

ENGINEERING EXHIBIT

Incentive Auction Channel Reassignment

Application for Minor Modification of Digital Television Station Construction Permit

prepared for

Gray Television Licensee, LLC

WCTV(DT) Thomasville, GA

Facility ID 31590

Ch. 20 570 kW 617 m

Gray Television Licensee, LLC (“Gray”) is the licensee of digital television station WCTV(DT), Channel 46, Facility ID 31590, Thomasville GA. Reassignment of WCTV from Channel 46 to Channel 20 was specified in the *Incentive Auction Closing and Channel Reassignment Public Notice* (“CCRPN”, DA 17-317, released April 13, 2017). A Construction Permit (“CP” file# 0000033928) authorizes WCTV to operate on Channel 20 at 750 kW effective radiated power (“ERP”) with a nondirectional antenna at 617 meters height above average terrain (“HAAT”). *Gray* proposes herein a minor modification of the reassignment CP to reduce the ERP to 570 kW. No other changes are sought.

The existing Channel 46 facility employs a side-mount antenna near the top of the WCTV tower. As with the current authorization, the proposed Channel 20 antenna will be installed at the top-mount position, in place of WCTV’s former analog Channel 6 antenna.

The tower structure corresponds to FCC Antenna Structure Registration (“ASR”) number 1019981, having an overall structure height above ground of 609.6 meters. The antenna replacement will result in a reduction in the structure’s overall height to 607.5 meters. Following construction, the FAA will be notified of the reduction in height and the FCC ASR will be modified accordingly.

The proposed antenna is a nondirectional elliptically polarized Dielectric model TFU-30GTH/VP-R O4 (25 percent vertical polarization). The horizontally polarized ERP is 570 kW and the vertically polarized ERP is 142.5 kW.

Figure 1 supplies a map that demonstrates compliance with §73.625(a)(1) regarding coverage of the entire principal community. The proposed facility's predicted population exceeds 95 percent of the *CCRPN* baseline facility's population.

At 750 kW ERP, the presently authorized WCTV noise limited service contour ("NLSC") extends beyond that of the *CCRPN* facility and resulted from a minor modification application filed during the second filing window.¹ The modification to 570 kW ERP sought herein provides an NLSC which also exceeds that of the *CCRPN* facility but is within that of the present authorization. A comparison map of the WCTV authorized, proposed, and reassignment NLSC is provided as Figure 2.

Interference study per FCC OET Bulletin 69² shows that the proposal complies with the 0.5 percent limit of new interference caused to pertinent nearby post-auction full service and Class A television stations and reassignments as required by §73.616. The interference study output report is provided as Table 1.

The authorized 750 kW ERP and the proposed 570 kW ERP exceed the maximum allowed for the proposed antenna HAAT of 617 meters permitted by §73.622(f)(8)(i). The existing WCTV authorization was granted pursuant to §73.622(f)(5), which permits the maximum ERP to be exceeded in order to provide the same geographic coverage area as the largest station within the same market. The total area within the proposed 570 kW ERP WCTV

¹Public Notice "Incentive Auction Task Force and Media Bureau Announce the Opening of the Second Filing Window for Eligible Full Power and Class A Television Station—October 3 Through November 2, 2017" DA 17-911, released September 20, 2017.

²FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004. This analysis employed the FCC's current "TVStudy" software with the default application processing template settings, 2 km cell size, and 1 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.

NLSC is 42,444 square kilometers, which is a reduction from the currently authorized WCTV NLSC of 44,410 square kilometers (750 kW ERP, Ch. 20, file# 0000033928) and the NLSC area of the licensed WCTV facility (44,438 sq. km, Ch. 46, BLCDDT-20050815AAA). Thus, the 570 kW ERP specified herein is in compliance with §73.622(f)(5) of the FCC's Rules.

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 10 percent antenna relative field in downward elevations (pattern data shows less than 10 percent relative field at angles 10 to 90 degrees below the antenna), the calculated signal density near the tower at two meters above ground level attributable to the proposed facility is $0.7 \mu\text{W}/\text{cm}^2$, which is 0.2 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. This exhibit is limited to the evaluation of exposure to RF electromagnetic field. No increase in structure height is proposed.

