

## **ENGINEERING EXHIBIT**

### **Incentive Auction Channel Reassignment**

#### **Request for Interim Antenna Special Temporary Authorization**

prepared for

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

WCAV(DT) Charlottesville, VA

Facility ID 363

Ch. 19 71 kW 306 m

*Gray Television Licensee, LLC* (“Gray”), licensee of WCAV(DT) (Facility ID 363, Charlottesville VA) requests Special Temporary Authority (“STA”) to operate on its pre-auction channel with an interim antenna and parameters at variance. WCAV is licensed (BLCDT-20090522ADB) to operate on Channel 19 at 155 kW effective radiated power (“ERP”) with a directional antenna at 326 meters height above average terrain (“HAAT”). Reassignment of WCAV from Channel 19 to Channel 32 was specified in the *Incentive Auction Closing and Channel Reassignment Public Notice* (DA 17-317, released April 13, 2017). WCAV has been assigned to make the transition to Channel 32 at phase 5 (testing period start date August 3, 2019 and phase completion date September 6, 2019).

*Gray* requests STA to operate WCAV on its pre-auction Channel 19 with an interim antenna at reduced power prior to its transition in order to accommodate tower work, removal of the pre-auction Channel 19 main antenna, and installation of the reassignment Channel 32 antenna. The necessary tower work is to commence during August 2019.

The proposed interim antenna is side-mounted on the WCAV tower structure. The overall structure elevation is less than 61 meters above ground and passes the FCC’s TOWAIR program for the transmitter location, thus FCC antenna structure registration is not necessary.

The interim antenna is a broadband nondirectional Dielectric model TUA-O4-08/32-H-R-S. The proposed interim facility ERP is 71 kW at 306 meters HAAT, and the corresponding transmitter power output is 5 kW. The interim facility will provide 48 dBμ principal community contour coverage over Charlottesville, and the 41 dBμ noise limited service contour (“NLSC”) does not extend beyond that of the authorized WCAV reassignment Channel 32 facility, as depicted in the attached Figure 1.

The proposed interim Channel 19 facility’s NLSC (71 kW ERP at 306 meters HAAT) extends beyond that of the pre-auction WCAV licensed Channel 19 facility (155 kW / 326 m) in some directions to the west. Despite the reduction in ERP and HAAT from the licensed values, the contour extension results from the use of a nondirectional antenna for the interim facility while the licensed main facility is directional. The interim antenna’s nondirectional ERP would have to be reduced to 3 kW to eliminate the contour extension, which in turn would sharply reduce the area and population that would be served by the interim operation. As depicted in Figure 1, the proposed interim Channel 19 facility does not expand beyond that achieved by the WCAV reassignment CP (file# 0000034188), which authorizes nondirectional operation on Channel 32 at 205 kW ERP and 329 meters HAAT. The contour extension only occurs over part of the region of the main Channel 19 antenna’s directional suppression, and, despite the extension, the net population and area within the NLSC of the interim Channel 19 operation (733,120 persons over 18,930 sq km) will be less than the licensed Channel 19 facility (858,651 persons over 19,794 sq km).

To consider the contour extension, interference study per FCC OET Bulletin 69<sup>1</sup> shows that the STA facility proposal does not create any new interference conflict with pertinent nearby full service and Class A television stations. FCC processing of this proposal is requested using a 2.0 km cell size and 0.2 km terrain profile increment. The interference study output report is provided as Table 1. As noted in Table 1, interference to two reassigned stations (WZBJ-CD

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<sup>1</sup>FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 (“OET-69”). This analysis employed the FCC’s current “TVStudy” software with the default application processing template settings, 2 km cell size, and 2 km terrain increment. Comparisons of various results of this computer program (run on a Mac processor) to the FCC’s implementation of TVStudy show excellent correlation.

Channel 19, Lynchburg VA and WAVY-TV Channel 19, Portsmouth VA) should be disregarded as WCAV will cease operation on Channel 19 before those stations commence operation with their authorized reassignment facilities.

