

## **ENGINEERING EXHIBIT**

### **Incentive Auction Channel Reassignment**

### **Application for Minor Modification of Digital Television Station Construction Permit**

prepared for

#### **CBS Operations Investments Inc.**

WTOG(DT) St. Petersburg, FL

Facility ID 74112

Ch. 19 700 kW 453 m

*CBS Operations Investments Inc. ("CBS")* is the licensee of digital television station WTOG(DT), Channel 44, Facility ID 74112, St. Petersburg, FL. Reassignment of WTOG from Channel 44 to Channel 19 was specified in the *Incentive Auction Closing and Channel Reassignment Public Notice ("CCRPN"*, DA 17-317, released April 13, 2017). *CBS* herein proposes modification of the WTOG Channel 19 Construction Permit ("CP", file# 0000064125). The CP authorizes operation at 700 kW effective radiated power ("ERP") at 458 meters antenna height above average terrain ("HAAT"). As proposed herein, WTOG will utilize a different transmitting location and decreased antenna HAAT of 453 meters, while maintaining the ERP at 700 kW.

The WTOG Channel 19 CP authorizes operation at the WTOG licensed Channel 44 site (BLCDT-20090622ACD) with a new antenna system to be top-mounted in lieu of an existing stacked antenna system. The tower's overall height above ground is 479.8 meters (1574 feet). The tower structure owner, American Tower Corporation ("ATC"), has determined that significant structural modifications are necessary to accommodate a replacement top-mount antenna and bring the tower to the current structural standard. ATC has advised *CBS* that the modifications are not practical to implement, and that the tower will be decommissioned for television broadcast use.

Therefore, WTOG must utilize an alternate site for its post-auction Channel 19 facility. As proposed herein, WTOG's Channel 19 facility will utilize an existing broadband antenna that is located on a different tower, associated with FCC Antenna Structure Registration number

1211242. The proposed site is located 2.0 km distant from the licensed WTOG Channel 44 site. No tower or antenna work is required to carry out this proposal and no change to the overall structure height will result.

The proposed antenna is a horizontally polarized nondirectional Dielectric model TUP-O5-12/60-1 and was previously utilized by WTOG's pre-transition digital Channel 59 licensed facility (BLCDT-20020430ABH) until 2009.

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.

The presently authorized WTOG noise limited service contour ("NLSC") extends beyond that of the *CCRPN* facility and originated with a minor modification application filed during the second filing window.<sup>1</sup> The modifications sought herein provide an NLSC which also exceeds that of the *CCRPN* facility. To the north, the proposed WTOG NLSC would extend beyond that as currently authorized, owing to the 2.0 km northerly shift in site location. A comparison map of the WTOG authorized, proposed, and reassignment NLSC is provided as Figure 2. The FCC's NLSC expansion "freeze" Public Notice<sup>2</sup> of April 5, 2013 (DA 13-618) is not applicable to the proposal since the freeze was lifted<sup>3</sup> on July 22, 2019 for reassigned stations such as WTOG that have not completed the transition to their post-auction channels.

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<sup>1</sup>Public 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.

<sup>2</sup>"*Media Bureau Announces Limitations on the Filing and Processing of Full Power and Class A Television Station Modification Applications, Effective Immediately, and Reminds Stations of Spectrum Act Preservation Mandate,*" DA 13-618, Public Notice, released April 5, 2013.

<sup>3</sup>"*Media Bureau Lifts the Freeze on the Filing of Minor Modification Applications that Expand the Contour of Full Power and Class A Television Stations for Certain Repacked Stations, Effective Immediately,*" DA 19-684, Public Notice, released July 22, 2019.

Interference study per FCC OET Bulletin 69<sup>4</sup> 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 proposed 700 kW ERP exceeds the maximum permitted by §73.622(f)(8)(i) for the proposed antenna HAAT of 453 meters. Section 73.622(f)(5) permits the maximum ERP to be exceeded in order to provide the same geographic coverage area as the largest station within the same market. As demonstrated in Figure 2, the total area within the proposed WTOG noise-limited service contour (“NLSC”) is 36,127 square kilometers, which does not exceed the NLSC area of WTVT(DT) (43,998 sq. km, Ch. 12, Tampa FL, BLCDT-20080410AAF). Thus, the 700 kW ERP specified herein is in compliance with §73.622(f)(5).

### **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 20 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  $1.2 \mu\text{W}/\text{cm}^2$ , which is 0.3 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,

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<sup>4</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 1 km terrain profile increment.

