

SECTION III - LICENSE APPLICATION ENGINEERING DATA

Name of Applicant

Heritage Christian Radio, Inc.

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)



Station License



Direct Measurement of Power

Correction of Coordinate Filing of less than three seconds

1. Facilities authorized in construction permit

Call Sign	File No. of Construction Permit (if applicable)	Frequency (kHz)	Hours of Operation	Power in kilowatts	
WBRI		1500 kHz	Daytime Only	Night	Day 5.0 kW

2. Station location

State Indiana	City or Town Indianapolis
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3. Transmitter location

State Indiana	County Marion	City or Town Indianapolis	Street address (or other identification) 4802 East 62nd Street
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4. Main studio location

State Indiana	County Marion	City or Town Indianapolis	Street address (or other identification) 4802 East 62nd Street
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5. Remote control point location (specify only if authorized directional antenna)

State Indiana	County Marion	City or Town Indianapolis	Street address (or other identification) 4802 East 62nd Street
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6. Has type-approved stereo generating equipment been installed?



Yes



No

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



Yes



No



Not Applicable

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

Exhibit No.

8. Operating constants:

RF common point or antenna current (in amperes) without modulation for Night System	RF common point or antenna current (in amperes) without modulation for day system 10.4 amperes
Measured antenna or common point resistance (in ohms) at operating frequency Night Day 50 ohms	Measured antenna or common point reactance (in ohms) at operating frequency Night Day + J 0 ohms

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
Tower 1 (North)		+160.0°		0.560		N/A
Tower 2 (Center)		0.0°		1.000		N/A
Tower 3 (South)		-146.0°		0.580		N/A

Manufacturer and type of antenna monitor:

Potomac Instruments AM-19(210)

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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 Three equal guyed, uniform cross-section steel towers mounted on unequal concrete base piers and insulators.	Overall height in meters of radiator above base insulator, or above base, if grounded. T1: 50.0 m T2: 50.0 m T3: 50.0 m	Overall height in meters above ground (without obstruction lighting) T1: 51.5 m T2: 51.2 m T3: 51.5 m	Overall height in meters above ground (include obstruction lighting) T1: 51.5 m T2: 51.2 m T3: 51.5 m	If antenna is either top loaded or sectionalized, describe fully in an Exhibit. <div>Exhibit No.</div>
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Excitation



Series



Shunt

T1 (North Tower): ASR not required
T2 (Center Tower): ASR not required
T3 (South Tower): ASR not required

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

North Latitude	39 °	52 '	13 "	West Longitude	86 °	05 '	17 "
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If not fully described above, attach as an Exhibit further details and dimensions including any other antenna mounted on tower and associated isolation circuits.

Exhibit No.
See Vertical Plan

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

Exhibit No.

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

No changes to the AM radiating base insulated towers have been implemented other than the addition of the W244DN.C - Indianapolis, IN FM Translator antenna and isolation circuitry to the south tower (T3) as authorized under Construction Permit BMPFT-20160419AAI. Therefore, this Form 302-AM License Modification is being filed pursuant to Special Condition/Restriction Number three (3) of the W244DN.C Construction Permit. In addition, this Form 302-AM License Modification is being filed as a Correction of Coordinates of less than three seconds as discovered during the construction process. No FAA or ASR corrections are required at this time.

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

The Common Point resistance and reactance measurements have been reset at 50 ohms +j 0 ohms after the above noted tower modification associated with, and as a \$1.30003(a) condition of licensing for W244DN.C - Indianapolis, IN FM Translator Construction Permit BMPFT-20160419AAI. A WBRI(AM) partial proof of performance for the noted construction has been included here-in.

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) Justin W. Asher	Signature (check appropriate box below) 
Address (include ZIP Code) Munn-Reese P.O. Box 220 Coldwater, MI 49036	Date November 15, 2016 Telephone No. (Include Area Code) 1(517)278-7339



Technical Director



Registered Professional Engineer



Chief Operator



Technical Consultant



Other (specify)

Indianapolis, IN - WBRI(AM) Copy of USGS Aerial Photograph of Site

799 ft/244 m

794 ft/242 m

790 ft/241 m

North Tower

Latitude (DMS)

Longitude (DMS)

NAD 27 datum values: 39 52 14.75538

86 05 15.45149

NAD 83 datum values: 39 52 14.90000

86 05 15.40000

Center Tower

Latitude (DMS)

Longitude (DMS)

