

## **ENGINEERING EXHIBIT**

### **Application for Low Power Television Digital Companion Construction Permit**

prepared for

#### **Gray Television Licensee, LLC**

WSVF-CA Harrisonburg, VA

Facility ID 57912

Ch. 43 (digital) 13 kW

*Gray Television Licensee, LLC* (“Gray”) is the licensee of Class A Television station WSVF-CA, analog Channel 25, Staunton-Waynesboro, VA, Facility ID 57912 (BLTTL-20011107ABW). *Gray* proposes herein to construct a digital companion facility on Channel 43. Additionally, this application specifies an administrative change to specify Harrisonburg, VA as the community to be served.

The proposed site is located immediately adjacent to and less than 0.1 km from the licensed analog WSVF-CA site. The proposed facility will employ a new antenna system to be installed on an existing tower structure. The tower structure is not presently registered with the FCC, as it is an existing structure of less than 61 meters overall height above ground and there are no landing areas within 8 km according to the FCC’s “TOWAIR” slope test program. Since no change to the structure’s overall height is proposed, FAA notification and commensurate FCC registration are not necessary.

The site is located within the quiet zone area specified in §73.1030(a) requiring coordination with the National Radio Astronomy Observatory (“NRAO”) at Green Bank, WV. The NRAO has been notified and supplied with technical details of this proposal, and does not object. A copy of NRAO’s coordination letter is provided as Attachment 1. The proposal complies with the limit indicated thereon of 4.8 Watts maximum ERP at 273 degrees True.

The proposed antenna is an ERI model AL8O-43 composite system with a parabolic cancellation element. The cancellation element will be oriented at 273 degrees True North which will create the required minima towards the NRAO.

The proposed facility will operate on Channel 43 as digital at 13 kW effective radiated power using a “stringent” out of channel emission mask. Figure 1 depicts the coverage contour of the proposed facility as well as that of the WSVF-CA licensed analog Channel 25 facility. The service area overlap shown demonstrates compliance with the requirements for a digital companion facility.

Detailed interference study per OET Bulletin 69 show that the proposal complies with the Commission’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 Commission’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 190 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. There are no authorized AM stations within 3.2 kilometers of the site. The site location is beyond the border areas requiring international coordination.

### **Human Exposure to Radiofrequency Electromagnetic Field**

The proposed operation was evaluated for human exposure to RF energy using the procedures outlined in the Commission’s OET Bulletin Number 65. Based on OET-65 equation (10), and considering 10 percent antenna relative field in downward elevations, the calculated signal density near the tower at two meters above ground level attributable to the proposed facility is  $10.2 \mu\text{W}/\text{cm}^2$ , which is 2.4 percent of the general population/uncontrolled maximum permitted exposure limit. This is 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 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.

This exhibit is limited to the evaluation of exposure to RF electromagnetic field. The proposed transmitting antenna will be side-mounted on an existing antenna support structure which was constructed prior to March 16, 2001. No change in structure height is proposed.

### **Certification**

The undersigned hereby certifies that the foregoing statement and associated attachments were prepared by him or under his direction, and that they are true and correct to the best of his knowledge and belief.



Joseph M. Davis, P.E.  
September 18, 2012

### **Chesapeake RF Consultants, LLC**

207 Old Dominion Road  
Yorktown, VA 23692  
703-650-9600

### List of Attachments

Figure 1	Coverage Contour Comparison
Table 1	Interference Analysis Results Summary
Attachment 1	NRAO Coordination
Form 346	Saved Version of Engineering Sections from FCC Form at Time of Upload

*This material was entered September 18, 2012 for filing electronically. Since the FCC's electronic filing system may be accessed by anyone with the applicant's account number and password, and electronic data may otherwise be altered in an unauthorized fashion, we cannot be responsible for changes made subsequent to our entry of this data and related attachments.*

