

## **ENGINEERING EXHIBIT**

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

**Gray Television Licensee, LLC**  
WTGB-LD Gainesville, FL  
Facility ID 186186  
Ch. 34 15 kW Directional

*Gray Television Licensee, LLC* (“Gray”) is the licensee of digital Low Power Television station WTGB-LD, Channel 34, Facility ID 186186, Gainesville FL. WTGB-LD is licensed to operate at 2.5 kW effective radiated power (“ERP”) with a directional antenna (file# 0000239033). *Gray* herein seeks a minor modification Construction Permit to relocate WTGB-LD and to utilize increased ERP and antenna height.

The proposed facility will employ a new antenna to be side-mounted on the tower structure associated with FCC Antenna Structure Registration number 1035360, located 26.1 km (16.2 miles) from the licensed site. No change to the overall structure height is proposed.

The proposed antenna is a Dielectric model TLP-12B/VP having elliptical polarization. The proposed ERP is 15 kW horizontally polarized and 4.5 kW vertically polarized 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. Since the proposed 51 dB $\mu$  contour encompasses that of the licensed facility, no service loss area will be created. Considerable service improvement will result as the population within the 51 dB $\mu$  contour increases to 385,480 persons (2010 census), which is a 91.2 percent increase beyond the 206,835 persons within the licensed WTGB-LD facility’s 51 dB $\mu$  contour.

Interference study per OET Bulletin 69<sup>1</sup> 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 20 percent antenna relative field in downward elevations (pattern data shows 20 percent or less relative field at angles 10 to 90 degrees below the antenna), the calculated power density attributable to the proposed facility at locations near the transmitter site at a height of two meters above ground level is  $0.6 \mu\text{W}/\text{cm}^2$ , which is 0.2 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. No increase in structure height is proposed.

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<sup>1</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, 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.

**Engineering Exhibit**  
**Gray Television Licensee, LLC (WTGB-LD)**  
(page 3 of 3)

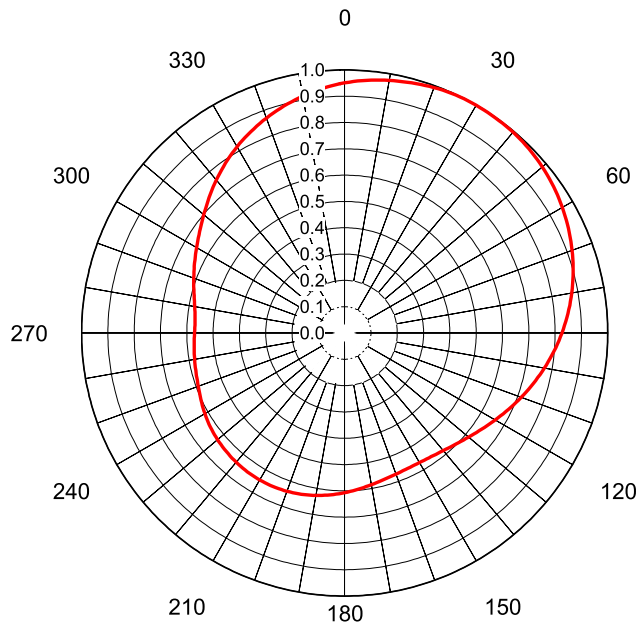


List of Attachments

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.	February 23, 2024	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



## AZIMUTH PATTERN Horizontal Polarization

Proposal No.  
Date **10-Aug-22**  
Call Letters **W34FW**  
Channel **34**  
Frequency **593 MHz**  
Antenna Type **TLP-12B/VP**  
Gain **1.76 (2.45dB)**  
Calculated

