

ENGINEERING EXHIBIT

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

Gray Television Licensee, LLC
W35EE-D Selma, AL
Facility ID 182345
Ch. 35 15 kW Nondirectional

Gray Television Licensee, LLC (“Gray”) is the licensee of digital Low Power Television station W35EE-D, Channel 35, Facility ID 182345, Selma AL. W35EE-D is licensed to operate at 5 kW effective radiated power (“ERP”) with a directional antenna (file# 0000218595). *Gray* herein seeks a minor modification Construction Permit to relocate W35EE-D and to utilize a nondirectional antenna at increased ERP and antenna height.

The proposed facility will employ a new side-mounted antenna on the tower structure associated with FCC Antenna Structure Registration number 1038800, located 33.6 km (20.8 miles) from the licensed site. No change to the overall structure height is proposed.

The proposed antenna is a Dielectric model TLP-12A/VP-R 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.

Figure 1 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 μ contour encompasses that of the licensed facility, no service loss area will be created. The population within the 51 dB μ contour increases to 51,031 persons (2010 census), which is a 6.3-fold increase beyond the 8,065 persons within the licensed W35EE-D facility’s 51 dB μ contour.

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 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 $2.1 \mu\text{W}/\text{cm}^2$, which is 0.5 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.

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 1.0 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 (W35EE-D)
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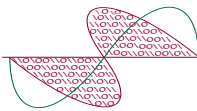


List of Attachments

Figure 1	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.	August 4, 2023	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



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

Figure 1
Coverage Contour Comparison
W35EE-D Selma, AL
Facility ID 182345
Ch. 35 15 kW Nondirectional