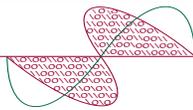
tower, or antenna from RF electromagnetic field exposure in excess of FCC guidelines. This exhibit is limited to the evaluation of exposure to RF electromagnetic field. No increase in structure height is proposed.

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 from FCC Form at Time of Upload

**Chesapeake RF Consultants, LLC**

Joseph M. Davis, P.E.	April 17, 2020	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



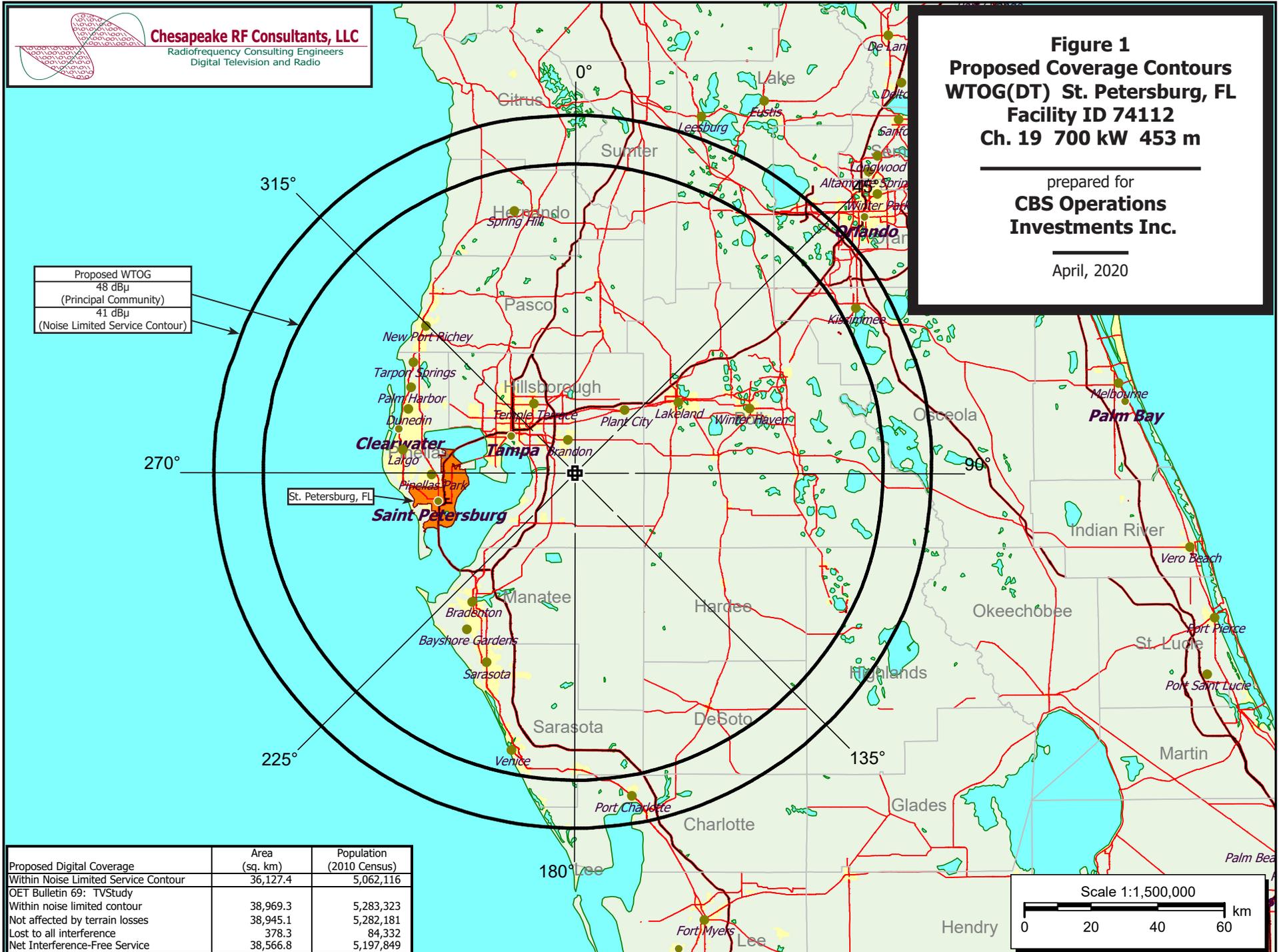
**Chesapeake RF Consultants, LLC**  
 Radiofrequency Consulting Engineers  
 Digital Television and Radio

