

## **ENGINEERING EXHIBIT**

### **Incentive Auction Channel Reassignment**

### **Application for Modification of Digital Class A Television Station Construction Permit**

prepared for

**CBS Operations Inc.**  
WBXI-CD Indianapolis, IN  
Facility ID 70416  
Ch. 36 15 kW

*CBS Operations Inc.* (“*CBS*”) is the licensee of Class A television station WBXI-CD, Channel 47, Facility ID 70416, Indianapolis, IN. Reassignment of WBXI-CD from Channel 47 to Channel 36 was specified in the *Incentive Auction Closing and Channel Reassignment Public Notice* (“*CCRPN*”, DA 17-317, released April 13, 2017). *CBS* herein proposes modification of the WBXI-CD Channel 36 Construction Permit (“*CP*”, file# 0000025132). This application is intended to be filed during the second filing window.<sup>1</sup> The *CP* authorizes operation at 0.057 kW effective radiated power (“*ERP*”) with a directional antenna. *CBS* proposes herein to increase the *ERP* to 15 kW nondirectional and utilize a different transmitting location.

As proposed herein, WBXI-CD will be relocated to the tower structure associated with FCC Antenna Structure Registration number 1253064, 14.4 km (8.9 miles) from the authorized WBXI-CD site. The proposed WBXI-CD facility will employ a new antenna system to be mounted on the tower’s candelabra and no change to the overall structure height is proposed.

Figure 1 depicts the 51 dB $\mu$  coverage contour of the authorized and proposed facilities. The service area overlap demonstrates compliance with §73.3572 for a minor change.

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<sup>1</sup>Public Notice “*Incentive Auction Task Force and Media Bureau Announce the Opening of the Second Filing Window for Eligible Full Power and Class A Television Station—October 3 Through November 2, 2017*” DA 17-911, released September 20, 2017.

Interference study per OET Bulletin 69<sup>2</sup> shows that the proposal complies with the FCC's interference protection requirements toward all post-auction digital television and Class A television stations, as well as existing and previously proposed television translator and low power television 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.

The nearest FCC monitoring station is 315 km distant at Allegan, MI. This exceeds by a large margin the threshold minimum distance specified in §73.1030(c)(3) that would suggest consideration of the monitoring station. The site is not located within the areas requiring coordination with "quiet" zones specified in §73.1030(a) and (b). The site location is beyond the border areas requiring international coordination. There are no authorized AM stations within 3 kilometers of the site.

### **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 the worst-case of 100% field at downward elevations, the calculated signal density near the transmitter site at two meters above ground level attributable to the proposed facility is  $14.4 \mu\text{W}/\text{cm}^2$ , which is 3.6 percent of the general population/uncontrolled maximum permitted exposure limit. This is below the five percent threshold limit described in §1.1307(b)(3) 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. When the antenna's elevation pattern is considered, the level of RF exposure will be much lower.

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<sup>2</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.

