

**Comprehensive Technical Exhibit**  
*Application for Construction Permit*  
**WGTQ-DT – Sault Ste. Marie, Michigan**  
**Tucker Broadcasting of Traverse City, Inc.**  
**June, 2008**

**General**

The following engineering statement and attached exhibits have been prepared for **Tucker Broadcasting of Traverse City, Inc.**, ("Tucker"), licensee of television station WGTQ(TV) at Sault Ste. Marie, Michigan, and are in support of their application for construction permit for WGTQ-DT post transition facilities.<sup>1</sup>

WGTQ(TV) currently operates on channel 8 as an NTSC facility with pre-transition DTV operations on channel 9. In the post-transition environment, WGTQ-DT will operate on channel 8 pursuant to the Commission's DTV Table of Allotments. This application is being filed to request a construction permit for the post-transition DTV facilities, which will vary slightly from those listed in Appendix B to the Commission's order adopting the DTV table of allotments.

**Discussion of WGTQ-DT Allotment and Proposed Facilities**

In the Appendix B table of allotments, WGTQ-DT is specified as operating in the post-transition environment on channel 8. The table in Appendix B specifies a maximum effective radiated power of 24 kW at an antenna center of 288 meters above average terrain. An Antenna ID of 74353 is associated with this allotment, which is similar in shape, but not identical to the current NTSC antenna, which will be used in the post-transition environment.

The proposed facility would operate with a maximum effective radiated power of 15 kW at a center of radiation at 288 meters above average terrain. The decrease in the maximum effective radiated power proposed is necessary to alleviate interference concerns to Canadian television station CICI-DT. The Appendix B facilities do not predict any interference to this Canadian station, however, if the existing antenna is utilized at the allotted power, then an area of 10.1 square

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<sup>1</sup> The Facility ID for WGTQ is 59279.

kilometers within the land area of Canada where interference is predicted to occur to CICI-DT results. In order to eliminate this interference, the maximum effective radiated power of WGTQ-DT must be reduced to 15 kW due to the inconsistencies between the Appendix B directional pattern and the actual directional pattern utilized by WGTQ-DT on channel 8.

The antenna that is currently used for WGTQ(TV) and WGTQ-DT will be utilized in the post-transition environment. It appears that the directional pattern for channel 9 was carried over to the channel 8 Appendix B allocation resulting in the necessary reduction in effective radiated power mentioned above. This particular antenna is a broadband multi-channel antenna, however, the directional characteristics of the antenna vary with channel.

As a result of these changes, there will clearly be differences between the allocated and proposed noise limited service contours. Even when the ERP reduction is factored in to the calculations, the distance to the proposed noise limited contour exceeds the Appendix B contour along certain azimuths. These increases are less than five miles, however, as indicated in Exhibits E-1 and E-2. In Exhibit E-1 both contours are depicted on a computer generated map, while Exhibit E-2 tabulates the distances to the contours at ten degree azimuth increments.

Although the proposed noise limited service contour would extend beyond the Appendix B contour at certain azimuths, no prohibited interference would occur to other facilities. In the case of domestic facilities, the distance to the noise limited contour is reduced along appropriate arcs. Although Exhibits E-3 and E-4 would appear to indicate prohibited interference to domestic facilities, the level towards those stations is actually lower than under the Appendix B facilities. With regard to Canadian facilities, the reduction in effective radiated power has resulted in no predicted interference to such stations.

The technical parameter changes described above will affect the DTV service area. Exhibits E-5 and E-6 illustrate and tabulate the predicted DTV service area for the proposed facility. As these exhibits demonstrate, the predicted service area population is 92,115 persons, which is a reduction from the Appendix B population of 98 percent. Although this reduction is greater than five percent of the Appendix B population, the public interest would be served by a grant of this application as it would ensure that a smooth transition to digital operations in February of 2009 occurs. A grant of this application will also prevent the applicant from having to resort to the economically unviable alternative of replacing an antenna that has been in service only a few years. It is respectfully requested, however, that the Commission engage in additional international coordination activities with Industry Canada in order to permit the applicant to subsequently increase the maximum effective radiated power to the Appendix B value using the existing antenna.

The proposed facility will comply with the community coverage requirements of Section 73.625 of the Commission's Rules. Exhibit E-7 illustrates the predicted 43 and 36 dBu F(50,90) service contours along with the received signal based on Longley-Rice bounded by the 36 dBu contour. As this map demonstrates, the community of license, Sault Ste. Marie, Michigan, would receive a signal well in excess of 43 dBu.

The antenna that would be utilized by the proposed facility is the existing Dielectric Communications model THB-C2-6H/12HD-1 antenna. This is considered a directional antenna operating with 0.5 degrees of electrical beamtilt. No mechanical beamtilt is proposed or utilized. Following Exhibit E-7 are three pages illustrating the patterns for the antenna that would be

utilized. These printouts were copied from the WGTQ(TV) application for construction permit.<sup>2</sup>

The proposed antenna is neither part of an AM radiator nor located in proximity to an AM transmission facility.

The proposed facility would not constitute a significant environmental impact. The absence of a significant environmental impact is predicted on two considerations. First, WGTQ-DT would utilize the existing WGTQ(TV) antenna system for DTV operations. Since no new tower or excavation would be necessary in order to complete construction, the proposed facility would not result in an increase in the present environmental impact from the existing facility.

