
| 6 | 0.0006 | 0.0002 | 0.0006 | 14.9009 |
| 7 | 0.0006 | 0.0002 | 0.0006 | 14.8367 |
| 8 | 0.0006 | 0.0002 | 0.0007 | 14.768 |
| 9 | 0.0007 | 0.0002 | 0.0007 | 14.695 |
| 10 | 0.0007 | 0.0002 | 0.0007 | 14.6181 |
| 11 | 0.0007 | 0.0002 | 0.0007 | 14.5374 |
| 12 | 0.0006 | 0.0002 | 0.0007 | 14.453 |
| 13 | 0.0006 | 0.0002 | 0.0006 | 14.3649 |
| 14 | 0.0006 | 0.0001 | 0.0006 | 14.2732 |
| 15 | 0.0005 | 0.0001 | 0.0005 | 14.1776 |
| 16 | 0.0005 | 0.0001 | 0.0005 | 14.0779 |
| 17 | 0.0004 | 0.0001 | 0.0004 | 13.9739 |
| 18 | 0.0003 | 0.0001 | 0.0003 | 13.8649 |
| 19 | 0.0002 | 0.0001 | 0.0002 | 13.7502 |
| 20 | 0.0001 | 0.0 | 0.0001 | 13.6266 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.13 – Tower 3 (NE) Model

Wire No. 2 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 21 | -0.0001 | 0.0001 | 0.0001 | 137.5042 |
| 22 | -0.0003 | 0.0002 | 0.0004 | 137.4956 |
| 23 | -0.0004 | 0.0003 | 0.0005 | 137.4792 |
| 24 | -0.0004 | 0.0004 | 0.0006 | 137.4582 |
| 25 | -0.0005 | 0.0005 | 0.0007 | 137.4335 |
| 26 | -0.0006 | 0.0005 | 0.0008 | 137.4054 |
| 27 | -0.0006 | 0.0006 | 0.0008 | 137.374 |
| 28 | -0.0006 | 0.0006 | 0.0008 | 137.3392 |
| 29 | -0.0006 | 0.0006 | 0.0009 | 137.3011 |
| 30 | -0.0006 | 0.0006 | 0.0009 | 137.2594 |
| 31 | -0.0006 | 0.0006 | 0.0009 | 137.214 |
| 32 | -0.0006 | 0.0006 | 0.0008 | 137.1648 |
| 33 | -0.0006 | 0.0005 | 0.0008 | 137.1116 |
| 34 | -0.0005 | 0.0005 | 0.0007 | 137.0542 |
| 35 | -0.0005 | 0.0005 | 0.0007 | 136.9924 |
| 36 | -0.0004 | 0.0004 | 0.0006 | 136.926 |
| 37 | -0.0004 | 0.0004 | 0.0005 | 136.8546 |
| 38 | -0.0003 | 0.0003 | 0.0004 | 136.7779 |
| 39 | -0.0002 | 0.0002 | 0.0003 | 136.6952 |
| 40 | -0.0001 | 0.0001 | 0.0002 | 136.6042 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 3 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 41 | 0.003 | -0.0044 | 0.0053 | -55.7783 |
| 42 | 0.003 | -0.0051 | 0.0059 | -59.851 |
| 43 | 0.0029 | -0.0055 | 0.0062 | -61.9085 |
| 44 | 0.0029 | -0.0058 | 0.0065 | -63.465 |
| 45 | 0.0028 | -0.006 | 0.0066 | -64.7214 |
| 46 | 0.0027 | -0.0061 | 0.0067 | -65.7763 |
| 47 | 0.0026 | -0.0061 | 0.0067 | -66.685 |
| 48 | 0.0025 | -0.0061 | 0.0066 | -67.4825 |
| 49 | 0.0024 | -0.006 | 0.0064 | -68.1926 |
| 50 | 0.0023 | -0.0058 | 0.0062 | -68.8325 |
| 51 | 0.0021 | -0.0056 | 0.006 | -69.415 |
| 52 | 0.0019 | -0.0053 | 0.0056 | -69.9501 |
| 53 | 0.0017 | -0.0049 | 0.0052 | -70.4455 |
| 54 | 0.0016 | -0.0045 | 0.0048 | -70.9074 |
| 55 | 0.0014 | -0.004 | 0.0043 | -71.3411 |
| 56 | 0.0012 | -0.0035 | 0.0037 | -71.7508 |
| 57 | 0.0009 | -0.0029 | 0.0031 | -72.1405 |
| 58 | 0.0007 | -0.0023 | 0.0024 | -72.5136 |
| 59 | 0.0005 | -0.0017 | 0.0017 | -72.874 |
| 60 | 0.0003 | -0.0009 | 0.001 | -73.2303 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.13 – Tower 3 (NE) Model

Wire No. 4 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 61 | -0.0001 | 0.0001 | 0.0001 | 127.8101 |
| 62 | -0.0002 | 0.0003 | 0.0004 | 127.803 |
| 63 | -0.0003 | 0.0004 | 0.0005 | 127.7892 |
| 64 | -0.0004 | 0.0005 | 0.0006 | 127.771 |
| 65 | -0.0004 | 0.0005 | 0.0007 | 127.7489 |
| 66 | -0.0004 | 0.0006 | 0.0007 | 127.7225 |
| 67 | -0.0005 | 0.0006 | 0.0008 | 127.6917 |
| 68 | -0.0005 | 0.0006 | 0.0008 | 127.6561 |
| 69 | -0.0005 | 0.0007 | 0.0008 | 127.6153 |
| 70 | -0.0005 | 0.0007 | 0.0008 | 127.569 |
| 71 | -0.0005 | 0.0007 | 0.0008 | 127.5169 |
| 72 | -0.0005 | 0.0006 | 0.0008 | 127.4586 |
| 73 | -0.0005 | 0.0006 | 0.0008 | 127.394 |
| 74 | -0.0004 | 0.0006 | 0.0007 | 127.3229 |
| 75 | -0.0004 | 0.0005 | 0.0006 | 127.2451 |
| 76 | -0.0003 | 0.0005 | 0.0006 | 127.1604 |
| 77 | -0.0003 | 0.0004 | 0.0005 | 127.0687 |
| 78 | -0.0002 | 0.0003 | 0.0004 | 126.9698 |
| 79 | -0.0002 | 0.0002 | 0.0003 | 126.8631 |
| 80 | -0.0001 | 0.0001 | 0.0002 | 126.7462 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 5 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 81 | 0.0 | -0.0001 | 0.0001 | -114.2963 |
| 82 | -0.0001 | -0.0002 | 0.0002 | -114.3075 |
| 83 | -0.0001 | -0.0003 | 0.0003 | -114.329 |
| 84 | -0.0002 | -0.0004 | 0.0004 | -114.3561 |
| 85 | -0.0002 | -0.0004 | 0.0005 | -114.3875 |
| 86 | -0.0002 | -0.0005 | 0.0005 | -114.4225 |
| 87 | -0.0002 | -0.0005 | 0.0005 | -114.4606 |
| 88 | -0.0002 | -0.0005 | 0.0006 | -114.5015 |
| 89 | -0.0002 | -0.0005 | 0.0006 | -114.5452 |
| 90 | -0.0002 | -0.0005 | 0.0006 | -114.5913 |
| 91 | -0.0002 | -0.0005 | 0.0006 | -114.64 |
| 92 | -0.0002 | -0.0005 | 0.0006 | -114.6911 |
| 93 | -0.0002 | -0.0005 | 0.0005 | -114.7448 |
| 94 | -0.0002 | -0.0005 | 0.0005 | -114.801 |
| 95 | -0.0002 | -0.0004 | 0.0005 | -114.8601 |
| 96 | -0.0002 | -0.0004 | 0.0004 | -114.922 |
| 97 | -0.0001 | -0.0003 | 0.0004 | -114.9873 |
| 98 | -0.0001 | -0.0003 | 0.0003 | -115.0562 |
| 99 | -0.0001 | -0.0002 | 0.0002 | -115.1294 |
| 100 | -0.0001 | -0.0001 | 0.0001 | -115.209 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.13 – Tower 3 (NE) Model

Wire No. 6 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 101 | 0.0001 | 0.0 | 0.0001 | -14.7148 |
| 102 | 0.0003 | -0.0001 | 0.0003 | -14.7339 |
| 103 | 0.0004 | -0.0001 | 0.0004 | -14.7703 |
| 104 | 0.0004 | -0.0001 | 0.0004 | -14.8162 |
| 105 | 0.0005 | -0.0001 | 0.0005 | -14.8689 |
| 106 | 0.0005 | -0.0001 | 0.0006 | -14.9272 |
| 107 | 0.0006 | -0.0002 | 0.0006 | -14.9901 |
| 108 | 0.0006 | -0.0002 | 0.0006 | -15.0571 |
| 109 | 0.0006 | -0.0002 | 0.0006 | -15.1277 |
| 110 | 0.0006 | -0.0002 | 0.0006 | -15.2016 |
| 111 | 0.0006 | -0.0002 | 0.0006 | -15.2785 |
| 112 | 0.0006 | -0.0002 | 0.0006 | -15.3585 |
| 113 | 0.0006 | -0.0002 | 0.0006 | -15.4414 |
| 114 | 0.0005 | -0.0001 | 0.0006 | -15.5273 |
| 115 | 0.0005 | -0.0001 | 0.0005 | -15.6164 |
| 116 | 0.0004 | -0.0001 | 0.0005 | -15.709 |
| 117 | 0.0004 | -0.0001 | 0.0004 | -15.8054 |
| 118 | 0.0003 | -0.0001 | 0.0003 | -15.9063 |
| 119 | 0.0002 | -0.0001 | 0.0002 | -16.0125 |
| 120 | 0.0001 | 0.0 | 0.0001 | -16.1271 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 7 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 121 | 0.0001 | 0.0001 | 0.0001 | 65.5429 |
| 122 | 0.0001 | 0.0003 | 0.0003 | 65.5145 |
| 123 | 0.0002 | 0.0004 | 0.0004 | 65.4602 |
| 124 | 0.0002 | 0.0005 | 0.0005 | 65.3925 |
| 125 | 0.0003 | 0.0005 | 0.0006 | 65.3153 |
| 126 | 0.0003 | 0.0006 | 0.0007 | 65.2311 |
| 127 | 0.0003 | 0.0006 | 0.0007 | 65.1417 |
| 128 | 0.0003 | 0.0007 | 0.0007 | 65.0484 |
| 129 | 0.0003 | 0.0007 | 0.0008 | 64.9522 |
| 130 | 0.0003 | 0.0007 | 0.0008 | 64.854 |
| 131 | 0.0003 | 0.0007 | 0.0008 | 64.7542 |
| 132 | 0.0003 | 0.0007 | 0.0007 | 64.6535 |
| 133 | 0.0003 | 0.0006 | 0.0007 | 64.5519 |
| 134 | 0.0003 | 0.0006 | 0.0007 | 64.4497 |
| 135 | 0.0003 | 0.0005 | 0.0006 | 64.3467 |
| 136 | 0.0002 | 0.0005 | 0.0005 | 64.2426 |
| 137 | 0.0002 | 0.0004 | 0.0005 | 64.1371 |
| 138 | 0.0002 | 0.0003 | 0.0004 | 64.0294 |
| 139 | 0.0001 | 0.0002 | 0.0003 | 63.9185 |
| 140 | 0.0001 | 0.0001 | 0.0002 | 63.8011 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.14 – Tower 4 (E) Model

ACSTModel
(MININEC 3.1 Core)
08-01-2019 13:59:17

WPON - Tower 4 (E) Model

Frequency = 1.460 MHz Wavelength = 205.34246 Meters

No. of Wires: 7

| Wire No. 1 | Coordinates | | | End | No. of |
|------------|-------------|----------|--------|------------|----------|
| X | Y | Z | Radius | Connection | Segments |
| 0 | 0 | 0 | | -1 | |
| 0 | 0 | 62.85761 | 0.291 | 0 | 20 |
| Wire No. 2 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| 29.21459 | 57.48561 | 0 | | -2 | |
| 29.21459 | 57.48561 | 64.62584 | 0.291 | 0 | 20 |
| Wire No. 3 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| 65.51537 | 111.1786 | 0 | | -3 | |
| 65.51537 | 111.1786 | 64.2836 | 0.291 | 0 | 20 |
| Wire No. 4 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| -1.572283 | 100.0864 | 0 | | -4 | |
| -1.572283 | 100.0864 | 63.37096 | 0.291 | 0 | 20 |
| Wire No. 5 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| -105.1341 | 14.06524 | 0 | | -5 | |
| -105.1341 | 14.06524 | 62.11609 | 0.291 | 0 | 20 |
| Wire No. 6 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| -76.04971 | 71.66562 | 0 | | -6 | |
| -76.04971 | 71.66562 | 63.42801 | 0.291 | 0 | 20 |
| Wire No. 7 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| -23.59468 | 64.58026 | 0 | | -7 | |
| -23.59468 | 64.58026 | 63.02873 | 0.291 | 0 | 20 |

Exhibit 1.14 – Tower 4 (E) Model

**** ANTENNA GEOMETRY ****

| Wire No. | 1 | Coordinates | | | Connection | | Pulse |
|----------|---|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 0 | 0 | 0 | 0.291 | -1 | 1 | 1 | |
| 0 | 0 | 3.14288 | 0.291 | 1 | 1 | 2 | |
| 0 | 0 | 6.285761 | 0.291 | 1 | 1 | 3 | |
| 0 | 0 | 9.428641 | 0.291 | 1 | 1 | 4 | |
| 0 | 0 | 12.57152 | 0.291 | 1 | 1 | 5 | |
| 0 | 0 | 15.7144 | 0.291 | 1 | 1 | 6 | |
| 0 | 0 | 18.85728 | 0.291 | 1 | 1 | 7 | |
| 0 | 0 | 22.00016 | 0.291 | 1 | 1 | 8 | |
| 0 | 0 | 25.14304 | 0.291 | 1 | 1 | 9 | |
| 0 | 0 | 28.28592 | 0.291 | 1 | 1 | 10 | |
| 0 | 0 | 31.42881 | 0.291 | 1 | 1 | 11 | |
| 0 | 0 | 34.57169 | 0.291 | 1 | 1 | 12 | |
| 0 | 0 | 37.71457 | 0.291 | 1 | 1 | 13 | |
| 0 | 0 | 40.85744 | 0.291 | 1 | 1 | 14 | |
| 0 | 0 | 44.00033 | 0.291 | 1 | 1 | 15 | |
| 0 | 0 | 47.14321 | 0.291 | 1 | 1 | 16 | |
| 0 | 0 | 50.28609 | 0.291 | 1 | 1 | 17 | |
| 0 | 0 | 53.42897 | 0.291 | 1 | 1 | 18 | |
| 0 | 0 | 56.57185 | 0.291 | 1 | 1 | 19 | |
| 0 | 0 | 59.71473 | 0.291 | 1 | 0 | 20 | |

| Wire No. | 2 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 29.21459 | 57.48561 | 0 | 0.291 | -2 | 2 | 21 | |
| 29.21459 | 57.48561 | 3.231292 | 0.291 | 2 | 2 | 22 | |
| 29.21459 | 57.48561 | 6.462584 | 0.291 | 2 | 2 | 23 | |
| 29.21459 | 57.48561 | 9.693876 | 0.291 | 2 | 2 | 24 | |
| 29.21459 | 57.48561 | 12.92517 | 0.291 | 2 | 2 | 25 | |
| 29.21459 | 57.48561 | 16.15646 | 0.291 | 2 | 2 | 26 | |
| 29.21459 | 57.48561 | 19.38775 | 0.291 | 2 | 2 | 27 | |
| 29.21459 | 57.48561 | 22.61904 | 0.291 | 2 | 2 | 28 | |
| 29.21459 | 57.48561 | 25.85034 | 0.291 | 2 | 2 | 29 | |
| 29.21459 | 57.48561 | 29.08163 | 0.291 | 2 | 2 | 30 | |
| 29.21459 | 57.48561 | 32.31292 | 0.291 | 2 | 2 | 31 | |
| 29.21459 | 57.48561 | 35.54421 | 0.291 | 2 | 2 | 32 | |
| 29.21459 | 57.48561 | 38.77551 | 0.291 | 2 | 2 | 33 | |
| 29.21459 | 57.48561 | 42.0068 | 0.291 | 2 | 2 | 34 | |
| 29.21459 | 57.48561 | 45.23809 | 0.291 | 2 | 2 | 35 | |
| 29.21459 | 57.48561 | 48.46938 | 0.291 | 2 | 2 | 36 | |
| 29.21459 | 57.48561 | 51.70067 | 0.291 | 2 | 2 | 37 | |
| 29.21459 | 57.48561 | 54.93196 | 0.291 | 2 | 2 | 38 | |
| 29.21459 | 57.48561 | 58.16326 | 0.291 | 2 | 2 | 39 | |
| 29.21459 | 57.48561 | 61.39455 | 0.291 | 2 | 0 | 40 | |

| Wire No. | 3 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 65.51537 | 111.1786 | 0 | 0.291 | -3 | 3 | 41 | |
| 65.51537 | 111.1786 | 3.21418 | 0.291 | 3 | 3 | 42 | |
| 65.51537 | 111.1786 | 6.42836 | 0.291 | 3 | 3 | 43 | |
| 65.51537 | 111.1786 | 9.64254 | 0.291 | 3 | 3 | 44 | |
| 65.51537 | 111.1786 | 12.85672 | 0.291 | 3 | 3 | 45 | |

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Exhibit 1.14 – Tower 4 (E) Model

| | | | | | | |
|----------|----------|----------|-------|---|---|----|
| 65.51537 | 111.1786 | 16.0709 | 0.291 | 3 | 3 | 46 |
| 65.51537 | 111.1786 | 19.28508 | 0.291 | 3 | 3 | 47 |
| 65.51537 | 111.1786 | 22.49926 | 0.291 | 3 | 3 | 48 |
| 65.51537 | 111.1786 | 25.71344 | 0.291 | 3 | 3 | 49 |
| 65.51537 | 111.1786 | 28.92762 | 0.291 | 3 | 3 | 50 |
| 65.51537 | 111.1786 | 32.1418 | 0.291 | 3 | 3 | 51 |
| 65.51537 | 111.1786 | 35.35598 | 0.291 | 3 | 3 | 52 |
| 65.51537 | 111.1786 | 38.57016 | 0.291 | 3 | 3 | 53 |
| 65.51537 | 111.1786 | 41.78434 | 0.291 | 3 | 3 | 54 |
| 65.51537 | 111.1786 | 44.99852 | 0.291 | 3 | 3 | 55 |
| 65.51537 | 111.1786 | 48.2127 | 0.291 | 3 | 3 | 56 |
| 65.51537 | 111.1786 | 51.42688 | 0.291 | 3 | 3 | 57 |
| 65.51537 | 111.1786 | 54.64106 | 0.291 | 3 | 3 | 58 |
| 65.51537 | 111.1786 | 57.85524 | 0.291 | 3 | 3 | 59 |
| 65.51537 | 111.1786 | 61.06942 | 0.291 | 3 | 0 | 60 |

| Wire No. | 4 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -1.572283 | | 100.0864 | 0 | 0.291 | -4 | 4 | 61 |
| -1.572283 | | 100.0864 | 3.168548 | 0.291 | 4 | 4 | 62 |
| -1.572283 | | 100.0864 | 6.337096 | 0.291 | 4 | 4 | 63 |
| -1.572283 | | 100.0864 | 9.505644 | 0.291 | 4 | 4 | 64 |
| -1.572283 | | 100.0864 | 12.67419 | 0.291 | 4 | 4 | 65 |
| -1.572283 | | 100.0864 | 15.84274 | 0.291 | 4 | 4 | 66 |
| -1.572283 | | 100.0864 | 19.01129 | 0.291 | 4 | 4 | 67 |
| -1.572283 | | 100.0864 | 22.17984 | 0.291 | 4 | 4 | 68 |
| -1.572283 | | 100.0864 | 25.34838 | 0.291 | 4 | 4 | 69 |
| -1.572283 | | 100.0864 | 28.51693 | 0.291 | 4 | 4 | 70 |
| -1.572283 | | 100.0864 | 31.68548 | 0.291 | 4 | 4 | 71 |
| -1.572283 | | 100.0864 | 34.85403 | 0.291 | 4 | 4 | 72 |
| -1.572283 | | 100.0864 | 38.02258 | 0.291 | 4 | 4 | 73 |
| -1.572283 | | 100.0864 | 41.19112 | 0.291 | 4 | 4 | 74 |
| -1.572283 | | 100.0864 | 44.35967 | 0.291 | 4 | 4 | 75 |
| -1.572283 | | 100.0864 | 47.52822 | 0.291 | 4 | 4 | 76 |
| -1.572283 | | 100.0864 | 50.69677 | 0.291 | 4 | 4 | 77 |
| -1.572283 | | 100.0864 | 53.86532 | 0.291 | 4 | 4 | 78 |
| -1.572283 | | 100.0864 | 57.03387 | 0.291 | 4 | 4 | 79 |
| -1.572283 | | 100.0864 | 60.20242 | 0.291 | 4 | 0 | 80 |

| Wire No. | 5 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -105.1341 | | 14.06524 | 0 | 0.291 | -5 | 5 | 81 |
| -105.1341 | | 14.06524 | 3.105805 | 0.291 | 5 | 5 | 82 |
| -105.1341 | | 14.06524 | 6.211609 | 0.291 | 5 | 5 | 83 |
| -105.1341 | | 14.06524 | 9.317414 | 0.291 | 5 | 5 | 84 |
| -105.1341 | | 14.06524 | 12.42322 | 0.291 | 5 | 5 | 85 |
| -105.1341 | | 14.06524 | 15.52902 | 0.291 | 5 | 5 | 86 |
| -105.1341 | | 14.06524 | 18.63483 | 0.291 | 5 | 5 | 87 |
| -105.1341 | | 14.06524 | 21.74063 | 0.291 | 5 | 5 | 88 |
| -105.1341 | | 14.06524 | 24.84644 | 0.291 | 5 | 5 | 89 |
| -105.1341 | | 14.06524 | 27.95224 | 0.291 | 5 | 5 | 90 |
| -105.1341 | | 14.06524 | 31.05805 | 0.291 | 5 | 5 | 91 |
| -105.1341 | | 14.06524 | 34.16385 | 0.291 | 5 | 5 | 92 |
| -105.1341 | | 14.06524 | 37.26966 | 0.291 | 5 | 5 | 93 |
| -105.1341 | | 14.06524 | 40.37546 | 0.291 | 5 | 5 | 94 |

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Exhibit 1.14 – Tower 4 (E) Model

| | | | | | | |
|-----------|----------|----------|-------|---|---|-----|
| -105.1341 | 14.06524 | 43.48127 | 0.291 | 5 | 5 | 95 |
| -105.1341 | 14.06524 | 46.58707 | 0.291 | 5 | 5 | 96 |
| -105.1341 | 14.06524 | 49.69287 | 0.291 | 5 | 5 | 97 |
| -105.1341 | 14.06524 | 52.79868 | 0.291 | 5 | 5 | 98 |
| -105.1341 | 14.06524 | 55.90449 | 0.291 | 5 | 5 | 99 |
| -105.1341 | 14.06524 | 59.01029 | 0.291 | 5 | 0 | 100 |

| Wire No. | 6 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -76.04971 | | 71.66562 | 0 | 0.291 | -6 | 6 | 101 |
| -76.04971 | | 71.66562 | 3.1714 | 0.291 | 6 | 6 | 102 |
| -76.04971 | | 71.66562 | 6.342801 | 0.291 | 6 | 6 | 103 |
| -76.04971 | | 71.66562 | 9.5142 | 0.291 | 6 | 6 | 104 |
| -76.04971 | | 71.66562 | 12.6856 | 0.291 | 6 | 6 | 105 |
| -76.04971 | | 71.66562 | 15.857 | 0.291 | 6 | 6 | 106 |
| -76.04971 | | 71.66562 | 19.0284 | 0.291 | 6 | 6 | 107 |
| -76.04971 | | 71.66562 | 22.1998 | 0.291 | 6 | 6 | 108 |
| -76.04971 | | 71.66562 | 25.3712 | 0.291 | 6 | 6 | 109 |
| -76.04971 | | 71.66562 | 28.5426 | 0.291 | 6 | 6 | 110 |
| -76.04971 | | 71.66562 | 31.714 | 0.291 | 6 | 6 | 111 |
| -76.04971 | | 71.66562 | 34.8854 | 0.291 | 6 | 6 | 112 |
| -76.04971 | | 71.66562 | 38.0568 | 0.291 | 6 | 6 | 113 |
| -76.04971 | | 71.66562 | 41.2282 | 0.291 | 6 | 6 | 114 |
| -76.04971 | | 71.66562 | 44.3996 | 0.291 | 6 | 6 | 115 |
| -76.04971 | | 71.66562 | 47.57101 | 0.291 | 6 | 6 | 116 |
| -76.04971 | | 71.66562 | 50.7424 | 0.291 | 6 | 6 | 117 |
| -76.04971 | | 71.66562 | 53.91381 | 0.291 | 6 | 6 | 118 |
| -76.04971 | | 71.66562 | 57.08521 | 0.291 | 6 | 6 | 119 |
| -76.04971 | | 71.66562 | 60.2566 | 0.291 | 6 | 0 | 120 |

| Wire No. | 7 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -23.59468 | | 64.58026 | 0 | 0.291 | -7 | 7 | 121 |
| -23.59468 | | 64.58026 | 3.151436 | 0.291 | 7 | 7 | 122 |
| -23.59468 | | 64.58026 | 6.302873 | 0.291 | 7 | 7 | 123 |
| -23.59468 | | 64.58026 | 9.454309 | 0.291 | 7 | 7 | 124 |
| -23.59468 | | 64.58026 | 12.60575 | 0.291 | 7 | 7 | 125 |
| -23.59468 | | 64.58026 | 15.75718 | 0.291 | 7 | 7 | 126 |
| -23.59468 | | 64.58026 | 18.90862 | 0.291 | 7 | 7 | 127 |
| -23.59468 | | 64.58026 | 22.06005 | 0.291 | 7 | 7 | 128 |
| -23.59468 | | 64.58026 | 25.21149 | 0.291 | 7 | 7 | 129 |
| -23.59468 | | 64.58026 | 28.36293 | 0.291 | 7 | 7 | 130 |
| -23.59468 | | 64.58026 | 31.51436 | 0.291 | 7 | 7 | 131 |
| -23.59468 | | 64.58026 | 34.6658 | 0.291 | 7 | 7 | 132 |
| -23.59468 | | 64.58026 | 37.81724 | 0.291 | 7 | 7 | 133 |
| -23.59468 | | 64.58026 | 40.96867 | 0.291 | 7 | 7 | 134 |
| -23.59468 | | 64.58026 | 44.12011 | 0.291 | 7 | 7 | 135 |
| -23.59468 | | 64.58026 | 47.27155 | 0.291 | 7 | 7 | 136 |
| -23.59468 | | 64.58026 | 50.42298 | 0.291 | 7 | 7 | 137 |
| -23.59468 | | 64.58026 | 53.57442 | 0.291 | 7 | 7 | 138 |
| -23.59468 | | 64.58026 | 56.72585 | 0.291 | 7 | 7 | 139 |
| -23.59468 | | 64.58026 | 59.8773 | 0.291 | 7 | 0 | 140 |

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Exhibit 1.14 – Tower 4 (E) Model

Sources: 1

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

Number of Loads: 6

Pulse No., Resistance, Reactance: 1 , 0 , -2180

Pulse No., Resistance, Reactance: 21 , 0 , -2180

Pulse No., Resistance, Reactance: 41 , 0 , -2180

Pulse No., Resistance, Reactance: 81 , 0 , -2180

Pulse No., Resistance, Reactance: 101 , 0 , -2180

Pulse No., Resistance, Reactance: 121 , 0 , -2180

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

Pulse 61 Voltage = (1.0, 0.0j)
 Current = (0.003, -0.0051j)
 Impedance = (86.155, 145.791j)
 Power = 0.001502 Watts

