Kathleen A. Kirby
202.719.3360
kkirby@wiley.law

Wiley Rein LLP
2050 M Street NW
Washington, DC 20036
Tel: 202.719.7000

wiley.law

March 7, 2022

VIA e-mail submission to James Bradshaw and Nazifa Sawez

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

Re: **Salem Communications Holding Corporation – FRN 0003760352**
Station WTBN(AM), Pinellas Park, FL (Fac. ID 51985)
Application for Station License

Dear Ms. Dortch:

On behalf of Salem Communications Holding Corporation, licensee of AM station WTBN, Pinellas Park, FL, we are submitting an application on FCC Form 302-AM for license.

The fee due for this application, $1,905.00, has been paid, using the FCC Payer FRN system. A copy of Form 159 confirming the payment is included herewith.

Should there be any questions concerning this application, please contact the undersigned.

Respectfully submitted,

Kathleen A. Kirby

Online Payment Information

Total Amount	$1,905.00
Payer FRN	0003760352
Payer Name	0003760352
Remittance ID	3751086
Treasury Tracking ID	26V895AH

Thank you for your payment!

READ INSTRUCTIONS CAREFULLY
BEFORE PROCEEDING

FEDERAL COMMUNICATIONS COMMISSION
REMITTANCE ADVICE

Approved by OMB
3060-0589

(1) LOCK BOX #	SPECIAL USE ONLY
979089	FCC USE ONLY

SECTION A – PAYER INFORMATION

(2) PAYER NAME (if paying by credit card enter name exactly as it appears on the card)	(3) TOTAL AMOUNT PAID (U.S. Dollars and cents)
Salem Communications Holding Corporation	1,905.00

(4) STREET ADDRESS LINE NO.1
4880 Santa Rosa Road

(5) STREET ADDRESS LINE NO. 2

(6) CITY	(7) STATE	(8) ZIP CODE
Camarillo	CA	93012

(9) DAYTIME TELEPHONE NUMBER (include area code)	(10) COUNTRY CODE (if not in U.S.A.)
8053844502	US

FCC REGISTRATION NUMBER (FRN) REQUIRED

(11) PAYER (FRN)	(12) FCC USE ONLY
0003760352	

IF MORE THAN ONE APPLICANT, USE CONTINUATION SHEETS (FORM 159-C)
COMPLETE SECTION BELOW FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET

(13) APPLICANT NAME
Salem Communications Holding Corporation

(14) STREET ADDRESS LINE NO.1
4880 Santa Rosa Road

(15) STREET ADDRESS LINE NO. 2

(16) CITY	(17) STATE	(18) ZIP CODE
Camarillo	CA	93012

(19) DAYTIME TELEPHONE NUMBER (include area code)	(20) COUNTRY CODE (if not in U.S.A.)
8053844502	US

FCC REGISTRATION NUMBER (FRN) REQUIRED

(21) APPLICANT (FRN)	(22) FCC USE ONLY
0003760352	

COMPLETE SECTION C FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET

(23A) CALL SIGN/OTHER ID	(24A) PAYMENT TYPE CODE	(25A) QUANTITY
WTBN(AM)	MMR	1
(26A) FEE DUE FOR (PTC)	(27A) TOTAL FEE	FCC USE ONLY
645.00	645.00	
(28A) FCC CODE I	(29A) FCC CODE 2	
51985	Form302-AM	

(23B) CALL SIGN/OTHER ID	(24B) PAYMENT TYPE CODE	(25B) QUANTITY
WTBN(AM)	MOR	1
(26B) FEE DUE FOR (PTC)	(27B) TOTAL FEE	FCC USE ONLY
1,260.00	1,260.00	
(28B)FCC CODE I	(29B) FCC CODE 2	
51985	Form302-AM	

SECTION D – CERTIFICATION

CERTIFICATION STATEMENT

I,_____, certify under penalty of perjury that the foregoing and supporting information is true and correct to the best of my knowledge, information and belief.

SIGNATURE_____ DATE_____

SECTION E - CREDIT CARD PAYMENT INFORMATION

MASTERCARD_____ VISA_____ AMEX_____ DISCOVER_____

ACCOUNT NUMBER_____ EXPIRATION DATE _____

I hereby authorize the FCC to charge my credit card for the service(s)/authorization herein described.

SIGNATURE_____ DATE_____

Federal Communications Commission
Washington, D. C. 20554

Approved by OMB
3060-0627
Expires 01/31/98

FOR FCC USE ONLY

FCC 302-AM
APPLICATION FOR AM BROADCAST STATION LICENSE

(Please read instructions before filling out form.)

FOR COMMISSION USE ONLY

FILE NO.

SECTION I - APPLICANT FEE INFORMATION

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

Salem Communications Holding Corporation

MAILING ADDRESS (Line 1) (Maximum 35 characters)
4880 Santa Rosa Road, Suite 300

MAILING ADDRESS (Line 2) (Maximum 35 characters)

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
Camarillo	CA	93012

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
(805)384-4502	WTBN	51985

2. A. Is a fee submitted with this application? [✔] Yes [ ] No

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

[ ] Governmental Entity [ ] Noncommercial educational licensee [ ] Other (Please explain):

C. If Yes, provide the following information:

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

(A) FEE TYPE CODE	(B) FEE MULTIPLE	(C) FEE DUE FOR FEE TYPE CODE IN COLUMN (A)	FOR FCC USE ONLY
MMR	0001	$ 645.00	

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

(A)	(B)	(C)	FOR FCC USE ONLY
MOR	0001	$ 1,260.00	

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

TOTAL AMOUNT REMITTED WITH THIS APPLICATION	FOR FCC USE ONLY
$ 1,905.00	

CLEAR ALL PAGES

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT Salem Communications Holding Corporation		
MAILING ADDRESS 4880 Santa Rosa Road, Suite 300		
CITY Camarillo	STATE CA	ZIP CODE 93012

2. This application is for:

☑ Commercial ☐ Noncommercial

☑ AM Directional ☐ AM Non-Directional

Call letters	Community of License	Construction Permit File No.	Modification of Construction Permit File No(s).	Expiration Date of Last Construction Permit
WTBN	Pinellas Park, FL	BP-20200615AAD		09/09/2023

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

☐ Yes ☑ No

If No, explain in an Exhibit. Program test authority is hereby requested.