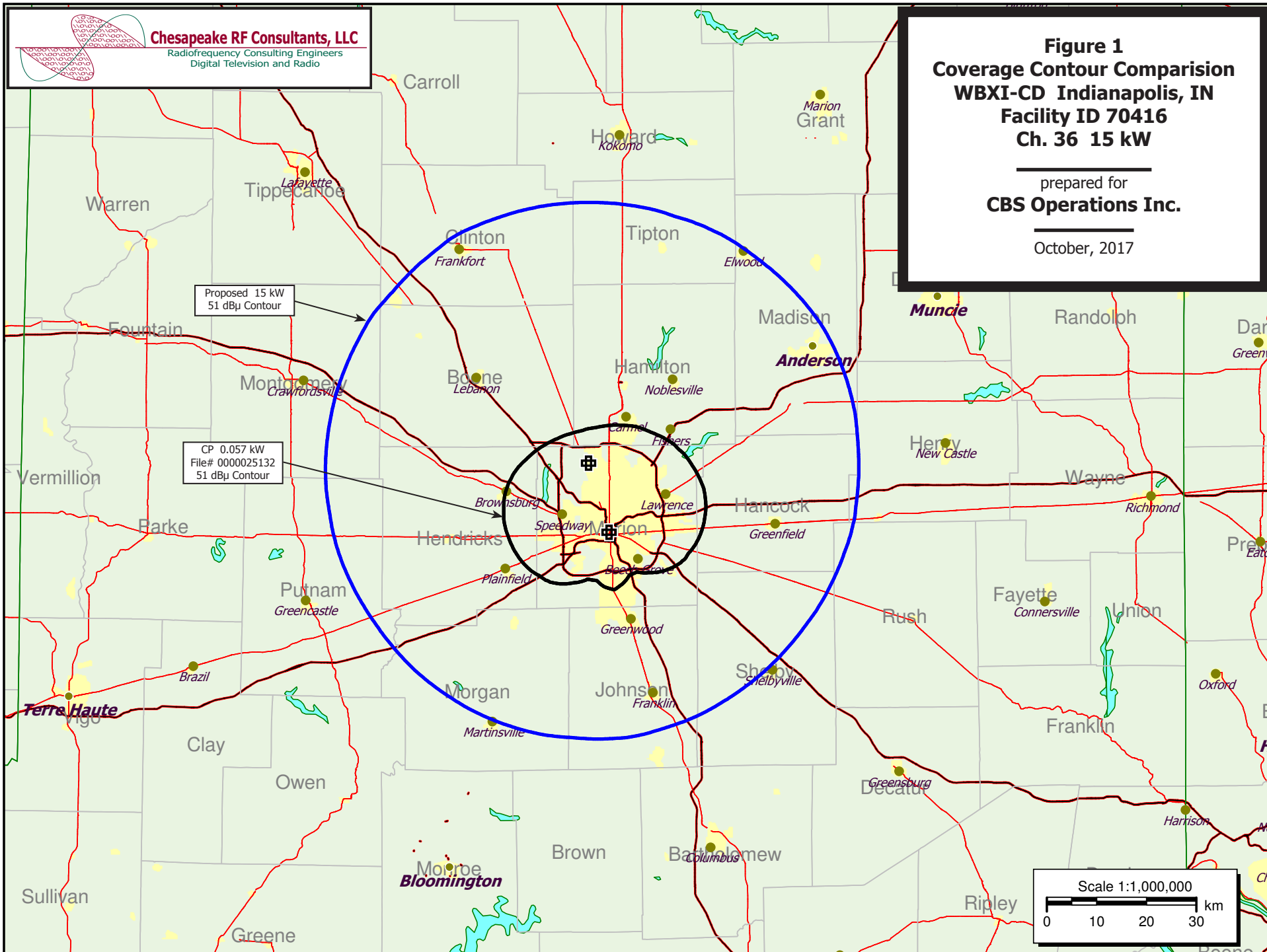
The general public will not be exposed to RF levels attributable to the proposal in excess of the FCC's guidelines. The applicant will coordinate exposure procedures with all pertinent stations and will reduce power or cease operation as necessary to protect persons having access to the site, mast, or 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	Coverage Contour Comparison
Table 1	OET Bulletin 69 Interference Study
Form 2100	Saved Version of Engineering Sections from FCC Form at Time of Upload

**Chesapeake RF Consultants, LLC**

Joseph M. Davis, P.E.	October 13, 2017	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



**Table 1 WBXI-CD OET Bulletin 69 Interference Study**  
(page 1 of 4)



tvstudy v2.2.3 (DAezul)  
Database: localhost, Study: WBXI-CD AT ATC 15KW, Model: Longley-Rice  
Start: 2017.10.13 13:45:22

Study created: 2017.10.13 13:39:29

Study build station data: LMS TV 2017-10-13 LMSTV

Proposal: WBXI-CD D36 DC APP INDIANAPOLIS, IN  
File number: WBXI-CD AT ATC 15KW  
Facility ID: 70416  
Station data: User record  
Record ID: 244  
Country: U.S.

