

## **ENGINEERING EXHIBIT**

### **Application for Modification of Digital Low Power Television Construction Permit**

prepared for

#### **WBOC, Inc.**

W42EI-D Georgetown, DE

Facility ID 187976

Ch. 42 (digital) 12 kW

*WBOC, Inc.* (“*WBOC*”) is the proposed assignee of unbuilt digital Low Power Television station W42EI-D, Channel 42, Georgetown DE, Facility ID 187976. W42EI-D is authorized to operate pursuant to a Construction Permit (“CP”, file# 0000007687) with 0.415 kW effective radiated power (“ERP”), directional. *WBOC* herein seeks a modification of the CP to utilize an alternate transmitting location and to specify changes of ERP, antenna height, and directional antenna pattern. An assignment application is pending (BAPDTL-20161208AAV) to assign the W42EI-D authorization to *WBOC*, and *WBOC* has secured the assignor’s consent to file this minor modification application.

The proposed facility will employ a new antenna system to be side-mounted on an existing tower structure associated with FCC Antenna Structure Registration number 1301089. No change to the overall structure height is proposed. The site is located more than 75 miles (121 km) from the reference coordinates of the markets listed in Appendix A of DA 09-1487<sup>1</sup>. The nearest such market is Baltimore MD, located 75.3 miles (121.1 km) from the proposed site.

The proposed W42EI-D facility will operate with a directional antenna at 12 kW ERP using a “stringent” out of channel emission mask. A plot of the directional antenna’s azimuthal pattern is supplied in Figure 1.

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<sup>1</sup>“Commencement of Rural, First-come, First-served digital licensing for Low Power Television and TV Translators Beginning August 25, 2009 and Commencement of Nationwide, First-come, First-served Digital Licensing for Low Power Television and TV Translator Services Beginning January 25, 2010,” Public Notice, DA 09-1487, Released June 29, 2009.

Figure 2 depicts the coverage contour of the proposed facility as well as that of the existing and prior W42EI-D CP facilities. As shown thereon, the proposed site is within 30 miles of the underlying, original CP (BNPDTL-20100817AAS, 18.3 miles distant) and has protected contour overlap with that facility. The contour overlap and distance with respect to the original CP demonstrate compliance with §74.788(b) for a minor change. Contour overlap and distance compliance should be applicable with respect to the original CP (BNPDTL-20100817AAS) rather than with respect to the existing CP as modified (0000007687), as the latter case would allow serial minor modifications of an unbuilt CP that could in sum be considered a major change.

Interference study per OET Bulletin 69<sup>2</sup> shows that the proposal complies with the FCC's interference protection requirements toward all digital television, television translator, LPTV, and Class A stations. The results, summarized in Table 1, show that any new interference does not exceed the FCC's interference limits (0.5 percent to full power and Class A stations, and 2.0 percent to secondary stations) to any facility.

The nearest FCC monitoring station is 126 km distant at Laurel, MD. This exceeds by a large margin the threshold minimum distance specified in §73.1030(c)(3) that would suggest consideration of the monitoring station. The site is not located within the areas requiring coordination with "quiet" zones specified in §73.1030(a) and (b). There are no authorized AM stations within 3 kilometers of the site. The site location is beyond the border areas requiring international coordination.

### **Human Exposure to Radiofrequency Electromagnetic Field (Environmental)**

The proposed operation was evaluated for human exposure to RF energy using the procedures outlined in the FCC's OET Bulletin Number 65. Based on OET-65 equation (10), and considering 25 percent antenna relative field in downward elevations, the calculated signal

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<sup>2</sup>FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 ("OET-69"). The implementation of OET-69 for this study followed the guidelines of OET-69 as specified therein. The default cell size of 1 km was employed. Comparisons of various results of this computer program (run on a Sun Sparc processor) to the Commission's implementation of OET-69 show excellent correlation.

density near the tower at two meters above ground level attributable to the proposed facility is  $3.2 \mu\text{W}/\text{cm}^2$ , which is 0.7 percent of the general population/uncontrolled maximum permitted exposure limit. This is well below the five percent threshold limit described in §1.1307(b) regarding sites with multiple emitters, categorically excluding the applicant from responsibility for taking any corrective action in the areas where the proposal's contribution is less than five percent.

The general public will not be exposed to RF levels attributable to the proposal in excess of the FCC's guidelines. RF exposure warning signs will continue to be posted. With respect to worker safety, the applicant will coordinate exposure procedures with all pertinent stations and will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from RF electromagnetic field exposure in excess of FCC guidelines.

Environmental matters covered by this exhibit are limited to the evaluation of exposure to RF electromagnetic field. The proposed transmitting antenna will be installed on an existing antenna support structure which was constructed prior to March 16, 2001. No change in structure height is proposed.