prepared for
Gray Television Licensee, LLC

August, 2023

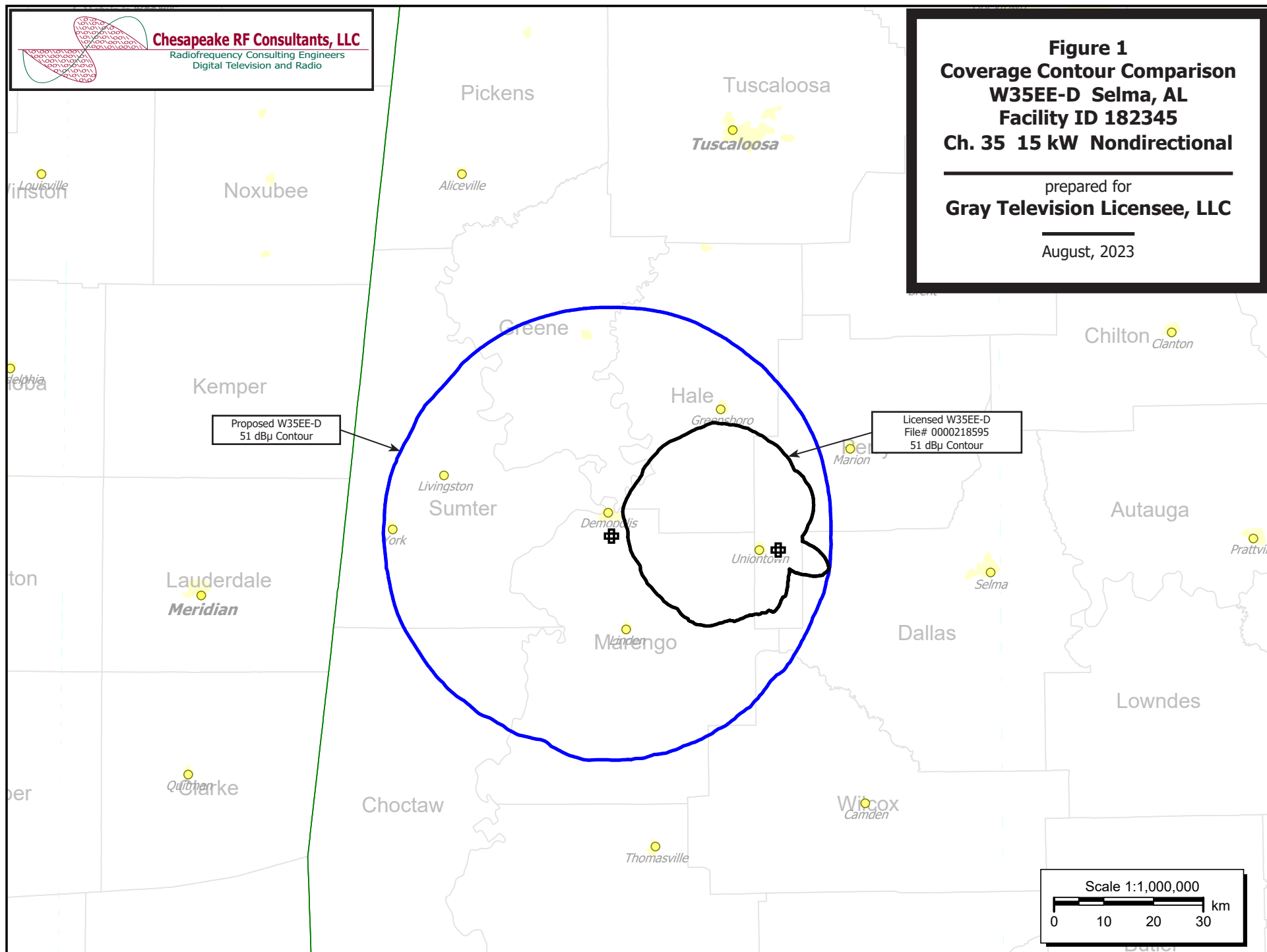


Table 1 W35EE-D TVStudy Analysis of Proposal (page 1 of 4)



tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: W35EE-D 1038800 370ft, Model: Longley-Rice
Start: 2023.08.04 14:13:25

Study created: 2023.08.04 14:13:25

Study build station data: LMS TV 2023-08-04

Proposal: W35EE-D D35 LD APP SELMA, AL
File number: W35EE-D 1038800 370ft
Facility ID: 182345
Station data: User record
Record ID: 53
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	W34FB-D	D34	LD	LIC	HAMILTON, AL	BLANK0000118546	174.3 km
Yes	WBIH	D34	DT	LIC	SELMA, AL	BLANK0000110807	92.8
No	WHBR	D34	DT	LIC	PENSACOLA, FL	BLCDT20060627AAV	207.7
No	WRBJ-TV	D34	DT	LIC	MAGEE, MS	BLCDT20110511AGB	166.2
No	DWKNI-LP	D35-	LD	APP	ANDALUSIA, AL	BLANK0000054917	176.6
Yes	WOTM-LD	D35	LD	LIC	Birmingham, AL	BLANK0000184910	149.6
No	WHVD-LD	D35	LD	LIC	HUNTSVILLE, AL	BLANK0000129320	278.6
No	WEAC-CD	D35	DC	LIC	JACKSONVILLE, AL	BLANK0000112954	222.5
No	WUDC-LD	D35	LD	CP	MONTGOMERY, AL	BNPDTL20091026ABC	153.4
No	WUDC-LD	D35	LD	LIC	MONTGOMERY, AL	BLANK0000199477	153.4
No	WECF-LD	D35	LD	LIC	PANAMA CITY, FL	BLANK0000081864	330.3
Yes	WJTC	D35	DT	LIC	PENSACOLA, FL	BLANK0000121002	211.3
No	WDTA-LD	D35	LD	LIC	ATLANTA, GA	BLANK0000126643	352.5
No	WLTZ	D35	DT	LIC	COLUMBUS, GA	BLCDT20060627ABT	276.0
No	KALB-TV	D35	DT	LIC	ALEXANDRIA, LA	BLCDT20090924AAC	469.0
No	KGLA-DT	D35	DT	LIC	HAMMOND, LA	BLANK0000207963	342.4
No	WTCI	D35	DT	CP	CHATTANOOGA, TN	BLANK0000034751	384.1
No	WTCI	D35	DT	LIC	CHATTANOOGA, TN	BLANK0000144354	384.1
No	WBBJ-TV	D35	DT	LIC	JACKSON, TN	BLANK0000116047	360.4
No	WTVY	D36	DT	LIC	DOTHAN, AL	BLCDT20090901AAL	262.4
No	WGOX-LD	D36	LD	LIC	Mobile, AL	BLANK0000169489	199.6
No	WDSF-LD	D36	LD	LIC	MONTGOMERY, AL	BLANK0000098057	131.4
Yes	WSES	D36	DT	LIC	TUSCALOOSA, AL	BLANK0000191494	117.7
No	WMAV-TV	D36	DT	LIC	OXFORD, MS	BLCDT20090612AAK	266.6
No	WLOO	D36	DT	LIC	VICKSBURG, MS	BLANK0000063959	241.5

