

ENGINEERING EXHIBIT

Digital Low Power Television Station Application for Minor Modification of Licensed Facility prepared for

Gray Television Licensee, LLC
WPHJ-LD Baxley, GA
Facility ID 8843
Ch. 15 11.3 kW Directional

Gray Television Licensee, LLC (“Gray”) is the licensee of digital Low Power Television station WPHJ-LD, Channel 15, Facility ID 8843, Baxley GA. WPHJ-LD is licensed (file# 0000187241, granted March 29, 2022) to operate with 15 kW effective radiated power (“ERP”) with a directional antenna at 421.2 meters height above ground level (“AGL”). *Gray* herein seeks a minor modification Construction Permit (“CP”) to utilize a different directional antenna at increased height and decreased ERP.

By way of background, WPHJ-LD is currently operating with a reduced facility pursuant to Special Temporary Authority (“STA” file# 0000215829). Due to reports of poor reception, WPHJ-LD is utilizing an alternate transmitting antenna at a lower elevation on the tower to aid in evaluating the licensed antenna’s performance and to consider antenna replacement. *Gray* proposes herein to replace the licensed WPHJ-LD antenna with the antenna currently authorized in the STA.

The proposed antenna is a directional PSI model PSILP12OI-15 having horizontal polarization. The antenna will be repositioned on the tower and side-mounted at 425.5 meters above ground level on the WPHJ-LD tower structure (FCC Antenna Structure Registration number 1018626), a 4.3 meter increase beyond the licensed antenna’s height. The proposed ERP is 11.3 kW using a “full service” out of channel emission mask.

A plot of the directional antenna's azimuthal pattern is supplied in Figure 1. Figure 2 depicts the coverage contour of the proposed facility as well as that of the licensed facility, demonstrating compliance with §73.3572 for a minor change.

Interference study per OET Bulletin 69¹ shows that the proposal complies with the FCC's interference protection requirements toward all digital television, television translator, LPTV, and Class A stations. The results, summarized in Table 1, show that any new interference does not exceed the FCC's interference limits (0.5 percent to full power and Class A stations, and 2.0 percent to secondary stations) to any facility.

Human Exposure to Radiofrequency Electromagnetic Field (Environmental)

The proposed facility 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 20 percent antenna relative field in downward elevations, the calculated power density attributable to the proposed WPHJ-LD facility at locations near the transmitter site at a height of two meters above ground level is $0.1 \mu\text{W}/\text{cm}^2$, which is 0.03 percent of the general population / uncontrolled maximum permissible 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.