Exhibit No.

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

☑ Yes ☐ No

If No, state exceptions in an Exhibit.

Exhibit No.

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

☐ Yes ☑ No

If Yes, explain in an Exhibit.

Exhibit No.

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

☐ Yes ☐ No

☑ Does not apply

If No, explain in an Exhibit.

Exhibit No.

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

☐ Yes ☑ No

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

Exhibit No.

CLEAR ALL PAGES

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	Signature	
Christopher J. Henderson	Christopher Henderson	
Title	Date	Telephone Number
Executive Vice President & Secretary	3/3/2022	(805)987-0400

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

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

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

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

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

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SECTION III - LICENSE APPLICATION ENGINEERING DATA

Name of Applicant
SALEM COMMUNICATIONS HOLDING CORPORATION

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
WTBN	BP-20200615AAD	570	Unlimited	0.73	0.25

2. Station location

State	City or Town
FLORIDA	PINELLAS PARK

3. Transmitter location

State	County	City or Town	Street address (or other identification)
FL	Pinellas	Safety Harbor	1000 Harbor Lake Drive

4. Main studio location

State	County	City or Town	Street address (or other identification)
FL	Hillsborough	Tampa	5211 W. Laurel St.

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

State	County	City or Town	Street address (or other identification)
FL	Hillsborough	Tampa	5211 W. Laurel St.

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
3.95	2.32

Measured antenna or common point resistance (in ohms) at operating frequency		Measured antenna or common point reactance (in ohms) at operating frequency	
Night	Day	Night	Day
50.0	50.0	0.0	0.0

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(C)	0.0	0.0	1.000	1.000		
2(N)	117.1	117.1	.978	.978		

Manufacturer and type of antenna monitor: Potomac Instruments 1901-4

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	85.31	86.9 #1, 88.4 #2	87.3 #1, 88.5 #2	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					
27	o	59	'	57	"	82	o	42	'	01	"

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?

None

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

New Construction

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

Name (Please Print or Type)	Signature (check appropriate box below)
Kurt Gorman	
Address (include ZIP Code) Phasetek Inc. 550 California Rd., Unit 11 Quakertown, PA 18951	Date February 26, 2022 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

WTBN, 570 KHZ, DA-2

PINELLAS PARK, FLORIDA

FEBRUARY, 2022

PHASETEK INC.

ENGINEERING STATEMENT CONCERNING
APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WTBN, 570 KHZ, DA-2
PINELLAS PARK, FLORIDA
FEBRUARY, 2022

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PHASETEK INC.

ENGINEERING STATEMENT CONCERNING
APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WTBN, 570 KHZ, DA-2
PINELLAS PARK, FLORIDA
FEBRUARY, 2022

SUMMARY

Adjustment of the Antenna System and a Proof of Performance employing Moment Method Modeling was performed on Radio Station WTBN, 570 KHz, Pinellas Park, Florida, after installation of Antenna Phasing equipment, filtering, transmission lines, and Sampling Lines. WTBN holds Construction Permit Number: BP-202006154AAD to change transmitter site and patterns. This report was prepared on behalf of Salem Communications Holding Corporation, licensee of Radio Station WTBN.

SITE MODIFICATIONS

The WTBN Transmitter site is that as currently licensed for Radio Station WGUL, 860 KHz. New phasing equipment and lines have been installed. Filtering has been installed at all towers. The site consists of three (3) towers. WTBN operates on towers #1 and #2. All Towers remain unchanged. A License Application employing Moment Method Modeling as set forth in Section 73.151(C) has been done to cover the Radio Station WTBN Construction Permit and license 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 12.

SPECIAL OPERATING CONDITION #4/SPURIOUS EMISSIONS

Due to the common usage of the Transmitter site by both Radio Stations WTBN, 570 KHz and WGUL, 860 KHz, filtering is installed at all Towers to prevent interaction and spurious radiation products. No changes have been made to the existing WGUL sampling system except for three equal length sampling line jumpers. Figure 14 shows measurement of any spurious radiation products. All filter circuits are located on the matching network side of the Sampling TCT's for both stations. The "reject" Filters (located at each tower) measure greater than 50,000 ohms, and are not included in the circuit model.

PHASETEK INC.

ENGINEERING STATEMENT CONCERNING
APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WTBN, 570 KHZ, DA-2
PINELLAS PARK, FLORIDA
FEBRUARY, 2022

ADDITIONAL TOWERS CO-LOCATED ON THE SITE

Located on the WTBN/WGUL transmitter site property are three (3) towers. Towers #1 and #2 are base insulated and series fed. Tower #3 is self supporting and grounded at the base with a six (6) wire skirt. This skirt is used for both feed/detuning. Tower #1 supports an FM antenna. Tower #2 supports a STL antenna. The ASRN for tower #3 is: 1008412. All Towers have aviation obstruction lighting. WTBN, 570 kHz, operates on towers #1 and #2. Tower #3 is detuned with the existing 860 kHz skirt at 570 kHz. All towers were included in the measured open circuit impedance matrix for 570 kHz to verify any influence on the model. With the skirt open circuited for tower #3, this appears as a low impedance to ground for the measurement process, and is included in the individual tower calculations that way. Since tower #3 is detuned for 570 kHz, it is included in the directional model for 570 kHz with an equivalent base reactance to detune at 570 kHz.

METHOD OF MOMENTS DETAIL

All Moment Method Modeling was done with Expert MININEC Broadcast Professional, Version 23. One wire was used to represent towers #1 and #2. Three wires were used to represent tower #3. Towers were driven individually to verify the Model compared to measured impedance data. Once the Model was verified, the Day Directional Antenna System was computed. WTBN utilizes the same radiation pattern for Day/Night modes of operation with a change in the input power. All feed point currents were computed for the Day mode, and when normalized, are the same for the Night mode. For the Directional mode, 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. The computed Day current moments are shown in Figure 15.

