

Technical Report Supporting a Minor Modification of a Licensed FM Translator

Pursuant to 47 C.F.R. Section 74:

for

*W278BQ.L - Manitowoc, WI
(Facility ID: 155590)*

*Non-Adjacent Channel Change per
47 C.F.R. Section 74.1233(a)(1)(i)(A)(2)
to
CH226D(93.1 MHz) - Manitowoc, WI*

*as a Commercial, Fill-In FM Translator
for WLKN(FM) - Cleveland, WI*

August, 2023

Asher Broadcast Consulting, LLC
justinasher@consultant.com
1(202)875-2986

Table of Contents

Table of Contents

Explanation of Technical Report

Exhibit 1 - Service Contour Study: Present vs Proposed Operations

Exhibit 2 - Service Contour Study: Proposed vs Primary Operations

Exhibit 3 - Copy of Existing Antenna Structure Registration

Exhibit 4 - Vertical Plan of Antenna System

Exhibit 5 - HAAT Calculation & Miscellaneous Coordinate Information

Exhibit 6 - Tabulation of Proposed Allocation

Exhibit 7(a-b) - Contour Protection Studies Toward Select Allocation Concern(s)

Exhibit 8 - Manufacturer's Directional Antenna Documentation

Supplemental Appendix(s):

RF Appendix 1 - Radio Frequency Radiation Compliance Showing

EXPLANATION OF PROPOSAL: This LMS filing and accompanying technical report supports a Minor Modification of a Licensed Facility (Construction Permit Application) for FM Translator W278BQ.L - Manitowoc, WI (Facility ID: 155590). This filing requests a 47 C.F.R. Section 74.1233(a)(1)(i)(A)(2) non-adjacent channel change from CH278D (103.5 MHz) to CH226D (93.1 MHz) based upon a showing of reduced interference. Operation on the new frequency of CH226D (93.1 MHz) with a directional power of 0.250 kW ERP circular polarization (H&V) is requested. The FM Translator will operate from a COR of 258.9 meters AMSL at the same (corrected coordinates) site location. This LMS Filing will continue to specify rebroadcast of Class A FM Primary Station WLKN(FM) - Cleveland, WI (CH251A, 98.1 MHz); Facility ID No. 67716. The Translator will continue to provide service to the community of Manitowoc, WI.

FACILITY COMPLIANCE SHOWINGS: The proposed Translator remains in compliance with 47 C.F.R. Section 74.1232 as noted herein. A map of the proposed 60 dBμ service contour in relation to the present 60 dBμ service contour has been included in **Exhibit 1**. The minor change proposed service area will overlap a portion of the presently licensed service area as noted in the exhibit. The proposed 60 dBμ contour of the Translator lies wholly inside the larger FM Class A primary 60 dBμ contour. The primary station service contour relationship has been plotted in **Exhibit 2**. Regarding permission to retransmit the Primary Station; both WLKN(FM) and CH226D.P(W278BQ) are under common control of Magnum Communications, Inc. (David R. Magnum); therefore, permission to rebroadcast is implied.

The proposed facility will be located on the tower bearing Antenna Structure Registration Number 1034205. In support of this filing, a copy of the ASRN has been included in **Exhibit 3**. A depiction of the tower and antenna configuration has been included in **Exhibit 4**. Further notification to the FAA or ASR governing authorities is not required as this proposal will not increase the overall tower height.

The applicant would like to note use of the NED 03 second terrain database for all allocation, contour and HAAT showings contained herein. A copy of the proposed HAAT calculation, demonstrating compliance with 47 C.F.R. Section 74.1235, has been included in ***Exhibit 5***.

The applicant certifies compliance with 47 C.F.R. Section 74.1234 regarding access to the transmitter site, at all hours and in all seasons; and/or providing means to turn on and off, at will, the transmitting apparatus from a point which is readily accessible at all hours and in all seasons. In addition, the transmitter is equipped with suitable automatic circuits which will place it in a non-radiating condition in the absence of a signal on the input channel; with the transmitting apparatus adequately protected against tampering by unauthorized persons.

ALLOCATION COMPLIANCE SHOWINGS: The proposed Translator remains in compliance with 47 C.F.R. Section 74.1204 & 74.1205 toward all allocation protection. A general allocation study for this proposal is found in ***Exhibit 6***. There are two (2) additional facilities, existing or proposed, close enough to merit further study. Therefore, a supplemental contour protection study has been provided toward each facility as included in ***Exhibit(s) 7(a-b)***. A copy of the manufacturer's directional antenna specifications has been included in ***Exhibit 8***.

Regarding protection of international concerns, the facility is, and will remain, more than 320 km from the common border between the United States and Canada or Mexico. As a result, no further international protection showings are believed required.

ENVIRONMENTAL COMPLIANCE SHOWINGS: The proposed facility complies with the maximum permissible radiofrequency electromagnetic exposure limits for controlled and uncontrolled environments as set forth under §1.1310 and/or §1.1307(b)(3) of the Commission's rules and the RF radiation protection guidelines as set forth in OET Bulletin No. 65 (Edition 97-01), and the accompanying Supplement A, (Edition 97-01). Compliance has been demonstrated in the attached **RF Appendix 1** of this filing. The facility is, or will be, properly marked with signs. Entry is, or will be, restricted by means of fencing, locked doors or gates. In addition, coordination with other users of the site will be secured to reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic fields in excess of FCC guidelines.

Regarding compliance with the NEPA, Nationwide Programmatic Agreement and NHPA Section 106 for tower co-location, compliance with the Agreement is not required where no new tower construction is being proposed and the tower is not being substantially altered. Specifically, compliance is not necessary where only an antenna and feedline are being reused on an existing structure, as here. However, should the Commission determine compliance is necessary, upon notification to the applicant, the applicant will file FCC Form 621.

CERTIFICATION OF TECHNICAL CONSULTANT: *I declare, under penalty of perjury, that the contents of this report are true and accurate to the best of my knowledge and belief. I further certify I have over twenty-four years of experience as a broadcast technical consultant before the Federal Communications Commission ("the FCC"); and am familiar with the Code of Federal Regulations Title 47 ("the Rules") as pertaining to this report and its contents herein. The underlying data utilized in this report was taken directly from FCC databases or indirectly through third party software vendors securing data directly from FCC databases. This firm cannot be held liable for errors or omissions resulting from the underlying data. The information contained herein is believed accurate to the date reported below.*

