

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 dB μ principal community contour coverage over Charlottesville, and the 41 dB μ 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 69¹ 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

¹FCC 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).

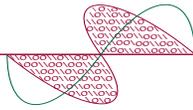
Regarding RF exposure, calculations per FCC OET Bulletin Number 65 (considering 5 percent antenna relative field in downward elevations) show that the signal density near the tower at two meters above ground level attributable to the proposed facility is $8.3 \mu\text{W}/\text{cm}^2$, which is 2.5 percent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

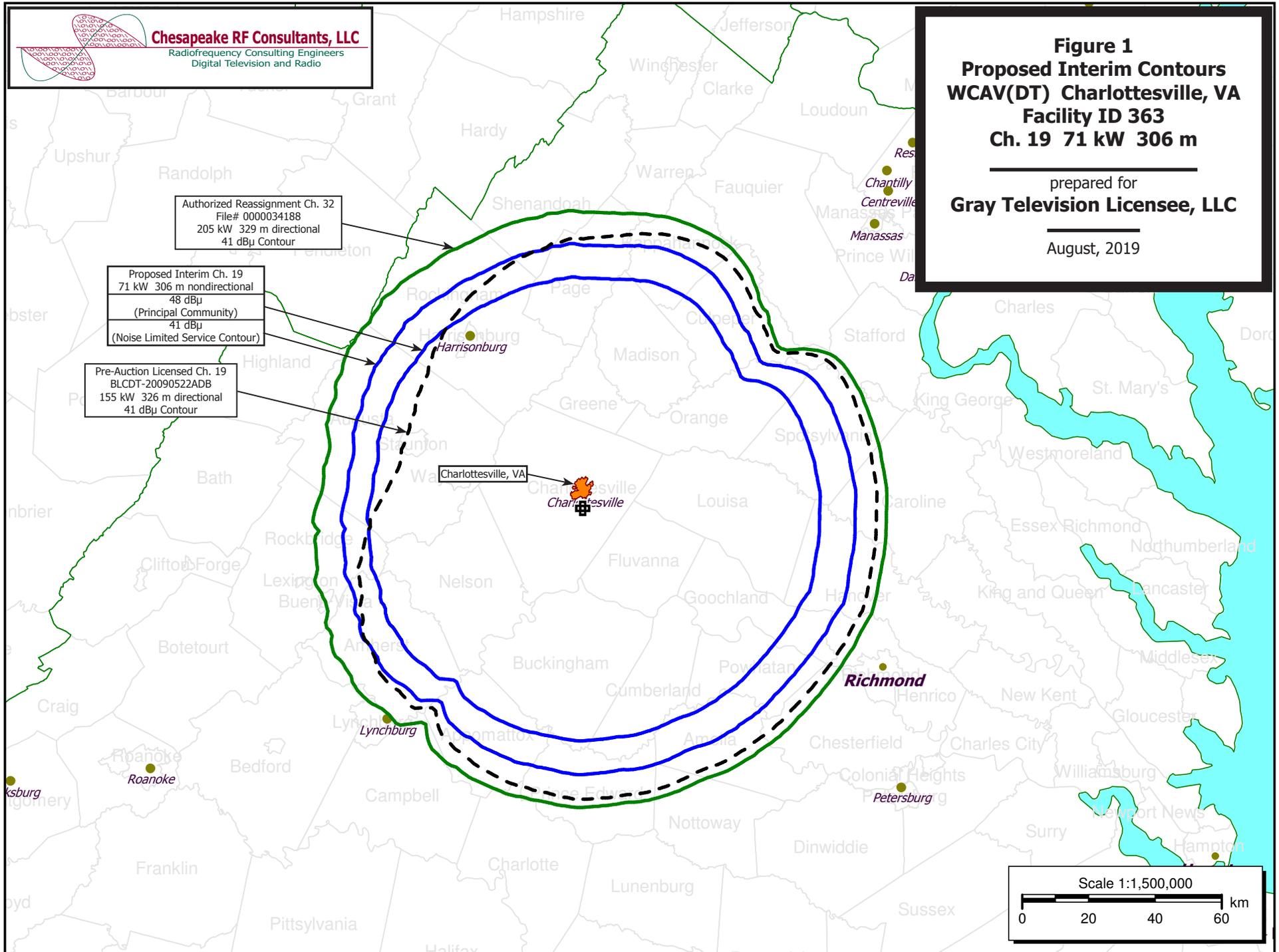


Table 1 WCAV STA TVStudy Analysis of Proposal
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tvstudy v2.2.5 (4uoc83)
 Database: localhost, Study: WCAV 71kW interim 2.0-0.2, Model: Longley-Rice
 Start: 2019.08.16 09:14:15