PHASETEK INC.

ENGINEERING STATEMENT CONCERNING
APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WTBN, 570 KHZ, DA-2
PINELLAS PARK, FLORIDA
FEBRUARY, 2022

MEASURING EQUIPMENT AND PERSONNEL

All Tower Resistance and Reactance measurements were made with a HP 8753ES Network analyzer with a Tunwall directional coupler and a Delta Electronics OIB-3 Operating Impedance Bridge. 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. The meter was compared to a Potomac Instruments PI 4100, Serial Number 188, calibrated on October 14, 2020, and agreed. All measurements were taken by Phasetek Inc. personnel supervised by Kurt Gorman of Phasetek Inc.

SPECIAL OPERATING CONDITION #4/WGUL OPERATION

After installation and adjustment of all filtering, the WGUL, 860 kHz antenna monitor parameters were adjusted to licensed values for Day/Night modes of operation. Measurement of monitored radials and monitoring points was performed. All licensed parameters, Common point impedances, and monitoring points are within currently licensed values. Therefore, a 302-AM is not required for the WGUL system.

SPECIAL OPERATING CONDITION #1/RF RADIATION COMPLIANCE

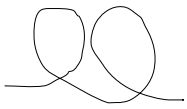
The WTBN/WGUL transmitter site towers are enclosed with individual perimeter fences that have the appropriate warning signs. As specified in the construction permit, WTBN/WGUL will reduce power or cease operation, as necessary, to protect persons having access to the site.

PHASETEK INC.

ENGINEERING STATEMENT CONCERNING
APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WTBN, 570 KHZ, DA-2
PINELLAS PARK, FLORIDA
FEBRUARY, 2022

CONCLUSION

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



Kurt Gorman, President
Phasetek Inc.
Quakertown, Pennsylvania

ANTENNA SYSTEM AS ADJUSTED

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WTBN, 570 KHZ, DA-2
PINELLAS PARK, FLORIDA
FEBRUARY, 2022

ANTENNA SYSTEM DESCRIPTION

1. The Antenna System consists of two (2) uniform, guyed, vertical steel transmitting Towers. Both Towers stand 85.31M (58.4°) above their Base Insulators. The Towers are arranged with Tower 1 as a reference; Tower 2 is spaced 61.2° on a bearing of 16.5°T. Both towers have aviation obstruction lighting.

2. The Ground System for each Tower remains as currently licensed for Radio Station WGUL and consists of (120) buried copper Radials, 85.3M in length except where they intersect with copper transverse straps between Towers or property boundaries. In addition, a 9.8M square copper ground screen is installed at each tower base. Copper strap connects all Towers to the main Transmitter grounding point.

3. The Sampling System consists of two (2), Phasetek Inc. P600-203, 1.0 V/A Toroidal Current Transformers. All TCT's are at the Output of each diplexing filter. These TCT's are connected to a Potomac Instruments 1901-4 antenna Monitor via two (2) equal lengths of Andrew, LDF-4-50A, 1/2" phase stabilized foam coaxial cable.

4. Tower registration numbers:
   Tower 1: 1008410
   Tower 2: 1008411

FIGURE 1
ANTENNA SYSTEM AS ADJUSTED

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
CONTINUED
WTBN, 570 KHZ, DA-2
PINELLAS PARK, FLORIDA
FEBRUARY, 2022

ANTENNA SYSTEM DESCRIPTION – Continued

DIRECTIONAL OPERATION (DAY)

COMMON POINT

Impedance = 50.0 + j 0.0 Ohms
Current = 2.32 Amperes
Power = 270 Watts

DIRECTIONAL OPERATION (NIGHT)

COMMON POINT

Impedance = 50.0 + j 0.0 Ohms
Current = 3.95 Amperes
Power = 780 Watts

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

FIGURE 2
WTBN SAMPLING SYSTEM DESCRIPTION/MEASUREMENTS

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WTBN, 570 KHZ, DA-2
PINELLAS PARK, FLORIDA
FEBRUARY, 2022

SAMPLING SYSTEM DESCRIPTION

The Sampling System consists of Phasetek Inc. 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 LDF-4-50A. The Antenna Monitor is a Potomac Instruments Model 1901-4, Serial Number 712.

SAMPLE LINE MEASUREMENTS

Impedance measurements were made of the Antenna Sampling Lines using an Array Solutions VNA-2180 network analyzer . Measurements were done with the lines open circuited and then connected to the TCT's.

The table below shows the frequencies 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 first resonant frequency above the carrier frequency, which is the closest one to the carrier frequency, was found to be 90 electrical degrees. The electrical length at carrier frequency appearing in the table below was calculated by ratioing the frequencies. Due to the length of the lines and the carrier frequency, both resonant frequencies are above the carrier frequency.

SAMPLE LINE MEASUREMENTS

	First Resonant Frequency (KHz) above 570 KHz	Second Resonant Frequency (KHz) above 570 KHz	Calculated Electrical Length (deg) at 570 KHz	Measured Impedance (ohms) Connected to TCT @ 570 KHz
Tower 1	671.03	2023.68	76.4	55.1 –j 6.8
Tower 2	671.32	2027.36	76.4	55.3 –j 6.9

FIGURE 2
WTBN SAMPLING SYSTEM DESCRIPTION/MEASUREMENTS

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WTBN, 570 KHZ, DA-2
PINELLAS PARK, FLORIDA
FEBRUARY, 2022
CONTINUED

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	1006.55	2.9 +j 49.7	335.52	0.4 –j 51.0	50.39
2	1006.98	2.7 +j 49.7	335.66	0.4 –j 51.2	50.48

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 #1 and are within the manufacturer's rating of ± 1.5% and ± 2.0°.