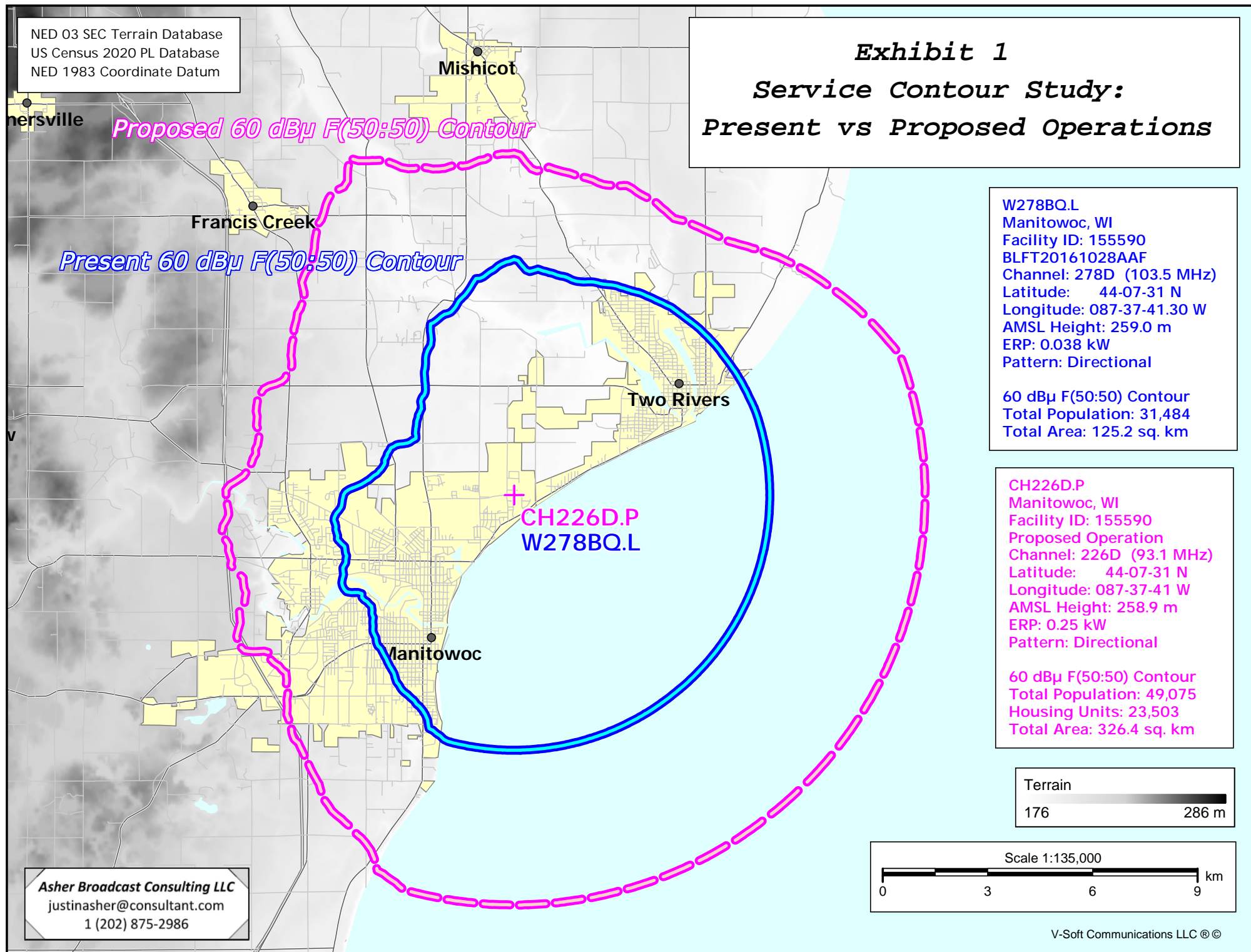


Justin W. Asher
Technical Consultant
August 20, 2023

NED 03 SEC Terrain Database
US Census 2020 PL Database
NED 1983 Coordinate Datum

Exhibit 1

Service Contour Study: Present vs Proposed Operations



Asher Broadcast Consulting LLC
justinasher@consultant.com
1 (202) 875-2986

Exhibit 2
Service Contour Study:
Proposed vs Primary Operations

Primary 60 dBμ F(50:50) Contour

Proposed 60 dBμ F(50:50) Contour

CH226D.P

WLKN.L

WLKN.L
Cleveland, WI
Facility ID: 67716
BLH19991025AET
Channel: 251A (98.1 MHz)
Latitude: 43-59-03 N
Longitude: 087-45-55.30 W
AMSL Height: 310.0 m
ERP: 5.80 kW
Pattern: Omni

CH226D.P
Manitowoc, WI
Facility ID: 155590
Proposed Operation
Channel: 226D (93.1 MHz)
Latitude: 44-07-31 N
Longitude: 087-37-41 W
AMSL Height: 258.9 m
ERP: 0.25 kW
Pattern: Directional

Terrain
176 393 m

NED 03 SEC Terrain Database
US Census 2020 PL Database
NAD 1983 Coordinate Datum

Scale 1:350,000
0 6 12 18 km

Asher Broadcast Consulting LLC
justinasher@consultant.com
1 (202) 875-2986

V-Soft Communications LLC ©

Exhibit 3

Copy of Existing Antenna Structure Registration

(public record copy)

Registration Detail

Reg Number	1034205	Status	Constructed
File Number	A0982825	Constructed	01/17/1986
EMI	No	Dismantled	
NEPA	No		

Antenna Structure

Structure Type

Location (in NAD83 Coordinates)

Lat/Long	44-07-31.0 N 087-37-41.0 W	Address	1915 MIRRO DR
City, State	MANITOWOC , WI		
Zip	54220	County	MANITOWOC
Center of AM Array		Position of Tower in Array	

Heights (meters)

Elevation of Site Above Mean Sea Level	Overall Height Above Ground (AGL)
182.9	152.0
Overall Height Above Mean Sea Level	Overall Height Above Ground w/o Appurtenances
334.9	151.0

Painting and Lighting Specifications

FAA Chapters 3, 4, 5, 9
Paint and Light in Accordance with FAA Circular Number 70/7460-1F

FAA Notification

FAA Study	83-AGL-1439-OE	FAA Issue Date	10/01/1984
-----------	----------------	----------------	------------

Owner & Contact Information

FRN	0002641918	Owner Entity Type	Corporation
-----	------------	-------------------	-------------

Owner

Seehafer Broadcasting Corp WQTC WLTV
Attention To: Mark Seehafer
P.O. Box 1385
Manitowoc , WI 54221

P: (920)682-0351
F:
E: mseehafer@womtradio.com

Contact

Attention To: Mark Seehafer
P.O. Box 1385
Manitowoc , WI 54221

P: (920)682-0351
F:
E: mseehafer@womtradio.com

Last Action Status

Status	Constructed	Received	11/06/2015
Purpose	Admin Update	Entered	11/06/2015
Mode	Interactive		

Related Applications

12/22/2015	A0985304 - Duplicate (DU)
11/06/2015	A0982825 - Admin Update (AU)
11/06/2015	A0982667 - Admin Update (AU)

Related applications (4)

Comments

Comments

None

History

Date

12/23/2015
12/22/2015
11/07/2015

Event

Registration Printed
Duplicate Registration Request Received
Registration Printed

All History (9)

Pleadings

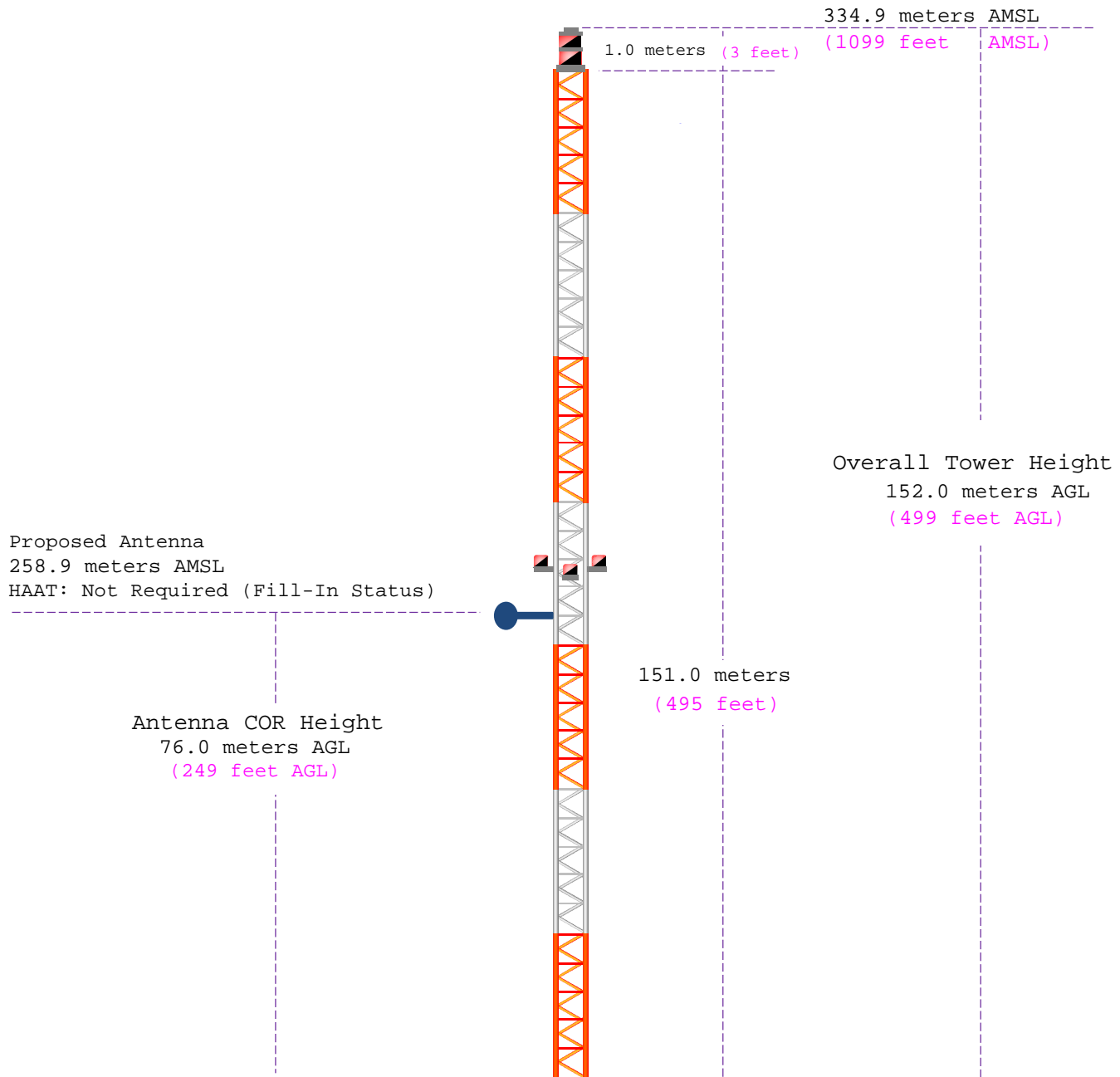
Pleading Type	Filer Name	Description	Date Entered
None			

