ENGINEERING EXHIBIT

Incentive Auction Channel Reassignment

Application for Modification of Digital Television Station Construction Permit

prepared for

CBS Operations Inc.
WTOG(DT) St. Petersburg, FL
Facility ID 74112
Ch. 19 530 kW 478 m

CBS Operations 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# 0000025842). This application is intended to be filed during the second filing window.[1] The CP authorizes operation at 255 kW effective radiated power ("ERP") at 478 meters antenna height above average terrain. *CBS* proposes herein to increase the ERP to 530 kW.

As with the current authorization, WTOG will be relocated to a different tower which is 1.2 km distant from the licensed WTOG site. The proposed Channel 19 operation will employ a new broadband antenna system to be top-mounted on the tower structure associated with FCC Antenna Structure Registration number 1057473. The proposed antenna will be shared with several other post-auction facilities. No change to the overall structure height will result.

The proposed antenna is an elliptically polarized nondirectional RFS model PEPL56D VPT. *CBS* will employ 25 percent vertical polarization for WTOG, such that the horizontally polarized ERP is 530 kW and the vertically polarized ERP is 132.5 kW.[2]

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[1]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.

[2]The proposed antenna provides for adjustable vertical polarization. The antenna provides separate inputs

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.

Interference study per FCC OET Bulletin 69[3] 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. **FCC processing of this proposal is requested using a <u>0.5 km cell size</u>.** The interference study output report is provided as Table 1.

The nearest FCC monitoring station is 162 km distant at Vero Beach, FL. This exceeds by a large margin the threshold minimum distance specified in §73.1030(c)(3) that would suggest consideration of the monitoring station. The site is not located within the areas requiring coordination with "quiet" zones specified in §73.1030(a) and (b). The site location is beyond the border areas requiring international coordination. There are no authorized AM stations within 3 kilometers of the site.

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 (typical) 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 1.0 $\mu W/cm^2$, which is 0.3 percent of the general population/uncontrolled maximum

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for horizontally polarized and vertically polarized radiators, which permits each of the television stations that share the antenna to individually choose how much vertical polarization to utilize. Following construction and licensing, any subsequent changes to the vertically polarized ERP will be described in a license modification application as necessary to show the revised system gains, losses, and transmitter power output. The horizontally polarized ERP will be maintained at 530 kW and the vertically polarized ERP will not exceed the horizontally polarized ERP.

[3]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, **<u>0.5 km cell size</u>**, and 1 km terrain profile increment. Comparisons of various results of this computer program (run on a Mac processor) to the FCCs implementation of TVStudy show excellent correlation. In order to allow the upload of elevation pattern data, a response of "Yes" is provided in the accompanying Form 2100 Antenna Technical Data section question regarding whether the elevation pattern varies for reasons other than the use of mechanical beamtilt.