**Figure 1**  
**Coverage Contour Comparison**  
**WSVF-CA Harrisonburg, VA**  
**Facility ID 57912**  
**Ch. 43 (digital) 13 kW**

prepared for  
**Gray Television Licensee, LLC**

September, 2012

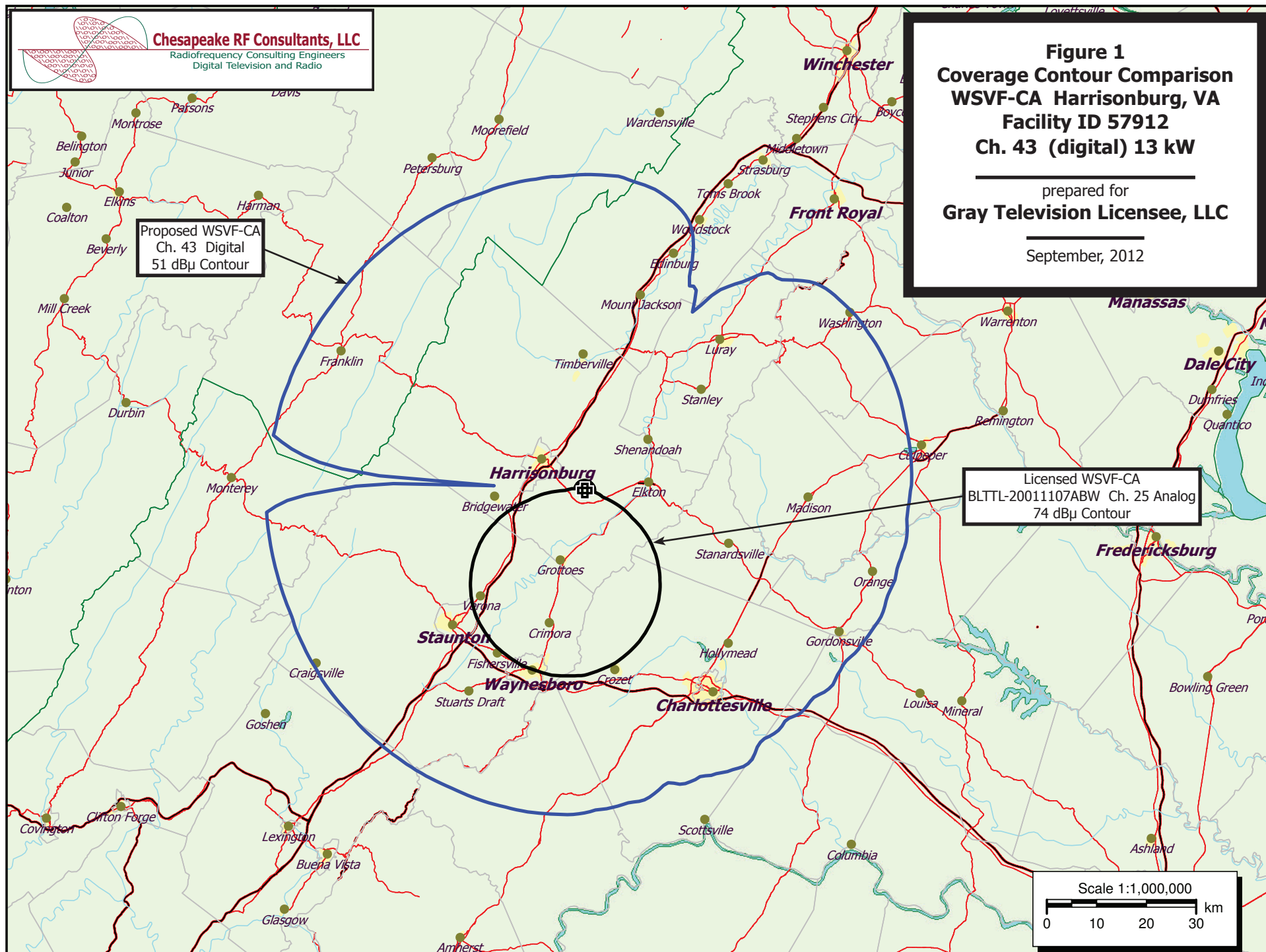


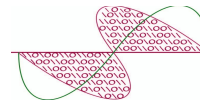
Table 1

**Interference Analysis Results Summary**

prepared for

**Gray Television Licensee, LLC**

WSVF-CA Harrisonburg, VA

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

WSVF-CA	USERRECORD-01	HARRISONBURG	VA US
Channel 43	ERP 13.	kW HAAT 500. m	RCAMSL 00913 m STRINGENT MASK
Latitude 038-23-34	Longitude 0078-46-13		
Dir Antenna Make	usr Model WSVF-CA	NRAO	Beam tilt N Ref Azimuth 0.

Ch.	Call	City/State	Dist	Status	Application Ref. No.	---Population (2000 Census)---	
			(km)			Baseline	New Interference
28	WAZF-CA	WINCHESTER/FRONT ROY VA	102.9	LIC	BLTTL-19940422IK	---	none
41	W41AO	HAMPSHIRE, ETC. WV	123.1	LIC	BLTT-19921006JH	---	none
42	WMPT	ANNAPOLIS MD	199.6	LIC	BLEDT-20100813BHC	---	none
42	W42CK	HAGERSTOWN MD	160.0	LIC	BLTTL-19991020AAP	---	none
42	WHSV-TV	HARRISONBURG VA	73.7	LIC	BLCDDT-20110113AAD	153,827	0 (0.00%)
42	WCVE-TV	RICHMOND VA	141.7	CP	BPEDT-20080610AAQ	---	none
42	WCVE-TV	RICHMOND VA	141.7	LIC	BLCDDT-20050606AHG	---	none
42	NEW	CLARKSBURG WV	164.4	APP	BNPDTL-20100514AAAY	---	none
42	NEW	SUTTON WV	169.6	APP	BNPDTL-20100514AAQ	---	none