Secondly, the proposed facility would not by itself result in human exposure to non-ionizing radiation levels exceeding the applicable safety standards. All areas of the transmitter site would lie within depression angles from the antenna where the relative field is 0.3 or less. Utilizing the power density equations in OET Bulletin 65, the predicted power density at ground level would be  $0.736 \mu\text{W}/\text{cm}^2$ .<sup>3</sup> Since this predicted power density is less than the upper limit of  $200 \mu\text{W}/\text{cm}^2$  permissible under the uncontrolled environment condition, it is apparent that the proposed facility will not result in potentially hazardous non-ionizing radiation exposure to humans at ground level.<sup>4</sup> In addition, the applicant certifies that it will coordinate with other present and future users of the site to ensure that workers are not exposed to levels of non-ionizing radiation which may exceed applicable safety standards. Such coordination will include, but is not necessarily limited to, a reduction in transmitter power or cessation of operation.

<sup>2</sup> See BPCT-20030313AHC. Directional patterns from the Dielectric engineering proposal for WGTQ.

<sup>3</sup> Power density calculated by:

$$S = \frac{33.4(E)^2(P)}{h^2} = \frac{33.4(0.3)^2(15000)}{(247.9)^2} = 1.55$$

<sup>4</sup> Power density calculations based on height above ground minus two meters to accommodate human height.

The requirements of Section 73.1030 of the Commission's Rules are applicable in this particular case however the applicant would be in compliance with this section of the Rules. The proposed facility would not operate in any of the radio astronomy zones or radio quiet zones described in Section 73.1030. The proposed facility is not located in close proximity to any protected FCC installation.

The structure utilized by the proposed facility is registered with the Commission. The ASR number assigned to this tower is 1006720. No physical changes to the structure are proposed in this application.

**Affidavit**

The preceding statement and attached exhibits have been prepared by me, or under my direction, and are true and accurate to the best of my belief and knowledge.



Above signature is digitized copy of actual signature  
License Expires November 30, 2009

**Jeremy D. Ruck, PE**  
**June 19, 2008**

**WGTQ-DT.ALL**

## ALLOCATION

Latitude: 46-03-08 N  
Longitude: 084-06-38 W  
ERP: 24.00 kW  
Channel: 8  
Frequency: 183.0 MHz  
AMSL Height: 483.0 m  
Horiz. Pattern: Directional  
Vert. Pattern: Yes  
Elec Tilt: 0.0  
Prop Model: FCC Method

