ENGINEERING EXHIBIT

Incentive Auction Channel Reassignment

Application for Digital Class A Television Station Construction Permit

prepared for

CBS Operations Inc.
WBXI-CD Indianapolis, IN
Facility ID 70416
Ch. 36 0.057 kW

CBS Operations Inc. ("CBS") is the licensee of Class A television station WBXI-CD, Channel 47, Facility ID 70416, Indianapolis, IN. *CBS* herein proposes construction of the WBXI-CD post-auction facility on Channel 36. 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).

The proposed Channel 36 operation will employ a new antenna system to be installed in lieu of the existing Channel 47 antenna. The WBXI-CD antenna supporting structure corresponds to FCC Antenna Structure Registration ("ASR") number 1227948, a rooftop structure atop the Chase Tower building in downtown Indianapolis. No change to the overall structure height will result from this proposal.

The proposed antenna is a horizontally polarized directional Dielectric model TLP-12M. *CBS* proposes to operate WBXI-CD with an effective radiated power ("ERP") of 0.057 kW. The directional antenna's azimuthal pattern is depicted in Figure 1.

The proposed Class A protected contour extends beyond that of the *CCRPN* reassignment value of 0.065 kW ERP. The proposal complies with §73.3700(b)(ii) as described in the following.

The *CCRPN* facility specifies the directional antenna pattern corresponding to the WBXI-CD's licensed Channel 47. That antenna model (Bogner B8UA) is obsolete and the original manufacturer is no longer in business. The directional pattern proposed herein replicates the reassignment pattern as closely as possible but falls short in many azimuths in order to avoid exceeding the *CCRPN* values. Due to the difference in directional pattern, WBXI-CD qualifies under §73.3700(b)(ii)(A) for a contour extension due to the loss of coverage area resulting from the new channel assignment.

Interference study per FCC OET Bulletin 69[1] shows that the proposal complies with the 0.5 percent limit of new interference caused to pertinent nearby post-auction full service and Class A television stations and reassignments as required by §§73.6017 - 73.6018. The interference study output report is provided as Table 1. This satisfies §73.3700(b)(ii)(C) for the proposed Class A protected contour extension.

The amount of contour extension does not exceed one percent in any direction. Figure 2 supplies a coverage contour comparison of the proposed WBXI-CD facility to the reassignment facility's contour and a one percent extension distance of the reassignment facility's contour. Here, the contour level is adjusted with the dipole factor to match FCC application processing. Table 1's results also demonstrate that the proposed contour is within the baseline contour plus one percent. Therefore the proposed contour extension complies with §73.3700(b)(ii)(B).

The proposed WBXI-CD facility's terrain-limited population provides a 89.3 percent match of the *CCRPN* baseline facility, as detailed in the following table.

[1]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, 2 km cell size, and 1 km terrain increment. Comparisons of various results of this computer program (run on a Mac processor) to the FCCs implementation of TVStudy show excellent correlation.

Terrain Limited Population - Match of Reassignment

Population Summary (2010 Census) OET Bulletin 69: TVStudy	Reassignment Parameters	Proposed
Within Noise Limited Contour	970,522	866,637
Not affected by terrain losses	970,522	866,637
Match of Reassignment	---	**89.30%**

The 95 percent population match target is not believed to be applicable to Class A station reassignment applications. The "expedited processing" portion of Form 2100 Schedule E does not contain the certification item[2] regarding whether the proposal would match or reduce by more than five percent the reassignment population. In this case the population match falls short because the original antenna is obsolete, the reassignment antenna pattern cannot be matched by the manufacturer's available standard LPTV/Class A "catalog" patterns, and contour expansion is limited to the one percent distance. *CBS* intends to file an expansion application at the appropriate filings window for a substantially larger facility that will easily provide coverage to more than 95 percent of the reassignment population.

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 Commission'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 Chase Tower at two meters above ground level attributable to the proposed facility is 0.03 $\mu W/cm^2$, which is 0.01 percent of the general population/uncontrolled maximum permitted

[2]The population match question is not on the form when being completed, and only appears on the PDF printout without any YES/NO response opportunity or indication.

exposure limit. This is well 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.