43	W43BP	CRESAPTOWN MD	132.6	LIC	BLTT-19981124JI	---	none
43	W42CK	HAGARSTOWN MD	160.0	CP	BDISDTL-20090812AAO	212,465	0 (0.00%)
43	WHFL-CD	GOLDSBORO NC	342.9	LIC	BLDTA-20120113ACG	---	none
43	WLXI	GREENSBORO NC	295.8	LIC	BLCDDT-20090204ABD	2,187,889	0 (0.00%)
43	W43DB-D	CANTON OH	318.4	CP MOD	BMPDTL-20110725AFM	---	none
43	WPBO	PORTSMOUTH OH	375.1	LIC	BLEDT-20040323ATV	---	none
43	WGAL	HARRISBURG PA	271.7	APP	BDRTCDT-20090824ADL	1,236,749	0 (0.00%)
43	WPGH-TV	PITTSBURGH PA	256.6	LIC	BLCDDT-20021216AAT	3,093,507	0 (0.00%)
43	WPGH-TV	PITTSBURGH PA	256.6	CP MOD	BMPCDT-20021216AAS	3,093,507	0 (0.00%)
43	WDCN-LD	FAIRFAX VA	158.7	CP	BDCCDTL-20101119ADD	---	none
43	WTLU-CD	LYNCHBURG VA	119.9	LIC	BLDTL-20100111ACB	236,108	232 (0.10%)
43	WTLU-CD	LYNCHBURG VA	119.9	APP	BSTA-20111025AAE	---	none
43	W43BO	MARION, ETC. VA	294.9	LIC	BLTTL-19970425JD	---	none
43	WBTD-LP	SUFFOLK VA	264.8	CP MOD	BMPDTL-20111212ACA	---	none
43	WVVA	BECKLEY WV	201.7	CP	BDRTCDT-20090707AEU	---	none
44	WIAV-LD	WASHINGTON DC	158.7	CP MOD	BMPDTL-20090630ADG	---	none
44	WWPB	HAGERSTOWN MD	156.0	LIC	BLEDT-20110509ACP	1,236,498	229 (0.02%)
44	WCVW	RICHMOND VA	141.7	LIC	BLEDT-20080820ABK	---	none
44	W44CL-D	ROANOKE VA	152.2	LIC	BLDTL-20110715AEF	---	none
44	W62DF	CLARKSBURG WV	164.5	CP	BDISDTL-20110825ABF	---	none
45	WZTD-LP	RICHMOND VA	141.7	LIC	BLTTL-20071102AQS	---	none



