SECTION III - LICENSE APPLICATION ENGINEERING DATA

Name of Applicant
Steel City Radio, Inc.

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)

☑ Station License ☐ Direct Measurement of Power

1. Facilities authorized in construction permit					
Call Sign	File No. of Construction Permit (if applicable)	Frequency (kHz)	Hours of Operation	Power in kilowatts	
				Night	Day
WITK	N/A	1550	Unlimited	0.5	10.0

2. Station location	
State	City or Town
Pennsylvania	Pittston

3. Transmitter location			
State	County	City or Town	Street address (or other identification)
PA	Luzerne	Dunmore	13 Coxton Road

4. Main studio location			
State	County	City or Town	Street address (or other identification)
PA	Luzerne	Exeter	944 Exeter Ave.

5. Remote control point location (specify only if authorized directional antenna)			
State	County	City or Town	Street address (or other identification)
PA	Luzerne	Exeter	944 Exeter Ave.

6. Has type-approved stereo generating equipment been installed? ☐ Yes ☑ No

7. Does the sampling system meet the requirements of 47 C.F.R. Section 73.68? ☑ Yes ☐ No ☐ Not Applicable

Attach as an Exhibit a detailed description of the sampling system as installed. Exhibit No. ENG

8. Operating constants:

RF common point or antenna current (in amperes) without modulation for night system	RF common point or antenna current (in amperes) without modulation for day system
3.29	14.5
Measured antenna or common point resistance (in ohms) at operating frequency Night 50.0 Day 50.0	Measured antenna or common point reactance (in ohms) at operating frequency Night -9.3 Day -9.3

Antenna indications for directional operation

Towers	Antenna monitor Phase reading(s) in degrees		Antenna monitor sample current ratio(s)		Antenna base currents	
	Night	Day	Night	Day	Night	Day
1(NW)	110.1	20.4	.651	.661		
2(C)	0.0	0.0	1.000	1.000		
3(SE)	-89.7	-42.1	.240	.763		

Manufacturer and type of antenna monitor: Potomac Instruments AM-19(204)

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	Overall height in meters of radiator above base insulator, or above base, if grounded.	Overall height in meters above ground (without obstruction lighting)	Overall height in meters above ground (include obstruction lighting)	If antenna is either top loaded or sectionalized, describe fully in an Exhibit.
Guyed Tower	57.9	60.6	60.6	Exhibit No. N/A

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	West Longitude
41 ° 20 ' 46 "	75 ° 47 ' 06 "

If not fully described above, attach as an Exhibit further details and dimensions including any other antenna mounted on tower and associated isolation circuits. Exhibit No. ENG

Also, if necessary for a complete description, attach as an Exhibit a sketch of the details and dimensions of ground system. Exhibit No. ENG

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

Coordinate correction. see engineering

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

Installation of FM antenna/line on tower 3 and new adjustment

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)	Signature (check appropriate box below)
Kurt Gorman	
Address (include ZIP Code) Phasetek Inc. 550 California Rd., Unit 11 Quakertown, PA 18951	Date May 15, 2018 Telephone No. (Include Area Code) 215-536-6648

☐ Technical Director

☐ Registered Professional Engineer

☐ Chief Operator

☑ Technical Consultant

☐ Other (specify)

ENGINEERING STATEMENT CONCERNING

APPLICATION FOR LICENSE INFORMATION

EMPLOYING MOMENT METHOD MODELING

WITK, 1550 KHZ, DA-2

PITTSTON, PENNSYLVANIA

MAY, 2018

PHASETEK INC.

ENGINEERING STATEMENT CONCERNING
APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WITK, 1550 KHZ, DA-2
PITTSTON, PENNSYLVANIA
MAY, 2018

TABLE OF CONTENTS

PHASETEK INC.

ENGINEERING STATEMENT CONCERNING
APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WITK, 1550 KHZ, DA-2
PITTSTON, PENNSYLVANIA
MAY, 2018

SUMMARY

Adjustment of the Antenna System and a Proof of Performance employing Moment Method Modeling were performed on Radio Station WITK, 1550 KHz, Pittston, Pennsylvania, after installation of the FM antenna and associated line for FM translator W234CY and changes to the array sampling system. This FM translator is authorized in construction Permit Number: BMPFT-20160729AEH. This report was prepared on behalf of Steel City Radio, Inc., licensee of Radio Station WITK.

SITE MODIFICATIONS

The WITK Transmitter site is that as currently licensed. The sampling system has been changed from sampling loops to TCT's. All Towers remain unchanged. There are no changes to the presently licensed standard radiation patterns, therefore, a site survey is not included. A License Application employing Moment Method Modeling as set forth in Section 73.151(C) has been done to license Radio Station WITK under the new rules.

REFERENCE POINTS

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

CORRECTION OF SITE COORDINATES

The current specified NAD 27 coordinates for the center of the array are: N41° 20' 45", W75° 47' 8". Actual measurement of the center of the array yields: N41° 20' 46", W75° 47' 6" (rounded to nearest second). Due to the fact that these are within 2 seconds, it is requested to correct these coordinates. The correct values are indicated on the attached Form302-AM.

PHASETEK INC.

ENGINEERING STATEMENT CONCERNING
APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WITK, 1550 KHZ, DA-2
PITTSTON, PENNSYLVANIA
MAY, 2018

METHOD OF MOMENTS DETAIL

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

MEASURING EQUIPMENT AND PERSONNEL

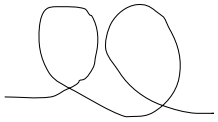
All Tower Resistance and Reactance measurements were made with a HP8753ES Network Analyzer and Tunwall directional coupler. Before use, tests of known impedances were made to verify operation. All Field Intensity Measurements were made with a Potomac Instruments Field Intensity Meter, model PI 4100,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

CONCLUSION

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

PHASETEK INC.