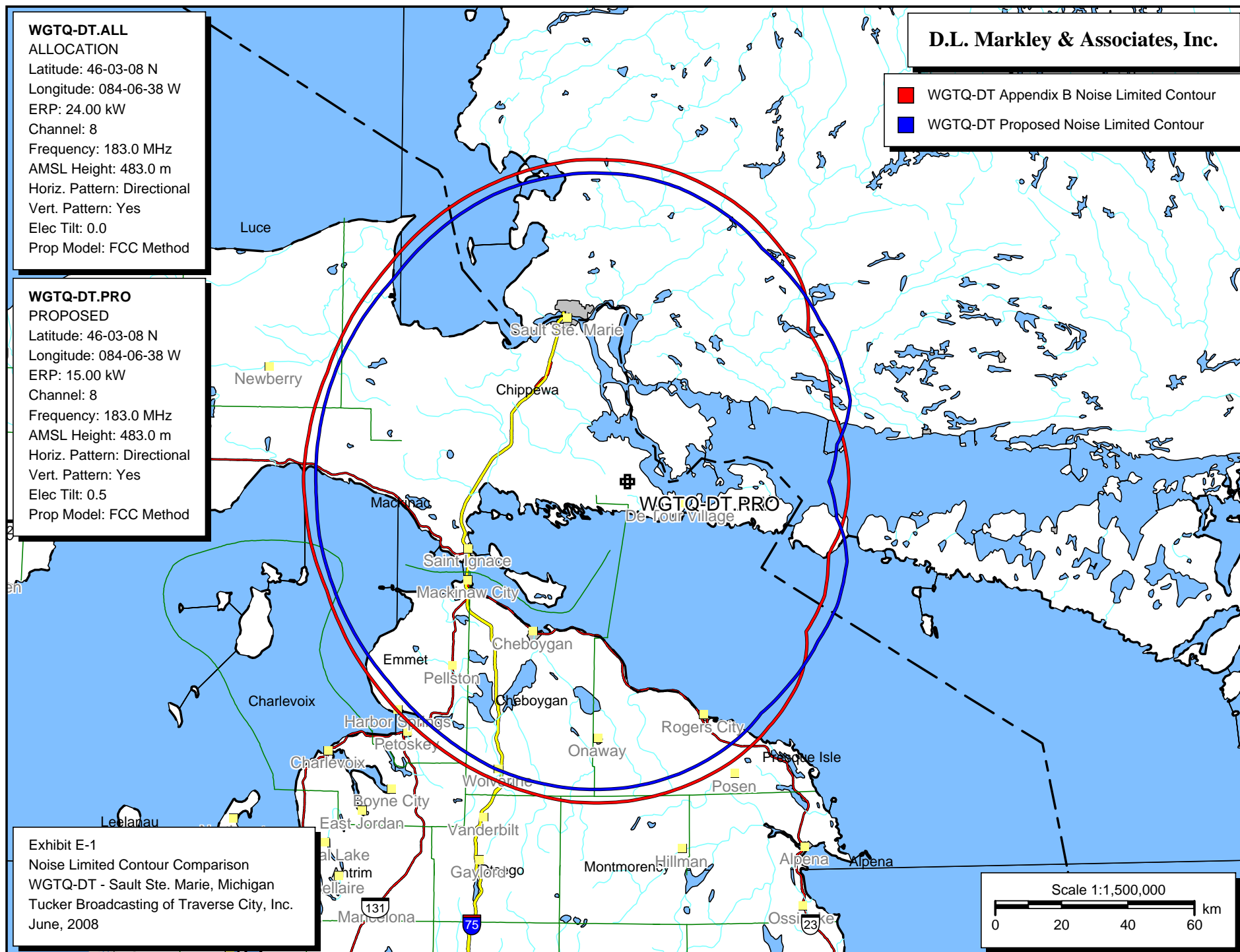
**WGTQ-DT.PRO**

## PROPOSED

Latitude: 46-03-08 N  
Longitude: 084-06-38 W  
ERP: 15.00 kW  
Channel: 8  
Frequency: 183.0 MHz  
AMSL Height: 483.0 m  
Horiz. Pattern: Directional  
Vert. Pattern: Yes  
Elec Tilt: 0.5  
Prop Model: FCC Method

**D.L. Markley & Associates, Inc.**

- WGTQ-DT Appendix B Noise Limited Contour
- WGTQ-DT Proposed Noise Limited Contour



## Exhibit E-1

Noise Limited Contour Comparison  
WGTQ-DT - Sault Ste. Marie, Michigan  
Tucker Broadcasting of Traverse City, Inc.  
June, 2008

Scale 1:1,500,000

0 20 40 60 km

**Exhibit E-2 - Comparison of Proposed and Allocated Noise Limited Service Contours**

Azimuth	HAAT in meters	Allocation NL Contour Distance in kilometers	Proposed NL Contour Distance in kilometers	Contour Distance Difference	
				kilometers	miles
0	300.5	96.4	92.3	-4.10	-2.55
10	298.8	93.9	89.6	-4.30	-2.67
20	295.8	90.3	85.7	-4.60	-2.86
30	297.4	85.6	81.0	-4.60	-2.86
40	296.1	80.3	78.4	-1.90	-1.18
50	294.9	70.8	75.4	4.60	2.86
60	291.6	69.2	73.9	4.70	2.92
70	294.7	65.4	71.3	5.90	3.67
80	297.3	66.2	64.0	-2.20	-1.37
90	299.0	66.6	60.6	-6.00	-3.73
100	296.1	66.1	63.9	-2.20	-1.37
110	277.2	64.4	70.3	5.90	3.67
120	279.8	68.5	73.2	4.70	2.92
130	284.3	70.2	74.8	4.60	2.86
140	283.6	79.6	77.7	-1.90	-1.18
150	288.4	85.2	80.5	-4.70	-2.92
160	292.2	90.1	85.6	-4.50	-2.80
170	292.5	93.5	89.3	-4.20	-2.61
180	296.9	96.1	92.0	-4.10	-2.55
190	296.5	97.8	93.8	-4.00	-2.49
200	294.9	98.2	94.8	-3.40	-2.11
210	293.8	98.2	94.8	-3.40	-2.11
220	292.0	97.9	94.3	-3.60	-2.24
230	288.6	97.3	93.7	-3.60	-2.24
240	288.2	96.9	93.9	-3.00	-1.86
250	280.2	96.1	93.9	-2.20	-1.37
260	266.3	97.0	94.0	-3.00	-1.86
270	259.7	97.4	93.7	-3.70	-2.30
280	260.9	96.8	93.8	-3.00	-1.86
290	276.7	96.0	93.8	-2.20	-1.37
300	278.3	96.5	93.5	-3.00	-1.86
310	271.0	96.7	93.1	-3.60	-2.24
320	287.5	97.7	94.1	-3.60	-2.24
330	295.3	98.3	94.9	-3.40	-2.11
340	297.1	98.3	95.0	-3.30	-2.05
350	299.4	98.0	94.0	-4.00	-2.49

**D.L. Markley & Associates, Inc.**

*Consulting Engineers*

2104 West Moss Avenue

Peoria, Illinois 61604



**WGTQ-DT.PRO**

PROPOSED

Latitude: 46-03-08 N

Longitude: 084-06-38 W

ERP: 15.00 kW

Channel: 8

Frequency: 183.0 MHz

AMSL Height: 483.0 m

Horiz. Pattern: Directional

Vert. Pattern: Yes

Elec Tilt: 0.5

Prop Model: Longley/Rice

Climate: Cont temperate

Conductivity: 0.0050

Dielec Const: 15.0

Refractivity: 301.0

Receiver Ht AG: 10.0 m

Receiver Gain: 0 dB

Time Variability: 10.0%

Sit. Variability: 50.0%

ITM Mode: Broadcast

**D.L. Markley & Associates, Inc.**

- ☒ WGTQ-DT.PRO
- ☐ CBEC-T
- ☐ CBLAT-
- ☐ CBLAT1
- ☐ CICI-D.A
- ☐ CKNCTV
- ☐ CKNX-T
- ☐ CKNXTV
- ☐ WDHS-D
- ☐ WDHS-D.A
- ☐ WDHS-D.A
- ☐ WWMT-D
- ☐ WWMT-D.C