## NATIONAL RADIO ASTRONOMY OBSERVATORY

POST OFFICE BOX 2

GREEN BANK, WV 24944-0002

NRQZ OFFICE TELEPHONE (304) 456-2107

HTTP://WWW.GB.NRAO.EDU/

FAX (304) 456-2276

NRQZ@NRAO.EDU

September 12, 2012

Page 1 of 2

NRQZ ID: 7965 21MAY2012

### Attachment 1

Gray Television Licensee LLC  
50 North Main Street  
Harrisonburg, VA 22802

Application Reason/Purpose  
File/Docket/Assignment #  
Applicant Name  
Call Sign  
Site Name or Loc  
Nearest City/State  
N Latitude  
W Longitude  
Ground Elevation (m)  
Freq. Band (MHz)  
Emission Designator  
Antenna 1 Type (Gain dBi)  
Height agl (m)  
Orientation (degT)  
Frequency Coordinator  
Previous Evaluations  
NRAO Coordination

Concurrence of an FCC application prior to FCC submission  
Shall be provided by applicant  
Gray Television Licensee LLC  
WSVF-DC  
Massanutten Mountain, VA  
Harrisonburg, VA  
38 23 34.5  
78 46 12.1  
890.6 (2921.9')  
644 - 650  
DTV  
9.39 dB ERI AL80  
22.6 (74.1')  
Non-directional  
None Listed  
None Listed  
NRQZ# 7965 21MAY2012

Dear Applicant:

The National Radio Quiet Zone (NRQZ) has evaluated these facilities to determine the interference impact on our highly sensitive radio astronomy operations.

#### Special Condition

The National Radio Astronomy Observatory (NRAO), Green Bank, WV, objects unless the Applicant's license is restricted to an Effective Radiated Power (ERP) of 4.8 Watts for DTV emissions at Azimuth 273 degrees True.

To meet this Special Condition, the Applicant shall:

1. Use the final engineering submitted by Joseph Davis, Chesapeake RF Consultants LLC, on 11SEP2012, indicating that all facilities meet the ERP restriction.
  - a. Cancellation antenna shall be mounted in close proximity to the feed antenna
  - b. Field measurements shall be performed at the first obstacle confirming field strength and phase adjustments sufficient to meet NRAO protection criteria.
  - c. Documentation which verifies field strength and phase adjustment measurements shall be submitted to NRAO for review.
  - d. The applicant will deconflict during system configuration and testing.
2. Arrange for a site inspection to verify the implementation of this Special Condition.





## NATIONAL RADIO ASTRONOMY OBSERVATORY

POST OFFICE BOX 2  
GREEN BANK, WV 24944-0002  
NRQZ OFFICE TELEPHONE (304) 456-2107  
HTTP://WWW.GB.NRAO.EDU/

FAX (304) 456-2276  
NRQZ@NRAO.EDU

September 12, 2012  
Page 2 of 2  
NRQZ ID: 7965 21MAY2012

### Regulatory

The NRQZ Office requests that:

1. The FCC places the Special Condition on the Station License.
2. This Letter of Concurrence be attached to the FCC application.
3. The applicant provides the NRQZ Office with notice of its official filing with the FCC per section 47CFR1.924 (a) (2).

The Sugar Grove Research Station, Sugar Grove, WV has no objections.

The National Radio Astronomy Observatory, Green Bank, WV, has no objection provided the Special Condition is met.

