

ENGINEERING EXHIBIT

Digital Class A Television Station Application for Minor Modification of Licensed Facility

prepared for

Gray Television Licensee, LLC

WBXM-CD Montgomery, AL

Facility ID 70412

Ch. 15 5 kW Directional

Gray Television Licensee, LLC (“Gray”) is the licensee of Class A television station WBXM-CD, Channel 15, Facility ID 70412, Montgomery AL. WBXM-CD is licensed to operate (file# 0000113013) with 5 kW effective radiated power (“ERP”), directional. *Gray* herein seeks a minor modification Construction Permit to relocate WBXM-CD.

The proposed WBXM-CD facility will employ a new antenna to be side-mounted on the existing tower structure associated with FCC Antenna Structure Registration number 1026612, located 31.8 km (19.8 miles) from the licensed site. No change to the overall structure height is proposed.

The proposed antenna is the existing WBXM-CD horizontally polarized PSI model PSILP8ML, to be moved to the new transmitting location. The ERP will remain at 5 kW directional 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. The service area overlap demonstrates 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

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

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

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 30 percent antenna relative field in downward elevations, the calculated signal density near the site at two meters above ground level attributable to the proposed facility is $12.6 \mu\text{W}/\text{cm}^2$, which is 3.9 percent of the general population/uncontrolled maximum permitted exposure limit. This is 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

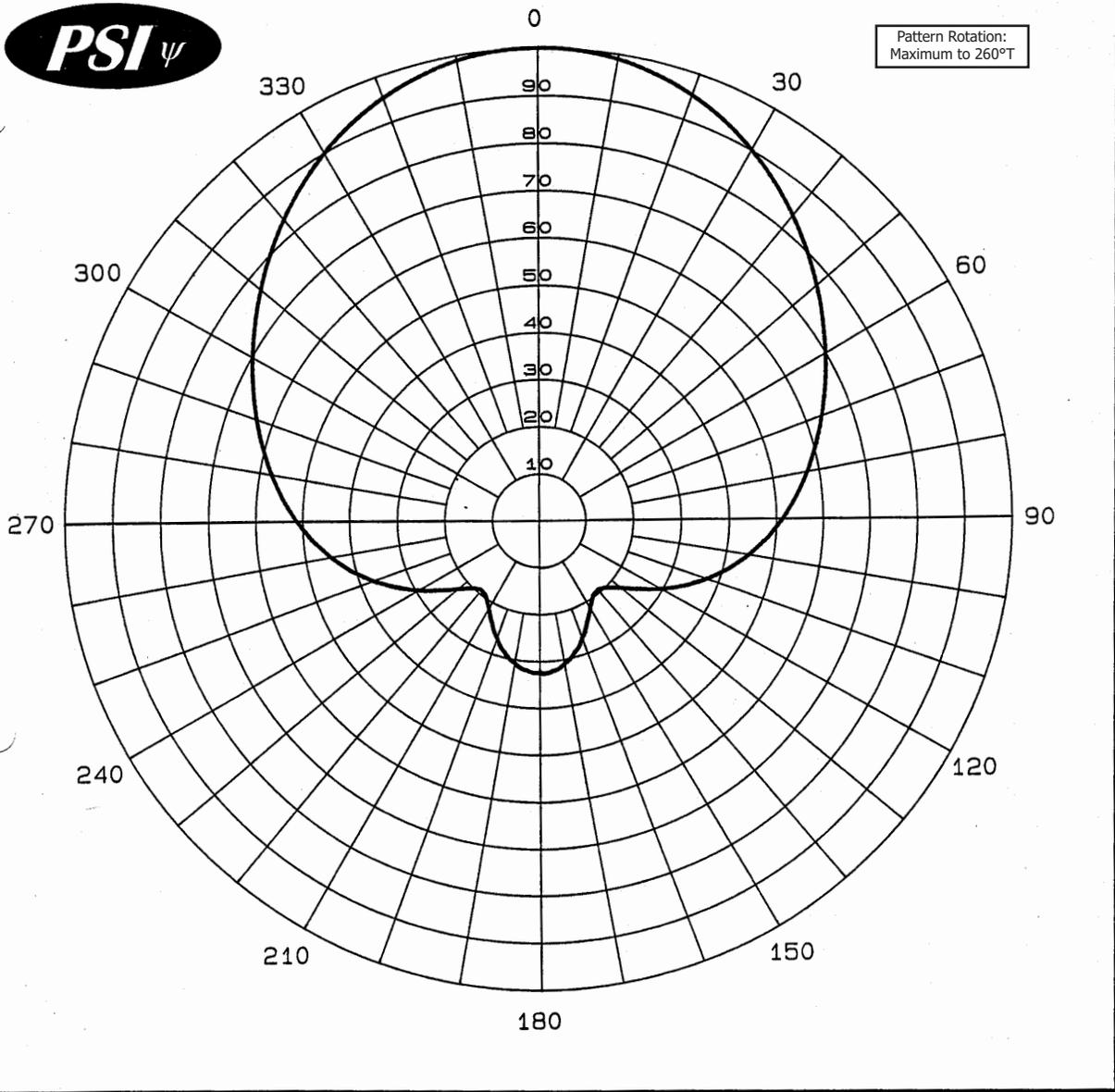
Figure 1	Antenna Azimuthal Pattern
Figure 2	Coverage Contour Comparison
Table 1	TVStudy Analysis of Proposal