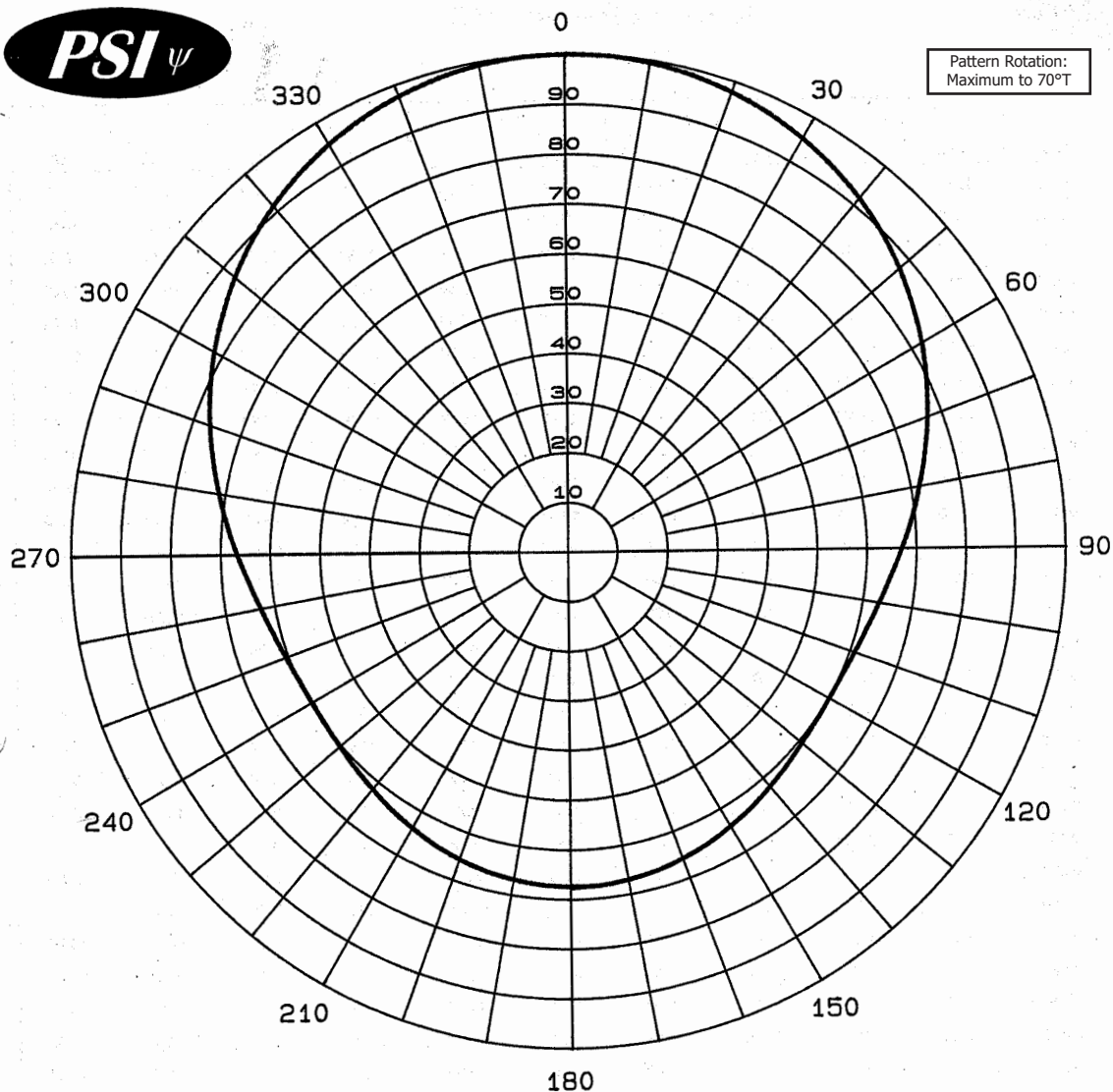
¹FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 ("OET-69"). This analysis employed the FCC's current "TVStudy" software with the default application processing template settings, 1 km cell size, and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

List of Attachments

Figure 1	Antenna Azimuthal Pattern
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.	October 20, 2023	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



Calculated Relative Field
Azimuth Plane Pattern
Low Power UHF Slot
Antenna Type: PSILP
Pattern Type: OI
Directivity: 1.70 (2.314 dB)
Date: 7/1/97
Rev. 0

PROPAGATION SYSTEMS, INC.
PO BOX 113
EBENSBURG, PA. 15931

Figure 1
Antenna Azimuthal Pattern
WPHJ-LD Baxley, GA
Facility ID 8843
Ch. 15 11.3 kW Directional

prepared for
Gray Television Licensee, LLC

October, 2023



Figure 2
Coverage Contour Comparison
WPHJ-LD Baxley, GA
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Ch. 15 11.3 kW Directional