Pattern Number **TLP-B-34 Hpol**

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.951	36	0.998	72	0.912	108	0.726	144	0.575	180	0.607	216	0.644	252	0.589	288	0.603	324	0.783
1	0.954	37	0.998	73	0.908	109	0.720	145	0.574	181	0.609	217	0.643	253	0.587	289	0.607	325	0.789
2	0.956	38	0.997	74	0.904	110	0.714	146	0.573	182	0.611	218	0.643	254	0.586	290	0.610	326	0.795
3	0.959	39	0.996	75	0.899	111	0.709	147	0.571	183	0.614	219	0.642	255	0.584	291	0.614	327	0.801
4	0.962	40	0.996	76	0.895	112	0.703	148	0.570	184	0.616	220	0.641	256	0.583	292	0.618	328	0.806
5	0.964	41	0.995	77	0.890	113	0.698	149	0.569	185	0.618	221	0.640	257	0.582	293	0.622	329	0.812
6	0.966	42	0.994	78	0.886	114	0.692	150	0.569	186	0.619	222	0.640	258	0.581	294	0.625	330	0.817
7	0.968	43	0.993	79	0.881	115	0.687	151	0.568	187	0.621	223	0.639	259	0.580	295	0.629	331	0.823
8	0.971	44	0.992	80	0.876	116	0.682	152	0.568	188	0.623	224	0.638	260	0.579	296	0.633	332	0.828
9	0.973	45	0.990	81	0.872	117	0.676	153	0.568	189	0.625	225	0.637	261	0.578	297	0.637	333	0.834
10	0.975	46	0.989	82	0.867	118	0.671	154	0.568	190	0.627	226	0.636	262	0.577	298	0.641	334	0.839
11	0.977	47	0.987	83	0.862	119	0.666	155	0.568	191	0.628	227	0.634	263	0.576	299	0.646	335	0.844
12	0.979	48	0.985	84	0.857	120	0.661	156	0.568	192	0.630	228	0.633	264	0.575	300	0.650	336	0.849
13	0.980	49	0.983	85	0.852	121	0.656	157	0.569	193	0.632	229	0.632	265	0.574	301	0.654	337	0.854
14	0.982	50	0.981	86	0.847	122	0.651	158	0.569	194	0.633	230	0.631	266	0.573	302	0.659	338	0.859
15	0.984	51	0.979	87	0.842	123	0.646	159	0.570	195	0.634	231	0.629	267	0.572	303	0.663	339	0.864
16	0.986	52	0.977	88	0.836	124	0.641	160	0.571	196	0.636	232	0.628	268	0.572	304	0.668	340	0.869
17	0.988	53	0.975	89	0.831	125	0.637	161	0.572	197	0.637	233	0.626	269	0.571	305	0.673	341	0.874
18	0.990	54	0.972	90	0.826	126	0.632	162	0.573	198	0.638	234	0.625	270	0.570	306	0.678	342	0.879
19	0.991	55	0.970	91	0.820	127	0.628	163	0.574	199	0.639	235	0.623	271	0.570	307	0.683	343	0.883
20	0.993	56	0.967	92	0.815	128	0.624	164	0.575	200	0.640	236	0.621	272	0.570	308	0.688	344	0.888
21	0.994	57	0.964	93	0.810	129	0.619	165	0.577	201	0.641	237	0.619	273	0.570	309	0.694	345	0.893
22	0.995	58	0.961	94	0.804	130	0.615	166	0.578	202	0.642	238	0.618	274	0.570	310	0.699	346	0.897
23	0.996	59	0.958	95	0.799	131	0.612	167	0.580	203	0.643	239	0.616	275	0.571	311	0.705	347	0.902
24	0.997	60	0.955	96	0.793	132	0.608	168	0.582	204	0.643	240	0.613	276	0.572	312	0.711	348	0.906
25	0.998	61	0.952	97	0.787	133	0.604	169	0.584	205	0.644	241	0.611	277	0.573	313	0.716	349	0.910
26	0.999	62	0.949	98	0.782	134	0.601	170	0.586	206	0.644	242	0.609	278	0.575	314	0.722	350	0.914
27	0.999	63	0.946	99	0.776	135	0.597	171	0.588	207	0.645	243	0.607	279	0.577	315	0.728	351	0.919
28	0.999	64	0.942	100	0.771	136	0.594	172	0.590	208	0.645	244	0.605	280	0.579	316	0.734	352	0.923
29	1.000	65	0.939	101	0.765	137	0.591	173	0.592	209	0.645	245	0.602	281	0.581	317	0.740	353	0.927
30	1.000	66	0.935	102	0.759	138	0.589	174	0.594	210	0.645	246	0.600	282	0.584	318	0.747	354	0.930
31	1.000	67	0.932	103	0.754	139	0.586	175	0.596	211	0.645	247	0.598	283	0.587	319	0.753	355	0.934
32	0.999	68	0.928	104	0.748	140	0.583	176	0.598	212	0.645	248	0.596	284	0.590	320	0.759	356	0.938
33	0.999	69	0.924	105	0.742	141	0.581	177	0.600	213	0.645	249	0.594	285	0.593	321	0.765	357	0.941
34	0.999	70	0.920	106	0.737	142	0.579	178	0.603	214	0.645	250	0.592	286	0.596	322	0.771	358	0.944
35	0.998	71	0.916	107	0.731	143	0.577	179	0.605	215	0.644	251	0.590	287	0.600	323	0.777	359	0.948