Chesapeake RF Consultants, LLC

Joseph M. Davis, P.E. December 6, 2022
207 Old Dominion Road Yorktown, VA 23692 703-650-9600



Pattern Rotation:
Maximum to 260°T



Calculated Relative Field
Azimuth Plane Pattern
Low Power UHF Slot
Antenna Type: PSILP
Pattern Type: ML
Directivity: 2.668 (4.262 dB)
Date: 7/1/97
Rev. 0

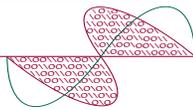
PROPAGATION SYSTEMS, INC.
PO BOX 113
EBENSBURG, PA. 15931

Figure 1
Antenna Azimuthal Pattern
WBXM-CD Montgomery, AL
Facility ID 70412
Ch. 15 5 kW Directional

prepared for
Gray Television Licensee, LLC

December, 2022





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

Figure 2
Coverage Contour Comparison
WBXM-CD Montgomery, AL
Facility ID 70412
Ch. 15 5 kW Directional

prepared for
Gray Television Licensee, LLC

December, 2022

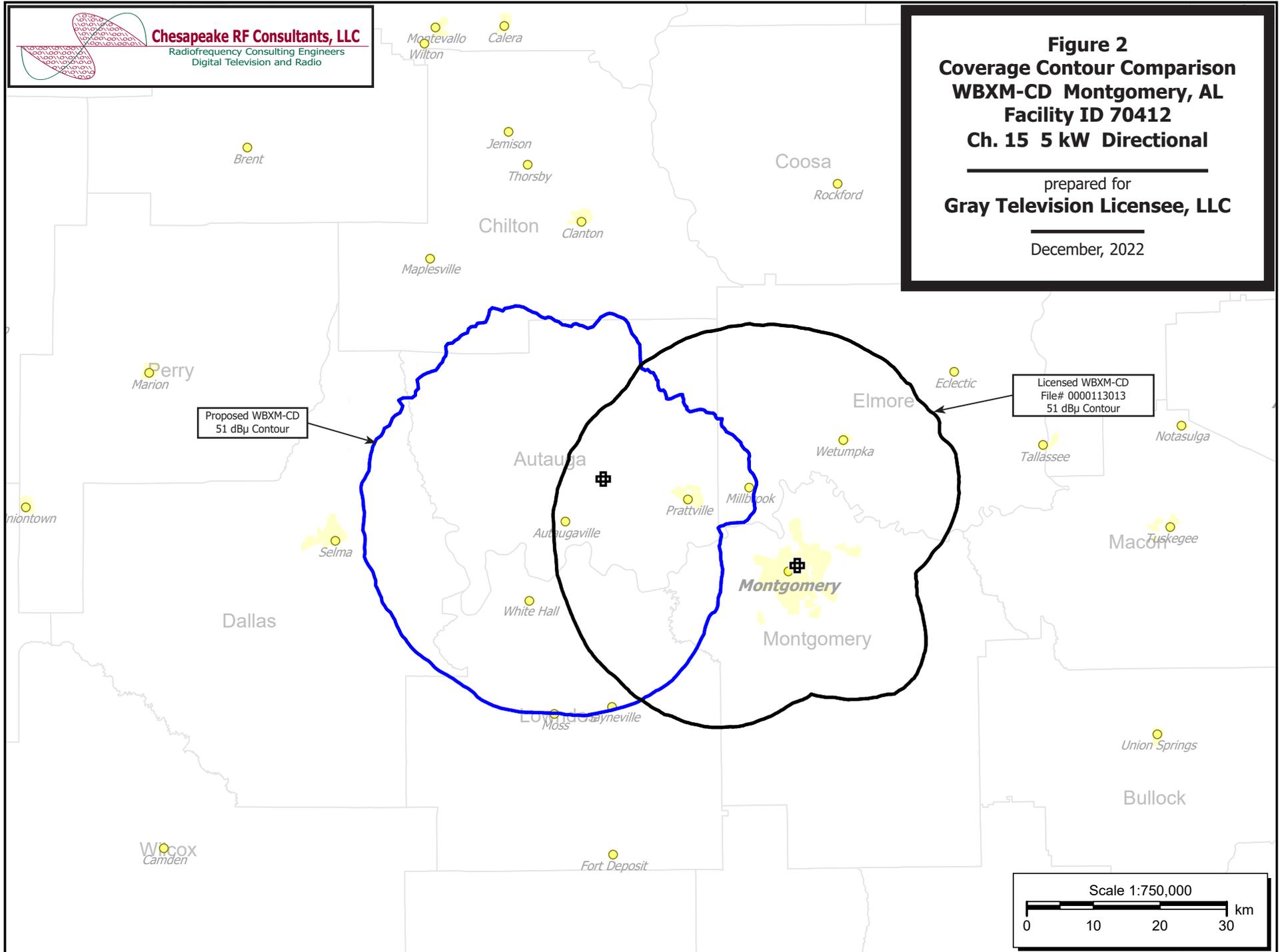


Table 1 WBXM-CD TVStudy Analysis of Proposal
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tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: WBXM-CD 1026612 PSI prop, Model: Longley-Rice
Start: 2022.12.06 13:53:11

Study created: 2022.12.06 13:53:11

Study build station data: LMS TV 2022-12-06

Proposal: WBXM-CD D15 DC APP MONTGOMERY, AL
File number: WBXM-CD 1026612 PSI
Facility ID: 70412
Station data: User record
Record ID: 4777
Country: U.S.