List of Attachments

Figure 1	Antenna Azimuthal Pattern
Figure 2	Coverage Contour Comparison
Table 1	Interference Analysis Results Summary
Form 2100	Saved Version of Engineering Sections from FCC Form at Time of Upload

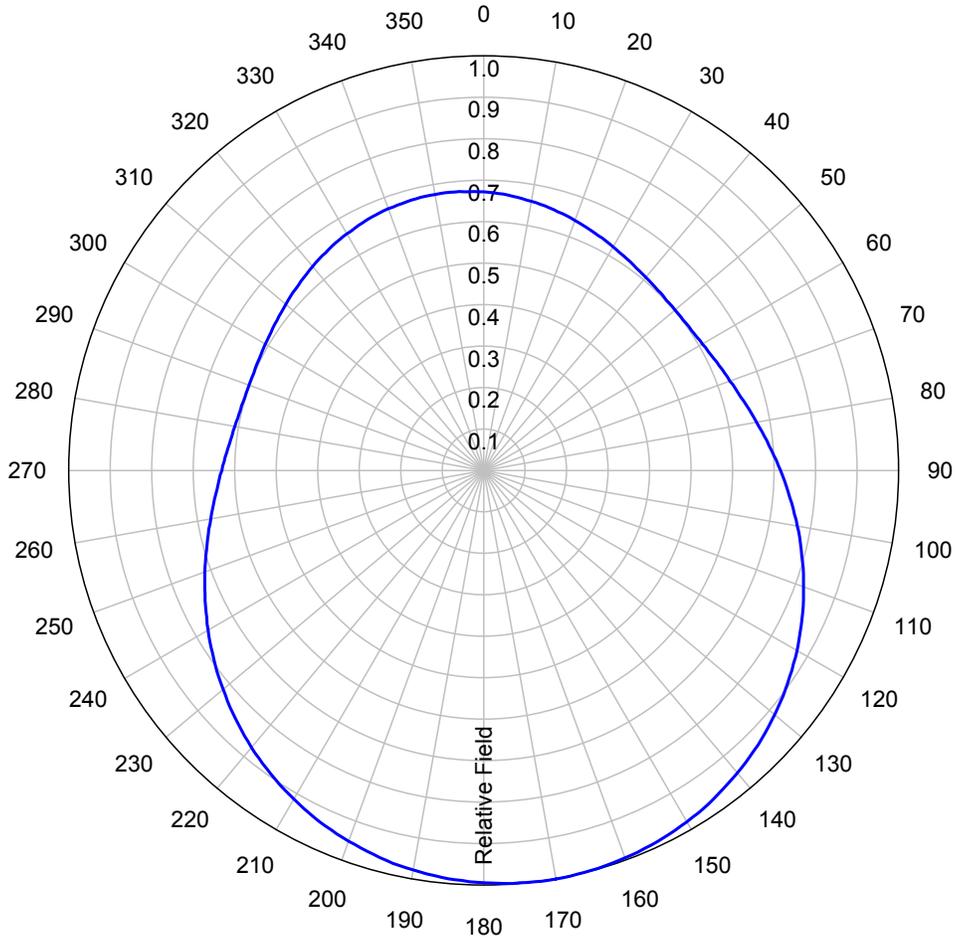
**Chesapeake RF Consultants, LLC**

Joseph M. Davis, P.E.                      December 22, 2016  
207 Old Dominion Road                      Yorktown, VA 23692                      703-650-9600

### AZIMUTH PATTERN

Type: ALP-OC  
 Directivity: Numeric 1.70 dBd 2.30  
 Peak(s) at: \_\_\_\_\_

Channel: 42  
 Location: Georgetown DE  
 Polarization: Horizontal  
 Note: Pattern shape and directivity may vary with channel and mouting configuration.



Preliminary, subject to final design and review.

ELECTRONICS RESEARCH, INC. **ERI**



**Figure 1**  
**Antenna Azimuthal Pattern**  
**W42EI-D Georgetown, DE**  
**Facility ID 187976**  
**Ch. 42 (digital) 12 kW**