ENGINEERING STATEMENT CONCERNING
APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WITK, 1550 KHZ, DA-2
PITTSTON, PENNSYLVANIA
MAY, 2018



Kurt Gorman, President
Phasetek Inc.
Quakertown, Pennsylvania

FIGURE 1

ANTENNA SYSTEM AS ADJUSTED

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WITK, 1550 KHZ, DA-2
PITTSTON, PENNSYLVANIA
MAY, 2018

ANTENNA SYSTEM DESCRIPTION

1. The Antenna System consists of three (3), vertical steel transmitting Towers. All Towers are uniform cross section and guyed. All Towers stand 57.9M (107.8^{o}) above their Base Insulators. The Towers are arranged with Tower 2 as a reference; Tower 1 is spaced 90.0^{o} on a bearing of 323.0^{o}T. Tower 3 is spaced 90.0^{o} on a bearing of 143.0^{o}T. Tower 3 supports an FM antenna. The feed for the FM antenna is isolated at the base with an isocoupler.

2. The Ground System for each Tower remains as currently licensed. Copper strap connects all Towers to the main Transmitter grounding point.

3. The Sampling System consists of three (3), Phasetek Inc. model P600-203, 1.0 V/A Toroidal Current Transformers. All TCT's are at the Output of each Antenna Tuning Unit. These TCT's are connected to a Potomac Instruments AM-19(204) Antenna Monitor via three (3) equal lengths of Andrew, LDF2-50, 3/8" phase stabilized foam coaxial cable.

FIGURE 1
ANTENNA SYSTEM AS ADJUSTED

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
CONTINUED
WITK, 1550 KHZ, DA-2
PITTSTON, PENNSYLVANIA
MAY, 2018

ANTENNA SYSTEM DESCRIPTION – Continued

DIRECTIONAL OPERATION (DAY)

COMMON POINT

Impedance = 50.0 - j 9.3 Ohms
Current = 14.5 Amperes
Power = 10,500 Watts

DIRECTIONAL OPERATION (NIGHT)

COMMON POINT

Impedance = 50.0 - j 9.3 Ohms
Current = 3.29 Amperes
Power = 540 Watts

Directional Antenna Monitor indications are within ±5% and ±3° of the modeled TCT values.

FIGURE 2
WITK SAMPLING SYSTEM DESCRIPTION/MEASUREMENTS

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WITK, 1550 KHZ, DA-2
PITTSTON, PENNSYLVANIA
MAY, 2018

SAMPLING SYSTEM DESCRIPTION

The Sampling System consists of Phasetek Inc. model P600-203 Toroidal Sampling Transformers (1.0 volt/amp) mounted at the base of each Tower. The sampling devices are connected to the Antenna Monitor with equal lengths of Andrew LDF2-50. The Antenna Monitor is a Potomac Instruments Model AM-19(204), Serial Number 2088.

SAMPLE LINE MEASUREMENTS

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

The table below shows the frequencies above and below the carrier frequency where resonance, defined as zero reactance corresponding with low resistance, was found. Frequencies of resonance occur at odd multiples of 90 degrees electrical length, the Sample Line length at the resonant frequency above the carrier frequency, which is the closest one to the carrier frequency, was found to be 450 electrical degrees. The electrical length at carrier frequency appearing in the table below was calculated by ratioing the frequencies.

SAMPLE LINE MEASUREMENTS

	Resonant Frequency (KHz) below 1550 KHz	Resonant Frequency (KHz) above 1550 KHz	Calculated Electrical Length (deg) at 1550 KHz	Measured Impedance (ohms) Connected to TCT @ 1550 KHz
Tower 1	1022.90	1711.25	407.6	50.9 -j 1.4
Tower 2	1024.55	1711.55	407.5	50.8 -j 0.5
Tower 3	1025.60	1711.70	407.5	51.0 -j 0.4

FIGURE 2
WITK SAMPLING SYSTEM DESCRIPTION/MEASUREMENTS

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
CONTINUED
WITK, 1550 KHZ, DA-2
PITTSTON, PENNSYLVANIA
MAY, 2018

SAMPLE LINE MEASUREMENTS (CONTINUED)

To determine the characteristic impedance values of the Sample Lines, open-circuited measurements were made with frequencies offset to produce ± 45 degrees of electrical length from resonance. The characteristic impedance was calculated using the following formula, where R1 +j X1 and R2 +j X2 are the measured impedances at the +45 and -45 degree offset frequencies, respectively:

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

Tower	+ 45 Degree Offset Frequency (kHz)	+ 45 Degree Measured Impedance (Ohms)	- 45 Degree Offset Frequency (kHz)	- 45 Degree Measured Impedance (Ohms)	Calculated Characteristic Impedance (Ohms)
1	1882.4	10.5 +j 48.0	1540.1	8.1 –j 48.1	48.96
2	1882.7	10.5 +j 48.2	1540.4	8.1 –j 48.1	49.05
3	1882.9	10.3 +j 48.0	1540.5	8.1 –j 48.0	48.89

SAMPLING TCT MEASUREMENTS

Measurements of the Phasetek Inc. Model P600-203, 1.0 V/A Toroidal Current Transformers were performed by a Hewlett Packard 8752A, Network Analyzer. Measurements are normalized to Tower #2 (reference) and are within the manufacturer's rating of ± 1.5% and ± 2.0°.