Access to the Chase Tower rooftop, antenna support structure, and any areas within the building that may exceed exposure limits is strictly controlled by the building owner. *CBS* will continue to participate in the building's RF exposure safety program along with the other broadcasters and FCC licensees that utilize the Chase Tower as a transmission site. As necessary, based on calculations or actual measurements considering all emitters, exposure abatement procedures will be confirmed and amended as necessary. The RF safety program will be employed to protect maintenance and installation workers from excessive exposure when work must be performed in locations where high RF levels may be present. Such areas have been placed under strict restricted access and properly identified.

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

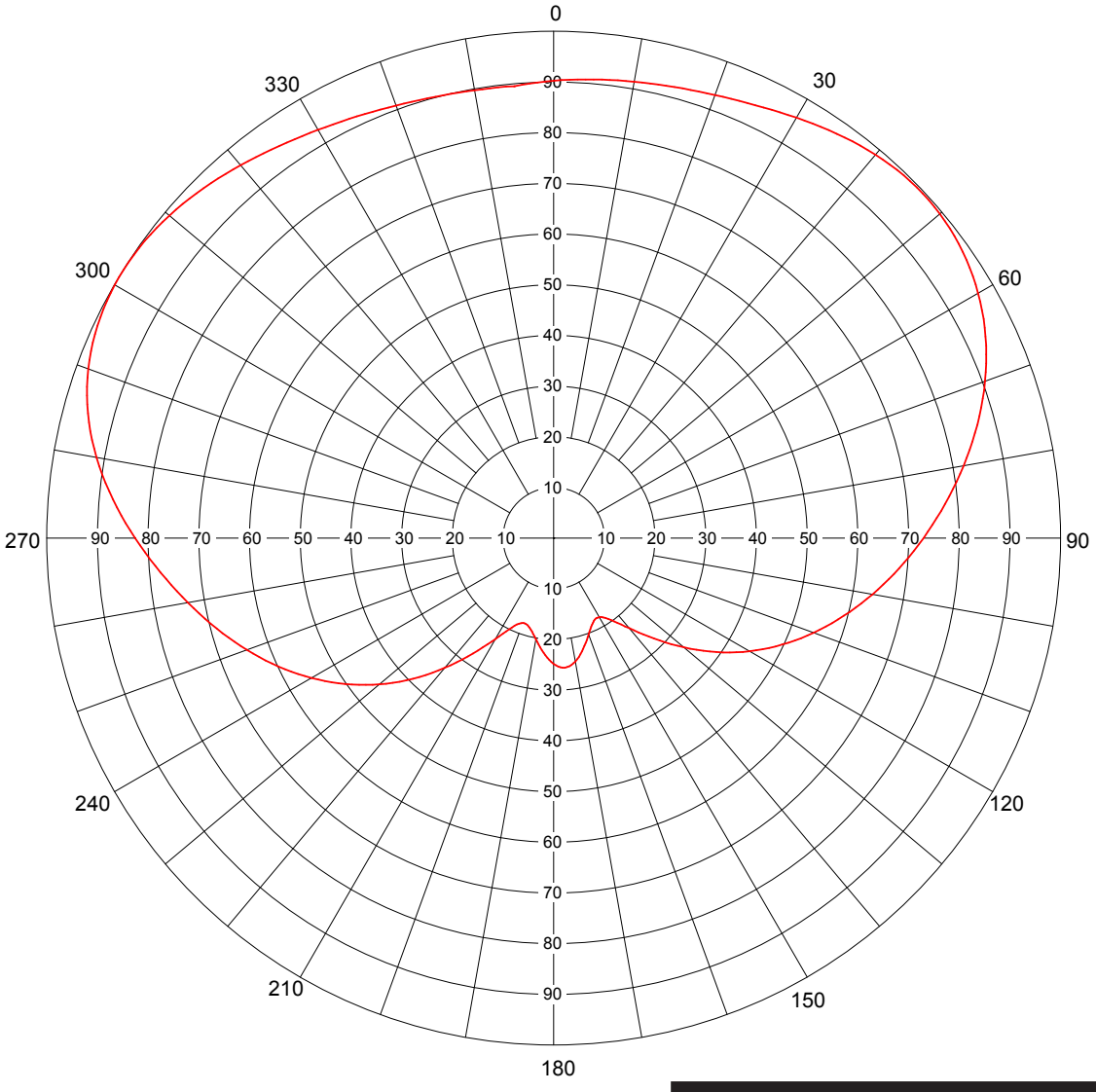
Figure 1	Antenna Azimuthal Pattern
Figure 2	Proposed Contour Expansion
Table 1	OET Bulletin 69 Interference Study
Form 2100	Saved Version of Engineering Sections from FCC Form at Time of Upload

