

ENGINEERING EXHIBIT

Application for Modification of Digital Television Translator Station Construction Permit

prepared for

CBS Operations Investments Inc.

W36FJ-D Sebring, FL

Facility ID 74113

Ch. 36 (digital) 8 kW

CBS Operations Investments Inc. (“CBS”) is the licensee of digital television translator station W23CN-D, Channel 23, Sebring FL, Facility ID 74113 (file# BLDDTT-20090903AAH). As a result of the Special Displacement Window,¹ a Construction Permit (“CP” file# 0000054117) authorizes W23CN-D to operate on Channel 36 using a new callsign of W36FJ-D with 15 kW effective radiated power (“ERP”) and a nondirectional antenna. CBS proposes herein a minor modification of the displacement CP for decreased ERP and to utilize a directional antenna. No change in site location is proposed.

W36FJ-D will continue to utilize the tower structure associated with FCC Antenna Structure Registration number 1030953. The proposed Channel 36 antenna will be top-mounted on the tower in place of the existing Channel 23 antenna.

The proposed directional antenna is a Dielectric model TLP-8W/VP-R having elliptical polarization. The ERP is 8 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 51 dBμ coverage contour of the licensed Channel 23 facility and those of the Channel 36 CP and proposed facilities, demonstrating compliance with §73.3572 for a minor change.

¹“*Incentive Auction Task Force and Media Bureau Announce Post-Incentive Auction Special Displacement Window April 10, 2018, through May 15, 2018, and Make Location and Channel Data Available,*” Public Notice, DA 18-124, released February 9, 2018.

Interference study per OET Bulletin 69² shows that the proposal complies with the FCC's interference protection requirements toward all digital television, television translator, LPTV, and Class A stations (existing and post-auction). 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 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 25 percent antenna relative field in downward elevations (pattern data shows less than 25 percent relative field at angles 10 – 90 degrees below the horizontal), the calculated signal density near the tower at two meters above ground level attributable to the proposed facility is $1.4 \mu\text{W}/\text{cm}^2$, 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, 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.

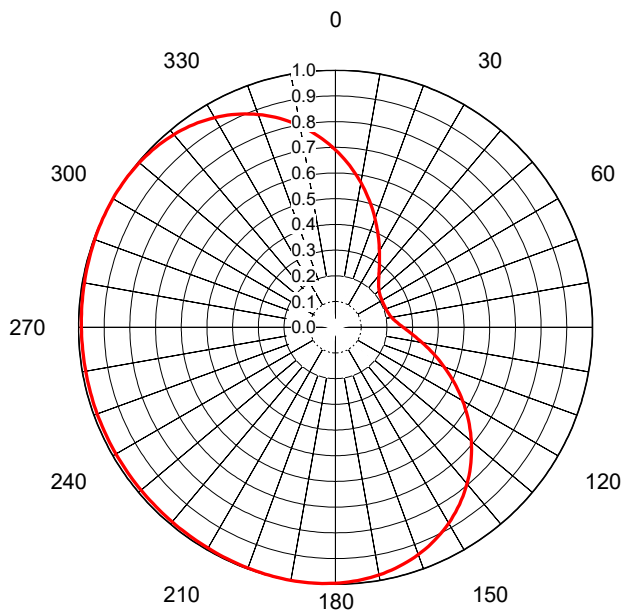
²FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 ("OET-69"). This analysis employed the FCC's current "TVStudy" software with the default application processing template settings, 1 km cell size, and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

Chesapeake RF Consultants, LLC

Joseph M. Davis, P.E.	January 30, 2020	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



AZIMUTH PATTERN Horizontal Polarization

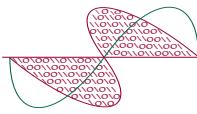
Proposal No. **C-71407-1**
 Date **26-Dec-19**
 Call Letters **W36FJ-D**
 Channel **36**
 Frequency **605 MHz**
 Antenna Type **TLP-8W/VP-R**
 Gain **1.57 (1.97dB)**
 Calculated

