

ENGINEERING EXHIBIT

Application for Digital Television Station Construction Permit

prepared for

Gray Television Licensee, LLC

WLUC-TV Marquette, MI

Facility ID 21259

Ch. 35 100 kW 258 m

Gray Television Licensee, LLC (“*Gray*”) is the licensee of digital television station WLUC-TV, Channel 35, Facility ID 21259, Marquette, MI. WLUC-TV is licensed (file# BLCDDT-20040202ALY) to operate with 63 kW effective radiated power (“ERP”) at 257 meters antenna height above average terrain (“HAAT”). *Gray* proposes herein to increase the ERP to 100 kW. This application is intended to be filed during the temporary lift of the freeze on minor modification applications that expand the coverage contour.¹

WLUC-TV will continue to employ its presently licensed directional antenna system which is side-mounted on the tower structure associated with FCC Antenna Structure Registration number 1000032. No change to overall structure height will result from this proposal. The antenna HAAT is adjusted to 258 meters.²

The antenna is a horizontally polarized Dielectric model TLP-24M (C). The directional antenna’s azimuthal pattern is supplied in Figure 1 and the elevation pattern is depicted in Figures 2 and 2A.

¹Public Notice “*Media Bureau Temporarily Lifts the Freeze on the Filing of Minor Modification Applications that Expand the Contour of Full Power and Class A Television Stations from November 28 through December 7, 2017*” DA 17-1086, released November 6, 2017.

²There is no change in antenna height above ground or above mean sea level. The WLUC-TV antenna HAAT is recalculated to be 258.3 meters, based on FCC 30 meter terrain data developed by OET.

Figure 3 supplies a map that demonstrates compliance with §73.625(a)(1) regarding coverage of the entire principal community. The proposed facility's predicted population exceeds 95 percent of the Incentive Auction³ baseline facility population.

Interference study per FCC OET Bulletin 69⁴ 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 §73.616. The interference study output report is provided as Table 1. TVStudy analysis also shows that the proposed power increase would not cause impermissible interference to any pre-auction facility that was reassigned or relinquished in the incentive auction.

The site location is within the Canadian coordination zone (214 km to the Canada border). There are no Canada television stations or allotments on relevant channels located within the pertinent culling distances for interference analysis consideration, based on current FCC LMS data.

The nearest FCC monitoring station is 441 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). 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 considering 20 percent antenna relative field in downward elevations (pattern data shows

³*Incentive Auction Closing and Channel Reassignment Public Notice*, DA 17-317, released April 13, 2017.

⁴FCC 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 FCC's implementation of TVStudy show excellent correlation.

less than 20 percent relative field at angles 10 to 90 degrees below the antenna), the calculated signal density near the tower at two meters above ground level attributable to the proposed facility is $2.2 \mu\text{W}/\text{cm}^2$, which is 0.5 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. No increase in structure height is proposed.

List of Attachments

Figure 1	Antenna Azimuthal Pattern
Figure 2, 2A	Antenna Elevation Pattern
Figure 3	Proposed Coverage Contours
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.	December 4, 2017	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600