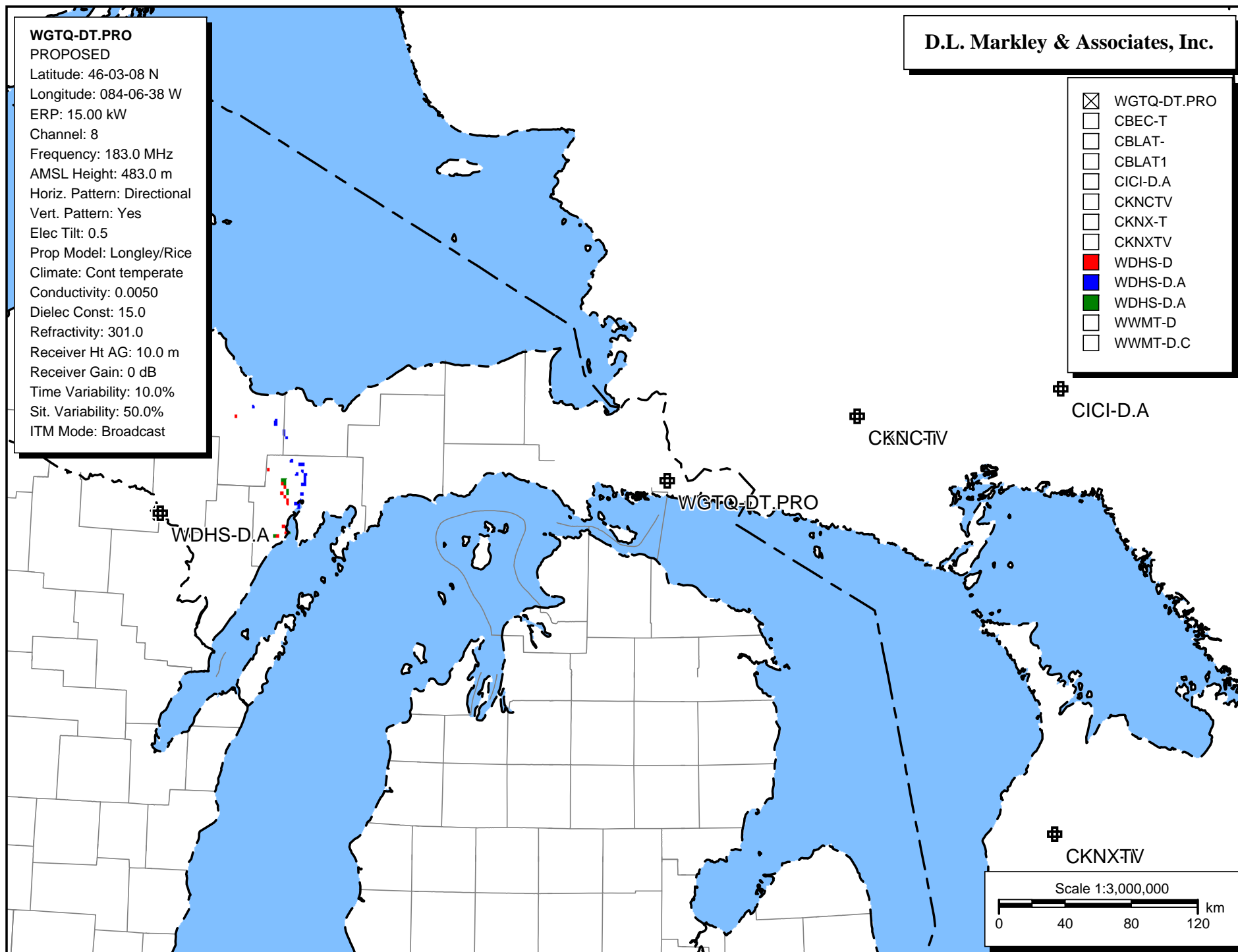


Exhibit E-4  
 Outgoing Interference Population Report  
 Based on Proposed WGTQ-DT Facilities.

WGTQ-DT.PRO (8) Sault Ste. Marie, MI - PROPOSED  
 Broadcast Type: Digital Service: V  
 Lat: 46-03-08 N Lng: 084-06-38 W ERP: 15.0 kW AMSL: 483.0 m  
 TV Outgoing Interference Study  
 Signal Resolution: 2.0 km  
 Consider NTSC Taboo: Yes  
 KWX error points are considered to  
     be interference free coverage.  
 Default # of radials computed for contours: 72  
 Contours calculated using 8 radial HAAT.  
 LR Profile Spacing Increment: 1.0 km  
 Masked interference points are being  
     counted as interference.  
 Pop Centroid DB: 2000 US Census (SF1)

Study Date: 6/19/2008  
 TV Database Date: 6/19/2008

Primary Terrain: V-Soft 3 Second US Terrain  
 Secondary Terrain: V-Soft 30 Second US Database

Population Database: 2000 US Census (SF1)

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 Stations Considered:

Call Letters	City	State	Dist	Bear
-----	-----	-----	-----	-----
CBEC-T (07-)	Elliot Lake	ON	120.8	71.5
CBLAT- (08+)	Manitouwadge	ON	366.5	340.1
CBLAT1 (08+)	Manitouwadge	ON	366.5	340.1
CICI-D.A (8)	Sudbury	ON	243.3	77.1
CKNCTV (07-)	Elliot Lake	ON	120.8	71.5
CKNX-T (08-)	Wingham	ON	315.9	132.6
CKNXTV (08-)	Wingham	ON	315.8	132.6
WDHS-D (8)	IRON MOUNTAIN	MI	306.0	266.6
WDHS-D.A (08)	Iron Mountain	MI	306.0	266.6
WDHS-D.A (08)	Iron Mountain	MI	306.0	266.6
WWMT-D (8)	KALAMAZOO	MI	396.6	197.2
WWMT-D.C (08)	Kalamazoo	MI	396.6	197.2

Call	Area	HUnits	Contour	Masked Ix	Unmasked Ix	%
-----	-----	-----	-----	-----	-----	-----
CBEC-T (07-)	0.0	0	0	0	0	0.0
CBLAT- (08+)	0.0	0	0	0	0	0.0
CBLAT1 (08+)	0.0	0	0	0	0	0.0
CICI-D.A (8)	0.0	0	0	0	0	0.0