**Figure 1**  
**Antenna Azimuthal Pattern**  
**WTGB-LD Gainesville, FL**  
**Facility ID 186186**  
**Ch. 34 15 kW Directional**

prepared for  
**Gray Television Licensee, LLC**

February, 2024

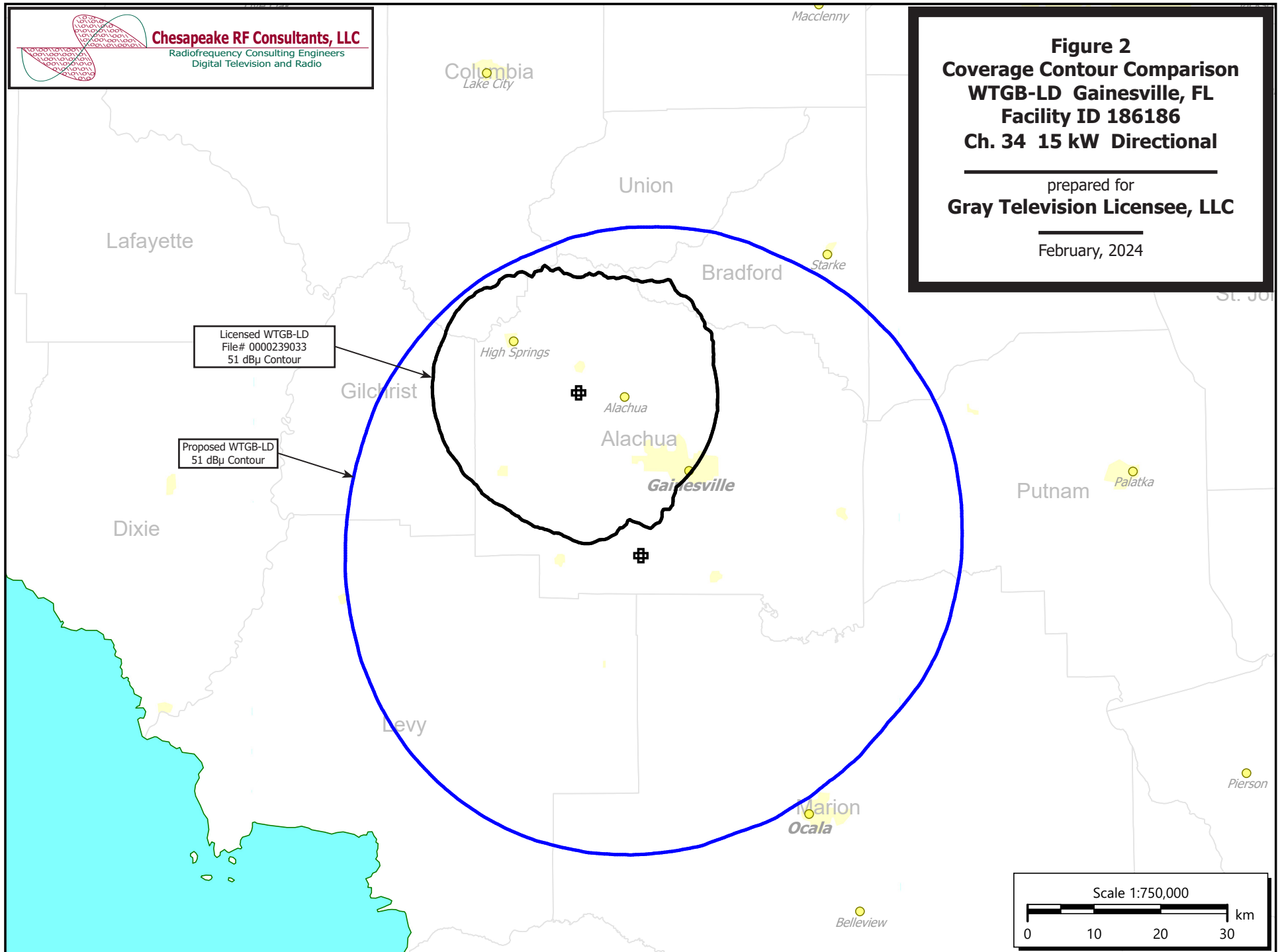


**Chesapeake RF Consultants, LLC**  
Radiofrequency Consulting Engineers  
Digital Television and Radio

**Figure 2**  
**Coverage Contour Comparison**  
**WTGB-LD Gainesville, FL**  
**Facility ID 186186**  
**Ch. 34 15 kW Directional**

prepared for  
**Gray Television Licensee, LLC**

February, 2024



# **Table 1 WTGB-LD TVStudy Analysis of Proposal** (page 1 of 3)



tvstudy v2.2.5 (4uoc83)  
Database: localhost, Study: WTGB-LD 1035360\_, Model: Longley-Rice  
Start: 2024.02.23 14:05:44

Study created: 2024.02.23 14:05:44

Study build station data: LMS TV 2024-02-23

Proposal: WTGB-LD D34 LD LIC JASPER, FL  
File number: WTGB-LD 1035360  
Facility ID: 186186  
Station data: User record  
Record ID: 271  
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	WWRJ-LD	N27-	TX	LIC	JACKSONVILLE, FL	BLTTL20140115AAF	111.1 km
No	WXCK-LD	D33	LD	LIC	CHIEFLAND, FL	BLANK0000151345	39.9
No	WXCK-LD	N33	TX	LIC	CHIEFLAND, FL	BLTTL19960415IC	39.9
No	WUJF-LD	D33	LD	LIC	JACKSONVILLE, FL	BLANK0000164521	115.1
Yes	WTLV	D33	DT	APP	JACKSONVILLE, FL	BLANK0000235765	115.6