Build options:
Protect LPTV records from Class A

Search options:
Baseline record excluded if station has CP

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
Yes	WDBB	D14	DT	LIC	BESSEMER, AL	BLANK0000192399	134.7 km
No	WFRW-LD	D14	LD	CP	ENTERPRISE, AL	BLANK0000193540	163.8
No	WFRW-LD	D14	LD	LIC	ENTERPRISE, AL	BLANK0000194769	163.8
No	WFGX	D14	DT	LIC	FORT WALTON BEACH, FL	BLANK0000121010	231.3
No	DDW15AZ	N15-	TX	APP	ALABASTER, AL	BLTTL19940809IB	84.5
No	WSSF-LD	D15	LD	LIC	FAYETTE, AL	BLDTL20080626AAG	174.9
No	WAFF	D15	DT	LIC	HUNTSVILLE, AL	BLANK0000111344	246.8
Yes	WPMT-TV	D15	DT	LIC	MOBILE, AL	BLANK0000120999	229.9
No	W15EN-D	D15	LD	LIC	PANAMA CITY, FL	BLANK0000179357	268.3
No	WTFL-LD	D15	LD	LIC	TALLAHASSEE, FL	BLANK0000150951	311.0
Yes	WRBL	D15	DT	LIC	COLUMBUS, GA	BLCDT20061013ABV	170.3
No	WGGD-LD	D15	LD	LIC	GAINESVILLE, GA	BLDTL20121213AIK	307.1
No	WNOL-TV	D15	DT	LIC	NEW ORLEANS, LA	BLANK0000204143	426.6
No	WNOL-TV	D15	DT	LIC	NEW ORLEANS, LA	BLCDT20121019AAR	426.6
No	WFXW	D15	DT	LIC	GREENVILLE, MS	BLCDT20090612ACI	404.2
No	WOOK-LD	D15	LD	LIC	MERIDIAN, MS	BLANK0000148952	197.6
No	DW15CG	N15-	TX	APP	PONTOTOC, MS	BLTTL20050308ABV	293.8
No	WCNT-LP	D15-	LD	CP	CHATTANOOGA, TN	BLANK0000197997	341.0
No	WDDY-LD	D15	LD	LIC	JACKSON, TN	BLANK0000203485	326.4
No	WTNZ	D15	DT	LIC	KNOXVILLE, TN	BLANK0000081278	458.7
No	W15EA-D	D15	DC	LIC	MEMPHIS, TN	BLANK0000093191	426.6
No	WTNX-LD	D15	LD	LIC	NASHVILLE, TN	BLANK0000154430	410.0
No	W16DV-D	D16	LD	LIC	Alexander City, AL	BLANK0000190001	106.2
No	W16DS-D	D16	DC	LIC	BIRMINGHAM, AL	BLANK0000080930	112.2
Yes	WALE-LD	D16	LD	LIC	MONTGOMERY, AL	BLANK0000152783	33.6
No	WJHG-TV	D16	DT	LIC	PANAMA CITY, FL	BLANK0000068516	263.7
No	WRDP-LD	D16	LD	LIC	COLUMBUS, GA	BLANK0000178766	160.3
No	WRDP-LD	D16	LD	CP	COLUMBUS, GA	BLANK0000185006	170.3
No	DDW26DS-D	D16	LD	APP	LA GRANGE, GA	BLANK0000053055	147.8
No	WPXA-TV	D16	DT	LIC	ROME, GA	BLANK0000081827	271.3
No	WLOV-TV	D16	DT	LIC	WEST POINT, MS	BLCDT20070405ABC	273.5