List of Attachments

Figure 1	Proposed Coverage Contours
Figure 2	Coverage Contour Comparison
Table 1	TVStudy Analysis of Proposal
Form 2100	Saved Version of Engineering Sections of FCC Form at Time of Upload

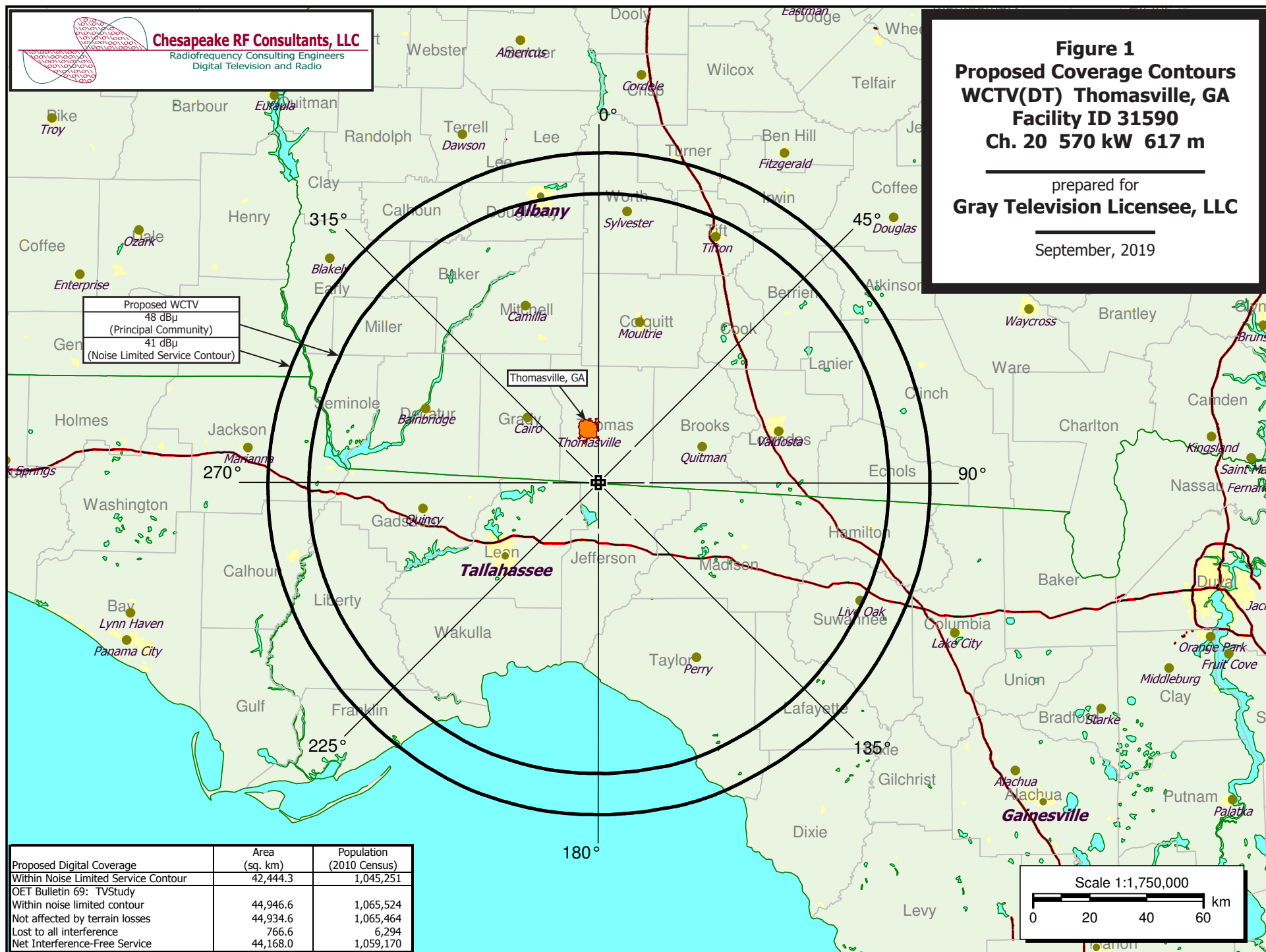
Chesapeake RF Consultants, LLC

Joseph M. Davis, P.E.	September 11, 2019	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600