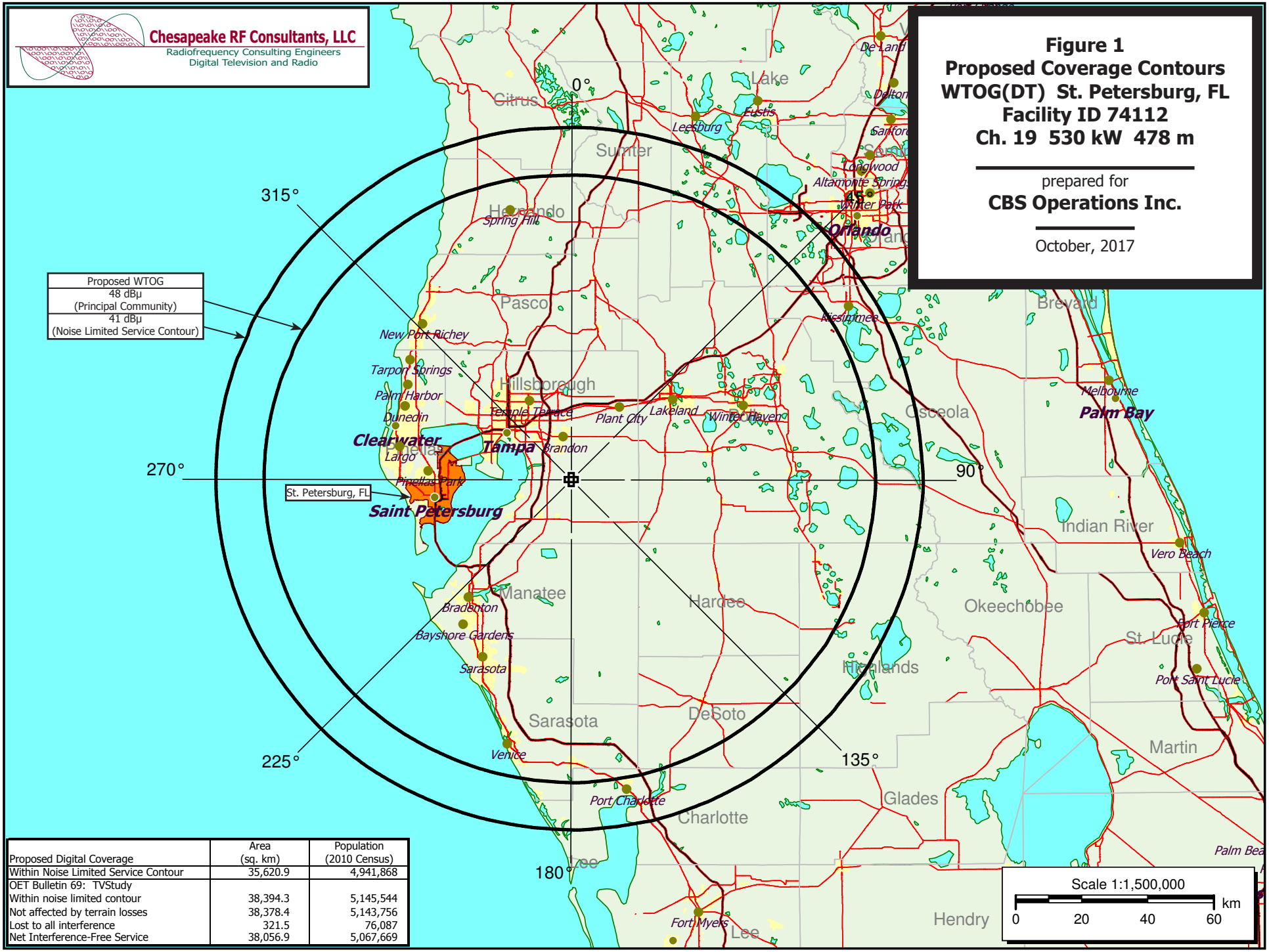
permitted exposure limit. This is well below the five percent threshold limit described in §1.1307(b) regarding sites with multiple emitters, categorically excluding the applicant from responsibility for taking any corrective action in the areas where the proposal's contribution is less than five percent.

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
Table 1	OET Bulletin 69 Interference Study
Form 2100	Saved Version of Engineering Sections from FCC Form at Time of Upload

Chesapeake RF Consultants, LLC
Joseph M. Davis, P.E. October 20, 2017
207 Old Dominion Road Yorktown, VA 23692 703-650-9600



Proposed Digital Coverage	Area (sq. km)	Population (2010 Census)
Within Noise Limited Service Contour	35,620.9	4,941,868
OET Bulletin 69: TVStudy		
Within noise limited contour	38,394.3	5,145,544
Not affected by terrain losses	38,378.4	5,143,756
Lost to all interference	321.5	76,087
Net Interference-Free Service	38,056.9	5,067,669

Table 1 WTOG(DT) OET Bulletin 69 Interference Study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tvstudy v2.2.3 (6K70F1)
Database: localhost,  Study: WTOG ATC 530KW Prop,  Model: Longley-Rice
Start: 2017.10.20 12:41:20

Study created: 2017.10.20 12:39:44

Study build station data: LMS TV 2017-10-07 LMSTV

    Proposal: WTOG D19 DT APP ST. PETERSBURG, FL
 File number: WTOG ATC 530KW Prop
 Facility ID: 74112
Station data: User record
   Record ID: 1384
     Country: U.S.
        Zone: III

Stations potentially affected by proposal:

IX   Call      Chan  Svc Status  City, State              File Number            Distance
No   WTCE-TV   D18   DT  CP      FORT PIERCE, FL          BLANK0000028156        223.6 km
Yes  WMOR-TV   D18   DT  CP      LAKELAND, FL             BLANK0000027493          0.0
Yes  WJAX-TV   D19   DT  LIC     JACKSONVILLE, FL         BLCDT20030328ANV       281.7
No   WSBS-CD   D19   DC  CP      MIAMI, ETC., FL          BLANK0000028483        289.0
Yes  WTLH      D19   DT  CP      BAINBRIDGE, GA           BLANK0000027936        358.7
No   WTVX      D20   DT  CP      FORT PIERCE, FL          BLANK0000025128        200.2
No   WZXZ-CD   D20   DC  CP      ORLANDO, ETC., FL        BLANK0000025143        130.7
Yes  WFTT-DT   D20   DT  CP      TAMPA, FL                BLANK0000025106          3.1