CKNCTV (07-)	0.0	0	0	0	0	0.0
CKNX-T (08-)	0.0	0	0	0	0	0.0
CKNXTV (08-)	0.0	0	0	0	0	0.0
WDHS-D (8)	47.7	4,101	121,754	0	8,663	7.1
WDHS-D.A (08)	71.3	328	202,849	0	529	0.3
WDHS-D.A (08)	44.3	1,577	126,513	0	3,346	2.6
WWMT-D (8)	0.0	0	2,375,418	0	0	0.0
WWMT-D.C (08)	0.0	0	2,368,197	0	0	0.0

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	Housing Units	Population
Michigan		
Alger County		
Total	5,964	9,862
WDHS-D.A (08)	10	15
Delta County		
Total	19,223	38,520
WDHS-D (8)	4,101	8,663
WDHS-D.A (08)	291	464
WDHS-D.A (08)	1,577	3,346
Marquette County		
Total	32,877	64,634
WDHS-D.A (08)	27	50

**WGTV-DT.PRO**

PROPOSED

Latitude: 46-03-08 N

Longitude: 084-06-38 W

ERP: 15.00 kW

Channel: 8

Frequency: 183.0 MHz

AMSL Height: 483.0 m

Horiz. Pattern: Directional

Vert. Pattern: Yes

Elec Tilt: 0.5

Prop Model: Longley/Rice

Climate: Cont temperate

Conductivity: 0.0050

Dielec Const: 15.0

Refractivity: 301.0

Receiver Ht AG: 10.0 m

Receiver Gain: 0 dB

Time Variability: 90.0%

Sit. Variability: 50.0%

ITM Mode: Broadcast

**D.L. Markley & Associates, Inc.**

- ☒ WGTV-DT.PRO
- ☐ CBEC-T
- CBLAT-
- CBLAT1
- CICI-D.A
- ☐ CKNCTV
- CKNX-T
- CKNXTV
- WDHS-D
- WDHS-D.A

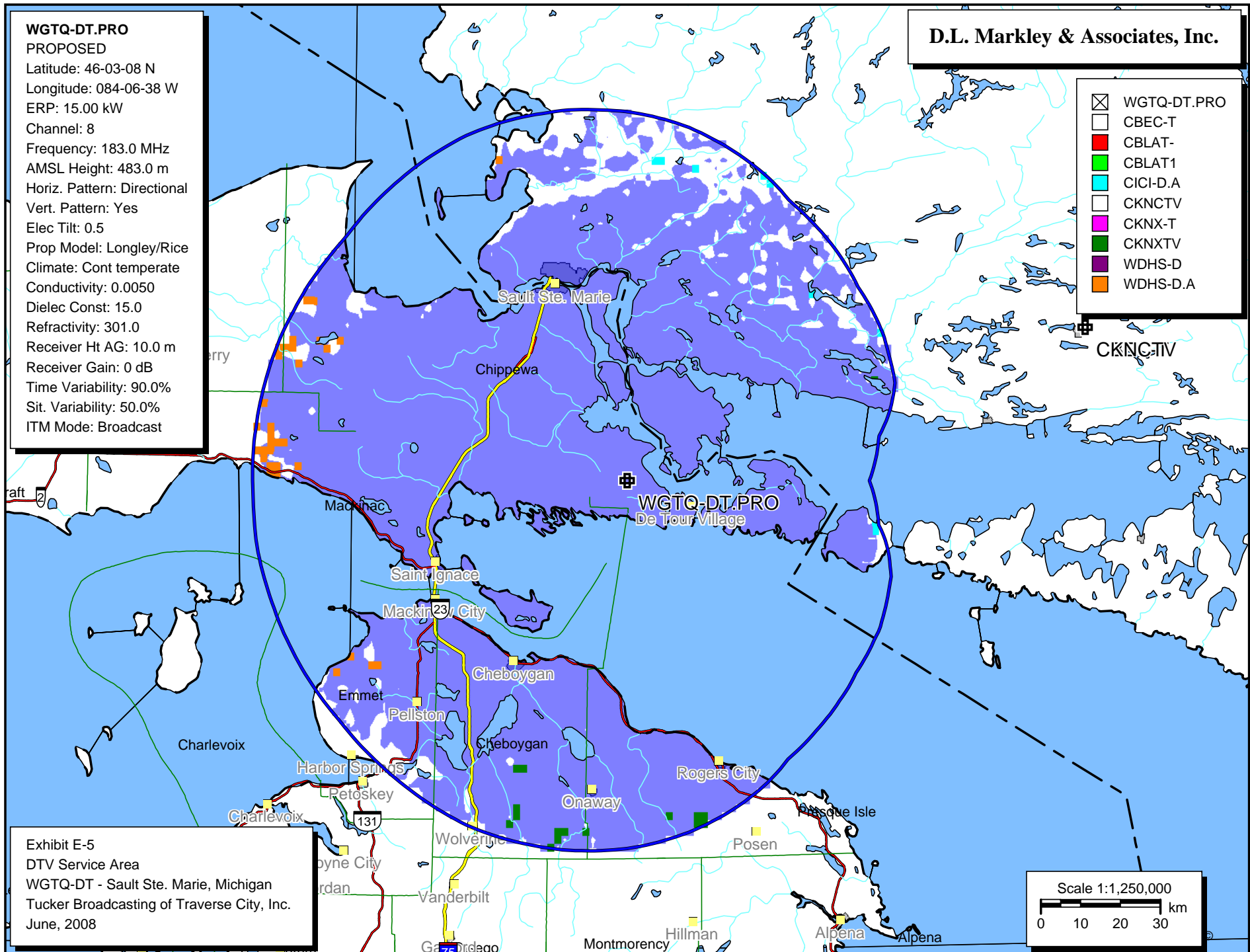


Exhibit E-5

DTV Service Area

WGTV-DT - Sault Ste. Marie, Michigan

Tucker Broadcasting of Traverse City, Inc.