FIGURE 2
WITK SAMPLING SYSTEM DESCRIPTION/MEASUREMENTS

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
CONTINUED
WITK, 1550 KHZ, DA-2
PITTSTON, PENNSYLVANIA
MAY, 2018

SAMPLING TCT MEASUREMENTS CONT'D

TOWER	TCT SERIAL #	MAGNITUDE	PHASE
1	761	1.002	-0.2°
2	762	1.000	0.0°
3	763	1.001	-0.1°

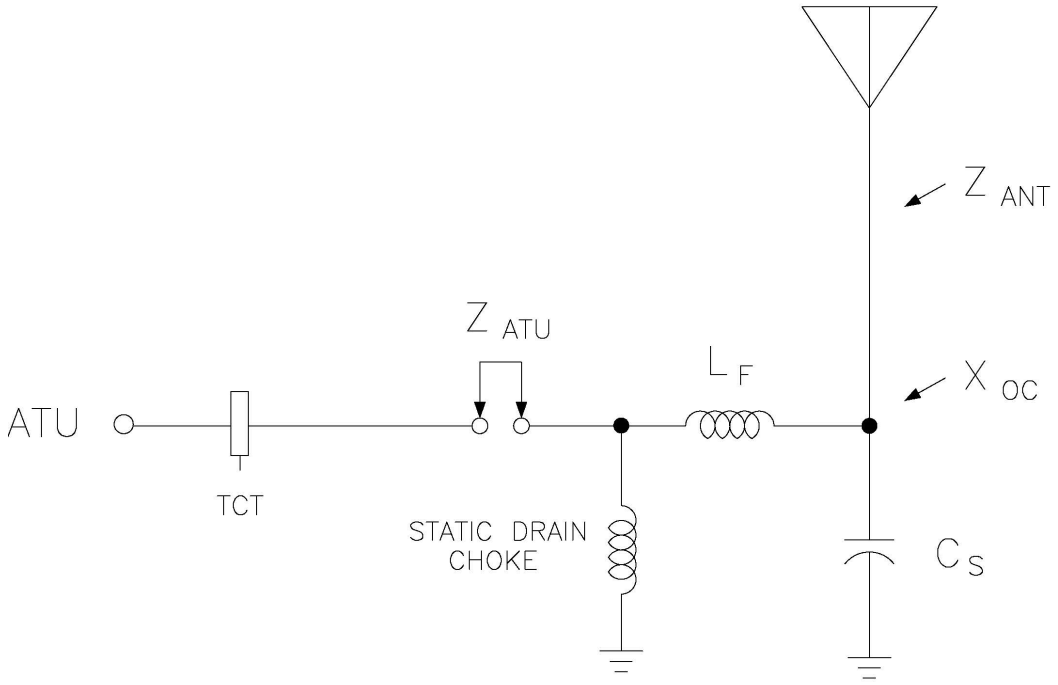
ANTENNA MONITOR MEASUREMENT

Measurement of the Potomac Instruments Model AM-19(204) Antenna Monitor was performed to verify calibration. A single RF Voltage was applied to the Reference Input (Tower #2) and each other Input by use of a "T" divider and equal electrical length coaxial cables. This yields the following:

Tower	Ratio	Phase
1	1.000	-0.2°
2	1.000	0.0°
3	1.000	-0.2°

The above is within the manufacturer's rating of ± 1.0% and ± 1.0°.

FIGURE 3
WITK TOWER IMPEDANCE MEASUREMENTS COMPARED TO METHOD OF MOMENTS MODEL



TOWER	Specified Cs (pf)	Measured L_F (µH)	Measured X_F (Ω)	Modeled Z_{ANT} (Ω)	Modeled Z_{ATU} (Ω)	Measured Z_{ATU} (Ω)
1	15	2.31	+j22.5	157.3 +j 219.8	176.3 +j 248.7	177.0 +j 248.5
2	15	2.57	+j25.0	127.8 +j 239.4	144.9 +j 275.9	145.5 +j 275.0
3	45	3.49	+j34.0	162.0 +j 229.1	210.2 +j 276.4	216.0 +j 281.0

Tower	Calculated X_{OC} (Ω)
1	-j 4,059.9
2	-j 4,059.5
3	-j 1,856.7

FIGURE 4
WITK MOMENT MODEL PARAMETERS

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WITK, 1550 KHZ, DA-2
PITTSTON, PENNSYLVANIA
MAY, 2018

Tower #	Wire #	# of Segments	Base Node
1	1	14	1
2	2	14	15
3	3	14	29

Tower #	Physical Height Degrees	Modeled Height Degrees	Modeled Radius Meters	% of Equivalent Radius
1	107.8	122.7	.218	100.0
2	107.8	123.4	.218	100.0
3	107.8	123.6	.218	100.0

Towers are uniform cross section, guyed with Base Insulator. All towers are three (3) sided with a 18" face width.

All Base Insulators are manufactured by NGK, with an assumed capacity of 15pf (-j6,845.4 ohms @ 1550 kHz). Tower #3 has a Phasetek Inc. P600-408 FM isocoupler with a measured capacity of 30pf.

All Towers have a Phasetek Inc. static drain choke. These measure –j10,000.0 ohms @ 1550 kHz.

FIGURE 5
WITK MOMENT SUMMARY FOR INDIVIDUAL TOWERS

WITK TOWER 1 (OTHERS OPEN)

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	90.	323.	0	.218	14
		90.	323.	122.7		
2	none	0	0	0	.218	14
		0	0	123.4		
3	none	90.	143.	0	.218	14
		90.	143.	123.6		

Number of wires = 3
current nodes = 42

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	8.76429	3	8.82857
radius	1	.218	1	.218

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.55	0	1	.0243452	.0245238

Sources

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

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	15	0	-4,059.5	0	0	0
2	29	0	-1,856.7	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.55	157.32	219.77	270.27	54.4	9.4989	-1.8356	-4.6256

FIGURE 5
WITK MOMENT SUMMARY FOR INDIVIDUAL TOWERS

WITK TOWER 2 (OTHERS OPEN)

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	90.	323.	0	.218	14
		90.	323.	122.7		
2	none	0	0	0	.218	14
		0	0	123.4		
3	none	90.	143.	0	.218	14
		90.	143.	123.6		

Number of wires = 3
current nodes = 42

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	8.76429	3	8.82857
radius	1	.218	1	.218

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.55	0	1	.0243452	.0245238

Sources

source	node	sector	magnitude	phase	type
1	15	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-4,059.9	0	0	0
2	29	0	-1,856.7	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 15, sector 1							
1.55	127.8	239.43	271.4	61.9	11.834	-1.4714	-5.4154

FIGURE 5
WITK MOMENT SUMMARY FOR INDIVIDUAL TOWERS

WITK TOWER 3 (OTHERS OPEN)