Dielectric

Date	**20 Jun 2017**		
Call Letters		Channel	**36**
Location			
Customer			
Antenna Type	**TLP-12M**		

AZIMUTH PATTERN

Gain	**1.90 (2.79 dB)**	Frequency	**605 MHz**
Calculated / Measured	**Calculated**	Drawing #	**TLP-M**



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

Figure 1
Antenna Azimuthal Pattern
WBXI-CD Indianapolis, IN
Facility ID 70416
Ch. 36 0.057 kW

prepared for
CBS Operations Inc.

June, 2017

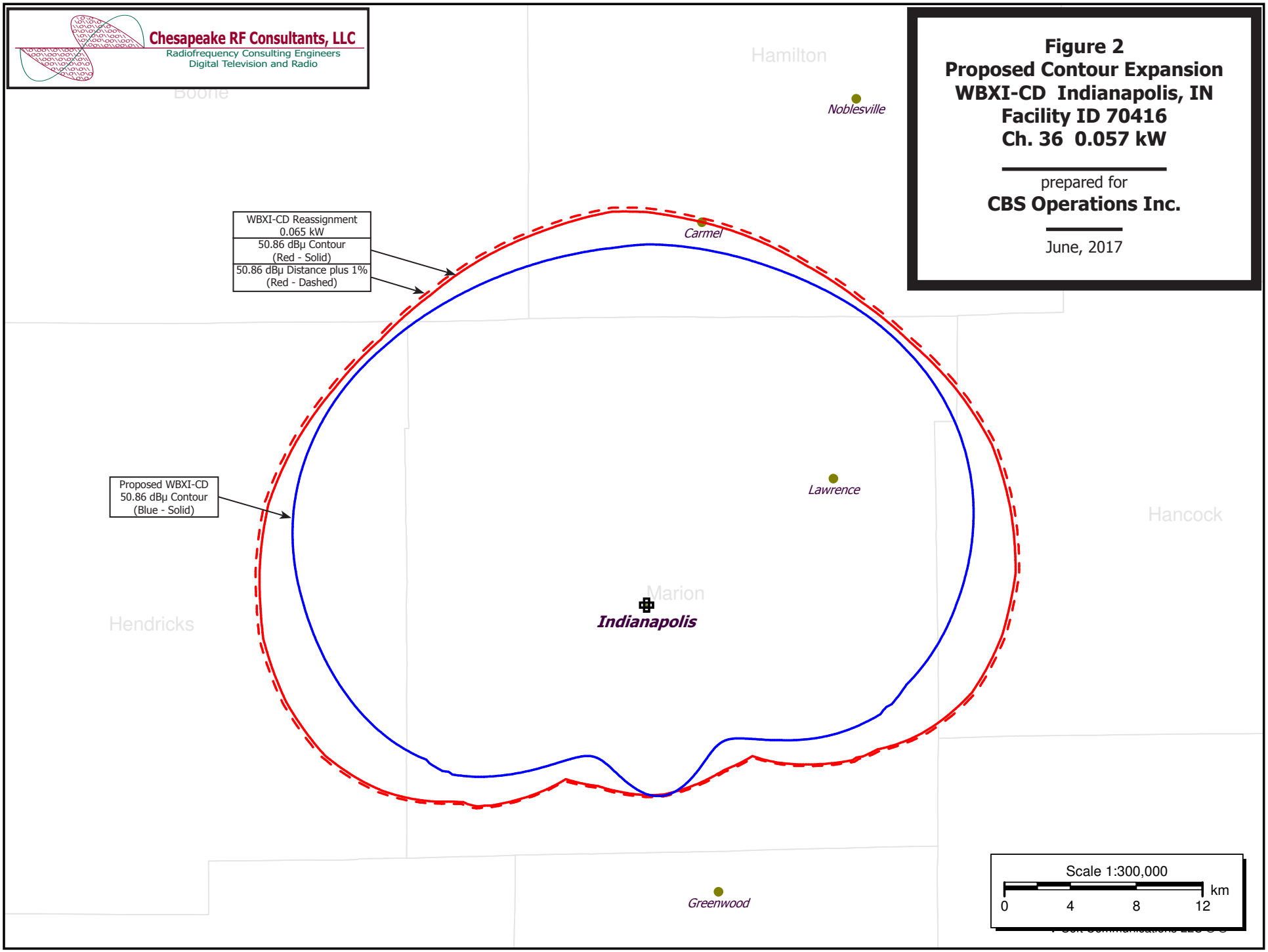

Chesapeake RF Consultants, LLC
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Figure 2
Proposed Contour Expansion
WBXI-CD Indianapolis, IN
Facility ID 70416
Ch. 36 0.057 kW
prepared for
CBS Operations Inc.
June, 2017
WBXI-CD Reassignment
0.065 kW
50.86 dBµ Contour
(Red - Solid)
50.86 dBµ Distance plus 1%
(Red - Dashed)
Proposed WBXI-CD
50.86 dBµ Contour
(Blue - Solid)
Hamilton
Noblesville
Carmel
Lawrence
Hancock
Marion
Indianapolis
Hendricks
Greenwood
Scale 1:300,000
km
0
4
8
12

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tvstudy v2.2.2
Database: localhost,  Study: WBXI-CD 57W,  Model: Longley-Rice
Start: 2017.06.20 07:52:19

Study created: 2017.06.20 07:52:14

Study build station data: LMS TV 2017-06-19 LMSTV

    Proposal: WBXI-CD D36 DC APP INDIANAPOLIS, IN
 File number: WBXI-CD 57W
 Facility ID: 70416
Station data: User record
   Record ID: 545
     Country: U.S.

Stations potentially affected:

Call      Chan  Svc Status  City, State              File Number            Distance