This letter constitutes coordination of assignment in the National Radio Quiet Zone as required by the FCC Rules and Regulations 47CFR1.924.

If I may be of assistance, please feel free to contact me.

Sincerely,

Paulette W. Woody  
Interference Office - NRQZ Administrator

PWW:pww

cc: Joseph Davis, Chesapeake RF Consultants  
File: 7965.docx

<b>Section III - Engineering (Digital)</b>												
<b>TECHNICAL SPECIFICATIONS</b>												
Ensure that the specifications below are accurate. Contradicting data found elsewhere in this application will be disregarded. All items must be completed. The response "on file" is not acceptable.												
<b>TECH BOX</b>												
1.	Channel: 43											
2.	Translator Input Channel No. :											
3.	Primary station proposed to be rebroadcast:											
	Facility Identifier		Call Sign		City			State		Channel		
4.	Antenna Location Coordinates: (NAD 27) Latitude: Degrees 38 Minutes 23 Seconds 34 <input checked="" type="radio"/> North <input type="radio"/> South  Longitude: Degrees 78 Minutes 46 Seconds 13 <input checked="" type="radio"/> West <input type="radio"/> East											
5.	Antenna Structure Registration Number: <input checked="" type="checkbox"/> Not Applicable [Exhibit 11] <input type="checkbox"/> Notification filed with FAA											
6.	Antenna Location Site Elevation Above Mean Sea Level: 890.6 meters											
7.	Overall Tower Height Above Ground Level: 24.4 meters											
8.	Height of Radiation Center Above Ground Level: 22.6 meters											
9.	Maximum Effective Radiated Power (ERP): 13 kW											
10.	Transmitter Output Power: 2 kW											
11.	a. Transmitting Antenna: Before selecting Directional "Off-the-Shelf", refer to "Search for Antenna Information" under <a href="http://licensing.fcc.gov/prod/cdb/publicacc/prod/cdb_pa.htm">CDBS Public Access</a> (http://licensing.fcc.gov/prod/cdb/publicacc/prod/cdb_pa.htm). Make sure that the Standard Pattern is marked Yes and that the relative field values shown match your values. Enter the Manufacturer (Make) and Model exactly as displayed in the Antenna Search. <input type="radio"/> Nondirectional <input type="radio"/> Directional Off-the Shelf <input checked="" type="radio"/> Directional composite  Manufacturer ERI    Model AL8043 WITH CANCELLATION  b. Electrical Beam Tilt: 1.75 degrees <input type="checkbox"/> Not Applicable  c. Mechanical Beam Tilt: degrees toward azimuth    degrees True <input checked="" type="checkbox"/> Not Applicable											
	d. Directional Antenna Relative Field Values: <input type="checkbox"/> N/A (Nondirectional or Off-the-Shelf)  Rotation (Degrees): <input checked="" type="checkbox"/> No Rotation											
	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value
	0	1	10	1	20	1	30	1	40	1	50	1
	60	1	70	1	80	1	90	1	100	1	110	1
	120	1	130	1	140	1	150	1	160	1	170	1
	180	1	190	1	200	1	210	1	220	1	230	1
	240	1	250	1	260	1	270	.332	280	1	290	1
	300	1	310	1	320	1	330	1	340	1	350	1
	Additional Azimuths		266	1	268	.707	273	.019	278	.707		
	e. Does the proposed antenna propose elevation radiation patterns that vary with azimuth for <input type="radio"/> Yes <input checked="" type="radio"/> No											



reasons other than the use of mechanical beam tilt?

[Exhibit 12]

If Yes, attach an Exhibit (see instructions for details).