Build options:  
Protect LPTV records from Class A

Stations affected by proposal:

Call	Chan	Svc	Status	City, State	File Number	Distance
WECY-LD	D35	LD	APP	Indianapolis, IN	BLANK0000015653	0.0 km
WECY-LD	D35	LD	CP	Indianapolis, IN	BLANK0000002944	23.3
WCCU	D36	DT	CP	URBANA, IL	BLANK0000002777	152.7
WHME-TV	D36	DT	CP	SOUTH BEND, IN	BLANK00000025171	189.1
WAVE	D36	DT	CP	LOUISVILLE, KY	BLANK00000025348	172.6
WDYC-LD	D36	LD	LIC	CINCINNATI, OH	BLDTL20130807AAI	169.8
WDYC-LD	D36	LD	CP	CINCINNATI, OH	BDFCDTL20100219AAB	167.9
WRGT-TV	D36	DT	CP	DAYTON, OH	BLANK00000025694	167.6

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: 39 53 39.20 N (NAD83)  
Longitude: 86 12 20.50 W  
Height AMSL: 518.8 m  
HAAT: 0.0 m  
Peak ERP: 15.0 kW  
Antenna: Omnidirectional  
Elev Pattn: Generic  
Elec Tilt: 1.25

50.9 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	15.0 kW	245.1 m	52.5 km
45.0	15.0	269.1	53.9
90.0	15.0	281.4	54.5
135.0	15.0	285.3	54.8
180.0	15.0	295.9	55.4
225.0	15.0	271.7	54.0
270.0	15.0	252.3	52.9
315.0	15.0	244.7	52.5

Database HAAT does not agree with computed HAAT  
Database HAAT: 0 m Computed HAAT: 268 m

\*\*Proposal service area extends beyond baseline plus 1.0%  
Proposal service area population is more than 95.0% of baseline

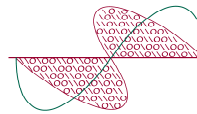
Distance to Canadian border: 342.6 km

Distance to Mexican border: 1779.8 km

Conditions at FCC monitoring station: Allegan MI  
Bearing: 3.9 degrees Distance: 302.1 km

Proposal is not within the West Virginia quiet zone area

**Table 1 WBXI-CD OET Bulletin 69 Interference Study**  
(page 2 of 4)



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

Conditions at Table Mountain receiving zone:  
Bearing: 277.2 degrees Distance: 1616.0 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%

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Interference to BLANK0000015653 APP, scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WECY-LD	D35	LD	APP	Indianapolis, IN	BLANK0000015653	
Undesireds:	WBXI-CD	D36	DC	BL	INDIANAPOLIS, IN	DTVBL70416	14.4 km
	WBXI-CD	D36	DC	APP	INDIANAPOLIS, IN	WBXI-CD AT ATC 15KW	0.0
	WIPX-LD	D34	LD	LIC	INDIANAPOLIS, IN	BLANK0000004295	0.0
	W35DE-D	D35	LD	CP	PEORIA, IL	BLANK0000010597	273.6
	WTWO	D35	DT	CP	TERRE HAUTE, IN	BLANK0000028193	124.8
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
5330.9 1,593,139		5330.9 1,593,139		3367.6 1,465,928		3367.6 1,465,928	0.00 0.00
Undesired		Total IX		Unique IX, before		Unique IX, after	
WBXI-CD D36 DC BL		0.0 0		0.0 0			
WBXI-CD D36 DC APP		16.0 811				0.0 0	
WIPX-LD D34 LD LIC		1952.3 126,146		1756.6 121,048		1755.6 121,020	
WTWO D35 DT CP		206.7 6,163		11.0 1,065		11.0 1,065	