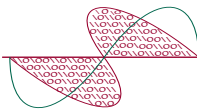


prepared for
Gray Television Licensee, LLC

September, 2019



Proposed Digital Coverage	Area (sq. km)	Population (2010 Census)
Within Noise Limited Service Contour	42,444.3	1,045,251
OET Bulletin 69: TVStudy		
Within noise limited contour	44,946.6	1,065,524
Not affected by terrain losses	44,934.6	1,065,464
Lost to all interference	766.6	6,294
Net Interference-Free Service	44,168.0	1,059,170



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

Figure 2
Coverage Contour Comparison
WCTV(DT) Thomasville, GA
Facility ID 31590
Ch. 20 570 kW 617 m

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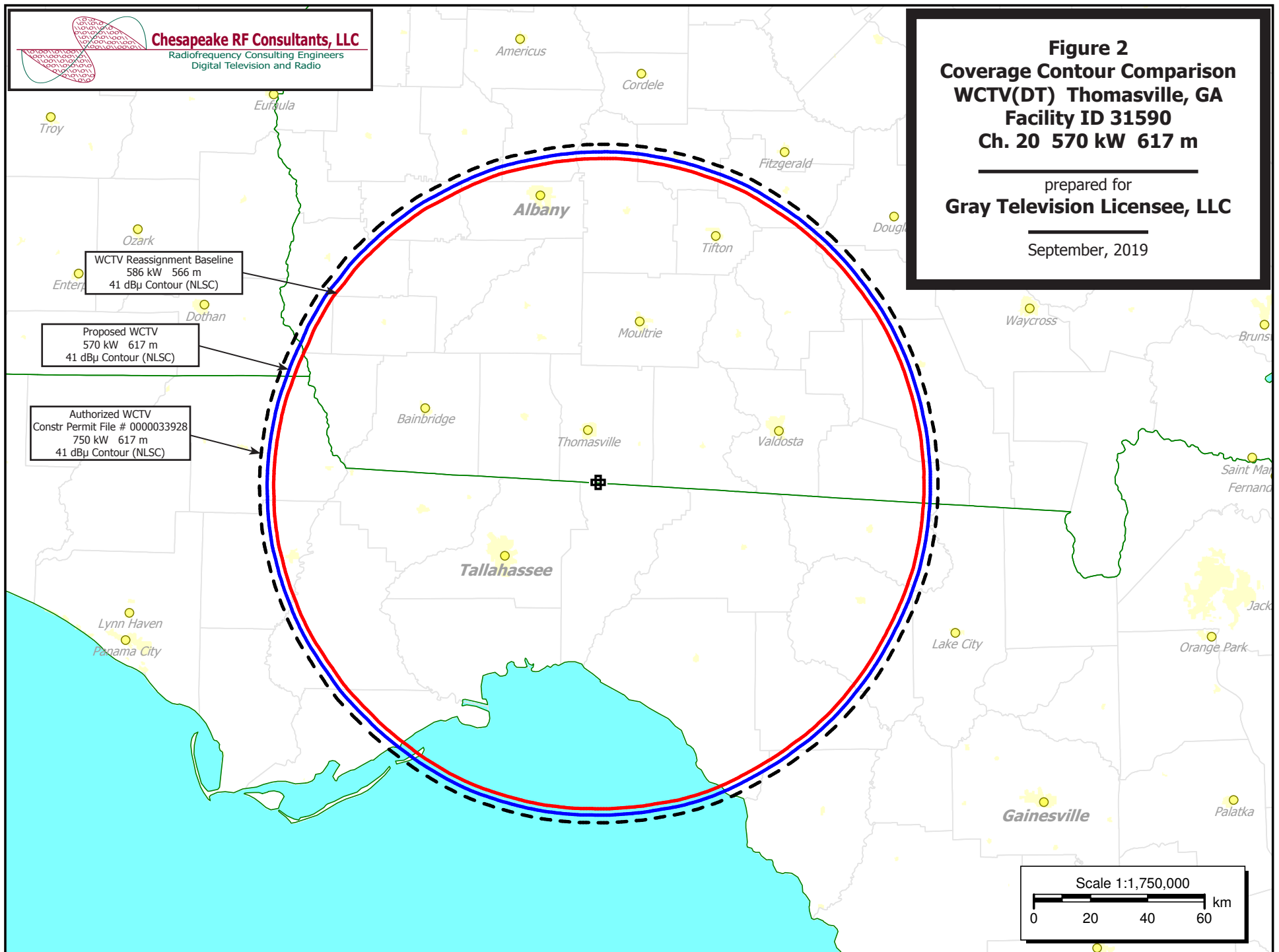