Relative Field Polar Plot

**NOTE: In addition to the information called for in this section, an explanatory exhibit providing full particulars must be submitted for each question for which a "No" response is provided.**

12. **Out-of-channel Emission Mask:** ☐ Simple ☒ Stringent ☐ Full Service

**CERTIFICATION**

13. **Interference :** The proposed facility complies with all of the following applicable rule sections. 47.C.F.R Sections 74.709, 74.793(e), 74.793(f), 74.793(g), 74.793(h), 74.794(b) and 73.1030. ☒ Yes ☐ No  
See Explanation in [Exhibit 13]
14. **Environmental Protection Act.** The proposed facility is excluded from environmental processing under 47. C.F.R. Section 1.1306 (i.e., The facility will not have a significant environmental impact and complies with the maximum permissible radiofrequency electromagnetic exposure limits for controlled and uncontrolled environments). Unless the applicant can determine RF compliance, an **Exhibit is required.** ☒ Yes ☐ No  
See Explanation in [Exhibit 14]  
  
By checking "Yes" above, the applicant also certifies that it, in coordination with other users of the site, will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic exposure in excess of FCC guidelines.
15. **Channels 52-59.** If the proposed channel is within channels 52-59, the applicant certifies compliance with the following requirements, as applicable:  
  
☐ The applicant is applying for a digital companion channel for which no suitable channel from channel 2-51 is available.  
  
☐ Pursuant to Section 74.786(d), the applicant has notified, within 30 days of filing this application, all commercial wireless licenses of the spectrum comprising the proposed TV channel and the first adjacent channels thereto, for which the proposed digital LPTV or TV translator antenna site lies inside the licensed geographic boundaries of the wireless licensees or within 75 miles and 50 miles, respectively, of the geographic boundaries of co-channel and adjacent-channel wireless licensees.
16. **Channels 60-69.** If the proposed channel is within channels 60-69, the applicant certifies compliance with the following requirements, as applicable:  
  
☐ Pursuant to Section 74.786(e), the applicant has notified, within 30 days of filing this application , all commercial wireless licenses of the spectrum comprising the proposed TV channel and the first adjacent channels thereto, for which the proposed digital LPTV or TV translator antenna site lies inside the licensed geographic boundaries of the wireless licensees or within 75 miles and 50 miles, respectively, of the geographic boundaries of co-channel and adjacent-channel wireless licensees.  
  
☐ Pursuant to Section 74.786(e), the applicant proposing operation on channel 63, 64, 68 and 69 ("public safety channels") has secured a coordinated spectrum use agreements(s) with 700 MHz public safety regional planning committee(s) and state administrator(s) of the region(s) and state(s) within which the antenna site of the digital LPTV or TV translator station is proposed to locate, and those adjoining regions and states with boundaries within 75 miles of the proposed station location.  
  
☐ Pursuant to Section 74.786(e), the applicant for a channel adjacent to channel 63, 64, 68 or 69 has notified, within 30 days of filing this application, the 700 MHz public safety regional planning committee(s) and state administrator(s) of the region and state containing the proposed digital LPTV or TV translator antenna site and regions and states whose geographic boundaries lie within 50 miles of the proposed LPTV or TV translator antenna site.