NAD 27 datum values: 39 52 13.35533

86 05 16.85146

NAD 83 datum values: 39 52 13.50000

86 05 16.80000

South Tower (Proposed FM Translator)

Latitude (DMS)

Longitude (DMS)

NAD 27 datum values: 39 52 11.85528

86 05 18.25143

NAD 83 datum values: 39 52 12.00000

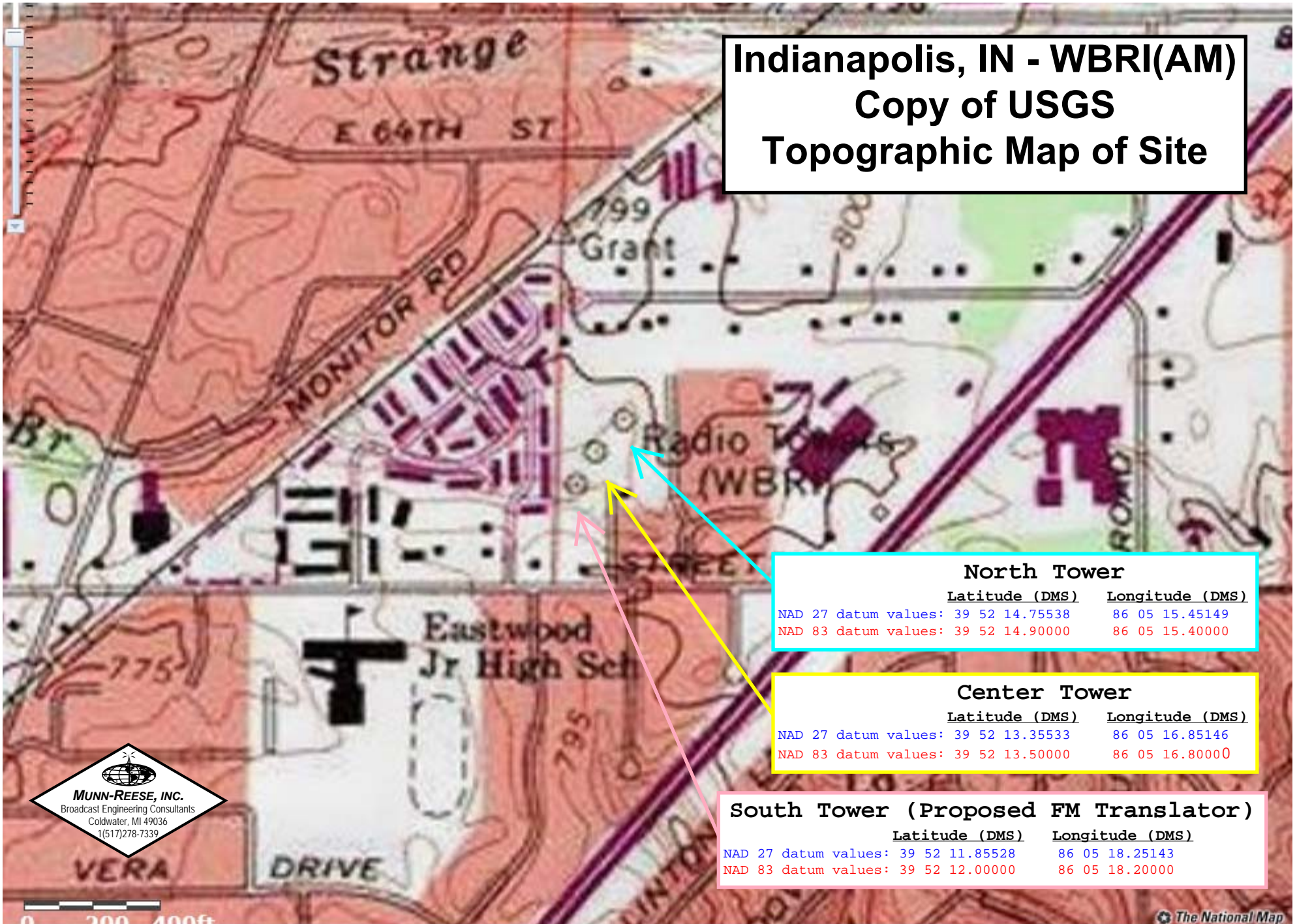
86 05 18.20000



0 50 100ft

The National Map

Indianapolis, IN - WBRI(AM) Copy of USGS Topographic Map of Site



Indianapolis, IN - WBRI(AM)