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Interference to BLANK0000002944 CP, scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WECY-LD	D35	LD	CP	Indianapolis, IN	BLANK0000002944	
Undesireds:	WBXI-CD	D36	DC	BL	INDIANAPOLIS, IN	DTVBL70416	31.1 km
	WBXI-CD	D36	DC	APP	INDIANAPOLIS, IN	WBXI-CD AT ATC 15KW	23.3
	WIPX-LD	D34	LD	LIC	INDIANAPOLIS, IN	BLANK0000004295	23.3
	W35DE-D	D35	LD	CP	PEORIA, IL	BLANK0000010597	288.0
	WTWO	D35	DT	CP	TERRE HAUTE, IN	BLANK0000028193	148.0
	WPTD	D35	DT	CP	DAYTON, OH	BLANK0000026763	151.4
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
6575.5 1,562,738		6575.5 1,562,738		5834.4 1,251,366		5834.4 1,251,366	0.00 0.00
Undesired		Total IX		Unique IX, before		Unique IX, after	
WBXI-CD D36 DC BL		0.0 0		0.0 0			
WBXI-CD D36 DC APP		13.1 2,089				0.0 0	
WIPX-LD D34 LD LIC		741.1 311,372		737.1 310,619		725.0 309,214	
WTWO D35 DT CP		2.0 701		0.0 0		0.0 0	
WPTD D35 DT CP		2.0 52		0.0 0		0.0 0	

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Interference to BLANK0000027777 CP, scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WCCU	D36	DT	CP	URBANA, IL	BLANK0000027777	
Undesireds:	WBXI-CD	D36	DC	BL	INDIANAPOLIS, IN	DTVBL70416	161.4 km
	WBXI-CD	D36	DC	APP	INDIANAPOLIS, IN	WBXI-CD AT ATC 15KW	152.7
	WQRF-TV	D36	DT	CP	ROCKFORD, IL	BLANK0000027710	243.2
	WHME-TV	D36	DT	CP	SOUTH BEND, IN	BLANK0000025171	205.1
	WAVE	D36	DT	CP	LOUISVILLE, KY	BLANK0000025348	280.8
	WRGT-TV	D36	DT	CP	DAYTON, OH	BLANK0000025694	318.5
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
14525.3 394,934		14509.3 394,868		14490.2 394,788		14470.3 394,181	0.14 0.15
Undesired		Total IX		Unique IX, before		Unique IX, after	
WBXI-CD D36 DC BL		0.0 0		0.0 0			

**Table 1 WBXI-CD OET Bulletin 69 Interference Study**  
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WBXI-CD D36 DC APP	30.0	675			20.0	607
WQRF-TV D36 DT CP	1.0	0	0.0	0	0.0	0
WHME-TV D36 DT CP	17.0	80	15.0	49	8.0	12
WAVE D36 DT CP	4.0	31	1.0	0	1.0	0
WRGT-TV D36 DT CP	1.0	15	0.0	0	0.0	0

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Interference to BLANK0000025171 CP, scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WHME-TV	D36	DT	CP	SOUTH BEND, IN	BLANK0000025171	
Undesireds:	WBXI-CD	D36	DC	BL	INDIANAPOLIS, IN	DTVBL70416	202.9 km
	WBXI-CD	D36	DC	APP	INDIANAPOLIS, IN	WBXI-CD AT ATC 15KW	189.1
	WGBO-DT	D35	DT	CP	JOLIET, IL	BLANK0000025108	125.9
	WQRF-TV	D36	DT	CP	ROCKFORD, IL	BLANK0000027710	260.5
	WAQP	D36	DT	CP	SAGINAW, MI	BLANK0000028088	250.1
	WRGT-TV	D36	DT	CP	DAYTON, OH	BLANK0000025694	262.8
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
20109.2 1,263,970		20106.2 1,263,888		20047.3 1,261,305		20041.4 1,261,212	0.03 0.01
Undesired			Total IX	Unique IX, before		Unique IX, after	
WBXI-CD D36 DC BL	0.0		0	0.0		0	
WBXI-CD D36 DC APP	6.0		93			6.0 93	
WGBO-DT D35 DT CP	12.0		1,009	6.0 694		6.0 694	
WQRF-TV D36 DT CP	16.0		509	5.0 194		5.0 194	
WAQP D36 DT CP	36.8		1,291	31.8 1,291		31.8 1,291	
WRGT-TV D36 DT CP	5.0		89	5.0 89		5.0 89	