Table 1 also shows 16.66 percent interference caused to *Gray's* licensed WHSV-TV reassignment facility (Channel 20 Harrisonburg VA). As demonstrated in Table 2, this is a reduction of interference from the existing situation where 16.99 percent interference is caused to WHSV-TV by the licensed WCAV facility. WHSV-TV achieved an early transition to its reassignment Channel 20, and the temporary interference received from WCAV during the transition was addressed in the exhibits underlying the WHSV-TV phase change request (LMS file# 0000054663).

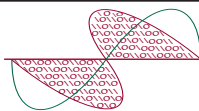
Regarding RF exposure, calculations per FCC OET Bulletin Number 65 (considering 5 percent antenna relative field in downward elevations) show that the signal density near the tower at two meters above ground level attributable to the proposed facility is  $8.3 \mu\text{W}/\text{cm}^2$ , which is 2.5 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 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.

List of Attachments

Figure 1	Proposed Interim Contours
Table 1	TVStudy Analysis of Proposal
Table 2	Interference Study Details Regarding WHSV-TV

**Chesapeake RF Consultants, LLC**

Joseph M. Davis, P.E.	August 16, 2019	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



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

**Figure 1**  
**Proposed Interim Contours**  
**WCAV(DT) Charlottesville, VA**  
**Facility ID 363**  
**Ch. 19 71 kW 306 m**

prepared for  
**Gray Television Licensee, LLC**

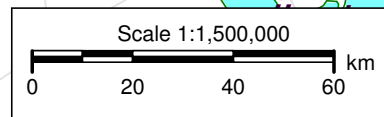
August, 2019

Authorized Reassignment Ch. 32  
File# 0000034188  
205 kW 329 m directional  
41 dBu Contour

Proposed Interim Ch. 19  
71 kW 306 m nondirectional  
48 dBu  
(Principal Community)  
41 dBu  
(Noise Limited Service Contour)

Pre-Auction Licensed Ch. 19  
BLCDT-20090522ADB  
155 kW 326 m directional  
41 dBu Contour

Charlottesville, VA



# **Table 1 WCAV STA TVStudy Analysis of Proposal** (page 1 of 3)



tvstudy v2.2.5 (4uoc83)  
Database: localhost, Study: WCAV 71kW interim 2.0-0.2, Model: Longley-Rice  
Start: 2019.08.16 09:14:15

Study created: 2019.08.16 09:14:15

Study build station data: LMS TV 2019-08-14

Proposal: WCAV D19 DT APP CHARLOTTESVILLE, VA  
File number: WCAV 71kW interim  
Facility ID: 363  
Station data: User record  
Record ID: 2828  
Country: U.S.

Build options:  
Protect pre-transition records not on baseline channel

Search options:  
Baseline record excluded if station has CP

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	WLFL	D18	DT	CP	RALEIGH, NC	BLANK0000068685	256.8 km
Yes	WDBJ	D18	DT	LIC	ROANOKE, VA	BLANK0000055470	171.7
No	WSOC-TV	D19	DT	CP	CHARLOTTE, NC	BLANK0000034695	362.9
No	WYDO	D19	DT	CP	GREENVILLE, NC	BLANK0000034494	336.0
No	WUNM-TV	D19	DT	LIC	JACKSONVILLE, NC	BLANK0000034823	336.0
No	WKYC	D19	DT	CP	CLEVELAND, OH	BLANK0000073059	467.1
No	WBYD-CD	D19	DC	CP	PITTSBURGH, PA	BLANK0000001584	293.0
No	WKPZ-CD	D19	DC	LIC	KINGSPORT, TN	BLANK0000001597	397.7
No	WKPZ-CD	D19	DC	LIC	KINGSPORT, TN	BLANK0000034402	397.7
Yes	WZBJ-CD	D19	DC	CP	LYNCHBURG, VA	BLANK0000034800	91.6
Yes	WAVY-TV	D19	DT	CP	PORTSMOUTH, VA	BLANK0000001579	216.7
No	WYSJ-CA	D19	DC	LIC	YORKTOWN, VA	BLANK00000075398	205.7
No	WVAH-TV	D19	DT	LIC	CHARLESTON, WV	BLANK00000075398	302.6
No	WUNC-TV	D20	DT	CP	CHAPEL HILL, NC	BLANK0000001155	243.2
No	DWAZF-CD	D20	DC	APP	FRONT ROYAL, VA	BLANK0000063970	160.6
Yes	WHSV-TV	D20	DT	LIC	HARRISONBURG, VA	BLANK00000619ABM	75.5
Yes	WWCW	D20	DT	LIC	LYNCHBURG, VA	BLANK0000034473	125.3
No	WGNT	D20	DT	CP	PORTSMOUTH, VA	BLANK0000068436	218.1
No	WAZT-CD	D20	DC	CP	WOODSTOCK, VA		140.0