Table 1 WCTV TVStudy Analysis of Proposal (page 1 of 4)



tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: WCTV CP-MOD 570kW, Model: Longley-Rice
Start: 2019.09.11 08:46:21

Study created: 2019.09.11 08:46:21

Study build station data: LMS TV 2019-09-11

Proposal: WCTV D20 DT APP THOMASVILLE, GA
File number: WCTV CP-MOD 570kW
Facility ID: 31590
Station data: User record
Record ID: 2849
Country: U.S.
Zone: III

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	WIYC	D19	DT	CP	TROY, AL	BLANK0000075838	245.4 km
No	WJAX-TV	D19	DT	LIC	JACKSONVILLE, FL	BLCDT20030328ANV	231.2
Yes	WTLH	D19	DT	CP	BAINBRIDGE, GA	BLANK0000034478	3.2
No	WABM	D20	DT	CP	BIRMINGHAM, AL	BLANK0000034382	413.1
Yes	WKRQ-TV	D20	DT	LIC	MOBILE, AL	BLANK0000080989	371.9
Yes	WCWJ	D20	DT	CP	JACKSONVILLE, FL	BLANK0000029603	232.9
No	WZLX-CD	D20	DC	CP	ORLANDO, ETC., FL	BLANK0000034824	360.4
Yes	WVEA-TV	D20	DT	CP	TAMPA, FL	BLANK0000034006	353.4
No	WANN-CD	D20	DC	CP	ATLANTA, GA	BLANK0000028242	350.7
No	WCBD-TV	D20	DT	CP	CHARLESTON, SC	BLANK0000034805	473.7
Yes	WDHN	D21	DT	LIC	DOTHAN, AL	BLCDT20090303ACR	145.3
No	WJEB-TV	D21	DT	CP	JACKSONVILLE, FL	BLANK0000028163	231.8

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D20
Latitude: 30 40 14.00 N (NAD83)
Longitude: 83 56 26.00 W
Height AMSL: 664.7 m
HAAT: 617.2 m
Peak ERP: 570 kW
Antenna: Omnidirectional
Elev Pattn: Generic
Elec Tilt: 0.75

39.4 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	570 kW	612.0 m	119.4 km
45.0	570	616.3	119.7
90.0	570	621.1	119.9
135.0	570	625.8	120.2
180.0	570	625.1	120.1
225.0	570	613.3	119.5
270.0	570	615.9	119.6
315.0	570	607.7	119.2

ERP exceeds maximum

ERP: 570 kW ERP maximum: 310 kW

Distance to Canadian border: 1228.5 km

Distance to Mexican border: 1372.2 km

Conditions at FCC monitoring station: Powder Springs GA
Bearing: 348.5 degrees Distance: 362.3 km

Proposal is not within the West Virginia quiet zone area

Table 1 WCTV TVStudy Analysis of Proposal
(page 2 of 4)



Conditions at Table Mountain receiving zone:
Bearing: 304.5 degrees Distance: 2187.8 km