FIGURE 2
WTBN SAMPLING SYSTEM DESCRIPTION/MEASUREMENTS

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WTBN, 570 KHZ, DA-2
PINELLAS PARK, FLORIDA
FEBRUARY, 2022
CONTINUED

SAMPLING TCT MEASUREMENTS CONT'D

TOWER	TCT SERIAL #	MAGNITUDE	PHASE
1	773	1.000	0.0^{o}
2	774	.996	0.2^{o}

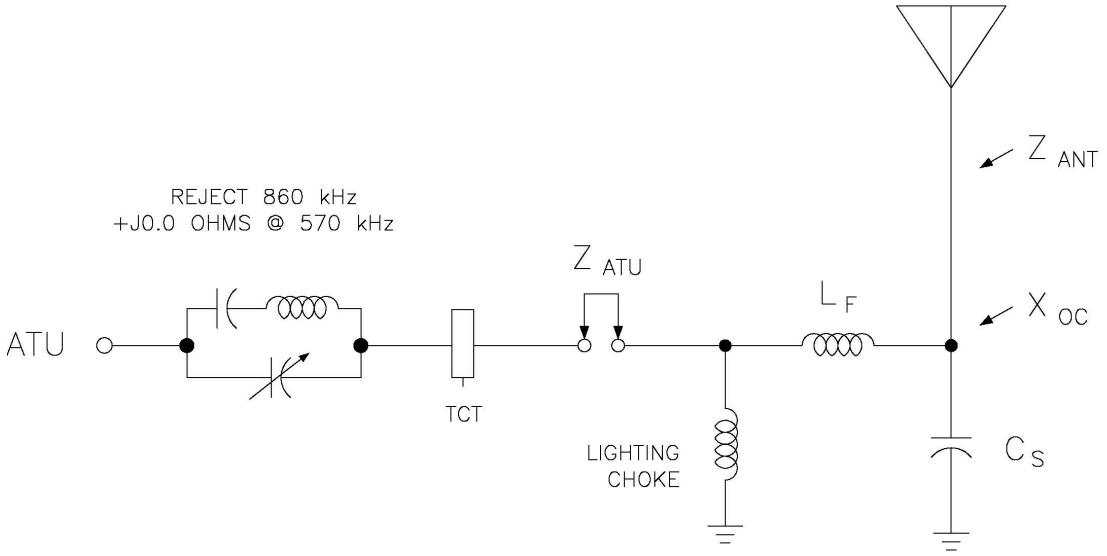
ANTENNA MONITOR MEASUREMENT

Measurement of the Potomac Instruments Model 1901-4 Antenna Monitor was performed to verify calibration. A single RF Voltage was applied to the Day/Night Reference Input (Tower #1) 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	0.0^{0}
2	1.004	-0.3^{0}

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

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



TOWER	Specified	Measured	Measured	Modeled	Modeled	Measured
	Cs (pf)	L_F (µH)	X_F (Ω)	Z_{ANT} (Ω)	Z_{ATU} (Ω)	Z_{ATU} (Ω)
1	28	0.56	+j2.0	16.64 –j 110.98	20.10 –j 119.47	21.4 –j 119.0
2	20	1.95	+j7.0	16.09 –j 116.54	19.58 –j 120.48	20.0 –j 120.2

Tower	Calculated X_{OC} (Ω)
1	+j 1,206.6
2	+j 1,172.2

FIGURE 4
WTBN MOMENT MODEL PARAMETERS

Tower #	Wire #	# of Segments	Base Node
1	1	10	1
2	2	10	11
3*	3-5	9	21

Tower #	Physical Height Degrees	Modeled Height Degrees	Modeled Radius Meters	% of Equivalent Radius
1	58.4	67.0	.2911	100.0
2	58.4	66.0	.2911	100.0
3*	37.0	37.0	2.1466/.9217	100.0/140.7

* Used for 860 kHz only

Towers #1 and #2 are uniform cross section and guyed. Tower #3 is tapered, self supporting, and grounded at base. Towers #1 and #2 have Base Insulators and are three (3) sided, 24" face width. Tower #3 is a stepped face, three sided, with 177" face width at base and 54" face width at top. Base insulators were manufactured by Austin with an assumed capacity of 15pF (-j18,614.6 ohms @ 570 kHz). Tower #3 is grounded at the base with a six (6) wire skirt. Tower #1 has a FM choke assembly with a capacity of 13pF, for a total of 28pF across the base (-j9,972.1 ohms @ 570 kHz). Tower #2 has a Mosely STL isocoupler with a capacity of 5pF, for a total of 20pF across the base (-j13,961.0 ohms @ 570 kHz).

Towers #1 and #2 have a Phasetek Inc. lighting choke. These measure +j1,074.4 ohms @ 570 kHz.

FIGURE 5
WTBN MOMENT SUMMARY FOR INDIVIDUAL TOWERS

WTBN TOWER 1

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	10
		0	0	67.		
2	none	61.2	16.5	0	.2911	10
		61.2	16.5	66.		
3	none	53.7	154.6	0	2.1466	3
		53.7	154.6	12.33		
4	none	53.7	154.6	12.33	1.4008	3
		53.7	154.6	21.66		
5	none	53.7	154.6	21.66	.9217	3
		53.7	154.6	37.		

Number of wires = 5
current nodes = 29

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	4	3.11	1	6.7
radius	1	.2911	3	2.1466

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	.57	0	1	8.64E-03	.0186111

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	11	0	1,172.2	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
.57	16.639	-110.98	112.22	278.5	18.087	-.96145	-7.0204

FIGURE 5
WTBN MOMENT SUMMARY FOR INDIVIDUAL TOWERS

WTBN TOWER 2

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	10
		0	0	67.		
2	none	61.2	16.5	0	.2911	10
		61.2	16.5	66.		
3	none	53.7	154.6	0	2.1466	3
		53.7	154.6	12.33		
4	none	53.7	154.6	12.33	1.4008	3
		53.7	154.6	21.66		
5	none	53.7	154.6	21.66	.9217	3
		53.7	154.6	37.		