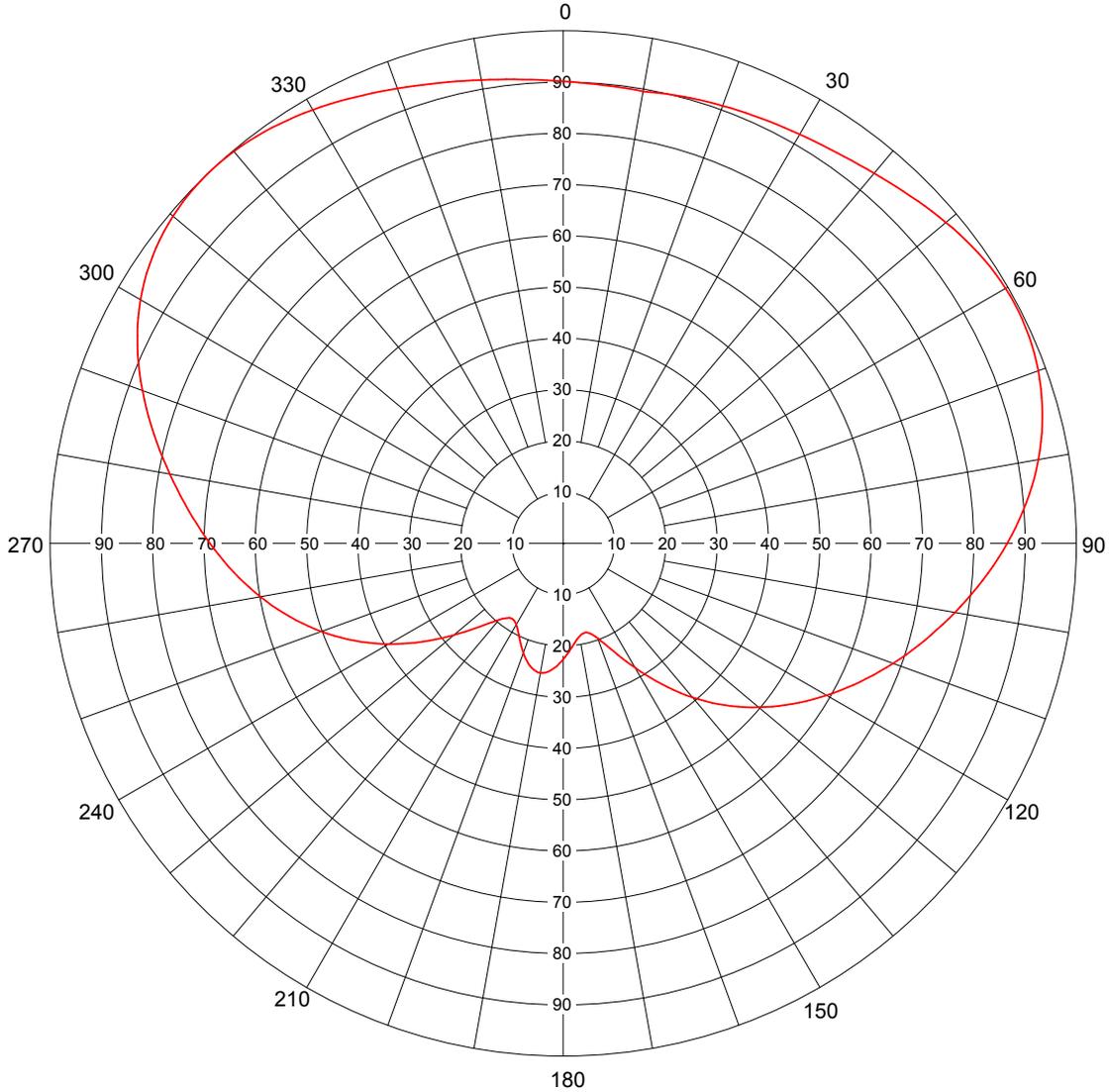
AZIMUTH PATTERN

Gain
Calculated / Measured

1.90 (2.79 dB)
Calculated

Frequency
Drawing #

599 MHz
TLP-M



Remarks:



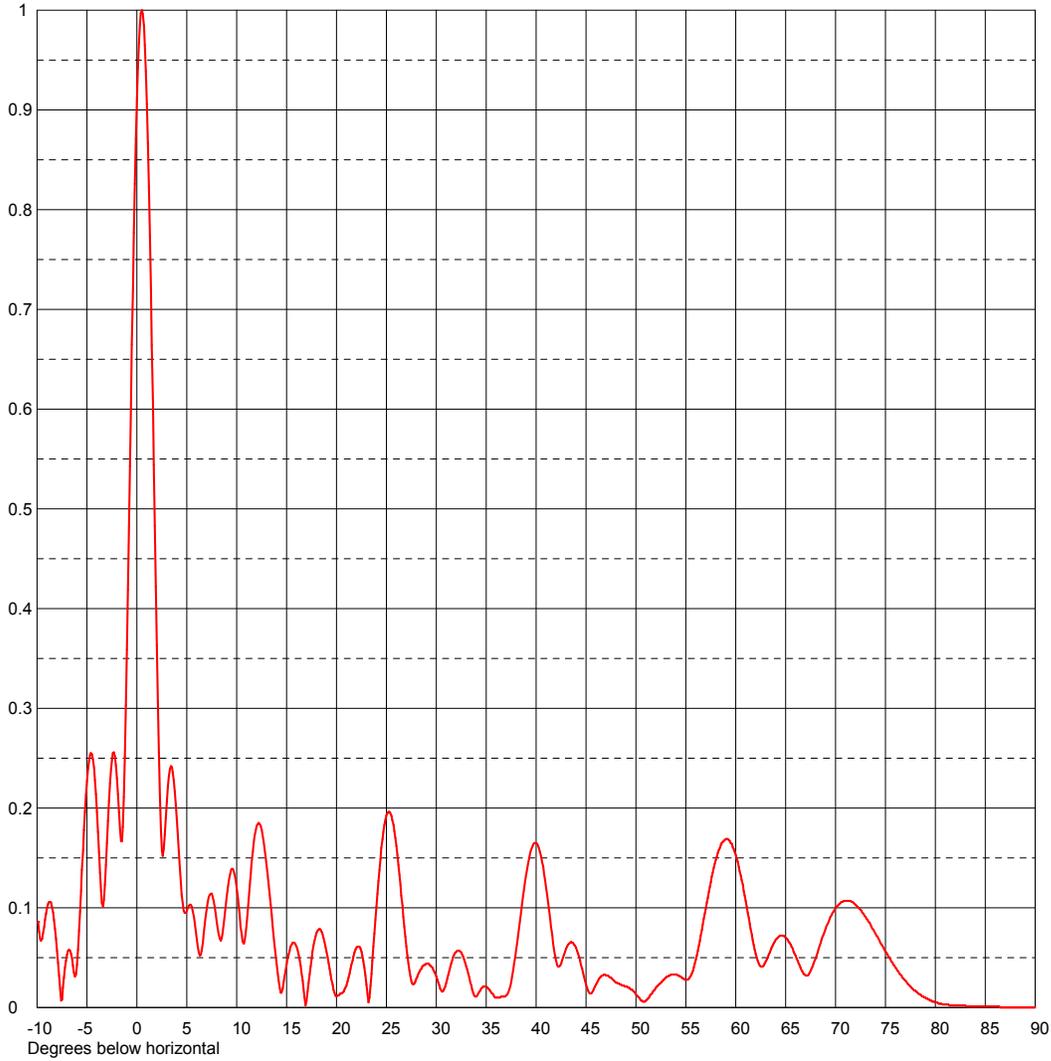
Figure 1
Antenna Azimuthal Pattern
WLUC-TV Marquette, MI
Facility ID 21259
Ch. 35 100 kW 258 m

prepared for
Gray Television Licensee, LLC

December, 2017

ELEVATION PATTERN

RMS Gain at Main Lobe	23.0 (13.62 dB)	Beam Tilt	0.50 Degrees
RMS Gain at Horizontal	19.0 (12.79 dB)	Frequency	599.00 MHz
Calculated / Measured	Calculated	Drawing #	24L230050-90



Remarks:



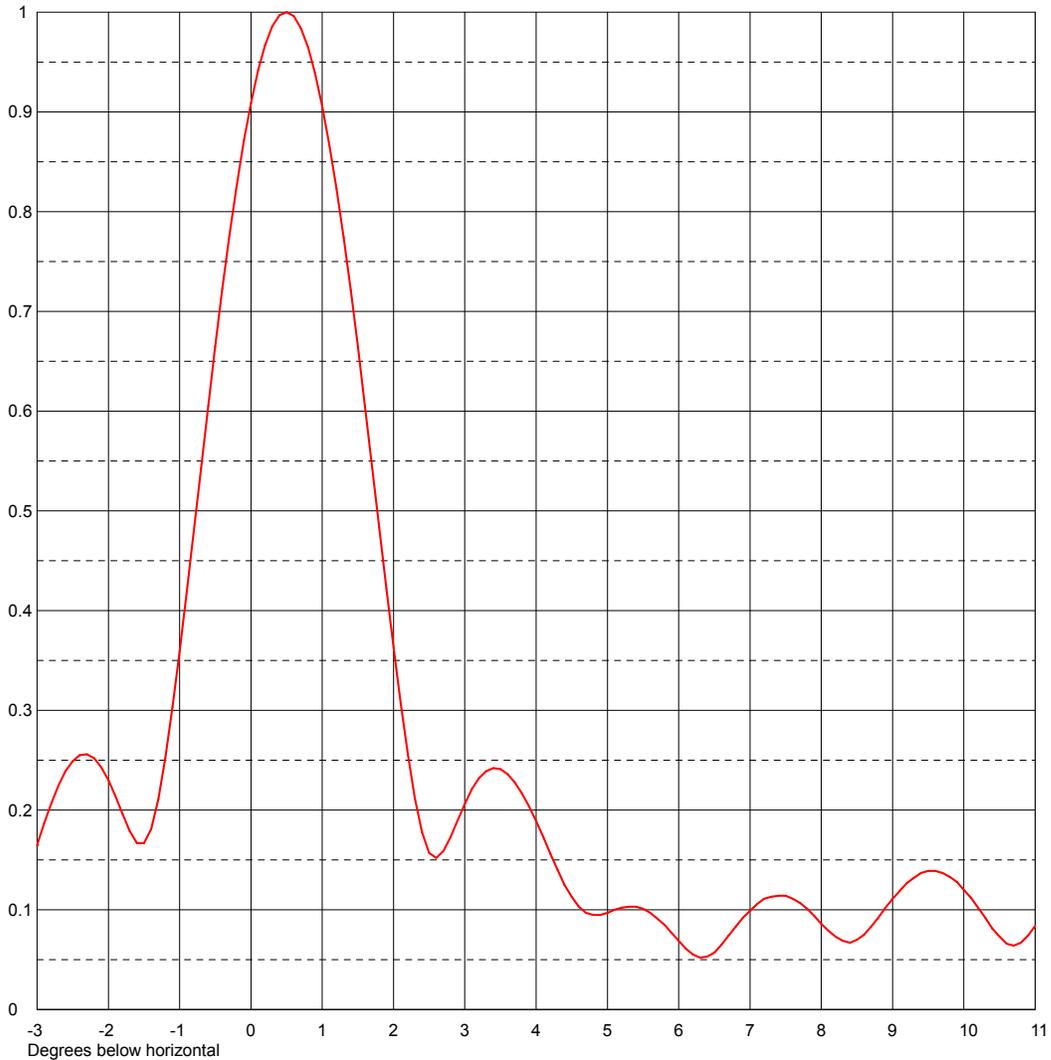
Figure 2
Antenna Elevation Pattern
WLUC-TV Marquette, MI
Facility ID 21259
Ch. 35 100 kW 258 m

prepared for
Gray Television Licensee, LLC

December, 2017

ELEVATION PATTERN

RMS Gain at Main Lobe	23.0 (13.62 dB)	Beam Tilt	0.50 Degrees
RMS Gain at Horizontal	19.0 (12.79 dB)	Frequency	599.00 MHz
Calculated / Measured	Calculated	Drawing #	24L230050



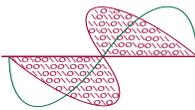
Remarks:



Figure 2A - Detail
Antenna Elevation Pattern
WLUC-TV Marquette, MI
Facility ID 21259
Ch. 35 100 kW 258 m

prepared for
Gray Television Licensee, LLC

December, 2017



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

Figure 3
Proposed Coverage Contours
WLUC-TV Marquette, MI
Facility ID 21259
Ch. 35 100 kW 258 m