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.690	36	0.290	72	0.210	108	0.427	144	0.833	180	0.996	216	0.990	252	0.987	288	0.996
1	0.679	37	0.283	73	0.211	109	0.438	145	0.841	181	0.997	217	0.990	253	0.987	289	0.997
2	0.667	38	0.276	74	0.212	110	0.450	146	0.850	182	0.998	218	0.989	254	0.987	290	0.997
3	0.655	39	0.269	75	0.213	111	0.462	147	0.858	183	0.998	219	0.989	255	0.987	291	0.997
4	0.643	40	0.263	76	0.214	112	0.474	148	0.866	184	0.999	220	0.989	256	0.987	292	0.998
5	0.632	41	0.257	77	0.216	113	0.486	149	0.873	185	0.999	221	0.988	257	0.987	293	0.998
6	0.620	42	0.252	78	0.217	114	0.498	150	0.881	186	1.000	222	0.988	258	0.987	294	0.999
7	0.607	43	0.247	79	0.219	115	0.510	151	0.888	187	1.000	223	0.988	259	0.987	295	0.999
8	0.595	44	0.242	80	0.222	116	0.522	152	0.895	188	1.000	224	0.988	260	0.987	296	0.999
9	0.583	45	0.238	81	0.224	117	0.534	153	0.902	189	1.000	225	0.988	261	0.987	297	1.000
10	0.571	46	0.234	82	0.227	118	0.546	154	0.908	190	1.000	226	0.987	262	0.987	298	1.000
11	0.559	47	0.230	83	0.230	119	0.559	155	0.914	191	1.000	227	0.987	263	0.987	299	1.000
12	0.546	48	0.227	84	0.234	120	0.571	156	0.920	192	1.000	228	0.987	264	0.987	300	1.000
13	0.534	49	0.224	85	0.238	121	0.583	157	0.926	193	1.000	229	0.987	265	0.988	301	1.000
14	0.522	50	0.222	86	0.242	122	0.595	158	0.931	194	0.999	230	0.987	266	0.988	302	1.000
15	0.510	51	0.219	87	0.247	123	0.607	159	0.937	195	0.999	231	0.987	267	0.988	303	1.000
16	0.498	52	0.217	88	0.252	124	0.620	160	0.942	196	0.999	232	0.987	268	0.988	304	1.000
17	0.486	53	0.216	89	0.257	125	0.632	161	0.946	197	0.998	233	0.987	269	0.988	305	0.999
18	0.474	54	0.214	90	0.263	126	0.643	162	0.951	198	0.998	234	0.987	270	0.989	306	0.999
19	0.462	55	0.213	91	0.269	127	0.655	163	0.955	199	0.997	235	0.987	271	0.989	307	0.998
20	0.450	56	0.212	92	0.276	128	0.667	164	0.959	200	0.997	236	0.987	272	0.989	308	0.998
21	0.438	57	0.211	93	0.283	129	0.679	165	0.963	201	0.997	237	0.987	273	0.990	309	0.997
22	0.427	58	0.210	94	0.290	130	0.690	166	0.966	202	0.996	238	0.987	274	0.990	310	0.996
23	0.416	59	0.209	95	0.298	131	0.701	167	0.970	203	0.996	239	0.986	275	0.990	311	0.995
24	0.404	60	0.209	96	0.306	132	0.713	168	0.973	204	0.995	240	0.986	276	0.991	312	0.994
25	0.393	61	0.208	97	0.315	133	0.724	169	0.976	205	0.995	241	0.986	277	0.991	313	0.992
26	0.383	62	0.208	98	0.323	134	0.735	170	0.979	206	0.994	242	0.986	278	0.991	314	0.991
27	0.372	63	0.208	99	0.333	135	0.745	171	0.981	207	0.994	243	0.986	279	0.992	315	0.989
28	0.362	64	0.208	100	0.342	136	0.756	172	0.983	208	0.993	244	0.986	280	0.992	316	0.988
29	0.352	65	0.208	101	0.352	137	0.766	173	0.986	209	0.993	245	0.986	281	0.993	317	0.986
30	0.342	66	0.208	102	0.362	138	0.776	174	0.988	210	0.992	246	0.986	282	0.993	318	0.983
31	0.333	67	0.208	103	0.372	139	0.786	175	0.989	211	0.992	247	0.986	283	0.994	319	0.981
32	0.323	68	0.208	104	0.383	140	0.796	176	0.991	212	0.991	248	0.986	284	0.994	320	0.979
33	0.315	69	0.208	105	0.393	141	0.805	177	0.992	213	0.991	249	0.986	285	0.995	321	0.976
34	0.306	70	0.209	106	0.404	142	0.815	178	0.994	214	0.991	250	0.986	286	0.995	322	0.973
35	0.298	71	0.209	107	0.416	143	0.824	179	0.995	215	0.990	251	0.986	287	0.996	323	0.970

Figure 1
Antenna Azimuthal Pattern
W36FJ-D Sebring, FL
Facility ID 74113
Ch. 36 (digital) 8 kW

prepared for
CBS Operations Investments Inc.