**Figure 1**  
**Proposed Coverage Contours**  
**WTOG(DT) St. Petersburg, FL**  
**Facility ID 74112**  
**Ch. 19 700 kW 453 m**

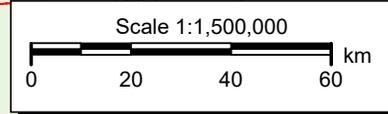
prepared for  
**CBS Operations**  
**Investments Inc.**

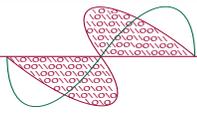
April, 2020

Proposed WTOG	48 dBμ
(Principal Community)	
(Noise Limited Service Contour)	41 dBμ



	Area (sq. km)	Population (2010 Census)
Proposed Digital Coverage		
Within Noise Limited Service Contour	36,127.4	5,062,116
OET Bulletin 69: TVStudy		
Within noise limited contour	38,969.3	5,283,323
Not affected by terrain losses	38,945.1	5,282,181
Lost to all interference	378.3	84,332
Net Interference-Free Service	38,566.8	5,197,849





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

**Figure 2**  
**Coverage Contour Comparison**  
**WTOG(DT) St. Petersburg, FL**  
**Facility ID 74112**  
**Ch. 19 700 kW 453 m**

prepared for  
**CBS Operations**  
**Investments Inc.**

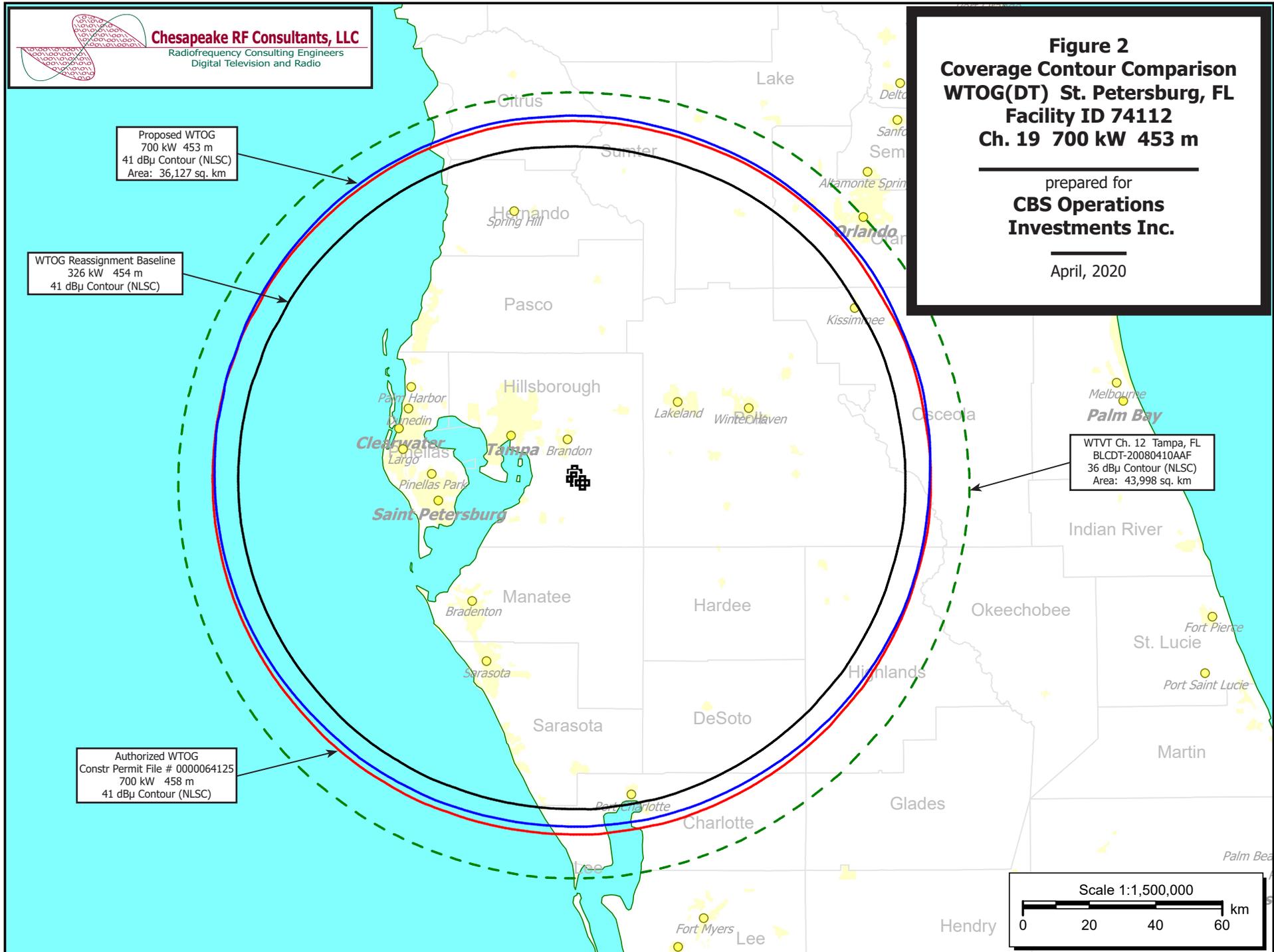
April, 2020

Proposed WTOG  
 700 kW 453 m  
 41 dBμ Contour (NLSC)  
 Area: 36,127 sq. km

WTOG Reassignment Baseline  
 326 kW 454 m  
 41 dBμ Contour (NLSC)

Authorized WTOG  
 Constr Permit File # 0000064125  
 700 kW 458 m  
 41 dBμ Contour (NLSC)

WTVT Ch. 12 Tampa, FL  
 BLCDT-20080410AAF  
 36 dBμ Contour (NLSC)  
 Area: 43,998 sq. km



**Table 1 WTOG TVStudy Analysis of Proposal**  
 (page 1 of 3)



tvstudy v2.2.5 (4uoc83)  
 Database: localhost, Study: WTOG CP-MOD 700kW, Model: Longley-Rice  
 Start: 2020.04.14 10:25:10