No	WOFL	D33	DT	LIC	ORLANDO, FL	BLANK0000216446	164.4
No	WNXG-LD	D33	LD	LIC	TALLAHASSEE, FL	BLANK0000129630	208.3
No	WGCT-LD	D33	LD	LIC	Tampa, FL	BLANK0000059159	188.2
No	W33EV-D	D33	LD	LIC	VALDOSTA, GA	BLANK0000194524	172.3
No	W33EV-D	D33	LD	CP	VALDOSTA, GA	BLANK0000217792	184.6
No	WFTX-TV	D34	DT	LIC	CAPE CORAL, FL	BLANK0000117402	310.4
Yes	WBXJ-CD	D34	DC	LIC	JACKSONVILLE, ETC., FL	BLANK0000108581	115.1
Yes	WUCF-TV	D34	DT	LIC	ORLANDO, FL	BLANK0000150045	164.0
No	W34FF-D	D34-	LD	LIC	PANAMA CITY, FL	BLANK0000179306	328.8
No	W34FF-D	D34-	LD	CP	PANAMA CITY, FL	BLANK0000234035	306.8
No	WDNP-LD	D34	LD	LIC	ST. PETERSBURG, FL	BLANK0000123622	178.4
No	WDNP-LD	D34	LD	CP	ST. PETERSBURG, FL	BLANK0000222214	178.4
No	WHDT	D34	DT	LIC	STUART, FL	BLANK0000085738	391.3
No	WXVK-LD	D34z	LD	LIC	Columbus, GA	BLANK0000115071	391.1
No	WSST-TV	D34	DT	LIC	CORDELE, GA	BLANK0000064103	294.3
No	W34FX-D	D34	LD	LIC	MONTROSE, GA	BLANK0000194505	323.7
No	WGWG	D34	DT	LIC	CHARLESTON, SC	BLANK0000199719	455.7
No	W35DH-D	D35	LD	LIC	GREENVILLE, FL	BLANK0000178364	194.5
No	W35EC-D	D35	LD	LIC	LAKE CITY, FL	BLANK0000233644	84.3
No	WRCZ-LD	D35	LD	LIC	OCALA, FL	BLANK0000013902	115.1
No	WFTV	D35	DT	LIC	ORLANDO, FL	BLANK0000149068	169.3
No	WTAM-LD	D35	LD	LIC	TAMPA, FL	BLANK0000106115	191.3
No	WBVJ-CD	D35+	DC	CP	VALDOSTA, GA	BLANK0000035757	180.7