January, 2020



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

Figure 2
Coverage Contour Comparison
W36FJ-D Sebring, FL
Facility ID 74113
Ch. 36 (digital) 8 kW

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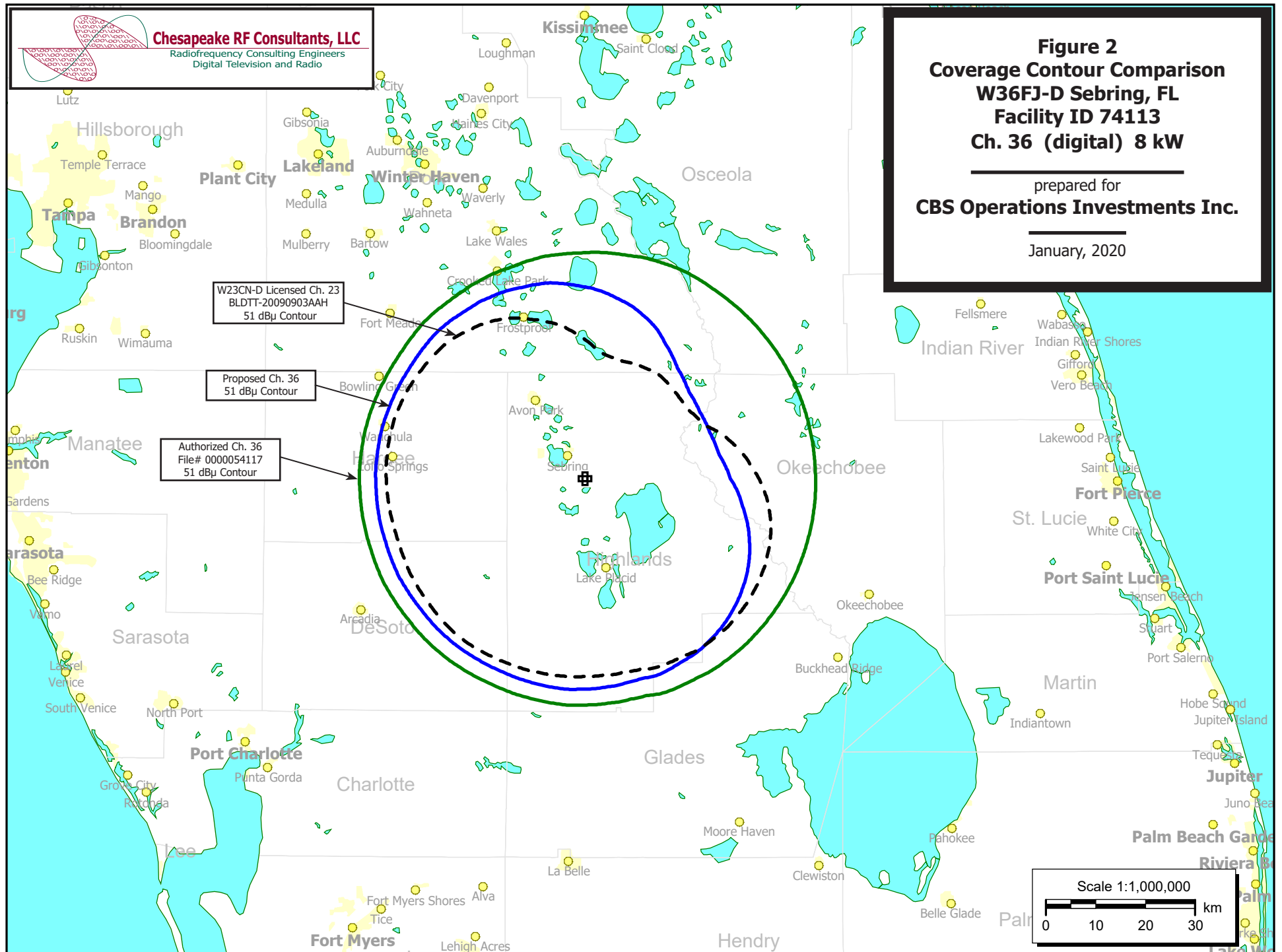