**PREPARERS CERTIFICATION ON PAGE 3 MUST BE COMPLETED AND SIGNED.**

### SECTION III PREPARER'S CERTIFICATION

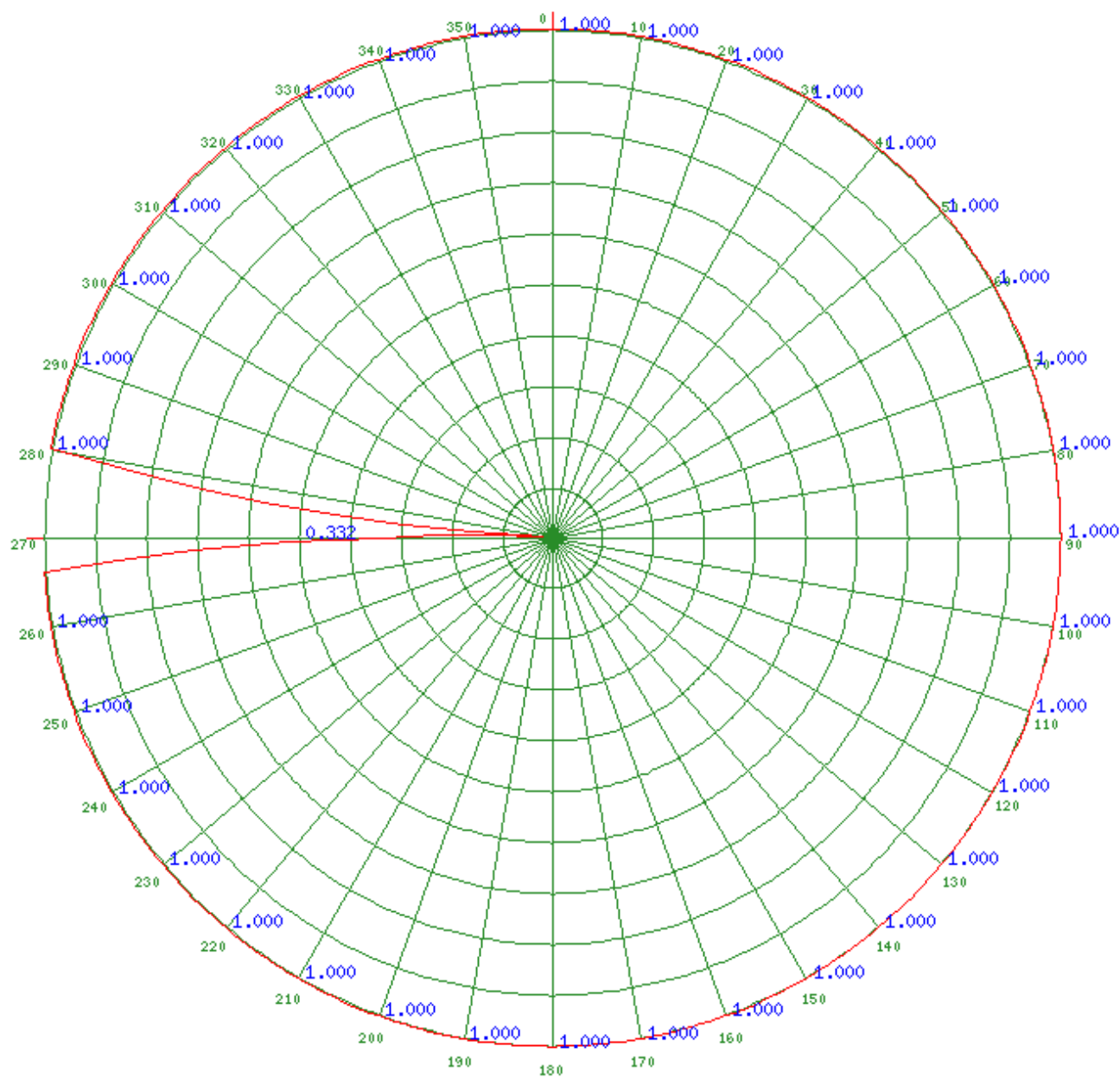
I certify that I have prepared Section III (Engineering Data) on behalf of the applicant, and that after such preparation, I have examined and found it to be accurate and true to the best of my knowledge and belief.

Name JOSEPH M. DAVIS, P.E.	Relationship to Applicant (e.g., Consulting Engineer) CONSULTING ENGINEER	
Signature	Date 9/18/2012	
Mailing Address CHESAPEAKE RF CONSULTANTS, LLC 207 OLD DOMINION ROAD		
City YORKTOWN	State or Country (if foreign address) VA	Zip Code 23692 -
Telephone Number (include area code) 7036509600	E-Mail Address (if available) JOSEPH.DAVIS@RF-CONSULTANTS.COM	

Any specified rotation has already been applied to the plotted pattern.

Field strength values shown on a rotated pattern may differ from the listed values because intermediate azimuths are interpolated between entered azimuths.

Close Window



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