Study created: 2020.04.14 10:25:10

Study build station data: LMS TV 2020-04-07

Proposal: WTOG D19 DT APP ST. PETERSBURG, FL  
 File number: WTOG CP-MOD 700kW  
 Facility ID: 74112  
 Station data: User record  
 Record ID: 3075  
 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	WTCE-TV	D18	DT	LIC	FORT PIERCE, FL	BLANK0000072132	225.1 km
Yes	WMOR-TV	D18	DT	LIC	LAKELAND, FL	BLANK0000105369	3.1
Yes	WJAX-TV	D19	DT	LIC	JACKSONVILLE, FL	BLCDT20030328ANV	278.7
No	WSBS-CD	D19	DC	LIC	MIAMI, ETC., FL	BLANK0000071683	291.4
No	WTLH	D19	DT	CP	BAINBRIDGE, GA	BLANK0000105738	355.8
No	WTVX	D20	DT	LIC	FORT PIERCE, FL	BLANK0000080021	201.7
No	WZXX-CD	D20	DC	LIC	ORLANDO, ETC., FL	BLANK0000108580	141.9
Yes	WVEA-TV	D20	DT	LIC	TAMPA, FL	BLANK0000099184	0.0

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: 27 50 51.50 N (NAD83)  
 Longitude: 82 15 49.40 W  
 Height AMSL: 472.8 m  
 HAAT: 452.9 m  
 Peak ERP: 700 kW  
 Antenna: Omnidirectional  
 Elev Pattn: Generic  
 Elec Tilt: 0.85

39.3 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	700 kW	452.5 m	111.3 km
45.0	700	456.5	111.6
90.0	700	446.3	110.8
135.0	700	442.2	110.4
180.0	700	442.4	110.4
225.0	700	453.8	111.4
270.0	700	464.7	112.3
315.0	700	465.3	112.4

ERP exceeds maximum  
 ERP: 700 kW ERP maximum: 654 kW

Distance to Canadian border: 1537.1 km

Distance to Mexican border: 1467.0 km

Conditions at FCC monitoring station: Vero Beach FL  
 Bearing: 99.1 degrees Distance: 162.5 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:  
 Bearing: 308.9 degrees Distance: 2505.8 km