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D35
Mask: Full Service
Latitude: 32 28 29.20 N (NAD83)
Longitude: 87 49 45.00 W
Height AMSL: 167.8 m
HAAT: 0.0 m
Peak ERP: 15.0 kW
Antenna: Omnidirectional
Elev Pattn: Generic
Elec Tilt: 0.50

50.8 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	15.0 kW	139.0 m	46.2 km
45.0	15.0	130.6	45.6
90.0	15.0	109.4	44.0
135.0	15.0	103.9	43.4

Table 1 W35EE-D TVStudy Analysis of Proposal
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180.0	15.0	122.3	45.1
225.0	15.0	119.1	44.9
270.0	15.0	136.2	46.0
315.0	15.0	130.3	45.6

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 124 m

Distance to Canadian border: 1119.5 km

Distance to Mexican border: 1139.4 km

Conditions at FCC monitoring station: Powder Springs GA
Bearing: 61.1 degrees Distance: 327.5 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 303.6 degrees Distance: 1770.4 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 BLANK0000110807 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WBIH	D34	DT	LIC	SELMA, AL	BLANK0000110807	
Undesireds:	W35EE-D	D35	LD	APP	SELMA, AL	W35EE-D 1038800 370ft	92.8 km
	WPXH-TV	D33	DT	LIC	HOOVER, AL	BLANK0000105366	104.9
	W34EY-D	D34	DC	LIC	HUNTSVILLE, AL	BLANK0000069366	245.8
	WHBR	D34	DT	LIC	PENSACOLA, FL	BLCDT20060627AAV	227.4
	WATC-DT	D34	DT	LIC	ATLANTA, GA	BLANK0000107129	279.2
	WSST-TV	D34	DT	LIC	CORDELE, GA	BLANK0000064103	294.5
	WRBJ-TV	D34	DT	LIC	MAGEE, MS	BLCDT20110511AGB	258.3
	WEAC-CD	D35	DC	LIC	JACKSONVILLE, AL	BLANK0000112954	150.4

	Service area			Terrain-limited	IX-free, before	IX-free, after	Percent New IX
	26855.0	720,621	26510.2	707,619	26059.7	687,730	0.17 0.02

Undesired	Total IX	Unique IX, before	Unique IX, after
W35EE-D D35 LD APP	58.2	191	43.2 149
WPXH-TV D33 DT LIC	66.7	13,145	38.8 9,970
W34EY-D D34 DC LIC	3.0	722	0.0 0
WHBR D34 DT LIC	149.1	2,130	87.8 720
WATC-DT D34 DT LIC	160.6	5,726	125.7 3,983
WSST-TV D34 DT LIC	1.0	0	0.0 0
WRBJ-TV D34 DT LIC	152.4	2,056	92.1 788
WEAC-CD D35 DC LIC	29.9	1,636	8.0 285

Interference to BLANK0000184910 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WOTM-LD	D35	LD	LIC	Birmingham, AL	BLANK0000184910	
Undesireds:	W35EE-D	D35	LD	APP	SELMA, AL	W35EE-D 1038800 370ft	149.6 km
	WHVD-LD	D35	LD	LIC	HUNTSVILLE, AL	BLANK0000129320	149.3
	WEAC-CD	D35	DC	LIC	JACKSONVILLE, AL	BLANK0000112954	77.3
	WUDC-LD	D35	LD	CP	MONTGOMERY, AL	BNPDTL20091026ABC	118.7
	WJTC	D35	DT	LIC	PENSACOLA, FL	BLANK0000121002	323.4
	WLTZ	D35	DT	LIC	COLUMBUS, GA	BLCDT20060627ABT	195.8
	W35DA-D	D35	LD	CP	MACON, GA	BLANK0000197147	285.1
	W35DZ-D	D35	LD	LIC	ALGOOD, TN	BLANK0000194635	331.2
	WTCI	D35	DT	CP	CHATTANOOGA, TN	BLANK0000034751	237.7
	WBBJ-TV	D35	DT	LIC	JACKSON, TN	BLANK0000116047	310.8
	WSES	D36	DT	LIC	TUSCALOOSA, AL	BLANK0000191494	71.9