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D34  
Mask: Full Service  
Latitude: 29 32 12.00 N (NAD83)  
Longitude: 82 23 59.00 W  
Height AMSL: 226.8 m  
HAAT: 0.0 m  
Peak ERP: 15.0 kW  
Antenna: DIE TLP-B 30.0 deg  
Elev Pattn: Generic  
Elec Tilt: 1.00

50.7 dBu contour:  
Azimuth ERP HAAT Distance  
0.0 deg 13.6 kW 200.3 m 49.7 km

**Table 1 WTGB-LD TVStudy Analysis of Proposal**  
(page 2 of 3)



45.0	14.7	204.2	50.3
90.0	10.2	203.9	48.4
135.0	5.38	194.7	44.6
180.0	5.53	201.6	45.1
225.0	6.07	206.0	45.9
270.0	4.87	204.6	44.7
315.0	7.97	202.2	47.1

Database HAAT does not agree with computed HAAT  
Database HAAT: 0 m    Computed HAAT: 202 m

Distance to Canadian border: 1349.4 km

Distance to Mexican border: 1481.3 km

Conditions at FCC monitoring station: Vero Beach FL  
Bearing: 140.8 degrees    Distance: 275.2 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:  
Bearing: 305.7 degrees    Distance: 2381.5 km

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%

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Interference to BLANK0000235765 APP scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance		
	WTLV	D33	DT	APP	JACKSONVILLE, FL	BLANK0000235765			
Undesireds:	WTGB-LD	D34	LD	LIC	JASPER, FL	WTGB-LD 1035360	115.6 km		
	WOFL	D33	DT	LIC	ORLANDO, FL	BLANK0000216446	191.0		
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX		
23854.7    1,468,373		23854.7    1,468,373		23601.1    1,459,921		23601.1    1,459,921	0.00    0.00		
Undesired				Total IX	Unique IX, before	Unique IX, after			
WTGB-LD D34 LD LIC				1.0    0		0.0    0			
WOFL D33 DT LIC				253.6    8,452	253.6    8,452	252.6    8,452			

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Interference to BLANK0000108581 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance		
	WBXJ-CD	D34	DC	LIC	JACKSONVILLE, ETC., FL	BLANK0000108581			
Undesireds:	WTGB-LD	D34	LD	LIC	JASPER, FL	WTGB-LD 1035360	115.1 km		
	WTLV	D33	DT	APP	JACKSONVILLE, FL	BLANK0000235765	1.1		
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX		
8674.6    1,264,553		8674.6    1,264,553		8668.6    1,264,355		8646.5    1,264,023	0.25    0.03		
Undesired				Total IX	Unique IX, before	Unique IX, after			
WTGB-LD D34 LD LIC				23.1    332		22.1    332			
WTLV D33 DT APP				6.0    198	6.0    198	5.0    198			

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Interference to BLANK0000150045 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WUCF-TV	D34	DT	LIC	ORLANDO, FL	BLANK0000150045	
Undesireds:	WTGB-LD	D34	LD	LIC	JASPER, FL	WTGB-LD 1035360	164.0 km
	WOFL	D33	DT	LIC	ORLANDO, FL	BLANK0000216446	0.7
	WFTX-TV	D34	DT	LIC	CAPE CORAL, FL	BLANK0000117402	212.7
	WBXJ-CD	D34	DC	LIC	JACKSONVILLE, ETC., FL	BLANK0000108581	191.6

**Table 1 WTGB-LD TVStudy Analysis of Proposal**  
(page 3 of 3)



WHDT	D34	DT	LIC	STUART, FL	BLANK0000085738	240.4
WFTV	D35	DT	LIC	ORLANDO, FL	BLANK0000149068	5.3

Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX
31837.8 3,705,345	31835.8 3,705,345	31256.4 3,663,058	31044.8 3,646,309	0.68 0.46