June, 2008

Scale 1:1,250,000

0 10 20 30 km

# Exhibit E-6

## DTV Service Area Tabulation and Summary of Population and Interference Based on Proposed Facilities.

WGTQ-DT.PRO (8) Sault Ste. Marie, MI - PROPOSED

Broadcast Type: Digital Service: V

Lat: 46-03-08 N Lng: 084-06-38 W ERP: 15.0 kW AMSL: 483.0 m

TV Incoming Interference Study

Interference Considered Within: FCC Contour: 36 dBu

Signal Resolution: 2.0 km

LR Profile Spacing Increment: 1.0 km

Consider NTSC Taboo: Yes

KWX error points are considered to  
be interference free coverage.

# of radials computed for protected contour: 360

Threshold for reception: 36.0

Pop Centroid DB: 2000 US Census (SF1)

Study Date: 6/19/2008

TV Database Date: 6/19/2008

Primary Terrain: V-Soft 3 Second US Terrain

Secondary Terrain: V-Soft 30 Second US Database

Population Database: 2000 US Census (SF1)

Percentages calculated using a baseline population of 96,613.

Stations which cause interference:

Call Letters	H Units	Population	%	Area (sq. km)
CBLAT- (08+)	0	0	0.000	3.35
CBLAT1 (08+)	0	0	0.000	3.35
CICI-D.A (08Z)	0	0	0.000	43.92
CKNX-T (08-)	4	14	0.014	10.30
CKNXTV (08-)	206	178	0.184	61.87
WDHS-D (8)	0	0	0.000	6.79
WDHS-D.A (08)	199	224	0.232	220.47

Masking Summary:

Call Letters	Total Interference		Unique Interference	
	Population	%	Population	%
CBLAT- (08+)	0	0.000	0	0.000
CBLAT1 (08+)	0	0.000	0	0.000
CICI-D.A (08Z)	0	0.000	0	0.000
CKNX-T (08-)	14	0.014	0	0.000
CKNXTV (08-)	178	0.184	153	0.158
WDHS-D (8)	0	0.000	0	0.000
WDHS-D.A (08)	224	0.232	213	0.220

Stations considered which do not cause interference:

CBEC-T (07-)  
 CBLAT- (08+)  
 CBLAT1 (08+)  
 CICI-D.A (08Z)  
 CKNCTV (07-)  
 WDHS-D (8)

Call Letters	City	State	Dist	Bear
CBEC-T (07-)	Elliot Lake	ON	120.8	71.5
CBLAT- (08+)	Manitouwadge	ON	366.5	340.1
CBLAT1 (08+)	Manitouwadge	ON	366.5	340.1
CICI-D.A (08Z)	Sudbury	ON	243.3	77.1
CKNCTV (07-)	Elliot Lake	ON	120.8	71.5
CKNX-T (08-)	Wingham	ON	315.9	132.6
CKNXTV (08-)	Wingham	ON	315.8	132.6
WDHS-D (8)	IRON MOUNTAIN	MI	306.0	266.6
WDHS-D.A (08)	Iron Mountain	MI	306.0	266.6

Totals for WGTQ-DT.PRO (8)

Calculation Area Population:	96,465	(	23362.6 sq. km )
Not Affected by Terrain Loss:	92,506	(	22279.4 sq. km )
Total NTSC Interference:	178	(	65.2 sq. km )
DTV Only Interference:	213	(	247.4 sq. km )
Total DTV Interference:	224	(	264.4 sq. km )
Interfered Population:	391	(	312.6 sq. km )
Interference Free:	92,115	(	21966.8 sq. km )

Percent Interference: 0.40

Terrain Blocked Population:	3,959	(	1083.2 sq. km)
Contour Area Population:	96,613		

Interference Free Breakdown:

White:	78,062	(	84.7% )
Black:	2,296	(	2.5% )
Hispanic:	997	(	1.1% )
Native American:	7,537	(	8.2% )
Asian:	303	(	0.3% )
Pacific Islander:	22	(	0.0% )
Mixed Race:	2,855	(	3.1% )
Other:	43	(	0.0% )
Total:	92,115		

	Housing Units	Population	% of County
Michigan			
Cheboygan County			
County Pop	16,583	26,448	
WGTQ-DT.PRO (8)	15,435	24,770	
CKNXTV (08-)	27	47	0.19
WDHS-D.A (08)	7	11	0.04
Ix Free	15,408	24,723	99.81
Chippewa County			
County Pop	19,430	38,543	
WGTQ-DT.PRO (8)	18,471	37,916	
WDHS-D.A (08)	55	63	0.17
Ix Free	18,416	37,853	99.83
Emmet County			
County Pop	18,554	31,437	
WGTQ-DT.PRO (8)	6,141	10,310	
WDHS-D.A (08)	65	107	1.04
Ix Free	6,076	10,203	98.96
Luce County			
County Pop	4,008	7,024	
WGTQ-DT.PRO (8)	0	0	
Ix Free	0	0	
Mackinac County			
County Pop	9,413	11,943	
WGTQ-DT.PRO (8)	6,766	9,097	
WDHS-D (8)	0	0	0.00
WDHS-D.A (08)	72	43	0.47
Ix Free	6,694	9,054	99.53
Presque Isle County			
County Pop	9,910	14,411	
WGTQ-DT.PRO (8)	6,589	10,413	
CKNX-T (08-)	4	14	0.13
CKNXTV (08-)	179	131	1.26
Ix Free	6,410	10,282	98.74