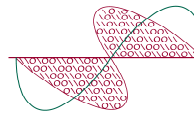
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Interference to BLANK0000025348 CP, scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WAVE	D36	DT	CP	LOUISVILLE, KY	BLANK0000025348	
Undesireds:	WBXI-CD	D36	DC	BL	INDIANAPOLIS, IN	DTVBL70416	158.2 km
	WBXI-CD	D36	DC	APP	INDIANAPOLIS, IN	WBXI-CD AT ATC 15KW	172.6
	WCCU	D36	DT	CP	URBANA, IL	BLANK0000027777	280.8
	WKAS	D36	DT	CP	ASHLAND, KY	BLANK0000025282	279.7
	KBSI	D36	DT	CP	CAPE GIRARDEAU, MO	BLANK0000025127	344.4
	WRGT-TV	D36	DT	CP	DAYTON, OH	BLANK0000025694	202.9
	WTVF	D36	DT	CP	NASHVILLE, TN	BLANK0000026801	248.4
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
28205.3 1,807,723		27610.4 1,798,353		26792.7 1,782,662		26760.9 1,782,211	0.12 0.03
Undesired			Total IX	Unique IX, before		Unique IX, after	
WBXI-CD D36 DC BL	0.0		0	0.0		0	
WBXI-CD D36 DC APP	67.9		1,002			31.9 451	
WCCU D36 DT CP	64.0		1,273	32.9 855		23.0 551	
WKAS D36 DT CP	4.0		44	1.0 8		1.0 8	
KBSI D36 DT CP	64.4		1,060	19.1 359		18.1 339	
WRGT-TV D36 DT CP	281.7		6,583	256.5 6,251		250.5 6,245	
WTVF D36 DT CP	491.0		8,062	436.6 7,227		433.6 7,193	

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Interference to BLDTL20130807AAI LIC, scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WDYC-LD	D36	LD	LIC	CINCINNATI, OH	BLDTL20130807AAI	
Undesireds:	WBXI-CD	D36	DC	BL	INDIANAPOLIS, IN	DTVBL70416	159.6 km
	WBXI-CD	D36	DC	APP	INDIANAPOLIS, IN	WBXI-CD AT ATC 15KW	169.8
	WPTD	D35	DT	CP	DAYTON, OH	BLANK0000026763	70.6
	WAVE	D36	DT	CP	LOUISVILLE, KY	BLANK0000025348	142.0
	WRGT-TV	D36	DT	CP	DAYTON, OH	BLANK0000025694	70.9
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
5967.9 1,865,765		5766.8 1,858,320		3546.2 1,089,265		3546.2 1,089,265	0.00 0.00
Undesired			Total IX	Unique IX, before		Unique IX, after	
WBXI-CD D36 DC BL	0.0		0	0.0		0	

**Table 1 WBXI-CD OET Bulletin 69 Interference Study**  
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**Chesapeake RF Consultants, LLC**  
Radiofrequency Consulting Engineers  
Digital Television and Radio

WBXI-CD D36 DC APP	1.0	35			0.0	0
WPTD D35 DT CP	41.5	7,658	1.0	165	1.0	165
WAVE D36 DT CP	198.9	25,079	55.8	2,227	55.8	2,227
WRGT-TV D36 DT CP	2163.8	766,663	2003.9	741,288	2003.9	741,288

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Interference to BDFCDTL20100219AAB CP, scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WDYC-LD	D36	LD	CP	CINCINNATI, OH	BDFCDTL20100219AAB	
Undesireds:	WBXI-CD	D36	DC	BL	INDIANAPOLIS, IN	DTVBL70416	157.7 km
	WBXI-CD	D36	DC	APP	INDIANAPOLIS, IN	WBXI-CD AT ATC 15KW	167.9
	WPTD	D35	DT	CP	DAYTON, OH	BLANK0000026763	70.3
	WAVE	D36	DT	CP	LOUISVILLE, KY	BLANK0000025348	141.1
	WRGT-TV	D36	DT	CP	DAYTON, OH	BLANK0000025694	70.6
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	Service area	Terrain-limited		IX-free, before		IX-free, after	Percent New IX
	6052.9 1,865,933	5831.0	1,856,253	3648.2	1,120,802	3648.2 1,120,802	0.00 0.00
Undesired			Total IX	Unique IX, before		Unique IX, after	
WBXI-CD D36 DC BL	0.0		0	0.0	0		
WBXI-CD D36 DC APP	1.0		0		0.0	0	
WPTD D35 DT CP	54.4	7,874	2.0	264	2.0	264	
WAVE D36 DT CP	218.7	40,990	47.8	4,963	47.8	4,963	
WRGT-TV D36 DT CP	2131.0	730,092	1938.3	692,669	1938.3	692,669	