Table 1 W35EE-D TVStudy Analysis of Proposal
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Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
5264.7	879,414	4687.1	821,520	3864.1	659,317	3863.1	658,417	0.03	0.14
Undesired		Total IX		Unique IX, before		Unique IX, after			
W35EE-D D35 LD APP	7.9	2,895				1.0 900			
WHVD-LD D35 LD LIC	1.0	145		0.0 0		0.0 0			
WEAC-CD D35 DC LIC	342.8	33,925		277.2 23,845		273.2 21,861			
WJTC D35 DT LIC	1.0	0		0.0 0		0.0 0			
WLTZ D35 DT LIC	1.0	0		0.0 0		0.0 0			
WTCI D35 DT CP	8.0	2,854		0.0 0		0.0 0			
WBBJ-TV D35 DT LIC	1.0	0		0.0 0		0.0 0			
WSES D36 DT LIC	538.8	136,244		479.2 128,278		477.2 128,267			

Interference to BLANK0000184910 LIC scenario 2

Call	Chan	Svc	Status	City, State	File Number	Distance
Desired: WOTM-LD	D35	LD	LIC	Birmingham, AL	BLANK0000184910	
Undesireds: W35EE-D	D35	LD	APP	SELMA, AL	W35EE-D 1038800 370ft	149.6 km
WHVD-LD	D35	LD	LIC	HUNTSVILLE, AL	BLANK0000129320	149.3
WEAC-CD	D35	DC	LIC	JACKSONVILLE, AL	BLANK0000112954	77.3
WUDC-LD	D35	LD	CP	MONTGOMERY, AL	BNPDTL20091026ABC	118.7
WJTC	D35	DT	LIC	PENSACOLA, FL	BLANK0000121002	323.4
WLTZ	D35	DT	LIC	COLUMBUS, GA	BLCDT20060627ABT	195.8
W35DA-D	D35	LD	CP	MACON, GA	BLANK0000197147	285.1
W35DZ-D	D35	LD	LIC	ALGOOD, TN	BLANK0000194635	331.2
WTCI	D35	DT	LIC	CHATTANOOGA, TN	BLANK0000144354	237.7
WBBJ-TV	D35	DT	LIC	JACKSON, TN	BLANK0000116047	310.8
WSES	D36	DT	LIC	TUSCALOOSA, AL	BLANK0000191494	71.9

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
5264.7	879,414	4687.1	821,520	3864.1	659,317	3863.1	658,417	0.03	0.14
Undesired		Total IX		Unique IX, before		Unique IX, after			
W35EE-D D35 LD APP	7.9	2,895				1.0 900			
WHVD-LD D35 LD LIC	1.0	145		0.0 0		0.0 0			
WEAC-CD D35 DC LIC	342.8	33,925		277.2 23,845		273.2 21,861			
WJTC D35 DT LIC	1.0	0		0.0 0		0.0 0			
WLTZ D35 DT LIC	1.0	0		0.0 0		0.0 0			
WTCI D35 DT LIC	8.0	2,854		0.0 0		0.0 0			
WBBJ-TV D35 DT LIC	1.0	0		0.0 0		0.0 0			
WSES D36 DT LIC	538.8	136,244		479.2 128,278		477.2 128,267			

Interference to BLANK0000121002 LIC scenario 1

Call	Chan	Svc	Status	City, State	File Number	Distance
Desired: WJTC	D35	DT	LIC	PENSACOLA, FL	BLANK0000121002	
Undesireds: W35EE-D	D35	LD	APP	SELMA, AL	W35EE-D 1038800 370ft	211.3 km
WHBR	D34	DT	LIC	PENSACOLA, FL	BLCDT20060627AAV	9.2
WLTZ	D35	DT	LIC	COLUMBUS, GA	BLCDT20060627ABT	327.2
WBVJ-CD	D35+	DC	LIC	VALDOSTA, GA	BLANK0000004708	409.6
KGLA-DT	D35	DT	LIC	HAMMOND, LA	BLANK0000207963	238.9
WTVY	D36	DT	LIC	DOTHAN, AL	BLCDT20090901AAL	177.0