WTWO      D35   DT  BL      TERRE HAUTE, IN          DTVBL20426             121.0 km
WPTD      D35   DT  BL      DAYTON, OH               DTVBL25067             163.1
W50CH-D   D36   DC  BL      ALTON, IL                DTVBL37238             352.2
WMEC      D36   DT  BL      MACOMB, IL               DTVBL70537             395.2
WQRF-TV   D36   DT  BL      ROCKFORD, IL             DTVBL52408             377.0
WCCU      D36   DT  BL      URBANA, IL               DTVBL69544             161.4
WHME-TV   D36   DT  BL      SOUTH BEND, IN           DTVBL36117             202.9
WKAS      D36   DT  BL      ASHLAND, KY              DTVBL34171             337.9
WAVE      D36   DT  BL      LOUISVILLE, KY           DTVBL13989             158.2
WAQP      D36   DT  BL      SAGINAW, MI              DTVBL67792             421.7
KBSI      D36   DT  BL      CAPE GIRARDEAU, MO       DTVBL19593             395.6
WQHS-DT   D36   DT  APP     CLEVELAND, OH            BLANK0000025113        416.6
WQHS-DT   D36   DT  BL      CLEVELAND, OH            DTVBL60556             416.6
WRGT-TV   D36   DT  BL      DAYTON, OH               DTVBL411               162.6
WMNT-CD   D36   DC  BL      TOLEDO, OH               DTVBL51913             304.7
WTVF      D36   DT  BL      NASHVILLE, TN            DTVBL36504             393.1
WVLR      D36   DT  BL      TAZEWELL, TN             DTVBL81750             448.7
WMKE-CD   D36   DC  BL      MILWAUKEE, WI            DTVBL35091             397.3