prepared for
Gray Television Licensee, LLC

October, 2023

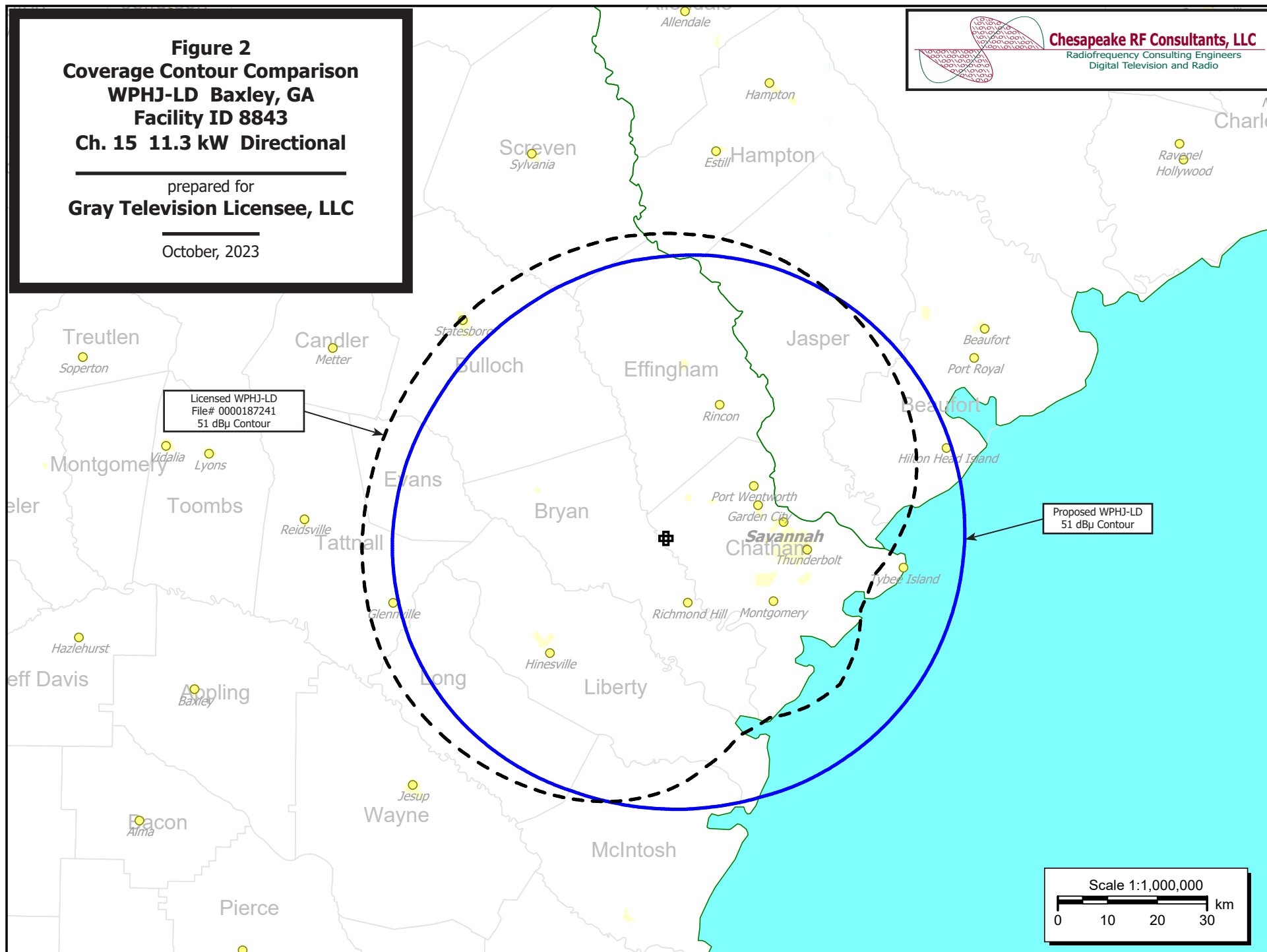


Table 1 WPHJ-LD TVStudy Analysis of Proposal (page 1 of 2)



tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: WPHJ-LD PSI 11.3kW, Model: Longley-Rice
Start: 2023.10.20 16:37:55