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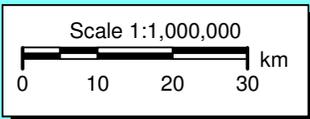
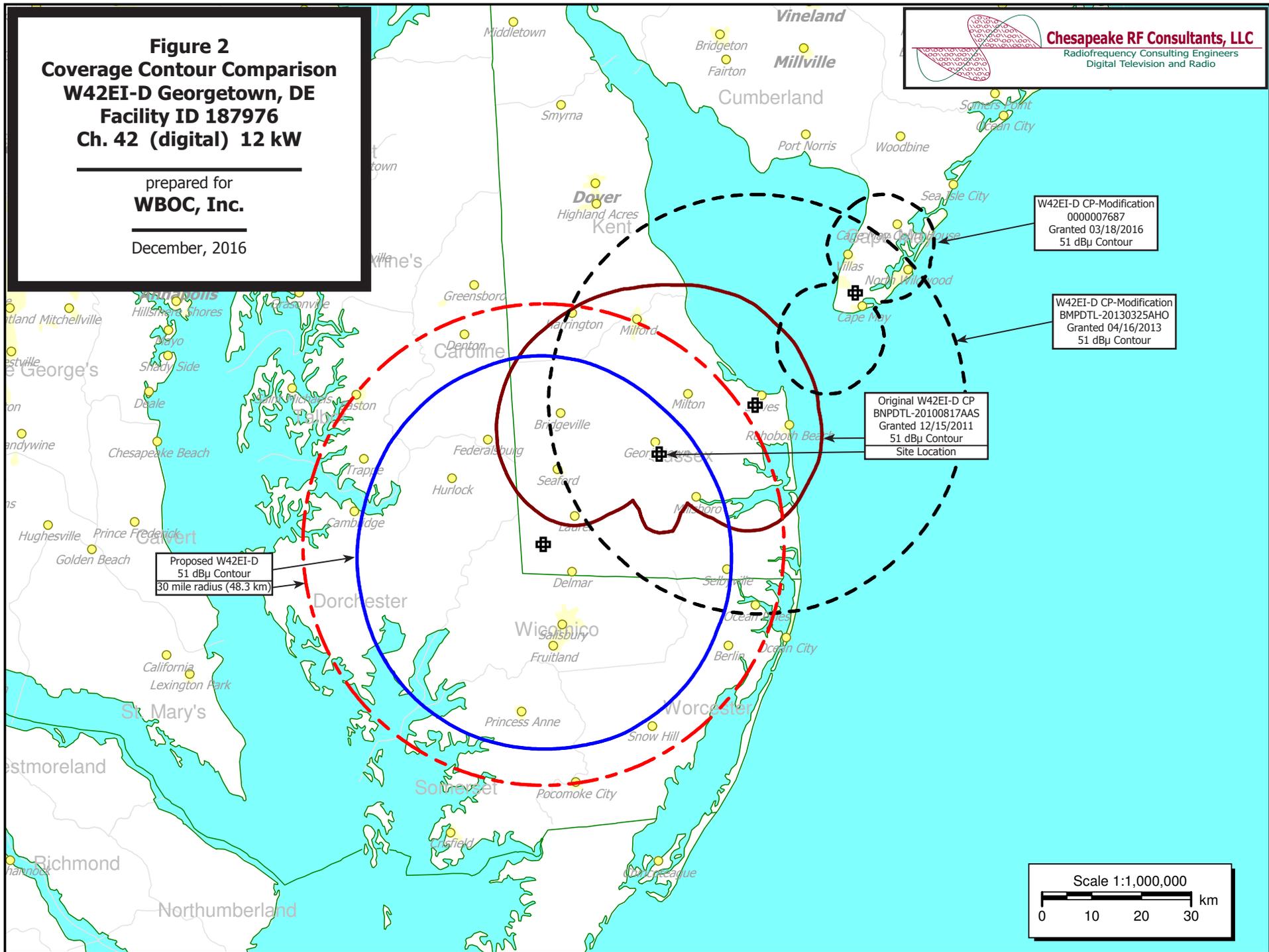
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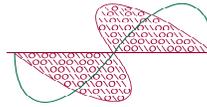
December, 2016

**Figure 2**  
**Coverage Contour Comparison**  
**W42EI-D Georgetown, DE**  
**Facility ID 187976**  
**Ch. 42 (digital) 12 kW**

prepared for  
**WBOC, Inc.**  
 December, 2016



**Table 1**  
**Interference Analysis Results Summary**



**Chesapeake RF Consultants, LLC**  
 Radiofrequency Consulting Engineers  
 Digital Television and Radio

prepared for  
**WBOC, Inc.**  
 W42EI-D Georgetown, DE

W42EI-D	USERRECORD-01	GEORGETOWN	DE US
Channel 42	ERP 15. kW	HAAT 96. m	RCAMSL 00105 m
STRINGENT MASK			
Latitude	038-30-17	Longitude	0075-38-37
Dir Antenna	Make usr	Model AND OC	Beam tilt N Ref Azimuth 170.

The LMS application requires NAD-83 coordinates. FCC internal systems then convert to NAD-27 and port over to CDBS for processing. This interference analysis utilizes truncated NAD-27 coordinates to replicate FCC processing.