Vertical Plan of Antenna System

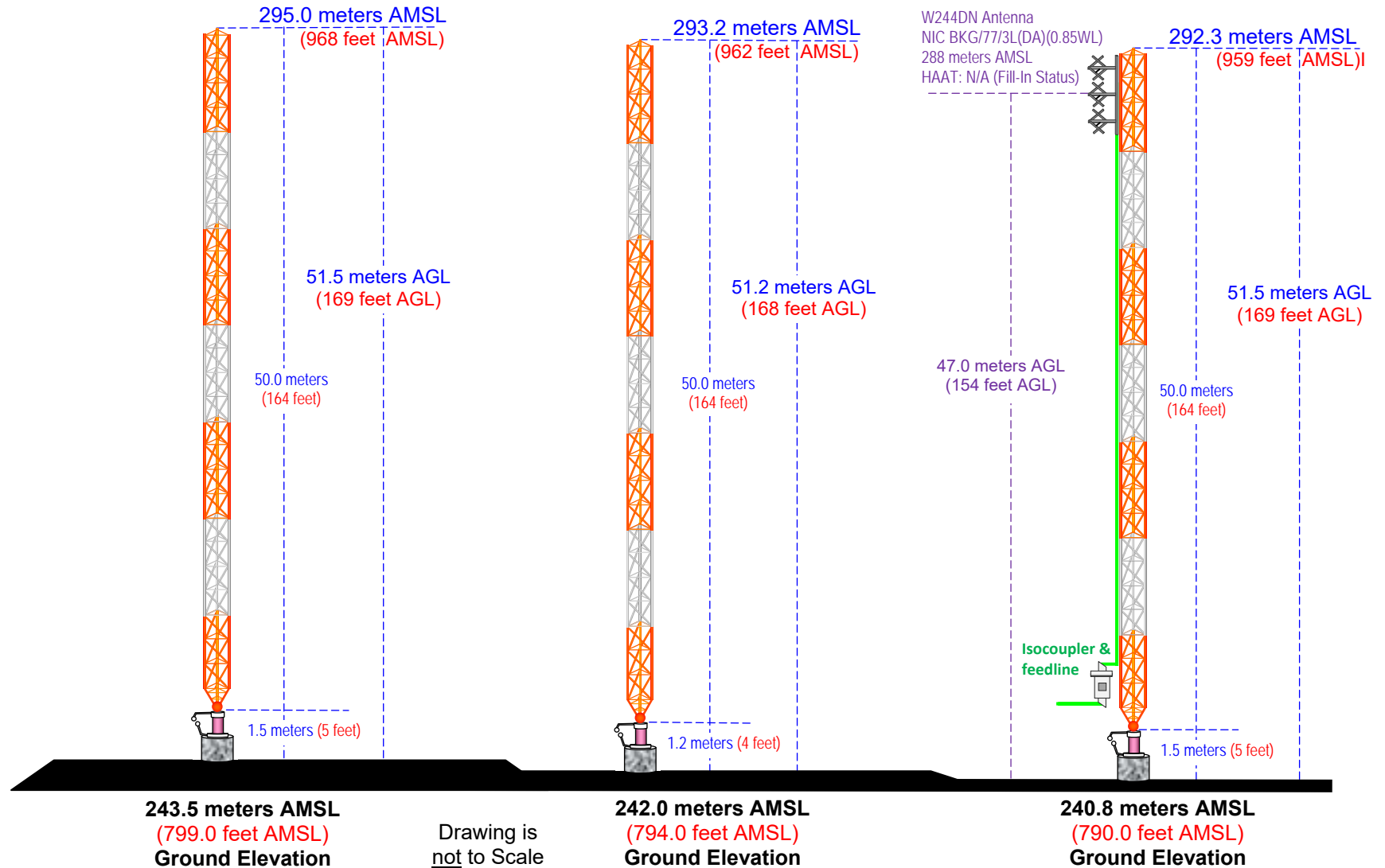
The site is located at 4802 E 62nd Street;
the city of Indianapolis, Marion County; Indiana.