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 46 11.10 N (NAD83)
  Longitude:  86  9 25.90 W
Height AMSL: 464.2 m
       HAAT: 0.0 m
   Peak ERP: 0.057 kW
    Antenna: DIE_TLP-M 355.0 deg

50.9 dBu contour:
Azimuth      ERP       HAAT   Distance
  0.0 deg  0.046 kW   236.5 m   22.0 km
 45.0      0.056      218.9     22.2
 90.0      0.030      213.3     18.8
135.0      0.004      215.7     11.5
180.0      0.003      241.1     11.3
225.0      0.009      245.8     14.7
270.0      0.039      231.8     20.9
315.0      0.054      228.7     22.5

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m   Computed HAAT: 229 m

Proposal service area is within baseline plus 1.0%
**Proposal service area population is less than 95.0% of baseline

Distance to Canadian border: 348.7 km

Distance to Mexican border: 1774.8 km
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Conditions at FCC monitoring station: Allegan MI
Bearing: 3.0 degrees   Distance: 315.7 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 277.6 degrees   Distance: 1621.9 km


Study cell size: 2.00 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 DTVBL20426 BL, scenario 1
Proposal causes no interference.

-------------------------------------------------------------------------------------------------------
Interference to DTVBL20426 BL, scenario 2
Proposal causes no interference.

-------------------------------------------------------------------------------------------------------
Interference to DTVBL25067 BL, scenario 1
Proposal causes no interference.

-------------------------------------------------------------------------------------------------------
Interference to DTVBL25067 BL, scenario 2
Proposal causes no interference.

-------------------------------------------------------------------------------------------------------
Interference to DTVBL37238 BL, scenario 1
Proposal causes no interference.

-------------------------------------------------------------------------------------------------------
Interference to DTVBL70537 BL, scenario 1
Proposal causes no interference.

-------------------------------------------------------------------------------------------------------
Interference to DTVBL52408 BL, scenario 1
Proposal causes no interference.

-------------------------------------------------------------------------------------------------------
Interference to DTVBL52408 BL, scenario 2
Proposal causes no interference.

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Interference to DTVBL69544 BL, scenario 1
Proposal causes no interference.

-------------------------------------------------------------------------------------------------------
Interference to DTVBL69544 BL, scenario 2
Proposal causes no interference.

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Interference to DTVBL36117 BL, scenario 1
Proposal causes no interference.

-------------------------------------------------------------------------------------------------------
Interference to DTVBL36117 BL, scenario 2
Proposal causes no interference.

-------------------------------------------------------------------------------------------------------
Interference to DTVBL36117 BL, scenario 3
Proposal causes no interference.

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Interference to DTVBL36117 BL, scenario 4
Proposal causes no interference.

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Interference to DTVBL34171 BL, scenario 1
Proposal causes no interference.

Interference to DTVBL34171 BL, scenario 2
Proposal causes no interference.

Interference to DTVBL13989 BL, scenario 1
Proposal causes no interference.

Interference to DTVBL67792 BL, scenario 1
Proposal causes no interference.

Interference to DTVBL67792 BL, scenario 2
Proposal causes no interference.

Interference to DTVBL19593 BL, scenario 1
Proposal causes no interference.

Interference to BLANK0000025113 APP, scenario 1
Proposal causes no interference.

Interference to DTVBL60556 BL, scenario 1
Proposal causes no interference.

Interference to DTVBL411 BL, scenario 1
Proposal causes no interference.

Interference to DTVBL411 BL, scenario 2
Proposal causes no interference.

Interference to DTVBL51913 BL, scenario 1
Proposal causes no interference.