**WGTO-DT.PRO**

PROPOSED

Latitude: 46-03-08 N

Longitude: 084-06-38 W

ERP: 15.00 kW

Channel: 8

Frequency: 183.0 MHz

AMSL Height: 483.0 m

Horiz. Pattern: Directional

Vert. Pattern: Yes

Elec Tilt: 0.5

Prop Model: Longley/Rice

Climate: Cont temperate

Conductivity: 0.0050

Dielec Const: 15.0

Refractivity: 301.0

Receiver Ht AG: 10.0 m

Receiver Gain: 0 dB

Time Variability: 90.0%

Sit. Variability: 50.0%

ITM Mode: Broadcast



City of License  
Sault Ste. Marie, MI**D.L. Markley & Associates, Inc.** > 43.0 dBu  
 36.0 - 43.0

Exhibit E-7

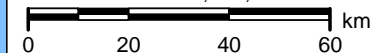
City of License Coverage

WGTO-DT - Sault Ste. Marie, Michigan

Tucker Broadcasting of Traverse City, Inc.

June, 2008

Scale 1:1,500,000

  
0 20 40 60 km





Proposal Number	Revision		
Date	06 Sep 2002		
Call Letters	WGTQ	Channel	8
Location	Sault Ste. Marie, MI		
Customer			
Antenna Type	THB-C2-6H/12HD-1		

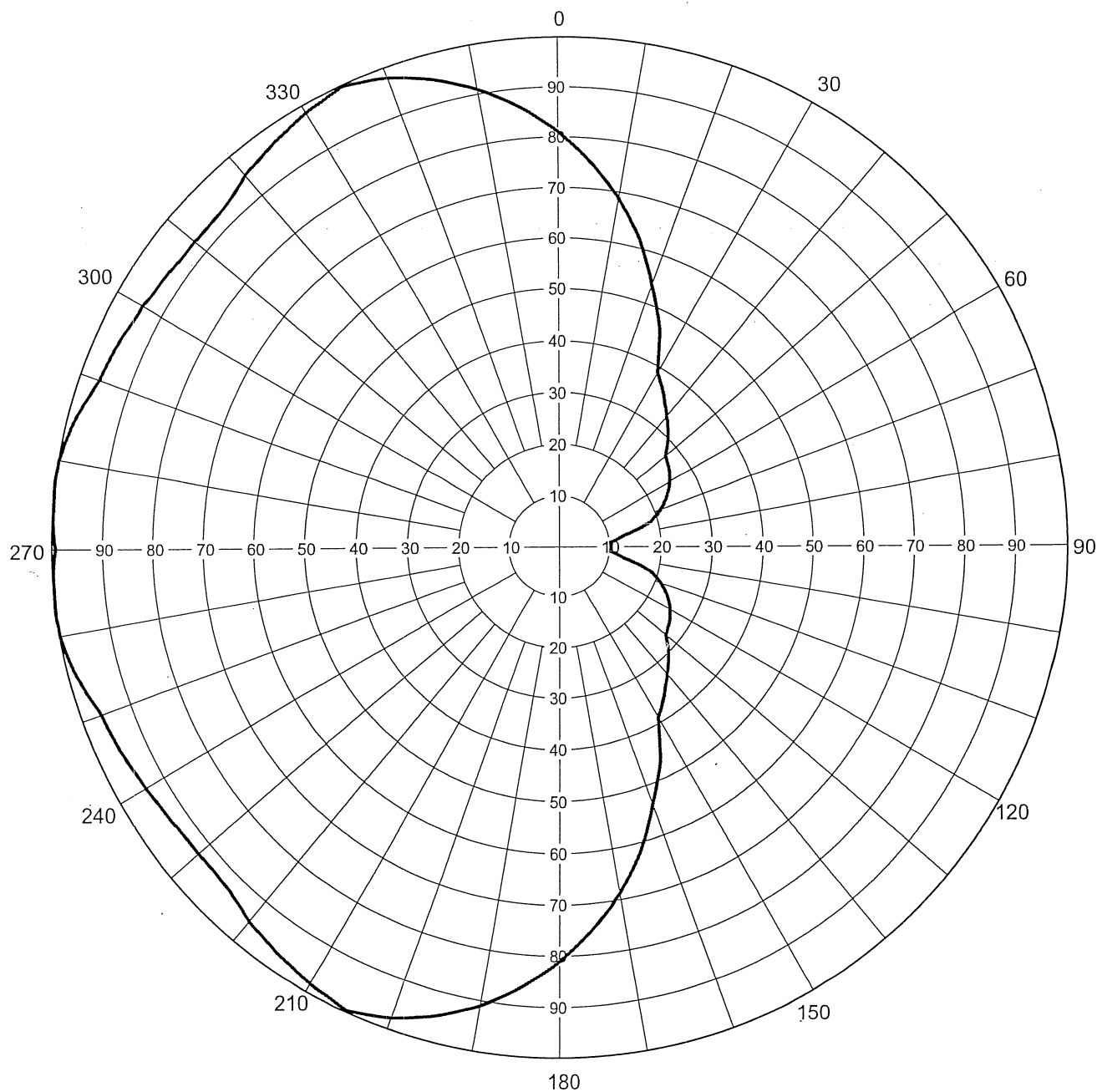
### AZIMUTH PATTERN

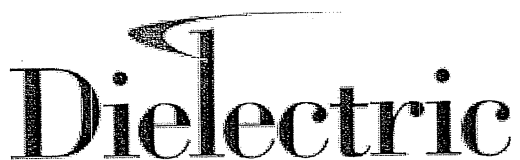
RMS Gain at Main Lobe  
Calculated / Measured