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D15
Mask: Full Service
Latitude: 32 29 29.20 N (NAD83)
Longitude: 86 35 39.80 W
Height AMSL: 186.9 m
HAAT: 0.0 m
Peak ERP: 5.00 kW
Antenna: PSI-PSILP8ML (ID 20497) 260.0 deg
Elev Pattn: Generic
Elec Tilt: 1.00

Table 1 WBXM-CD TV Study Analysis of Proposal
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48.8 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	1.01 kW	65.7 m	27.1 km
45.0	0.200	70.3	19.6
90.0	0.480	81.3	25.5
135.0	0.351	111.6	27.3
180.0	1.62	140.7	37.3
225.0	3.74	122.1	40.3
270.0	4.90	87.4	38.1
315.0	2.66	71.8	32.9

Database HAAT does not agree with computed HAAT

Database HAAT: 0 m Computed HAAT: 94 m

Distance to Canadian border: 1078.0 km

Distance to Mexican border: 1235.2 km

Conditions at FCC monitoring station: Powder Springs GA

Bearing: 48.3 degrees Distance: 231.3 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:

Bearing: 302.3 degrees Distance: 1866.6 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 BLANK0000192399 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WDBB	D14	DT	LIC	BESSEMER, AL	BLANK0000192399	
Undesireds:	WBXM-CD	D15	DC	APP	MONTGOMERY, AL	WBXM-CD 1026612 PSI	134.7 km
	WFGX	D14	DT	LIC	FORT WALTON BEACH, FL	BLANK0000121010	319.3
	WSKC-CD	D14	DC	LIC	ATLANTA, GA	BLANK0000080978	307.7
	WDBD	D14	DT	LIC	JACKSON, MS	BLANK0000064020	309.5
	WDSI-TV	D14	DT	LIC	CHATTANOOGA, TN	BLANK0000059350	269.2
	WAFF	D15	DT	LIC	HUNTSVILLE, AL	BLANK0000111344	159.7
	Service area		Terrain-limited		IX-free, before	IX-free, after	Percent New IX
	43464.9	1,793,850	42375.1	1,763,728	40928.6	1,702,144	40926.6 1,702,101 0.00 0.00
Undesired			Total IX		Unique IX, before	Unique IX, after	
WBXM-CD	D15	DC	APP	10.0	59	2.0	43
WFGX	D14	DT	LIC	421.0	14,433	409.0	14,417
WSKC-CD	D14	DC	LIC	2.0	13	0.0	0
WDBD	D14	DT	LIC	113.1	4,502	109.1	4,502
WDSI-TV	D14	DT	LIC	179.0	5,230	155.9	4,787
WAFF	D15	DT	LIC	758.5	37,849	737.4	37,419