Study created: 2023.10.20 16:37:54

Study build station data: LMS TV 2023-10-19

Proposal: WPHJ-LD D15 LD APP BAXLEY, GA
File number: WPHJ-LD PSI 11.3kW
Facility ID: 8843
Station data: User record
Record ID: 195
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	WFOX-TV	D14	DT	LIC	JACKSONVILLE, FL	BLANK0000120746	198.2 km
No	W31FE-D	N14+	TX	LIC	Savannah, GA	BLTT20040915ADW	109.0
No	WSCG-LD	D14+	LD	LIC	BEAUFORT, ETC., SC	BLANK0000063818	69.2
No	WOTF-TV	D15	DT	LIC	DAYTONA BEACH, FL	BLANK0000097961	348.4
No	WNFT-LD	D15	LD	LIC	GAINESVILLE, FL	BLDTL20110714ACG	293.7
No	WNFT-LD	D15	LD	CP	GAINESVILLE, FL	BLANK0000106078	293.7
No	WUJX-LD	D15	LD	LIC	JACKSONVILLE, FL	BLANK0000121572	198.2
No	WTFL-LD	D15	LD	LIC	TALLAHASSEE, FL	BLANK0000150951	316.9
No	WRBL	D15	DT	LIC	COLUMBUS, GA	BLCDT20061013ABV	325.0
No	WGGD-LD	D15	LD	LIC	GAINESVILLE, GA	BLDTL20121213AIK	333.2
No	W15EB-D	D15	DC	LIC	CHARLOTTE, NC	BLANK0000188950	352.3
No	WDKT-LD	D15	LD	LIC	HENDERSONVILLE, NC	BLANK0000089000	335.6
No	WILM-LD	D15	LD	LIC	WILMINGTON, NC	BLANK0000055240	384.4
Yes	WLTX	D15	DT	LIC	COLUMBIA, SC	BLANK0000082085	233.6
No	W15DC-D	D15	LD	APP	FLORENCE, SC	BLANK0000223361	298.2
No	W15DC-D	D15	LD	LIC	FLORENCE, SC	BLANK0000178761	322.4
No	W15DC-D	D15	LD	CP	FLORENCE, SC	BLANK0000185135	318.4
No	W15ES-D	D15	LD	LIC	MYRTLE BEACH, SC	BLANK0000194110	274.6
No	W15ES-D	D15	LD	CP	MYRTLE BEACH, SC	BLANK0000198647	246.4
No	W16EL-D	D16	LD	LIC	AUGUSTA, GA	BLANK0000222337	176.7
No	W16EE-D	D16	LD	CP	AUGUSTA, GA	BLANK0000186170	171.2
No	W16EK-D	D16	LD	LIC	Douglas, GA	BLANK0000217699	189.8
No	WSAV-TV	D16	DT	LIC	SAVANNAH, GA	BLANK0000055021	4.9
No	DWLOW-LP	N19-	TX	APP	BEAUFORT, SC	BLTT20000302AAU	69.2

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D15
Mask: Full Service
Latitude: 32 3 15.00 N (NAD83)
Longitude: 81 21 0.00 W
Height AMSL: 430.9 m
HAAT: 0.0 m
Peak ERP: 11.3 kW
Antenna: PSI-PSILP12OI-15 (ID 1010769) 70.0 deg
Elev Pattn: Generic
Elec Tilt: 1.00

48.8 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	6.53 kW	420.3 m	59.5 km
45.0	10.5	425.3	62.6
90.0	10.9	427.8	62.9
135.0	7.05	428.2	60.3
180.0	4.20	428.1	57.2

Table 1 WPHJ-LD TVStudy Analysis of Proposal
(page 2 of 2)



225.0 4.77 426.2 57.9
270.0 4.92 418.2 57.7
315.0 4.14 421.4 56.8

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 424 m

Distance to Canadian border: 1073.6 km

Distance to Mexican border: 1655.5 km

Conditions at FCC monitoring station: Powder Springs GA
Bearing: 303.5 degrees Distance: 373.3 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 299.5 degrees Distance: 2315.1 km