Automated Letters

None

Exhibit 4

Vertical Plan of Antenna System and Support Tower



Ground Elevation: 182.9 meters AMSL (600 feet AMSL)		
Address: 1915 MIRRO DR		
City: MANITOWOC		
County: MANITOWOC		
State: WISCONSIN		
Antenna Structure Registration		Latitude (D M S) Longitude (D M S)
1034205		--- --- (NAD 1927)
		Lat/Long: 44-07-31.0 N 087-37-41.0 W (NAD 1983)
Drawing Is Not To Scale		Asher Broadcast Consulting, LLC justinasher@consultant.com 1(202)875-2986

Exhibit 5

HAAT and Miscellaneous Coordinate Information

HAAT Calculation (NAD 1983):

N. Lat. = 440731.0 W. Lng. = 873741.0
 HAAT and Distance to Contour,
 FCC, FM 2-10 Mi, 51 pts Method - NED 03 SEC

Azi.	AV EL	HAAT	ERP kW	dBk	Field	60-F5
000	188.9	70.0	0.1600	-7.96	0.800	9.76
030	188.9	70.0	0.1225	-9.12	0.700	9.12
060	178.3	80.6	0.2025	-6.94	0.900	11.04
090	176.5	82.4	0.2500	-6.02	1.000	11.73
120	176.7	82.2	0.2500	-6.02	1.000	11.72
150	177.0	81.9	0.2500	-6.02	1.000	11.70
180	177.0	81.9	0.2500	-6.02	1.000	11.70
210	195.8	63.1	0.2500	-6.02	1.000	10.41
240	212.5	46.4	0.2500	-6.02	1.000	8.89
270	218.4	40.5	0.2500	-6.02	1.000	8.22
300	226.5	32.4	0.2500	-6.02	1.000	7.33
330	200.3	58.6	0.2500	-6.02	1.000	10.07

Ave EL= 193.06 M HAAT= 65.84 M AMSL= 258.9 M

NAD 1983 to NAD 1927 Conversion:

Various Coordinate Conversion Calculations (NAD 1983):

Position Type	Lat Lon
Degrees Lat Long	44.1252778°, -087.6280556°
Degrees Minutes	44°07.51667', -087°37.68333'
Degrees Minutes Seconds	44°07'31.0000", -087°37'41.0000"
UTM	16T 449752mE 4885979mN
UTM centimeter	16T 449752.24mE 4885979.06mN
MGRS	16TDP4975285979
Grid North	-0.4°
GARS	185ME45
Maidenhead	EN64ED40PB16
GEOREF	GJCQ22310751
Plus Code	86PJ49GC+4Q
Plus Code Extended	86PJ49GC+4Q82HPR
what3words	marsh.track.nagged

Exhibit 6

Tabulation of Proposed Allocation

Blue Text indicates contour protection studies toward select stations as included in ***Exhibit(s) 7(a-b)***.

REFERENCE		CH# 226D - 93.1 MHz, Pwr= 0.25 kW DA, HAAT= 65.8 M, COR= 258.9 M								DISPLAY DATES	
44 07 31.00 N.		Average Protected F(50-50)= 10.6 km								DATA 08-18-23	
87 37 41.00 W.		Standard Directional								SEARCH 08-19-23	
CH CITY	CALL	TYPE STATE	ANT ---	AZI FILE #	DIST LNG	PWR(kW) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*	
225A Chilton	WKZY	LIC NCN WI	263.6 83.2	50.54 BLH20121015AAA	44 04 22.60 88 15 24.70	5.800 102	43.5 362	27.8 Woodward Communications, I	-1.1	10.8	
226D Green Bay	W226BD	LIC _CN WI	323.1 142.8	49.10 BLFT20090611ABY	44 28 40.00 87 59 59.40	0.250 40	23.8 249	7.1 Midwest Communications, In	14.9	9.7	
224A Kewaunee	WEZY	LIC _CN WI	4.5 184.6	41.48 BMLH20020403AAK	44 29 50.00 87 35 12.30	6.000 100	2.8 322	29.1 Magnum Broadcasting, Inc.	28.9	11.4	
229A Sheboygan	WBFB	LIC _CN WI	190.8 10.7	45.85 BLH19930225KB	43 43 12.00 87 44 04.30	6.000 77	2.7 277	27.7 Midwest Communications, In	31.5	17.1	
226C1 Iron Mountain	WIMK	LIC _CN MI	350.4 170.1	191.29 BMLH20140402ACM	45 49 14.80 88 02 30.50	100.000 180	161.7 526	63.8 Amc Partners Escanaba, LLC	19.4	95.8	
227B Milwaukee	WLDB	LIC NCN WI	191.1 10.9	116.56 BLH20050923AAH	43 05 46.00 87 54 15.30	16.000 270	78.8 468	67.0 Milwaukee Radio Alliance,	26.1	24.9	
228C2 New London	WGEE	LIC _CN WI	302.9 122.3	86.93 BLH19890911KB	44 32 46.90 88 32 57.30	50.000 150	6.0 388	52.4 Midwest Communications, In	72.0	33.4	
223B West Bend	WMBZ	LIC _CN WI	215.1 34.7	94.34 BLH19950601KA	43 25 45.90 88 18 02.30	17.500 164	4.8 474	58.0 Magnum Communications, Inc	78.6	34.7	
226D Ripon	W226CQ	LIC _CN WI	251.0 70.1	103.39 BLFT20181109ABA	43 48 55.90 88 50 47.40	0.250 373	44.1 373	12.8 Hometown Broadcasting, LLC	50.5	63.4	
227C3 Onkama	762337	CP NCN MI	70.6 251.7	125.45 0000158413	44 29 23.90 86 08 08.70	7.000 108	51.4 343	34.0 62.3	73.3		
227D Sturgeon Bay	W227CH	LIC _CN WI	14.4 194.6	82.09 BLFT20141119AHN	44 50 24.90 87 22 10.30	0.080 233	7.5 233	5.3 Kemma Communications LLC	65.1	63.1	
229D Fond Du Lac	W229DE	LIC _CN WI	239.4 58.9	76.39 BLFT20180822AAQ	43 46 21.90 88 26 50.30	0.250 268	1.1 268	7.1 Radio Plus, Inc.	66.4	68.2	
226A Ferrysburg	WMPA	LIC NCN MI	136.3 317.2	163.02 BLH20120723ADX	43 03 25.10 86 14 28.20	6.000 65	81.5 249	24.3 Wghn, Inc.	69.8	98.6	
226A Ferrysburg	WMPA	APP NCN MI	136.3 317.2	163.02 0000186979	43 03 25.10 86 14 28.20	6.000 65	81.5 249	24.3 Wghn, Inc.	69.8	98.6	
225L1 Oconto Falls	WPPS-LP	LIC _CN WI	330.4 150.0	91.44 BLL20170125AGM	44 50 20.90 88 12 02.40	0.100 30	265	70.7 St. Padre Pio Radio, Inc	70.3		
226A De Forest	WJQM	LIC ZEN WI	230.5 49.4	166.85 BMLH20070802ADL	43 09 34.00 89 12 55.40	6.000 98	83.8 378	27.4 Mid-West Management, Inc.	73.3	111.3	