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	90.	323.	0	.218	14
		90.	323.	122.7		
2	none	0	0	0	.218	14
		0	0	123.4		
3	none	90.	143.	0	.218	14
		90.	143.	123.6		

Number of wires = 3
current nodes = 42

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	8.76429	3	8.82857
radius	1	.218	1	.218

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.55	0	1	.0243452	.0245238

Sources

source	node	sector	magnitude	phase	type
1	29	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-4,059.9	0	0	0
2	15	0	-4,059.5	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 29, sector 1							
1.55	162.	229.12	280.61	54.7	9.9288	-1.7556	-4.7819

FIGURE 6
WITK MOMENT MODEL ARRAY SYNTHESIS
(DIRECTIONAL – DAY)

WITK DAY

MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 1.55 MHz

tower	field ratio magnitude	phase (deg)
1	.68	32.
2	1.	5.
3	.9	-56.

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	627.208	96.1	3.30478	44.7
15	1,022.45	59.4	4.96793	23.7
29	1,292.95	359.5	3.92281	334.2

Sum of square of source currents = 101.981
Total power = 10,000. watts

TOWER ADMITTANCE MATRIX

admittance	real (mhos)	imaginary (mhos)
Y(1, 1)	.00220463	-.00265441
Y(1, 2)	.00144375	.000300013
Y(1, 3)	.000276723	-.000502713
Y(2, 1)	.00144374	.000300003
Y(2, 2)	.0021179	-.00214019
Y(2, 3)	.00142675	.000291906
Y(3, 1)	.000276721	-.000502715
Y(3, 2)	.00142675	.000291904
Y(3, 3)	.00214893	-.00255162

TOWER IMPEDANCE MATRIX

impedance	real (ohms)	imaginary (ohms)
Z(1, 1)	156.591	222.135
Z(1, 2)	55.3042	-82.7268
Z(1, 3)	-77.1467	-36.1626
Z(2, 1)	55.3052	-82.7274
Z(2, 2)	135.66	235.484
Z(2, 3)	55.4639	-85.3255
Z(3, 1)	-77.147	-36.1631
Z(3, 2)	55.4642	-85.3256
Z(3, 3)	163.039	229.317

FIGURE 7
WITK MOMENT MODEL SUMMARY FOR DIRECTIONAL DAY MODE

WITK DAY

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	90.	323.	0	.218	14
		90.	323.	122.7		
2	none	0	0	0	.218	14
		0	0	123.4		
3	none	90.	143.	0	.218	14
		90.	143.	123.6		

Number of wires = 3
current nodes = 42

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	8.76429	3	8.82857
radius	1	.218	1	.218

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.55	0	1	.0243452	.0245238

Sources

source	node	sector	magnitude	phase	type
1	1	1	887.006	96.1	voltage
2	15	1	1,445.96	59.4	voltage
3	29	1	1,828.5	359.5	voltage

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.55	118.51	148.24	189.79	51.4	6.3432	-2.7617	-3.274
source = 2; node 15, sector 1							
1.55	167.01	120.28	205.81	35.8	5.1789	-3.397	-2.6552
source = 3; node 29, sector 1							
1.55	297.88	141.07	329.6	25.3	7.3251	-2.3864	-3.7391

CURRENT rms
Frequency = 1.55 MHz
Input power = 10,000. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	71.8772	54.1634	0	3.30477	44.7	2.34749	2.32611
2	71.8772	54.1634	8.76429	3.72757	39.5	2.87778	2.36921
3	71.8772	54.1634	17.5286	3.9569	36.6	3.17565	2.36057
4	71.8772	54.1634	26.2929	4.0814	34.5	3.36219	2.31377
5	71.8772	54.1634	35.0571	4.11003	32.9	3.45154	2.23141
6	71.8772	54.1634	43.8214	4.04677	31.5	3.4497	2.11564
7	71.8772	54.1634	52.5857	3.89496	30.4	3.36074	1.96879
8	71.8772	54.1634	61.35	3.65853	29.4	3.18872	1.79357
9	71.8772	54.1634	70.1143	3.34239	28.5	2.93831	1.59308
10	71.8772	54.1634	78.8786	2.95236	27.7	2.61488	1.37069
11	71.8772	54.1634	87.6429	2.49493	26.9	2.22438	1.12996
12	71.8772	54.1634	96.4072	1.97657	26.3	1.77271	.874246
13	71.8772	54.1634	105.171	1.40203	25.6	1.26425	.606106
14	71.8772	54.1634	113.936	.769542	25.	.697422	.325264
END	71.8772	54.1634	122.7	0	0	0	0
GND	0	0	0	4.96794	23.7	4.54959	1.99539
16	0	0	8.81429	5.50811	16.1	5.29261	1.52564
17	0	0	17.6286	5.81483	11.9	5.69002	1.19831
18	0	0	26.4429	5.98354	8.8	5.91336	.913731
19	0	0	35.2571	6.01989	6.3	5.98335	.662333
20	0	0	44.0714	5.92603	4.3	5.90951	.442151
21	0	0	52.8857	5.70459	2.5	5.69895	.253599
22	0	0	61.7	5.35997	1.	5.35907	.0977498
23	0	0	70.5143	4.89849	359.7	4.89843	-.024288
24	0	0	79.3286	4.32821	358.5	4.32677	-.111649
25	0	0	88.1429	3.65842	357.4	3.65476	-.163812
26	0	0	96.9572	2.89862	356.4	2.89299	-.180571
27	0	0	105.771	2.05595	355.5	2.04958	-.161775
28	0	0	114.586	1.12813	354.6	1.1231	-.106438
END	0	0	123.4	0	0	0	0
GND	-71.8772	-54.1634	0	3.92281	334.2	3.53192	-1.70705
30	-71.8772	-54.1634	8.82857	4.50147	321.	3.49872	-2.83235
31	-71.8772	-54.1634	17.6571	4.90513	314.2	3.42098	-3.51529
32	-71.8772	-54.1634	26.4857	5.18903	309.5	3.2982	-4.00599
33	-71.8772	-54.1634	35.3143	5.34593	305.9	3.13258	-4.33197
34	-71.8772	-54.1634	44.1429	5.37103	303.	2.9273	-4.50321
35	-71.8772	-54.1634	52.9714	5.26248	300.7	2.6863	-4.5252
36	-71.8772	-54.1634	61.8	5.02149	298.7	2.41414	-4.40311
37	-71.8772	-54.1634	70.6286	4.65209	297.1	2.1158	-4.14311
38	-71.8772	-54.1634	79.4571	4.16066	295.6	1.79653	-3.75281
39	-71.8772	-54.1634	88.2857	3.55536	294.3	1.4616	-3.24103
40	-71.8772	-54.1634	97.1143	2.84496	293.1	1.11592	-2.61697
41	-71.8772	-54.1634	105.943	2.0363	292.	.76323	-1.88785
42	-71.8772	-54.1634	114.771	1.12686	291.	.403788	-1.05203
END	-71.8772	-54.1634	123.6	0	0	0	0