Number of wires = 5
current nodes = 29

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	4	3.11	1	6.7
radius	1	.2911	3	2.1466

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	.57	0	1	8.64E-03	.0186111

Sources

source	node	sector	magnitude	phase	type
1	11	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	1,206.6	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 11, sector 1							
.57	16.086	-116.54	117.65	277.9	20.268	-.85778	-7.4659

FIGURE 6
WTBN MOMENT MODEL ARRAY SYNTHESIS (DIRECTIONAL DAY)

WTBN DAY

MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = .57 MHz

tower	field ratio magnitude	phase (deg)
1	1.	0
2	.95	117.2
3	0	0

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	334.58	280.7	3.40582	1.3
11	430.034	30.3	3.41977	117.8
21	42.7093	9.6	.0849283	100.9

Sum of square of source currents = 46.6033
Total power = 250. watts

TOWER ADMITTANCE MATRIX

admittance	real (mhos)	imaginary (mhos)
Y(1, 1)	.00118788	.00876754
Y(1, 2)	.000796631	-.000659063
Y(1, 3)	.00020681	-.000173048
Y(2, 1)	.000796661	-.000659037
Y(2, 2)	.00103646	.00837594
Y(2, 3)	5.9758E-05	-.000184846
Y(3, 1)	.000206738	-.000172483
Y(3, 2)	5.9794E-05	-.000184626
Y(3, 3)	6.0819E-05	.0051591

TOWER IMPEDANCE MATRIX

impedance	real (ohms)	imaginary (ohms)
Z(1, 1)	16.6832	-110.992
Z(1, 2)	12.7069	-5.6011
Z(1, 3)	5.56085	-3.02984
Z(2, 1)	12.7066	-5.60167
Z(2, 2)	16.0567	-116.697
Z(2, 3)	2.61929	-3.63727
Z(3, 1)	5.56488	-3.04207
Z(3, 2)	2.62069	-3.64275
Z(3, 3)	2.72836	-193.779

FIGURE 7
WTBN MOMENT MODEL SUMMARY FOR DIRECTIONAL DAY MODE

```
WTBN DAY

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

wire  caps Distance     Angle        Z            radius      segs
 1    none 0            0            0            .2911        10
           0            0            67.
 2    none 61.2         16.5         0            .2911        10
           61.2         16.5         66.
 3    none 53.7         154.6        0            2.1466       3
           53.7         154.6        12.33
 4    none 53.7         154.6        12.33        1.4008       3
           53.7         154.6        21.66
 5    none 53.7         154.6        21.66        .9217        3
           53.7         154.6        37.

Number of wires          =  5
          current nodes  =  29

                         minimum                  maximum
Individual wires      wire    value             wire  value
segment length         4      3.11               1    6.7
radius                 1      .2911              3    2.1466


ELECTRICAL DESCRIPTION
Frequencies (MHz)
     frequency                no. of  segment length (wavelengths)
 no. lowest       step         steps   minimum        maximum
 1   .57          0             1      8.64E-03       .0186111

Sources
source node    sector  magnitude      phase          type
 1      1       1      473.168        280.7          voltage
 2      11      1      608.16         30.3           voltage

Lumped loads
            resistance    reactance     inductance  capacitance passive
load  node  (ohms)        (ohms)        (mH)        (uF)        circuit
 1     21   0             502.76        0           0            0


IMPEDANCE
   normalization = 50.
freq     resist   react    imped    phase    VSWR    S11      S12
(MHz)    (ohms)   (ohms)   (ohms)   (deg)            dB       dB
source =  1; node 1, sector 1
.57      16.072   -96.917  98.24    279.4    15.054  -1.1557  -6.3146

source =  2; node 11, sector 1
.57      5.445    -125.63  125.75   272.5    67.252  -.25833  -12.385
```

CURRENT rms
Frequency = .57 MHz
Input power = 250. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	3.40504	1.3	3.40419	.076294
2	0	0	6.7	3.18452	.7	3.18425	.0409448
3	0	0	13.4	2.96867	.4	2.96861	.0187093
4	0	0	20.1	2.72149	.1	2.72149	2.5E-03
5	0	0	26.8	2.43953	359.8	2.43952	-8.84E-03
6	0	0	33.5	2.12304	359.6	2.12298	-.0159289
7	0	0	40.2	1.77348	359.4	1.77337	-.0192152
8	0	0	46.9	1.39244	359.2	1.39231	-.019097
9	0	0	53.6	.980305	359.1	.980176	-.0159067
10	0	0	60.3	.532763	358.9	.532672	-9.83E-03
END	0	0	67.	0	0	0	0
GND	58.6798	-17.3817	0	3.41903	117.8	-1.59556	3.0239
12	58.6798	-17.3817	6.6	3.14502	117.6	-1.45827	2.78651
13	58.6798	-17.3817	13.2	2.89745	117.5	-1.33653	2.57078
14	58.6798	-17.3817	19.8	2.62937	117.3	-1.2067	2.33612
15	58.6798	-17.3817	26.4	2.33575	117.2	-1.06638	2.07812
16	58.6798	-17.3817	33.	2.01614	117.	-.91546	1.79632
17	58.6798	-17.3817	39.6	1.6716	116.8	-.754683	1.49154
18	58.6798	-17.3817	46.2	1.30339	116.7	-.584895	1.16479
19	58.6798	-17.3817	52.8	.911727	116.5	-.40653	.816075
20	58.6798	-17.3817	59.4	.492557	116.3	-.218141	.441618
END	58.6798	-17.3817	66.	0	0	0	0
GND	-48.5091	-23.0338	0	.084993	98.9	-.0131501	.0839695
22	-48.5091	-23.0338	4.11	.0258445	98.6	-3.88E-03	.025552
23	-48.5091	-23.0338	8.22	8.97E-03	95.9	-9.18E-04	8.92E-03
J3	-48.5091	-23.0338	12.33	5.68E-03	289.5	1.9E-03	-5.35E-03
2J1	-48.5091	-23.0338	12.33	5.68E-03	289.5	1.9E-03	-5.35E-03
25	-48.5091	-23.0338	15.44	.0108112	286.3	3.03E-03	-.0103774
26	-48.5091	-23.0338	18.55	.0147639	285.7	4.E-03	-.0142122
J4	-48.5091	-23.0338	21.66	.0170927	285.9	4.67E-03	-.0164413
2J1	-48.5091	-23.0338	21.66	.0170927	285.9	4.67E-03	-.0164413
28	-48.5091	-23.0338	26.7733	.0168333	286.6	4.82E-03	-.0161289
29	-48.5091	-23.0338	31.8867	.0122502	287.7	3.73E-03	-.0116672
END	-48.5091	-23.0338	37.	0	0	0	0