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

Wire No. 1 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 1 | 0.0001 | 0.0001 | 0.0001 | 65.7124 |
| 2 | 0.0001 | 0.0003 | 0.0003 | 65.6929 |
| 3 | 0.0002 | 0.0004 | 0.0004 | 65.6556 |
| 4 | 0.0002 | 0.0005 | 0.0005 | 65.6086 |
| 5 | 0.0003 | 0.0006 | 0.0006 | 65.5544 |
| 6 | 0.0003 | 0.0006 | 0.0007 | 65.4942 |
| 7 | 0.0003 | 0.0007 | 0.0007 | 65.4291 |
| 8 | 0.0003 | 0.0007 | 0.0007 | 65.3595 |
| 9 | 0.0003 | 0.0007 | 0.0008 | 65.2859 |
| 10 | 0.0003 | 0.0007 | 0.0008 | 65.2087 |
| 11 | 0.0003 | 0.0007 | 0.0008 | 65.1282 |
| 12 | 0.0003 | 0.0007 | 0.0007 | 65.0443 |
| 13 | 0.0003 | 0.0006 | 0.0007 | 64.9574 |
| 14 | 0.0003 | 0.0006 | 0.0007 | 64.8674 |
| 15 | 0.0003 | 0.0005 | 0.0006 | 64.7741 |
| 16 | 0.0002 | 0.0005 | 0.0005 | 64.6775 |
| 17 | 0.0002 | 0.0004 | 0.0005 | 64.5773 |
| 18 | 0.0002 | 0.0003 | 0.0004 | 64.4729 |
| 19 | 0.0001 | 0.0002 | 0.0003 | 64.3637 |
| 20 | 0.0001 | 0.0001 | 0.0002 | 64.2468 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.14 – Tower 4 (E) Model

Wire No. 2 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 21 | -0.0001 | 0.0001 | 0.0002 | 151.6314 |
| 22 | -0.0004 | 0.0002 | 0.0004 | 151.6251 |
| 23 | -0.0005 | 0.0003 | 0.0006 | 151.6135 |
| 24 | -0.0006 | 0.0003 | 0.0007 | 151.5996 |
| 25 | -0.0007 | 0.0004 | 0.0008 | 151.5847 |
| 26 | -0.0008 | 0.0004 | 0.0009 | 151.57 |
| 27 | -0.0008 | 0.0005 | 0.001 | 151.5562 |
| 28 | -0.0009 | 0.0005 | 0.001 | 151.5442 |
| 29 | -0.0009 | 0.0005 | 0.001 | 151.5346 |
| 30 | -0.0009 | 0.0005 | 0.001 | 151.5277 |
| 31 | -0.0009 | 0.0005 | 0.001 | 151.524 |
| 32 | -0.0009 | 0.0005 | 0.001 | 151.5236 |
| 33 | -0.0008 | 0.0004 | 0.0009 | 151.5265 |
| 34 | -0.0008 | 0.0004 | 0.0009 | 151.5326 |
| 35 | -0.0007 | 0.0004 | 0.0008 | 151.5415 |
| 36 | -0.0006 | 0.0003 | 0.0007 | 151.5527 |
| 37 | -0.0005 | 0.0003 | 0.0006 | 151.5654 |
| 38 | -0.0004 | 0.0002 | 0.0005 | 151.579 |
| 39 | -0.0003 | 0.0002 | 0.0003 | 151.5923 |
| 40 | -0.0002 | 0.0001 | 0.0002 | 151.6045 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 3 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 41 | -0.0001 | 0.0001 | 0.0002 | 123.5769 |
| 42 | -0.0002 | 0.0003 | 0.0004 | 123.5644 |
| 43 | -0.0003 | 0.0005 | 0.0005 | 123.5403 |
| 44 | -0.0004 | 0.0005 | 0.0007 | 123.5101 |
| 45 | -0.0004 | 0.0006 | 0.0008 | 123.4753 |
| 46 | -0.0005 | 0.0007 | 0.0008 | 123.4367 |
| 47 | -0.0005 | 0.0007 | 0.0009 | 123.395 |
| 48 | -0.0005 | 0.0008 | 0.0009 | 123.3504 |
| 49 | -0.0005 | 0.0008 | 0.0009 | 123.3033 |
| 50 | -0.0005 | 0.0008 | 0.0009 | 123.2538 |
| 51 | -0.0005 | 0.0008 | 0.0009 | 123.2021 |
| 52 | -0.0005 | 0.0008 | 0.0009 | 123.1482 |
| 53 | -0.0005 | 0.0007 | 0.0009 | 123.0922 |
| 54 | -0.0004 | 0.0007 | 0.0008 | 123.0338 |
| 55 | -0.0004 | 0.0006 | 0.0007 | 122.9731 |
| 56 | -0.0004 | 0.0005 | 0.0007 | 122.9097 |
| 57 | -0.0003 | 0.0005 | 0.0006 | 122.8433 |
| 58 | -0.0002 | 0.0004 | 0.0004 | 122.7736 |
| 59 | -0.0002 | 0.0003 | 0.0003 | 122.6998 |
| 60 | -0.0001 | 0.0002 | 0.0002 | 122.6198 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.14 – Tower 4 (E) Model

Wire No. 4 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 61 | 0.003 | -0.0051 | 0.0059 | -59.4191 |
| 62 | 0.003 | -0.0058 | 0.0065 | -62.7118 |
| 63 | 0.003 | -0.0062 | 0.0069 | -64.3918 |
| 64 | 0.0029 | -0.0065 | 0.0071 | -65.6727 |
| 65 | 0.0029 | -0.0066 | 0.0072 | -66.7127 |
| 66 | 0.0028 | -0.0067 | 0.0073 | -67.5902 |
| 67 | 0.0027 | -0.0067 | 0.0073 | -68.3493 |
| 68 | 0.0026 | -0.0067 | 0.0072 | -69.0181 |
| 69 | 0.0024 | -0.0065 | 0.007 | -69.6158 |
| 70 | 0.0023 | -0.0063 | 0.0067 | -70.1566 |
| 71 | 0.0021 | -0.0061 | 0.0064 | -70.6508 |
| 72 | 0.002 | -0.0057 | 0.0061 | -71.1066 |
| 73 | 0.0018 | -0.0053 | 0.0056 | -71.5306 |
| 74 | 0.0016 | -0.0049 | 0.0051 | -71.9279 |
| 75 | 0.0014 | -0.0044 | 0.0046 | -72.3028 |
| 76 | 0.0012 | -0.0038 | 0.004 | -72.659 |
| 77 | 0.001 | -0.0032 | 0.0033 | -72.9997 |
| 78 | 0.0008 | -0.0025 | 0.0026 | -73.3278 |
| 79 | 0.0005 | -0.0018 | 0.0019 | -73.6466 |
| 80 | 0.0003 | -0.001 | 0.001 | -73.9635 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 5 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 81 | 0.0001 | 0.0 | 0.0001 | 5.6066 |
| 82 | 0.0003 | 0.0 | 0.0003 | 5.5891 |
| 83 | 0.0004 | 0.0 | 0.0004 | 5.5554 |
| 84 | 0.0004 | 0.0 | 0.0004 | 5.5129 |
| 85 | 0.0005 | 0.0 | 0.0005 | 5.4635 |
| 86 | 0.0005 | 0.0001 | 0.0005 | 5.4086 |
| 87 | 0.0006 | 0.0001 | 0.0006 | 5.3488 |
| 88 | 0.0006 | 0.0001 | 0.0006 | 5.2846 |
| 89 | 0.0006 | 0.0001 | 0.0006 | 5.2162 |
| 90 | 0.0006 | 0.0001 | 0.0006 | 5.1439 |
| 91 | 0.0006 | 0.0001 | 0.0006 | 5.0679 |
| 92 | 0.0006 | 0.0001 | 0.0006 | 4.9881 |
| 93 | 0.0006 | 0.0 | 0.0006 | 4.9046 |
| 94 | 0.0005 | 0.0 | 0.0005 | 4.8174 |
| 95 | 0.0005 | 0.0 | 0.0005 | 4.7262 |
| 96 | 0.0004 | 0.0 | 0.0004 | 4.6309 |
| 97 | 0.0004 | 0.0 | 0.0004 | 4.5312 |
| 98 | 0.0003 | 0.0 | 0.0003 | 4.4265 |
| 99 | 0.0002 | 0.0 | 0.0002 | 4.3161 |
| 100 | 0.0001 | 0.0 | 0.0001 | 4.1969 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.14 – Tower 4 (E) Model

Wire No. 6 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 101 | -0.0001 | 0.0001 | 0.0001 | 115.2918 |
| 102 | -0.0002 | 0.0003 | 0.0004 | 115.2765 |
| 103 | -0.0002 | 0.0005 | 0.0005 | 115.2472 |
| 104 | -0.0003 | 0.0006 | 0.0006 | 115.2104 |
| 105 | -0.0003 | 0.0006 | 0.0007 | 115.1682 |
| 106 | -0.0003 | 0.0007 | 0.0008 | 115.1216 |
| 107 | -0.0004 | 0.0008 | 0.0008 | 115.0714 |
| 108 | -0.0004 | 0.0008 | 0.0009 | 115.0181 |
| 109 | -0.0004 | 0.0008 | 0.0009 | 114.9623 |
| 110 | -0.0004 | 0.0008 | 0.0009 | 114.904 |
| 111 | -0.0004 | 0.0008 | 0.0009 | 114.8437 |
| 112 | -0.0004 | 0.0008 | 0.0009 | 114.7814 |
| 113 | -0.0003 | 0.0008 | 0.0008 | 114.7172 |
| 114 | -0.0003 | 0.0007 | 0.0008 | 114.651 |
| 115 | -0.0003 | 0.0006 | 0.0007 | 114.5827 |
| 116 | -0.0003 | 0.0006 | 0.0006 | 114.5122 |
| 117 | -0.0002 | 0.0005 | 0.0005 | 114.439 |
| 118 | -0.0002 | 0.0004 | 0.0004 | 114.3628 |
| 119 | -0.0001 | 0.0003 | 0.0003 | 114.2829 |
| 120 | -0.0001 | 0.0002 | 0.0002 | 114.1969 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 7 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 121 | -0.0002 | 0.0 | 0.0002 | 178.1075 |
| 122 | -0.0005 | 0.0 | 0.0005 | 178.1052 |
| 123 | -0.0006 | 0.0 | 0.0006 | 178.1016 |
| 124 | -0.0008 | 0.0 | 0.0008 | 178.0991 |
| 125 | -0.0009 | 0.0 | 0.0009 | 178.0995 |
| 126 | -0.001 | 0.0 | 0.001 | 178.1047 |
| 127 | -0.001 | 0.0 | 0.001 | 178.1162 |
| 128 | -0.0011 | 0.0 | 0.0011 | 178.1357 |
| 129 | -0.0011 | 0.0 | 0.0011 | 178.1645 |
| 130 | -0.0011 | 0.0 | 0.0011 | 178.2036 |
| 131 | -0.0011 | 0.0 | 0.0011 | 178.2537 |
| 132 | -0.001 | 0.0 | 0.001 | 178.3154 |
| 133 | -0.001 | 0.0 | 0.001 | 178.3887 |
| 134 | -0.0009 | 0.0 | 0.0009 | 178.4734 |
| 135 | -0.0009 | 0.0 | 0.0009 | 178.5691 |
| 136 | -0.0008 | 0.0 | 0.0008 | 178.6747 |
| 137 | -0.0006 | 0.0 | 0.0006 | 178.7891 |
| 138 | -0.0005 | 0.0 | 0.0005 | 178.9107 |
| 139 | -0.0004 | 0.0 | 0.0004 | 179.0381 |
| 140 | -0.0002 | 0.0 | 0.0002 | 179.1713 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.15 – Tower 5 (SW) Model

```
*****
                        ACSModel
                    (MININEC 3.1 Core)
                08-01-2019                14:02:39
*****
```

WPON - Tower 5 (SW) Model

Frequency = 1.460 MHz Wavelength = 205.34246 Meters

No. of Wires: 7

| Wire No. | Coordinates | | | End | No. of |
|------------|-------------|----------|--------|------------|----------|
| X | Y | Z | Radius | Connection | Segments |
| 0 | 0 | 0 | | -1 | |
| 0 | 0 | 62.85761 | 0.291 | 0 | 20 |
| Wire No. 2 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| 29.21459 | 57.48561 | 0 | | -2 | |
| 29.21459 | 57.48561 | 64.62584 | 0.291 | 0 | 20 |
| Wire No. 3 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| 65.51537 | 111.1786 | 0 | | -3 | |
| 65.51537 | 111.1786 | 64.2836 | 0.291 | 0 | 20 |
| Wire No. 4 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| -1.572283 | 100.0864 | 0 | | -4 | |
| -1.572283 | 100.0864 | 63.37096 | 0.291 | 0 | 20 |
| Wire No. 5 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| -105.1341 | 14.06524 | 0 | | -5 | |
| -105.1341 | 14.06524 | 62.11609 | 0.291 | 0 | 20 |
| Wire No. 6 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| -76.04971 | 71.66562 | 0 | | -6 | |
| -76.04971 | 71.66562 | 63.42801 | 0.291 | 0 | 20 |
| Wire No. 7 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| -23.59468 | 64.58026 | 0 | | -7 | |
| -23.59468 | 64.58026 | 63.02873 | 0.291 | 0 | 20 |

Exhibit 1.15 – Tower 5 (SW) Model

**** ANTENNA GEOMETRY ****

| Wire No. | 1 | Coordinates | | | Connection | | Pulse |
|----------|---|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 0 | 0 | 0 | 0.291 | -1 | 1 | 1 | |
| 0 | 0 | 3.14288 | 0.291 | 1 | 1 | 2 | |
| 0 | 0 | 6.285761 | 0.291 | 1 | 1 | 3 | |
| 0 | 0 | 9.428641 | 0.291 | 1 | 1 | 4 | |
| 0 | 0 | 12.57152 | 0.291 | 1 | 1 | 5 | |
| 0 | 0 | 15.7144 | 0.291 | 1 | 1 | 6 | |
| 0 | 0 | 18.85728 | 0.291 | 1 | 1 | 7 | |
| 0 | 0 | 22.00016 | 0.291 | 1 | 1 | 8 | |
| 0 | 0 | 25.14304 | 0.291 | 1 | 1 | 9 | |
| 0 | 0 | 28.28592 | 0.291 | 1 | 1 | 10 | |
| 0 | 0 | 31.42881 | 0.291 | 1 | 1 | 11 | |
| 0 | 0 | 34.57169 | 0.291 | 1 | 1 | 12 | |
| 0 | 0 | 37.71457 | 0.291 | 1 | 1 | 13 | |
| 0 | 0 | 40.85744 | 0.291 | 1 | 1 | 14 | |
| 0 | 0 | 44.00033 | 0.291 | 1 | 1 | 15 | |
| 0 | 0 | 47.14321 | 0.291 | 1 | 1 | 16 | |
| 0 | 0 | 50.28609 | 0.291 | 1 | 1 | 17 | |
| 0 | 0 | 53.42897 | 0.291 | 1 | 1 | 18 | |
| 0 | 0 | 56.57185 | 0.291 | 1 | 1 | 19 | |
| 0 | 0 | 59.71473 | 0.291 | 1 | 0 | 20 | |

| Wire No. | 2 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 29.21459 | 57.48561 | 0 | 0.291 | -2 | 2 | 21 | |
| 29.21459 | 57.48561 | 3.231292 | 0.291 | 2 | 2 | 22 | |
| 29.21459 | 57.48561 | 6.462584 | 0.291 | 2 | 2 | 23 | |
| 29.21459 | 57.48561 | 9.693876 | 0.291 | 2 | 2 | 24 | |
| 29.21459 | 57.48561 | 12.92517 | 0.291 | 2 | 2 | 25 | |
| 29.21459 | 57.48561 | 16.15646 | 0.291 | 2 | 2 | 26 | |
| 29.21459 | 57.48561 | 19.38775 | 0.291 | 2 | 2 | 27 | |
| 29.21459 | 57.48561 | 22.61904 | 0.291 | 2 | 2 | 28 | |
| 29.21459 | 57.48561 | 25.85034 | 0.291 | 2 | 2 | 29 | |
| 29.21459 | 57.48561 | 29.08163 | 0.291 | 2 | 2 | 30 | |
| 29.21459 | 57.48561 | 32.31292 | 0.291 | 2 | 2 | 31 | |
| 29.21459 | 57.48561 | 35.54421 | 0.291 | 2 | 2 | 32 | |
| 29.21459 | 57.48561 | 38.77551 | 0.291 | 2 | 2 | 33 | |
| 29.21459 | 57.48561 | 42.0068 | 0.291 | 2 | 2 | 34 | |
| 29.21459 | 57.48561 | 45.23809 | 0.291 | 2 | 2 | 35 | |
| 29.21459 | 57.48561 | 48.46938 | 0.291 | 2 | 2 | 36 | |
| 29.21459 | 57.48561 | 51.70067 | 0.291 | 2 | 2 | 37 | |
| 29.21459 | 57.48561 | 54.93196 | 0.291 | 2 | 2 | 38 | |
| 29.21459 | 57.48561 | 58.16326 | 0.291 | 2 | 2 | 39 | |
| 29.21459 | 57.48561 | 61.39455 | 0.291 | 2 | 0 | 40 | |

| Wire No. | 3 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 65.51537 | 111.1786 | 0 | 0.291 | -3 | 3 | 41 | |
| 65.51537 | 111.1786 | 3.21418 | 0.291 | 3 | 3 | 42 | |
| 65.51537 | 111.1786 | 6.42836 | 0.291 | 3 | 3 | 43 | |
| 65.51537 | 111.1786 | 9.64254 | 0.291 | 3 | 3 | 44 | |
| 65.51537 | 111.1786 | 12.85672 | 0.291 | 3 | 3 | 45 | |

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Exhibit 1.15 – Tower 5 (SW) Model

| | | | | | | |
|----------|----------|----------|-------|---|---|----|
| 65.51537 | 111.1786 | 16.0709 | 0.291 | 3 | 3 | 46 |
| 65.51537 | 111.1786 | 19.28508 | 0.291 | 3 | 3 | 47 |
| 65.51537 | 111.1786 | 22.49926 | 0.291 | 3 | 3 | 48 |
| 65.51537 | 111.1786 | 25.71344 | 0.291 | 3 | 3 | 49 |
| 65.51537 | 111.1786 | 28.92762 | 0.291 | 3 | 3 | 50 |
| 65.51537 | 111.1786 | 32.1418 | 0.291 | 3 | 3 | 51 |
| 65.51537 | 111.1786 | 35.35598 | 0.291 | 3 | 3 | 52 |
| 65.51537 | 111.1786 | 38.57016 | 0.291 | 3 | 3 | 53 |
| 65.51537 | 111.1786 | 41.78434 | 0.291 | 3 | 3 | 54 |
| 65.51537 | 111.1786 | 44.99852 | 0.291 | 3 | 3 | 55 |
| 65.51537 | 111.1786 | 48.2127 | 0.291 | 3 | 3 | 56 |
| 65.51537 | 111.1786 | 51.42688 | 0.291 | 3 | 3 | 57 |
| 65.51537 | 111.1786 | 54.64106 | 0.291 | 3 | 3 | 58 |
| 65.51537 | 111.1786 | 57.85524 | 0.291 | 3 | 3 | 59 |
| 65.51537 | 111.1786 | 61.06942 | 0.291 | 3 | 0 | 60 |

| Wire No. | 4 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -1.572283 | | 100.0864 | 0 | 0.291 | -4 | 4 | 61 |
| -1.572283 | | 100.0864 | 3.168548 | 0.291 | 4 | 4 | 62 |
| -1.572283 | | 100.0864 | 6.337096 | 0.291 | 4 | 4 | 63 |
| -1.572283 | | 100.0864 | 9.505644 | 0.291 | 4 | 4 | 64 |
| -1.572283 | | 100.0864 | 12.67419 | 0.291 | 4 | 4 | 65 |
| -1.572283 | | 100.0864 | 15.84274 | 0.291 | 4 | 4 | 66 |
| -1.572283 | | 100.0864 | 19.01129 | 0.291 | 4 | 4 | 67 |
| -1.572283 | | 100.0864 | 22.17984 | 0.291 | 4 | 4 | 68 |
| -1.572283 | | 100.0864 | 25.34838 | 0.291 | 4 | 4 | 69 |
| -1.572283 | | 100.0864 | 28.51693 | 0.291 | 4 | 4 | 70 |
| -1.572283 | | 100.0864 | 31.68548 | 0.291 | 4 | 4 | 71 |
| -1.572283 | | 100.0864 | 34.85403 | 0.291 | 4 | 4 | 72 |
| -1.572283 | | 100.0864 | 38.02258 | 0.291 | 4 | 4 | 73 |
| -1.572283 | | 100.0864 | 41.19112 | 0.291 | 4 | 4 | 74 |
| -1.572283 | | 100.0864 | 44.35967 | 0.291 | 4 | 4 | 75 |
| -1.572283 | | 100.0864 | 47.52822 | 0.291 | 4 | 4 | 76 |
| -1.572283 | | 100.0864 | 50.69677 | 0.291 | 4 | 4 | 77 |
| -1.572283 | | 100.0864 | 53.86532 | 0.291 | 4 | 4 | 78 |
| -1.572283 | | 100.0864 | 57.03387 | 0.291 | 4 | 4 | 79 |
| -1.572283 | | 100.0864 | 60.20242 | 0.291 | 4 | 0 | 80 |

| Wire No. | 5 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -105.1341 | | 14.06524 | 0 | 0.291 | -5 | 5 | 81 |
| -105.1341 | | 14.06524 | 3.105805 | 0.291 | 5 | 5 | 82 |
| -105.1341 | | 14.06524 | 6.211609 | 0.291 | 5 | 5 | 83 |
| -105.1341 | | 14.06524 | 9.317414 | 0.291 | 5 | 5 | 84 |
| -105.1341 | | 14.06524 | 12.42322 | 0.291 | 5 | 5 | 85 |
| -105.1341 | | 14.06524 | 15.52902 | 0.291 | 5 | 5 | 86 |
| -105.1341 | | 14.06524 | 18.63483 | 0.291 | 5 | 5 | 87 |
| -105.1341 | | 14.06524 | 21.74063 | 0.291 | 5 | 5 | 88 |
| -105.1341 | | 14.06524 | 24.84644 | 0.291 | 5 | 5 | 89 |
| -105.1341 | | 14.06524 | 27.95224 | 0.291 | 5 | 5 | 90 |
| -105.1341 | | 14.06524 | 31.05805 | 0.291 | 5 | 5 | 91 |
| -105.1341 | | 14.06524 | 34.16385 | 0.291 | 5 | 5 | 92 |
| -105.1341 | | 14.06524 | 37.26966 | 0.291 | 5 | 5 | 93 |
| -105.1341 | | 14.06524 | 40.37546 | 0.291 | 5 | 5 | 94 |

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Exhibit 1.15 – Tower 5 (SW) Model

| | | | | | | |
|-----------|----------|----------|-------|---|---|-----|
| -105.1341 | 14.06524 | 43.48127 | 0.291 | 5 | 5 | 95 |
| -105.1341 | 14.06524 | 46.58707 | 0.291 | 5 | 5 | 96 |
| -105.1341 | 14.06524 | 49.69287 | 0.291 | 5 | 5 | 97 |
| -105.1341 | 14.06524 | 52.79868 | 0.291 | 5 | 5 | 98 |
| -105.1341 | 14.06524 | 55.90449 | 0.291 | 5 | 5 | 99 |
| -105.1341 | 14.06524 | 59.01029 | 0.291 | 5 | 0 | 100 |

| Wire No. | 6 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -76.04971 | | 71.66562 | 0 | 0.291 | -6 | 6 | 101 |
| -76.04971 | | 71.66562 | 3.1714 | 0.291 | 6 | 6 | 102 |
| -76.04971 | | 71.66562 | 6.342801 | 0.291 | 6 | 6 | 103 |
| -76.04971 | | 71.66562 | 9.5142 | 0.291 | 6 | 6 | 104 |
| -76.04971 | | 71.66562 | 12.6856 | 0.291 | 6 | 6 | 105 |
| -76.04971 | | 71.66562 | 15.857 | 0.291 | 6 | 6 | 106 |
| -76.04971 | | 71.66562 | 19.0284 | 0.291 | 6 | 6 | 107 |
| -76.04971 | | 71.66562 | 22.1998 | 0.291 | 6 | 6 | 108 |
| -76.04971 | | 71.66562 | 25.3712 | 0.291 | 6 | 6 | 109 |
| -76.04971 | | 71.66562 | 28.5426 | 0.291 | 6 | 6 | 110 |
| -76.04971 | | 71.66562 | 31.714 | 0.291 | 6 | 6 | 111 |
| -76.04971 | | 71.66562 | 34.8854 | 0.291 | 6 | 6 | 112 |
| -76.04971 | | 71.66562 | 38.0568 | 0.291 | 6 | 6 | 113 |
| -76.04971 | | 71.66562 | 41.2282 | 0.291 | 6 | 6 | 114 |
| -76.04971 | | 71.66562 | 44.3996 | 0.291 | 6 | 6 | 115 |
| -76.04971 | | 71.66562 | 47.57101 | 0.291 | 6 | 6 | 116 |
| -76.04971 | | 71.66562 | 50.7424 | 0.291 | 6 | 6 | 117 |
| -76.04971 | | 71.66562 | 53.91381 | 0.291 | 6 | 6 | 118 |
| -76.04971 | | 71.66562 | 57.08521 | 0.291 | 6 | 6 | 119 |
| -76.04971 | | 71.66562 | 60.2566 | 0.291 | 6 | 0 | 120 |

| Wire No. | 7 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -23.59468 | | 64.58026 | 0 | 0.291 | -7 | 7 | 121 |
| -23.59468 | | 64.58026 | 3.151436 | 0.291 | 7 | 7 | 122 |
| -23.59468 | | 64.58026 | 6.302873 | 0.291 | 7 | 7 | 123 |
| -23.59468 | | 64.58026 | 9.454309 | 0.291 | 7 | 7 | 124 |
| -23.59468 | | 64.58026 | 12.60575 | 0.291 | 7 | 7 | 125 |
| -23.59468 | | 64.58026 | 15.75718 | 0.291 | 7 | 7 | 126 |
| -23.59468 | | 64.58026 | 18.90862 | 0.291 | 7 | 7 | 127 |
| -23.59468 | | 64.58026 | 22.06005 | 0.291 | 7 | 7 | 128 |
| -23.59468 | | 64.58026 | 25.21149 | 0.291 | 7 | 7 | 129 |
| -23.59468 | | 64.58026 | 28.36293 | 0.291 | 7 | 7 | 130 |
| -23.59468 | | 64.58026 | 31.51436 | 0.291 | 7 | 7 | 131 |
| -23.59468 | | 64.58026 | 34.6658 | 0.291 | 7 | 7 | 132 |
| -23.59468 | | 64.58026 | 37.81724 | 0.291 | 7 | 7 | 133 |
| -23.59468 | | 64.58026 | 40.96867 | 0.291 | 7 | 7 | 134 |
| -23.59468 | | 64.58026 | 44.12011 | 0.291 | 7 | 7 | 135 |
| -23.59468 | | 64.58026 | 47.27155 | 0.291 | 7 | 7 | 136 |
| -23.59468 | | 64.58026 | 50.42298 | 0.291 | 7 | 7 | 137 |
| -23.59468 | | 64.58026 | 53.57442 | 0.291 | 7 | 7 | 138 |
| -23.59468 | | 64.58026 | 56.72585 | 0.291 | 7 | 7 | 139 |
| -23.59468 | | 64.58026 | 59.8773 | 0.291 | 7 | 0 | 140 |

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Exhibit 1.15 – Tower 5 (SW) Model

Sources: 1

Pulse No., Voltage Magnitude, Phase (Degrees): 81, 1.0, 0.0

Number of Loads: 6

Pulse No., Resistance, Reactance: 1 , 0 , -2180

Pulse No., Resistance, Reactance: 21 , 0 , -2180

Pulse No., Resistance, Reactance: 41 , 0 , -2180

Pulse No., Resistance, Reactance: 61 , 0 , -2180

Pulse No., Resistance, Reactance: 101 , 0 , -2180

Pulse No., Resistance, Reactance: 121 , 0 , -2180

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

Pulse 81 Voltage = (1.0, 0.0j)
 Current = (0.0038, -0.0051j)
 Impedance = (93.229, 127.105j)
 Power = 0.001876 Watts