FIGURE 8
WITK MOMENT MODEL ARRAY SYNTHESIS
(DIRECTIONAL – NIGHT)

WITK NIGHT

MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 1.55 MHz

tower	field ratio magnitude	phase (deg)
1	.523	119.2
2	1.	0
3	.523	-119.3

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	183.544	199.8	.995629	123.8
15	489.946	75.5	1.56993	12.2
29	383.064	319.8	.497738	264.9

Sum of square of source currents = 7.40742
Total power = 500. watts

TOWER ADMITTANCE MATRIX

admittance	real (mhos)	imaginary (mhos)
Y(1, 1)	.00220463	-.00265441
Y(1, 2)	.00144375	.000300013
Y(1, 3)	.000276723	-.000502713
Y(2, 1)	.00144374	.000300003
Y(2, 2)	.0021179	-.00214019
Y(2, 3)	.00142675	.000291906
Y(3, 1)	.000276721	-.000502715
Y(3, 2)	.00142675	.000291904
Y(3, 3)	.00214893	-.00255162

TOWER IMPEDANCE MATRIX

impedance	real (ohms)	imaginary (ohms)
Z(1, 1)	156.591	222.135
Z(1, 2)	55.3042	-82.7268
Z(1, 3)	-77.1467	-36.1626
Z(2, 1)	55.3052	-82.7274
Z(2, 2)	135.66	235.484
Z(2, 3)	55.4639	-85.3255
Z(3, 1)	-77.147	-36.1631
Z(3, 2)	55.4642	-85.3256
Z(3, 3)	163.039	229.317

FIGURE 9
WITK MOMENT MODEL SUMMARY FOR DIRECTIONAL NIGHT MODE

```
WITK NIGHT

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

wire  caps Distance     Angle        Z            radius      segs
 1    none 90.          323.         0            .218         14
           90.          323.         122.7
 2    none 0            0            0            .218         14
           0            0            123.4
 3    none 90.          143.         0            .218         14
           90.          143.         123.6

Number of wires          =  3
          current nodes  =  42

                         minimum                  maximum
Individual wires      wire    value             wire  value
segment length         1      8.76429            3    8.82857
radius                 1      .218               1    .218


ELECTRICAL DESCRIPTION
Frequencies (MHz)
     frequency                no. of  segment length (wavelengths)
 no. lowest       step         steps   minimum        maximum
 1   1.55         0             1      .0243452       .0245238

Sources
source node    sector  magnitude      phase          type
 1      1       1      259.57         199.8          voltage
 2      15      1      692.889        75.5           voltage
 3      29      1      541.735        319.8          voltage



IMPEDANCE
   normalization = 50.
freq     resist   react    imped    phase    VSWR    S11      S12
(MHz)    (ohms)   (ohms)   (ohms)   (deg)            dB       dB
source =  1; node 1, sector 1
1.55     44.569   178.88   184.35   76.      16.311  -1.0664  -6.621

source =  2; node 15, sector 1
1.55     140.47   278.68   312.08   63.2     14.152  -1.2296  -6.0806

source =  3; node 29, sector 1
1.55     442.39   629.75   769.61   54.9     26.853  -.64722  -8.5869
```