prepared for
Gray Television Licensee, LLC

December, 2017

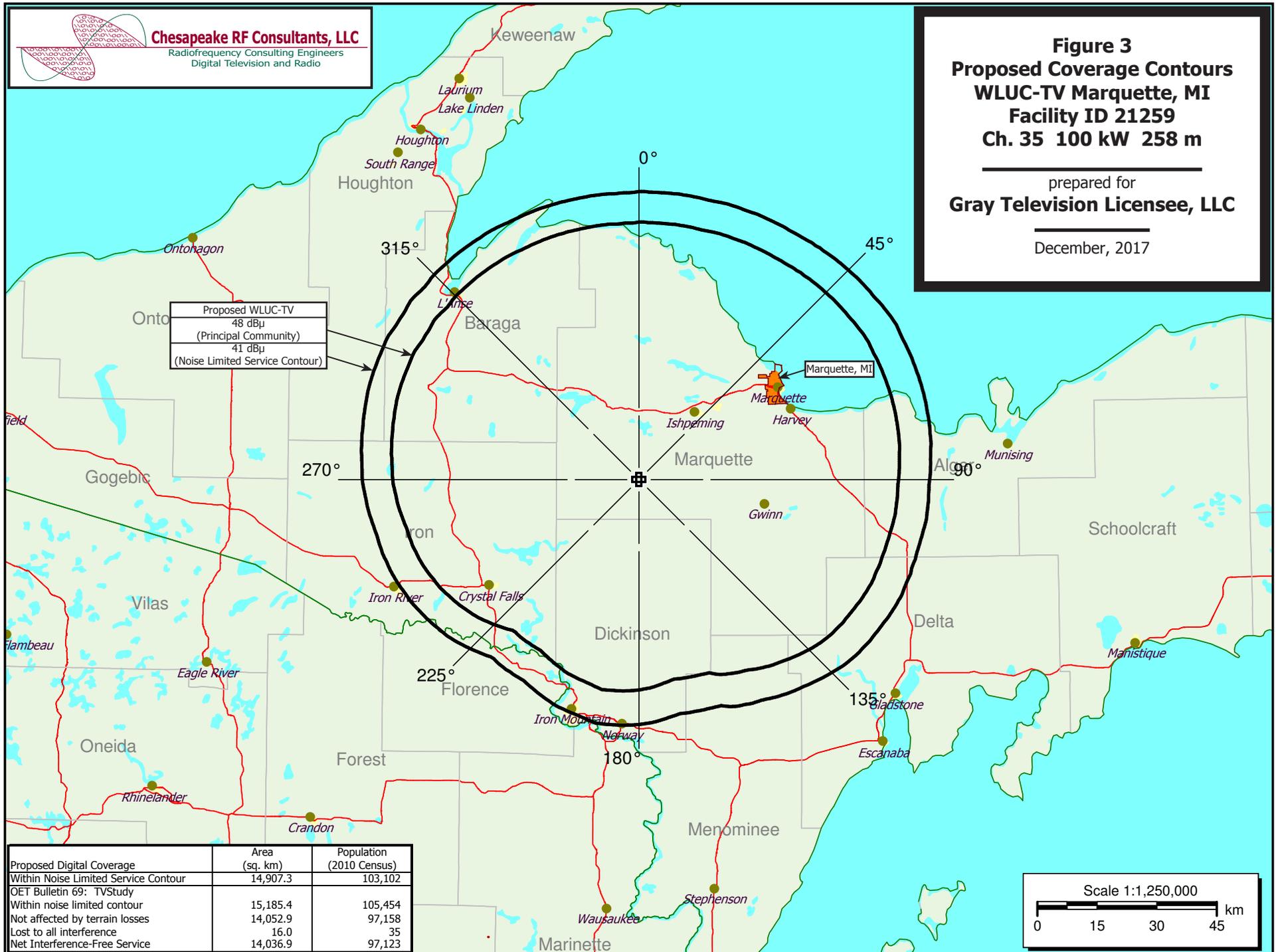


Table 1 WLUC-TV OET Bulletin 69 Interference Study
 (page 1 of 7)



tvstudy v2.2.4 (Z2Qqz3)
 Database: localhost, Study: WLUC-TV 100kW, Model: Longley-Rice
 Start: 2017.12.04 14:56:21

Study created: 2017.12.04 14:56:21

Study build station data: LMS TV 2017-12-03 LMSTV

Proposal: WLUC-TV D35 DT APP MARQUETTE, MI
 File number: WLUC-TV 100kW
 Facility ID: 21259
 Station data: User record
 Record ID: 1573
 Country: U.S.
 Zone: II

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	WPBN-TV	D35	DT	CP	TRAVERSE CITY, MI	BLANK0000027437	279.3 km
Yes	WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373	279.3
No	WPBN-TV	D35	DT	BL	TRAVERSE CITY, MI	DTVBL21253	279.3
No	KSTP-TV	D35	DT	LIC	ST. PAUL, MN	BLCDT20090622ABR	434.3
No	WACY-TV	D36	DT	CP	APPLETON, WI	BLANK0000026771	220.1
No	WACY-TV	D36	DT	APP	APPLETON, WI	BLANK0000034873	220.1
No	WACY-TV	D36	DT	BL	APPLETON, WI	DTVBL361	220.1
No	WLEF-TV	D36	DT	APP	PARK FALLS, WI	BLANK0000035675	191.7
No	WLEF-TV	D36	DT	LIC	PARK FALLS, WI	BLEDT20110323ABO	191.7

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
 Latitude: 46 20 11.00 N (NAD83)
 Longitude: 87 50 56.00 W
 Height AMSL: 699.8 m
 HAAT: 258.3 m
 Peak ERP: 100 kW
 Antenna: DIE-TLP-24M (C) (ID 44077) 0.0 deg
 Elev Pattn: Generic
 Elec Tilt: 0.50

40.8 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	81.2 kW	243.3 m	73.0 km
45.0	91.8	262.3	75.0
90.0	74.8	258.4	73.6
135.0	19.8	289.3	68.8
180.0	5.11	285.4	61.4
225.0	5.57	252.4	59.8
270.0	47.3	240.2	70.0
315.0	99.6	235.3	73.5

**Proposal is within coordination distance of Canadian border
 Distance to Canadian border: 214.0 km

Distance to Mexican border: 2183.3 km

Conditions at FCC monitoring station: Allegan MI
 Bearing: 159.4 degrees Distance: 441.0 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
 Bearing: 250.1 degrees Distance: 1561.3 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%

Table 1 WLUC-TV OET Bulletin 69 Interference Study
(page 2 of 7)



Interference to BLANK0000034373 APP scenario 1

Call	Chan	Svc	Status	City, State	File Number	Distance			
Desired: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373				
Undesireds: WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km			
WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3			
WCMV	D34	DT	APP	CADILLAC, MI	BLANK0000029577	0.0			
WGBO-DT	D35	DT	CP	JOLIET, IL	BLANK0000025108	378.0			
WOLP-CD	D35	DC	CP	GRAND RAPIDS, MI	BLANK0000027729	231.8			
WAQP	D36	DT	CP	SAGINAW, MI	BLANK0000028088	188.1			
Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX					
30270.4	442,005	29386.1	430,953	29325.9	428,862	29317.9	428,854	0.03	0.00
Undesired	Total IX	Unique IX, before	Unique IX, after						
WLUC-TV D35 DT BL	0.0	0	0.0	0					
WLUC-TV D35 DT APP	8.0	8	8.0	8					
WOLP-CD D35 DC CP	52.2	1,884	36.1	1,474	36.1	1,474			
WAQP D36 DT CP	24.1	617	8.0	207	8.0	207			