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

Wire No. 1 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 1 | 0.0 | 0.0001 | 0.0001 | 72.4606 |
| 2 | 0.0001 | 0.0002 | 0.0002 | 72.4364 |
| 3 | 0.0001 | 0.0003 | 0.0003 | 72.3898 |
| 4 | 0.0001 | 0.0004 | 0.0004 | 72.3307 |
| 5 | 0.0001 | 0.0004 | 0.0005 | 72.2618 |
| 6 | 0.0002 | 0.0005 | 0.0005 | 72.1844 |
| 7 | 0.0002 | 0.0005 | 0.0005 | 72.0992 |
| 8 | 0.0002 | 0.0005 | 0.0006 | 72.0066 |
| 9 | 0.0002 | 0.0005 | 0.0006 | 71.9067 |
| 10 | 0.0002 | 0.0005 | 0.0006 | 71.7997 |
| 11 | 0.0002 | 0.0005 | 0.0006 | 71.6855 |
| 12 | 0.0002 | 0.0005 | 0.0006 | 71.5641 |
| 13 | 0.0002 | 0.0005 | 0.0005 | 71.4355 |
| 14 | 0.0002 | 0.0005 | 0.0005 | 71.2993 |
| 15 | 0.0001 | 0.0004 | 0.0005 | 71.1555 |
| 16 | 0.0001 | 0.0004 | 0.0004 | 71.0038 |
| 17 | 0.0001 | 0.0003 | 0.0003 | 70.8438 |
| 18 | 0.0001 | 0.0003 | 0.0003 | 70.6749 |
| 19 | 0.0001 | 0.0002 | 0.0002 | 70.496 |
| 20 | 0.0 | 0.0001 | 0.0001 | 70.3027 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.15 – Tower 5 (SW) Model

Wire No. 2 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 21 | 0.0001 | 0.0 | 0.0001 | -10.1591 |
| 22 | 0.0003 | -0.0001 | 0.0003 | -10.1791 |
| 23 | 0.0004 | -0.0001 | 0.0004 | -10.217 |
| 24 | 0.0005 | -0.0001 | 0.0005 | -10.2645 |
| 25 | 0.0005 | -0.0001 | 0.0006 | -10.3188 |
| 26 | 0.0006 | -0.0001 | 0.0006 | -10.3785 |
| 27 | 0.0006 | -0.0001 | 0.0007 | -10.4426 |
| 28 | 0.0007 | -0.0001 | 0.0007 | -10.5102 |
| 29 | 0.0007 | -0.0001 | 0.0007 | -10.5809 |
| 30 | 0.0007 | -0.0001 | 0.0007 | -10.6543 |
| 31 | 0.0007 | -0.0001 | 0.0007 | -10.73 |
| 32 | 0.0007 | -0.0001 | 0.0007 | -10.808 |
| 33 | 0.0006 | -0.0001 | 0.0007 | -10.8882 |
| 34 | 0.0006 | -0.0001 | 0.0006 | -10.9706 |
| 35 | 0.0006 | -0.0001 | 0.0006 | -11.0554 |
| 36 | 0.0005 | -0.0001 | 0.0005 | -11.1429 |
| 37 | 0.0004 | -0.0001 | 0.0004 | -11.2336 |
| 38 | 0.0003 | -0.0001 | 0.0003 | -11.328 |
| 39 | 0.0002 | 0.0 | 0.0002 | -11.4272 |
| 40 | 0.0001 | 0.0 | 0.0001 | -11.534 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 3 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 41 | 0.0 | -0.0001 | 0.0001 | -112.6759 |
| 42 | -0.0001 | -0.0003 | 0.0003 | -112.6868 |
| 43 | -0.0002 | -0.0004 | 0.0004 | -112.7077 |
| 44 | -0.0002 | -0.0005 | 0.0005 | -112.7339 |
| 45 | -0.0002 | -0.0005 | 0.0006 | -112.764 |
| 46 | -0.0002 | -0.0006 | 0.0006 | -112.7974 |
| 47 | -0.0003 | -0.0006 | 0.0007 | -112.8334 |
| 48 | -0.0003 | -0.0007 | 0.0007 | -112.8718 |
| 49 | -0.0003 | -0.0007 | 0.0007 | -112.9123 |
| 50 | -0.0003 | -0.0007 | 0.0007 | -112.9548 |
| 51 | -0.0003 | -0.0007 | 0.0007 | -112.9991 |
| 52 | -0.0003 | -0.0007 | 0.0007 | -113.0453 |
| 53 | -0.0003 | -0.0006 | 0.0007 | -113.0934 |
| 54 | -0.0002 | -0.0006 | 0.0006 | -113.1434 |
| 55 | -0.0002 | -0.0005 | 0.0006 | -113.1954 |
| 56 | -0.0002 | -0.0005 | 0.0005 | -113.2498 |
| 57 | -0.0002 | -0.0004 | 0.0004 | -113.3068 |
| 58 | -0.0001 | -0.0003 | 0.0004 | -113.3668 |
| 59 | -0.0001 | -0.0002 | 0.0003 | -113.4304 |
| 60 | -0.0001 | -0.0001 | 0.0001 | -113.4996 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.15 – Tower 5 (SW) Model

Wire No. 4 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 61 | 0.0001 | 0.0 | 0.0001 | 11.4602 |
| 62 | 0.0003 | 0.0001 | 0.0003 | 11.4352 |
| 63 | 0.0004 | 0.0001 | 0.0004 | 11.3875 |
| 64 | 0.0005 | 0.0001 | 0.0005 | 11.3278 |
| 65 | 0.0005 | 0.0001 | 0.0005 | 11.2598 |
| 66 | 0.0006 | 0.0001 | 0.0006 | 11.1854 |
| 67 | 0.0006 | 0.0001 | 0.0006 | 11.106 |
| 68 | 0.0007 | 0.0001 | 0.0007 | 11.0228 |
| 69 | 0.0007 | 0.0001 | 0.0007 | 10.9364 |
| 70 | 0.0007 | 0.0001 | 0.0007 | 10.8474 |
| 71 | 0.0007 | 0.0001 | 0.0007 | 10.7564 |
| 72 | 0.0007 | 0.0001 | 0.0007 | 10.6634 |
| 73 | 0.0006 | 0.0001 | 0.0006 | 10.5686 |
| 74 | 0.0006 | 0.0001 | 0.0006 | 10.472 |
| 75 | 0.0005 | 0.0001 | 0.0005 | 10.3734 |
| 76 | 0.0005 | 0.0001 | 0.0005 | 10.2723 |
| 77 | 0.0004 | 0.0001 | 0.0004 | 10.1684 |
| 78 | 0.0003 | 0.0001 | 0.0003 | 10.0608 |
| 79 | 0.0002 | 0.0 | 0.0002 | 9.9484 |
| 80 | 0.0001 | 0.0 | 0.0001 | 9.8278 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 5 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 81 | 0.0038 | -0.0051 | 0.0063 | -53.7406 |
| 82 | 0.0037 | -0.0058 | 0.0069 | -57.3135 |
| 83 | 0.0037 | -0.0062 | 0.0072 | -59.1645 |
| 84 | 0.0036 | -0.0065 | 0.0074 | -60.5921 |
| 85 | 0.0036 | -0.0066 | 0.0075 | -61.7614 |
| 86 | 0.0035 | -0.0067 | 0.0076 | -62.7553 |
| 87 | 0.0033 | -0.0067 | 0.0075 | -63.6202 |
| 88 | 0.0032 | -0.0067 | 0.0074 | -64.3859 |
| 89 | 0.003 | -0.0065 | 0.0072 | -65.073 |
| 90 | 0.0029 | -0.0063 | 0.007 | -65.6962 |
| 91 | 0.0027 | -0.0061 | 0.0066 | -66.267 |
| 92 | 0.0025 | -0.0057 | 0.0062 | -66.7939 |
| 93 | 0.0022 | -0.0053 | 0.0058 | -67.284 |
| 94 | 0.002 | -0.0049 | 0.0053 | -67.7429 |
| 95 | 0.0017 | -0.0044 | 0.0047 | -68.1753 |
| 96 | 0.0015 | -0.0038 | 0.0041 | -68.5852 |
| 97 | 0.0012 | -0.0032 | 0.0034 | -68.9761 |
| 98 | 0.0009 | -0.0025 | 0.0027 | -69.3514 |
| 99 | 0.0007 | -0.0018 | 0.0019 | -69.7148 |
| 100 | 0.0004 | -0.001 | 0.0011 | -70.0749 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.15 – Tower 5 (SW) Model

Wire No. 6 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 101 | -0.0001 | 0.0001 | 0.0002 | 145.7005 |
| 102 | -0.0004 | 0.0003 | 0.0005 | 145.6936 |
| 103 | -0.0005 | 0.0004 | 0.0006 | 145.6804 |
| 104 | -0.0006 | 0.0004 | 0.0008 | 145.6637 |
| 105 | -0.0007 | 0.0005 | 0.0009 | 145.6441 |
| 106 | -0.0008 | 0.0005 | 0.001 | 145.622 |
| 107 | -0.0008 | 0.0006 | 0.001 | 145.5977 |
| 108 | -0.0009 | 0.0006 | 0.0011 | 145.5711 |
| 109 | -0.0009 | 0.0006 | 0.0011 | 145.5423 |
| 110 | -0.0009 | 0.0006 | 0.0011 | 145.5112 |
| 111 | -0.0009 | 0.0006 | 0.0011 | 145.4777 |
| 112 | -0.0009 | 0.0006 | 0.0011 | 145.4418 |
| 113 | -0.0008 | 0.0006 | 0.001 | 145.4031 |
| 114 | -0.0008 | 0.0005 | 0.0009 | 145.3617 |
| 115 | -0.0007 | 0.0005 | 0.0009 | 145.3171 |
| 116 | -0.0006 | 0.0004 | 0.0008 | 145.269 |
| 117 | -0.0005 | 0.0004 | 0.0006 | 145.2173 |
| 118 | -0.0004 | 0.0003 | 0.0005 | 145.1612 |
| 119 | -0.0003 | 0.0002 | 0.0004 | 145.1003 |
| 120 | -0.0002 | 0.0001 | 0.0002 | 145.0325 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 7 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 121 | 0.0 | 0.0001 | 0.0001 | 80.5821 |
| 122 | 0.0 | 0.0003 | 0.0003 | 80.5664 |
| 123 | 0.0001 | 0.0004 | 0.0004 | 80.536 |
| 124 | 0.0001 | 0.0005 | 0.0005 | 80.4968 |
| 125 | 0.0001 | 0.0005 | 0.0005 | 80.4498 |
| 126 | 0.0001 | 0.0006 | 0.0006 | 80.3953 |
| 127 | 0.0001 | 0.0006 | 0.0006 | 80.3332 |
| 128 | 0.0001 | 0.0006 | 0.0007 | 80.2631 |
| 129 | 0.0001 | 0.0007 | 0.0007 | 80.1847 |
| 130 | 0.0001 | 0.0007 | 0.0007 | 80.0976 |
| 131 | 0.0001 | 0.0007 | 0.0007 | 80.0015 |
| 132 | 0.0001 | 0.0006 | 0.0007 | 79.896 |
| 133 | 0.0001 | 0.0006 | 0.0006 | 79.7809 |
| 134 | 0.0001 | 0.0006 | 0.0006 | 79.656 |
| 135 | 0.0001 | 0.0005 | 0.0005 | 79.5211 |
| 136 | 0.0001 | 0.0005 | 0.0005 | 79.376 |
| 137 | 0.0001 | 0.0004 | 0.0004 | 79.2205 |
| 138 | 0.0001 | 0.0003 | 0.0003 | 79.0543 |
| 139 | 0.0 | 0.0002 | 0.0002 | 78.8767 |
| 140 | 0.0 | 0.0001 | 0.0001 | 78.6836 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.16 – Tower 6 (SE) Model

 ACSModel
 (MININEC 3.1 Core)
 08-01-2019 14:04:36

WPON - Tower 6 (SE) Model

Frequency = 1.460 MHz Wavelength = 205.34246 Meters

No. of Wires: 7

| Wire No. | Coordinates | | | End | No. of |
|------------|-------------|----------|--------|------------|----------|
| X | Y | Z | Radius | Connection | Segments |
| 0 | 0 | 0 | | -1 | |
| 0 | 0 | 62.85761 | 0.291 | 0 | 20 |
| Wire No. 2 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| 29.21459 | 57.48561 | 0 | | -2 | |
| 29.21459 | 57.48561 | 64.62584 | 0.291 | 0 | 20 |
| Wire No. 3 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| 65.51537 | 111.1786 | 0 | | -3 | |
| 65.51537 | 111.1786 | 64.2836 | 0.291 | 0 | 20 |
| Wire No. 4 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| -1.572283 | 100.0864 | 0 | | -4 | |
| -1.572283 | 100.0864 | 63.37096 | 0.291 | 0 | 20 |
| Wire No. 5 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| -105.1341 | 14.06524 | 0 | | -5 | |
| -105.1341 | 14.06524 | 62.11609 | 0.291 | 0 | 20 |
| Wire No. 6 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| -76.04971 | 71.66562 | 0 | | -6 | |
| -76.04971 | 71.66562 | 63.42801 | 0.291 | 0 | 20 |
| Wire No. 7 | Coordinates | | | End | No. of |
| X | Y | Z | Radius | Connection | Segments |
| -23.59468 | 64.58026 | 0 | | -7 | |
| -23.59468 | 64.58026 | 63.02873 | 0.291 | 0 | 20 |

Exhibit 1.16 – Tower 6 (SE) Model

**** ANTENNA GEOMETRY ****

| Wire No. | 1 | Coordinates | | | Connection | | Pulse |
|----------|---|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 0 | 0 | 0 | 0.291 | -1 | 1 | 1 | |
| 0 | 0 | 3.14288 | 0.291 | 1 | 1 | 2 | |
| 0 | 0 | 6.285761 | 0.291 | 1 | 1 | 3 | |
| 0 | 0 | 9.428641 | 0.291 | 1 | 1 | 4 | |
| 0 | 0 | 12.57152 | 0.291 | 1 | 1 | 5 | |
| 0 | 0 | 15.7144 | 0.291 | 1 | 1 | 6 | |
| 0 | 0 | 18.85728 | 0.291 | 1 | 1 | 7 | |
| 0 | 0 | 22.00016 | 0.291 | 1 | 1 | 8 | |
| 0 | 0 | 25.14304 | 0.291 | 1 | 1 | 9 | |
| 0 | 0 | 28.28592 | 0.291 | 1 | 1 | 10 | |
| 0 | 0 | 31.42881 | 0.291 | 1 | 1 | 11 | |
| 0 | 0 | 34.57169 | 0.291 | 1 | 1 | 12 | |
| 0 | 0 | 37.71457 | 0.291 | 1 | 1 | 13 | |
| 0 | 0 | 40.85744 | 0.291 | 1 | 1 | 14 | |
| 0 | 0 | 44.00033 | 0.291 | 1 | 1 | 15 | |
| 0 | 0 | 47.14321 | 0.291 | 1 | 1 | 16 | |
| 0 | 0 | 50.28609 | 0.291 | 1 | 1 | 17 | |
| 0 | 0 | 53.42897 | 0.291 | 1 | 1 | 18 | |
| 0 | 0 | 56.57185 | 0.291 | 1 | 1 | 19 | |
| 0 | 0 | 59.71473 | 0.291 | 1 | 0 | 20 | |

| Wire No. | 2 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 29.21459 | 57.48561 | 0 | 0.291 | -2 | 2 | 21 | |
| 29.21459 | 57.48561 | 3.231292 | 0.291 | 2 | 2 | 22 | |
| 29.21459 | 57.48561 | 6.462584 | 0.291 | 2 | 2 | 23 | |
| 29.21459 | 57.48561 | 9.693876 | 0.291 | 2 | 2 | 24 | |
| 29.21459 | 57.48561 | 12.92517 | 0.291 | 2 | 2 | 25 | |
| 29.21459 | 57.48561 | 16.15646 | 0.291 | 2 | 2 | 26 | |
| 29.21459 | 57.48561 | 19.38775 | 0.291 | 2 | 2 | 27 | |
| 29.21459 | 57.48561 | 22.61904 | 0.291 | 2 | 2 | 28 | |
| 29.21459 | 57.48561 | 25.85034 | 0.291 | 2 | 2 | 29 | |
| 29.21459 | 57.48561 | 29.08163 | 0.291 | 2 | 2 | 30 | |
| 29.21459 | 57.48561 | 32.31292 | 0.291 | 2 | 2 | 31 | |
| 29.21459 | 57.48561 | 35.54421 | 0.291 | 2 | 2 | 32 | |
| 29.21459 | 57.48561 | 38.77551 | 0.291 | 2 | 2 | 33 | |
| 29.21459 | 57.48561 | 42.0068 | 0.291 | 2 | 2 | 34 | |
| 29.21459 | 57.48561 | 45.23809 | 0.291 | 2 | 2 | 35 | |
| 29.21459 | 57.48561 | 48.46938 | 0.291 | 2 | 2 | 36 | |
| 29.21459 | 57.48561 | 51.70067 | 0.291 | 2 | 2 | 37 | |
| 29.21459 | 57.48561 | 54.93196 | 0.291 | 2 | 2 | 38 | |
| 29.21459 | 57.48561 | 58.16326 | 0.291 | 2 | 2 | 39 | |
| 29.21459 | 57.48561 | 61.39455 | 0.291 | 2 | 0 | 40 | |

| Wire No. | 3 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 65.51537 | 111.1786 | 0 | 0.291 | -3 | 3 | 41 | |
| 65.51537 | 111.1786 | 3.21418 | 0.291 | 3 | 3 | 42 | |
| 65.51537 | 111.1786 | 6.42836 | 0.291 | 3 | 3 | 43 | |
| 65.51537 | 111.1786 | 9.64254 | 0.291 | 3 | 3 | 44 | |
| 65.51537 | 111.1786 | 12.85672 | 0.291 | 3 | 3 | 45 | |

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Exhibit 1.16 – Tower 6 (SE) Model

| | | | | | | |
|----------|----------|----------|-------|---|---|----|
| 65.51537 | 111.1786 | 16.0709 | 0.291 | 3 | 3 | 46 |
| 65.51537 | 111.1786 | 19.28508 | 0.291 | 3 | 3 | 47 |
| 65.51537 | 111.1786 | 22.49926 | 0.291 | 3 | 3 | 48 |
| 65.51537 | 111.1786 | 25.71344 | 0.291 | 3 | 3 | 49 |
| 65.51537 | 111.1786 | 28.92762 | 0.291 | 3 | 3 | 50 |
| 65.51537 | 111.1786 | 32.1418 | 0.291 | 3 | 3 | 51 |
| 65.51537 | 111.1786 | 35.35598 | 0.291 | 3 | 3 | 52 |
| 65.51537 | 111.1786 | 38.57016 | 0.291 | 3 | 3 | 53 |
| 65.51537 | 111.1786 | 41.78434 | 0.291 | 3 | 3 | 54 |
| 65.51537 | 111.1786 | 44.99852 | 0.291 | 3 | 3 | 55 |
| 65.51537 | 111.1786 | 48.2127 | 0.291 | 3 | 3 | 56 |
| 65.51537 | 111.1786 | 51.42688 | 0.291 | 3 | 3 | 57 |
| 65.51537 | 111.1786 | 54.64106 | 0.291 | 3 | 3 | 58 |
| 65.51537 | 111.1786 | 57.85524 | 0.291 | 3 | 3 | 59 |
| 65.51537 | 111.1786 | 61.06942 | 0.291 | 3 | 0 | 60 |

| Wire No. | 4 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -1.572283 | | 100.0864 | 0 | 0.291 | -4 | 4 | 61 |
| -1.572283 | | 100.0864 | 3.168548 | 0.291 | 4 | 4 | 62 |
| -1.572283 | | 100.0864 | 6.337096 | 0.291 | 4 | 4 | 63 |
| -1.572283 | | 100.0864 | 9.505644 | 0.291 | 4 | 4 | 64 |
| -1.572283 | | 100.0864 | 12.67419 | 0.291 | 4 | 4 | 65 |
| -1.572283 | | 100.0864 | 15.84274 | 0.291 | 4 | 4 | 66 |
| -1.572283 | | 100.0864 | 19.01129 | 0.291 | 4 | 4 | 67 |
| -1.572283 | | 100.0864 | 22.17984 | 0.291 | 4 | 4 | 68 |
| -1.572283 | | 100.0864 | 25.34838 | 0.291 | 4 | 4 | 69 |
| -1.572283 | | 100.0864 | 28.51693 | 0.291 | 4 | 4 | 70 |
| -1.572283 | | 100.0864 | 31.68548 | 0.291 | 4 | 4 | 71 |
| -1.572283 | | 100.0864 | 34.85403 | 0.291 | 4 | 4 | 72 |
| -1.572283 | | 100.0864 | 38.02258 | 0.291 | 4 | 4 | 73 |
| -1.572283 | | 100.0864 | 41.19112 | 0.291 | 4 | 4 | 74 |
| -1.572283 | | 100.0864 | 44.35967 | 0.291 | 4 | 4 | 75 |
| -1.572283 | | 100.0864 | 47.52822 | 0.291 | 4 | 4 | 76 |
| -1.572283 | | 100.0864 | 50.69677 | 0.291 | 4 | 4 | 77 |
| -1.572283 | | 100.0864 | 53.86532 | 0.291 | 4 | 4 | 78 |
| -1.572283 | | 100.0864 | 57.03387 | 0.291 | 4 | 4 | 79 |
| -1.572283 | | 100.0864 | 60.20242 | 0.291 | 4 | 0 | 80 |

| Wire No. | 5 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -105.1341 | | 14.06524 | 0 | 0.291 | -5 | 5 | 81 |
| -105.1341 | | 14.06524 | 3.105805 | 0.291 | 5 | 5 | 82 |
| -105.1341 | | 14.06524 | 6.211609 | 0.291 | 5 | 5 | 83 |
| -105.1341 | | 14.06524 | 9.317414 | 0.291 | 5 | 5 | 84 |
| -105.1341 | | 14.06524 | 12.42322 | 0.291 | 5 | 5 | 85 |
| -105.1341 | | 14.06524 | 15.52902 | 0.291 | 5 | 5 | 86 |
| -105.1341 | | 14.06524 | 18.63483 | 0.291 | 5 | 5 | 87 |
| -105.1341 | | 14.06524 | 21.74063 | 0.291 | 5 | 5 | 88 |
| -105.1341 | | 14.06524 | 24.84644 | 0.291 | 5 | 5 | 89 |
| -105.1341 | | 14.06524 | 27.95224 | 0.291 | 5 | 5 | 90 |
| -105.1341 | | 14.06524 | 31.05805 | 0.291 | 5 | 5 | 91 |
| -105.1341 | | 14.06524 | 34.16385 | 0.291 | 5 | 5 | 92 |
| -105.1341 | | 14.06524 | 37.26966 | 0.291 | 5 | 5 | 93 |
| -105.1341 | | 14.06524 | 40.37546 | 0.291 | 5 | 5 | 94 |

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Exhibit 1.16 – Tower 6 (SE) Model

| | | | | | | |
|-----------|----------|----------|-------|---|---|-----|
| -105.1341 | 14.06524 | 43.48127 | 0.291 | 5 | 5 | 95 |
| -105.1341 | 14.06524 | 46.58707 | 0.291 | 5 | 5 | 96 |
| -105.1341 | 14.06524 | 49.69287 | 0.291 | 5 | 5 | 97 |
| -105.1341 | 14.06524 | 52.79868 | 0.291 | 5 | 5 | 98 |
| -105.1341 | 14.06524 | 55.90449 | 0.291 | 5 | 5 | 99 |
| -105.1341 | 14.06524 | 59.01029 | 0.291 | 5 | 0 | 100 |

| Wire No. 6 | | Coordinates | | Radius | Connection | | Pulse |
|------------|----------|-------------|-------|--------|------------|------|-------|
| X | Y | Z | | | End1 | End2 | No. |
| -76.04971 | 71.66562 | 0 | 0.291 | -6 | 6 | | 101 |
| -76.04971 | 71.66562 | 3.1714 | 0.291 | 6 | 6 | | 102 |
| -76.04971 | 71.66562 | 6.342801 | 0.291 | 6 | 6 | | 103 |
| -76.04971 | 71.66562 | 9.5142 | 0.291 | 6 | 6 | | 104 |
| -76.04971 | 71.66562 | 12.6856 | 0.291 | 6 | 6 | | 105 |
| -76.04971 | 71.66562 | 15.857 | 0.291 | 6 | 6 | | 106 |
| -76.04971 | 71.66562 | 19.0284 | 0.291 | 6 | 6 | | 107 |
| -76.04971 | 71.66562 | 22.1998 | 0.291 | 6 | 6 | | 108 |
| -76.04971 | 71.66562 | 25.3712 | 0.291 | 6 | 6 | | 109 |
| -76.04971 | 71.66562 | 28.5426 | 0.291 | 6 | 6 | | 110 |
| -76.04971 | 71.66562 | 31.714 | 0.291 | 6 | 6 | | 111 |
| -76.04971 | 71.66562 | 34.8854 | 0.291 | 6 | 6 | | 112 |
| -76.04971 | 71.66562 | 38.0568 | 0.291 | 6 | 6 | | 113 |
| -76.04971 | 71.66562 | 41.2282 | 0.291 | 6 | 6 | | 114 |
| -76.04971 | 71.66562 | 44.3996 | 0.291 | 6 | 6 | | 115 |
| -76.04971 | 71.66562 | 47.57101 | 0.291 | 6 | 6 | | 116 |
| -76.04971 | 71.66562 | 50.7424 | 0.291 | 6 | 6 | | 117 |
| -76.04971 | 71.66562 | 53.91381 | 0.291 | 6 | 6 | | 118 |
| -76.04971 | 71.66562 | 57.08521 | 0.291 | 6 | 6 | | 119 |
| -76.04971 | 71.66562 | 60.2566 | 0.291 | 6 | 0 | | 120 |

| Wire No. 7 | | Coordinates | | Radius | Connection | | Pulse |
|------------|----------|-------------|-------|--------|------------|------|-------|
| X | Y | Z | | | End1 | End2 | No. |
| -23.59468 | 64.58026 | 0 | 0.291 | -7 | 7 | | 121 |
| -23.59468 | 64.58026 | 3.151436 | 0.291 | 7 | 7 | | 122 |
| -23.59468 | 64.58026 | 6.302873 | 0.291 | 7 | 7 | | 123 |
| -23.59468 | 64.58026 | 9.454309 | 0.291 | 7 | 7 | | 124 |
| -23.59468 | 64.58026 | 12.60575 | 0.291 | 7 | 7 | | 125 |
| -23.59468 | 64.58026 | 15.75718 | 0.291 | 7 | 7 | | 126 |
| -23.59468 | 64.58026 | 18.90862 | 0.291 | 7 | 7 | | 127 |
| -23.59468 | 64.58026 | 22.06005 | 0.291 | 7 | 7 | | 128 |
| -23.59468 | 64.58026 | 25.21149 | 0.291 | 7 | 7 | | 129 |
| -23.59468 | 64.58026 | 28.36293 | 0.291 | 7 | 7 | | 130 |
| -23.59468 | 64.58026 | 31.51436 | 0.291 | 7 | 7 | | 131 |
| -23.59468 | 64.58026 | 34.6658 | 0.291 | 7 | 7 | | 132 |
| -23.59468 | 64.58026 | 37.81724 | 0.291 | 7 | 7 | | 133 |
| -23.59468 | 64.58026 | 40.96867 | 0.291 | 7 | 7 | | 134 |
| -23.59468 | 64.58026 | 44.12011 | 0.291 | 7 | 7 | | 135 |
| -23.59468 | 64.58026 | 47.27155 | 0.291 | 7 | 7 | | 136 |
| -23.59468 | 64.58026 | 50.42298 | 0.291 | 7 | 7 | | 137 |
| -23.59468 | 64.58026 | 53.57442 | 0.291 | 7 | 7 | | 138 |
| -23.59468 | 64.58026 | 56.72585 | 0.291 | 7 | 7 | | 139 |
| -23.59468 | 64.58026 | 59.8773 | 0.291 | 7 | 0 | | 140 |