CURRENT rms
Frequency = 1.55 MHz
Input power = 500. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	71.8772	54.1634	0	.995627	123.8	-.554042	.827231
2	71.8772	54.1634	8.76429	1.14558	121.9	-.604849	.972888
3	71.8772	54.1634	17.5286	1.22521	120.8	-.628258	1.05187
4	71.8772	54.1634	26.2929	1.26889	120.1	-.636426	1.09774
5	71.8772	54.1634	35.0571	1.28068	119.5	-.630901	1.11449
6	71.8772	54.1634	43.8214	1.26242	119.	-.612486	1.10389
7	71.8772	54.1634	52.5857	1.21552	118.6	-.581877	1.0672
8	71.8772	54.1634	61.35	1.14149	118.2	-.539858	1.00576
9	71.8772	54.1634	70.1143	1.04211	117.9	-.487361	.921121
10	71.8772	54.1634	78.8786	.919446	117.6	-.425464	.815083
11	71.8772	54.1634	87.6429	.7758	117.3	-.355349	.689632
12	71.8772	54.1634	96.4072	.613453	117.	-.2782	.546744
13	71.8772	54.1634	105.171	.434173	116.7	-.194963	.387937
14	71.8772	54.1634	113.936	.237701	116.4	-.105681	.212916
END	71.8772	54.1634	122.7	0	0	0	0
GND	0	0	0	1.56993	12.2	1.53436	.332301
16	0	0	8.81429	1.95352	6.5	1.94086	.222037
17	0	0	17.6286	2.17854	3.9	2.17357	.1471
18	0	0	26.4429	2.32599	2.1	2.32448	.0839054
19	0	0	35.2571	2.40428	.7	2.40409	.0301569
20	0	0	44.0714	2.41672	359.7	2.41668	-.0146598
21	0	0	52.8857	2.36557	358.8	2.36503	-.0505204
22	0	0	61.7	2.2533	358.	2.25198	-.0772692
23	0	0	70.5143	2.08303	357.4	2.08087	-.094768
24	0	0	79.3286	1.85855	356.8	1.85569	-.102957
25	0	0	88.1429	1.5842	356.3	1.58092	-.10187
26	0	0	96.9572	1.26446	355.8	1.26113	-.0916079
27	0	0	105.771	.902746	355.4	.899851	-.0722388
28	0	0	114.586	.498309	355.	.496409	-.0434682
END	0	0	123.4	0	0	0	0
GND	-71.8772	-54.1634	0	.49774	264.9	-.0444098	-.495755
30	-71.8772	-54.1634	8.82857	.794084	250.7	-.261853	-.749669
31	-71.8772	-54.1634	17.6571	.986402	246.1	-.399052	-.902079
32	-71.8772	-54.1634	26.4857	1.12825	243.5	-.503631	-1.0096
33	-71.8772	-54.1634	35.3143	1.22484	241.7	-.580509	-1.07854
34	-71.8772	-54.1634	44.1429	1.27796	240.4	-.631159	-1.11123
35	-71.8772	-54.1634	52.9714	1.28856	239.4	-.656126	-1.10901
36	-71.8772	-54.1634	61.8	1.2577	238.6	-.655847	-1.07316
37	-71.8772	-54.1634	70.6286	1.18684	237.9	-.630947	-1.00523
38	-71.8772	-54.1634	79.4571	1.07791	237.3	-.582326	-.907071
39	-71.8772	-54.1634	88.2857	.933241	236.8	-.511151	-.78081
40	-71.8772	-54.1634	97.1143	.755346	236.3	-.418708	-.628674
41	-71.8772	-54.1634	105.943	.546154	235.9	-.306009	-.452374
42	-71.8772	-54.1634	114.771	.30505	235.5	-.172612	-.251517
END	-71.8772	-54.1634	123.6	0	0	0	0

FIGURE 10
DERIVED DIRECTIONAL PARAMETERS

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WITK, 1550 KHZ, DA-2
PITTSTON, PENNSYLVANIA
MAY, 2018

DAY:

	Theoretical		Base Network Input Current		Normalized TCT	
Tower	**Field**	**Phase**	**Amplitude**	**Phase**	**Amplitude**	**Phase**
1 (NW)	.680	32.00°	3.18	46.48°	.661	20.4°
2 (C)	1.000	5.00°	4.81	26.07°	1.000	0.0°
3 (SE)	.900	-56.00°	3.67	-15.99°	.321	-42.1°

NIGHT:

	Theoretical		Base Network Input Current		Normalized TCT	
Tower	**Field**	**Phase**	**Amplitude**	**Phase**	**Amplitude**	**Phase**
1 (NW)	.523	119.15°	0.95	124.45°	.651	110.1°
2 (C)	1 .000	0.00°	1.46	14.38°	1.000	0.0°
3 (SE)	.523	-119.25°	0.35	-75.29°	1.000	-89.7°

FIGURE 11
WITK TOWER BASE CIRCUIT ANALYSIS DESCRIPTION

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WITK, 1550 KHZ, DA-2
PITTSTON, PENNSYLVANIA
MAY, 2018

CIRCUIT ANALYSIS

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

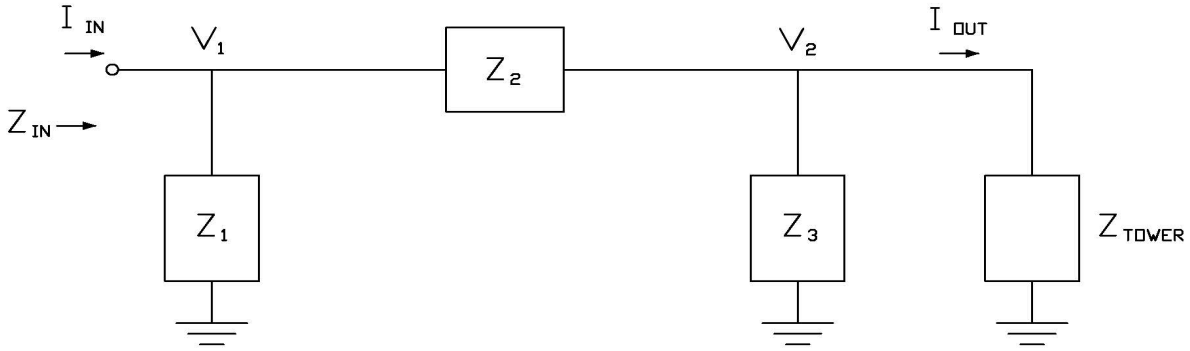


FIGURE 12
WITK CIRCUIT ANALYSIS FOR INDIVIDUAL TOWERS

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

FREQUENCY : 1550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,-10000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 22.50 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -6845.40 OHMS
TOWER IMPEDANCE (R,X) : 157.32, 219.77 OHMS

NODE	TO	NODE	IMPEDANCE (OHMS) R	X
1		GROUND	0.00	-10000.00
2		GROUND	167.83	223.07
1		2	0.00	22.50

NODE	VOLTAGE MAGNITUDE	PHASE
1	100.00	0.00
2	93.85	-2.61

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	176.34	248.72	304.89	54.66
INPUT CURRENT (AMPS) :	0.19	-0.27	0.33	-54.66
OUTPUT CURRENT (AMPS) :	0.19	-0.29	0.35	-57.01

INPUT/OUTPUT CURRENT RATIO = 0.9445
INPUT/OUTPUT PHASE = 2.35 DEGREES

FIGURE 12
WITK CIRCUIT ANALYSIS FOR INDIVIDUAL TOWERS

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

FREQUENCY : 1550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,-10000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 25.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -6845.40 OHMS
TOWER IMPEDANCE (R,X) : 127.80, 239.43 OHMS