Table 1 W36FJ-D TVStudy Analysis of Proposal (page 1 of 3)



tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: W23CN-D CP-Mod_TLP-8W, Model: Longley-Rice
Start: 2020.01.28 14:56:56

Study created: 2020.01.28 14:56:56

Study build station data: LMS TV 2020-01-28

Proposal: W23CN-D D36 LD APP SEBRING, FL
File number: W23CN-D CP-Mod_TLP-8W
Facility ID: 74113
Station data: User record
Record ID: 2958
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	W21AU-D	N21+	TX	LIC	ORLANDO, FL	BLTTL19920715IB	128.2 km
No	WGFS-LP	N22-	TX	CP	FORT MYERS, FL	BPTTL20140501ACL	118.9
Yes	WFTX-TV	D35	DT	LIC	CAPE CORAL, FL	BLCDT20050311ACY	83.0
No	WFTV	D35	DT	CP	ORLANDO, FL	BLANK0000034714	128.6
No	WSLF-LD	D35	LD	LIC	PORT ST. LUCIE, FL	BLDTL20120215ABJ	106.1
No	WTAM-LD	D35	LD	CP	TAMPA, FL	BLANK0000051686	93.4
No	WFLX	D35	DT	LIC	WEST PALM BEACH, FL	BLANK0000070400	151.1
Yes	W36EC-D	D36	LD	LIC	BARTOW, FL	BLANK0000057967	94.7
No	WUFT	D36	DT	LIC	GAINESVILLE, FL	BLEDT20040304AAF	268.6
No	WCAY-CD	D36	DC	LIC	KEY WEST, FL	BLDTA20110222ABB	322.4
No	WPXP-TV	D36	DT	LIC	LAKE WORTH, FL	BLCDT20030808ABE	152.4
No	W47DA	D36+	LD	CP	MELBOURNE, FL	BLANK0000054053	102.6
No	WZDT-LP	D36+	LD	CP	NAPLES, FL	BLANK0000054428	114.3
No	WHDO-CD	D36	DC	LIC	ORLANDO, FL	BLANK0000098331	101.5
No	WZXZ-CD	D36	DC	LIC	ORLANDO, ETC., FL	BLANK0000001260	125.1
Yes	WDNP-LD	D36	LD	LIC	ST. PETERSBURG, FL	BLANK0000007389	100.8
Yes	WSPF-CD	D36	DC	CP	ST. PETERSBURG, FL	BLANK0000086794	93.4
No	WDNP-LD	N36+	TX	LIC	ST. PETERSBURG, FL	BLTT20020725AAC	147.0

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D36
Mask: Full Service
Latitude: 27 27 15.00 N (NAD83)
Longitude: 81 24 22.00 W
Height AMSL: 157.9 m
HAAT: 0.0 m
Peak ERP: 8.00 kW
Antenna: DIE TLP-8W 0.0 deg
Elev Pattn: Generic
Elec Tilt: 1.00

50.9 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	3.81 kW	127.5 m	38.4 km
45.0	0.470	138.2	28.4
90.0	0.553	142.6	29.5
135.0	4.42	143.2	40.2
180.0	7.94	129.3	42.3
225.0	7.81	129.7	42.2
270.0	7.82	126.1	42.0
315.0	7.80	122.7	41.7

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 132 m

Table 1 W36FJ-D TVStudy Analysis of Proposal
(page 2 of 3)



Distance to Canadian border: 1583.4 km

Distance to Mexican border: 1548.4 km

Conditions at FCC monitoring station: Vero Beach FL
Bearing: 77.3 degrees Distance: 77.9 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 308.9 degrees Distance: 2599.0 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%