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D19  
Latitude: 37 59 4.20 N (NAD83)  
Longitude: 78 28 51.10 W  
Height AMSL: 472.2 m  
HAAT: 306.2 m  
Peak ERP: 71.0 kW  
Antenna: Omnidirectional  
Elev Pattn: Generic  
Elec Tilt: 0.75

39.3 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	71.0 kW	327.4 m	81.5 km
45.0	71.0	239.9	73.8
90.0	71.0	356.5	84.5
135.0	71.0	342.6	83.1
180.0	71.0	336.4	82.5
225.0	71.0	292.8	78.1
270.0	71.0	252.0	74.7
315.0	71.0	302.2	79.0

Distance to Canadian border: 508.5 km

**Table 1 WCAV STA TVStudy Analysis of Proposal**  
(page 2 of 3)



Distance to Mexican border: 2184.9 km

Conditions at FCC monitoring station: Laurel MD  
Bearing: 47.2 degrees Distance: 195.0 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:  
Bearing: 284.4 degrees Distance: 2311.7 km

\*\*Proposal fails distance check to land mobile station: Washington DC ch. 18, 163.4 km

Study cell size: 2.00 km  
Profile point spacing: 0.20 km

Maximum new IX to full-service and Class A: 0.50%  
Maximum new IX to LPTV: 2.00%

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Interference to BLANK0000055470 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WDBJ	D18	DT	LIC	ROANOKE, VA	BLANK0000055470	
Undesireds:	WCAV	D19	DT	APP	CHARLOTTESVILLE, VA	WCAV 71kW interim	171.7 km
	WUNE-TV	D17	DT	LIC	LINVILLE, NC	BLEDT20091118ADR	196.0
	WFXR	D17	DT	LIC	ROANOKE, VA	BLCDDT20090609ABS	0.3
	WNEH	D18	DT	LIC	GREENWOOD, SC	BLEDT20090622ADL	362.4
	WFXB	D18	DT	LIC	MYRTLE BEACH, SC	BLCDDT20070205ACJ	345.5
	WVAH-TV	D19	DT	LIC	CHARLESTON, WV	BLCDDT20050621AAV	204.2
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
45760.7 1,606,844		41963.1 1,482,586		41855.4 1,477,707		41851.4 1,477,684	0.01 0.00
Undesired			Total IX		Unique IX, before		Unique IX, after
WCAV D19 DT APP			4.0 23		4.0 23		
WUNE-TV D17 DT LIC			8.0 85		4.0 49		
WFXR D17 DT LIC			24.0 684		24.0 684		
WNEH D18 DT LIC			23.9 2,664		4.0 2,225		
WFXB D18 DT LIC			71.8 1,820		47.8 1,345		
WVAH-TV D19 DT LIC			4.0 101		4.0 101		

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Interference to BLANK0000034402 CP scenario 1

\*\*IX: 2.72% interference caused

**No change to WCAV's requirement to coordinate with upstream station WZBJ-CD at phase 5**

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WZBJ-CD	D19	DC	CP	LYNCHBURG, VA	BLANK0000034402	
Undesireds:	WCAV	D19	DT	APP	CHARLOTTESVILLE, VA	WCAV 71kW interim	91.6 km
	WSOC-TV	D19	DT	CP	CHARLOTTE, NC	BLANK0000034695	272.2
	WKPZ-CD	D19	DC	LIC	KINGSPORT, TN	BLANK0000001584	318.3
	WAVY-TV	D19	DT	CP	PORTSMOUTH, VA	BLANK0000034800	242.2
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
8336.9 287,146		7640.2 273,684		7540.6 273,137		7021.9 265,696	6.88 2.72
Undesired			Total IX		Unique IX, before		Unique IX, after
WCAV D19 DT APP			566.5 7,687		518.6 7,441		
WSOC-TV D19 DT CP			20.0 219		0.0 0		
WAVY-TV D19 DT CP			99.7 547		79.7 328		