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Interference to BLANK0000025694 CP, scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WRGT-TV	D36	DT	CP	DAYTON, OH	BLANK0000025694	
Undesireds:	WBXI-CD	D36	DC	BL	INDIANAPOLIS, IN	DTVBL70416	162.6 km
	WBXI-CD	D36	DC	APP	INDIANAPOLIS, IN	WBXI-CD AT ATC 15KW	167.6
	WPTD	D35	DT	CP	DAYTON, OH	BLANK0000026763	0.6
	WHME-TV	D36	DT	CP	SOUTH BEND, IN	BLANK0000025171	262.8
	WKAS	D36	DT	CP	ASHLAND, KY	BLANK0000025282	198.9
	WAVE	D36	DT	CP	LOUISVILLE, KY	BLANK0000025348	202.9
	WQHS-DT	D36	DT	CP	CLEVELAND, OH	BLANK0000025113	283.6
	WMNT-CD	D36	DC	CP	TOLEDO, OH	BLANK0000028583	222.9
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	Service area	Terrain-limited		IX-free, before		IX-free, after	Percent New IX
	24016.1 3,259,602	23780.4	3,235,734	23360.0	3,154,074	23196.4 3,151,476	0.70 0.08
Undesired			Total IX	Unique IX, before		Unique IX, after	
WBXI-CD D36 DC BL	0.0		0	0.0	0		
WBXI-CD D36 DC APP	185.4	3,372			163.6	2,598	
WPTD D35 DT CP	52.6	27,845	44.7	24,286	41.7	24,154	
WHME-TV D36 DT CP	16.0	269	4.0	34	4.0	34	
WKAS D36 DT CP	17.9	2,642	7.9	2,542	7.9	2,542	
WAVE D36 DT CP	349.7	54,414	265.9	47,283	253.0	46,745	
WQHS-DT D36 DT CP	78.9	3,852	10.0	215	10.0	215	
WMNT-CD D36 DC CP	15.0	394	0.0	0	0.0	0	

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Interference to proposal, scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WBXI-CD	D36	DC	APP	INDIANAPOLIS, IN	WBXI-CD AT ATC 15KW	
Undesireds:	WCCU	D36	DT	CP	URBANA, IL	BLANK0000027777	152.7 km
	WHME-TV	D36	DT	CP	SOUTH BEND, IN	BLANK0000025171	189.1
	WAVE	D36	DT	CP	LOUISVILLE, KY	BLANK0000025348	172.6
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	Service area	Terrain-limited		IX-free		Percent IX	
	9082.8 1,796,530	9077.8	1,796,484	9068.9	1,795,121	0.10	0.08
Undesired			Total IX	Unique IX		Prcnt Unique IX	
WCCU D36 DT CP	1.0		16	0.0	0	0.00	0.00
WHME-TV D36 DT CP	2.0		966	0.0	0	0.00	0.00
WAVE D36 DT CP	8.9		1,363	5.9	381	0.07	0.02



**Channel and Facility Information**

Section	Question	Response
Proposed Community of License	Facility ID	70416
	State	Indiana
	City	INDIANAPOLIS
	DCA Channel	36

**Antenna Location Data**

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1253064
Coordinates (NAD83)	Latitude	39° 53' 39.2" N+
	Longitude	086° 12' 20.5" W-
	Structure Type	GTOWER-Guyed Structure Used for Communication Purposes
	Overall Structure Height	307.8 meters
	Support Structure Height	259.0 meters
	Ground Elevation (AMSL)	252.7 meters
Antenna Data	Height of Radiation Center Above Ground Level	266.1 meters
	Height of Radiation Center Above Mean Sea Level	518.8 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:	DIE
	Model	TLP-12A/VP
	Rotation	
	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