Interference to BLCDT20050311ACY LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WFTX-TV	D35	DT	LIC	CAPE CORAL, FL	BLCDT20050311ACY	
Undesireds:	W23CN-D	D36	LD	APP	SEBRING, FL	W23CN-D CP-Mod TLP-8W	83.0 km
	WEDQ	D34	DT	LIC	TAMPA, FL	BLEDT20060913ABQ	125.6
	WFLX	D35	DT	LIC	WEST PALM BEACH, FL	BLANK0000070400	156.8
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
28792.5		1,772,539		28792.5		1,723,484	0.05 0.01
				25971.9		1,723,606	
Undesired			Total IX		Unique IX, before		Unique IX, after
W23CN-D D36 LD APP			32.1		1,448		12.0 122
WEDQ D34 DT LIC			279.2		36,353		279.2 36,353
WFLX D35 DT LIC			2541.5		12,580		2521.4 11,254

Interference to BLANK0000057967 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	W36EC-D	D36	LD	LIC	BARTOW, FL	BLANK0000057967	
Undesireds:	W23CN-D	D36	LD	APP	SEBRING, FL	W23CN-D CP-Mod TLP-8W	94.7 km
	WFTV	D35	DT	CP	ORLANDO, FL	BLANK0000034714	100.2
	WUFT	D36	DT	LIC	GAINESVILLE, FL	BLEDT20040304AAF	178.3
	W47DA	D36+	LD	CP	MELBOURNE, FL	BLANK0000054053	123.3
	WHDO-CD	D36	DC	LIC	ORLANDO, FL	BLANK0000098331	61.2
	WDNP-LD	D36	LD	LIC	ST. PETERSBURG, FL	BLANK0000007389	49.3
	WSPF-CD	D36	DC	CP	ST. PETERSBURG, FL	BLANK0000086794	47.1
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
1495.7		387,877		1495.7		282,042	0.00 0.00
				1026.9		282,042	
Undesired			Total IX		Unique IX, before		Unique IX, after
W23CN-D D36 LD APP			3.0		12		0.0 0
WFTV D35 DT CP			2.0		12		0.0 0
WUFT D36 DT LIC			6.0		203		2.0 8
W47DA D36+ LD CP			1.0		0		0.0 0
WHDO-CD D36 DC LIC			158.2		35,135		82.6 25,810
WDNP-LD D36 LD LIC			37.9		19,106		9.0 2,923
WSPF-CD D36 DC CP			372.2		77,082		271.7 53,138

Interference to BLANK0000057967 LIC scenario 2

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	W36EC-D	D36	LD	LIC	BARTOW, FL	BLANK0000057967	
Undesireds:	W23CN-D	D36	LD	APP	SEBRING, FL	W23CN-D CP-Mod TLP-8W	94.7 km
	WFTV	D35	DT	CP	ORLANDO, FL	BLANK0000034714	100.2
	WUFT	D36	DT	LIC	GAINESVILLE, FL	BLEDT20040304AAF	178.3

Table 1 W36FJ-D TVStudy Analysis of Proposal
(page 3 of 3)



	W47DA	D36	LD	CP	MELBOURNE, FL	BLANK0000054053	123.3		
	WHDO-CD	D36	DC	LIC	ORLANDO, FL	BLANK0000098331	61.2		
	WSFF-CD	D36	DC	CP	ST. PETERSBURG, FL	BLANK0000086794	47.1		
Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
1495.7	387,877	1495.7	387,877	1035.9	284,965	1035.9	284,965	0.00	0.00
Undesired		Total IX		Unique IX, before		Unique IX, after			
W23CN-D	D36 LD APP	3.0	12			0.0	0		
WFTV	D35 DT CP	2.0	12	0.0	0	0.0	0		
WUFT	D36 DT LIC	6.0	203	3.0	8	2.0	8		
W47DA	D36+ LD CP	1.0	0	0.0	0	0.0	0		
WHDO-CD	D36 DC LIC	158.2	35,135	82.6	25,810	82.6	25,810		
WSFF-CD	D36 DC CP	372.2	77,082	296.6	67,574	295.6	67,574		