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Exhibit 1.16 – Tower 6 (SE) Model

Sources: 1

Pulse No., Voltage Magnitude, Phase (Degrees): 101, 1.0, 0.0

Number of Loads: 6

Pulse No., Resistance, Reactance: 1 , 0 ,-2180

Pulse No., Resistance, Reactance: 21 , 0 ,-2180

Pulse No., Resistance, Reactance: 41 , 0 ,-2180

Pulse No., Resistance, Reactance: 61 , 0 ,-2180

Pulse No., Resistance, Reactance: 81 , 0 ,-2180

Pulse No., Resistance, Reactance: 121 , 0 ,-2180

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

Pulse 101 Voltage = (1.0, 0.0j)

Current = (0.0031, -0.0048j)

Impedance = (94.837, 147.606j)

Power = 0.001540 Watts

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

Wire No. 1 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 1 | 0.0001 | 0.0001 | 0.0001 | 54.3742 |
| 2 | 0.0001 | 0.0002 | 0.0003 | 54.3526 |
| 3 | 0.0002 | 0.0003 | 0.0003 | 54.3111 |
| 4 | 0.0002 | 0.0003 | 0.0004 | 54.2587 |
| 5 | 0.0003 | 0.0004 | 0.0005 | 54.1979 |
| 6 | 0.0003 | 0.0004 | 0.0005 | 54.1303 |
| 7 | 0.0003 | 0.0005 | 0.0006 | 54.0565 |
| 8 | 0.0003 | 0.0005 | 0.0006 | 53.9771 |
| 9 | 0.0004 | 0.0005 | 0.0006 | 53.8926 |
| 10 | 0.0004 | 0.0005 | 0.0006 | 53.8031 |
| 11 | 0.0004 | 0.0005 | 0.0006 | 53.7088 |
| 12 | 0.0003 | 0.0005 | 0.0006 | 53.6099 |
| 13 | 0.0003 | 0.0005 | 0.0006 | 53.5063 |
| 14 | 0.0003 | 0.0004 | 0.0005 | 53.398 |
| 15 | 0.0003 | 0.0004 | 0.0005 | 53.285 |
| 16 | 0.0003 | 0.0003 | 0.0004 | 53.1669 |
| 17 | 0.0002 | 0.0003 | 0.0004 | 53.0436 |
| 18 | 0.0002 | 0.0002 | 0.0003 | 52.9144 |
| 19 | 0.0001 | 0.0002 | 0.0002 | 52.7785 |
| 20 | 0.0001 | 0.0001 | 0.0001 | 52.6325 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.16 – Tower 6 (SE) Model

Wire No. 2 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 21 | 0.0001 | 0.0001 | 0.0001 | 56.5753 |
| 22 | 0.0002 | 0.0003 | 0.0003 | 56.5503 |
| 23 | 0.0002 | 0.0003 | 0.0004 | 56.5027 |
| 24 | 0.0003 | 0.0004 | 0.0005 | 56.4433 |
| 25 | 0.0003 | 0.0005 | 0.0006 | 56.3755 |
| 26 | 0.0004 | 0.0005 | 0.0006 | 56.3015 |
| 27 | 0.0004 | 0.0006 | 0.0007 | 56.2225 |
| 28 | 0.0004 | 0.0006 | 0.0007 | 56.1397 |
| 29 | 0.0004 | 0.0006 | 0.0007 | 56.0539 |
| 30 | 0.0004 | 0.0006 | 0.0007 | 55.9657 |
| 31 | 0.0004 | 0.0006 | 0.0007 | 55.8757 |
| 32 | 0.0004 | 0.0006 | 0.0007 | 55.7841 |
| 33 | 0.0004 | 0.0006 | 0.0007 | 55.6911 |
| 34 | 0.0004 | 0.0005 | 0.0006 | 55.5968 |
| 35 | 0.0003 | 0.0005 | 0.0006 | 55.501 |
| 36 | 0.0003 | 0.0004 | 0.0005 | 55.4034 |
| 37 | 0.0002 | 0.0004 | 0.0004 | 55.3037 |
| 38 | 0.0002 | 0.0003 | 0.0004 | 55.201 |
| 39 | 0.0001 | 0.0002 | 0.0003 | 55.0945 |
| 40 | 0.0001 | 0.0001 | 0.0001 | 54.981 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 3 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 41 | 0.0001 | 0.0 | 0.0001 | -16.5617 |
| 42 | 0.0003 | -0.0001 | 0.0003 | -16.5776 |
| 43 | 0.0004 | -0.0001 | 0.0004 | -16.6081 |
| 44 | 0.0005 | -0.0001 | 0.0005 | -16.6463 |
| 45 | 0.0005 | -0.0002 | 0.0006 | -16.6904 |
| 46 | 0.0006 | -0.0002 | 0.0006 | -16.7393 |
| 47 | 0.0006 | -0.0002 | 0.0007 | -16.7922 |
| 48 | 0.0007 | -0.0002 | 0.0007 | -16.8487 |
| 49 | 0.0007 | -0.0002 | 0.0007 | -16.9085 |
| 50 | 0.0007 | -0.0002 | 0.0007 | -16.9714 |
| 51 | 0.0007 | -0.0002 | 0.0007 | -17.0372 |
| 52 | 0.0006 | -0.0002 | 0.0007 | -17.1058 |
| 53 | 0.0006 | -0.0002 | 0.0006 | -17.1773 |
| 54 | 0.0006 | -0.0002 | 0.0006 | -17.2516 |
| 55 | 0.0005 | -0.0002 | 0.0006 | -17.329 |
| 56 | 0.0005 | -0.0001 | 0.0005 | -17.4097 |
| 57 | 0.0004 | -0.0001 | 0.0004 | -17.4939 |
| 58 | 0.0003 | -0.0001 | 0.0003 | -17.5823 |
| 59 | 0.0002 | -0.0001 | 0.0002 | -17.6756 |
| 60 | 0.0001 | 0.0 | 0.0001 | -17.7763 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.16 – Tower 6 (SE) Model

Wire No. 4 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 61 | -0.0001 | 0.0001 | 0.0001 | 117.678 |
| 62 | -0.0002 | 0.0003 | 0.0004 | 117.6605 |
| 63 | -0.0002 | 0.0004 | 0.0005 | 117.627 |
| 64 | -0.0003 | 0.0005 | 0.0006 | 117.5851 |
| 65 | -0.0003 | 0.0006 | 0.0007 | 117.5371 |
| 66 | -0.0004 | 0.0007 | 0.0008 | 117.4845 |
| 67 | -0.0004 | 0.0007 | 0.0008 | 117.4281 |
| 68 | -0.0004 | 0.0008 | 0.0008 | 117.3688 |
| 69 | -0.0004 | 0.0008 | 0.0009 | 117.3068 |
| 70 | -0.0004 | 0.0008 | 0.0009 | 117.2427 |
| 71 | -0.0004 | 0.0008 | 0.0009 | 117.1767 |
| 72 | -0.0004 | 0.0007 | 0.0008 | 117.1088 |
| 73 | -0.0004 | 0.0007 | 0.0008 | 117.0392 |
| 74 | -0.0003 | 0.0007 | 0.0007 | 116.9677 |
| 75 | -0.0003 | 0.0006 | 0.0007 | 116.8942 |
| 76 | -0.0003 | 0.0005 | 0.0006 | 116.8184 |
| 77 | -0.0002 | 0.0005 | 0.0005 | 116.7399 |
| 78 | -0.0002 | 0.0004 | 0.0004 | 116.6581 |
| 79 | -0.0001 | 0.0003 | 0.0003 | 116.5722 |
| 80 | -0.0001 | 0.0002 | 0.0002 | 116.4797 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 5 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 81 | -0.0001 | 0.0001 | 0.0002 | 142.2332 |
| 82 | -0.0003 | 0.0003 | 0.0004 | 142.2248 |
| 83 | -0.0004 | 0.0003 | 0.0006 | 142.2088 |
| 84 | -0.0005 | 0.0004 | 0.0007 | 142.1886 |
| 85 | -0.0006 | 0.0005 | 0.0008 | 142.1653 |
| 86 | -0.0007 | 0.0005 | 0.0008 | 142.1396 |
| 87 | -0.0007 | 0.0006 | 0.0009 | 142.1119 |
| 88 | -0.0007 | 0.0006 | 0.0009 | 142.0826 |
| 89 | -0.0008 | 0.0006 | 0.001 | 142.0517 |
| 90 | -0.0008 | 0.0006 | 0.001 | 142.0195 |
| 91 | -0.0007 | 0.0006 | 0.0009 | 141.986 |
| 92 | -0.0007 | 0.0006 | 0.0009 | 141.9513 |
| 93 | -0.0007 | 0.0005 | 0.0009 | 141.9153 |
| 94 | -0.0006 | 0.0005 | 0.0008 | 141.878 |
| 95 | -0.0006 | 0.0005 | 0.0008 | 141.8392 |
| 96 | -0.0005 | 0.0004 | 0.0007 | 141.7986 |
| 97 | -0.0004 | 0.0004 | 0.0006 | 141.756 |
| 98 | -0.0004 | 0.0003 | 0.0005 | 141.7108 |
| 99 | -0.0003 | 0.0002 | 0.0003 | 141.6625 |
| 100 | -0.0001 | 0.0001 | 0.0002 | 141.6094 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.16 – Tower 6 (SE) Model

Wire No. 6 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 101 | 0.0031 | -0.0048 | 0.0057 | -57.2793 |
| 102 | 0.0031 | -0.0055 | 0.0063 | -60.9007 |
| 103 | 0.003 | -0.0059 | 0.0066 | -62.7451 |
| 104 | 0.003 | -0.0062 | 0.0069 | -64.1498 |
| 105 | 0.0029 | -0.0064 | 0.007 | -65.2895 |
| 106 | 0.0028 | -0.0065 | 0.0071 | -66.2507 |
| 107 | 0.0027 | -0.0065 | 0.007 | -67.0817 |
| 108 | 0.0026 | -0.0064 | 0.007 | -67.8135 |
| 109 | 0.0025 | -0.0063 | 0.0068 | -68.467 |
| 110 | 0.0023 | -0.0061 | 0.0066 | -69.0575 |
| 111 | 0.0022 | -0.0059 | 0.0063 | -69.5965 |
| 112 | 0.002 | -0.0055 | 0.0059 | -70.0928 |
| 113 | 0.0018 | -0.0052 | 0.0055 | -70.5534 |
| 114 | 0.0016 | -0.0047 | 0.005 | -70.9839 |
| 115 | 0.0014 | -0.0042 | 0.0045 | -71.3889 |
| 116 | 0.0012 | -0.0037 | 0.0039 | -71.7725 |
| 117 | 0.001 | -0.0031 | 0.0032 | -72.1381 |
| 118 | 0.0008 | -0.0024 | 0.0026 | -72.4889 |
| 119 | 0.0005 | -0.0017 | 0.0018 | -72.8285 |
| 120 | 0.0003 | -0.001 | 0.001 | -73.165 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 7 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 121 | -0.0001 | 0.0 | 0.0002 | 162.7997 |
| 122 | -0.0004 | 0.0001 | 0.0004 | 162.8041 |
| 123 | -0.0005 | 0.0002 | 0.0005 | 162.8124 |
| 124 | -0.0006 | 0.0002 | 0.0007 | 162.8228 |
| 125 | -0.0007 | 0.0002 | 0.0007 | 162.8346 |
| 126 | -0.0008 | 0.0002 | 0.0008 | 162.8477 |
| 127 | -0.0008 | 0.0003 | 0.0009 | 162.8616 |
| 128 | -0.0009 | 0.0003 | 0.0009 | 162.8762 |
| 129 | -0.0009 | 0.0003 | 0.0009 | 162.8913 |
| 130 | -0.0009 | 0.0003 | 0.0009 | 162.9066 |
| 131 | -0.0009 | 0.0003 | 0.0009 | 162.9221 |
| 132 | -0.0009 | 0.0003 | 0.0009 | 162.9374 |
| 133 | -0.0008 | 0.0002 | 0.0008 | 162.9522 |
| 134 | -0.0008 | 0.0002 | 0.0008 | 162.9663 |
| 135 | -0.0007 | 0.0002 | 0.0007 | 162.9792 |
| 136 | -0.0006 | 0.0002 | 0.0006 | 162.9905 |
| 137 | -0.0005 | 0.0002 | 0.0005 | 162.9997 |
| 138 | -0.0004 | 0.0001 | 0.0004 | 163.0061 |
| 139 | -0.0003 | 0.0001 | 0.0003 | 163.0092 |
| 140 | -0.0002 | 0.0001 | 0.0002 | 163.008 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.17 – Tower 7 (EC) Model

 ACSModel
 (MININEC 3.1 Core)
 08-01-2019 14:06:26

WPON - Tower 7 (EC) Model

Frequency = 1.460 MHz Wavelength = 205.34246 Meters

No. of Wires: 7

| Wire No. | Coordinates | Radius | End Connection | No. of Segments |
|------------|-------------|----------|----------------|-----------------|
| X | Y | Z | | |
| 0 | 0 | 0 | -1 | |
| 0 | 0 | 62.85761 | 0 | 20 |
| Wire No. 2 | Coordinates | Radius | End Connection | No. of Segments |
| X | Y | Z | | |
| 29.21459 | 57.48561 | 0 | -2 | |
| 29.21459 | 57.48561 | 64.62584 | 0 | 20 |
| Wire No. 3 | Coordinates | Radius | End Connection | No. of Segments |
| X | Y | Z | | |
| 65.51537 | 111.1786 | 0 | -3 | |
| 65.51537 | 111.1786 | 64.2836 | 0 | 20 |
| Wire No. 4 | Coordinates | Radius | End Connection | No. of Segments |
| X | Y | Z | | |
| -1.572283 | 100.0864 | 0 | -4 | |
| -1.572283 | 100.0864 | 63.37096 | 0 | 20 |
| Wire No. 5 | Coordinates | Radius | End Connection | No. of Segments |
| X | Y | Z | | |
| -105.1341 | 14.06524 | 0 | -5 | |
| -105.1341 | 14.06524 | 62.11609 | 0 | 20 |
| Wire No. 6 | Coordinates | Radius | End Connection | No. of Segments |
| X | Y | Z | | |
| -76.04971 | 71.66562 | 0 | -6 | |
| -76.04971 | 71.66562 | 63.42801 | 0 | 20 |
| Wire No. 7 | Coordinates | Radius | End Connection | No. of Segments |
| X | Y | Z | | |
| -23.59468 | 64.58026 | 0 | -7 | |
| -23.59468 | 64.58026 | 63.02873 | 0 | 20 |

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Exhibit 1.17 – Tower 7 (EC) Model

**** ANTENNA GEOMETRY ****

| Wire No. | 1 | Coordinates | | | Connection | | Pulse |
|----------|---|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 0 | 0 | 0 | 0.291 | -1 | 1 | 1 | |
| 0 | 0 | 3.14288 | 0.291 | 1 | 1 | 2 | |
| 0 | 0 | 6.285761 | 0.291 | 1 | 1 | 3 | |
| 0 | 0 | 9.428641 | 0.291 | 1 | 1 | 4 | |
| 0 | 0 | 12.57152 | 0.291 | 1 | 1 | 5 | |
| 0 | 0 | 15.7144 | 0.291 | 1 | 1 | 6 | |
| 0 | 0 | 18.85728 | 0.291 | 1 | 1 | 7 | |
| 0 | 0 | 22.00016 | 0.291 | 1 | 1 | 8 | |
| 0 | 0 | 25.14304 | 0.291 | 1 | 1 | 9 | |
| 0 | 0 | 28.28592 | 0.291 | 1 | 1 | 10 | |
| 0 | 0 | 31.42881 | 0.291 | 1 | 1 | 11 | |
| 0 | 0 | 34.57169 | 0.291 | 1 | 1 | 12 | |
| 0 | 0 | 37.71457 | 0.291 | 1 | 1 | 13 | |
| 0 | 0 | 40.85744 | 0.291 | 1 | 1 | 14 | |
| 0 | 0 | 44.00033 | 0.291 | 1 | 1 | 15 | |
| 0 | 0 | 47.14321 | 0.291 | 1 | 1 | 16 | |
| 0 | 0 | 50.28609 | 0.291 | 1 | 1 | 17 | |
| 0 | 0 | 53.42897 | 0.291 | 1 | 1 | 18 | |
| 0 | 0 | 56.57185 | 0.291 | 1 | 1 | 19 | |
| 0 | 0 | 59.71473 | 0.291 | 1 | 0 | 20 | |

| Wire No. | 2 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 29.21459 | 57.48561 | 0 | 0.291 | -2 | 2 | 21 | |
| 29.21459 | 57.48561 | 3.231292 | 0.291 | 2 | 2 | 22 | |
| 29.21459 | 57.48561 | 6.462584 | 0.291 | 2 | 2 | 23 | |
| 29.21459 | 57.48561 | 9.693876 | 0.291 | 2 | 2 | 24 | |
| 29.21459 | 57.48561 | 12.92517 | 0.291 | 2 | 2 | 25 | |
| 29.21459 | 57.48561 | 16.15646 | 0.291 | 2 | 2 | 26 | |
| 29.21459 | 57.48561 | 19.38775 | 0.291 | 2 | 2 | 27 | |
| 29.21459 | 57.48561 | 22.61904 | 0.291 | 2 | 2 | 28 | |
| 29.21459 | 57.48561 | 25.85034 | 0.291 | 2 | 2 | 29 | |
| 29.21459 | 57.48561 | 29.08163 | 0.291 | 2 | 2 | 30 | |
| 29.21459 | 57.48561 | 32.31292 | 0.291 | 2 | 2 | 31 | |
| 29.21459 | 57.48561 | 35.54421 | 0.291 | 2 | 2 | 32 | |
| 29.21459 | 57.48561 | 38.77551 | 0.291 | 2 | 2 | 33 | |
| 29.21459 | 57.48561 | 42.0068 | 0.291 | 2 | 2 | 34 | |
| 29.21459 | 57.48561 | 45.23809 | 0.291 | 2 | 2 | 35 | |
| 29.21459 | 57.48561 | 48.46938 | 0.291 | 2 | 2 | 36 | |
| 29.21459 | 57.48561 | 51.70067 | 0.291 | 2 | 2 | 37 | |
| 29.21459 | 57.48561 | 54.93196 | 0.291 | 2 | 2 | 38 | |
| 29.21459 | 57.48561 | 58.16326 | 0.291 | 2 | 2 | 39 | |
| 29.21459 | 57.48561 | 61.39455 | 0.291 | 2 | 0 | 40 | |

| Wire No. | 3 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 65.51537 | 111.1786 | 0 | 0.291 | -3 | 3 | 41 | |
| 65.51537 | 111.1786 | 3.21418 | 0.291 | 3 | 3 | 42 | |
| 65.51537 | 111.1786 | 6.42836 | 0.291 | 3 | 3 | 43 | |
| 65.51537 | 111.1786 | 9.64254 | 0.291 | 3 | 3 | 44 | |
| 65.51537 | 111.1786 | 12.85672 | 0.291 | 3 | 3 | 45 | |

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Exhibit 1.17 – Tower 7 (EC) Model

| | | | | | | |
|----------|----------|----------|-------|---|---|----|
| 65.51537 | 111.1786 | 16.0709 | 0.291 | 3 | 3 | 46 |
| 65.51537 | 111.1786 | 19.28508 | 0.291 | 3 | 3 | 47 |
| 65.51537 | 111.1786 | 22.49926 | 0.291 | 3 | 3 | 48 |
| 65.51537 | 111.1786 | 25.71344 | 0.291 | 3 | 3 | 49 |
| 65.51537 | 111.1786 | 28.92762 | 0.291 | 3 | 3 | 50 |
| 65.51537 | 111.1786 | 32.1418 | 0.291 | 3 | 3 | 51 |
| 65.51537 | 111.1786 | 35.35598 | 0.291 | 3 | 3 | 52 |
| 65.51537 | 111.1786 | 38.57016 | 0.291 | 3 | 3 | 53 |
| 65.51537 | 111.1786 | 41.78434 | 0.291 | 3 | 3 | 54 |
| 65.51537 | 111.1786 | 44.99852 | 0.291 | 3 | 3 | 55 |
| 65.51537 | 111.1786 | 48.2127 | 0.291 | 3 | 3 | 56 |
| 65.51537 | 111.1786 | 51.42688 | 0.291 | 3 | 3 | 57 |
| 65.51537 | 111.1786 | 54.64106 | 0.291 | 3 | 3 | 58 |
| 65.51537 | 111.1786 | 57.85524 | 0.291 | 3 | 3 | 59 |
| 65.51537 | 111.1786 | 61.06942 | 0.291 | 3 | 0 | 60 |

| Wire No. | 4 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -1.572283 | | 100.0864 | 0 | 0.291 | -4 | 4 | 61 |
| -1.572283 | | 100.0864 | 3.168548 | 0.291 | 4 | 4 | 62 |
| -1.572283 | | 100.0864 | 6.337096 | 0.291 | 4 | 4 | 63 |
| -1.572283 | | 100.0864 | 9.505644 | 0.291 | 4 | 4 | 64 |
| -1.572283 | | 100.0864 | 12.67419 | 0.291 | 4 | 4 | 65 |
| -1.572283 | | 100.0864 | 15.84274 | 0.291 | 4 | 4 | 66 |
| -1.572283 | | 100.0864 | 19.01129 | 0.291 | 4 | 4 | 67 |
| -1.572283 | | 100.0864 | 22.17984 | 0.291 | 4 | 4 | 68 |
| -1.572283 | | 100.0864 | 25.34838 | 0.291 | 4 | 4 | 69 |
| -1.572283 | | 100.0864 | 28.51693 | 0.291 | 4 | 4 | 70 |
| -1.572283 | | 100.0864 | 31.68548 | 0.291 | 4 | 4 | 71 |
| -1.572283 | | 100.0864 | 34.85403 | 0.291 | 4 | 4 | 72 |
| -1.572283 | | 100.0864 | 38.02258 | 0.291 | 4 | 4 | 73 |
| -1.572283 | | 100.0864 | 41.19112 | 0.291 | 4 | 4 | 74 |
| -1.572283 | | 100.0864 | 44.35967 | 0.291 | 4 | 4 | 75 |
| -1.572283 | | 100.0864 | 47.52822 | 0.291 | 4 | 4 | 76 |
| -1.572283 | | 100.0864 | 50.69677 | 0.291 | 4 | 4 | 77 |
| -1.572283 | | 100.0864 | 53.86532 | 0.291 | 4 | 4 | 78 |
| -1.572283 | | 100.0864 | 57.03387 | 0.291 | 4 | 4 | 79 |
| -1.572283 | | 100.0864 | 60.20242 | 0.291 | 4 | 0 | 80 |

| Wire No. | 5 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -105.1341 | | 14.06524 | 0 | 0.291 | -5 | 5 | 81 |
| -105.1341 | | 14.06524 | 3.105805 | 0.291 | 5 | 5 | 82 |
| -105.1341 | | 14.06524 | 6.211609 | 0.291 | 5 | 5 | 83 |
| -105.1341 | | 14.06524 | 9.317414 | 0.291 | 5 | 5 | 84 |
| -105.1341 | | 14.06524 | 12.42322 | 0.291 | 5 | 5 | 85 |
| -105.1341 | | 14.06524 | 15.52902 | 0.291 | 5 | 5 | 86 |
| -105.1341 | | 14.06524 | 18.63483 | 0.291 | 5 | 5 | 87 |
| -105.1341 | | 14.06524 | 21.74063 | 0.291 | 5 | 5 | 88 |
| -105.1341 | | 14.06524 | 24.84644 | 0.291 | 5 | 5 | 89 |
| -105.1341 | | 14.06524 | 27.95224 | 0.291 | 5 | 5 | 90 |
| -105.1341 | | 14.06524 | 31.05805 | 0.291 | 5 | 5 | 91 |
| -105.1341 | | 14.06524 | 34.16385 | 0.291 | 5 | 5 | 92 |
| -105.1341 | | 14.06524 | 37.26966 | 0.291 | 5 | 5 | 93 |
| -105.1341 | | 14.06524 | 40.37546 | 0.291 | 5 | 5 | 94 |

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Exhibit 1.17 – Tower 7 (EC) Model

| | | | | | | |
|-----------|----------|----------|-------|---|---|-----|
| -105.1341 | 14.06524 | 43.48127 | 0.291 | 5 | 5 | 95 |
| -105.1341 | 14.06524 | 46.58707 | 0.291 | 5 | 5 | 96 |
| -105.1341 | 14.06524 | 49.69287 | 0.291 | 5 | 5 | 97 |
| -105.1341 | 14.06524 | 52.79868 | 0.291 | 5 | 5 | 98 |
| -105.1341 | 14.06524 | 55.90449 | 0.291 | 5 | 5 | 99 |
| -105.1341 | 14.06524 | 59.01029 | 0.291 | 5 | 0 | 100 |

| Wire No. | 6 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -76.04971 | | 71.66562 | 0 | 0.291 | -6 | 6 | 101 |
| -76.04971 | | 71.66562 | 3.1714 | 0.291 | 6 | 6 | 102 |
| -76.04971 | | 71.66562 | 6.342801 | 0.291 | 6 | 6 | 103 |
| -76.04971 | | 71.66562 | 9.5142 | 0.291 | 6 | 6 | 104 |
| -76.04971 | | 71.66562 | 12.6856 | 0.291 | 6 | 6 | 105 |
| -76.04971 | | 71.66562 | 15.857 | 0.291 | 6 | 6 | 106 |
| -76.04971 | | 71.66562 | 19.0284 | 0.291 | 6 | 6 | 107 |
| -76.04971 | | 71.66562 | 22.1998 | 0.291 | 6 | 6 | 108 |
| -76.04971 | | 71.66562 | 25.3712 | 0.291 | 6 | 6 | 109 |
| -76.04971 | | 71.66562 | 28.5426 | 0.291 | 6 | 6 | 110 |
| -76.04971 | | 71.66562 | 31.714 | 0.291 | 6 | 6 | 111 |
| -76.04971 | | 71.66562 | 34.8854 | 0.291 | 6 | 6 | 112 |
| -76.04971 | | 71.66562 | 38.0568 | 0.291 | 6 | 6 | 113 |
| -76.04971 | | 71.66562 | 41.2282 | 0.291 | 6 | 6 | 114 |
| -76.04971 | | 71.66562 | 44.3996 | 0.291 | 6 | 6 | 115 |
| -76.04971 | | 71.66562 | 47.57101 | 0.291 | 6 | 6 | 116 |
| -76.04971 | | 71.66562 | 50.7424 | 0.291 | 6 | 6 | 117 |
| -76.04971 | | 71.66562 | 53.91381 | 0.291 | 6 | 6 | 118 |
| -76.04971 | | 71.66562 | 57.08521 | 0.291 | 6 | 6 | 119 |
| -76.04971 | | 71.66562 | 60.2566 | 0.291 | 6 | 0 | 120 |

| Wire No. | 7 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -23.59468 | | 64.58026 | 0 | 0.291 | -7 | 7 | 121 |
| -23.59468 | | 64.58026 | 3.151436 | 0.291 | 7 | 7 | 122 |
| -23.59468 | | 64.58026 | 6.302873 | 0.291 | 7 | 7 | 123 |
| -23.59468 | | 64.58026 | 9.454309 | 0.291 | 7 | 7 | 124 |
| -23.59468 | | 64.58026 | 12.60575 | 0.291 | 7 | 7 | 125 |
| -23.59468 | | 64.58026 | 15.75718 | 0.291 | 7 | 7 | 126 |
| -23.59468 | | 64.58026 | 18.90862 | 0.291 | 7 | 7 | 127 |
| -23.59468 | | 64.58026 | 22.06005 | 0.291 | 7 | 7 | 128 |
| -23.59468 | | 64.58026 | 25.21149 | 0.291 | 7 | 7 | 129 |
| -23.59468 | | 64.58026 | 28.36293 | 0.291 | 7 | 7 | 130 |
| -23.59468 | | 64.58026 | 31.51436 | 0.291 | 7 | 7 | 131 |
| -23.59468 | | 64.58026 | 34.6658 | 0.291 | 7 | 7 | 132 |
| -23.59468 | | 64.58026 | 37.81724 | 0.291 | 7 | 7 | 133 |
| -23.59468 | | 64.58026 | 40.96867 | 0.291 | 7 | 7 | 134 |
| -23.59468 | | 64.58026 | 44.12011 | 0.291 | 7 | 7 | 135 |
| -23.59468 | | 64.58026 | 47.27155 | 0.291 | 7 | 7 | 136 |
| -23.59468 | | 64.58026 | 50.42298 | 0.291 | 7 | 7 | 137 |
| -23.59468 | | 64.58026 | 53.57442 | 0.291 | 7 | 7 | 138 |
| -23.59468 | | 64.58026 | 56.72585 | 0.291 | 7 | 7 | 139 |
| -23.59468 | | 64.58026 | 59.8773 | 0.291 | 7 | 0 | 140 |