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



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%

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Interference to BLANK0000105369 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance			
	WMOR-TV	D18	DT	LIC	LAKELAND, FL	BLANK0000105369				
Undesireds:	WTOG	D19	DT	BL	ST. PETERSBURG, FL	DTVBL74112	1.3 km			
	WTOG	D19	DT	APP	ST. PETERSBURG, FL	WTOG CP-MOD 700kW	3.1			
	WFTS-TV	D17	DT	LIC	TAMPA, FL	BLANK0000098995	2.5			
	WTCE-TV	D18	DT	LIC	FORT PIERCE, FL	BLANK0000072132	223.6			
	WJXT	D18	DT	LIC	JACKSONVILLE, FL	BLANK0000097950	281.3			
	Service area		Terrain-limited		IX-free, before	IX-free, after	Percent New IX			
	42044.1	5,394,541	42044.1	5,394,541	40909.9	5,277,424	40901.8	5,277,052	0.02	0.01
Undesired			Total IX		Unique IX, before		Unique IX, after			
WTOG D19 DT BL		0.0	0		0.0	0				
WTOG D19 DT APP		8.1	372			8.1	372			
WFTS-TV D17 DT LIC		16.1	3,412		16.1	3,412	16.1	3,412		
WTCE-TV D18 DT LIC		828.6	37,893		735.8	15,651	735.8	15,651		
WJXT D18 DT LIC		382.3	98,054		289.5	75,812	289.5	75,812		

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Interference to BLCDT20030328ANV LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance			
	WJAX-TV	D19	DT	LIC	JACKSONVILLE, FL	BLCDT20030328ANV				
Undesireds:	WTOG	D19	DT	BL	ST. PETERSBURG, FL	DTVBL74112	280.7 km			
	WTOG	D19	DT	APP	ST. PETERSBURG, FL	WTOG CP-MOD 700kW	278.7			
	WJXT	D18	DT	LIC	JACKSONVILLE, FL	BLANK0000097950	1.8			
	WTLH	D19	DT	CP	BAINBRIDGE, GA	BLANK0000105738	234.4			
	WCWJ	D20	DT	LIC	JACKSONVILLE, FL	BLANK0000097952	1.8			
	Service area		Terrain-limited		IX-free, before	IX-free, after	Percent New IX			
	27334.3	1,630,782	27334.3	1,630,782	26860.8	1,624,859	26801.0	1,623,476	0.22	0.09
Undesired			Total IX		Unique IX, before		Unique IX, after			
WTOG D19 DT BL		23.9	1,163		8.0	854				
WTOG D19 DT APP		95.8	2,702			67.8	2,237			
WJXT D18 DT LIC		4.0	62		0.0	0	0.0	0		
WTLH D19 DT CP		441.5	4,662		385.3	4,283	373.3	4,127		
WCWJ D20 DT LIC		64.3	477		20.0	345	20.0	345		

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Interference to BLANK0000099184 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance			
	WVEA-TV	D20	DT	LIC	TAMPA, FL	BLANK0000099184				
Undesireds:	WTOG	D19	DT	BL	ST. PETERSBURG, FL	DTVBL74112	2.0 km			
	WTOG	D19	DT	APP	ST. PETERSBURG, FL	WTOG CP-MOD 700kW	0.0			
	WTVX	D20	DT	LIC	FORT PIERCE, FL	BLANK0000080021	201.7			
	WCWJ	D20	DT	LIC	JACKSONVILLE, FL	BLANK0000097952	278.3			
	WXXZ-CD	D20	DC	LIC	ORLANDO, ETC., FL	BLANK0000108580	141.9			
	WCTV	D20	DT	CP	THOMASVILLE, GA	BLANK0000081758	353.4			
	WCLF	D21	DT	APP	CLEARWATER, FL	BLANK0000036056	3.1			
	WKME-CD	D21	DC	LIC	KISSIMMEE, FL	BLANK0000090448	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	32485.3	4,441,336	32469.1	4,440,576	0.05	0.02
Undesired			Total IX		Unique IX, before		Unique IX, after			

**Table 1 WTOG TVStudy Analysis of Proposal**  
(page 3 of 3)



WTOG D19 DT BL	64.3	6,012	20.2	3,408		
WTOG D19 DT APP	121.1	10,040			36.3	4,168
WTVX D20 DT LIC	943.5	64,480	588.1	25,094	555.7	22,737
WCWJ D20 DT LIC	205.1	20,519	152.7	12,145	152.7	12,145
WZXX-CD D20 DC LIC	496.9	64,828	161.5	17,427	153.4	15,928
WCTV D20 DT CP	12.1	1,445	0.0	0	0.0	0
WCLF D21 DT APP	28.1	1,722	4.1	0	8.1	2
WKME-CD D21 DC LIC	117.2	28,689	4.0	798	0.0	0

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Interference to BLANK0000099184 LIC scenario 2