No land mobile station failures found

Study cell size: 2.00 km
Profile point spacing: 1.00 km

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

Interference to BLANK0000034478 CP scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WTLH	D19	DT	CP	BAINBRIDGE, GA	BLANK0000034478	
Undesireds:	WCTV	D20	DT	BL	THOMASVILLE, GA	DTVBL31590	3.3 km
	WCTV	D20	DT	APP	THOMASVILLE, GA	WCTV CP-MOD 570kW	3.2
	WIYC	D19	DT	CP	TROY, AL	BLANK0000075838	242.4
	WJAX-TV	D19	DT	LIC	JACKSONVILLE, FL	BLCDT20030328ANV	234.4
	WGCL-TV	D19	DT	LIC	ATLANTA, GA	BLCDT20060113ACO	349.2
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
44366.2 1,065,127		44362.2 1,065,105		44246.5 1,064,377		44178.8 1,063,593	0.15 0.07
Undesired		Total IX		Unique IX, before		Unique IX, after	
WCTV D20 DT BL		27.8 245		27.8 245			
WCTV D20 DT APP		95.6 1,029				95.6 1,029	
WIYC D19 DT CP		4.1 0		0.0 0		0.0 0	
WJAX-TV D19 DT LIC		64.0 446		60.1 444		60.1 444	
WGCL-TV D19 DT LIC		27.8 39		19.8 37		19.8 37	

Interference to BLANK0000080989 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WKRG-TV	D20	DT	LIC	MOBILE, AL	BLANK0000080989	
Undesireds:	WCTV	D20	DT	BL	THOMASVILLE, GA	DTVBL31590	371.9 km
	WCTV	D20	DT	APP	THOMASVILLE, GA	WCTV CP-MOD 570kW	371.9
	WIIQ	D19	DT	LIC	DEMOPOLIS, AL	BLEDT20090511AHE	186.1
	WABM	D20	DT	CP	BIRMINGHAM, AL	BLANK0000034382	325.3
	WMPN-TV	D20	DT	LIC	JACKSON, MS	BLEDT20080807AAP	295.9
	WPAN	D21	DT	CP	FORT WALTON BEACH, FL	BLANK0000029983	40.9
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
43540.0 1,526,600		43433.0 1,526,075		42721.0 1,514,240		42717.0 1,514,136	0.01 0.01
Undesired		Total IX		Unique IX, before		Unique IX, after	
WCTV D20 DT BL		23.9 66		12.0 45			
WCTV D20 DT APP		23.9 170				16.0 149	
WIIQ D19 DT LIC		4.1 180		0.0 0		0.0 0	
WABM D20 DT CP		317.7 3,580		230.1 3,067		234.1 3,067	
WMPN-TV D20 DT LIC		322.0 2,806		250.5 2,494		250.5 2,494	
WPAN D21 DT CP		131.9 5,716		131.9 5,716		131.9 5,716	

Interference to BLANK0000029603 CP scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WCWJ	D20	DT	CP	JACKSONVILLE, FL	BLANK0000029603	
Undesireds:	WCTV	D20	DT	BL	THOMASVILLE, GA	DTVBL31590	232.9 km
	WCTV	D20	DT	APP	THOMASVILLE, GA	WCTV CP-MOD 570kW	232.9
	WVEA-TV	D20	DT	CP	TAMPA, FL	BLANK0000034006	278.3
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
29886.7 1,660,676		29882.7 1,660,538		28768.9 1,648,409		28696.7 1,648,171	0.25 0.01

Table 1 WCTV TVStudy Analysis of Proposal
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Undesired		Total IX	Unique IX, before	Unique IX, after
WCTV D20 DT BL	982.1	6,750	850.0	3,821
WCTV D20 DT APP	1054.3	6,887		922.2
WVEA-TV D20 DT CP	263.8	8,308	131.7	5,379
				131.7
				5,480

Interference to BLANK0000034006 CP scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WVEA-TV	D20	DT	CP	TAMPA, FL	BLANK0000034006	
Undesireds:	WCTV	D20	DT	BL	THOMASVILLE, GA	DTVBL31590	353.4 km
	WCTV	D20	DT	APP	THOMASVILLE, GA	WCTV CP-MOD 570kW	353.4
	WTOG	D19	DT	CP	ST. PETERSBURG, FL	BLANK0000064125	2.0
	WTVX	D20	DT	LIC	FORT PIERCE, FL	BLANK0000080021	201.7
	WCWJ	D20	DT	CP	JACKSONVILLE, FL	BLANK0000029603	278.3
	WZXZ-CD	D20	DC	CP	ORLANDO, ETC., FL	BLANK0000034824	141.9
	WCLF	D21	DT	APP	CLEARWATER, FL	BLANK0000036056	3.1
	WKME-CD	D21	DC	CP	KISSIMMEE, FL	BLANK0000028487	93.3