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Exhibit 1.17 – Tower 7 (EC) Model

Sources: 1

Pulse No., Voltage Magnitude, Phase (Degrees): 121, 1.0, 0.0

Number of Loads: 6

Pulse No., Resistance, Reactance: 1 , 0 ,-2180
 Pulse No., Resistance, Reactance: 21 , 0 ,-2180
 Pulse No., Resistance, Reactance: 41 , 0 ,-2180
 Pulse No., Resistance, Reactance: 61 , 0 ,-2180
 Pulse No., Resistance, Reactance: 81 , 0 ,-2180
 Pulse No., Resistance, Reactance: 101 , 0 ,-2180

***** SOURCE DATA *****
 Pulse 121 Voltage = (1.0, 0.0j)
 Current = (0.0031, -0.0054j)
 Impedance = (80.98, 138.592j)
 Power = 0.001571 Watts

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

Wire No. 1 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 1 | -0.0001 | 0.0001 | 0.0001 | 126.7153 |
| 2 | -0.0002 | 0.0003 | 0.0003 | 126.7047 |
| 3 | -0.0003 | 0.0004 | 0.0005 | 126.6843 |
| 4 | -0.0003 | 0.0005 | 0.0006 | 126.6587 |
| 5 | -0.0004 | 0.0005 | 0.0006 | 126.6291 |
| 6 | -0.0004 | 0.0006 | 0.0007 | 126.5964 |
| 7 | -0.0004 | 0.0006 | 0.0008 | 126.561 |
| 8 | -0.0005 | 0.0006 | 0.0008 | 126.5233 |
| 9 | -0.0005 | 0.0006 | 0.0008 | 126.4834 |
| 10 | -0.0005 | 0.0006 | 0.0008 | 126.4417 |
| 11 | -0.0005 | 0.0006 | 0.0008 | 126.3982 |
| 12 | -0.0005 | 0.0006 | 0.0008 | 126.3529 |
| 13 | -0.0004 | 0.0006 | 0.0007 | 126.3059 |
| 14 | -0.0004 | 0.0006 | 0.0007 | 126.257 |
| 15 | -0.0004 | 0.0005 | 0.0006 | 126.2062 |
| 16 | -0.0003 | 0.0005 | 0.0006 | 126.1532 |
| 17 | -0.0003 | 0.0004 | 0.0005 | 126.0978 |
| 18 | -0.0002 | 0.0003 | 0.0004 | 126.0395 |
| 19 | -0.0002 | 0.0002 | 0.0003 | 125.9777 |
| 20 | -0.0001 | 0.0001 | 0.0002 | 125.9105 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.17 – Tower 7 (EC) Model

Wire No. 2 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 21 | -0.0001 | 0.0001 | 0.0002 | 151.7736 |
| 22 | -0.0004 | 0.0002 | 0.0004 | 151.7693 |
| 23 | -0.0005 | 0.0003 | 0.0006 | 151.7613 |
| 24 | -0.0006 | 0.0003 | 0.0007 | 151.752 |
| 25 | -0.0007 | 0.0004 | 0.0008 | 151.7423 |
| 26 | -0.0008 | 0.0004 | 0.0009 | 151.7332 |
| 27 | -0.0009 | 0.0005 | 0.001 | 151.7255 |
| 28 | -0.0009 | 0.0005 | 0.001 | 151.7196 |
| 29 | -0.0009 | 0.0005 | 0.001 | 151.7163 |
| 30 | -0.0009 | 0.0005 | 0.001 | 151.7159 |
| 31 | -0.0009 | 0.0005 | 0.001 | 151.7186 |
| 32 | -0.0009 | 0.0005 | 0.001 | 151.7246 |
| 33 | -0.0008 | 0.0004 | 0.0009 | 151.7339 |
| 34 | -0.0008 | 0.0004 | 0.0009 | 151.7461 |
| 35 | -0.0007 | 0.0004 | 0.0008 | 151.7611 |
| 36 | -0.0006 | 0.0003 | 0.0007 | 151.7782 |
| 37 | -0.0005 | 0.0003 | 0.0006 | 151.7967 |
| 38 | -0.0004 | 0.0002 | 0.0005 | 151.8159 |
| 39 | -0.0003 | 0.0002 | 0.0004 | 151.8348 |
| 40 | -0.0002 | 0.0001 | 0.0002 | 151.8524 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 3 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 41 | 0.0001 | 0.0001 | 0.0001 | 60.8733 |
| 42 | 0.0002 | 0.0003 | 0.0004 | 60.8538 |
| 43 | 0.0003 | 0.0005 | 0.0005 | 60.8165 |
| 44 | 0.0003 | 0.0006 | 0.0006 | 60.7695 |
| 45 | 0.0004 | 0.0006 | 0.0007 | 60.7155 |
| 46 | 0.0004 | 0.0007 | 0.0008 | 60.6556 |
| 47 | 0.0004 | 0.0007 | 0.0009 | 60.5908 |
| 48 | 0.0004 | 0.0008 | 0.0009 | 60.5215 |
| 49 | 0.0005 | 0.0008 | 0.0009 | 60.4484 |
| 50 | 0.0005 | 0.0008 | 0.0009 | 60.3717 |
| 51 | 0.0005 | 0.0008 | 0.0009 | 60.2915 |
| 52 | 0.0004 | 0.0008 | 0.0009 | 60.2082 |
| 53 | 0.0004 | 0.0007 | 0.0008 | 60.1217 |
| 54 | 0.0004 | 0.0007 | 0.0008 | 60.032 |
| 55 | 0.0004 | 0.0006 | 0.0007 | 59.939 |
| 56 | 0.0003 | 0.0006 | 0.0006 | 59.8426 |
| 57 | 0.0003 | 0.0005 | 0.0005 | 59.7425 |
| 58 | 0.0002 | 0.0004 | 0.0004 | 59.6381 |
| 59 | 0.0002 | 0.0003 | 0.0003 | 59.5287 |
| 60 | 0.0001 | 0.0002 | 0.0002 | 59.4115 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.17 – Tower 7 (EC) Model

Wire No. 4 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 61 | -0.0002 | 0.0 | 0.0002 | 177.671 |
| 62 | -0.0005 | 0.0 | 0.0005 | 177.6695 |
| 63 | -0.0007 | 0.0 | 0.0007 | 177.6675 |
| 64 | -0.0008 | 0.0 | 0.0008 | 177.667 |
| 65 | -0.0009 | 0.0 | 0.0009 | 177.6699 |
| 66 | -0.001 | 0.0 | 0.001 | 177.6782 |
| 67 | -0.0011 | 0.0 | 0.0011 | 177.6935 |
| 68 | -0.0011 | 0.0 | 0.0011 | 177.7174 |
| 69 | -0.0012 | 0.0 | 0.0012 | 177.7513 |
| 70 | -0.0012 | 0.0 | 0.0012 | 177.7964 |
| 71 | -0.0011 | 0.0 | 0.0011 | 177.8533 |
| 72 | -0.0011 | 0.0 | 0.0011 | 177.9225 |
| 73 | -0.0011 | 0.0 | 0.0011 | 178.0042 |
| 74 | -0.001 | 0.0 | 0.001 | 178.098 |
| 75 | -0.0009 | 0.0 | 0.0009 | 178.2034 |
| 76 | -0.0008 | 0.0 | 0.0008 | 178.3193 |
| 77 | -0.0007 | 0.0 | 0.0007 | 178.4444 |
| 78 | -0.0005 | 0.0 | 0.0005 | 178.577 |
| 79 | -0.0004 | 0.0 | 0.0004 | 178.7155 |
| 80 | -0.0002 | 0.0 | 0.0002 | 178.8601 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 5 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 81 | 0.0 | 0.0001 | 0.0001 | 74.2921 |
| 82 | 0.0001 | 0.0003 | 0.0003 | 74.2716 |
| 83 | 0.0001 | 0.0004 | 0.0004 | 74.232 |
| 84 | 0.0001 | 0.0004 | 0.0005 | 74.1821 |
| 85 | 0.0001 | 0.0005 | 0.0005 | 74.1242 |
| 86 | 0.0002 | 0.0005 | 0.0006 | 74.0598 |
| 87 | 0.0002 | 0.0006 | 0.0006 | 73.9896 |
| 88 | 0.0002 | 0.0006 | 0.0006 | 73.9143 |
| 89 | 0.0002 | 0.0006 | 0.0007 | 73.8342 |
| 90 | 0.0002 | 0.0006 | 0.0007 | 73.7495 |
| 91 | 0.0002 | 0.0006 | 0.0006 | 73.6606 |
| 92 | 0.0002 | 0.0006 | 0.0006 | 73.5676 |
| 93 | 0.0002 | 0.0006 | 0.0006 | 73.4704 |
| 94 | 0.0002 | 0.0005 | 0.0006 | 73.3691 |
| 95 | 0.0001 | 0.0005 | 0.0005 | 73.2636 |
| 96 | 0.0001 | 0.0004 | 0.0005 | 73.1537 |
| 97 | 0.0001 | 0.0004 | 0.0004 | 73.0391 |
| 98 | 0.0001 | 0.0003 | 0.0003 | 72.9193 |
| 99 | 0.0001 | 0.0002 | 0.0002 | 72.7936 |
| 100 | 0.0 | 0.0001 | 0.0001 | 72.6586 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.17 – Tower 7 (EC) Model

Wire No. 6 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 101 | -0.0002 | 0.0001 | 0.0002 | 159.977 |
| 102 | -0.0004 | 0.0001 | 0.0004 | 159.9758 |
| 103 | -0.0006 | 0.0002 | 0.0006 | 159.9736 |
| 104 | -0.0007 | 0.0002 | 0.0007 | 159.9714 |
| 105 | -0.0008 | 0.0003 | 0.0008 | 159.97 |
| 106 | -0.0008 | 0.0003 | 0.0009 | 159.97 |
| 107 | -0.0009 | 0.0003 | 0.001 | 159.9718 |
| 108 | -0.0009 | 0.0003 | 0.001 | 159.9762 |
| 109 | -0.001 | 0.0003 | 0.001 | 159.9834 |
| 110 | -0.001 | 0.0004 | 0.001 | 159.9939 |
| 111 | -0.001 | 0.0003 | 0.001 | 160.0079 |
| 112 | -0.0009 | 0.0003 | 0.001 | 160.0254 |
| 113 | -0.0009 | 0.0003 | 0.0009 | 160.0465 |
| 114 | -0.0008 | 0.0003 | 0.0009 | 160.0709 |
| 115 | -0.0008 | 0.0003 | 0.0008 | 160.0983 |
| 116 | -0.0007 | 0.0002 | 0.0007 | 160.1282 |
| 117 | -0.0006 | 0.0002 | 0.0006 | 160.16 |
| 118 | -0.0005 | 0.0002 | 0.0005 | 160.1929 |
| 119 | -0.0003 | 0.0001 | 0.0004 | 160.226 |
| 120 | -0.0002 | 0.0001 | 0.0002 | 160.2589 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 7 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 121 | 0.0031 | -0.0054 | 0.0062 | -59.702 |
| 122 | 0.0031 | -0.0061 | 0.0069 | -62.8039 |
| 123 | 0.0031 | -0.0065 | 0.0072 | -64.397 |
| 124 | 0.0031 | -0.0067 | 0.0074 | -65.6171 |
| 125 | 0.003 | -0.0069 | 0.0075 | -66.6113 |
| 126 | 0.0029 | -0.007 | 0.0076 | -67.4526 |
| 127 | 0.0028 | -0.007 | 0.0075 | -68.1822 |
| 128 | 0.0027 | -0.0069 | 0.0074 | -68.8263 |
| 129 | 0.0025 | -0.0068 | 0.0072 | -69.4032 |
| 130 | 0.0024 | -0.0066 | 0.007 | -69.926 |
| 131 | 0.0022 | -0.0063 | 0.0067 | -70.4048 |
| 132 | 0.0021 | -0.0059 | 0.0063 | -70.8471 |
| 133 | 0.0019 | -0.0055 | 0.0058 | -71.2593 |
| 134 | 0.0017 | -0.005 | 0.0053 | -71.6463 |
| 135 | 0.0015 | -0.0045 | 0.0047 | -72.0123 |
| 136 | 0.0012 | -0.0039 | 0.0041 | -72.3606 |
| 137 | 0.001 | -0.0033 | 0.0034 | -72.6945 |
| 138 | 0.0008 | -0.0026 | 0.0027 | -73.0166 |
| 139 | 0.0006 | -0.0018 | 0.0019 | -73.3302 |
| 140 | 0.0003 | -0.001 | 0.0011 | -73.6427 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.20

9

Moment Method Day Array Parameter Sheet

WPON - Walled Lake, MI

Modeling Software: Au Contraire - Version 1.030

Station: WPON - Walled Lake, MI

Freq (kHz) 1460

Day Pattern

for AMQ

| Twr | Field Parameters | | Mininec Model | |
|--------|------------------|--------|---------------|--------|
| | Ratio | Phase | Ratio | Phase |
| 1 (NW) | 1.000 | 0.0° | 1.000 | 0.0° |
| 2 (NC) | 0.630 | -71.0° | 0.587 | -54.2° |
| 3 (NE) | Detuned | | | |
| 4 (E) | Detuned | | | |
| 5 (SW) | 0.530 | -6.0° | 0.570 | -9.4° |
| 6 (SE) | 0.334 | -77.0° | 0.429 | -57.7° |
| 7 (EC) | Detuned | | 0.000 | -6.6° |

Mininec Model Data

| Twr | Drive Point | | Current | | Shunt | ATU Output | |
|--------|-------------|---------|---------|--------|-------|------------|----------|
| | R | X | Mag | Phase | X | Mag | Phase |
| 1 (NW) | 44.794 | 103.925 | 3.1832 | 5.3° | -2180 | 3.0322 | 6.560° |
| 2 (NC) | 163.990 | 100.649 | 1.8595 | -52.1° | -2180 | 1.7792 | -47.624° |
| 3 (NE) | Detuned | | | | | | |
| 4 (E) | Detuned | | | | | | |
| 5 (SW) | 20.975 | 81.114 | 1.7961 | -3.4° | -2180 | 1.7294 | -2.828° |
| 6 (SE) | 151.021 | -11.961 | 1.2903 | -55.1° | -2180 | 1.3005 | -51.121° |
| 7 (EC) | Detuned | | | | | | |

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Exhibit 1.20

Moment Method Day Array Parameter Sheet

WPON - Walled Lake, MI

Formulas for Calculating ATU Output Current with Shunt Reactance

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

$Z_{BASE} = R_B + jX_B$

X_S = Shunt Reactance

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

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

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Exhibit 1.21 – Day Pattern Details

 ACSModel
 (MININEC 3.1 Core)
 08-08-2019 10:37:25

WPON - Day Pattern Details

Frequency = 1.460 MHz Wavelength = 205.34246 Meters

No. of Wires: 7

| Wire No. | Coordinates X Y Z | Radius | End Connection | No. of Segments |
|------------|---------------------------------------|--------|-------------------|--------------------|
| Wire No. 1 | 0 0 0 | 0.291 | -1 | |
| | 0 0 62.85761 | 0.291 | 0 | 20 |
| Wire No. 2 | 29.21459 57.48561 0 | 0.291 | -2 | |
| | 29.21459 57.48561 64.62584 | 0.291 | 0 | 20 |
| Wire No. 3 | 65.51537 111.1786 0 | 0.291 | -3 | |
| | 65.51537 111.1786 64.2836 | 0.291 | 0 | 20 |
| Wire No. 4 | -1.572283 100.0864 0 | 0.291 | -4 | |
| | -1.572283 100.0864 63.37096 | 0.291 | 0 | 20 |
| Wire No. 5 | -105.1341 14.06524 0 | 0.291 | -5 | |
| | -105.1341 14.06524 62.11609 | 0.291 | 0 | 20 |
| Wire No. 6 | -76.04971 71.66562 0 | 0.291 | -6 | |
| | -76.04971 71.66562 63.42801 | 0.291 | 0 | 20 |
| Wire No. 7 | -23.59468 64.58026 0 | 0.291 | -7 | |
| | -23.59468 64.58026 63.02873 | 0.291 | 0 | 20 |

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Exhibit 1.21 – Day Pattern Details

**** ANTENNA GEOMETRY ****

| Wire No. | 1 | Coordinates | | | Connection | | Pulse |
|----------|---|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 0 | 0 | 0 | 0.291 | -1 | 1 | 1 | |
| 0 | 0 | 3.14288 | 0.291 | 1 | 1 | 2 | |
| 0 | 0 | 6.285761 | 0.291 | 1 | 1 | 3 | |
| 0 | 0 | 9.428641 | 0.291 | 1 | 1 | 4 | |
| 0 | 0 | 12.57152 | 0.291 | 1 | 1 | 5 | |
| 0 | 0 | 15.7144 | 0.291 | 1 | 1 | 6 | |
| 0 | 0 | 18.85728 | 0.291 | 1 | 1 | 7 | |
| 0 | 0 | 22.00016 | 0.291 | 1 | 1 | 8 | |
| 0 | 0 | 25.14304 | 0.291 | 1 | 1 | 9 | |
| 0 | 0 | 28.28592 | 0.291 | 1 | 1 | 10 | |
| 0 | 0 | 31.42881 | 0.291 | 1 | 1 | 11 | |
| 0 | 0 | 34.57169 | 0.291 | 1 | 1 | 12 | |
| 0 | 0 | 37.71457 | 0.291 | 1 | 1 | 13 | |
| 0 | 0 | 40.85744 | 0.291 | 1 | 1 | 14 | |
| 0 | 0 | 44.00033 | 0.291 | 1 | 1 | 15 | |
| 0 | 0 | 47.14321 | 0.291 | 1 | 1 | 16 | |
| 0 | 0 | 50.28609 | 0.291 | 1 | 1 | 17 | |
| 0 | 0 | 53.42897 | 0.291 | 1 | 1 | 18 | |
| 0 | 0 | 56.57185 | 0.291 | 1 | 1 | 19 | |
| 0 | 0 | 59.71473 | 0.291 | 1 | 0 | 20 | |

| Wire No. | 2 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 29.21459 | 57.48561 | 0 | 0.291 | -2 | 2 | 21 | |
| 29.21459 | 57.48561 | 3.231292 | 0.291 | 2 | 2 | 22 | |
| 29.21459 | 57.48561 | 6.462584 | 0.291 | 2 | 2 | 23 | |
| 29.21459 | 57.48561 | 9.693876 | 0.291 | 2 | 2 | 24 | |
| 29.21459 | 57.48561 | 12.92517 | 0.291 | 2 | 2 | 25 | |
| 29.21459 | 57.48561 | 16.15646 | 0.291 | 2 | 2 | 26 | |
| 29.21459 | 57.48561 | 19.38775 | 0.291 | 2 | 2 | 27 | |
| 29.21459 | 57.48561 | 22.61904 | 0.291 | 2 | 2 | 28 | |
| 29.21459 | 57.48561 | 25.85034 | 0.291 | 2 | 2 | 29 | |
| 29.21459 | 57.48561 | 29.08163 | 0.291 | 2 | 2 | 30 | |
| 29.21459 | 57.48561 | 32.31292 | 0.291 | 2 | 2 | 31 | |
| 29.21459 | 57.48561 | 35.54421 | 0.291 | 2 | 2 | 32 | |
| 29.21459 | 57.48561 | 38.77551 | 0.291 | 2 | 2 | 33 | |
| 29.21459 | 57.48561 | 42.0068 | 0.291 | 2 | 2 | 34 | |
| 29.21459 | 57.48561 | 45.23809 | 0.291 | 2 | 2 | 35 | |
| 29.21459 | 57.48561 | 48.46938 | 0.291 | 2 | 2 | 36 | |
| 29.21459 | 57.48561 | 51.70067 | 0.291 | 2 | 2 | 37 | |
| 29.21459 | 57.48561 | 54.93196 | 0.291 | 2 | 2 | 38 | |
| 29.21459 | 57.48561 | 58.16326 | 0.291 | 2 | 2 | 39 | |
| 29.21459 | 57.48561 | 61.39455 | 0.291 | 2 | 0 | 40 | |

| Wire No. | 3 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 65.51537 | 111.1786 | 0 | 0.291 | -3 | 3 | 41 | |
| 65.51537 | 111.1786 | 3.21418 | 0.291 | 3 | 3 | 42 | |
| 65.51537 | 111.1786 | 6.42836 | 0.291 | 3 | 3 | 43 | |
| 65.51537 | 111.1786 | 9.64254 | 0.291 | 3 | 3 | 44 | |
| 65.51537 | 111.1786 | 12.85672 | 0.291 | 3 | 3 | 45 | |

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Exhibit 1.21 – Day Pattern Details

| | | | | | | |
|----------|----------|----------|-------|---|---|----|
| 65.51537 | 111.1786 | 16.0709 | 0.291 | 3 | 3 | 46 |
| 65.51537 | 111.1786 | 19.28508 | 0.291 | 3 | 3 | 47 |
| 65.51537 | 111.1786 | 22.49926 | 0.291 | 3 | 3 | 48 |
| 65.51537 | 111.1786 | 25.71344 | 0.291 | 3 | 3 | 49 |
| 65.51537 | 111.1786 | 28.92762 | 0.291 | 3 | 3 | 50 |
| 65.51537 | 111.1786 | 32.1418 | 0.291 | 3 | 3 | 51 |
| 65.51537 | 111.1786 | 35.35598 | 0.291 | 3 | 3 | 52 |
| 65.51537 | 111.1786 | 38.57016 | 0.291 | 3 | 3 | 53 |
| 65.51537 | 111.1786 | 41.78434 | 0.291 | 3 | 3 | 54 |
| 65.51537 | 111.1786 | 44.99852 | 0.291 | 3 | 3 | 55 |
| 65.51537 | 111.1786 | 48.2127 | 0.291 | 3 | 3 | 56 |
| 65.51537 | 111.1786 | 51.42688 | 0.291 | 3 | 3 | 57 |
| 65.51537 | 111.1786 | 54.64106 | 0.291 | 3 | 3 | 58 |
| 65.51537 | 111.1786 | 57.85524 | 0.291 | 3 | 3 | 59 |
| 65.51537 | 111.1786 | 61.06942 | 0.291 | 3 | 0 | 60 |

| Wire No. | 4 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -1.572283 | | 100.0864 | 0 | 0.291 | -4 | 4 | 61 |
| -1.572283 | | 100.0864 | 3.168548 | 0.291 | 4 | 4 | 62 |
| -1.572283 | | 100.0864 | 6.337096 | 0.291 | 4 | 4 | 63 |
| -1.572283 | | 100.0864 | 9.505644 | 0.291 | 4 | 4 | 64 |
| -1.572283 | | 100.0864 | 12.67419 | 0.291 | 4 | 4 | 65 |
| -1.572283 | | 100.0864 | 15.84274 | 0.291 | 4 | 4 | 66 |
| -1.572283 | | 100.0864 | 19.01129 | 0.291 | 4 | 4 | 67 |
| -1.572283 | | 100.0864 | 22.17984 | 0.291 | 4 | 4 | 68 |
| -1.572283 | | 100.0864 | 25.34838 | 0.291 | 4 | 4 | 69 |
| -1.572283 | | 100.0864 | 28.51693 | 0.291 | 4 | 4 | 70 |
| -1.572283 | | 100.0864 | 31.68548 | 0.291 | 4 | 4 | 71 |
| -1.572283 | | 100.0864 | 34.85403 | 0.291 | 4 | 4 | 72 |
| -1.572283 | | 100.0864 | 38.02258 | 0.291 | 4 | 4 | 73 |
| -1.572283 | | 100.0864 | 41.19112 | 0.291 | 4 | 4 | 74 |
| -1.572283 | | 100.0864 | 44.35967 | 0.291 | 4 | 4 | 75 |
| -1.572283 | | 100.0864 | 47.52822 | 0.291 | 4 | 4 | 76 |
| -1.572283 | | 100.0864 | 50.69677 | 0.291 | 4 | 4 | 77 |
| -1.572283 | | 100.0864 | 53.86532 | 0.291 | 4 | 4 | 78 |
| -1.572283 | | 100.0864 | 57.03387 | 0.291 | 4 | 4 | 79 |
| -1.572283 | | 100.0864 | 60.20242 | 0.291 | 4 | 0 | 80 |

| Wire No. | 5 | Coordinates | | | Connection | | Pulse |
|-----------|---|-------------|----------|--------|------------|------|-------|
| X | | Y | Z | Radius | End1 | End2 | No. |
| -105.1341 | | 14.06524 | 0 | 0.291 | -5 | 5 | 81 |
| -105.1341 | | 14.06524 | 3.105805 | 0.291 | 5 | 5 | 82 |
| -105.1341 | | 14.06524 | 6.211609 | 0.291 | 5 | 5 | 83 |
| -105.1341 | | 14.06524 | 9.317414 | 0.291 | 5 | 5 | 84 |
| -105.1341 | | 14.06524 | 12.42322 | 0.291 | 5 | 5 | 85 |
| -105.1341 | | 14.06524 | 15.52902 | 0.291 | 5 | 5 | 86 |
| -105.1341 | | 14.06524 | 18.63483 | 0.291 | 5 | 5 | 87 |
| -105.1341 | | 14.06524 | 21.74063 | 0.291 | 5 | 5 | 88 |
| -105.1341 | | 14.06524 | 24.84644 | 0.291 | 5 | 5 | 89 |
| -105.1341 | | 14.06524 | 27.95224 | 0.291 | 5 | 5 | 90 |
| -105.1341 | | 14.06524 | 31.05805 | 0.291 | 5 | 5 | 91 |
| -105.1341 | | 14.06524 | 34.16385 | 0.291 | 5 | 5 | 92 |
| -105.1341 | | 14.06524 | 37.26966 | 0.291 | 5 | 5 | 93 |
| -105.1341 | | 14.06524 | 40.37546 | 0.291 | 5 | 5 | 94 |