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WVEA-TV	D20	DT	LIC	TAMPA, FL	BLANK0000099184	
Undesireds:	WTOG	D19	DT	BL	ST. PETERSBURG, FL	DTVBL74112	2.0 km
	WTOG	D19	DT	APP	ST. PETERSBURG, FL	WTOG CP-MOD 700kW	0.0
	WTVX	D20	DT	LIC	FORT PIERCE, FL	BLANK0000080021	201.7
	WCWJ	D20	DT	LIC	JACKSONVILLE, FL	BLANK0000097952	278.3
	WZXX-CD	D20	DC	LIC	ORLANDO, ETC., FL	BLANK0000108580	141.9
	WCTV	D20	DT	CP	THOMASVILLE, GA	BLANK0000081758	353.4
	WKME-CD	D21	DC	LIC	KISSIMMEE, FL	BLANK0000090448	93.3

Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX
33827.7	4,553,004	33815.6	4,441,336	0.04

Undesired	Total IX	Unique IX, before	Unique IX, after
WTOG D19 DT BL	64.3	36.2	3,410
WTOG D19 DT APP	121.1	10,040	48.3
WTVX D20 DT LIC	943.5	64,480	25,430
WCWJ D20 DT LIC	205.1	20,519	12,145
WZXX-CD D20 DC LIC	496.9	64,828	17,427
WCTV D20 DT CP	12.1	1,445	0
WKME-CD D21 DC LIC	117.2	28,689	798

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Interference to proposal scenario 1  
1.60% interference received

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WTOG	D19	DT	APP	ST. PETERSBURG, FL	WTOG CP-MOD 700kW	
Undesireds:	WMOR-TV	D18	DT	LIC	LAKELAND, FL	BLANK0000105369	3.1 km
	WJAX-TV	D19	DT	LIC	JACKSONVILLE, FL	BLCDT20030328ANV	278.7
	WTLH	D19	DT	CP	BAINBRIDGE, GA	BLANK0000105738	355.8

Service area	Terrain-limited	IX-free	Percent IX
38969.3	5,283,323	38945.1	5,197,849

Undesired	Total IX	Unique IX	Prct Unique IX
WMOR-TV D18 DT LIC	12.0	341	0.03
WJAX-TV D19 DT LIC	366.2	83,991	0.90
WTLH D19 DT CP	16.1	2,129	0.00

**Channel and Facility Information**

Section	Question	Response
<b>Proposed Community of License</b>	Facility ID	74112
	State	Florida
	City	ST. PETERSBURG
	DTV Channel	19
	Designated Market Area	Tampa-St. Pete (Sarasota)
<b>Facility Type</b>	Facility Type	Commercial
	Station Type	Auxiliary
<b>Zone</b>	Zone	3

**Antenna Location Data**

Section	Question	Response
<b>Antenna Structure Registration</b>	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1211242
<b>Coordinates (NAD83)</b>	Latitude	27° 50' 51.5" N+
	Longitude	082° 15' 49.4" W-
	Structure Type	TOWER-A free standing or guyed struct
	Overall Structure Height	479.1 meters
	Support Structure Height	442.3 meters
	Ground Elevation (AMSL)	23.2 meters
<b>Antenna Data</b>	Height of Radiation Center Above Ground Level	449.6 meters
	Height of Radiation Center Above Average Terrain	452.9 meters
	Height of Radiation Center Above Mean Sea Level	472.8 meters
	Effective Radiated Power	700 kW

**Antenna  
Technical Data**

Section	Question	Response
<b>Antenna Type</b>	Antenna Type	Non-Directional
	Do you have an Antenna ID?	
	Antenna ID	
<b>Antenna Manufacturer and Model</b>	Manufacturer:	DIE
	Model	TUP-O5-12/60-1
	Rotation	
	Electrical Beam Tilt	0.85
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Horizontal
<b>DTV and DTS: Elevation 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	

**Construction  
Permit  
Certifications**

Section	Question	Response
<p><b>Post-Incentive Auction Expedited Processing</b></p>	<p>It will operate on the DTV channel for this station as established in the post-incentive auction channel reassignment public notice.</p>	<p>Yes</p>
	<p>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.</p>	<p>No</p>
	<p>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.</p>	<p>Yes</p>
	<p>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.</p>	<p>Yes</p>
<p><b>Environmental Effect</b></p>	<p>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)</p>	<p>No</p>
<p><b>Broadcast Facility</b></p>	<p>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.</p>	<p>Yes</p>