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
35122.8	1,380,814	34871.9	1,378,817	34685.1	1,373,748	34670.9	1,373,721	0.04	0.00
Undesired		Total IX		Unique IX, before		Unique IX, after			
W35EE-D D35 LD APP	21.3	51				14.2 27			
WHBR D34 DT LIC	30.5	827		30.5 827		30.5 827			
WLTZ D35 DT LIC	3.1	0		2.0 0		1.0 0			
KGLA-DT D35 DT LIC	82.4	825		82.4 825		76.3 801			
WTVY D36 DT LIC	71.9	3,417		70.9 3,417		70.9 3,417			

Interference to BLANK0000191494 LIC scenario 1

Call	Chan	Svc	Status	City, State	File Number	Distance
Desired: WSES	D36	DT	LIC	TUSCALOOSA, AL	BLANK0000191494	

Table 1 W35EE-D TVStudy Analysis of Proposal
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Undesireds:	W35EE-D	D35	LD	APP	SELMA, AL	W35EE-D 1038800 370ft	117.7 km
	WEAC-CD	D35	DC	LIC	JACKSONVILLE, AL	BLANK0000112954	145.2
	WTVY	D36	DT	LIC	DOTHAN, AL	BLCDT20090901AAL	325.9
	WUPA	D36	DT	LIC	ATLANTA, GA	BLANK0000084466	288.3
	WMAV-TV	D36	DT	LIC	OXFORD, MS	BLEDT20090612AAK	228.5
	WLOO	D36	DT	LIC	VICKSBURG, MS	BLANK0000063959	309.5
	WTVF	D36	DT	LIC	NASHVILLE, TN	BLANK0000115766	315.4
<hr/>							
	Service area	Terrain-limited		IX-free, before		IX-free, after	Percent New IX
	46526.7 1,828,545	45188.0	1,796,732	42941.6	1,708,002	42905.5 1,707,719	0.08 0.02
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Undesired		Total IX		Unique IX, before		Unique IX, after	
W35EE-D D35 LD APP		40.1	283			36.1	283
WEAC-CD D35 DC LIC		679.3	34,840	403.7	19,282	403.7	19,282
WTVY D36 DT LIC		330.2	7,403	252.4	5,064	249.4	5,064
WUPA D36 DT LIC		656.3	26,857	228.4	7,960	228.4	7,960
WMAV-TV D36 DT LIC		142.7	3,435	76.4	1,891	76.4	1,891
WLOO D36 DT LIC		46.9	648	23.9	135	23.9	135
WTVF D36 DT LIC		921.1	37,576	769.4	34,352	769.4	34,352
<hr/>							
Interference to proposal scenario 1							
	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	W35EE-D	D35	LD	APP	SELMA, AL	W35EE-D 1038800 370ft	
Undesireds:	WUDC-LD	D35	LD	CP	MONTGOMERY, AL	BNPDTL20091026ABC	153.4 km
	WJTC	D35	DT	LIC	PENSACOLA, FL	BLANK0000121002	211.3
	WSES	D36	DT	LIC	TUSCALOOSA, AL	BLANK0000191494	117.7
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	Service area	Terrain-limited		IX-free		Percent IX	
	6417.9 51,226	6380.8	50,881	6321.5	50,379	0.93 0.99	
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Undesired		Total IX		Unique IX		Prct Unique IX	
WJTC D35 DT LIC		50.3	424	48.3	424	0.76 0.83	
WSES D36 DT LIC		11.0	78	9.0	78	0.14 0.15	

**Channel and
Facility
Information**

Section	Question	Response
Facility ID	182345	
State	Alabama	
City	SELMA	
LPD Channel	35	

Antenna Location
Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1038800
Coordinates (NAD83)	Latitude	32° 28' 29.2" N+
	Longitude	087° 49' 45.0" W-
	Structure Type	TOWER-A free standing or guyed struct
	Overall Structure Height	135.9 meters
	Support Structure Height	135.9 meters
	Ground Elevation (AMSL)	55.0 meters
Antenna Data	Height of Radiation Center Above Ground Level	112.8 meters
	Height of Radiation Center Above Mean Sea Level	167.8 meters
	Effective Radiated Power	15 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:	Dielectric
	Model	TLP-12A/VP-R
	Rotation	
	Electrical Beam Tilt	0.5
	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