	Service area		Terrain-limited		IX-free, before	IX-free, after	Percent New IX
33827.7	4,553,004	33815.6	4,552,113		32461.1	4,431,444	0.00 0.00

Undesired		Total IX	Unique IX, before	Unique IX, after
WCTV D20 DT BL	12.1	1,445	0.0	0
WCTV D20 DT APP	12.1	1,445		0.0
WTOG D19 DT CP	133.1	17,106	40.3	12,907
WTVX D20 DT LIC	943.5	64,480	559.7	25,050
WCWJ D20 DT CP	209.1	20,912	156.8	12,538
WZXZ-CD D20 DC CP	496.9	64,828	145.3	15,961
WCLF D21 DT APP	28.1	1,722	4.1	0
WKME-CD D21 DC CP	117.2	28,689	4.0	798

Interference to BLANK0000034006 CP scenario 2

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WVEA-TV	D20	DT	CP	TAMPA, FL	BLANK0000034006	
Undesireds:	WCTV	D20	DT	BL	THOMASVILLE, GA	DTVBL31590	353.4 km
	WCTV	D20	DT	APP	THOMASVILLE, GA	WCTV CP-MOD 570kW	353.4
	WTOG	D19	DT	CP	ST. PETERSBURG, FL	BLANK0000064125	2.0
	WTVX	D20	DT	LIC	FORT PIERCE, FL	BLANK0000080021	201.7
	WCWJ	D20	DT	CP	JACKSONVILLE, FL	BLANK0000029603	278.3
	WZXZ-CD	D20	DC	CP	ORLANDO, ETC., FL	BLANK0000034824	141.9
	WKME-CD	D21	DC	CP	KISSIMMEE, FL	BLANK0000028487	93.3

	Service area		Terrain-limited		IX-free, before	IX-free, after	Percent New IX
33827.7	4,553,004	33815.6	4,552,113		32465.2	4,431,444	0.00 0.00

Undesired		Total IX	Unique IX, before	Unique IX, after
WCTV D20 DT BL	12.1	1,445	0.0	0
WCTV D20 DT APP	12.1	1,445		0.0
WTOG D19 DT CP	133.1	17,106	56.3	12,909
WTVX D20 DT LIC	943.5	64,480	563.8	25,386
WCWJ D20 DT CP	209.1	20,912	156.8	12,538
WZXZ-CD D20 DC CP	496.9	64,828	145.3	15,961
WKME-CD D21 DC CP	117.2	28,689	4.0	798

Interference to BLCDT20090303ACR LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WDHN	D21	DT	LIC	DOTHAN, AL	BLCDT20090303ACR	
Undesireds:	WCTV	D20	DT	BL	THOMASVILLE, GA	DTVBL31590	145.3 km
	WCTV	D20	DT	APP	THOMASVILLE, GA	WCTV CP-MOD 570kW	145.3
	WTTO	D21	DT	CP	HOMEWOOD, AL	BLANK0000029999	286.2
	WPAN	D21	DT	CP	FORT WALTON BEACH, FL	BLANK0000029983	208.0
	WPBA	D21	DT	LIC	ATLANTA, GA	BLCDT20041013ABK	294.5
	WCOV-TV	D22	DT	CP	MONTGOMERY, AL	BLANK0000072324	114.6
	WTWC-TV	D22	DT	CP	TALLAHASSEE, FL	BLANK0000034393	142.0

Table 1 WCTV TVStudy Analysis of Proposal
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Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
22899.1	452,377	22746.1	451,978	22297.4	448,686	22293.4	448,671	0.02	0.00
Undesired		Total IX		Unique IX, before		Unique IX, after			
WCTV D20 DT BL		11.9	30	0.0	0				
WCTV D20 DT APP		23.9	225			4.0	15		
WTO D21 DT CP		88.9	165	36.3	115	36.3	115		
WPAN D21 DT CP		24.0	411	24.0	411	24.0	411		
WPBA D21 DT LIC		16.2	41	0.0	0	0.0	0		
WCOV-TV D22 DT CP		320.5	2,299	280.1	2,290	280.1	2,290		
WTWC-TV D22 DT CP		55.8	426	43.8	396	35.8	216		