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Exhibit 1.21 – Day Pattern Details

| | | | | | | |
|-----------|----------|----------|-------|---|---|-----|
| -105.1341 | 14.06524 | 43.48127 | 0.291 | 5 | 5 | 95 |
| -105.1341 | 14.06524 | 46.58707 | 0.291 | 5 | 5 | 96 |
| -105.1341 | 14.06524 | 49.69287 | 0.291 | 5 | 5 | 97 |
| -105.1341 | 14.06524 | 52.79868 | 0.291 | 5 | 5 | 98 |
| -105.1341 | 14.06524 | 55.90449 | 0.291 | 5 | 5 | 99 |
| -105.1341 | 14.06524 | 59.01029 | 0.291 | 5 | 0 | 100 |

| Wire No. 6 | | Coordinates | | Radius | Connection | | Pulse |
|------------|----------|-------------|-------|--------|------------|------|-------|
| X | Y | Z | | | End1 | End2 | No. |
| -76.04971 | 71.66562 | 0 | 0.291 | -6 | 6 | | 101 |
| -76.04971 | 71.66562 | 3.1714 | 0.291 | 6 | 6 | | 102 |
| -76.04971 | 71.66562 | 6.342801 | 0.291 | 6 | 6 | | 103 |
| -76.04971 | 71.66562 | 9.5142 | 0.291 | 6 | 6 | | 104 |
| -76.04971 | 71.66562 | 12.6856 | 0.291 | 6 | 6 | | 105 |
| -76.04971 | 71.66562 | 15.857 | 0.291 | 6 | 6 | | 106 |
| -76.04971 | 71.66562 | 19.0284 | 0.291 | 6 | 6 | | 107 |
| -76.04971 | 71.66562 | 22.1998 | 0.291 | 6 | 6 | | 108 |
| -76.04971 | 71.66562 | 25.3712 | 0.291 | 6 | 6 | | 109 |
| -76.04971 | 71.66562 | 28.5426 | 0.291 | 6 | 6 | | 110 |
| -76.04971 | 71.66562 | 31.714 | 0.291 | 6 | 6 | | 111 |
| -76.04971 | 71.66562 | 34.8854 | 0.291 | 6 | 6 | | 112 |
| -76.04971 | 71.66562 | 38.0568 | 0.291 | 6 | 6 | | 113 |
| -76.04971 | 71.66562 | 41.2282 | 0.291 | 6 | 6 | | 114 |
| -76.04971 | 71.66562 | 44.3996 | 0.291 | 6 | 6 | | 115 |
| -76.04971 | 71.66562 | 47.57101 | 0.291 | 6 | 6 | | 116 |
| -76.04971 | 71.66562 | 50.7424 | 0.291 | 6 | 6 | | 117 |
| -76.04971 | 71.66562 | 53.91381 | 0.291 | 6 | 6 | | 118 |
| -76.04971 | 71.66562 | 57.08521 | 0.291 | 6 | 6 | | 119 |
| -76.04971 | 71.66562 | 60.2566 | 0.291 | 6 | 0 | | 120 |

| Wire No. 7 | | Coordinates | | Radius | Connection | | Pulse |
|------------|----------|-------------|-------|--------|------------|------|-------|
| X | Y | Z | | | End1 | End2 | No. |
| -23.59468 | 64.58026 | 0 | 0.291 | -7 | 7 | | 121 |
| -23.59468 | 64.58026 | 3.151436 | 0.291 | 7 | 7 | | 122 |
| -23.59468 | 64.58026 | 6.302873 | 0.291 | 7 | 7 | | 123 |
| -23.59468 | 64.58026 | 9.454309 | 0.291 | 7 | 7 | | 124 |
| -23.59468 | 64.58026 | 12.60575 | 0.291 | 7 | 7 | | 125 |
| -23.59468 | 64.58026 | 15.75718 | 0.291 | 7 | 7 | | 126 |
| -23.59468 | 64.58026 | 18.90862 | 0.291 | 7 | 7 | | 127 |
| -23.59468 | 64.58026 | 22.06005 | 0.291 | 7 | 7 | | 128 |
| -23.59468 | 64.58026 | 25.21149 | 0.291 | 7 | 7 | | 129 |
| -23.59468 | 64.58026 | 28.36293 | 0.291 | 7 | 7 | | 130 |
| -23.59468 | 64.58026 | 31.51436 | 0.291 | 7 | 7 | | 131 |
| -23.59468 | 64.58026 | 34.6658 | 0.291 | 7 | 7 | | 132 |
| -23.59468 | 64.58026 | 37.81724 | 0.291 | 7 | 7 | | 133 |
| -23.59468 | 64.58026 | 40.96867 | 0.291 | 7 | 7 | | 134 |
| -23.59468 | 64.58026 | 44.12011 | 0.291 | 7 | 7 | | 135 |
| -23.59468 | 64.58026 | 47.27155 | 0.291 | 7 | 7 | | 136 |
| -23.59468 | 64.58026 | 50.42298 | 0.291 | 7 | 7 | | 137 |
| -23.59468 | 64.58026 | 53.57442 | 0.291 | 7 | 7 | | 138 |
| -23.59468 | 64.58026 | 56.72585 | 0.291 | 7 | 7 | | 139 |
| -23.59468 | 64.58026 | 59.8773 | 0.291 | 7 | 0 | | 140 |

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Exhibit 1.21 – Day Pattern Details

Sources: 4

Pulse No., Voltage Magnitude, Phase (Degrees): 1, 360.2, 72.0

Pulse No., Voltage Magnitude, Phase (Degrees): 21, 357.8, -20.6

Pulse No., Voltage Magnitude, Phase (Degrees): 81, 150.5, 72.1

Pulse No., Voltage Magnitude, Phase (Degrees): 101, 195.5, -59.6

Number of Loads: 3

Pulse No., Resistance, Reactance: 41 , 0 , 375.6

Pulse No., Resistance, Reactance: 61 , 0 , 387.9

Pulse No., Resistance, Reactance: 121 , 0 , 384.4

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

Pulse 1 Voltage = (111.2774, 342.6156j)
 Current = (3.1695, 0.2954j)
 Impedance = (44.794, 103.925j)
 Power = 226.94 Watts

Pulse 21 Voltage = (334.92, -125.849j)
 Current = (1.1414, -1.4679j)
 Impedance = (163.99, 100.649j)
 Power = 283.5 Watts

Pulse 81 Voltage = (46.2484, 143.196j)
 Current = (1.7929, -0.1065j)
 Impedance = (20.975, 81.114j)
 Power = 33.83 Watts

Pulse 101 Voltage = (98.9472, -168.5867j)
 Current = (0.739, -1.0578j)
 Impedance = (151.021, -11.961j)
 Power = 125.72 Watts

Total Power = 670.000 Watts

Exhibit 1.21 – Day Pattern Details

CURRENT DATA

Wire No. 1 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 1 | 3.1695 | 0.2954 | 3.1832 | 5.3238 |
| 2 | 3.4114 | 0.2127 | 3.418 | 3.5683 |
| 3 | 3.5296 | 0.1622 | 3.5333 | 2.6318 |
| 4 | 3.6002 | 0.1192 | 3.6021 | 1.8967 |
| 5 | 3.6304 | 0.0815 | 3.6313 | 1.2856 |
| 6 | 3.6238 | 0.0481 | 3.6241 | 0.7598 |
| 7 | 3.5824 | 0.0186 | 3.5824 | 0.2973 |
| 8 | 3.5075 | -0.0071 | 3.5075 | -0.1158 |
| 9 | 3.4005 | -0.029 | 3.4006 | -0.4894 |
| 10 | 3.2627 | -0.0473 | 3.263 | -0.8307 |
| 11 | 3.0953 | -0.0619 | 3.096 | -1.145 |
| 12 | 2.9 | -0.0727 | 2.9009 | -1.4366 |
| 13 | 2.6781 | -0.0799 | 2.6793 | -1.709 |
| 14 | 2.4313 | -0.0834 | 2.4327 | -1.9647 |
| 15 | 2.1611 | -0.0833 | 2.1627 | -2.2063 |
| 16 | 1.869 | -0.0795 | 1.8707 | -2.4355 |
| 17 | 1.5562 | -0.0721 | 1.5578 | -2.6543 |
| 18 | 1.223 | -0.0612 | 1.2245 | -2.8641 |
| 19 | 0.868 | -0.0465 | 0.8693 | -3.0669 |
| 20 | 0.4855 | -0.0277 | 0.4863 | -3.2672 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 2 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 21 | 1.1414 | -1.4679 | 1.8595 | -52.1337 |
| 22 | 1.0441 | -1.713 | 2.0061 | -58.6357 |
| 23 | 0.9786 | -1.8462 | 2.0895 | -62.0745 |
| 24 | 0.9169 | -1.9421 | 2.1477 | -64.7281 |
| 25 | 0.8566 | -2.0077 | 2.1828 | -66.8943 |
| 26 | 0.7967 | -2.046 | 2.1957 | -68.7238 |
| 27 | 0.737 | -2.0588 | 2.1867 | -70.3031 |
| 28 | 0.6775 | -2.0471 | 2.1563 | -71.6883 |
| 29 | 0.6182 | -2.0117 | 2.1045 | -72.9185 |
| 30 | 0.5593 | -1.9535 | 2.032 | -74.0225 |
| 31 | 0.5012 | -1.8733 | 1.9392 | -75.0221 |
| 32 | 0.444 | -1.772 | 1.8268 | -75.9345 |
| 33 | 0.388 | -1.6507 | 1.6957 | -76.7732 |
| 34 | 0.3335 | -1.5103 | 1.5467 | -77.5495 |
| 35 | 0.2807 | -1.352 | 1.3808 | -78.2725 |
| 36 | 0.2298 | -1.1768 | 1.199 | -78.9501 |
| 37 | 0.1811 | -0.9854 | 1.0019 | -79.5893 |
| 38 | 0.1345 | -0.7784 | 0.79 | -80.1963 |
| 39 | 0.0901 | -0.555 | 0.5622 | -80.7781 |
| 40 | 0.0474 | -0.3114 | 0.315 | -81.3485 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.21 – Day Pattern Details

Wire No. 3 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 41 | 0.1131 | -0.3178 | 0.3373 | -70.4145 |
| 42 | 0.0813 | -0.2281 | 0.2421 | -70.3837 |
| 43 | 0.0621 | -0.1729 | 0.1837 | -70.2533 |
| 44 | 0.046 | -0.1258 | 0.1339 | -69.9249 |
| 45 | 0.0321 | -0.0844 | 0.0903 | -69.1519 |
| 46 | 0.0202 | -0.0477 | 0.0518 | -67.0721 |
| 47 | 0.0099 | -0.0153 | 0.0183 | -57.136 |
| 48 | 0.0012 | 0.0129 | 0.0129 | 84.5736 |
| 49 | -0.006 | 0.037 | 0.0375 | 99.1558 |
| 50 | -0.0117 | 0.057 | 0.0582 | 101.6037 |
| 51 | -0.0161 | 0.0729 | 0.0746 | 102.4305 |
| 52 | -0.0191 | 0.0847 | 0.0868 | 102.7252 |
| 53 | -0.0209 | 0.0923 | 0.0947 | 102.7765 |
| 54 | -0.0216 | 0.0959 | 0.0983 | 102.6931 |
| 55 | -0.0212 | 0.0954 | 0.0977 | 102.5252 |
| 56 | -0.0198 | 0.0908 | 0.0929 | 102.2987 |
| 57 | -0.0175 | 0.0822 | 0.0841 | 102.0278 |
| 58 | -0.0144 | 0.0696 | 0.0711 | 101.7207 |
| 59 | -0.0106 | 0.0529 | 0.0539 | 101.3809 |
| 60 | -0.0061 | 0.0314 | 0.032 | 101.0036 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 4 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 61 | 0.5128 | -0.3388 | 0.6146 | -33.4523 |
| 62 | 0.3647 | -0.2407 | 0.437 | -33.4283 |
| 63 | 0.2746 | -0.1805 | 0.3286 | -33.3264 |
| 64 | 0.1983 | -0.1291 | 0.2366 | -33.0669 |
| 65 | 0.1319 | -0.0838 | 0.1562 | -32.4441 |
| 66 | 0.0736 | -0.0436 | 0.0855 | -30.6785 |
| 67 | 0.0226 | -0.0081 | 0.024 | -19.7451 |
| 68 | -0.0213 | 0.0229 | 0.0313 | 132.9801 |
| 69 | -0.0585 | 0.0494 | 0.0766 | 139.7998 |
| 70 | -0.0889 | 0.0714 | 0.1141 | 141.2262 |
| 71 | -0.1128 | 0.089 | 0.1437 | 141.7514 |
| 72 | -0.1302 | 0.1019 | 0.1654 | 141.9642 |
| 73 | -0.1413 | 0.1102 | 0.1792 | 142.0323 |
| 74 | -0.146 | 0.114 | 0.1852 | 142.0214 |
| 75 | -0.1445 | 0.1131 | 0.1835 | 141.9621 |
| 76 | -0.137 | 0.1076 | 0.1742 | 141.87 |
| 77 | -0.1236 | 0.0974 | 0.1574 | 141.7536 |
| 78 | -0.1042 | 0.0826 | 0.133 | 141.6175 |
| 79 | -0.0788 | 0.0628 | 0.1008 | 141.4633 |
| 80 | -0.0467 | 0.0375 | 0.0599 | 141.288 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Exhibit 1.21 – Day Pattern Details

Wire No. 5 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 81 | 1.7929 | -0.1065 | 1.7961 | -3.4003 |
| 82 | 1.892 | -0.1399 | 1.8972 | -4.2301 |
| 83 | 1.9367 | -0.1586 | 1.9432 | -4.6815 |
| 84 | 1.9589 | -0.1728 | 1.9665 | -5.0402 |
| 85 | 1.9617 | -0.1834 | 1.9702 | -5.3408 |
| 86 | 1.9465 | -0.1909 | 1.9558 | -5.601 |
| 87 | 1.9143 | -0.1955 | 1.9242 | -5.8305 |
| 88 | 1.8657 | -0.1973 | 1.8761 | -6.0358 |
| 89 | 1.8015 | -0.1964 | 1.8122 | -6.2214 |
| 90 | 1.7222 | -0.1929 | 1.733 | -6.3905 |
| 91 | 1.6286 | -0.1869 | 1.6392 | -6.5457 |
| 92 | 1.5213 | -0.1784 | 1.5317 | -6.6888 |
| 93 | 1.4012 | -0.1676 | 1.4112 | -6.8214 |
| 94 | 1.269 | -0.1546 | 1.2784 | -6.9448 |
| 95 | 1.1256 | -0.1394 | 1.1342 | -7.06 |
| 96 | 0.9716 | -0.1222 | 0.9793 | -7.1679 |
| 97 | 0.8076 | -0.103 | 0.8142 | -7.2692 |
| 98 | 0.6338 | -0.0819 | 0.639 | -7.3645 |
| 99 | 0.4493 | -0.0588 | 0.4531 | -7.4547 |
| 100 | 0.2511 | -0.0332 | 0.2533 | -7.5415 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 6 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 101 | 0.739 | -1.0578 | 1.2903 | -55.0621 |
| 102 | 0.6124 | -1.1275 | 1.283 | -61.4909 |
| 103 | 0.533 | -1.1602 | 1.2768 | -65.3285 |
| 104 | 0.4633 | -1.1782 | 1.266 | -68.5332 |
| 105 | 0.4001 | -1.1834 | 1.2492 | -71.3188 |
| 106 | 0.342 | -1.1769 | 1.2256 | -73.7971 |
| 107 | 0.2884 | -1.1594 | 1.1948 | -76.0329 |
| 108 | 0.2391 | -1.1314 | 1.1564 | -78.0696 |
| 109 | 0.194 | -1.0933 | 1.1104 | -79.9391 |
| 110 | 0.1532 | -1.0455 | 1.0567 | -81.6663 |
| 111 | 0.1166 | -0.9887 | 0.9955 | -83.2709 |
| 112 | 0.0845 | -0.9232 | 0.927 | -84.7697 |
| 113 | 0.0568 | -0.8496 | 0.8515 | -86.1764 |
| 114 | 0.0335 | -0.7686 | 0.7694 | -87.503 |
| 115 | 0.0147 | -0.6808 | 0.6809 | -88.7601 |
| 116 | 0.0004 | -0.5866 | 0.5866 | -89.957 |
| 117 | -0.0094 | -0.4865 | 0.4866 | -91.1027 |
| 118 | -0.0147 | -0.3808 | 0.3811 | -92.2056 |
| 119 | -0.0154 | -0.2691 | 0.2695 | -93.2762 |
| 120 | -0.0114 | -0.1497 | 0.1502 | -94.339 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.21 – Day Pattern Details

Wire No. 7 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|--------------|----------------|---------------------|---------------------|--------------------|
| 121 | 0.7365 | 0.0031 | 0.7365 | 0.2422 |
| 122 | 0.5262 | 0.0022 | 0.5262 | 0.245 |
| 123 | 0.398 | 0.0018 | 0.398 | 0.2569 |
| 124 | 0.2892 | 0.0014 | 0.2892 | 0.2871 |
| 125 | 0.1942 | 0.0012 | 0.1942 | 0.3594 |
| 126 | 0.1104 | 0.0011 | 0.1104 | 0.5579 |
| 127 | 0.037 | 0.001 | 0.037 | 1.5665 |
| 128 | -0.0267 | 0.001 | 0.0267 | 177.8241 |
| 129 | -0.0808 | 0.0011 | 0.0808 | 179.2357 |
| 130 | -0.1255 | 0.0012 | 0.1255 | 179.4569 |
| 131 | -0.1608 | 0.0013 | 0.1608 | 179.5235 |
| 132 | -0.1868 | 0.0015 | 0.1868 | 179.5374 |
| 133 | -0.2035 | 0.0017 | 0.2036 | 179.5253 |
| 134 | -0.2112 | 0.0019 | 0.2112 | 179.4966 |
| 135 | -0.2099 | 0.002 | 0.2099 | 179.4553 |
| 136 | -0.1997 | 0.0021 | 0.1997 | 179.4029 |
| 137 | -0.1807 | 0.0021 | 0.1807 | 179.3399 |
| 138 | -0.1529 | 0.002 | 0.1529 | 179.2657 |
| 139 | -0.116 | 0.0017 | 0.116 | 179.1793 |
| 140 | -0.069 | 0.0011 | 0.069 | 179.0773 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.30

Moment Method Night Pattern Parameter Sheet

WPON - Walled Lake, MI

Modeling Software: Au Contraire - Version 1.030

Station: WPON - Walled Lake, MI

Freq (kHz) 1460

Night Pattern

| Twr | Field Parameters | | Mininec Model | |
|--------|------------------|---------|---------------|-----------|
| | Ratio | Phase | Ratio | Phase |
| 1 (NW) | Detuned | | | |
| 2 (NC) | 0.640 | -123.0° | 0.434 ✓ | -113.9° ✓ |
| 3 (NE) | Detuned | | | |
| 4 (E) | Detuned | | | |
| 5 (SW) | Detuned | | | |
| 6 (SE) | 0.590 | 159.0° | 0.609 ✓ | 156.9° ✓ |
| 7 (EC) | 1.000 | 0.0° | 1.000 ✓ | 0.0° ✓ |

Mininec Model Data

| Twr | Drive Point | | Current | | Shunt X | ATU Output | |
|--------|-------------|-----------|---------|---------|------------|------------|-----------|
| | R | X | Mag | Phase | | Mag | Phase |
| 1 (NW) | Detuned | | | | | | |
| 2 (NC) | 135.807 ✓ | 330.759 ✓ | 1.7284 | -112.1° | -2180 | 1.4701 | -107.854° |
| 3 (NE) | Detuned | | | | | | |
| 4 (E) | Detuned | | | | | | |
| 5 (SW) | Detuned | | | | | | |
| 6 (SE) | 29.126 ✓ | 153.724 ✓ | 2.2171 | 162.2° | -2180 | 2.0610 | 163.003° |
| 7 (EC) | 45.390 ✓ | 168.412 ✓ | 3.6693 | 4.8° | -2180 | 3.3867 | 6.085° |

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Exhibit 1.30

Moment Method Night Pattern Parameter Sheet

WPON - Walled Lake, MI

Formulas for Calculating ATU Output Current with Shunt Reactance

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

$Z_{BASE} = R_B + jX_B$

X_S = Shunt Reactance

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

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

Exhibit 1.31 – Night Pattern Details

 ACSModel
 (MININEC 3.1 Core)
 08-08-2019 11:36:10

WPON - Night Pattern Details

Frequency = 1.460 MHz Wavelength = 205.34246 Meters

No. of Wires: 7

| Wire No. | Coordinates | | Radius | End Connection | No. of Segments |
|------------|-------------|----------|--------|----------------|-----------------|
| X | Y | Z | | | |
| 0 | 0 | 0 | | -1 | |
| 0 | 0 | 62.85761 | 0.291 | 0 | 20 |
| Wire No. 2 | Coordinates | | | End Connection | No. of Segments |
| X | Y | Z | Radius | | |
| 29.21459 | 57.48561 | 0 | | -2 | |
| 29.21459 | 57.48561 | 64.62584 | 0.291 | 0 | 20 |
| Wire No. 3 | Coordinates | | | End Connection | No. of Segments |
| X | Y | Z | Radius | | |
| 65.51537 | 111.1786 | 0 | | -3 | |
| 65.51537 | 111.1786 | 64.2836 | 0.291 | 0 | 20 |
| Wire No. 4 | Coordinates | | | End Connection | No. of Segments |
| X | Y | Z | Radius | | |
| -1.572283 | 100.0864 | 0 | | -4 | |
| -1.572283 | 100.0864 | 63.37096 | 0.291 | 0 | 20 |
| Wire No. 5 | Coordinates | | | End Connection | No. of Segments |
| X | Y | Z | Radius | | |
| -105.1341 | 14.06524 | 0 | | -5 | |
| -105.1341 | 14.06524 | 62.11609 | 0.291 | 0 | 20 |
| Wire No. 6 | Coordinates | | | End Connection | No. of Segments |
| X | Y | Z | Radius | | |
| -76.04971 | 71.66562 | 0 | | -6 | |
| -76.04971 | 71.66562 | 63.42801 | 0.291 | 0 | 20 |
| Wire No. 7 | Coordinates | | | End Connection | No. of Segments |
| X | Y | Z | Radius | | |
| -23.59468 | 64.58026 | 0 | | -7 | |
| -23.59468 | 64.58026 | 63.02873 | 0.291 | 0 | 20 |

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Exhibit 1.31 – Night Pattern Details

**** ANTENNA GEOMETRY ****

| Wire No. | 1 | Coordinates | | | Connection | | Pulse |
|----------|---|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 0 | 0 | 0 | 0.291 | -1 | 1 | 1 | |
| 0 | 0 | 3.14288 | 0.291 | 1 | 1 | 2 | |
| 0 | 0 | 6.285761 | 0.291 | 1 | 1 | 3 | |
| 0 | 0 | 9.428641 | 0.291 | 1 | 1 | 4 | |
| 0 | 0 | 12.57152 | 0.291 | 1 | 1 | 5 | |
| 0 | 0 | 15.7144 | 0.291 | 1 | 1 | 6 | |
| 0 | 0 | 18.85728 | 0.291 | 1 | 1 | 7 | |
| 0 | 0 | 22.00016 | 0.291 | 1 | 1 | 8 | |
| 0 | 0 | 25.14304 | 0.291 | 1 | 1 | 9 | |
| 0 | 0 | 28.28592 | 0.291 | 1 | 1 | 10 | |
| 0 | 0 | 31.42881 | 0.291 | 1 | 1 | 11 | |
| 0 | 0 | 34.57169 | 0.291 | 1 | 1 | 12 | |
| 0 | 0 | 37.71457 | 0.291 | 1 | 1 | 13 | |
| 0 | 0 | 40.85744 | 0.291 | 1 | 1 | 14 | |
| 0 | 0 | 44.00033 | 0.291 | 1 | 1 | 15 | |
| 0 | 0 | 47.14321 | 0.291 | 1 | 1 | 16 | |
| 0 | 0 | 50.28609 | 0.291 | 1 | 1 | 17 | |
| 0 | 0 | 53.42897 | 0.291 | 1 | 1 | 18 | |
| 0 | 0 | 56.57185 | 0.291 | 1 | 1 | 19 | |
| 0 | 0 | 59.71473 | 0.291 | 1 | 0 | 20 | |

| Wire No. | 2 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 29.21459 | 57.48561 | 0 | 0.291 | -2 | 2 | 21 | |
| 29.21459 | 57.48561 | 3.231292 | 0.291 | 2 | 2 | 22 | |
| 29.21459 | 57.48561 | 6.462584 | 0.291 | 2 | 2 | 23 | |
| 29.21459 | 57.48561 | 9.693876 | 0.291 | 2 | 2 | 24 | |
| 29.21459 | 57.48561 | 12.92517 | 0.291 | 2 | 2 | 25 | |
| 29.21459 | 57.48561 | 16.15646 | 0.291 | 2 | 2 | 26 | |
| 29.21459 | 57.48561 | 19.38775 | 0.291 | 2 | 2 | 27 | |
| 29.21459 | 57.48561 | 22.61904 | 0.291 | 2 | 2 | 28 | |
| 29.21459 | 57.48561 | 25.85034 | 0.291 | 2 | 2 | 29 | |
| 29.21459 | 57.48561 | 29.08163 | 0.291 | 2 | 2 | 30 | |
| 29.21459 | 57.48561 | 32.31292 | 0.291 | 2 | 2 | 31 | |
| 29.21459 | 57.48561 | 35.54421 | 0.291 | 2 | 2 | 32 | |
| 29.21459 | 57.48561 | 38.77551 | 0.291 | 2 | 2 | 33 | |
| 29.21459 | 57.48561 | 42.0068 | 0.291 | 2 | 2 | 34 | |
| 29.21459 | 57.48561 | 45.23809 | 0.291 | 2 | 2 | 35 | |
| 29.21459 | 57.48561 | 48.46938 | 0.291 | 2 | 2 | 36 | |
| 29.21459 | 57.48561 | 51.70067 | 0.291 | 2 | 2 | 37 | |
| 29.21459 | 57.48561 | 54.93196 | 0.291 | 2 | 2 | 38 | |
| 29.21459 | 57.48561 | 58.16326 | 0.291 | 2 | 2 | 39 | |
| 29.21459 | 57.48561 | 61.39455 | 0.291 | 2 | 0 | 40 | |

| Wire No. | 3 | Coordinates | | | Connection | | Pulse |
|----------|----------|-------------|--------|------|------------|-----|-------|
| X | Y | Z | Radius | End1 | End2 | No. | |
| 65.51537 | 111.1786 | 0 | 0.291 | -3 | 3 | 41 | |
| 65.51537 | 111.1786 | 3.21418 | 0.291 | 3 | 3 | 42 | |
| 65.51537 | 111.1786 | 6.42836 | 0.291 | 3 | 3 | 43 | |
| 65.51537 | 111.1786 | 9.64254 | 0.291 | 3 | 3 | 44 | |
| 65.51537 | 111.1786 | 12.85672 | 0.291 | 3 | 3 | 45 | |
| 65.51537 | 111.1786 | 16.0709 | 0.291 | 3 | 3 | 46 | |