 Interference to BLANK0000120999 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WPMI-TV	D15	DT	LIC	MOBILE, AL	BLANK0000120999	
Undesireds:	WBXM-CD	D15	DC	APP	MONTGOMERY, AL	WBXM-CD 1026612 PSI	229.9 km
	WFGX	D14	DT	LIC	FORT WALTON BEACH, FL	BLANK0000121010	3.6
	WRBL	D15	DT	LIC	COLUMBUS, GA	BLCDT20061013ABV	327.7
	WNOL-TV	D15	DT	LIC	NEW ORLEANS, LA	BLANK0000204143	237.3
	WJHG-TV	D16	DT	LIC	PANAMA CITY, FL	BLANK0000068516	214.2

Table 1 WBXM-CD TVStudy Analysis of Proposal
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WMAH-TV		D16	DT	LIC	BILOXI, MS		BLEDT20110404AGM		128.9
Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
40593.4	1,470,090	40436.1		1,469,742	39148.6	1,454,441	39148.6	1,454,441	0.00 0.00
Undesired		Total IX		Unique IX, before		Unique IX, after			
WBXM-CD	D15 DC APP	3.0		23			0.0		0
WFGX	D14 DT LIC	259.5		2,409	254.4	2,346	254.4	2,346	
WRBL	D15 DT LIC	307.9		2,172	304.9	2,121	301.8	2,098	
WNOL-TV	D15 DT LIC	178.3		1,255	32.5	7	32.5	7	
WJHG-TV	D16 DT LIC	1.0		0	0.0	0	0.0	0	
WMAH-TV	D16 DT LIC	691.6		10,776	544.9	9,516	544.9	9,516	

Interference to BLANK0000120999 LIC scenario 2

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance		
	WPMI-TV	D15	DT	LIC	MOBILE, AL	BLANK0000120999			
Undesireds:	WBXM-CD	D15	DC	APP	MONTGOMERY, AL	WBXM-CD 1026612 PSI	229.9 km		
	WFGX	D14	DT	LIC	FORT WALTON BEACH, FL	BLANK0000121010	3.6		
	WRBL	D15	DT	LIC	COLUMBUS, GA	BLCDDT20061013ABV	327.7		
	WNOL-TV	D15	DT	LIC	NEW ORLEANS, LA	BLCDDT20121019AAR	237.3		
	WJHG-TV	D16	DT	LIC	PANAMA CITY, FL	BLANK0000068516	214.2		
	WMAH-TV	D16	DT	LIC	BILOXI, MS	BLEDT20110404AGM	128.9		
Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
40593.4	1,470,090	40436.1		1,469,742	39148.6	1,454,441	39148.6	1,454,441	0.00 0.00
Undesired		Total IX		Unique IX, before		Unique IX, after			
WBXM-CD	D15 DC APP	3.0		23			0.0		0
WFGX	D14 DT LIC	259.5		2,409	254.4	2,346	254.4	2,346	
WRBL	D15 DT LIC	307.9		2,172	304.9	2,121	301.8	2,098	
WNOL-TV	D15 DT LIC	179.3		1,255	32.5	7	32.5	7	
WJHG-TV	D16 DT LIC	1.0		0	0.0	0	0.0	0	
WMAH-TV	D16 DT LIC	691.6		10,776	543.9	9,516	543.9	9,516	