Interference to BLANK000007389 LIC scenario 1									
Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance		
	WDNP-LD	D36	LD	LIC	ST. PETERSBURG, FL	BLANK000007389			
Undesireds:	W23CN-D	D36	LD	APP	SEBRING, FL	W23CN-D CP-Mod TLP-8W	100.8	km	
	W36EC-D	D36	LD	LIC	BARTOW, FL	BLANK0000057967	49.3		
	WUFT	D36	DT	LIC	GAINESVILLE, FL	BLEDT20040304AAF	207.1		
	WHDO-CD	D36	DC	LIC	ORLANDO, FL	BLANK0000098331	108.9		
	WSFF-CD	D36	DC	CP	ST. PETERSBURG, FL	BLANK0000086794	7.3		
Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
4537.6	1,681,381	4537.6	1,681,381	253.5	132,478	253.5	132,478	0.00	0.00
Undesired		Total IX		Unique IX, before		Unique IX, after			
W23CN-D	D36 LD APP	6.0	193			0.0	0		
W36EC-D	D36 LD LIC	24.9	1,462	0.0	0	0.0	0		
WUFT	D36 DT LIC	2.0	0	0.0	0	0.0	0		
WHDO-CD	D36 DC LIC	1.0	0	0.0	0	0.0	0		
WSFF-CD	D36 DC CP	4284.1	1,548,903	4259.1	1,547,441	4258.2	1,547,397		

Interference to BLANK0000086794 CP scenario 1									
Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance		
	WSFF-CD	D36	DC	CP	ST. PETERSBURG, FL	BLANK0000086794			
Undesireds:	W23CN-D	D36	LD	APP	SEBRING, FL	W23CN-D CP-Mod TLP-8W	93.4	km	
	WUFT	D36	DT	LIC	GAINESVILLE, FL	BLEDT20040304AAF	210.5		
	WHDO-CD	D36	DC	LIC	ORLANDO, FL	BLANK0000098331	105.1		
Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
8275.4	2,838,765	8271.4	2,836,856	8264.4	2,835,045	8259.4	2,835,045	0.06	0.00
Undesired		Total IX		Unique IX, before		Unique IX, after			
W23CN-D	D36 LD APP	9.0	1,811			5.0	0		
WUFT	D36 DT LIC	4.0	0	2.0	0	2.0	0		
WHDO-CD	D36 DC LIC	5.0	1,811	3.0	1,811	1.0	0		

Interference to proposal scenario 1									
Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance		
	W23CN-D	D36	LD	APP	SEBRING, FL	W23CN-D CP-Mod TLP-8W			
Undesireds:	WPXP-TV	D36	DT	LIC	LAKE WORTH, FL	BLCDT20030808ABE	152.4	km	
	WHDO-CD	D36	DC	LIC	ORLANDO, FL	BLANK0000098331	101.5		
	WDNP-LD	D36	LD	LIC	ST. PETERSBURG, FL	BLANK000007389	100.8		
	WSFF-CD	D36	DC	CP	ST. PETERSBURG, FL	BLANK0000086794	93.4		
Service area		Terrain-limited		IX-free		Percent IX			
4653.4	126,371	4653.4	126,371	4583.3	124,446	1.51	1.52		
Undesired		Total IX		Unique IX		Prct Unique IX			
WPXP-TV	D36 DT LIC	21.1	34	21.1	34	0.45	0.03		
WHDO-CD	D36 DC LIC	1.0	6	1.0	6	0.02	0.00		
WSFF-CD	D36 DC CP	48.0	1,885	48.0	1,885	1.03	1.49		

Channel and Facility Information

Section	Question	Response
Facility ID	74113	
State	Florida	
City	SEBRING	
LPT Channel	36	

Antenna Location Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1030953
Coordinates (NAD83)	Latitude	27° 27' 15.0" N+
	Longitude	081° 24' 22.0" W-
	Structure Type	GTOWER-Guyed Structure Used for Communication Purposes
	Overall Structure Height	127.2 meters
	Support Structure Height	121.8 meters
	Ground Elevation (AMSL)	33.4 meters
Antenna Data	Height of Radiation Center Above Ground Level	124.5 meters
	Height of Radiation Center Above Mean Sea Level	157.9 meters
	Effective Radiated Power	8 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:	DIE
	Model	TLP-8W/VP-R
	Rotation	0 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	0.690	90	0.263	180	0.996	270	0.989
10	0.571	100	0.342	190	1.000	280	0.992
20	0.450	110	0.450	200	0.997	290	0.997
30	0.342	120	0.571	210	0.992	300	1.000
40	0.263	130	0.690	220	0.989	310	0.996
50	0.222	140	0.796	230	0.987	320	0.979
60	0.209	150	0.881	240	0.986	330	0.942
70	0.209	160	0.942	250	0.986	340	0.881
80	0.222	170	0.979	260	0.987	350	0.796

Additional Azimuths

Degree	V _A
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