Interference to BLANK0000034373 APP scenario 2

Call	Chan	Svc	Status	City, State	File Number	Distance			
Desired: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373				
Undesireds: WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km			
WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3			
WCMV	D34	DT	APP	CADILLAC, MI	BLANK0000029577	0.0			
WGBO-DT	D35	DT	CP	JOLIET, IL	BLANK0000025108	378.0			
WOLP-CD	D35	DC	BL	GRAND RAPIDS, MI	DTVBL167892	231.8			
WAQP	D36	DT	CP	SAGINAW, MI	BLANK0000028088	188.1			
Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX					
30270.4	442,005	29386.1	430,953	29337.9	429,288	29329.9	429,280	0.03	0.00
Undesired	Total IX	Unique IX, before	Unique IX, after						
WLUC-TV D35 DT BL	0.0	0	0.0	0					
WLUC-TV D35 DT APP	8.0	8	8.0	8					
WOLP-CD D35 DC BL	40.2	1,458	24.1	1,048	24.1	1,048			
WAQP D36 DT CP	24.1	617	8.0	207	8.0	207			

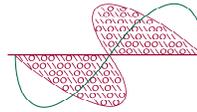
Interference to BLANK0000034373 APP scenario 3

Call	Chan	Svc	Status	City, State	File Number	Distance			
Desired: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373				
Undesireds: WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km			
WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3			
WCMV	D34	DT	APP	CADILLAC, MI	BLANK0000029577	0.0			
WGBO-DT	D35	DT	CP	JOLIET, IL	BLANK0000025108	378.0			
WOLP-CD	D35	DC	CP	GRAND RAPIDS, MI	BLANK0000027729	231.8			
WAQP	D36	DT	APP	SAGINAW, MI	BLANK0000034899	188.1			
Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX					
30270.4	442,005	29386.1	430,953	29317.9	428,651	29309.9	428,643	0.03	0.00
Undesired	Total IX	Unique IX, before	Unique IX, after						
WLUC-TV D35 DT BL	0.0	0	0.0	0					
WLUC-TV D35 DT APP	8.0	8	8.0	8					
WOLP-CD D35 DC CP	52.2	1,884	36.1	1,474	36.1	1,474			
WAQP D36 DT APP	32.2	828	16.1	418	16.1	418			

Interference to BLANK0000034373 APP scenario 4

Call	Chan	Svc	Status	City, State	File Number	Distance
Desired: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373	

Table 1 WLUC-TV OET Bulletin 69 Interference Study
(page 3 of 7)



Undesireds:	WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2	km
	WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3	
	WCMV	D34	DT	APP	CADILLAC, MI	BLANK0000029577	0.0	
	WGBO-DT	D35	DT	CP	JOLIET, IL	BLANK0000025108	378.0	
	WOLP-CD	D35	DC	CP	GRAND RAPIDS, MI	BLANK0000027729	231.8	
	WAQP	D36	DT	BL	SAGINAW, MI	DTVBL67792	188.1	

Service area	30270.4	442,005	Terrain-limited	29386.1	430,953	IX-free, before	29325.9	428,862	IX-free, after	29317.9	428,854	Percent New IX	0.03	0.00
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Undesired					Total IX		Unique IX, before		Unique IX, after					
WLUC-TV	D35	DT	BL	0.0	0	0.0	0							
WLUC-TV	D35	DT	APP	8.0	8			8.0	8					
WOLP-CD	D35	DC	CP	52.2	1,884	36.1	1,474	36.1	1,474					
WAQP	D36	DT	BL	24.1	617	8.0	207	8.0	207					

Interference to BLANK0000034373 APP scenario 5

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373	
Undesireds:	WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km
	WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3
	WCMV	D34	DT	APP	CADILLAC, MI	BLANK0000029577	0.0
	WGBO-DT	D35	DT	CP	JOLIET, IL	BLANK0000025108	378.0
	WOLP-CD	D35	DC	BL	GRAND RAPIDS, MI	DTVBL167892	231.8
	WAQP	D36	DT	APP	SAGINAW, MI	BLANK0000034899	188.1

Service area	30270.4	442,005	Terrain-limited	29386.1	430,953	IX-free, before	29329.9	429,077	IX-free, after	29321.9	429,069	Percent New IX	0.03	0.00
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Undesired					Total IX		Unique IX, before		Unique IX, after					
WLUC-TV	D35	DT	BL	0.0	0	0.0	0							
WLUC-TV	D35	DT	APP	8.0	8			8.0	8					
WOLP-CD	D35	DC	BL	40.2	1,458	24.1	1,048	24.1	1,048					
WAQP	D36	DT	APP	32.2	828	16.1	418	16.1	418					

Interference to BLANK0000034373 APP scenario 6

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373	
Undesireds:	WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km
	WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3
	WCMV	D34	DT	APP	CADILLAC, MI	BLANK0000029577	0.0
	WGBO-DT	D35	DT	CP	JOLIET, IL	BLANK0000025108	378.0
	WOLP-CD	D35	DC	BL	GRAND RAPIDS, MI	DTVBL167892	231.8
	WAQP	D36	DT	BL	SAGINAW, MI	DTVBL67792	188.1

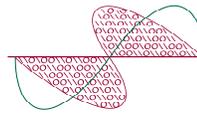
Service area	30270.4	442,005	Terrain-limited	29386.1	430,953	IX-free, before	29337.9	429,288	IX-free, after	29329.9	429,280	Percent New IX	0.03	0.00
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Undesired					Total IX		Unique IX, before		Unique IX, after					
WLUC-TV	D35	DT	BL	0.0	0	0.0	0							
WLUC-TV	D35	DT	APP	8.0	8			8.0	8					
WOLP-CD	D35	DC	BL	40.2	1,458	24.1	1,048	24.1	1,048					
WAQP	D36	DT	BL	24.1	617	8.0	207	8.0	207					