FIGURE 10
DERIVED DIRECTIONAL PARAMETERS

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WTBN, 570 KHZ, DA-2
PINELLAS PARK, FLORIDA
FEBRUARY, 2022

DAY:

	Theoretical		Base Network Input Current		Normalized TCT	
Tower	**Field**	**Phase**	**Amplitude**	**Phase**	**Amplitude**	**Phase**
1 (C)	1.000	0.0^{o}	3.14	0.46^{o}	1.000	0.0^{o}
2 (N)	.950	117.2^{o}	3.07	117.52^{o}	.978	117.1^{o}

FIGURE 11
WTBN TOWER BASE CIRCUIT ANALYSIS DESCRIPTION

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
WTBN, 570 KHZ, DA-2
PINELLAS PARK, FLORIDA
FEBRUARY, 2022

CIRCUIT ANALYSIS

Circuit Analysis was performed on each Tower of the WTBN 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.

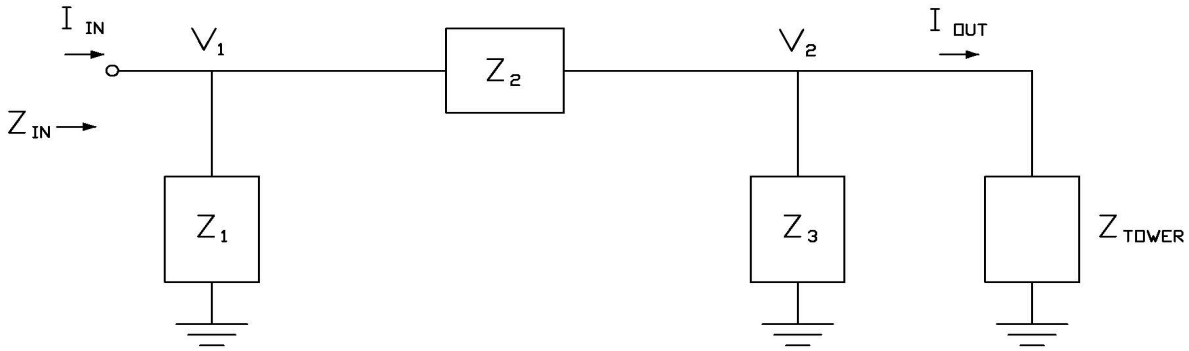


FIGURE 12
WTBN CIRCUIT ANALYSIS FOR INDIVIDUAL TOWERS

CUSTOMER : WTBN
NETWORK ID : TOWER 1

FREQUENCY : 570.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00, 1074.40 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 2.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -9972.10 OHMS
TOWER IMPEDANCE (R,X) : 16.64, -110.98 OHMS

NODE	TO NODE	IMPEDANCE (OHMS) R	X
1	GROUND	0.00	1074.40
2	GROUND	16.28	-109.79
1	2	0.00	2.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	100.00	0.00
2	101.81	-0.15

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	20.10	-119.47	121.15	-80.45
INPUT CURRENT (AMPS) :	0.14	0.81	0.83	80.45
OUTPUT CURRENT (AMPS) :	0.14	0.90	0.91	81.32

INPUT/OUTPUT CURRENT RATIO = 0.9098
INPUT/OUTPUT PHASE = -0.87 DEGREES

CUSTOMER : WTBN
NETWORK ID : TOWER 2

FREQUENCY : 570.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00, 1074.40 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 7.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00,-13961.00 OHMS
TOWER IMPEDANCE (R,X) : 16.09, -116.54 OHMS

NODE	TO NODE	IMPEDANCE (OHMS) R	X
1	GROUND	0.00	1074.40
2	GROUND	15.82	-115.59
1	2	0.00	7.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	100.00	0.00
2	106.32	-0.50

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	19.58	-120.48	122.06	-80.77
INPUT CURRENT (AMPS) :	0.13	0.81	0.82	80.77
OUTPUT CURRENT (AMPS) :	0.13	0.89	0.90	81.64

INPUT/OUTPUT CURRENT RATIO = 0.9066
INPUT/OUTPUT PHASE = -0.87 DEGREES

FIGURE 13
WTBN CIRCUIT ANALYSIS FOR DIRECTIONAL DAY MODE

CUSTOMER : WTBN
NETWORK ID : TOWER 1 DAY

FREQUENCY : 570.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00, 1074.40 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 2.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -9972.10 OHMS
TOWER IMPEDANCE (R,X) : 16.07, -96.92 OHMS

NODE	TO NODE	IMPEDANCE (OHMS) R	X
1	GROUND	0.00	1074.40
2	GROUND	15.76	-96.01
1	2	0.00	2.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	327.80	-79.11
2	334.58	280.70

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	18.93	-102.72	104.45	-79.56
INPUT CURRENT (AMPS) :	3.14	0.02	3.14	0.46
OUTPUT CURRENT (AMPS) :	3.40	0.08	3.41	1.29

INPUT/OUTPUT CURRENT RATIO = 0.9215
INPUT/OUTPUT PHASE = -0.83 DEGREES

CUSTOMER : WTBN
NETWORK ID : TOWER 2 DAY

FREQUENCY : 570.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00, 1074.40 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 7.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00,-13961.00 OHMS
TOWER IMPEDANCE (R,X) : 5.45, -125.63 OHMS

NODE	TO NODE	IMPEDANCE (OHMS) R	X
1	GROUND	0.00	1074.40
2	GROUND	5.35	-124.51
1	2	0.00	7.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	405.90	30.45
2	430.03	30.30

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	6.75	-131.91	132.08	-87.07
INPUT CURRENT (AMPS) :	-1.42	2.73	3.07	117.52
OUTPUT CURRENT (AMPS) :	-1.60	3.02	3.42	117.82