NODE	TO NODE	IMPEDANCE (OHMS) R	X
1	GROUND	0.00	-10000.00
2	GROUND	137.18	245.45
1	2	0.00	25.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	100.00	0.00
2	92.72	-2.30

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	144.88	275.93	311.65	62.30
INPUT CURRENT (AMPS) :	0.15	-0.28	0.32	-62.30
OUTPUT CURRENT (AMPS) :	0.15	-0.31	0.34	-64.21

INPUT/OUTPUT CURRENT RATIO = 0.9392
INPUT/OUTPUT PHASE = 1.92 DEGREES

FIGURE 12
WITK CIRCUIT ANALYSIS FOR INDIVIDUAL TOWERS

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

FREQUENCY : 1550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,-10000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 34.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -2281.80 OHMS
TOWER IMPEDANCE (R,X) : 162.00, 229.12 OHMS

NODE	TO	NODE	IMPEDANCE (OHMS) R	X
1		GROUND	0.00	-10000.00
2		GROUND	198.94	238.99
1		2	0.00	34.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	100.00	0.00
2	92.06	-3.69

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	210.18	276.36	347.20	52.75
INPUT CURRENT (AMPS) :	0.17	-0.23	0.29	-52.75
OUTPUT CURRENT (AMPS) :	0.17	-0.28	0.33	-58.43

INPUT/OUTPUT CURRENT RATIO = 0.8779
INPUT/OUTPUT PHASE = 5.68 DEGREES

FIGURE 13
WITK CIRCUIT ANALYSIS FOR DIRECTIONAL DAY MODE

CUSTOMER : WITK
NETWORK ID : TOWER 1 DAY

FREQUENCY : 1550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,-10000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 22.50 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -6845.40 OHMS
TOWER IMPEDANCE (R,X) : 118.51, 148.24 OHMS

NODE	TO	NODE	IMPEDANCE (OHMS) R	X
1		GROUND	0.00	-10000.00
2		GROUND	123.78	149.33
1		2	0.00	22.50

NODE	VOLTAGE MAGNITUDE	PHASE
1	684.80	99.99
2	627.21	96.10

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	128.12	173.22	215.45	53.51
INPUT CURRENT (AMPS) :	2.19	2.30	3.18	46.48
OUTPUT CURRENT (AMPS) :	2.35	2.33	3.30	44.74

INPUT/OUTPUT CURRENT RATIO = 0.9618
INPUT/OUTPUT PHASE = 1.74 DEGREES

FIGURE 13
WITK CIRCUIT ANALYSIS FOR DIRECTIONAL DAY MODE

CUSTOMER : WITK
NETWORK ID : TOWER 2 DAY

FREQUENCY : 1550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,-10000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 25.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -6845.40 OHMS
TOWER IMPEDANCE (R,X) : 167.01, 120.28 OHMS

NODE	TO NODE	IMPEDANCE (OHMS) R	X
1	GROUND	0.00	-10000.00
2	GROUND	172.93	118.14
1	2	0.00	25.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	1095.94	64.68
2	1022.45	59.40

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	177.93	142.09	227.71	38.61
INPUT CURRENT (AMPS) :	4.32	2.11	4.81	26.07
OUTPUT CURRENT (AMPS) :	4.55	1.99	4.97	23.64

INPUT/OUTPUT CURRENT RATIO = 0.9688
INPUT/OUTPUT PHASE = 2.43 DEGREES

FIGURE 13
WITK CIRCUIT ANALYSIS FOR DIRECTIONAL DAY MODE

CUSTOMER : WITK
NETWORK ID : TOWER 3 DAY

FREQUENCY : 1550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,-10000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 34.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -2281.80 OHMS
TOWER IMPEDANCE (R,X) : 297.88, 141.07 OHMS

NODE	TO NODE	IMPEDANCE (OHMS) R	X
1	GROUND	0.00	-10000.00
2	GROUND	332.00	104.17
1	2	0.00	34.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	1336.22	4.68
2	1292.95	359.50

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	340.99	128.62	364.44	20.67
INPUT CURRENT (AMPS) :	3.52	-1.01	3.67	-15.99
OUTPUT CURRENT (AMPS) :	3.53	-1.71	3.92	-25.84

INPUT/OUTPUT CURRENT RATIO = 0.9347
INPUT/OUTPUT PHASE = 9.85 DEGREES

FIGURE 14
WITK CIRCUIT ANALYSIS FOR DIRECTIONAL NIGHT MODE

CUSTOMER : WITK
NETWORK ID : TOWER 1 NIGHT

FREQUENCY : 1550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,-10000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 22.50 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -6845.40 OHMS
TOWER IMPEDANCE (R,X) : 44.57, 178.88 OHMS

NODE	TO NODE	IMPEDANCE (OHMS) R	X
1	GROUND	0.00	-10000.00
2	GROUND	46.99	183.37
1	2	0.00	22.50

NODE	VOLTAGE MAGNITUDE	PHASE
1	204.75	-158.68
2	183.54	199.80

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	48.99	209.96	215.60	76.87
INPUT CURRENT (AMPS) :	-0.54	0.78	0.95	124.45
OUTPUT CURRENT (AMPS) :	-0.55	0.83	1.00	123.79

INPUT/OUTPUT CURRENT RATIO = 0.9539
INPUT/OUTPUT PHASE = 0.66 DEGREES

FIGURE 14
WITK CIRCUIT ANALYSIS FOR DIRECTIONAL NIGHT MODE

CUSTOMER : WITK
NETWORK ID : TOWER 2 NIGHT

FREQUENCY : 1550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,-10000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 25.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -6845.40 OHMS
TOWER IMPEDANCE (R,X) : 140.47, 278.68 OHMS

NODE	TO	NODE	IMPEDANCE (OHMS) R	X
1		GROUND	0.00	-10000.00
2		GROUND	152.58	287.24
1		2	0.00	25.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	523.50	77.43
2	489.95	75.50