Center of Array:	Latitude (D M S)	Longitude (D M S)
NAD 27 datum values:	39 52 13.35533	86 05 16.85146
NAD 83 datum values:	39 52 13.50000	86 05 16.80000

North Tower: Latitude (DMS) Longitude (DMS)
NAD 27 datum: 39 52 14.75538 86 05 15.45149
NAD 83 datum: 39 52 14.90000 86 05 15.40000

Center Tower: Latitude (DMS) Longitude (DMS)
NAD 27 datum: 39 52 13.35533 86 05 16.85146
NAD 83 datum: 39 52 13.50000 86 05 16.80000

South Tower: Latitude (DMS) Longitude (DMS)
NAD 27 datum: 39 52 11.85528 86 05 18.25143
NAD 83 datum: 39 52 12.00000 86 05 18.20000



MUNN-REESE
Broadcast Engineering Consultants
Coldwater, MI 49036

ENGINEERING REPORT

PARTIAL PROOF OF PERFORMANCE

WBRI(AM) - Indianapolis, IN

Facility ID No. 54706

BZ-20001027ABS

**47 C.F.R. §1.30003(b) - Installation
on an AM Antenna Array**

For the co-location of the W244DN - Indianapolis, IN
antenna and feedline and as a Special Condition
of Licensing per BMPFT-20160419AAI.

November, 2016

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Broadcast Engineering Consultants
Coldwater, MI 49036

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2. Discussion of Report
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5. Exhibit 2.0 -Tabulation of Daytime Ratios
6. Exhibit 3.0 - Vertical Plan of Existing Antenna Array

Certification of Technical Consultant

The firm of Munn-Reese, Inc., Broadcast Technical Consultants, with offices at 385 Airport Drive, Coldwater, Michigan, has been retained for the purpose of 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.

November 15, 2016

By 
Justin W. Asher, Technical Consultant

MUNN-REESE, INC.
Broadcast Engineering Consultants
COLDWATER, MI 49036-0220
517-278-7339 (x107)
justin@munn-reese.com

Discussion

The firm of Munn-Reese, Inc., was retained to prepare this report detailing a Partial Proof of Performance on AM Radio Station WBRI(AM) - Indianapolis, IN (Facility ID No. 54706), License No. BZ-20001027ABS, as required by 47 C.F.R. §1.30003(b) for the co-location of the W244DN - Indianapolis, IN (Facility ID No. 143959) antenna and feedline on tower three (south tower) of the WBRI(AM) array.

WBRI(AM) - Indianapolis, IN currently operates on 1500 kHz with 5.0 kW of daytime only directional power using a three tower array. Therefore only one daytime partial proof has been supplied here-in.

W244DN - Indianapolis, IN currently operates on CH244D (96.7 MHz) with 0.250 kW (H&V) ERP at an antenna COR of 288 meters AMSL (47 meters AGL). W244DN employs a Nicom BKG/77-3L(DA)(0.85WL) directional antenna oriented at 220.0°T on the previously identified tower three (south tower) of the WBRI(AM) array. The antenna and feedline are coupled to the base insulated tower via a custom Phasetek isocoupler.

Directional field strength measurements were conducted by Mr. Tyger Elton, corporate engineer for WBRI(AM) licensee, Heritage Christian Radio, Inc.. Mr. Elton made his measurements using Potomac Instruments Field Intensity Meter, Model #FIM-41, Serial Number 1218. This meter was last calibrated July 27, 2012.

Measurements were taken on the four (4) daytime monitor point radials, meeting the requirements of 47 C.F.R. §73.154(a) of the FCC Rules. Daytime Field strength measurements were taken on the dates and at the times indicated in the respective Tabulations of Field Strength Measurements, shown as **Exhibit(s) 1.0** and **1.1**. The tabulation sheets show the distance from the transmitter site to each point number in units of kilometers and miles as reported in the original 1964 Full Proof of Performance. The locations and point numbers were derived from topographical maps in conjunction with GPS assistance. All 2016 measurements were taken with the identical meter at the times and dates indicated.

Exhibit 2.0 provides a summary of the field intensity measurements made on the daytime array. Log ratios between the present measurements and the corresponding 1964 Original Directional Proof of Performance values were used to calculate the current inverse distance field on each measured radial. As seen in these exhibit(s), as well as the actual measurements in **Exhibit(s) 1.0** and **1.1**, the radial averages for all direct and log ratios between the present measurements and the corresponding 1964 original directional Proof-of-Performance values remain wholly within the authorized daytime augmented pattern.

A vertical plan of the array as constructed has been included in **Exhibit 3.0**.

The antenna resistance/common point reactance impedance measurement(s) for the daytime only directional operation remains unchanged at $50 \pm 0 j$ ohms. Pursuant to the submittal of this partial proof of performance, WBRI(AM) respectfully requests the relicensing of the new Antenna Monitor operating parameters as noted on the companion Form 302-AM and included here-in.