No land mobile station failures found

Proposal is not within the Offshore Radio Service protected area

Study cell size: 1.00 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 BLANK0000082085 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WLTX	D15	DT	LIC	COLUMBIA, SC	BLANK0000082085	
Undesireds:	WPHJ-LD	D15	LD	APP	BAXLEY, GA	WPHJ-LD PSI 11.3kW	233.6 km
	WWJS	D14	DD	LIC	HICKORY, NC	BLANK0000109333	159.5
	W15EB-D	D15	DC	LIC	CHARLOTTE, NC	BLANK0000188950	122.9
	WRAZ	D15	DT	LIC	RALEIGH, NC	BLANK0000143683	268.9
	WJPM-TV	D16	DT	LIC	FLORENCE, SC	BLANK0000138174	96.0
	Service area		Terrain-limited		IX-free, before	IX-free, after	Percent New IX
	34749.0	1,582,666	34626.1	1,579,876	33164.2	1,505,912	0.09 0.02
Undesired			Total IX		Unique IX, before	Unique IX, after	
WPHJ-LD D15 LD APP		29.9	228		29.9	228	
WWJS D14 DD LIC		3.0	0	0.0	0	0.0	0
W15EB-D D15 DC LIC		516.8	19,725	418.7	15,678	418.7	15,678
WRAZ D15 DT LIC		774.3	16,522	591.7	11,492	591.7	11,492
WJPM-TV D16 DT LIC		353.4	42,747	268.9	41,764	268.9	41,764

Interference to proposal scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WPHJ-LD	D15	LD	APP	BAXLEY, GA	WPHJ-LD PSI 11.3kW	
Undesireds:	WSCG-LD	D14+	LD	LIC	BEAUFORT, ETC., SC	BLANK0000063818	69.2 km
	WNFT-LD	D15	LD	LIC	GAINESVILLE, FL	BLDTL20110714ACG	293.7
	WLTX	D15	DT	LIC	COLUMBIA, SC	BLANK0000082085	233.6
	W15DC-D	D15	LD	APP	FLORENCE, SC	BLANK0000223361	298.2
	W15ES-D	D15	LD	LIC	MYRTLE BEACH, SC	BLANK0000194110	274.6
	WSAV-TV	D16	DT	LIC	SAVANNAH, GA	BLANK0000055021	4.9
	Service area		Terrain-limited		IX-free	Percent IX	
	11074.7	576,567	11074.7	576,567	10441.6	565,630	5.72 1.90
Undesired			Total IX		Unique IX	Prct Unique IX	
WSCG-LD D14+ LD LIC		6.0	0	0.0	0	0.00	0.00
WLTX D15 DT LIC		5.0	0	0.0	0	0.00	0.00
WSAV-TV D16 DT LIC		633.1	10,937	622.1	10,937	5.62	1.90

**Channel and
Facility
Information**

Section	Question	Response
Facility ID	8843	
State	Georgia	
City	BAXLEY	
LPD Channel	15	

**Antenna Location
Data**

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1018626
Coordinates (NAD83)	Latitude	32° 03' 15.0" N+
	Longitude	081° 21' 00.0" W-
	Structure Type	GTOWER-Guyed Structure Used for Communication Purposes
	Overall Structure Height	466.6 meters
	Support Structure Height	431.9 meters
	Ground Elevation (AMSL)	5.4 meters
Antenna Data	Height of Radiation Center Above Ground Level	425.5 meters
	Height of Radiation Center Above Mean Sea Level	430.9 meters
	Effective Radiated Power	11.3 kW

Antenna
Technical Data

Section	Question	Response
Antenna Type	Antenna Type	Directional Custom
	Do you have an Antenna ID?	Yes
	Antenna ID	1010769
Antenna Manufacturer and Model	Manufacturer:	PSI
	Model	PSILP12OI-15
	Rotation	70 degrees
	Electrical Beam Tilt	1.0
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Horizontal
Elevation Radiation 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	
	Out-of-Channel Emission Mask:	Full Service

Directional Antenna Relative Field Values (Pre-rotated Pattern)

Degree	Value	Degree	Value	Degree	Value	Degree	Value
0	1	90	0.66	180	0.67	270	0.66
10	1	100	0.63	190	0.67	280	0.71
20	0.98	110	0.61	200	0.66	290	0.76
30	0.95	120	0.60	210	0.64	300	0.82
40	0.91	130	0.60	220	0.62	310	0.87
50	0.87	140	0.62	230	0.60	320	0.91
60	0.82	150	0.64	240	0.60	330	0.95
70	0.76	160	0.66	250	0.61	340	0.98
80	0.71	170	0.67	260	0.63	350	1

Additional Azimuths

Degree	V _A
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