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| | | | | | | |
|------------|-------------|----------|--------|------------|------|-------|
| 65.51537 | 111.1786 | 19.28508 | 0.291 | 3 | 3 | 47 |
| 65.51537 | 111.1786 | 22.49926 | 0.291 | 3 | 3 | 48 |
| 65.51537 | 111.1786 | 25.71344 | 0.291 | 3 | 3 | 49 |
| 65.51537 | 111.1786 | 28.92762 | 0.291 | 3 | 3 | 50 |
| 65.51537 | 111.1786 | 32.1418 | 0.291 | 3 | 3 | 51 |
| 65.51537 | 111.1786 | 35.35598 | 0.291 | 3 | 3 | 52 |
| 65.51537 | 111.1786 | 38.57016 | 0.291 | 3 | 3 | 53 |
| 65.51537 | 111.1786 | 41.78434 | 0.291 | 3 | 3 | 54 |
| 65.51537 | 111.1786 | 44.99852 | 0.291 | 3 | 3 | 55 |
| 65.51537 | 111.1786 | 48.2127 | 0.291 | 3 | 3 | 56 |
| 65.51537 | 111.1786 | 51.42688 | 0.291 | 3 | 3 | 57 |
| 65.51537 | 111.1786 | 54.64106 | 0.291 | 3 | 3 | 58 |
| 65.51537 | 111.1786 | 57.85524 | 0.291 | 3 | 3 | 59 |
| 65.51537 | 111.1786 | 61.06942 | 0.291 | 3 | 0 | 60 |
| | | | | | | |
| Wire No. 4 | Coordinates | | | Connection | | Pulse |
| X | Y | Z | Radius | End1 | End2 | No. |
| -1.572283 | 100.0864 | 0 | 0.291 | -4 | 4 | 61 |
| -1.572283 | 100.0864 | 3.168548 | 0.291 | 4 | 4 | 62 |
| -1.572283 | 100.0864 | 6.337096 | 0.291 | 4 | 4 | 63 |
| -1.572283 | 100.0864 | 9.505644 | 0.291 | 4 | 4 | 64 |
| -1.572283 | 100.0864 | 12.67419 | 0.291 | 4 | 4 | 65 |
| -1.572283 | 100.0864 | 15.84274 | 0.291 | 4 | 4 | 66 |
| -1.572283 | 100.0864 | 19.01129 | 0.291 | 4 | 4 | 67 |
| -1.572283 | 100.0864 | 22.17984 | 0.291 | 4 | 4 | 68 |
| -1.572283 | 100.0864 | 25.34838 | 0.291 | 4 | 4 | 69 |
| -1.572283 | 100.0864 | 28.51693 | 0.291 | 4 | 4 | 70 |
| -1.572283 | 100.0864 | 31.68548 | 0.291 | 4 | 4 | 71 |
| -1.572283 | 100.0864 | 34.85403 | 0.291 | 4 | 4 | 72 |
| -1.572283 | 100.0864 | 38.02258 | 0.291 | 4 | 4 | 73 |
| -1.572283 | 100.0864 | 41.19112 | 0.291 | 4 | 4 | 74 |
| -1.572283 | 100.0864 | 44.35967 | 0.291 | 4 | 4 | 75 |
| -1.572283 | 100.0864 | 47.52822 | 0.291 | 4 | 4 | 76 |
| -1.572283 | 100.0864 | 50.69677 | 0.291 | 4 | 4 | 77 |
| -1.572283 | 100.0864 | 53.86532 | 0.291 | 4 | 4 | 78 |
| -1.572283 | 100.0864 | 57.03387 | 0.291 | 4 | 4 | 79 |
| -1.572283 | 100.0864 | 60.20242 | 0.291 | 4 | 0 | 80 |
| | | | | | | |
| Wire No. 5 | Coordinates | | | Connection | | Pulse |
| X | Y | Z | Radius | End1 | End2 | No. |
| -105.1341 | 14.06524 | 0 | 0.291 | -5 | 5 | 81 |
| -105.1341 | 14.06524 | 3.105805 | 0.291 | 5 | 5 | 82 |
| -105.1341 | 14.06524 | 6.211609 | 0.291 | 5 | 5 | 83 |
| -105.1341 | 14.06524 | 9.317414 | 0.291 | 5 | 5 | 84 |
| -105.1341 | 14.06524 | 12.42322 | 0.291 | 5 | 5 | 85 |
| -105.1341 | 14.06524 | 15.52902 | 0.291 | 5 | 5 | 86 |
| -105.1341 | 14.06524 | 18.63483 | 0.291 | 5 | 5 | 87 |
| -105.1341 | 14.06524 | 21.74063 | 0.291 | 5 | 5 | 88 |
| -105.1341 | 14.06524 | 24.84644 | 0.291 | 5 | 5 | 89 |
| -105.1341 | 14.06524 | 27.95224 | 0.291 | 5 | 5 | 90 |
| -105.1341 | 14.06524 | 31.05805 | 0.291 | 5 | 5 | 91 |
| -105.1341 | 14.06524 | 34.16385 | 0.291 | 5 | 5 | 92 |
| -105.1341 | 14.06524 | 37.26966 | 0.291 | 5 | 5 | 93 |
| -105.1341 | 14.06524 | 40.37546 | 0.291 | 5 | 5 | 94 |
| -105.1341 | 14.06524 | 43.48127 | 0.291 | 5 | 5 | 95 |
| -105.1341 | 14.06524 | 46.58707 | 0.291 | 5 | 5 | 96 |

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| | | | | | | |
|-----------|----------|----------|-------|---|---|-----|
| -105.1341 | 14.06524 | 49.69287 | 0.291 | 5 | 5 | 97 |
| -105.1341 | 14.06524 | 52.79868 | 0.291 | 5 | 5 | 98 |
| -105.1341 | 14.06524 | 55.90449 | 0.291 | 5 | 5 | 99 |
| -105.1341 | 14.06524 | 59.01029 | 0.291 | 5 | 0 | 100 |

| Wire No. 6 | | Coordinates | | Radius | Connection | | Pulse |
|------------|----------|-------------|-------|--------|------------|-----|-------|
| X | Y | Z | End1 | | End2 | No. | |
| -76.04971 | 71.66562 | 0 | 0.291 | -6 | 6 | 101 | |
| -76.04971 | 71.66562 | 3.1714 | 0.291 | 6 | 6 | 102 | |
| -76.04971 | 71.66562 | 6.342801 | 0.291 | 6 | 6 | 103 | |
| -76.04971 | 71.66562 | 9.5142 | 0.291 | 6 | 6 | 104 | |
| -76.04971 | 71.66562 | 12.6856 | 0.291 | 6 | 6 | 105 | |
| -76.04971 | 71.66562 | 15.857 | 0.291 | 6 | 6 | 106 | |
| -76.04971 | 71.66562 | 19.0284 | 0.291 | 6 | 6 | 107 | |
| -76.04971 | 71.66562 | 22.1998 | 0.291 | 6 | 6 | 108 | |
| -76.04971 | 71.66562 | 25.3712 | 0.291 | 6 | 6 | 109 | |
| -76.04971 | 71.66562 | 28.5426 | 0.291 | 6 | 6 | 110 | |
| -76.04971 | 71.66562 | 31.714 | 0.291 | 6 | 6 | 111 | |
| -76.04971 | 71.66562 | 34.8854 | 0.291 | 6 | 6 | 112 | |
| -76.04971 | 71.66562 | 38.0568 | 0.291 | 6 | 6 | 113 | |
| -76.04971 | 71.66562 | 41.2282 | 0.291 | 6 | 6 | 114 | |
| -76.04971 | 71.66562 | 44.3996 | 0.291 | 6 | 6 | 115 | |
| -76.04971 | 71.66562 | 47.57101 | 0.291 | 6 | 6 | 116 | |
| -76.04971 | 71.66562 | 50.7424 | 0.291 | 6 | 6 | 117 | |
| -76.04971 | 71.66562 | 53.91381 | 0.291 | 6 | 6 | 118 | |
| -76.04971 | 71.66562 | 57.08521 | 0.291 | 6 | 6 | 119 | |
| -76.04971 | 71.66562 | 60.2566 | 0.291 | 6 | 0 | 120 | |

| Wire No. 7 | | Coordinates | | Radius | Connection | | Pulse |
|------------|----------|-------------|-------|--------|------------|-----|-------|
| X | Y | Z | End1 | | End2 | No. | |
| -23.59468 | 64.58026 | 0 | 0.291 | -7 | 7 | 121 | |
| -23.59468 | 64.58026 | 3.151436 | 0.291 | 7 | 7 | 122 | |
| -23.59468 | 64.58026 | 6.302873 | 0.291 | 7 | 7 | 123 | |
| -23.59468 | 64.58026 | 9.454309 | 0.291 | 7 | 7 | 124 | |
| -23.59468 | 64.58026 | 12.60575 | 0.291 | 7 | 7 | 125 | |
| -23.59468 | 64.58026 | 15.75718 | 0.291 | 7 | 7 | 126 | |
| -23.59468 | 64.58026 | 18.90862 | 0.291 | 7 | 7 | 127 | |
| -23.59468 | 64.58026 | 22.06005 | 0.291 | 7 | 7 | 128 | |
| -23.59468 | 64.58026 | 25.21149 | 0.291 | 7 | 7 | 129 | |
| -23.59468 | 64.58026 | 28.36293 | 0.291 | 7 | 7 | 130 | |
| -23.59468 | 64.58026 | 31.51436 | 0.291 | 7 | 7 | 131 | |
| -23.59468 | 64.58026 | 34.6658 | 0.291 | 7 | 7 | 132 | |
| -23.59468 | 64.58026 | 37.81724 | 0.291 | 7 | 7 | 133 | |
| -23.59468 | 64.58026 | 40.96867 | 0.291 | 7 | 7 | 134 | |
| -23.59468 | 64.58026 | 44.12011 | 0.291 | 7 | 7 | 135 | |
| -23.59468 | 64.58026 | 47.27155 | 0.291 | 7 | 7 | 136 | |
| -23.59468 | 64.58026 | 50.42298 | 0.291 | 7 | 7 | 137 | |
| -23.59468 | 64.58026 | 53.57442 | 0.291 | 7 | 7 | 138 | |
| -23.59468 | 64.58026 | 56.72585 | 0.291 | 7 | 7 | 139 | |
| -23.59468 | 64.58026 | 59.8773 | 0.291 | 7 | 0 | 140 | |

Exhibit 1.31 – Night Pattern Details

Sources: 3

Pulse No., Voltage Magnitude, Phase (Degrees): 21, 618.0, -44.4
 Pulse No., Voltage Magnitude, Phase (Degrees): 101, 346.9, -118.5
 Pulse No., Voltage Magnitude, Phase (Degrees): 121, 640.0, 79.7

Number of Loads: 4

Pulse No., Resistance, Reactance: 1 , 0 , 381.1
 Pulse No., Resistance, Reactance: 41 , 0 , 370
 Pulse No., Resistance, Reactance: 61 , 0 , 377.5
 Pulse No., Resistance, Reactance: 81 , 0 , 383.7

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

Pulse 21 Voltage = (441.7124, -432.2389j)
 Current = (-0.6491, -1.602j)
 Impedance = (135.807, 330.759j)
 Power = 202.86 Watts

Pulse 101 Voltage = (-165.7804, -304.706j)
 Current = (-2.1107, 0.6785j)
 Impedance = (29.126, 153.724j)
 Power = 71.58 Watts

Pulse 121 Voltage = (114.3427, 629.7011j)
 Current = (3.6564, 0.3065j)
 Impedance = (45.39, 168.412j)
 Power = 305.55 Watts

Total Power = 580.000 Watts

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Exhibit 1.31 – Night Pattern Details

CURRENT DATA

Wire No. 1 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 1 | 0.252 | 0.0757 | 0.2631 | 16.729 |
| 2 | 0.1807 | 0.0543 | 0.1887 | 16.7311 |
| 3 | 0.1372 | 0.0413 | 0.1432 | 16.7398 |
| 4 | 0.1001 | 0.0301 | 0.1045 | 16.761 |
| 5 | 0.0676 | 0.0204 | 0.0706 | 16.8086 |
| 6 | 0.0389 | 0.0118 | 0.0407 | 16.9299 |
| 7 | 0.0136 | 0.0043 | 0.0143 | 17.4825 |
| 8 | -0.0084 | -0.0023 | 0.0087 | -164.7881 |
| 9 | -0.0272 | -0.0079 | 0.0283 | -163.8074 |
| 10 | -0.0427 | -0.0125 | 0.0445 | -163.6439 |
| 11 | -0.0551 | -0.0162 | 0.0575 | -163.5734 |
| 12 | -0.0643 | -0.019 | 0.0671 | -163.531 |
| 13 | -0.0703 | -0.0208 | 0.0733 | -163.5003 |
| 14 | -0.0732 | -0.0217 | 0.0763 | -163.4755 |
| 15 | -0.0729 | -0.0217 | 0.0761 | -163.4545 |
| 16 | -0.0695 | -0.0207 | 0.0725 | -163.4366 |
| 17 | -0.063 | -0.0188 | 0.0658 | -163.4221 |
| 18 | -0.0535 | -0.0159 | 0.0558 | -163.4115 |
| 19 | -0.0406 | -0.0121 | 0.0424 | -163.4058 |
| 20 | -0.0242 | -0.0072 | 0.0253 | -163.4065 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 2 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|-------------|------------------|------------------|-----------------|
| 21 | -0.6491 | -1.602 | 1.7284 | -112.0563 |
| 22 | -0.9692 | -1.9262 | 2.1563 | -116.7112 |
| 23 | -1.153 | -2.105 | 2.4001 | -118.7111 |
| 24 | -1.2963 | -2.2367 | 2.5852 | -120.095 |
| 25 | -1.408 | -2.3303 | 2.7227 | -121.1405 |
| 26 | -1.492 | -2.3901 | 2.8175 | -121.9734 |
| 27 | -1.55 | -2.418 | 2.8722 | -122.6604 |
| 28 | -1.5831 | -2.4155 | 2.8881 | -123.2412 |
| 29 | -1.5921 | -2.3835 | 2.8664 | -123.7419 |
| 30 | -1.5776 | -2.3231 | 2.8081 | -124.1801 |
| 31 | -1.5401 | -2.2351 | 2.7144 | -124.5686 |
| 32 | -1.4804 | -2.1208 | 2.5864 | -124.9168 |
| 33 | -1.3992 | -1.9812 | 2.4255 | -125.2319 |
| 34 | -1.2974 | -1.8176 | 2.2331 | -125.5196 |
| 35 | -1.1758 | -1.6312 | 2.0107 | -125.7845 |
| 36 | -1.0351 | -1.4232 | 1.7598 | -126.0304 |
| 37 | -0.8762 | -1.1946 | 1.4815 | -126.2605 |
| 38 | -0.6993 | -0.9458 | 1.1762 | -126.4779 |
| 39 | -0.5034 | -0.6758 | 0.8427 | -126.6855 |
| 40 | -0.2853 | -0.3801 | 0.4752 | -126.8891 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.31 – Night Pattern Details

Wire No. 3 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 41 | 0.406 | -0.2678 | 0.4864 | -33.4064 |
| 42 | 0.2931 | -0.1932 | 0.3511 | -33.3949 |
| 43 | 0.2237 | -0.1472 | 0.2677 | -33.3469 |
| 44 | 0.1644 | -0.1077 | 0.1965 | -33.2273 |
| 45 | 0.1122 | -0.0728 | 0.1338 | -32.9509 |
| 46 | 0.066 | -0.0416 | 0.0781 | -32.2271 |
| 47 | 0.0252 | -0.014 | 0.0289 | -28.995 |
| 48 | -0.0104 | 0.0103 | 0.0146 | 135.2356 |
| 49 | -0.0408 | 0.0312 | 0.0514 | 142.6408 |
| 50 | -0.0662 | 0.0487 | 0.0822 | 143.671 |
| 51 | -0.0864 | 0.0627 | 0.1068 | 144.0254 |
| 52 | -0.1016 | 0.0733 | 0.1253 | 144.1692 |
| 53 | -0.1115 | 0.0804 | 0.1375 | 144.2197 |
| 54 | -0.1164 | 0.0839 | 0.1435 | 144.22 |
| 55 | -0.1162 | 0.0839 | 0.1433 | 144.1894 |
| 56 | -0.111 | 0.0802 | 0.137 | 144.1374 |
| 57 | -0.1008 | 0.073 | 0.1244 | 144.0692 |
| 58 | -0.0855 | 0.0621 | 0.1057 | 143.9873 |
| 59 | -0.065 | 0.0474 | 0.0804 | 143.8925 |
| 60 | -0.0387 | 0.0283 | 0.048 | 143.7828 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 4 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 61 | 0.0592 | 0.2666 | 0.2731 | 77.4782 |
| 62 | 0.0426 | 0.1915 | 0.1962 | 77.4714 |
| 63 | 0.0324 | 0.1456 | 0.1492 | 77.4411 |
| 64 | 0.0239 | 0.1065 | 0.1091 | 77.3555 |
| 65 | 0.0165 | 0.0721 | 0.074 | 77.1276 |
| 66 | 0.0101 | 0.0417 | 0.0429 | 76.4443 |
| 67 | 0.0045 | 0.0149 | 0.0155 | 72.9898 |
| 68 | -0.0001 | -0.0086 | 0.0086 | -90.5022 |
| 69 | -0.0038 | -0.0287 | 0.0289 | -97.5815 |
| 70 | -0.0067 | -0.0455 | 0.0459 | -98.3876 |
| 71 | -0.0088 | -0.0589 | 0.0595 | -98.4585 |
| 72 | -0.01 | -0.069 | 0.0697 | -98.2737 |
| 73 | -0.0106 | -0.0757 | 0.0765 | -97.9585 |
| 74 | -0.0105 | -0.0791 | 0.0798 | -97.563 |
| 75 | -0.0099 | -0.0792 | 0.0798 | -97.1137 |
| 76 | -0.0088 | -0.0758 | 0.0763 | -96.6283 |
| 77 | -0.0074 | -0.069 | 0.0694 | -96.1205 |
| 78 | -0.0058 | -0.0588 | 0.059 | -95.6021 |
| 79 | -0.004 | -0.0449 | 0.045 | -95.083 |
| 80 | -0.0021 | -0.0269 | 0.0269 | -94.5653 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

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Exhibit 1.31 – Night Pattern Details

Wire No. 5 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 81 | -0.054 | -0.062 | 0.0822 | -131.0492 |
| 82 | -0.0387 | -0.0444 | 0.0589 | -131.0481 |
| 83 | -0.0294 | -0.0337 | 0.0447 | -131.0436 |
| 84 | -0.0215 | -0.0246 | 0.0327 | -131.0336 |
| 85 | -0.0145 | -0.0167 | 0.0221 | -131.0144 |
| 86 | -0.0084 | -0.0096 | 0.0127 | -130.9745 |
| 87 | -0.0029 | -0.0034 | 0.0045 | -130.8337 |
| 88 | 0.0018 | 0.002 | 0.0027 | 48.6725 |
| 89 | 0.0058 | 0.0066 | 0.0088 | 48.9245 |
| 90 | 0.0091 | 0.0105 | 0.0139 | 48.9935 |
| 91 | 0.0118 | 0.0136 | 0.018 | 49.046 |
| 92 | 0.0137 | 0.0158 | 0.021 | 49.0962 |
| 93 | 0.015 | 0.0174 | 0.0229 | 49.1471 |
| 94 | 0.0156 | 0.0181 | 0.0239 | 49.1988 |
| 95 | 0.0155 | 0.018 | 0.0238 | 49.2505 |
| 96 | 0.0148 | 0.0172 | 0.0227 | 49.3008 |
| 97 | 0.0134 | 0.0156 | 0.0206 | 49.3479 |
| 98 | 0.0114 | 0.0132 | 0.0174 | 49.3896 |
| 99 | 0.0086 | 0.0101 | 0.0133 | 49.4236 |
| 100 | 0.0051 | 0.006 | 0.0079 | 49.447 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

Wire No. 6 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|-----------|----------------|---------------------|---------------------|--------------------|
| 101 | -2.1107 | 0.6785 | 2.2171 | 162.1794 |
| 102 | -2.329 | 0.7988 | 2.4621 | 161.0696 |
| 103 | -2.441 | 0.8642 | 2.5895 | 160.5036 |
| 104 | -2.5147 | 0.9118 | 2.6749 | 160.0703 |
| 105 | -2.5563 | 0.9448 | 2.7253 | 159.7164 |
| 106 | -2.5688 | 0.9648 | 2.744 | 159.4153 |
| 107 | -2.554 | 0.9726 | 2.7329 | 159.1526 |
| 108 | -2.5129 | 0.9687 | 2.6932 | 158.9188 |
| 109 | -2.4467 | 0.9535 | 2.6259 | 158.7077 |
| 110 | -2.3562 | 0.9274 | 2.5321 | 158.5145 |
| 111 | -2.2425 | 0.8908 | 2.413 | 158.3359 |
| 112 | -2.1069 | 0.844 | 2.2696 | 158.1692 |
| 113 | -1.9504 | 0.7875 | 2.1033 | 158.0123 |
| 114 | -1.7743 | 0.7218 | 1.9154 | 157.8635 |
| 115 | -1.5798 | 0.6472 | 1.7073 | 157.7215 |
| 116 | -1.3683 | 0.5644 | 1.4801 | 157.5852 |
| 117 | -1.1406 | 0.4736 | 1.235 | 157.4534 |
| 118 | -0.8973 | 0.3749 | 0.9724 | 157.3254 |
| 119 | -0.6373 | 0.2679 | 0.6913 | 157.1999 |
| 120 | -0.3565 | 0.1508 | 0.3871 | 157.0744 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

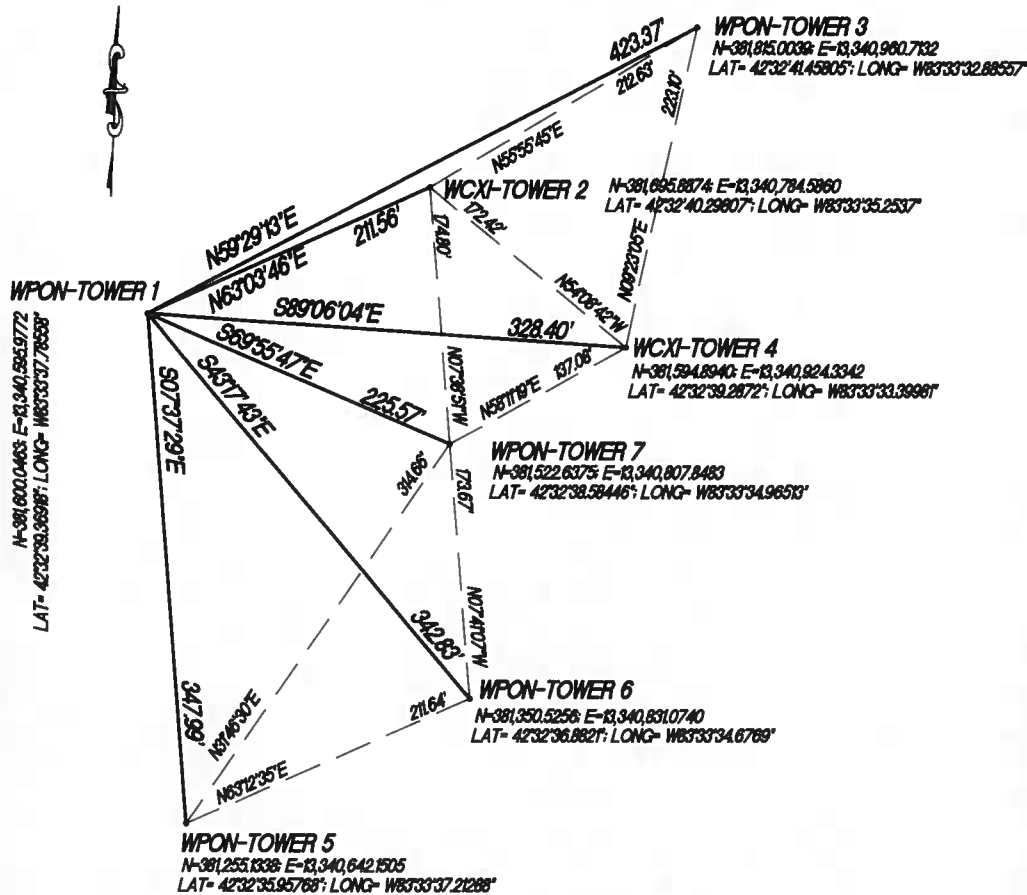
MUNN-REESEBroadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.31 – Night Pattern Details

Wire No. 7 :

| Pulse No. | Real (Amps) | Imaginary (Amps) | Magnitude (Amps) | Phase (Degrees) |
|--------------|----------------|---------------------|---------------------|--------------------|
| 121 | 3.6564 | 0.3065 | 3.6693 | 4.792 |
| 122 | 4.1083 | 0.2215 | 4.1142 | 3.0859 |
| 123 | 4.3456 | 0.1694 | 4.3489 | 2.2327 |
| 124 | 4.5084 | 0.125 | 4.5101 | 1.5883 |
| 125 | 4.6096 | 0.086 | 4.6104 | 1.0684 |
| 126 | 4.6554 | 0.0513 | 4.6557 | 0.6317 |
| 127 | 4.649 | 0.0207 | 4.649 | 0.2551 |
| 128 | 4.5925 | -0.0061 | 4.5925 | -0.076 |
| 129 | 4.4878 | -0.0291 | 4.4879 | -0.3717 |
| 130 | 4.3367 | -0.0484 | 4.337 | -0.6392 |
| 131 | 4.1409 | -0.0639 | 4.1414 | -0.8838 |
| 132 | 3.9024 | -0.0756 | 3.9031 | -1.1098 |
| 133 | 3.6233 | -0.0835 | 3.6242 | -1.3204 |
| 134 | 3.3057 | -0.0876 | 3.3069 | -1.5184 |
| 135 | 2.9518 | -0.0879 | 2.9532 | -1.7058 |
| 136 | 2.5638 | -0.0844 | 2.5652 | -1.8847 |
| 137 | 2.1432 | -0.077 | 2.1446 | -2.0565 |
| 138 | 1.6906 | -0.0656 | 1.6919 | -2.2228 |
| 139 | 1.2041 | -0.0502 | 1.2052 | -2.3852 |
| 140 | 0.6757 | -0.0301 | 0.6764 | -2.5476 |
| E | 0.0 | 0.0 | 0.0 | 0.0 |

"MILFORD TOWERS" (AS-BUILT)



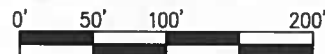
Surveyor's Certification:

I hereby certify that I have surveyed "THE MILFORD TOWERS", as shown herein and that all bearings are related to TRUE NORTH and that all coordinates are in the Michigan State Plain Coordinate System as of 1983 and that the Latitudes and Longitudes are expressed in "WGS84".

Exhibit 2.10
Post Construction Site Survey



Mende Bezanovski, P.S. 49430



Note:

All bearings as shown herein are in relation to: "TRUE NORTH"



36636 North Pointe Dr. New Baltimore, MI, 48047
TEL: (586) 822-4964, FAX: (586) 591-5930
info@ab-sb-landsurvey.com;
www.ab-sb-landsurvey.com

SCALE: 1" = 100'

JOB NUMBER: 2009-04-16-118

FIELD: MB

REVISIONS:

CLIENT: BIRACH BROADCASTING

ADDRESS:
2911 E Maple Road
Milford, MI, 48381

PAGE: 2 OF 2

DRAWN: MB

CHECKED: MB

DATE: 06-30-2019

TEL: (248)-557-3500
FAX: (248)-557-4015

Exhibit 2.11 - Post Construction Verification of Array Geometry

Station: WPON - Walled Lake, MI

Freq: 1460

| Tower | Authorized Geometry | | | | Verified Geometry* | | | | Distance from | | |
|--------|---------------------|-----------------|----------------|------------------|--------------------|--------------------|----------------|------------------|-----------------------------|----------------------------|--------------------------------|
| | Spacing (Elec°) | Spacing (ft) | Spacing (m) | Azimuth (° T) | Spacing (ft) | Spacing (Elec°) | Spacing (m) | Azimuth (° T) | Authorized Location (ft) | Authorized Location (m) | Authorized Location (Elec°) |
| 1 - NW | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref |
| 2 - NC | 113.20° | 211.83 | 64.6 | 63.50° | 211.56 | 113.05° | 64.5 | 63.06° | 1.65 | 0.5 | 0.9° |
| 5 - SW | 186.00° | 348.07 | 106.1 | 173.00° | 347.99 | 185.96° | 106.1 | 172.38° | 3.77 | 1.1 | 2.0° |
| 6 - SE | 185.63° | 347.38 | 105.9 | 137.25° | 342.83 | 183.20° | 104.5 | 136.70° | 5.63 | 1.7 | 3.0° |
| 7 - EC | 120.15° | 224.84 | 68.5 | 110.36° | 225.57 | 120.54° | 68.8 | 110.07° | 1.35 | 0.4 | 0.7° |

* From "As Built" Survey by AB-SB Land Survey, P.C.