In light of the measurements taken and results obtained, the recent addition of the W244DN - Indianapolis, IN (Facility ID No. 143959) antenna and feedline on tower three (south tower) of the WBRI(AM) array is believed to have had a negligible effect on the WBRI(AM) daytime only operation. Therefore no further action is required on behalf of WBRI(AM) other than submittal of this partial proof of performance within the attached WBRI(AM) Form 302-AM License Modification (also submitted for the purpose of a correction of coordinates of less than three seconds discovered during the preparation of this report).

Exhibit 1.0

Daytime Field Strength Measurements on Radial(s) 36.0° & 97.0°

Call:	WBRI(AM)		Frequency (kHz):			1500 kHz		Power (kW):		5.000 kW	
			Bearing (°T):			36.0°					
Point	1964 Licensed Directional			2016 Partial Directional			Distance	Distance	Direct		Log
#	mV/m	Time	Date	mV/m	Time	Date	Miles	km	Ratio		Ratio
MP	154	---	circa 1964	150	1200	10/25/16	1.20	1.93	0.9740		-0.0263
17	45.0	---	circa 1964	21.1	1240	10/25/16	2.52	4.06	0.4689		-0.7574
19	43.0	---	circa 1964	19.0	1300	10/25/16	3.76	6.05	0.4419		-0.8168
21	22.0	---	circa 1964	11.0	1338	10/25/16	4.96	7.98	0.5000		-0.6931
23	19.0	---	circa 1964	11.5	1400	10/25/16	6.07	9.77	0.6053		-0.5021
24	21.0	---	circa 1964	10.0	1414	10/25/16	6.78	10.91	0.4762		-0.7419
25	14.5	---	circa 1964	8.50	1438	10/25/16	7.34	11.81	0.5862		-0.5341
26	13.0	---	circa 1964	6.50	1500	10/25/16	8.63	13.89	0.5000		-0.6931
							Arithmetic Ratio:		0.5691		
							Log Ratio:		0.5512		

Call:	WBRI(AM)			Frequency (kHz):			1500 kHz		Power (kW):		5.000 kW	
			Bearing (°T):			97.0°						
Point	1964 Licensed Directional			2016 Partial Directional			Distance	Distance	Direct		Log	
#	mV/m	Time	Date	mV/m	Time	Date	miles	km	Ratio		Ratio	
MP	18.0	0959	09/02/00	13.0	1345	10/23/16	2.73	4.39	0.7222		-0.3254	
19	19.0	---	circa 1964	8.10	1622	10/23/16	3.45	5.55	0.4263		-0.8526	
20	9.60	---	circa 1964	6.00	1635	10/23/16	4.14	6.66	0.6250		-0.4700	
22	4.20	---	circa 1964	2.20	1705	10/23/16	5.20	8.37	0.5238		-0.6466	
24	4.90	---	circa 1964	2.00	1010	10/24/16	7.18	11.55	0.4082		-0.8961	
25	4.90	---	circa 1964	3.20	1030	10/24/16	8.19	13.18	0.6531		-0.4261	
26	2.90	---	circa 1964	1.90	1046	10/24/16	9.22	14.84	0.6552		-0.4229	
27	2.80	---	circa 1964	1.60	1107	10/24/16	10.20	16.41	0.5714		-0.5596	
							Arithmetic Ratio:		0.5731			
							Log Ratio:		0.5628			

Daytime Field Strength Measurements on Radial(s) 140.0° & 321.0°

Call:	WBRI(AM)		Frequency (kHz):			1500 kHz		Power (kW):		5.000 kW	
			Bearing (°T):			140.0°					
Point	1964 Licensed Directional			2016 Partial Directional			Distance	Distance	Direct		Log
#	mV/m	Time	Date	mV/m	Time	Date	miles	km	Ratio		Ratio
MP	46.5	---	circa 1964	29.0	1215	10/24/16	2.43	3.91	0.6237	MP	-0.4722
17	35.5	---	circa 1964	19.0	1229	10/24/16	2.93	4.72	0.5352		-0.6251
19	24.0	---	circa 1964	10.9	1252	10/24/16	3.95	6.36	0.4542		-0.7893
21	12.0	---	circa 1964	5.80	1345	10/24/16	4.76	7.66	0.4833		-0.7270
22	14.5	---	circa 1964	7.70	1422	10/24/16	5.32	8.56	0.5310		-0.6329
23	20.0	---	circa 1964	11.0	1438	10/24/16	5.82	9.37	0.5500		-0.5978
24	11.0	---	circa 1964	8.60	1452	10/24/16	7.00	11.26	0.7818		-0.2461
25	9.20	---	circa 1964	8.20	1529	10/24/16	8.09	13.02	0.8913		-0.1151
							Arithmetic Ratio:		0.6063		
							Log Ratio:		0.5911		