**Table 1 WCAV STA TVStudy Analysis of Proposal**  
(page 3 of 3)



Interference to BLANK0000034800 CP scenario 1  
\*\*IX: 2.03% interference caused

**WAVY-TV transitions at phase 7 and is therefore not a conflict for WCAV (phase 5)**

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WAVY-TV	D19	DT	CP	PORTSMOUTH, VA	BLANK0000034800	
Undesireds:	WCAV	D19	DT	APP	CHARLOTTESVILLE, VA	WCAV 71kW interim	216.7 km
	WYDO	D19	DT	CP	GREENVILLE, NC	BLANK0000034494	204.7
	WZBJ-CD	D19	DC	CP	LYNCHBURG, VA	BLANK0000034402	242.2
	WGNT	D20	DT	CP	PORTSMOUTH, VA	BLANK0000034473	1.5
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
30225.3 2,080,708		30209.4 2,078,665		28775.8 2,056,191		28476.8 2,014,505	1.04 2.03
Undesired		Total IX		Unique IX, before		Unique IX, after	
WCAV D19 DT APP		323.1 43,409				299.1 41,686	
WYDO D19 DT CP		1405.6 21,526		1393.6 19,939		1377.6 19,794	
WZBJ-CD D19 DC CP		4.0 1,548		0.0 0		0.0 0	
WGNT D20 DT CP		35.9 987		27.9 948		23.9 918	

Interference to BLANK0000063970 LIC scenario 1  
\*\*IX: 16.66% interference caused

**Proposal results in decreased interference caused to WHSV-TV from the current situation, see Table 2**

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WHSV-TV	D20	DT	LIC	HARRISONBURG, VA	BLANK0000063970	
Undesireds:	WCAV	D19	DT	APP	CHARLOTTESVILLE, VA	WCAV 71kW interim	75.5 km
	WZBJ-CD	D19	DC	CP	LYNCHBURG, VA	BLANK0000034402	90.6
	WUNC-TV	D20	DT	CP	CHAPEL HILL, NC	BLANK0000075398	255.9
	WPGH-TV	D20	DT	CP	PITTSBURGH, PA	BLANK0000034375	265.7
	WGNT	D20	DT	CP	PORTSMOUTH, VA	BLANK0000034473	290.0
	WAZT-CD	D20	DC	CP	WOODSTOCK, VA	BLANK0000068436	167.9
	WWCW	D21	DT	CP	LYNCHBURG, VA	BLANK0000027725	98.0
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
28255.8 845,013		23888.8 697,836		21858.9 596,847		20373.1 497,431	6.80 16.66
Undesired		Total IX		Unique IX, before		Unique IX, after	
WCAV D19 DT APP		2283.8 125,971				1485.8 99,416	
WZBJ-CD D19 DC CP		382.8 57,800		63.8 16,738		63.8 16,738	
WUNC-TV D20 DT CP		565.4 16,495		131.2 2,583		103.4 1,632	
WPGH-TV D20 DT CP		24.1 132		16.0 132		16.0 132	
WGNT D20 DT CP		1363.9 40,248		929.8 28,210		290.6 5,884	
WAZT-CD D20 DC CP		207.6 5,018		167.9 4,096		163.9 3,643	
WWCW D21 DT CP		414.7 41,901		95.6 2,357		87.7 2,357	

Interference to BLCDT20090619ABM LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WWCW	D20	DT	LIC	LYNCHBURG, VA	BLCDT20090619ABM	
Undesireds:	WCAV	D19	DT	APP	CHARLOTTESVILLE, VA	WCAV 71kW interim	125.3 km
	WUND-TV	D20	DT	LIC	EDENTON, NC	BMLEDT20101027ABX	333.0
	WHSV-TV	D20	DT	LIC	HARRISONBURG, VA	BLANK0000063970	98.0
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
38813.3 1,404,553		33433.5 1,239,021		32003.3 1,202,503		31963.6 1,202,107	0.12 0.03
Undesired		Total IX		Unique IX, before		Unique IX, after	
WCAV D19 DT APP		274.1 3,847				39.8 396	
WUND-TV D20 DT LIC		103.6 1,403		43.9 630		39.9 629	
WHSV-TV D20 DT LIC		1386.3 35,888		1326.5 35,115		1112.0 31,832	