Interference to BLCDDT20061013ABV LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance		
	WRBL	D15	DT	LIC	COLUMBUS, GA	BLCDDT20061013ABV			
Undesireds:	WBXM-CD	D15	DC	APP	MONTGOMERY, AL	WBXM-CD 1026612 PSI	170.3 km		
	WAFF	D15	DT	LIC	HUNTSVILLE, AL	BLANK0000111344	310.9		
	WPMI-TV	D15	DT	LIC	MOBILE, AL	BLANK0000120999	327.7		
	WTNZ	D15	DT	LIC	KNOXVILLE, TN	BLANK0000081278	415.6		
	WDMA-CD	D16	DC	LIC	MACON, GA	BLANK0000074865	119.7		
Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
45078.3	1,492,912	44446.1		1,466,210	43849.7	1,400,850	43681.8	1,397,417	0.38 0.25
Undesired		Total IX		Unique IX, before		Unique IX, after			
WBXM-CD	D15 DC APP	209.2		3,851			167.9		3,433
WAFF	D15 DT LIC	196.3		19,535	179.2	17,797	174.2	17,694	
WPMI-TV	D15 DT LIC	257.1		2,457	243.0	2,282	216.8	2,077	
WTNZ	D15 DT LIC	4.0		1,563	1.0	0	1.0	0	
WDMA-CD	D16 DC LIC	156.1		43,543	156.1	43,543	156.1	43,543	

Interference to BLANK0000152783 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WALE-LD	D16	LD	LIC	MONTGOMERY, AL	BLANK0000152783	
Undesireds:	WBXM-CD	D15	DC	APP	MONTGOMERY, AL	WBXM-CD 1026612 PSI	33.6 km
	W16DV-D	D16	LD	LIC	Alexander City, AL	BLANK0000190001	86.4
	WJHG-TV	D16	DT	LIC	PANAMA CITY, FL	BLANK0000068516	236.2
	WRDP-LD	D16	LD	LIC	COLUMBUS, GA	BLANK0000178766	132.3
	DDW26DS-D	D16	LD	APP	LA GRANGE, GA	BLANK0000053055	130.9
	W16EK-D	D16	LD	LIC	LENEX, GA	BLANK0000194555	303.5
	WPXA-TV	D16	DT	LIC	ROME, GA	BLANK0000081827	267.4
	WGBP-TV	D17	DD	APP	OPELIKA, AL	BLANK0000194947	143.1

Table 1 WBXM-CD TVStudy Analysis of Proposal
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Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX
7067.4 379,669	7023.4 379,119	6799.8 373,082	6784.8 372,905	0.22 0.05
Undesired	Total IX	Unique IX, before	Unique IX, after	
WBXM-CD D15 DC APP	15.0 177		15.0 177	
W16DV-D D16 LD LIC	208.5 5,917	192.4 5,604	192.4 5,604	
WJHG-TV D16 DT LIC	26.1 317	14.1 120	14.1 120	
DDW26DS-D D16 LD APP	8.0 129	0.0 0	0.0 0	
WPXA-TV D16 DT LIC	5.0 3	1.0 0	1.0 0	

 Interference to proposal scenario 1
 21.14% interference received

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WBXM-CD	D15	DC	APP	MONTGOMERY, AL	WBXM-CD 1026612 PSI	
Undesireds:	WAFF	D15	DT	LIC	HUNTSVILLE, AL	BLANK0000111344	246.8 km
	WPMI-TV	D15	DT	LIC	MOBILE, AL	BLANK0000120999	229.9
	WRBL	D15	DT	LIC	COLUMBUS, GA	BLCDT20061013ABV	170.3

Service area	Terrain-limited	IX-free	Percent IX
3168.6 98,624	3077.4 94,108	2690.9 74,209	12.56 21.14
Undesired	Total IX	Unique IX	Prcnt Unique IX
WAFF D15 DT LIC	2.0 0	0.0 0	0.00 0.00
WPMI-TV D15 DT LIC	22.1 938	5.0 0	0.16 0.00
WRBL D15 DT LIC	381.5 19,899	363.4 18,961	11.81 20.15