Interference to BLANK0000034373 APP scenario 7

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373	
Undesireds:	WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km
	WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3
	WCMV	D34	DT	APP	CADILLAC, MI	BLANK0000029577	0.0
	WGBO-DT	D35	DT	APP	JOLIET, IL	BLANK0000034007	378.0
	WOLP-CD	D35	DC	CP	GRAND RAPIDS, MI	BLANK0000027729	231.8
	WAQP	D36	DT	CP	SAGINAW, MI	BLANK0000028088	188.1

Table 1 WLUC-TV OET Bulletin 69 Interference Study
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Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX
30270.4 442,005	29386.1 430,953	29317.9 428,834	29309.9 428,826	0.03 0.00
Undesired	Total IX	Unique IX, before	Unique IX, after	
WLUC-TV D35 DT BL	0.0 0	0.0 0		
WLUC-TV D35 DT APP	8.0 8		8.0 8	
WGBO-DT D35 DT APP	20.0 84	8.0 28	8.0 28	
WOLP-CD D35 DC CP	52.2 1,884	24.1 1,418	24.1 1,418	
WAQP D36 DT CP	24.1 617	8.0 207	8.0 207	

Interference to BLANK0000034373 APP scenario 8

Call	Chan	Svc	Status	City, State	File Number	Distance
Desired: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373	
Undesireds: WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km
WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3
WCMV	D34	DT	APP	CADILLAC, MI	BLANK0000029577	0.0
WGBO-DT	D35	DT	APP	JOLIET, IL	BLANK0000034007	378.0
WOLP-CD	D35	DC	BL	GRAND RAPIDS, MI	DTVBL167892	231.8
WAQP	D36	DT	CP	SAGINAW, MI	BLANK0000028088	188.1

Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX
30270.4 442,005	29386.1 430,953	29325.9 429,259	29317.9 429,251	0.03 0.00
Undesired	Total IX	Unique IX, before	Unique IX, after	
WLUC-TV D35 DT BL	0.0 0	0.0 0		
WLUC-TV D35 DT APP	8.0 8		8.0 8	
WGBO-DT D35 DT APP	20.0 84	12.0 29	12.0 29	
WOLP-CD D35 DC BL	40.2 1,458	16.1 993	16.1 993	
WAQP D36 DT CP	24.1 617	8.0 207	8.0 207	

Interference to BLANK0000034373 APP scenario 9

Call	Chan	Svc	Status	City, State	File Number	Distance
Desired: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373	
Undesireds: WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km
WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3
WCMV	D34	DT	APP	CADILLAC, MI	BLANK0000029577	0.0
WOLP-CD	D35	DC	CP	GRAND RAPIDS, MI	BLANK0000027729	231.8
WAQP	D36	DT	CP	SAGINAW, MI	BLANK0000028088	188.1

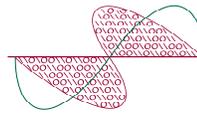
Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX
30270.4 442,005	29386.1 430,953	29325.9 428,862	29317.9 428,854	0.03 0.00
Undesired	Total IX	Unique IX, before	Unique IX, after	
WLUC-TV D35 DT BL	0.0 0	0.0 0		
WLUC-TV D35 DT APP	8.0 8		8.0 8	
WOLP-CD D35 DC CP	52.2 1,884	36.1 1,474	36.1 1,474	
WAQP D36 DT CP	24.1 617	8.0 207	8.0 207	

Interference to BLANK0000034373 APP scenario 10

Call	Chan	Svc	Status	City, State	File Number	Distance
Desired: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373	
Undesireds: WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km
WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3
WCMV	D34	DT	APP	CADILLAC, MI	BLANK0000029577	0.0
WOLP-CD	D35	DC	BL	GRAND RAPIDS, MI	DTVBL167892	231.8
WAQP	D36	DT	CP	SAGINAW, MI	BLANK0000028088	188.1

Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX
30270.4 442,005	29386.1 430,953	29337.9 429,288	29329.9 429,280	0.03 0.00
Undesired	Total IX	Unique IX, before	Unique IX, after	
WLUC-TV D35 DT BL	0.0 0	0.0 0		
WLUC-TV D35 DT APP	8.0 8		8.0 8	
WOLP-CD D35 DC BL	40.2 1,458	24.1 1,048	24.1 1,048	

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

WAQP D36 DT CP 24.1 617 8.0 207 8.0 207

Interference to BLANK000034373 APP scenario 11

Call	Chan	Svc	Status	City, State	File Number	Distance
Desired: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK000034373	
Undesireds: WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km
WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3
WCMV	D34	DT	APP	CADILLAC, MI	BLANK000029577	0.0
WGBO-DT	D35	DT	APP	JOLIET, IL	BLANK000034007	378.0
WOLP-CD	D35	DC	CP	GRAND RAPIDS, MI	BLANK000027729	231.8
WAQP	D36	DT	APP	SAGINAW, MI	BLANK000034899	188.1
Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX		
30270.4 442,005	29386.1 430,953	29309.9 428,623	29301.9 428,615	0.03 0.00		
Undesired	Total IX	Unique IX, before	Unique IX, after			
WLUC-TV D35 DT BL	0.0 0	0.0 0				
WLUC-TV D35 DT APP	8.0 8		8.0 8			
WGBO-DT D35 DT APP	20.0 84	8.0 28	8.0 28			
WOLP-CD D35 DC CP	52.2 1,884	24.1 1,418	24.1 1,418			
WAQP D36 DT APP	32.2 828	16.1 418	16.1 418			