**Table 2 Interference Study Details Regarding WHSV-TV**  
(page 1 of 1)



**Existing Condition**  
**Licensed WCAV Interference to WHSV-TV: 16.99 percent**

Study cell size: 2.00 km  
Profile point spacing: 0.20 km

Interference to BLANK0000063970 LIC scenario 1

**\*\*IX: 16.99% interference caused**

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WHSV-TV	D20	DT	LIC	HARRISONBURG, VA	BLANK0000063970	
Undesireds:	WCAV	D19	DT	LIC	CHARLOTTESVILLE, VA	BLCDT20090522ADB	75.5 km
	WZBJ-CD	D19	DC	CP	LYNCHBURG, VA	BLANK0000034402	90.6
	WUNC-TV	D20	DT	CP	CHAPEL HILL, NC	BLANK0000075398	255.9
	WPGH-TV	D20	DT	CP	PITTSBURGH, PA	BLANK0000034375	265.7
	WGNT	D20	DT	CP	PORTSMOUTH, VA	BLANK0000034473	290.0
	WAZT-CD	D20	DC	CP	WOODSTOCK, VA	BLANK0000068436	167.9
	WWCW	D21	DT	CP	LYNCHBURG, VA	BLANK0000027725	98.0
<hr/>							
	Service area	Terrain-limited		IX-free, before		IX-free, after	Percent New IX
	28255.8	845,013	23888.8	697,836	21858.9	596,847	20238.0 495,455 7.42 <b>16.99</b>
<hr/>							
Undesired			Total IX	Unique IX, before		Unique IX, after	
WCAV D19 DT LIC			2478.8	128,605		1620.9	101,392
WZBJ-CD D19 DC CP			382.8	57,800		63.8	16,738
WUNC-TV D20 DT CP			565.4	16,495		131.2	2,583
WPGH-TV D20 DT CP			24.1	132		16.0	132
WGNT D20 DT CP			1363.9	40,248		28,210	266.7
WAZT-CD D20 DC CP			207.6	5,018		167.9	4,096
WWCW D21 DT CP			414.7	41,901		95.6	2,357

**Proposed Condition**  
**Proposed WCAV STA Interference to WHSV-TV: 16.66 percent**

Study cell size: 2.00 km  
Profile point spacing: 0.20 km

Interference to BLANK0000063970 LIC scenario 1

**\*\*IX: 16.66% interference caused**

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WHSV-TV	D20	DT	LIC	HARRISONBURG, VA	BLANK0000063970	
Undesireds:	WCAV	D19	DT	APP	CHARLOTTESVILLE, VA	WCAV 71kW interim	75.5 km
	WZBJ-CD	D19	DC	CP	LYNCHBURG, VA	BLANK0000034402	90.6
	WUNC-TV	D20	DT	CP	CHAPEL HILL, NC	BLANK0000075398	255.9
	WPGH-TV	D20	DT	CP	PITTSBURGH, PA	BLANK0000034375	265.7
	WGNT	D20	DT	CP	PORTSMOUTH, VA	BLANK0000034473	290.0
	WAZT-CD	D20	DC	CP	WOODSTOCK, VA	BLANK0000068436	167.9
	WWCW	D21	DT	CP	LYNCHBURG, VA	BLANK0000027725	98.0
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	Service area	Terrain-limited		IX-free, before		IX-free, after	Percent New IX
	28255.8	845,013	23888.8	697,836	21858.9	596,847	20373.1 497,431 6.80 <b>16.66</b>
<hr/>							
Undesired			Total IX	Unique IX, before		Unique IX, after	
WCAV D19 DT APP			2283.8	125,971		1485.8	99,416
WZBJ-CD D19 DC CP			382.8	57,800		63.8	16,738
WUNC-TV D20 DT CP			565.4	16,495		131.2	2,583
WPGH-TV D20 DT CP			24.1	132		16.0	132
WGNT D20 DT CP			1363.9	40,248		28,210	290.6
WAZT-CD D20 DC CP			207.6	5,018		167.9	4,096
WWCW D21 DT CP			414.7	41,901		95.6	2,357