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	162.53	319.75	358.68	63.06
INPUT CURRENT (AMPS) :	1.41	0.36	1.46	14.38
OUTPUT CURRENT (AMPS) :	1.53	0.33	1.57	12.25

INPUT/OUTPUT CURRENT RATIO = 0.9297
INPUT/OUTPUT PHASE = 2.13 DEGREES

FIGURE 14
WITK CIRCUIT ANALYSIS FOR DIRECTIONAL NIGHT MODE

CUSTOMER : WITK
NETWORK ID : TOWER 3 NIGHT

FREQUENCY : 1550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,-10000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 34.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -2281.80 OHMS
TOWER IMPEDANCE (R,X) : 442.39, 629.75 OHMS

NODE	TO NODE	IMPEDANCE (OHMS) R	X
1	GROUND	0.00	-10000.00
2	GROUND	787.48	658.93
1	2	0.00	34.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	391.32	-38.78
2	383.06	319.80

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	902.64	668.15	1123.02	36.51
INPUT CURRENT (AMPS) :	0.09	-0.34	0.35	-75.29
OUTPUT CURRENT (AMPS) :	-0.04	-0.50	0.50	-95.11

INPUT/OUTPUT CURRENT RATIO = 0.7001
INPUT/OUTPUT PHASE = 19.83 DEGREES

FIGURE 15
WITK REFERENCE FIELD INTENSITY MEASUREMENTS
MAY, 2018

WITK DAY REFERENCE POINT MEASUREMENTS – MAY 12, 2018

						CO-ORD NAD27			
Radial		**Dist km**	**mV/m**	**Time**		**Deg**	**Min**	**Sec**	**Description**
83°	1	1.08	709	1251	N	41	20	50.0	Phoenix St. at drive
					W	75	46	20.2	
	2	2.29	317	1303	N	41	20	54.7	Stephenson St./Donnelly St. at Fire
					W	75	45	28.2	Hydrant
	3	2.50	390	1258	N	41	20	55.2	Foote Ave., Parking lot School House
					W	75	45	19.1	Apartments
203°	1	1.94	276	1317	N	41	19	43.1	#110 Linden St.
					W	75	47	36.6	
	2	2.17	233	1321	N	41	19	41.7	Stanton St./Liberty St. corner
					W	75	47	43.2	
	3	2.23	285	1333	N	41	19	39.8	#228 Wyoming Ave.
					W	75	47	44.0	
300°	1	2.31	26.0	1425	N	41	21	23.2	#1426 Exeter Ave.
					W	75	48	32.4	
	2	6.22	0.66	1446	N	41	22	25.5	Church lot, edge of Cemetery
					W	75	50	58.3	
	3	6.24	0.86	1441	N	41	22	28.3	Mount Zion Rd., at Church sign
					W	75	50	58.1	

FIGURE 15

WELE REFERENCE FIELD INTENSITY MEASUREMENTS

CONTINUED

WITK DAY REFERENCE POINT MEASUREMENTS – MAY 12, 2018

					CO-ORD NAD27			
Radial		**Dist km**	**mV/m**	**Time**	**Deg**	**Min**	**Sec**	**Description**
346°	1	0.61	185	1514	N 41	21	05.3	Coxton Rd. East of lines
					W 75	47	12.3	
	2	3.22	1.89	1521	N 41	22	27.5	Coxton Rd. by railroad tracks
					W 75	47	40.6	
	3	4.78	0.59	1530	N 41	23	16.1	Coxton Rd. at 25MPH sign
					W 75	47	56.6	

FIGURE 15

WITK REFERENCE FIELD INTENSITY MEASUREMENTS

CONTINUED

WITK NIGHT REFERENCE POINT MEASUREMENTS – MAY 12, 2018

						CO-ORD NAD27			
Radial		**Dist km**	**mV/m**	**Time**		**Deg**	**Min**	**Sec**	**Description**
24°	1	0.49	137	1751	N	41	21	00.6	Coxton Rd.
					W	75	46	57.8	
	2	0.50	100	1753	N	41	21	00.4	Coxton Rd.
					W	75	46	57.7	
	3	0.62	50.2	1758	N	41	21	04.4	In field by water
					W	75	46	55.9	
143°	1	0.30	756	1731	N	41	20	38.3	Kurry St./Cliff St.
					W	75	46	58.2	
	2	0.97	247	1740	N	41	20	21.1	End of Huckleberry Lane
					W	75	46	40.9	
	3	1.08	164	1743	N	41	20	18.0	Road end at cul-de-sac
					W	75	46	38.3	
262°	1	1.69	8.94	1656	N	41	20	38.4	Exeter Rd. at pull off
					W	75	48	18.5	
	2	1.79	8.19	1700	N	41	20	38.0	Old Exeter Ave in front of Church
					W	75	48	22.5	
	3	4.35	0.15	1712	N	41	20	28.9	#1100 Shooley Ave.
					W	75	50	11.9	

FIGURE 15

WITK REFERENCE FIELD INTENSITY MEASUREMENTS

CONTINUED

WITK NIGHT REFERENCE POINT MEASUREMENTS – MAY 12, 2018

						CO-ORD NAD27			
Radial		**Dist km**	**mV/m**	**Time**		**Deg**	**Min**	**Sec**	**Description**
293°	1	1.79	5.62	1617	N	41	21	07.9	Exeter Ave.
					W	75	48	17.2	
	2	6.00	1.26	1631	N	41	22	01.9	#1326 Mount Zion Rd.
					W	75	51	04.3	
	3	6.80	0.20	1638	N	41	22	11.5	#355 Bodle Rd.
					W	75	51	36.3	
353°	1	0.52	60.4	1545	N	41	21	02.9	Dirt road
					W	75	47	09.0	
	2	0.63	52.8	1550	N	41	21	06.3	Coxton Rd. by guard rail
					W	75	47	09.6	
	3	0.64	45.0	1541	N	41	21	06.4	Coxton Rd. by rock pile
					W	75	47	09.7	