**1.85 (2.67 dB)**  
**Calculated**

Frequency  
Drawing #

**183 MHz**  
**THB-C2-8**

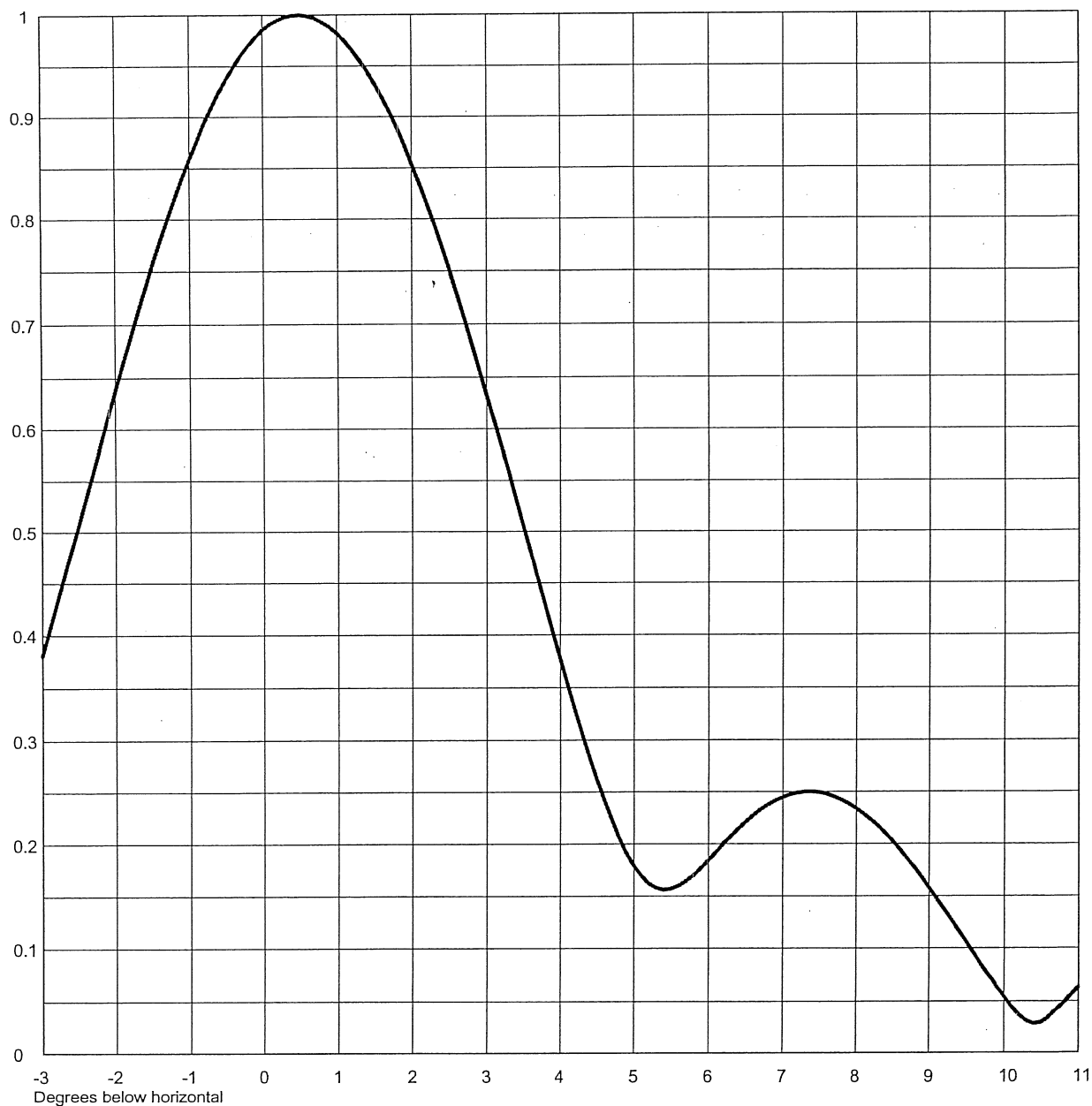




Proposal Number	Revision		
Date	06 Sep 2002		
Call Letters	WGTQ	Channel	8
Location	Sault Ste. Marie, MI		
Customer			
Antenna Type	THB-C2-6H/12HD-1		

### ELEVATION PATTERN

RMS Gain at Main Lobe	12.1 (10.83 dB)	Beam Tilt	0.50 Degrees
RMS Gain at Horizontal	11.7 (10.68 dB)	Frequency	183.00 MHz
Calculated / Measured	Calculated	Drawing #	06H121050





Proposal Number	Revision	
Date	06 Sep 2002	
Call Letters	WGTQ	Channel 8
Location	Sault Ste. Marie, MI	
Customer		
Antenna Type	THB-C2-6H/12HD-1	

### ELEVATION PATTERN

RMS Gain at Main Lobe	12.1 (10.83 dB)	Beam Tilt	0.50 Degrees
RMS Gain at Horizontal	11.7 (10.68 dB)	Frequency	183.00 MHz
Calculated / Measured	Calculated	Drawing #	06H121050-90