Interference to BLANK000034373 APP scenario 12

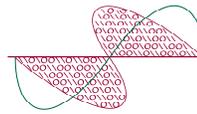
Call	Chan	Svc	Status	City, State	File Number	Distance
Desired: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK000034373	
Undesireds: WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km
WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3
WCMV	D34	DT	APP	CADILLAC, MI	BLANK000029577	0.0
WGBO-DT	D35	DT	APP	JOLIET, IL	BLANK000034007	378.0
WOLP-CD	D35	DC	CP	GRAND RAPIDS, MI	BLANK000027729	231.8
WAQP	D36	DT	BL	SAGINAW, MI	DTVBL67792	188.1
Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX		
30270.4 442,005	29386.1 430,953	29317.9 428,834	29309.9 428,826	0.03 0.00		
Undesired	Total IX	Unique IX, before	Unique IX, after			
WLUC-TV D35 DT BL	0.0 0	0.0 0				
WLUC-TV D35 DT APP	8.0 8		8.0 8			
WGBO-DT D35 DT APP	20.0 84	8.0 28	8.0 28			
WOLP-CD D35 DC CP	52.2 1,884	24.1 1,418	24.1 1,418			
WAQP D36 DT BL	24.1 617	8.0 207	8.0 207			

Interference to BLANK000034373 APP scenario 13

Call	Chan	Svc	Status	City, State	File Number	Distance
Desired: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK000034373	
Undesireds: WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km
WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3
WCMV	D34	DT	APP	CADILLAC, MI	BLANK000029577	0.0
WGBO-DT	D35	DT	APP	JOLIET, IL	BLANK000034007	378.0
WOLP-CD	D35	DC	BL	GRAND RAPIDS, MI	DTVBL167892	231.8
WAQP	D36	DT	APP	SAGINAW, MI	BLANK000034899	188.1
Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX		
30270.4 442,005	29386.1 430,953	29317.9 429,048	29309.9 429,040	0.03 0.00		
Undesired	Total IX	Unique IX, before	Unique IX, after			
WLUC-TV D35 DT BL	0.0 0	0.0 0				
WLUC-TV D35 DT APP	8.0 8		8.0 8			
WGBO-DT D35 DT APP	20.0 84	12.0 29	12.0 29			
WOLP-CD D35 DC BL	40.2 1,458	16.1 993	16.1 993			
WAQP D36 DT APP	32.2 828	16.1 418	16.1 418			

Interference to BLANK000034373 APP scenario 14

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

Call	Chan	Svc	Status	City, State	File Number	Distance			
Desired: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373				
Undesireds: WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km			
WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3			
WCMV	D34	DT	APP	CADILLAC, MI	BLANK0000029577	0.0			
WGBO-DT	D35	DT	APP	JOLIET, IL	BLANK0000034007	378.0			
WOLP-CD	D35	DC	BL	GRAND RAPIDS, MI	DTVBL167892	231.8			
WAQP	D36	DT	BL	SAGINAW, MI	DTVBL67792	188.1			
Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX					
30270.4	442,005	29386.1	430,953	29325.9	429,259	29317.9	429,251	0.03	0.00
Undesired	Total IX	Unique IX, before	Unique IX, after						
WLUC-TV D35 DT BL	0.0	0	0.0	0					
WLUC-TV D35 DT APP	8.0	8	8.0	8					
WGBO-DT D35 DT APP	20.0	84	12.0	29	12.0	29			
WOLP-CD D35 DC BL	40.2	1,458	16.1	993	16.1	993			
WAQP D36 DT BL	24.1	617	8.0	207	8.0	207			

Interference to BLANK0000034373 APP scenario 15

Call	Chan	Svc	Status	City, State	File Number	Distance			
Desired: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373				
Undesireds: WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km			
WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3			
WCMV	D34	DT	APP	CADILLAC, MI	BLANK0000029577	0.0			
WOLP-CD	D35	DC	CP	GRAND RAPIDS, MI	BLANK0000027729	231.8			
WAQP	D36	DT	APP	SAGINAW, MI	BLANK0000034899	188.1			
Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX					
30270.4	442,005	29386.1	430,953	29317.9	428,651	29309.9	428,643	0.03	0.00
Undesired	Total IX	Unique IX, before	Unique IX, after						
WLUC-TV D35 DT BL	0.0	0	0.0	0					
WLUC-TV D35 DT APP	8.0	8	8.0	8					
WOLP-CD D35 DC CP	52.2	1,884	36.1	1,474	36.1	1,474			
WAQP D36 DT APP	32.2	828	16.1	418	16.1	418			

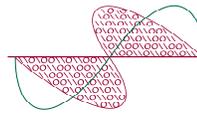
Interference to BLANK0000034373 APP scenario 16

Call	Chan	Svc	Status	City, State	File Number	Distance			
Desired: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373				
Undesireds: WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km			
WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3			
WCMV	D34	DT	APP	CADILLAC, MI	BLANK0000029577	0.0			
WOLP-CD	D35	DC	CP	GRAND RAPIDS, MI	BLANK0000027729	231.8			
WAQP	D36	DT	BL	SAGINAW, MI	DTVBL67792	188.1			
Service area	Terrain-limited	IX-free, before	IX-free, after	Percent New IX					
30270.4	442,005	29386.1	430,953	29325.9	428,862	29317.9	428,854	0.03	0.00
Undesired	Total IX	Unique IX, before	Unique IX, after						
WLUC-TV D35 DT BL	0.0	0	0.0	0					
WLUC-TV D35 DT APP	8.0	8	8.0	8					
WOLP-CD D35 DC CP	52.2	1,884	36.1	1,474	36.1	1,474			
WAQP D36 DT BL	24.1	617	8.0	207	8.0	207			

Interference to BLANK0000034373 APP scenario 17

Call	Chan	Svc	Status	City, State	File Number	Distance
Desired: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373	
Undesireds: WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km
WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3
WCMV	D34	DT	APP	CADILLAC, MI	BLANK0000029577	0.0
WOLP-CD	D35	DC	BL	GRAND RAPIDS, MI	DTVBL167892	231.8