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	WFLF	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	BLEDT20090827AAT	336.0
No	WKYC	D19	DT	CP	CLEVELAND, OH	BLANK0000034823	467.1
No	WBYD-CD	D19	DC	CP	PITTSBURGH, PA	BLANK0000073059	293.0
No	WKPZ-CD	D19	DC	LIC	KINGSPORT, TN	BLANK0000001584	397.7
No	WKPZ-CD	D19	DC	LIC	KINGSPORT, TN	BLANK0000001597	397.7
Yes	WZBJ-CD	D19	DC	CP	LYNCHBURG, VA	BLANK0000034402	91.6
Yes	WAVY-TV	D19	DT	CP	PORTSMOUTH, VA	BLANK0000034800	216.7
No	WYSJ-CA	D19	DC	LIC	YORKTOWN, VA	BLANK0000001579	205.7
No	WVAH-TV	D19	DT	LIC	CHARLESTON, WV	BLCDT20050621AAV	302.6
No	WUNC-TV	D20	DT	CP	CHAPEL HILL, NC	BLANK0000075398	243.2
No	DWAZF-CD	D20	DC	APP	FRONT ROYAL, VA	BLANK0000001155	160.6
Yes	WHSV-TV	D20	DT	LIC	HARRISONBURG, VA	BLANK0000063970	75.5
Yes	WWCW	D20	DT	LIC	LYNCHBURG, VA	BLCDT20090619ABM	125.3
No	WGNT	D20	DT	CP	PORTSMOUTH, VA	BLANK0000034473	218.1
No	WAZT-CD	D20	DC	CP	WOODSTOCK, VA	BLANK0000068436	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%

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	BLCDT20090609ABS	0.3
	WNEH	D18	DT	LIC	GREENWOOD, SC	BLEDT20090622ADL	362.4
	WFXB	D18	DT	LIC	MYRTLE BEACH, SC	BLCDT20070205ACJ	345.5
	WVAH-TV	D19	DT	LIC	CHARLESTON, WV	BLCDT20050621AAV	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	49	
WFXR D17 DT LIC		24.0	684	24.0	684	684	
WNEH D18 DT LIC		23.9	2,664	4.0	2,225	2,225	
WFXB D18 DT LIC		71.8	1,820	47.8	1,345	1,345	
WVAH-TV D19 DT LIC		4.0	101	4.0	101	101	

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	0	
WAVY-TV D19 DT CP		99.7	547	79.7	328	158	

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)

Call	Chan	Svc	Status	City, State	File Number	Distance	
Desired: WAVY-TV	D19	DT	CP	PORTSMOUTH, VA	BLANK0000034800		
Undesireds: WCAV	D19	DT	APP	CHARLOTTEVILLE, 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	1377.6	19,794			
WZBJ-CD D19 DC CP	4.0	1,548	0.0	0			
WGNT D20 DT CP	35.9	987	27.9	948			

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

Call	Chan	Svc	Status	City, State	File Number	Distance	
Desired: WHSV-TV	D20	DT	LIC	HARRISONBURG, VA	BLANK0000063970		
Undesireds: WCAV	D19	DT	APP	CHARLOTTEVILLE, 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			
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	929.8	28,210			
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			

Interference to BLCDT20090619ABM LIC scenario 1

Call	Chan	Svc	Status	City, State	File Number	Distance	
Desired: WWCW	D20	DT	LIC	LYNCHBURG, VA	BLCDT20090619ABM		
Undesireds: WCAV	D19	DT	APP	CHARLOTTEVILLE, 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	39.9	629			
WHSV-TV D20 DT LIC	1386.3	35,888	112.0	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			
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	16.99
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	63.8	16,738			
WUNC-TV D20 DT CP	565.4	16,495	131.2	2,583	99.5	1,713			
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	266.7	5,632			
WAZT-CD D20 DC CP	207.6	5,018	167.9	4,096	159.9	3,643			
WWCW D21 DT CP	414.7	41,901	95.6	2,357	87.7	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			
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			