Interference to proposal scenario 1
0.59% interference received

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WCTV	D20	DT	APP	THOMASVILLE, GA	WCTV CP-MOD 570kW	
Undesireds:	WTLH	D19	DT	CP	BAINBRIDGE, GA	BLANK0000034478	3.2 km
	WKRQ-TV	D20	DT	LIC	MOBILE, AL	BLANK0000080989	371.9
	WCWJ	D20	DT	CP	JACKSONVILLE, FL	BLANK0000029603	232.9
	WDHN	D21	DT	LIC	DOTHAN, AL	BLCDT20090303ACR	145.3

Service area		Terrain-limited		IX-free		Percent IX	
44946.6	1,065,524	44934.6	1,065,464	44168.0	1,059,170	1.71	0.59
Undesired		Total IX		Unique IX		Prcnt Unique IX	
WTLH D19 DT CP		23.9	288	23.9	288	0.05	0.03
WKRQ-TV D20 DT LIC		32.0	408	24.0	228	0.05	0.02
WCWJ D20 DT CP		328.4	2,723	328.4	2,723	0.73	0.26
WDHN D21 DT LIC		390.2	3,055	382.2	2,875	0.85	0.27

Channel and Facility Information

Section	Question	Response
Proposed Community of License	Facility ID	31590
	State	Georgia
	City	THOMASVILLE
	DTV Channel	20
	Designated Market Area	Tallahassee-Thomasville
Facility Type	Facility Type	Commercial
	Station Type	Main
Zone	Zone	3

Antenna Location Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1019981
Coordinates (NAD83)	Latitude	30° 40' 14.0" N+
	Longitude	083° 56' 26.0" W-
	Structure Type	TOWER-A free standing or guyed struct
	Overall Structure Height	609.6 meters
	Support Structure Height	587.0 meters
	Ground Elevation (AMSL)	67.6 meters
Antenna Data	Height of Radiation Center Above Ground Level	597.1 meters
	Height of Radiation Center Above Average Terrain	617.2 meters
	Height of Radiation Center Above Mean Sea Level	664.7 meters
	Effective Radiated Power	570 kW

Antenna Technical Data

Section	Question	Response
Antenna Type	Antenna Type	Non-Directional
	Do you have an Antenna ID?	
	Antenna ID	
Antenna Manufacturer and Model	Manufacturer:	DIE
	Model	TFU-30GTH/VP-R O4
	Rotation	
	Electrical Beam Tilt	0.75
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Elliptical
DTV and DTS: Elevation Pattern	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	

**Construction
Permit
Certifications**

Section	Question	Response
Post-Incentive Auction Expedited Processing	It will operate on the DTV channel for this station as established in the post-incentive auction channel reassignment public notice.	Yes
	It will operate post-incentive auction facilities that do not expand the noise-limited service contour in any direction beyond that established by the post-incentive auction channel reassignment public notice.	No
	It will operate post-incentive auction facilities that match or reduce by no more than five percent with respect to predicted population from those defined in the post-incentive auction channel reassignment public notice.	Yes
	The antenna structure to be used by this facility has been registered by the Commission and will not require re-registration to support the proposed antenna, OR the FAA has previously determined that the proposed structure will not adversely affect safety in air navigation and this structure qualifies for later registration under the Commission's phased registration plan, OR the proposed installation on this structure does not require notification to the FAA pursuant to 47 C.F.R. Section 17.7.	Yes
Environmental Effect	Would a Commission grant of Authorization for this location be an action which may have a significant environmental effect? (See 47 C.F.R. Section 1.1306)	No
Broadcast Facility	The proposed facility complies with the applicable engineering standards and assignment requirements of 47 C. F.R. Sections 73.616, 73.622(i), 73.623(e), 73.625, 73.1030, and 73.1125.	Yes