Interference to DTVBL51913 BL, scenario 2
Proposal causes no interference.

Interference to DTVBL36504 BL, scenario 1
Proposal causes no interference.

Interference to DTVBL81750 BL, scenario 1
Proposal causes no interference.

Interference to DTVBL35091 BL, scenario 1
Proposal causes no interference.

Interference to DTVBL35091 BL, scenario 2
Proposal causes no interference.

Interference to proposal, scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WBXI-CD	D36	DC	APP	INDIANAPOLIS, IN	WBXI-CD 57W	
Undesireds:	WCCU	D36	DT	BL	URBANA, IL	DTVBL69544	161.4 km
	WHME-TV	D36	DT	BL	SOUTH BEND, IN	DTVBL36117	202.9
	WAVE	D36	DT	BL	LOUISVILLE, KY	DTVBL13989	158.2
	WRGT-TV	D36	DT	BL	DAYTON, OH	DTVBL411	162.6

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

	WMNT-CD	D36	DC	BL	TOLEDO, OH		DTVBL51913		304.7

Service area		Terrain-limited		IX-free		Percent IX	
1059.5	866,637	1059.5	866,637	1059.5	866,637	0.00	0.00

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	1227948
Coordinates (NAD83)	Latitude	39° 46' 11.1" N+
	Longitude	086° 09' 25.9" W-
	Structure Type	BANT-Building with antenna on top
	Overall Structure Height	253.0 meters
	Support Structure Height	253.0 meters
	Ground Elevation (AMSL)	218.5 meters
Antenna Data	Height of Radiation Center Above Ground Level	245.7 meters
	Height of Radiation Center Above Mean Sea Level	464.2 meters
	Effective Radiated Power	0.057 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-12M
	Rotation	355 degrees
	Electrical Beam Tilt	1.0
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Horizontal
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	V_A (Authorized Value)	Degree	V_A (Authorized Value)	Degree	V_A (Authorized Value)	Degree	V_A (Authorized Value)
0	0.895	**90**	0.775	**180**	0.257	**270**	0.778
10	0.908	**100**	0.684	**190**	0.227	**280**	0.873
20	0.921	**110**	0.593	**200**	0.183	**290**	0.951
30	0.942	**120**	0.497	**210**	0.194	**300**	0.993
40	0.974	**130**	0.392	**220**	0.278	**310**	0.998
50	0.995	**140**	0.280	**230**	0.393	**320**	0.976
60	0.985	**150**	0.197	**240**	0.502	**330**	0.944
70	0.940	**160**	0.184	**250**	0.599	**340**	0.918
80	0.865	**170**	0.226	**260**	0.688	**350**	0.901

Additional Azimuths

Degree	V_A
53	0.996
307	1.000

Construction Permit Certifications

Section	Question	Response
Post-Incentive Auction Expedited Processing	It will operate on the DTV channel for this station as established in the post-incentive auction channel reassignment public notice.	Yes
	It will operate post-incentive auction facilities that do not expand the noise-limited service contour in any direction beyond that established by the post-incentive auction channel reassignment public notice.	No
	It will operate post-incentive auction facilities that match or reduce by no more than five percent with respect to predicted population from those defined in the post-incentive auction channel reassignment public notice.	
	The antenna structure to be used by this facility has been registered by the Commission and will not require re-registration to support the proposed antenna, OR the FAA has previously determined that the proposed structure will not adversely affect safety in air navigation and this structure qualifies for later registration under the Commission's phased registration plan, OR the proposed installation on this structure does not require notification to the FAA pursuant to 47 C.F.R. Section 17.7.	Yes
Environmental Effect	Would a Commission grant of Authorization for this location be an action which may have a significant environmental effect? (See Section 1.1306 of 47 C.F.R.)	No
Broadcast Facility	The proposed facility complies with all of the following applicable rule sections. 47 C.F.R. Sections 74.709, 74.793 (e), 74.793(f), 74.793(g), 74.793(h)	Yes