Terrain database is NED 03 SEC , R= 73.215 qualifying spacings or FCC minimum Spacings in KM, M= Margin in KM
In & Out distances between contours are shown at closest points. Reference zone= East Zone, Co to 3rd adjacent.
All separation margins (if shown) include rounding.
Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, _= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)
"affixed to 'IN' or 'OUT' values = site inside restricted contour.
< = Station meets FCC minimum distance spacing for its class.
Reference station has protected zone issue: AM tower

Exhibit 7a

Contour Protection Studies Toward Select Allocation Concern(s)

FMCommander Single Allocation Study - 08-19-2023 - NED 03 SEC
CH226D.P's Overlaps (In= -1.1 km, Out= 10.81 km)

CH226D.P CH 226 D DA
Lat= 44 07 31.00, Lng= 87 37 41.00
0.25 kW 65.8 m HAAT, 258.9 m COR
Prot.= 60 dBu, Intef.= 54 dBu

WKZY CH 225 A 73.215 N BLH20121015AAA
Lat= 44 04 22.60, Lng= 88 15 24.70
5.8 kW 102 m HAAT, 361.5 m COR
Prot.= 60 dBu, Intef.= 54 dBu

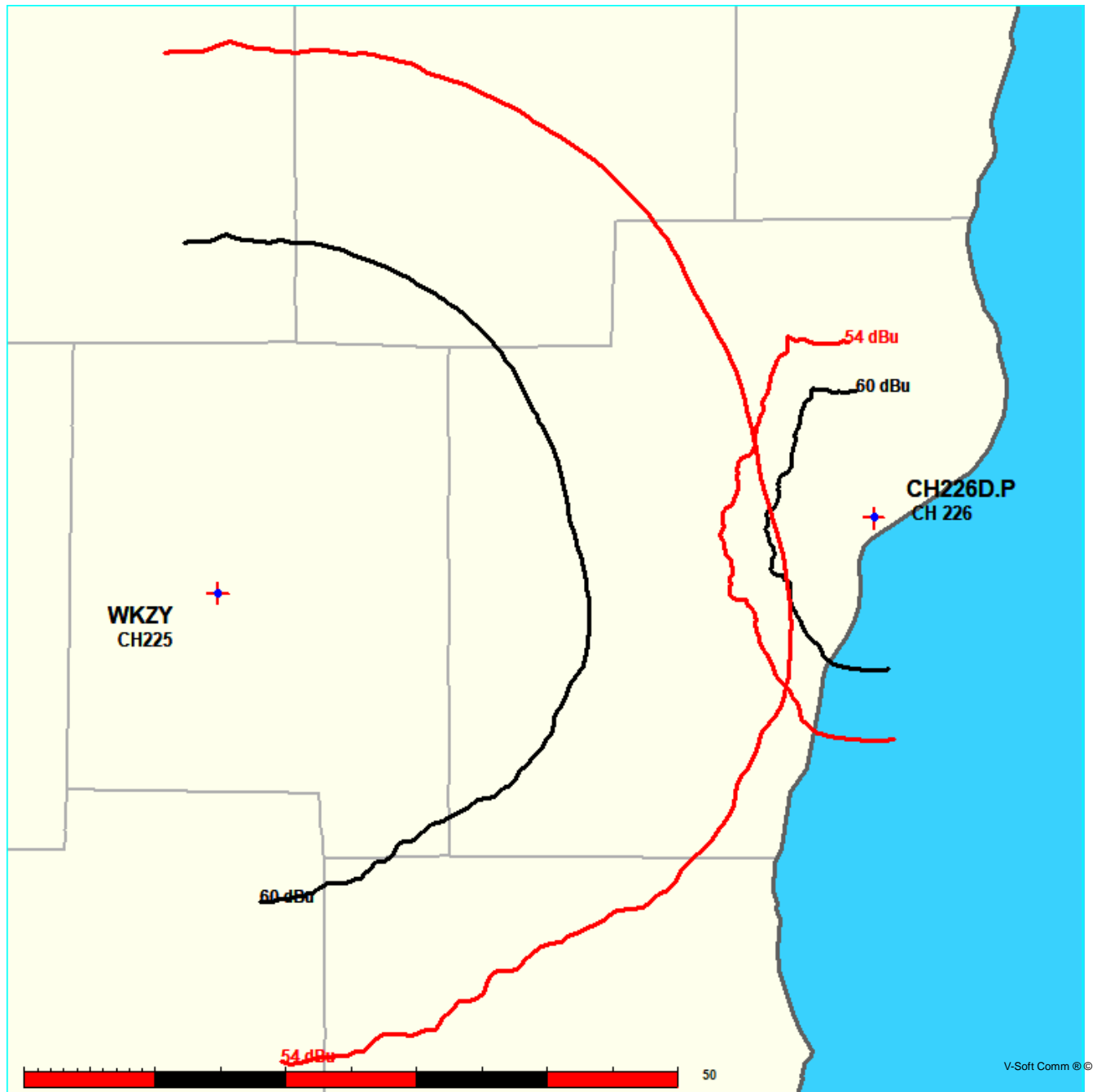


Exhibit 7a

Contour Protection Studies Toward Select Allocation Concern(s)

08-19-2023

Terrain Data: NED 03 SEC

FMOver Analysis

CH226D.P

WKZY BLH20121015AAA

Channel = 226D
 Max ERP = 0.25 kW
 RCAMSL = 258.9 m
 N. Lat. 44 07 31.00
 W. Lng. 87 37 41.00
 Protected
 60 dBu