Undesired	Total IX	Unique IX, before	Unique IX, after
WTGB-LD D34 LD LIC	217.7 18,305		211.6 16,749
WOFL D33 DT LIC	102.4 14,209	70.4 8,695	65.3 7,139
WFTX-TV D34 DT LIC	102.7 10,402	94.7 8,169	93.7 8,169
WBXJ-CD D34 DC LIC	22.2 4,083	22.2 4,083	22.2 4,083
WHDT D34 DT LIC	4.0 933	0.0 0	0.0 0
WFTV D35 DT LIC	386.1 20,148	354.0 13,852	354.0 13,852

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Interference to proposal scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WTGB-LD	D34	LD	LIC	JASPER, FL	WTGB-LD 1035360	
Undesireds:	WXCK-LD	D33	LD	LIC	CHIEFLAND, FL	BLANK0000151345	39.9 km
	WBXJ-CD	D34	DC	LIC	JACKSONVILLE, ETC., FL	BLANK0000108581	115.1
	WUCF-TV	D34	DT	LIC	ORLANDO, FL	BLANK0000150045	164.0
	W34FF-D	D34-	LD	LIC	PANAMA CITY, FL	BLANK0000179306	328.8
	WDNP-LD	D34	LD	LIC	ST. PETERSBURG, FL	BLANK0000123622	178.4

Service area	Terrain-limited	IX-free	Percent IX
6939.5 389,994	6939.5 389,994	6747.7 388,069	2.76 0.49

Undesired	Total IX	Unique IX	Prcnt Unique IX
WXCK-LD D33 LD LIC	177.6 1,433	177.6 1,433	2.56 0.37
WBXJ-CD D34 DC LIC	10.1 359	10.1 359	0.14 0.09
WUCF-TV D34 DT LIC	4.0 133	4.0 133	0.06 0.03

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Interference to proposal scenario 2

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WTGB-LD	D34	LD	LIC	JASPER, FL	WTGB-LD 1035360	
Undesireds:	WBXJ-CD	D34	DC	LIC	JACKSONVILLE, ETC., FL	BLANK0000108581	115.1 km
	WUCF-TV	D34	DT	LIC	ORLANDO, FL	BLANK0000150045	164.0
	W34FF-D	D34-	LD	LIC	PANAMA CITY, FL	BLANK0000179306	328.8
	WDNP-LD	D34	LD	LIC	ST. PETERSBURG, FL	BLANK0000123622	178.4

Service area	Terrain-limited	IX-free	Percent IX
6939.5 389,994	6939.5 389,994	6925.4 389,502	0.20 0.13

Undesired	Total IX	Unique IX	Prcnt Unique IX
WBXJ-CD D34 DC LIC	10.1 359	10.1 359	0.14 0.09
WUCF-TV D34 DT LIC	4.0 133	4.0 133	0.06 0.03



**Channel and  
Facility  
Information**

Section	Question	Response
Facility ID	186186	
State	Florida	
City	Gainesville	
LPD Channel	34	

Antenna Location  
Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1035360
Coordinates (NAD83)	Latitude	29° 32' 12.0" N+
	Longitude	082° 23' 59.0" W-
	Structure Type	TOWER-A free standing or guyed struct
	Overall Structure Height	299.5 meters
	Support Structure Height	281.7 meters
	Ground Elevation (AMSL)	19.5 meters
Antenna Data	Height of Radiation Center Above Ground Level	207.3 meters
	Height of Radiation Center Above Mean Sea Level	226.8 meters
	Effective Radiated Power	15 kW

Antenna  
Technical Data

Section	Question	Response
Antenna Type	Antenna Type	Directional Custom
	Do you have an Antenna ID?	No
	Antenna ID	
Antenna Manufacturer and Model	Manufacturer:	Dielectric
	Model	TLP-12B/VP
	Rotation	30 degrees
	Electrical Beam Tilt	1.0
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Elliptical
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	0.661	180	0.645	270	0.650
10	0.996	100	0.615	190	0.641	280	0.699
20	0.981	110	0.583	200	0.631	290	0.759
30	0.955	120	0.569	210	0.613	300	0.817
40	0.920	130	0.571	220	0.592	310	0.869
50	0.876	140	0.586	230	0.579	320	0.914
60	0.826	150	0.607	240	0.570	330	0.951
70	0.771	160	0.627	250	0.579	340	0.975
80	0.714	170	0.640	260	0.610	350	0.993

Additional Azimuths

Degree	V <sub>A</sub>
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