Ch.	Call	City/State	Dist (km)	Status	Application Ref. No.	---Population (2000 Census)---	
						Baseline	New Interference
27	WEVD-LP	DOVER DE	76.8	LIC	BLTTL-19870929IH	---	none
41	WUTB	BALTIMORE MD	130.0	LIC	BLCDDT-20100809CHT	---	none
41	WDUM-LD	SPRINGVILLE NJ	174.4	LIC	BLTTL-20041117ACS	---	none
41	W51DO	HAMPTON VA	173.5	CP	BDISDTL-20100721FZS	---	none
42	WZME	BRIDGEPORT CT	383.8	LIC	BLCDDT-20061218ACB	---	none
42	WZME	BRIDGEPORT CT	286.9	APP	BPCDDT-20120601ARY +	---	none
42	WMPT	ANNAPOLIS MD	100.8	LIC	BLEDT-20100813BHC	6,958,756	27,848 (0.40%)
42	W42CK	HAGERSTOWN MD	221.7	LIC	BLTTL-19991020AAP	---	none
42	WRAY-TV	WILSON NC	370.7	LIC	BLCDDT-20060609AAX	---	none
42	WSKG-TV	BINGHAMTON NY	396.1	LIC	BLEDT-20050526ACA	---	none
42	WKOB-LD	NEW YORK NY	288.1	CP MOD	BMPDDL-20140710AAE	---	none
42	W22EW-D	PORT JERVIS NY	328.2	LIC	BLTTL-20070223AHH	---	none
42	W22EW-D	PORT JERVIS NY	292.5	CP MOD	BMPDDL-20101109ADN	---	none
42	W42AE	POUGHKEEPSIE NY	383.8	LIC	BLTTL-20040225AAW	---	none
42	WTFX-TV	PHILADELPHIA PA	174.2	LIC	BLCDDT-20120511ADN	7,881,382	0 (0.00%)
42	W42DG-D	STATE COLLEGE PA	312.3	LIC	BLDTL-20071109AAR	---	none
42	WHSV-TV	HARRISONBURG VA	238.4	LIC	BLCDDT-20110113AAD	---	none
42	WCVE-TV	RICHMOND VA	203.9	LIC	BLCDDT-20050606AHG	---	none
43	WDCN-LD	FAIRFAX VA	133.8	CP	BDCCDDL-20101119ADD	---	none
43	WBTD-LD	SUFFOLK VA	202.2	LIC	BLDTL-20121009AAI	---	none

+ Indicates station is part of a DTS

**Channel and Facility Information**

Section	Question	Response
Proposed Community of License	Facility ID	187976
	State	Delaware
	City	GEORGETOWN
	LPD Channel	42

**Antenna Location Data**

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1301089
Coordinates (NAD83)	Latitude	38° 30' 18.0" N+
	Longitude	075° 38' 36.0" W-
	Structure Type	GTOWER-Guyed Structure Used for Communication Purposes
	Overall Structure Height	305.4 meters
	Support Structure Height	271.3 meters
	Ground Elevation (AMSL)	14.0 meters
Antenna Data	Height of Radiation Center Above Ground Level	91 meters
	Height of Radiation Center Above Mean Sea Level	105.0 meters
	Effective Radiated Power	12 kW

**Antenna  
Technical Data**

Section	Question	Response
<b>Antenna Type</b>	Antenna Type	Directional Custom
	Do you have an Antenna ID?	No
	Antenna ID	
<b>Antenna Manufacturer and Model</b>	Manufacturer:	ERI
	Model	ALP12L2-HS0C-42
	Rotation	170 degrees
	Electrical Beam Tilt	0.5
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Horizontal
<b>Elevation Radiation Pattern</b>	Does the proposed antenna propose elevation radiation patterns that vary with azimuth for reasons other than the use of mechanical beam tilt?	No
	Uploaded file for elevation antenna (or radiation) pattern data	
	Out-of-Channel Emission Mask:	Stringent

**Directional Antenna Relative Field Values (Pre-rotated Pattern)**

Degree	V <sub>A</sub> (Authorized Value)						
0	1	90	0.668	180	0.676	270	0.668
10	0.994	100	0.631	190	0.672	280	0.715
20	0.978	110	0.609	200	0.659	290	0.767
30	0.951	120	0.602	210	0.642	300	0.820
40	0.915	130	0.608	220	0.623	310	0.871
50	0.871	140	0.623	230	0.608	320	0.915
60	0.820	150	0.642	240	0.602	330	0.951
70	0.767	160	0.659	250	0.609	340	0.978
80	0.715	170	0.672	260	0.631	350	0.994

**Additional Azimuths**

Degree	V <sub>A</sub>
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