Channel = 225A
 Max ERP = 5.8 kW
 RCAMSL = 361.5 m
 N. Lat. 44 04 22.60
 W. Lng. 88 15 24.70
 Interfering
 54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
222.0	000.2500	0051.1	009.4	091.3	005.8000	0102.2	044.0	53.94	
223.0	000.2500	0050.3	009.3	091.1	005.8000	0102.2	043.9	53.96	
224.0	000.2500	0048.9	009.2	090.8	005.8000	0102.2	043.9	53.97	
225.0	000.2500	0048.3	009.1	090.6	005.8000	0102.1	043.8	53.99	
226.0	000.2500	0047.7	009.0	090.4	005.8000	0102.0	043.7	54.01*	0.03
227.0	000.2500	0046.1	008.9	090.1	005.8000	0101.8	043.8	53.98	
228.0	000.2500	0044.9	008.7	089.8	005.8000	0101.5	043.7	53.97	
229.0	000.2500	0043.3	008.5	089.5	005.8000	0101.2	043.8	53.93	
230.0	000.2500	0042.9	008.5	089.3	005.8000	0101.0	043.7	53.94	
231.0	000.2500	0041.7	008.4	089.1	005.8000	0100.9	043.7	53.92	
232.0	000.2500	0040.9	008.3	088.9	005.8000	0100.8	043.7	53.92	
233.0	000.2500	0041.2	008.3	088.7	005.8000	0100.7	043.6	53.96	
234.0	000.2500	0041.2	008.3	088.6	005.8000	0100.7	043.5	53.99	
235.0	000.2500	0041.8	008.4	088.5	005.8000	0100.6	043.4	54.04*	0.11
236.0	000.2500	0041.9	008.4	088.3	005.8000	0100.6	043.3	54.08*	0.21
237.0	000.2500	0041.0	008.3	088.1	005.8000	0100.6	043.3	54.08*	0.20
238.0	000.2500	0042.2	008.4	088.0	005.8000	0100.6	043.1	54.15*	0.38
239.0	000.2500	0044.6	008.7	088.0	005.8000	0100.6	042.8	54.28*	0.70
240.0	000.2500	0046.4	008.9	088.0	005.8000	0100.6	042.5	54.38*	0.95
241.0	000.2500	0046.8	008.9	087.8	005.8000	0100.6	042.4	54.43*	1.06
242.0	000.2500	0046.9	008.9	087.6	005.8000	0100.5	042.4	54.45*	1.10
243.0	000.2500	0046.4	008.9	087.4	005.8000	0100.3	042.3	54.44*	1.09
244.0	000.2500	0045.2	008.8	087.1	005.8000	0100.1	042.4	54.41*	1.00
245.0	000.2500	0044.0	008.6	086.9	005.8000	0100.0	042.5	54.37*	0.91
246.0	000.2500	0043.6	008.6	086.7	005.8000	0099.9	042.4	54.36*	0.89
247.0	000.2500	0043.1	008.5	086.5	005.8000	0099.7	042.5	54.35*	0.86
248.0	000.2500	0041.2	008.3	086.2	005.8000	0099.6	042.6	54.28*	0.68
249.0	000.2500	0040.6	008.2	086.0	005.8000	0099.4	042.6	54.25*	0.63
250.0	000.2500	0039.8	008.1	085.7	005.8000	0099.3	042.7	54.22*	0.55
251.0	000.2500	0039.9	008.1	085.6	005.8000	0099.2	042.6	54.23*	0.57
252.0	000.2500	0039.6	008.1	085.4	005.8000	0099.0	042.6	54.22*	0.55
253.0	000.2500	0039.3	008.1	085.2	005.8000	0098.9	042.6	54.21*	0.52
254.0	000.2500	0040.1	008.2	085.0	005.8000	0098.8	042.5	54.25*	0.62

Exhibit 7a
Contour Protection Studies Toward Select Allocation Concern(s)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
255.0	000.2500	0040.8	008.3	084.8	005.8000	0098.7	042.4	54.29* 0.71
256.0	000.2500	0041.5	008.3	084.7	005.8000	0098.7	042.3	54.33* 0.81
257.0	000.2500	0041.0	008.3	084.5	005.8000	0098.6	042.3	54.30* 0.75
258.0	000.2500	0041.1	008.3	084.3	005.8000	0098.5	042.3	54.31* 0.77
259.0	000.2500	0041.3	008.3	084.1	005.8000	0098.5	042.3	54.32* 0.79
260.0	000.2500	0040.9	008.3	083.9	005.8000	0098.4	042.3	54.31* 0.75
261.0	000.2500	0041.4	008.3	083.7	005.8000	0098.3	042.2	54.32* 0.80
262.0	000.2500	0042.2	008.4	083.5	005.8000	0098.1	042.1	54.34* 0.85
263.0	000.2500	0042.1	008.4	083.3	005.8000	0097.9	042.1	54.32* 0.79
264.0	000.2500	0041.7	008.4	083.1	005.8000	0097.6	042.2	54.28* 0.70
265.0	000.2500	0040.7	008.2	082.9	005.8000	0097.4	042.3	54.22* 0.54
266.0	000.2500	0040.1	008.2	082.7	005.8000	0097.3	042.4	54.17* 0.43
267.0	000.2500	0040.0	008.2	082.5	005.8000	0097.2	042.4	54.16* 0.40
268.0	000.2500	0040.3	008.2	082.3	005.8000	0097.1	042.4	54.16* 0.39
269.0	000.2500	0040.4	008.2	082.1	005.8000	0097.0	042.4	54.15* 0.37
270.0	000.2500	0040.5	008.2	081.9	005.8000	0096.9	042.4	54.15* 0.36
271.0	000.2500	0040.6	008.2	081.7	005.8000	0096.9	042.4	54.14* 0.35
272.0	000.2500	0039.7	008.1	081.6	005.8000	0097.0	042.5	54.09* 0.22
273.0	000.2500	0037.8	007.9	081.4	005.8000	0096.9	042.8	53.99
274.0	000.2500	0036.2	007.7	081.3	005.8000	0096.9	043.0	53.91
275.0	000.2500	0035.4	007.6	081.2	005.8000	0096.8	043.1	53.85
276.0	000.2500	0034.6	007.6	081.0	005.8000	0096.7	043.2	53.80
277.0	000.2500	0034.5	007.5	080.9	005.8000	0096.6	043.2	53.77
278.0	000.2500	0034.2	007.5	080.7	005.8000	0096.5	043.3	53.73
279.0	000.2500	0033.7	007.5	080.6	005.8000	0096.4	043.4	53.69
280.0	000.2500	0034.0	007.5	080.4	005.8000	0096.3	043.4	53.68
281.0	000.2500	0033.6	007.5	080.2	005.8000	0096.3	043.5	53.64
282.0	000.2500	0033.7	007.5	080.1	005.8000	0096.2	043.5	53.62
283.0	000.2500	0033.7	007.5	079.9	005.8000	0096.1	043.6	53.59
284.0	000.2500	0034.1	007.5	079.7	005.8000	0096.0	043.6	53.58
285.0	000.2500	0035.1	007.6	079.5	005.8000	0096.0	043.5	53.59
286.0	000.2500	0035.3	007.6	079.3	005.8000	0095.9	043.6	53.57
287.0	000.2500	0035.6	007.7	079.2	005.8000	0095.7	043.6	53.55
288.0	000.2500	0036.3	007.7	079.0	005.8000	0095.5	043.6	53.53
289.0	000.2500	0036.5	007.8	078.8	005.8000	0095.3	043.6	53.50
290.0	000.2500	0036.8	007.8	078.6	005.8000	0095.2	043.7	53.47
291.0	000.2500	0037.3	007.9	078.4	005.8000	0095.1	043.7	53.45
292.0	000.2500	0036.6	007.8	078.3	005.8000	0095.0	043.8	53.39
293.0	000.2500	0036.4	007.8	078.2	005.8000	0095.0	043.9	53.36
294.0	000.2500	0035.4	007.6	078.1	005.8000	0095.1	044.1	53.29
295.0	000.2500	0034.0	007.5	078.1	005.8000	0095.1	044.3	53.21
296.0	000.2500	0032.9	007.4	078.1	005.8000	0095.1	044.5	53.15
297.0	000.2500	0032.4	007.3	078.0	005.8000	0095.1	044.6	53.11
298.0	000.2500	0032.5	007.3	077.8	005.8000	0095.2	044.7	53.08

Exhibit 7a

Contour Protection Studies Toward Select Allocation Concern(s)

08-19-2023 Terrain Data: NED 03 SEC FMOver Analysis

WKZY BLH20121015AAA

CH226D.P

Channel = 225A
 Max ERP = 5.8 kW
 RCAMSL = 361.5 m
 N. Lat. 44 04 22.60
 W. Lng. 88 15 24.70
 Protected
 60 dBu