INPUT/OUTPUT CURRENT RATIO = 0.8987
INPUT/OUTPUT PHASE = -0.30 DEGREES

FIGURE 15
WTBN REFERENCE FIELD INTENSITY MEASUREMENTS
FEBRUARY, 2022

WTBN DAY REFERENCE POINT MEASUREMENTS – FEBRUARY 25, 2022

					CO-ORD NAD27				
Radial		**Dist km**	**mV/m**	**Time**		**Deg**	**Min**	**Sec**	**Description**
16.5°	1	0.50	17.7	1625	N	28	00	12.5	Marshall St. at pole
					W	82	41	55.8	
	2	0.74	16.4	1619	N	28	00	19.9	Huntington Lane opposite #1115
					W	82	41	53.2	
	3	1.47	10.8	1608	N	28	00	42.6	Enterprise Rd., South side, at cover
					W	82	41	45.7	
196.5°	1	0.68	124	1637	N	27	59	36.0	#1410 Dr. MLK St.
					W	82	42	08.1	
	2	1.04	163	1658	N	27	59	24.8	#100 Crestwood Drive
					W	82	42	11.9	
	3	1.30	90.0	1643	N	27	59	16.5	#1429 Oak Haven St.
					W	82	42	14.5	

FIGURE 15 CONTINUED
WTBN REFERENCE FIELD INTENSITY MEASUREMENTS
FEBRUARY, 2022

WTBN NIGHT REFERENCE POINT MEASUREMENTS – FEBRUARY 25, 2022

						CO-ORD NAD27			
Radial		**Dist km**	**mV/m**	**Time**		**Deg**	**Min**	**Sec**	**Description**
16.5°	1	0.50	29.9	1626	N	28	00	12.5	Marshall St. at pole
					W	82	41	55.8	
	2	0.74	28.1	1618	N	28	00	19.9	Huntington Lane opposite #1115
					W	82	41	53.2	
	3	1.47	18.1	1610	N	28	00	42.6	Enterprise Rd., South side, at cover
					W	82	41	45.7	
196.5°	1	0.68	212	1636	N	27	59	36.0	#1410 Dr. MLK St.
					W	82	42	08.1	
	2	1.04	255	1657	N	27	59	24.8	#100 Crestwood Drive
					W	82	42	11.9	
	3	1.30	150	1644	N	27	59	16.5	#1429 Oak Haven St.
					W	82	42	14.5	

FIGURE 16

WTBN CERTIFIED ARRAY GEOMETRY SURVEY/ANALYSIS
FEBRUARY, 2022

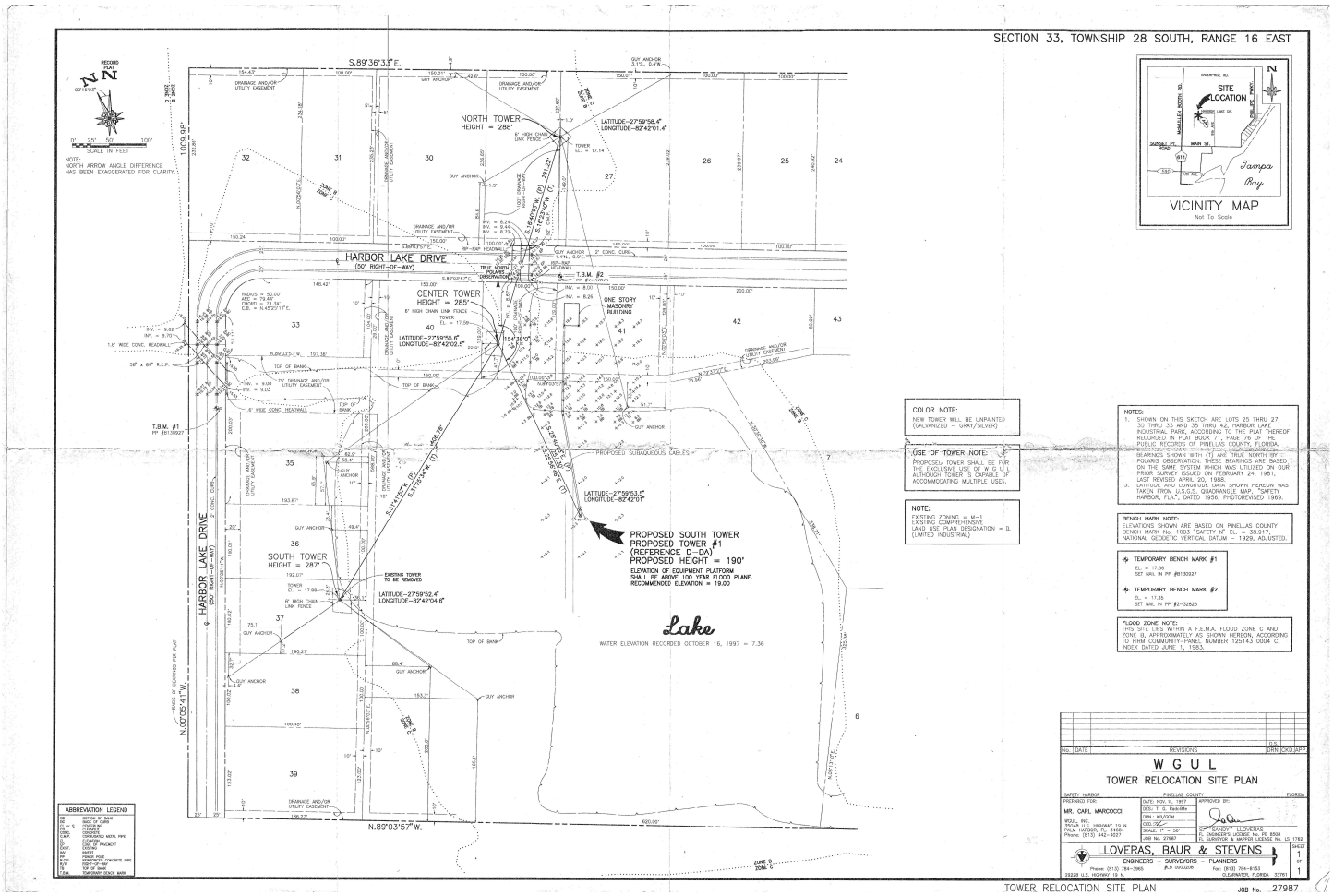


FIGURE 16 CONTINUED

WTBN CERTIFIED ARRAY GEOMETRY SURVEY/ANALYSIS
FEBRUARY, 2022

Station Tower Geometry Analysis

- *Enter Requested Data in Yellow Blocks*

Callsign:	WTBN	*Reference Tower:*	1
Freq. (kHz):	570 kHz	*Feet per wavelength:*	1725.563257