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 49 10.80 N (NAD83)
  Longitude:  82 15 38.00 W
Height AMSL: 497.9 m
       HAAT: 477.7 m
   Peak ERP: 530 kW
    Antenna: Omnidirectional
Elev Pattrn: PEPL56D VPT VRP 503MHz
  Elec Tilt: 0.75

39.3 dBu contour:
Azimuth      ERP       HAAT   Distance
  0.0 deg    530 kW   477.5 m  110.5 km
 45.0        530      481.1    110.8
 90.0        530      474.7    110.3
135.0        530      464.5    109.5
180.0        530      469.0    109.8
225.0        530      479.2    110.7
270.0        530      488.3    111.4
315.0        530      486.9    111.3

**Proposal service area extends beyond baseline plus 1.0%
Proposal service area population is more than 95.0% of baseline

Distance to Canadian border: 1540.2 km

Distance to Mexican border: 1467.0 km

Conditions at FCC monitoring station: Vero Beach FL
Bearing: 98.1 degrees   Distance: 161.7 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 309.0 degrees   Distance: 2508.0 km

No land mobile station failures found
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Study cell size: 0.50 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 BLANK0000027493 CP, scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WMOR-TV	D18	DT	CP	LAKELAND, FL	BLANK0000027493	
Undesireds:	WTOG	D19	DT	BL	ST. PETERSBURG, FL	DTVBL74112	1.3 km
	WTOG	D19	DT	APP	ST. PETERSBURG, FL	WTOG ATC 530KW Prop	0.0
	WFTS-TV	D17	DT	CP	TAMPA, FL	BLANK0000026825	2.5
	WTCE-TV	D18	DT	CP	FORT PIERCE, FL	BLANK0000028156	223.6
	WJXT	D18	DT	CP	JACKSONVILLE, FL	BLANK0000027956	281.3

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
42633.9	5,429,764	42626.2	5,429,028	41475.5	5,323,619	41476.5	5,323,619	-0.00	0.00

Undesired		Total IX		Unique IX, before		Unique IX, after	
WTOG D19 DT BL	2.7	0		1.0	0		
WTOG D19 DT APP	0.0	0				0.0	0
WFTS-TV D17 DT CP	17.9	502		15.2	453	16.6	453
WTCE-TV D18 DT CP	845.6	35,105		740.8	20,963	740.8	20,963
WJXT D18 DT CP	392.3	83,993		286.0	69,802	286.2	69,802

Interference to BLCDT20030328ANV LIC, scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	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 ATC 530KW Prop	281.7
	WJXT	D18	DT	CP	JACKSONVILLE, FL	BLANK0000027956	1.8
	WTLH	D19	DT	CP	BAINBRIDGE, GA	BLANK0000027936	234.4
	WCWJ	D20	DT	CP	JACKSONVILLE, FL	BLANK0000029603	1.8

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
27349.6	1,630,970	27349.1	1,630,970	27029.6	1,628,591	26995.6	1,627,783	0.13	0.05

Undesired		Total IX		Unique IX, before		Unique IX, after	
WTOG D19 DT BL	28.7	822		15.6	710		
WTOG D19 DT APP	71.8	1,685				49.7	1,518
WJXT D18 DT CP	1.5	3		0.0	0	0.0	0
WTLH D19 DT CP	272.2	1,464		244.1	1,330	236.1	1,276
WCWJ D20 DT CP	46.9	227		29.9	202	29.1	202

Interference to BLANK0000027936 CP, scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WTLH	D19	DT	CP	BAINBRIDGE, GA	BLANK0000027936	
Undesireds:	WTOG	D19	DT	BL	ST. PETERSBURG, FL	DTVBL74112	357.5 km
	WTOG	D19	DT	APP	ST. PETERSBURG, FL	WTOG ATC 530KW Prop	358.7
	WIYC	D19	DT	CP	TROY, AL	BLANK0000025714	242.4
	WJAX-TV	D19	DT	LIC	JACKSONVILLE, FL	BLCDT20030328ANV	234.4
	WGCL-TV	D19	DT	LIC	ATLANTA, GA	BLCDT20060113ACO	349.2
	WCTV	D20	DT	CP	THOMASVILLE, GA	BLANK0000025442	3.2

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
41088.7	1,040,474	41082.2	1,040,459	40930.3	1,036,455	40930.3	1,036,455	0.00	0.00