Table 1 WLUC-TV OET Bulletin 69 Interference Study
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WAQP	D36	DT	APP	SAGINAW, MI	BLANK0000034899	188.1			
Service area	Terrain-limited		IX-free, before		IX-free, after		Percent New IX		
30270.4	442,005	29386.1	430,953	29329.9	429,077	29321.9	429,069	0.03	0.00
Undesired	Total IX		Unique IX, before		Unique IX, after				
WLUC-TV D35 DT BL	0.0	0	0.0	0					
WLUC-TV D35 DT APP	8.0	8			8.0	8			
WOLP-CD D35 DC BL	40.2	1,458	24.1	1,048	24.1	1,048			
WAQP D36 DT APP	32.2	828	16.1	418	16.1	418			

Interference to BLANK0000034373 APP scenario 18

Call	Chan	Svc	Status	City, State	File Number	Distance			
Desired: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373				
Undesireds: WLUC-TV	D35	DT	BL	MARQUETTE, MI	DTVBL21259	279.2 km			
WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW	279.3			
WCMV	D34	DT	APP	CADILLAC, MI	BLANK0000029577	0.0			
WOLP-CD	D35	DC	BL	GRAND RAPIDS, MI	DTVBL167892	231.8			
WAQP	D36	DT	BL	SAGINAW, MI	DTVBL67792	188.1			
Service area	Terrain-limited		IX-free, before		IX-free, after		Percent New IX		
30270.4	442,005	29386.1	430,953	29337.9	429,288	29329.9	429,280	0.03	0.00
Undesired	Total IX		Unique IX, before		Unique IX, after				
WLUC-TV D35 DT BL	0.0	0	0.0	0					
WLUC-TV D35 DT APP	8.0	8			8.0	8			
WOLP-CD D35 DC BL	40.2	1,458	24.1	1,048	24.1	1,048			
WAQP D36 DT BL	24.1	617	8.0	207	8.0	207			

Interference to proposal scenario 1

Call	Chan	Svc	Status	City, State	File Number	Distance	
Desired: WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW		
Undesireds: WPBN-TV	D35	DT	CP	TRAVERSE CITY, MI	BLANK0000027437	279.3 km	
Service area	Terrain-limited		IX-free		Percent IX		
15185.4	105,454	14052.9	97,158	14036.9	97,123	0.11	0.04
Undesired	Total IX		Unique IX		Prct Unique IX		
WPBN-TV D35 DT CP	16.0	35	16.0	35	0.11	0.04	

Interference to proposal scenario 2

Call	Chan	Svc	Status	City, State	File Number	Distance	
Desired: WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW		
Undesireds: WPBN-TV	D35	DT	APP	TRAVERSE CITY, MI	BLANK0000034373	279.3 km	
Service area	Terrain-limited		IX-free		Percent IX		
15185.4	105,454	14052.9	97,158	14016.9	97,094	0.26	0.07
Undesired	Total IX		Unique IX		Prct Unique IX		
WPBN-TV D35 DT APP	36.0	64	36.0	64	0.26	0.07	

Interference to proposal scenario 3

Call	Chan	Svc	Status	City, State	File Number	Distance	
Desired: WLUC-TV	D35	DT	APP	MARQUETTE, MI	WLUC-TV 100kW		
Undesireds: WPBN-TV	D35	DT	BL	TRAVERSE CITY, MI	DTVBL21253	279.3 km	
Service area	Terrain-limited		IX-free		Percent IX		
15185.4	105,454	14052.9	97,158	14036.9	97,123	0.11	0.04
Undesired	Total IX		Unique IX		Prct Unique IX		
WPBN-TV D35 DT BL	16.0	35	16.0	35	0.11	0.04	

Channel and Facility Information

Section	Question	Response
Proposed Community of License	Facility ID	21259
	State	Michigan
	City	MARQUETTE
	DTV Channel	35
Facility Type	Facility Type	Commercial
	Station Type	Main
Zone	Zone	2

Antenna Location Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1000032
Coordinates (NAD83)	Latitude	46° 20' 11.0" N+
	Longitude	087° 50' 56.0" W-
	Structure Type	TOWER-A free standing or guyed struct
	Overall Structure Height	310.3 meters
	Support Structure Height	258.5 meters
	Ground Elevation (AMSL)	449.8 meters
Antenna Data	Height of Radiation Center Above Ground Level	250 meters
	Height of Radiation Center Above Average Terrain	258.3 meters
	Height of Radiation Center Above Mean Sea Level	699.8 meters
	Effective Radiated Power	100 kW

**Antenna
Technical Data**

Section	Question	Response
Antenna Type	Antenna Type	Directional Custom
	Do you have an Antenna ID?	Yes
	Antenna ID	44077
Antenna Manufacturer and Model	Manufacturer:	DIE
	Model	TLP-24M (C)
	Rotation	0 degrees
	Electrical Beam Tilt	0.5
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Horizontal
DTV and DTS: Elevation 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	

Directional Antenna Relative Field Values (Pre-rotated Pattern)

Degree	V _A (Authorized Value)						
0	0.901	90	0.865	180	0.226	270	0.688
10	0.895	100	0.775	190	0.257	280	0.778
20	0.908	110	0.684	200	0.227	290	0.873
30	0.921	120	0.593	210	0.183	300	0.951
40	0.942	130	0.497	220	0.194	310	0.993
50	0.974	140	0.392	230	0.278	320	0.998
60	0.995	150	0.28	240	0.393	330	0.976
70	0.985	160	0.197	250	0.502	340	0.944
80	0.94	170	0.184	260	0.599	350	0.918

Additional Azimuths

Degree	V _A
62	0.996
317	1

**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.	Yes
	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 the applicable engineering standards and assignment requirements of 47 C.F.R. Sections 73.616, 73.622(i), 73.623(e), 73.625, 73.1030, and 73.1125.	Yes