Tower Pair Studied	*Licensed Spacing (Electrical degrees)*	*Licensed Azimuth (Degrees True)*	*Measured Distance (feet)*	*Measured Azimuth (Degrees True)*	*Tower Location Error from Licensed (Result in Feet)*	*Tower Location Error from Licensed (Electrical Degrees)*	*Tower No. & (Loc)*
1 (ref)	0.0	0.0	0.0	0.0	0.00	0.00 °	#1(C)
1 to 2	61.2	16.5	291.220	16.3940	2.19	0.46 °	#2(N)
					–	–	
					–	–	
					–	–	
					–	–	
					–	–	
					–	–	
					–	–	

Law of Cosines Analysis

Tower Pair Studied	Licensed Specification (Side "a") of Triangle (Feet)	Licensed Azimuth Versus Measured Azimuth Difference	Included Angle A Converted to Radians	Tower Location Error from licensed position (Result in Feet)	Error in Feet Converted to Electrical Degrees	*Error Greater Greater Than 1.5° ? (7.19 ft)*
1 (ref)	--	--	--	0.00	0.00 °	N/A
1 to 2	293.35	0.1060 °	0.001850049	2.19	0.46 °	No - Therefore Okay
0	--	--	--	--	–	–
0	--	--	--	--	–	–
0	--	--	--	--	–	–
0	--	--	--	--	–	–
0	--	--	--	--	–	–
0	--	--	--	--	–	–
0	--	--	--	--	–	–

FIGURE 17
WTBN SPURIOUS RADIATION MEASUREMENTS
JULY, 2021

WTBN, 570 kHz, 0.25 kW DA- Day
WGUL, 860 kHz, 5.0 kW, DA- Day

FREQUENCY (kHz)	FIELD (mV/M)	dB to WTBN	dB to WGU
570	163		
860	490		
580	0.01	-84.2438	-93.8039
850	0.01	-84.2438	-93.8039
870	0.015	-80.7219	-90.2821
1140	0.031	-74.4165	-83.9767
1150	0.01	-84.2438	-93.8039
1430	0.04	-72.2026	-81.7627
1440	0.031	-74.4165	-83.9767
1710	0.012	-82.6601	-92.2203
1720	0.018	-79.1383	-88.6985
2000	0.01	-84.2438	-93.8039
2010	0.026	-75.9443	-85.5045
2290	0.011	-83.4159	-92.9761
2570	0.009	-85.1589	-94.7191
2580	0.012	-82.6601	-92.2203
2860	0.009	-85.1589	-94.7191
3150	0.0091	-85.0629	-94.6231
3430	0.0093	-84.8741	-94.4343
3720	0.0096	-84.5983	-94.1585
4290	0.0097	-84.5083	-94.0685

Above taken at point 1.04 kM from antenna
Point coordinates (NAD 27): N 27° 59' 24.8", W 82° 42' 11.9"
with Potomac Instruments PI 4100, SN 273
Above meet required 67dB (WTBN Day) and 80dB (WGUL Day)

FIGURE 17 CONTINUED
WTBN SPURIOUS RADIATION MEASUREMENTS
JULY, 2021

WTBN, 570 kHz, 0.73 kW DA- Night
WGUL, 860 kHz, 1.5 kW, DA- Night

FREQUENCY (kHz)	FIELD (mV/M)	dB to WTBN	dB to WGU
570	255		
860	442		
580	0.01	-88.1308	-92.9084
850	0.01	-88.1308	-92.9084
870	0.015	-84.609	-89.3866
1140	0.029	-78.8828	-83.6605
1150	0.01	-88.1308	-92.9084
1430	0.039	-76.3095	-81.0872
1440	0.04	-76.0896	-80.8672
1710	0.012	-86.5472	-91.3248
1720	0.02	-82.1102	-86.8878
2000	0.02	-82.1102	-86.8878
2010	0.024	-80.5266	-85.3042
2290	0.012	-86.5472	-91.3248
2570	0.0096	-88.4854	-93.263
2580	0.011	-87.3029	-92.0806
2860	0.0096	-88.4854	-93.263
3150	0.0094	-88.6682	-93.4459
3430	0.0092	-88.855	-93.6327
3720	0.0096	-88.4854	-93.263
4290	0.0098	-88.3063	-93.0839

Above taken at point 1.04 kM from antenna
Point coordinates (NAD 27): N 27° 59' 24.8", W 82° 42' 11.9"
with Potomac Instruments PI 4100, SN 273
Above meet required 71.6dB (WTBN Night) and 74.8dB (WGUL Night)

FIGURE 18
WTBN CALCULATED CURRENT MOMENTS
FEBRUARY, 2022

WTBN DAY

CURRENT MOMENTS(amp-degrees) rms

Frequency = .57 MHz
Input power = 250. watts

			vertical current moment	
wire	magnitude	phase (deg)	magnitude	phase (deg)
1	274.342	0.0	274.342	0.0
2	260.628	117.2	260.628	117.2
3	.656425	98.5	.656425	98.5
4	.206644	286.7	.206644	286.7
5	.452443	286.7	.452443	286.7

Medium wave array vertical current moment (amps-degrees) rms
(Calculation assumes tower wires are grouped together.
The first wire of each group must contain the source.)

tower	magnitude	phase (deg)
1	274.342	0.0
2	260.628	117.2
3	.0945946	11.