Call:	WBRI(AM)		Frequency (kHz):			1500 kHz		Power (kW):		5.000 kW	
			Bearing (°T):			321.0°					
Point	1964 Licensed Directional			2016 Partial Directional			Distance	Distance	Direct		Log
#	mV/m	Time	Date	mV/m	Time	Date	miles	km	Ratio		Ratio
MP	63.0	---	circa 1964	44.0	1700	10/24/16	1.28	2.06	0.6984		-0.3589
18	11.0	---	circa 1964	14.6	1729	10/24/16	2.55	4.10	1.3273		0.2831
20	11.0	---	circa 1964	10.9	1800	10/24/16	3.69	5.94	0.9909		-0.0091
22	8.50	---	circa 1964	7.50	1824	10/24/16	4.38	7.05	0.8824		-0.1252
24	5.90	---	circa 1964	5.60	1849	10/24/16	5.37	8.64	0.9492		-0.0522
25	5.60	---	circa 1964	5.30	0918	10/24/16	5.88	9.46	0.9464		-0.0551
26	5.60	---	circa 1964	5.20	1000	10/25/16	6.48	10.43	0.9286		-0.0741
27	4.80	---	circa 1964	4.80	1039	10/25/16	7.60	12.23	1.0000		0.0000
							Arithmetic Ratio:		0.9654		
							Log Ratio:		0.9522		

Exhibit 2.0

Tabulation of Daytime Ratios

Daytime Partial Proof Ratio(s):

Azimuth (° True)	Full Proof 1964 DA (mV/m/km)	2016 DA/ 1964DA (Log Ratio)	Partial 2016 DA (mV/m/km)	Augmented Pattern (mV/m/km)
036.0°T	379.81	0.5512	209.36	489.62
097.0°T	125.21	0.5628	70.46	147.12
140.0°T	228.53	0.5911	135.09	251.62
321.0°T	118.29	0.9522	112.64	160.43

Daytime Monitor Point Values:

Radial	Licensed MP Limit (mV/m)	1964 Proof MP Value (mV/m)	Requested MP Limit (mV/m)	2016 Partial MP Value (mV/m)
036.0°T	219.0 mV/m	154.0 mV/m	Unchanged	150.0 mV/m
097.0°T	24.2 mV/m	18.0 mV/m*	Unchanged	13.0 mV/m
140.0°T	55.1 mV/m	46.5 mV/m	Unchanged	29.0 mV/m
321.0°T	75.0 mV/m	63.0 mV/m	Unchanged	44.0 mV/m
*Denotes MP changed to new Point and value in BZ-20001027ABS				

Daytime Operating Constants:

	BZ-20001027ABS Licensed Value(s)	2016 Partial Value(s)
Transmitter Power	5000 watts (nom.) 5400 watts (input)	5000 watts (nom.) 5400 watts (input)
Common Point	10.4 amperes	10.4 amperes
Antenna Monitor	Current	Current
Field #1(N)	0.550	0.560
Field #2(C)	1.000	1.000
Field #3(S)	0.550	0.580
Antenna Phase	Degrees	Degrees
Phase #1(N)	+158.0°	+160.0°
Phase #2(C)	0.0°	0.0°
Phase #3(S)	-144.0°	-146.0°

Exhibit 3.0

Vertical Plan of Antenna System

The site is located at 4802 E 62nd Street;
the city of Indianapolis, Marion County; Indiana.

Center of Array:	Latitude (D M S)	Longitude (D M S)
NAD 27 datum values:	39 52 13.35533	86 05 16.85146
NAD 83 datum values:	39 52 13.50000	86 05 16.80000

North Tower: Latitude (DMS) Longitude (DMS)
NAD 27 datum: 39 52 14.75538 86 05 15.45149
NAD 83 datum: 39 52 14.90000 86 05 15.40000

Center Tower: Latitude (DMS) Longitude (DMS)
NAD 27 datum: 39 52 13.35533 86 05 16.85146
NAD 83 datum: 39 52 13.50000 86 05 16.80000

South Tower: Latitude (DMS) Longitude (DMS)
NAD 27 datum: 39 52 11.85528 86 05 18.25143
NAD 83 datum: 39 52 12.00000 86 05 18.20000