Undesired		Total IX		Unique IX, before		Unique IX, after	
WTOG D19 DT BL	0.0	0		0.0	0		
WTOG D19 DT APP	0.2	0				0.0	0
WIYC D19 DT CP	0.5	0		0.5	0	0.5	0
WJAX-TV D19 DT LIC	19.4	462		16.5	462	16.2	462
WGCL-TV D19 DT LIC	28.9	123		25.9	123	25.9	123

WCTV D20 DT CP	106.1	3,419	106.1	3,419	106.1	3,419

Interference to BLANK0000025106 CP, scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WFTT-DT	D20	DT	CP	TAMPA, FL	BLANK0000025106	
Undesireds:	WTOG	D19	DT	BL	ST. PETERSBURG, FL	DTVBL74112	2.0 km
	WTOG	D19	DT	APP	ST. PETERSBURG, FL	WTOG ATC 530KW Prop	3.1
	WTVX	D20	DT	CP	FORT PIERCE, FL	BLANK0000025128	201.7
	WCWJ	D20	DT	CP	JACKSONVILLE, FL	BLANK0000029603	278.3
	WZXZ-CD	D20	DC	CP	ORLANDO, ETC., FL	BLANK0000025143	129.0
	WCTV	D20	DT	CP	THOMASVILLE, GA	BLANK0000025442	353.4
	WCLF	D21	DT	LIC	CLEARWATER, FL	BLCDT20060627AAQ	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	
28037.3	4,295,275	28031.7	4,295,172	27476.5	4,255,835	27291.2	4,234,585	0.67	0.50

Undesired		Total IX		Unique IX, before		Unique IX, after	
WTOG D19 DT BL	75.0	9,176	49.5	6,925			
WTOG D19 DT APP	314.1	35,065			234.8	28,175	
WTVX D20 DT CP	414.4	26,550	255.8	18,007	216.2	15,870	
WCWJ D20 DT CP	130.3	6,658	72.3	4,135	71.5	3,641	
WZXZ-CD D20 DC CP	3.4	497	0.7	485	0.5	0	
WCTV D20 DT CP	5.3	6	0.0	0	0.0	0	
WCLF D21 DT LIC	3.9	184	2.7	172	0.0	0	
WKME-CD D21 DC CP	97.5	5,285	12.3	1,068	11.4	270	

Interference to proposal, scenario 1
1.48% interference

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WTOG	D19	DT	APP	ST. PETERSBURG, FL	WTOG ATC 530KW Prop	
Undesireds:	WMOR-TV	D18	DT	CP	LAKELAND, FL	BLANK0000027493	0.0 km
	WJAX-TV	D19	DT	LIC	JACKSONVILLE, FL	BLCDT20030328ANV	281.7
	WTLH	D19	DT	CP	BAINBRIDGE, GA	BLANK0000027936	358.7
	WFTT-DT	D20	DT	CP	TAMPA, FL	BLANK0000025106	3.1

Service area		Terrain-limited		IX-free		Percent IX	
38394.3	5,145,544	38378.4	5,143,756	38056.9	5,067,669	0.84	1.48

Undesired		Total IX		Unique IX		Prcnt Unique IX	
WMOR-TV D18 DT CP	0.2	0	0.2	0	0.00	0.00	
WJAX-TV D19 DT LIC	318.1	75,718	313.1	75,587	0.82	1.47	
WTLH D19 DT CP	6.3	137	1.4	6	0.00	0.00	
WFTT-DT D20 DT CP	1.9	363	1.7	363	0.00	0.01	

Channel and Facility Information

Section	Question	Response
Proposed Community of License	Facility ID	74112
	State	Florida
	City	ST. PETERSBURG
	DTV Channel	19
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	1057473
Coordinates (NAD83)	Latitude	27° 49' 10.8" N+
	Longitude	082° 15' 38.0" W-
	Structure Type	GTOWER-Guyed Structure Used for Communication Purposes
	Overall Structure Height	485.5 meters
	Support Structure Height	440.1 meters
	Ground Elevation (AMSL)	22.9 meters
Antenna Data	Height of Radiation Center Above Ground Level	475 meters
	Height of Radiation Center Above Average Terrain	477.7 meters
	Height of Radiation Center Above Mean Sea Level	497.9 meters
	Effective Radiated Power	530 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:	RFS
	Model	PEPL56D VPT
	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?	Yes
	Uploaded file for elevation antenna (or radiation) pattern data	WTOG PEPL56D VPT VRP 503MHz.xml

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 Section 1.1306 of 47 C.F.R.)	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