Channel = 226D
 Max ERP = 0.25 kW
 RCAMSL = 258.9 m
 N. Lat. 44 07 31.00
 W. Lng. 87 37 41.00
 Interfering
 54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
038.0	005.8000	0099.6	028.0	296.5	000.2500	0032.7	036.6	34.19	
039.0	005.8000	0099.9	028.1	296.4	000.2500	0032.7	036.2	34.38	
040.0	005.8000	0100.6	028.2	296.3	000.2500	0032.7	035.7	34.57	
041.0	005.8000	0100.8	028.2	296.2	000.2500	0032.8	035.2	34.76	
042.0	005.8000	0101.0	028.2	296.0	000.2500	0032.9	034.7	34.96	
043.0	005.8000	0101.0	028.2	295.7	000.2500	0033.1	034.2	35.17	
044.0	005.8000	0101.0	028.2	295.5	000.2500	0033.3	033.8	35.40	
045.0	005.8000	0101.0	028.2	295.2	000.2500	0033.7	033.3	35.66	
046.0	005.8000	0101.0	028.2	294.9	000.2500	0034.1	032.8	35.93	
047.0	005.8000	0101.2	028.2	294.6	000.2500	0034.4	032.4	36.17	
048.0	005.8000	0101.3	028.3	294.3	000.2500	0034.9	031.9	36.48	
049.0	005.8000	0101.2	028.2	293.9	000.2500	0035.6	031.5	36.82	
050.0	005.8000	0100.9	028.2	293.4	000.2500	0036.3	031.0	37.16	
051.0	005.8000	0100.5	028.1	292.9	000.2500	0036.3	030.6	37.34	
052.0	005.8000	0100.5	028.1	292.4	000.2500	0036.2	030.2	37.53	
053.0	005.8000	0100.2	028.1	291.9	000.2500	0036.7	029.8	37.84	
054.0	005.8000	0099.7	028.0	291.3	000.2500	0037.3	029.4	38.17	
055.0	005.8000	0099.0	028.0	290.6	000.2500	0037.2	029.1	38.33	
056.0	005.8000	0098.6	027.9	290.0	000.2500	0036.7	028.7	38.43	
057.0	005.8000	0098.1	027.8	289.2	000.2500	0036.6	028.4	38.59	
058.0	005.8000	0097.6	027.8	288.5	000.2500	0036.5	028.0	38.75	
059.0	005.8000	0097.6	027.8	287.9	000.2500	0036.2	027.7	38.91	
060.0	005.8000	0097.8	027.8	287.2	000.2500	0035.8	027.3	39.05	
061.0	005.8000	0098.0	027.8	286.6	000.2500	0035.3	026.9	39.17	
062.0	005.8000	0097.5	027.7	285.7	000.2500	0035.3	026.6	39.34	
063.0	005.8000	0097.8	027.8	285.0	000.2500	0035.1	026.3	39.52	
064.0	005.8000	0098.2	027.8	284.3	000.2500	0034.3	025.9	39.56	
065.0	005.8000	0097.9	027.8	283.4	000.2500	0033.7	025.6	39.60	
066.0	005.8000	0098.1	027.8	282.5	000.2500	0033.8	025.3	39.84	
067.0	005.8000	0098.2	027.8	281.7	000.2500	0033.5	025.0	39.97	
068.0	005.8000	0097.9	027.8	280.7	000.2500	0033.7	024.8	40.18	
069.0	005.8000	0097.7	027.8	279.7	000.2500	0033.9	024.6	40.37	
070.0	005.8000	0097.3	027.7	278.6	000.2500	0033.9	024.4	40.51	

Exhibit 7a

Contour Protection Studies Toward Select Allocation Concern(s)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
071.0	005.8000	0097.0	027.7	277.6	000.2500	0034.1	024.2	40.69
072.0	005.8000	0096.6	027.6	276.5	000.2500	0034.7	024.0	40.91
073.0	005.8000	0096.4	027.6	275.4	000.2500	0035.1	023.9	41.13
074.0	005.8000	0096.2	027.6	274.3	000.2500	0036.1	023.7	41.47
075.0	005.8000	0096.3	027.6	273.2	000.2500	0037.5	023.6	41.91
076.0	005.8000	0095.7	027.5	272.0	000.2500	0039.7	023.5	42.45
077.0	005.8000	0095.4	027.5	270.8	000.2500	0040.6	023.4	42.71
078.0	005.8000	0095.1	027.4	269.7	000.2500	0040.4	023.4	42.73
079.0	005.8000	0095.5	027.5	268.5	000.2500	0040.2	023.2	42.77
080.0	005.8000	0096.1	027.6	267.4	000.2500	0040.0	023.1	42.85
081.0	005.8000	0096.7	027.6	266.2	000.2500	0040.1	022.9	42.96
082.0	005.8000	0097.0	027.7	265.0	000.2500	0040.7	022.9	43.14
083.0	005.8000	0097.5	027.8	263.8	000.2500	0041.8	022.8	43.44
084.0	005.8000	0098.4	027.9	262.6	000.2500	0042.0	022.7	43.59
085.0	005.8000	0098.8	027.9	261.4	000.2500	0041.7	022.7	43.52
086.0	005.8000	0099.5	028.0	260.1	000.2500	0040.9	022.6	43.39
087.0	005.8000	0100.0	028.1	258.8	000.2500	0041.3	022.6	43.49
088.0	005.8000	0100.6	028.2	257.6	000.2500	0040.9	022.6	43.40
089.0	005.8000	0100.9	028.2	256.4	000.2500	0041.4	022.7	43.44
090.0	005.8000	0101.7	028.3	255.1	000.2500	0040.9	022.7	43.33
091.0	005.8000	0102.2	028.4	253.8	000.2500	0039.9	022.8	43.04
092.0	005.8000	0102.3	028.4	252.6	000.2500	0039.5	022.9	42.85
093.0	005.8000	0102.6	028.4	251.5	000.2500	0039.8	023.1	42.81
094.0	005.8000	0102.8	028.4	250.3	000.2500	0039.8	023.2	42.68
095.0	005.8000	0103.0	028.5	249.2	000.2500	0040.4	023.4	42.67
096.0	005.8000	0103.2	028.5	248.1	000.2500	0041.1	023.6	42.69
097.0	005.8000	0103.4	028.5	247.0	000.2500	0043.1	023.8	42.95
098.0	005.8000	0103.6	028.5	245.9	000.2500	0043.6	024.1	42.88
099.0	005.8000	0103.5	028.5	245.0	000.2500	0044.0	024.4	42.76
100.0	005.8000	0103.3	028.5	244.1	000.2500	0045.1	024.7	42.77
101.0	005.8000	0102.7	028.4	243.3	000.2500	0046.1	025.0	42.71
102.0	005.8000	0101.3	028.3	242.6	000.2500	0046.7	025.5	42.51
103.0	005.8000	0099.4	028.0	242.2	000.2500	0046.8	026.0	42.19
104.0	005.8000	0097.9	027.8	241.7	000.2500	0046.8	026.5	41.88
105.0	005.8000	0097.4	027.7	241.0	000.2500	0046.8	026.9	41.63
106.0	005.8000	0097.7	027.8	240.2	000.2500	0046.6	027.2	41.38
107.0	005.8000	0097.2	027.7	239.6	000.2500	0046.2	027.6	41.05
108.0	005.8000	0096.4	027.6	239.2	000.2500	0045.1	028.0	40.59
109.0	005.8000	0095.1	027.4	238.8	000.2500	0044.0	028.5	40.09
110.0	005.8000	0095.0	027.4	238.2	000.2500	0042.6	028.9	39.59
111.0	005.8000	0095.7	027.5	237.5	000.2500	0041.5	029.2	39.17
112.0	005.8000	0096.2	027.6	236.9	000.2500	0041.0	029.5	38.89
113.0	005.8000	0096.2	027.6	236.4	000.2500	0041.7	029.9	38.83
114.0	005.8000	0095.4	027.5	236.1	000.2500	0042.0	030.4	38.64

Exhibit 7b
Contour Protection Studies Toward Select Allocation Concern(s)

FMCommander Single Allocation Study - 08-19-2023 - NED 03 SEC
CH226D.P's Overlaps (In= 14.91 km, Out= 9.69 km)

CH226D.P CH 226 D DA
Lat= 44 07 31.00, Lng= 87 37 41.00
0.25 kW 65.8 m HAAT, 258.9 m COR
Prot.= 60 dBu, Intef.= 40 dBu

W226BD CH 226 D BLFT20090611ABY
Lat= 44 28 40.00, Lng= 87 59 59.40
0.25 kW 39.7 m HAAT, 249 m COR
Prot.= 60 dBu, Intef.= 40 dBu