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Coldwater, MI 49036

Exhibit 3.10 - WPON - Walled Lake Sample System Verification

Carrier Freq (kHz) 1460

Sample Line

| Manufacturer | Model | Velocity Factor (0.xx) | Design Length (feet) | Full Wave Freq (kHz) |
|--------------|------------|---------------------------|-------------------------|-------------------------|
| RFS | LCF 12-50J | 0.88 | 400 | 2163.9 |

Theoretical Calculations

| | 90° | 270° | 450° | 630° |
|-----------------------------|--------|--------|--------|--------|
| Resonant Frequency (kHz) | 541.0 | 1622.9 | 2704.8 | 3786.7 |
| Distance from Carrier (kHz) | -919.0 | 162.9 | 1244.8 | 2326.7 |

Initial Measurements (Before Trimming Line Lengths)

| Sample Lines | Selected Resonance (Electrical °) | Measured Freq at Resonance (MHz) | Line Length at Carrier Freq (Electrical °) | Maximum Deviation | ave on |
|--------------|--------------------------------------|----------------------------------------|--------------------------------------------------|----------------------|--------|
| Twr 1 | 270° | 1.43245 | 275.2° | 0.72° | Orange |
| Twr 2 | 270° | 1.43134 | 275.4° | | Blue |
| Twr 5 | 270° | 1.4347 | 274.8° | | Brown |
| Twr 6 | 270° | 1.43095 | 275.5° | | Red |
| Twr 7 | 270° | 1.43105 | 275.5° | | Yellow |

Final Measurements (After Trimming Line Lengths)

Measurement Date: 7/23/2019

| Sample Lines | Selected Resonance (Electrical °) | Measured Freq at Resonance (MHz) | Line Length at Carrier Freq (Electrical °) | Maximum Deviation | ave on |
|--------------|--------------------------------------|----------------------------------------|--------------------------------------------------|----------------------|--------|
| Twr 1 | 270° | 1.43188 | 275.3° | 0.76° | Orange |
| Twr 2 | 270° | 1.43075 | 275.5° | | Blue |
| Twr 5 | 270° | 1.43432 | 274.8° | | Brown |
| Twr 6 | 270° | 1.43055 | 275.6° | | Red |
| Twr 7 | 270° | 1.43035 | 275.6° | | Yellow |

Sample Line Impedance Measurements

Measurement Date: 7/23/2019

| Sample Lines | +45° Frequency (MHz) | Measured Resistance | Measured Reactance | Line Impedance | Avg ±45° Impedance | Maximum Deviation | ave on |
|--------------|-------------------------|------------------------|-----------------------|----------------|-----------------------|----------------------|--------|
| Twr 1 | 1.67053 | 4.77 | 50.09 | 50.32 | 50.17 | 0.85 | |
| Twr 2 | 1.66921 | 4.78 | 50.31 | 50.54 | 50.47 | | |

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Coldwater, MI 49036

Exhibit 3.10 - WPON - Walled Lake Sample System Verification

| | | | | | |
|-------|---------|------|-------|-------|-------|
| Twr 5 | 1.67337 | 4.81 | 50.64 | 50.87 | 50.69 |
| Twr 6 | 1.66898 | 4.73 | 49.73 | 49.95 | 49.85 |
| Twr 7 | 1.66874 | 4.81 | 50.34 | 50.57 | 50.42 |

| Sample Lines | -45° Frequency (MHz) | Measured Resistance | Measured Reactance | Line Impedance |
|--------------|----------------------|---------------------|--------------------|----------------|
| Twr 1 | 1.19323 | 3.17 | -49.93 | 50.03 |
| Twr 2 | 1.19229 | 3.18 | -50.31 | 50.41 |
| Twr 5 | 1.19527 | 3.19 | -50.42 | 50.52 |
| Twr 6 | 1.19213 | 3.15 | -49.64 | 49.74 |
| Twr 7 | 1.19196 | 3.19 | -50.17 | 50.27 |

Sampling Devices

Measurement Date: 4/12/2019

| | Location | Manufacturer | Model | Serial Number | Magnitude | Phase |
|------|----------|--------------|-------|---------------|-----------|--------|
| WPON | Twr 1 | Delta | TCT-3 | 15116 | 1.000 | 0.000 |
| WPON | Twr 2 | Delta | TCT-3 | 15114 | 0.999 | 0.020 |
| WPON | Twr 5 | Delta | TCT-3 | 2476 | 1.002 | 0.020 |
| WPON | Twr 6 | Delta | TCT-3 | 15115 | 1.005 | -0.042 |
| WPON | Twr 7 | Delta | TCT-3 | 15119 | 1.000 | 0.059 |

Sample Line Measurements with Sampling Devices Attached

Measurement Date: 7/23/2019

| Sample Line | Frequency (MHz) | Measured Resistance | Measured Reactance | Impedance Magnitude | ave on |
|-------------|-----------------|---------------------|--------------------|---------------------|--------|
| Twr 1 | 1460 | 50.59 | -2.090 | 50.63 | Orange |
| Twr 2 | 1460 | 51.26 | -2.000 | 51.30 | Blue |
| Twr 5 | 1460 | 51.48 | -2.310 | 51.53 | Brown |
| Twr 6 | 1460 | 49.77 | -1.750 | 49.80 | Red |
| Twr 7 | 1460 | 50.02 | -1.98 | 50.06 | Yellow |

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Exhibit 4.10 - Day Field Strength Measurement Reference Points

| WPON - Walled Lake, MI | | | | | |
|-------------------------|---------------|-----------------|-----------------------|-----------------------|----------------------------------------------------------|
| Day Directional Pattern | | | | | |
| Radial: | 13.5° | | | | FIM-41 s/n 1149 - Calibrated 5/4/2016 |
| | | Distance | NAD83 | | |
| Point # | mV/m | km | North Latitude | West Longitude | Description |
| 1 | 7.0 | 4.46 | 42-34-59.4 | 83-32-49.4 | 4337 Ravinewood Dr. @ mailbox |
| 2 | 6.8 | 5.03 | 42-35-17.4 | 83-32-43.7 | Int. of Ravinewood Dr. & Ravinewood Ct. near street sign |
| 3 | 4.3 | 6.41 | 42-36-01.0 | 83-32-29.5 | 5498, 5499, 5506 Plantation Dr. @ mailboxes |
| | | | | | |
| Radial: | 87.0° | | | | FIM-41 s/n 1149 - Calibrated 5/4/2016 |
| | | Distance | NAD83 | | |
| Point # | mV/m | km | North Latitude | West Longitude | Description |
| 1 | 75.0 | 3.20 | 42-32-44.3 | 83-31-14.8 | 1410 Woodbridge Ln. |
| 2 | 51.5 | 4.46 | 42-32-46.4 | 83-30-19.6 | 1953 Twin Sun Cir.(Center of Rd.) |
| 3 | 29.2 | 6.10 | 42-32-48.9 | 83-29-07.5 | 1473 & 1485 Meadow Dr property line |
| | | | | | |
| Radial: | 204.5° | | | | FIM-41 s/n 1149 - Calibrated 5/4/2016 |
| | | Distance | NAD83 | | |
| Point # | mV/m | km | North Latitude | West Longitude | Description |
| 1 | 9.5 | 3.24 | 42-31-03.2 | 83-34-34.4 | 30657 Old Plank Rd. @ driveway |
| 2 | 2.11 | 8.21 | 42-28-36.8 | 83-36-05.1 | 55475 11 Mile Rd. |
| 3 | 1.53 | 10.1 | 42-27-41.3 | 83-36-39.5 | Ardmore Blvd., 200 Ft S. of 10 Mile Rd. |
| | | | | | |
| Radial: | 320.5° | | | | FIM-41 s/n 1149 - Calibrated 5/4/2016 |
| | | Distance | NAD83 | | |
| Point # | mV/m | km | North Latitude | West Longitude | Description |
| 1 | 6.5 | 3.18 | 42-33-58.2 | 83-35-04.5 | 1400 E. Dawson Rd. E. of driveway |
| 2 | 2.57 | 5.78 | 42-35-03.8 | 83-36-17.2 | 431 W. Washington St. |
| 3 | 1.97 | 6.11 | 42-35-11.6 | 83-36-26.5 | 529 John R. St. |
| | | | | | |

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Exhibit 4.11 - Night Field Strength Measurement Reference Points

| WPON - Walled Lake, MI | | | | | |
|---------------------------|--------|----------|----------------|----------------|---------------------------------------------------|
| Night Directional Pattern | | | | | |
| Radial: | 83.0° | | | | FIM-41 s/n 1149 - Calibrated 5/4/2016 |
| | | Distance | NAD83 | | |
| Point # | mV/m | km | North Latitude | West Longitude | Description |
| 1 | 3.7 | 7.62 | 42-33-08.6 | 83-28-02.9 | Dawn Ridge Rd. N. of Meadowridge Rd. 40 Ft. |
| 2 | 3.31 | 8.24 | 42-33-11.2 | 83-27-35.9 | 1831 Alton Cir. @ N. property line |
| 3 | 2.88 | 8.60 | 42-33-12.4 | 83-27-20.1 | 2040 Quail Run @ driveway |
| Radial: | 141.0° | | | | FIM-41 s/n 1149 - Calibrated 5/4/2016 |
| | | Distance | NAD83 | | |
| Point # | mV/m | km | North Latitude | West Longitude | Description |
| 1 | 3.65 | 6.07 | 42-30-06.1 | 83-30-48.1 | 46974 Liberty Dr. W. property line |
| 2 | 2.03 | 9.30 | 42-28-44.4 | 83-29-18.9 | 44649 Copland Ln. E. property line, across street |
| 3 | 1.47 | 10.30 | 42-28-19.4 | 83-28-51.0 | 24823 Thatcher Dr. @ driveway |
| Radial: | 204.0° | | | | FIM-41 s/n 1149 - Calibrated 5/4/2016 |
| | | Distance | NAD83 | | |
| Point # | mV/m | km | North Latitude | West Longitude | Description |
| 1 | 16.5 | 3.29 | 42-31-01.2 | 83-34-34.3 | 210 Feet S. of 30657 Old Plank Rd driveway |
| 2 | 3.05 | 8.18 | 42-28-37.0 | 83-36-01.3 | 55675 11 Mile Rd. W. of house |
| 3 | 2.05 | 10.30 | 42-27-35.0 | 83-36-38.8 | Rockway Ct. N. of pond. W. of Ardmore Blvd. |
| Radial: | 261.5° | | | | FIM-41 s/n 1149 - Calibrated 5/4/2016 |
| | | Distance | NAD83 | | |
| Point # | mV/m | km | North Latitude | West Longitude | Description |
| 1 | 6.4 | 3.38 | 42-32-22.5 | 83-36-02.3 | 253 Cumberland Trail NW of driveway |
| 2 | 0.45 | 12.00 | 42-31-40.8 | 83-42-16.6 | 5224 Kierstan Dr. |
| 3 | 0.43 | 12.70 | 42-31-37.4 | 83-42-46.2 | 5300 Pine Tree Trail @ driveway |

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Exhibit 4.11 - Night Field Strength Measurement Reference Points

[illegible]

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Coldwater, MI 49036

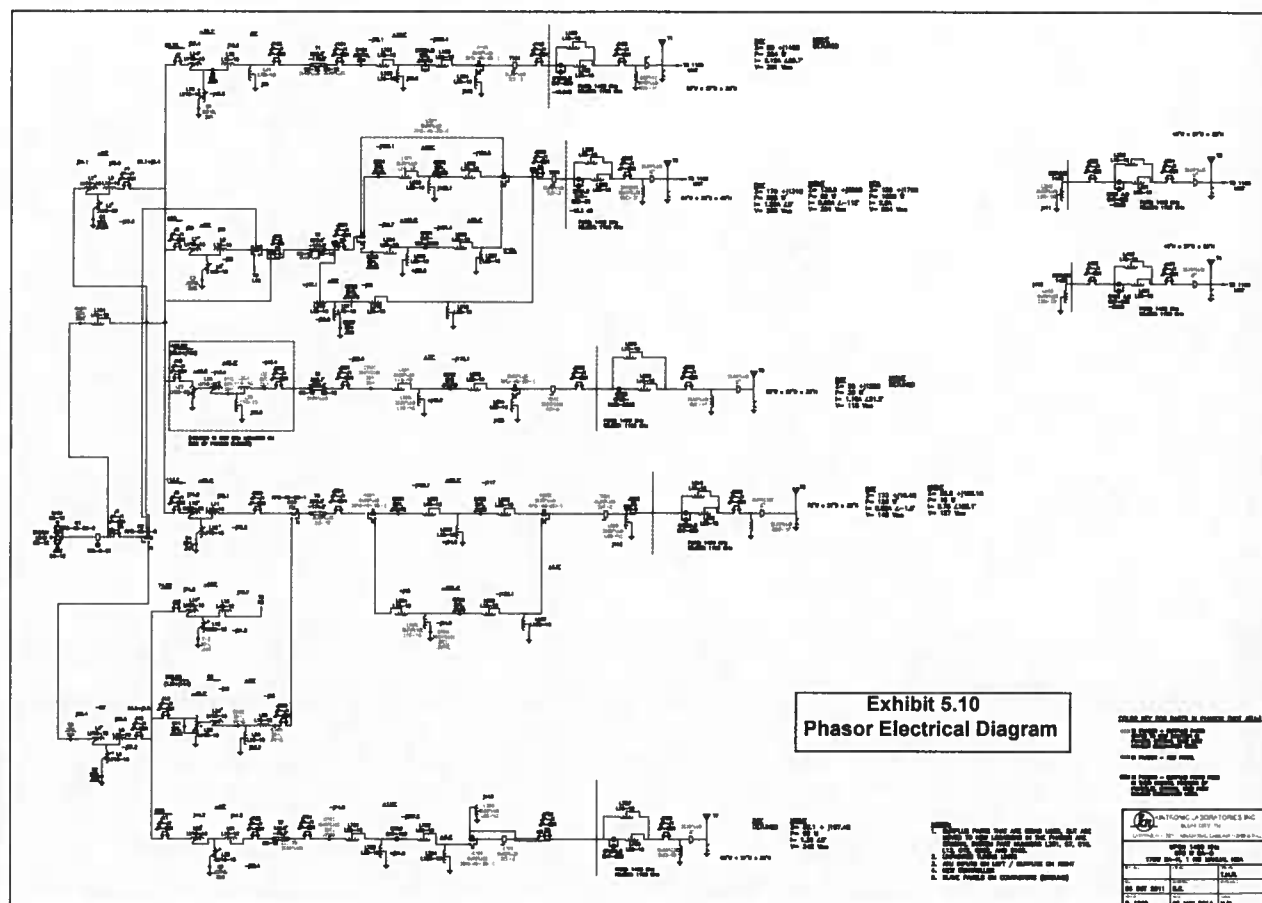


Exhibit 6.10 – WPON Intermodulation Product Observations Involving WCXI

**ENGINEERING REPORT
INTERMODULATION STUDY**

CFR 47 §73.44 Compliance

WPON(AM) – WALLED LAKE, MI

1460 kHz

SEPTEMBER 2019

Copyright 2019

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2. Certification of Engineers
3. Discussion
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5. Table 2 Nighttime Tabulation of Intermodulation Frequencies and Measured Fields
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7. Spectrum Plot of WPON-B Daytime at 2.0 MHz Span
8. Spectrum Plot of WPON-C Nighttime at 500 kHz Span
9. Spectrum Plot of WPON-D Nighttime at 2.0 MHz Span

CERTIFICATION OF ENGINEERS


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

The data utilized in this report is based on field measurements made by the undersigned, or others under the supervision of the undersigned, on the dates and times indicated in the report.

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

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

September 6, 2019

Sincerely,

By _____
Ed Trombley
Project Engineer

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

Discussion

The firm of Munn-Reese has been retained by Birach Broadcasting Corporation to perform the necessary measurements to show compliance with the FCC rules regarding FCC part 73.44.

Birach Broadcasting has collocated two AM directional arrays using shared towers and ground systems. WCXI(AM) operates on 1160 kHz, with a nominal daytime power of 15 kW using a three tower directional array. WCXI(AM) also operates nighttime with a nominal power of 400 watts using a two tower directional array. WPON(AM) operates on 1460 kHz, with a nominal daytime power of 670 watts using a four tower directional array. WPON(AM) also operates nighttime with a nominal power of 580 watts using a three tower directional array. There are seven towers total, located on the property.

Band Pass Band Reject filters have been employed at each tower to keep the WCXI(AM) and WPON(AM) signals from mixing and creating spurious interference to other broadcast stations in the area.

On September 4, 2019, Richard Grzebik, Field Engineer and Ed Trombley, Senior Engineer both employed at Munn-Reese, conducted measurements of the mixing products and spectral conditions of WPON(AM) as a requirement for licensing the station. These measurements were conducted with both WCXI(AM) and WPON(AM) operating at full nominal power. Each daytime and nighttime directional array displayed the correct phase and ratio as required for licensing.

The measurement data obtained for this report indicates the operation of WPON(AM) to be IN COMPLIANCE with the provisions of CFR 47 §73.44 of the FCC rules regarding AM Broadcast Stations.

Table 1**Displays the Daytime measurements and the required limits**

| Call Sign | Flag | Frequency | Fundamental Field | Power Watts | Required Attenuation |
|--------------|--------------------|----------------|----------------------|----------------------|----------------------|
| WCXI(AM) | A | 1160 kHz | 2250 mv/m | 15,000 watts | 80.0 dB |
| WPON(AM) | B | 1460 kHz | 350.0 mv/m | 670 watts | 71.26 dB |
| Relationship | Intermod Frequency | Mix Field uV/m | Measured Attenuation | Required Attenuation | Pass / Fail |
| 2A | 2320.000 | 109.0 | -86.5 dB | -80.0 dB | PASS |
| 2B | 2920.000 | 12.0 | -89.3 dB | -71.26 dB | PASS |
| 3A | 3480.000 | 185.0 | -81.7 dB | -80.0 dB | PASS |
| 3B | 4380.000 | >10.0 | >-90.9 dB | -71.26 dB | PASS |
| 4A | 4640.000 | 55.0 | -92.2 dB | -80.0 dB | PASS |
| A+B | 2620.000 | 16.0 | -103.0 dB | -80.0 dB | PASS |
| 2A-B | 860.000 | 22.0 | -100.2 dB | -80.0 dB | PASS |
| 2A+B | 3780.000 | 50.0 | -93.1 dB | -80.0 dB | PASS |
| 2B-A | 1760.000 | 16.0 | -86.8 dB | -71.26 dB | PASS |
| 2B+A | 4080.000 | 23.0 | -83.6 dB | -71.26 dB | PASS |
| 2B-2A | 600.000 | >10.0 | <-90.9 dB | -71.26 dB | PASS |

Table 2**Displays the Nighttime measurements and the required limits**

| Call Sign | Flag | Frequency | Fundamental Field | Power Watts | Required Attenuation |
|--------------|--------------------|----------------|----------------------|----------------------|----------------------|
| WCXI(AM) | A | 1160 kHz | 2200 mv/m | 15,000 watts | 80.0 dB |
| WPON(AM) | B | 1460 kHz | 355.0 mv/m | 670 watts | 71.26 dB |
| Relationship | Intermod Frequency | Mix Field uV/m | Measured Attenuation | Required Attenuation | Pass / Fail |
| 2A | 2320.000 | 109.0 | -86.3 dB | -80.0 dB | PASS |
| 2B | 2920.000 | 12.0 | -89.3 dB | -71.26 dB | PASS |
| 3A | 3480.000 | 185.0 | -81.7 dB | -80.0 dB | PASS |
| 3B | 4380.000 | >10.0 | <-90.9 dB | -71.26 dB | PASS |
| 4A | 4640.000 | 55.0 | -92.2 dB | -80.0 dB | PASS |
| A+B | 2620.000 | 16.0 | -102.9 dB | -80.0 dB | PASS |
| 2A-B | 860.000 | 22.0 | -100.2 dB | -80.0 dB | PASS |
| 2A+B | 3780.000 | 50.0 | -93.1 dB | -80.0 dB | PASS |
| 2B-A | 1760.000 | 16.0 | -86.8 dB | -71.26 dB | PASS |
| 2B+A | 4080.000 | 23.0 | -83.6 dB | -71.26 dB | PASS |
| 2B-2A | 600.000 | >10.0 | <-90.9 dB | -71.26 dB | PASS |

FOR
FCC
USE
ONLY

FCC 302-AM
APPLICATION FOR AM
BROADCAST STATION LICENSE

(Please read instructions before filling out form.)

FOR COMMISSION USE ONLY

FILE NO:

3mmh-20190917 ABX

SECTION I - APPLICANT FEE INFORMATION

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

Birach Broadcasting Corporation

MAILING ADDRESS (Line 1) (Maximum 35 characters)

21700 Northwestern Highway

MAILING ADDRESS (Line 2) (Maximum 35 characters)

Tower 14, Suite 1190

CITY

Southfield

STATE OR COUNTRY (if foreign address)

MI

ZIP CODE

48075

TELEPHONE NUMBER (include area code)

248-557-3500

CALL LETTERS

WPON

OTHER FCC IDENTIFIER (If applicable)

22045

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



Yes



No

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



Governmental Entity



Noncommercial educational licensee



Other (Please explain):

C. If Yes, provide the following information:

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

(A)

| FEE TYPE CODE | | |
|------------------|---|---|
| M | O | R |

(B)

| FEE MULTIPLE | | | |
|--------------|---|---|---|
| 0 | 0 | 0 | 1 |

(C)

| FEE DUE FOR FEE TYPE CODE IN COLUMN (A) |
|-----------------------------------------------|
| \$ 835.00 |

FOR FCC USE ONLY

| |
|--|
| |
|--|

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

(A)

| | | |
|--|--|--|
| | | |
|--|--|--|

(B)

| | | | |
|---|---|---|---|
| 0 | 0 | 0 | 1 |
|---|---|---|---|

(C)

| |
|----|
| \$ |
|----|

FOR FCC USE ONLY

| |
|--|
| |
|--|

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

TOTAL AMOUNT
REMITTED WITH THIS
APPLICATION

\$ 835.00

FOR FCC USE ONLY

| |
|--|
| |
|--|

| | | |
|-----------------------------------------------------------------|-------------|-------------------|
| SECTION II - APPLICANT INFORMATION | | |
| 1. NAME OF APPLICANT Birach Broadcasting Corporation | | |
| MAILING ADDRESS 21700 Northwestern Hwy, Tower 14, Suite 1190 | | |
| CITY Southfield | STATE MI | ZIP CODE 48075 |

2. This application is for:

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

| | | | | |
|----------------------|-----------------------------------------|------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------|
| Call letters WPON | Community of License Walled Lake, MI | Construction Permit File No. BP-20180516AAA | Modification of Construction Permit File No(s). | Expiration Date of Last Construction Permit 10/10/2021 |
|----------------------|-----------------------------------------|------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------|

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

☒ Yes ☐ No

Exhibit No.

If No, explain in an Exhibit.

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

☒ Yes ☐ No

Exhibit No.

If No, state exceptions in an Exhibit.

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

Exhibit No.

If Yes, explain in an Exhibit.

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

☐ Yes ☐ No

☒ Does not apply

Exhibit No.

If No, explain in an Exhibit.

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

Exhibit 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.

BMP
20190917AAT
0003766847

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 <i>SIMA BIRACH</i> | Signature <i>[Signature]</i> | |
| Title <i>President</i> | Date <i>2/13/19</i> | Telephone Number <i>248/577-3500</i> |

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 (3080-0627), 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

Birach Broadcasting Corporation

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)



Station License



Direct Measurement of Power

Moment Method Proof

1. Facilities authorized in construction permit

| Call Sign | File No. of Construction Permit (if applicable) | Frequency (kHz) | Hours of Operation | Power in kilowatts | |
|-----------|----------------------------------------------------|--------------------|--------------------|--------------------|----------------|
| WPON | BP-20180516AAA | 1460 | Unlimited | Night 0.58 kW | Day 0.67 kW |

2. Station location

| | |
|-------------------|-----------------------------|
| State Michigan | City or Town Walled Lake |
|-------------------|-----------------------------|

3. Transmitter location

| | | | |
|-------------|-------------------|-------------------------|-------------------------------------------------------------|
| State MI | County Oakland | City or Town Milford | Street address (or other identification) 2909 E Maple |
|-------------|-------------------|-------------------------|-------------------------------------------------------------|

4. Main studio location

| | | | |
|-------------|-------------------|----------------------------|----------------------------------------------------------------------|
| State MI | County Oakland | City or Town Southfield | Street address (or other identification) 21700 NW Hwy Ste 1190 |
|-------------|-------------------|----------------------------|----------------------------------------------------------------------|

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

| | | | |
|-------|--------|--------------|---------------------------------------------|
| State | County | City or Town | Street address (or other identification) |
|-------|--------|--------------|---------------------------------------------|

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



Yes



No

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



Yes



No



Not Applicable

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

 Exhibit No.
See Ex 3.10

8. Operating constants:

| | | | |
|----------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------|-----------------|
| RF common point or antenna current (in amperes) without modulation for night system 3.54 amperes <i>627</i> | | RF common point or antenna current (in amperes) without modulation for day system 3.8 amperes <i>722</i> | |
| Measured antenna or common point resistance (in ohms) at operating frequency Night 50 ohms | Day 50 ohms | Measured antenna or common point reactance (in ohms) at operating frequency Night -j5 ohms | Day -j5 ohms |

Antenna indications for directional operation

| Towers | | | Antenna monitor Phase reading(s) in degrees | | Antenna monitor sample current ratio(s) | | Antenna base currents | |
|----------|---------|-----------|------------------------------------------------|-------|--------------------------------------------|-------|-----------------------|-----|
| MOM Loc. | FCC Day | FCC Night | Night | Day | Night | Day | Night | Day |
| T1(NW) | T1 | | N/A | 0.0 | N/A | 1.000 | N/A | N/A |
| T2(NW) | T2 | <i>T1</i> | -113.9 | -54.2 | 0.434 | 0.587 | N/A | N/A |
| T5(SW) | T3 | | N/A | -9.4 | N/A | 0.570 | N/A | N/A |
| T6(SE) | T4 | <i>T3</i> | 156.9 | -57.7 | 0.609 | 0.429 | N/A | N/A |
| T7(EC) | | <i>T2</i> | 0.0 | N/A | 1.00 | N/A | N/A | N/A |

Manufacturer and type of antenna monitor:

Gorman-Redlich Model #: CMR

SECTION III - Page 2

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

| | | | | |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Type Radiator Uniform Cross Section Steel Towers mounted on base piers and insulators | Overall height in meters of radiator above base insulator, or above base, if grounded (T1-7) - 59.4 | Overall height in meters above ground (without obstruction lighting) (T1-7) - 60.6 | Overall height in meters above ground (include obstruction lighting) (T1-7) - 60.6 | If antenna is either top loaded or sectionalized, describe fully in an Exhibit. <div>Exhibit No.</div> |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|

Excitation

☒

Series

☐

Shunt

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

| | |
|-------------------------------|-------------------------------|
| North Latitude 42 ° 32 ' 39 " | West Longitude 83 ° 33 ' 36 " |
|-------------------------------|-------------------------------|

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

Exhibit No.

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

Exhibit No.
See Discussion

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

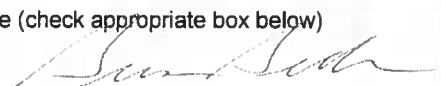
Applicant Certifies Compliance with the special conditons under CP: BP-20180516AAA. See attached

MOM proof of Performance and Exhibits. A 301-AM is being filed with corrected parameters to match as-built survey.

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

N/A

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

| | |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Name (Please Print or Type) Bruce Bellamy | Signature (check appropriate box below)  |
| Address (include ZIP Code) P.O. Box 220 Coldwater, MI 49036 | Date 09/09/2019 |
| | Telephone No. (Include Area Code) 517.278.7339 |

☐

Technical Director

☐

Registered Professional Engineer

☐

Chief Operator

☒

Technical Consultant

☐

Other (specify)

Law Offices
Putbrese Hunsaker & Trent, P.C.

John C. Trent

Of Counsel:

Cary S. Tepper*

Howard Weiss

Keith E. Putbrese (Retired)

David M. Hunsaker

(1944-2002)

*Not Admitted in Virginia

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Woodstock, Virginia 22664

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

September 16, 2019

VIA FEDEX

Federal Communications Commission
Media Bureau
P.O. Box 979089
St. Louis MO 63197-9000

Re: Radio Station WPON (AM), Walled Lake, Michigan (FCC Facility ID No. 22045); License to Cover Construction Permit BP-20180516AAA

Dear Madam Secretary:

On behalf of Birach Broadcasting Corporation, ("BCR") the Licensee of Radio Station WPON (AM), Walled Lake, Michigan, please find attached in triplicate, FCC Form 302-AM License Application to cover Construction Permit BP-20180516AAA. BCR respectfully requests Program Test Authority.

In addition to the Form 302-AM, there is attached FCC Form 159, together with credit card information to pay the FCC for the requisite filing fee of \$835.00. If you have any questions, please contact this office.

Very truly yours,


John C. Trent

cc: WPON Public Inspection File