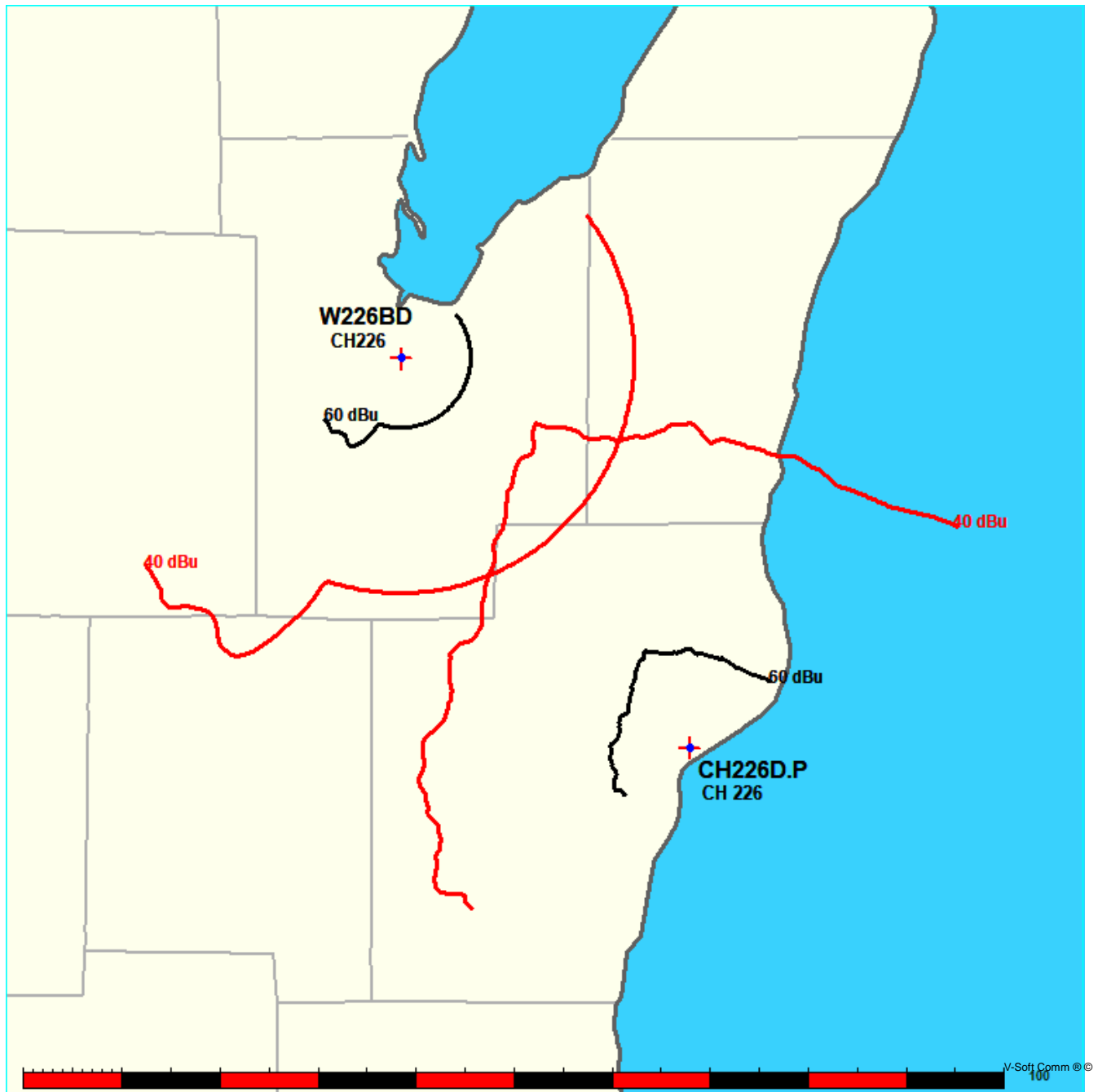


Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

08-19-2023

Terrain Data: NED 03 SEC

FMOver Analysis

CH226D.P

W226BD BLFT20090611ABY

Channel = 226D
Max ERP = 0.25 kW
RCAMSL = 258.9 m
N. Lat. 44 07 31.00
W. Lng. 87 37 41.00
Protected
60 dBu

Channel = 226D
Max ERP = 0.25 kW
RCAMSL = 249 m
N. Lat. 44 28 40.00
W. Lng. 87 59 59.40
Interfering
40 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
281.0	000.2500	0033.6	007.5	149.4	000.2500	-0003.8	043.9	31.38	
282.0	000.2500	0033.7	007.5	149.3	000.2500	-0003.7	043.8	31.40	
283.0	000.2500	0033.7	007.5	149.1	000.2500	-0003.6	043.7	31.43	
284.0	000.2500	0034.1	007.5	149.1	000.2500	-0003.5	043.5	31.46	
285.0	000.2500	0035.1	007.6	149.0	000.2500	-0003.5	043.4	31.51	
286.0	000.2500	0035.3	007.6	148.9	000.2500	-0003.4	043.3	31.54	
287.0	000.2500	0035.6	007.7	148.8	000.2500	-0003.4	043.1	31.57	
288.0	000.2500	0036.3	007.7	148.8	000.2500	-0003.3	043.0	31.61	
289.0	000.2500	0036.5	007.8	148.7	000.2500	-0003.3	042.9	31.64	
290.0	000.2500	0036.8	007.8	148.5	000.2500	-0003.2	042.8	31.68	
291.0	000.2500	0037.3	007.9	148.4	000.2500	-0003.2	042.6	31.71	
292.0	000.2500	0036.6	007.8	148.2	000.2500	-0003.1	042.6	31.72	
293.0	000.2500	0036.4	007.8	148.1	000.2500	-0003.0	042.6	31.74	
294.0	000.2500	0035.4	007.6	147.8	000.2500	-0002.9	042.6	31.73	
295.0	000.2500	0034.0	007.5	147.6	000.2500	-0002.8	042.6	31.71	
296.0	000.2500	0032.9	007.4	147.3	000.2500	-0002.5	042.7	31.71	
297.0	000.2500	0032.4	007.3	147.2	000.2500	-0002.3	042.6	31.72	
298.0	000.2500	0032.5	007.3	147.0	000.2500	-0002.2	042.6	31.74	
299.0	000.2500	0032.4	007.3	146.9	000.2500	-0002.0	042.5	31.75	
300.0	000.2500	0032.4	007.3	146.7	000.2500	-0001.9	042.5	31.77	
301.0	000.2500	0033.1	007.4	146.6	000.2500	-0001.8	042.3	31.80	
302.0	000.2500	0034.2	007.5	146.5	000.2500	-0001.7	042.2	31.85	
303.0	000.2500	0034.7	007.6	146.4	000.2500	-0001.6	042.1	31.88	
304.0	000.2500	0035.5	007.7	146.2	000.2500	-0001.4	041.9	31.92	
305.0	000.2500	0035.9	007.7	146.1	000.2500	-0001.2	041.8	31.95	
306.0	000.2500	0036.6	007.8	146.0	000.2500	-0001.0	041.7	31.98	
307.0	000.2500	0037.5	007.9	145.8	000.2500	-0000.7	041.6	32.02	
308.0	000.2500	0038.0	007.9	145.7	000.2500	-0000.5	041.5	32.05	
309.0	000.2500	0038.5	008.0	145.5	000.2500	-0000.2	041.4	32.08	
310.0	000.2500	0039.2	008.1	145.4	000.2500	0000.0	041.3	32.11	
311.0	000.2500	0039.4	008.1	145.2	000.2500	0000.1	041.2	32.13	
312.0	000.2500	0039.9	008.2	145.0	000.2500	0000.3	041.1	32.16	
313.0	000.2500	0040.3	008.2	144.8	000.2500	0000.5	041.1	32.18	

Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
314.0	000.2500	0041.6	008.3	144.7	000.2500	0000.7	040.9	32.24
315.0	000.2500	0043.7	008.6	144.5	000.2500	0000.9	040.6	32.32
316.0	000.2500	0044.3	008.7	144.3	000.2500	0001.2	040.5	32.35
317.0	000.2500	0044.9	008.7	144.1	000.2500	0001.4	040.4	32.37
318.0	000.2500	0044.9	008.7	143.9	000.2500	0001.7	040.4	32.38
319.0	000.2500	0045.6	008.8	143.7	000.2500	0001.8	040.3	32.41
320.0	000.2500	0046.9	008.9	143.5	000.2500	0001.9	040.2	32.45
321.0	000.2500	0048.0	009.1	143.3	000.2500	0001.9	040.0	32.49
322.0	000.2500	0049.7	009.2	143.1	000.2500	0002.1	039.9	32.55
323.0	000.2500	0051.1	009.4	142.8	000.2500	0002.2	039.7	32.60
324.0	000.2500	0052.7	009.5	142.6	000.2500	0002.2	039.6	32.65
325.0	000.2500	0053.3	009.6	142.4	000.2500	0002.3	039.5	32.67
326.0	000.2500	0054.6	009.7	142.1	000.2500	0002.3	039.4	32.70
327.0	000.2500	0056.3	009.9	141.8	000.2500	0002.4	039.3	32.75
328.0	000.2500	0057.7	010.0	141.6	000.2500	0002.5	039.2	32.78
329.0	000.2500	0058.6	010.1	141.3	000.2500	0002.7	039.1	32.80
330.0	000.2500	0058.6	010.1	141.0	000.2500	0002.8	039.1	32.79
331.0	000.2450	0059.0	010.0	140.8	000.2500	0002.9	039.2	32.77
332.0	000.2401	0061.0	010.1	140.5	000.2500	0003.1	039.1	32.80
333.0	000.2352	0066.4	010.5	140.2	000.2500	0003.4	038.8	32.89
334.0	000.2304	0070.1	010.7	139.8	000.2500	0003.6	038.7	32.94
335.0	000.2256	0068.6	010.5	139.6	000.2500	0003.6	038.9	32.88
336.0	000.2209	0068.1	010.4	139.4	000.2500	0003.6	039.0	32.83
337.0	000.2162	0067.9	010.4	139.2	000.2500	0003.7	039.1	32.79
338.0	000.2116	0067.7	010.3	138.9	000.2500	0003.9	039.2	32.75
339.0	000.2070	0067.1	010.2	138.7	000.2500	0004.1	039.4	32.71
340.0	000.2025	0065.7	010.1	138.6	000.2500	0004.3	039.6	32.64
341.0	000.1980	0064.1	009.9	138.4	000.2500	0004.5	039.8	32.57
342.0	000.1936	0063.6	009.8	138.3	000.2500	0004.7	040.0	32.52
343.0	000.1892	0063.7	009.8	138.1	000.2500	0004.9	040.1	32.49
344.0	000.1849	0064.4	009.7	137.9	000.2500	0005.2	040.2	32.46
345.0	000.1806	0064.3	009.7	137.7	000.2500	0005.4	040.3	32.42
346.0	000.1764	0063.9	009.6	137.5	000.2500	0005.5	040.4	32.37
347.0	000.1722	0064.2	009.6	137.3	000.2500	0005.9	040.6	32.34
348.0	000.1681	0064.8	009.5	137.2	000.2500	0006.2	040.7	32.31
349.0	000.1640	0066.1	009.6	136.9	000.2500	0006.8	040.7	32.29
350.0	000.1600	0067.3	009.6	136.7	000.2500	0007.3	040.8	32.26
351.0	000.1600	0066.2	009.5	136.6	000.2500	0007.7	040.9	32.22
352.0	000.1600	0066.2	009.5	136.4	000.2500	0008.2	041.0	32.19
353.0	000.1600	0066.8	009.6	136.2	000.2500	0008.6	041.1	32.17
354.0	000.1600	0067.6	009.6	135.9	000.2500	0008.9	041.2	32.15
355.0	000.1600	0067.8	009.6	135.7	000.2500	0009.2	041.3	32.12
356.0	000.1600	0069.1	009.7	135.5	000.2500	0009.6	041.3	32.11

Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

08-19-2023

Terrain Data: NED 03 SEC

FMOver Analysis

W226BD BLFT20090611ABY

CH226D.P

Channel = 226D

Max ERP = 0.25 kW

RCAMSL = 249 m

N. Lat. 44 28 40.00

W. Lng. 87 59 59.40

Protected

60 dBu

Channel = 226D

Max ERP = 0.25 kW

RCAMSL = 258.9 m

N. Lat. 44 07 31.00

W. Lng. 87 37 41.00

Interfering

40 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
098.0	000.2500	0010.0	007.1	329.6	000.2500	0058.8	044.4	35.93	
099.0	000.2500	0010.4	007.1	329.5	000.2500	0058.8	044.3	35.96	
100.0	000.2500	0010.3	007.1	329.3	000.2500	0058.8	044.2	36.00	
101.0	000.2500	0010.6	007.1	329.2	000.2500	0058.7	044.1	36.02	
102.0	000.2500	0010.7	007.1	329.1	000.2500	0058.6	044.0	36.04	
103.0	000.2500	0010.9	007.1	329.0	000.2500	0058.6	043.9	36.06	
104.0	000.2500	0011.0	007.1	328.9	000.2500	0058.5	043.8	36.08	
105.0	000.2500	0011.3	007.1	328.8	000.2500	0058.4	043.7	36.10	
106.0	000.2500	0011.3	007.1	328.7	000.2500	0058.2	043.6	36.11	
107.0	000.2500	0011.5	007.1	328.6	000.2500	0058.0	043.6	36.12	
108.0	000.2500	0011.5	007.1	328.4	000.2500	0057.9	043.5	36.13	
109.0	000.2500	0011.3	007.1	328.3	000.2500	0057.8	043.4	36.15	
110.0	000.2500	0011.7	007.1	328.2	000.2500	0057.8	043.3	36.17	
111.0	000.2500	0012.1	007.1	328.0	000.2500	0057.7	043.2	36.19	
112.0	000.2500	0012.0	007.1	327.9	000.2500	0057.7	043.2	36.21	
113.0	000.2500	0012.3	007.1	327.8	000.2500	0057.6	043.1	36.22	
114.0	000.2500	0012.9	007.1	327.6	000.2500	0057.4	043.0	36.22	
115.0	000.2500	0012.2	007.1	327.5	000.2500	0057.1	043.0	36.21	
116.0	000.2500	0012.8	007.1	327.4	000.2500	0056.9	042.9	36.20	
117.0	000.2500	0014.4	007.1	327.2	000.2500	0056.7	042.8	36.20	
118.0	000.2500	0014.7	007.1	327.1	000.2500	0056.5	042.8	36.19	
119.0	000.2500	0015.5	007.1	326.9	000.2500	0056.2	042.7	36.18	
120.0	000.2500	0016.5	007.1	326.8	000.2500	0055.9	042.7	36.17	
121.0	000.2500	0018.6	007.1	326.6	000.2500	0055.6	042.6	36.14	
122.0	000.2500	0020.7	007.1	326.5	000.2500	0055.3	042.6	36.11	
123.0	000.2500	0019.8	007.1	326.3	000.2500	0055.0	042.5	36.09	
124.0	000.2500	0015.6	007.1	326.2	000.2500	0054.8	042.5	36.08	
125.0	000.2500	0013.0	007.1	326.0	000.2500	0054.6	042.4	36.07	
126.0	000.2500	0012.3	007.1	325.9	000.2500	0054.5	042.4	36.06	
127.0	000.2500	0012.3	007.1	325.7	000.2500	0054.2	042.3	36.05	
128.0	000.2500	0011.0	007.1	325.5	000.2500	0054.0	042.3	36.03	
129.0	000.2500	0010.4	007.1	325.4	000.2500	0053.8	042.3	36.01	
130.0	000.2500	0009.4	007.1	325.2	000.2500	0053.5	042.2	35.98	

Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

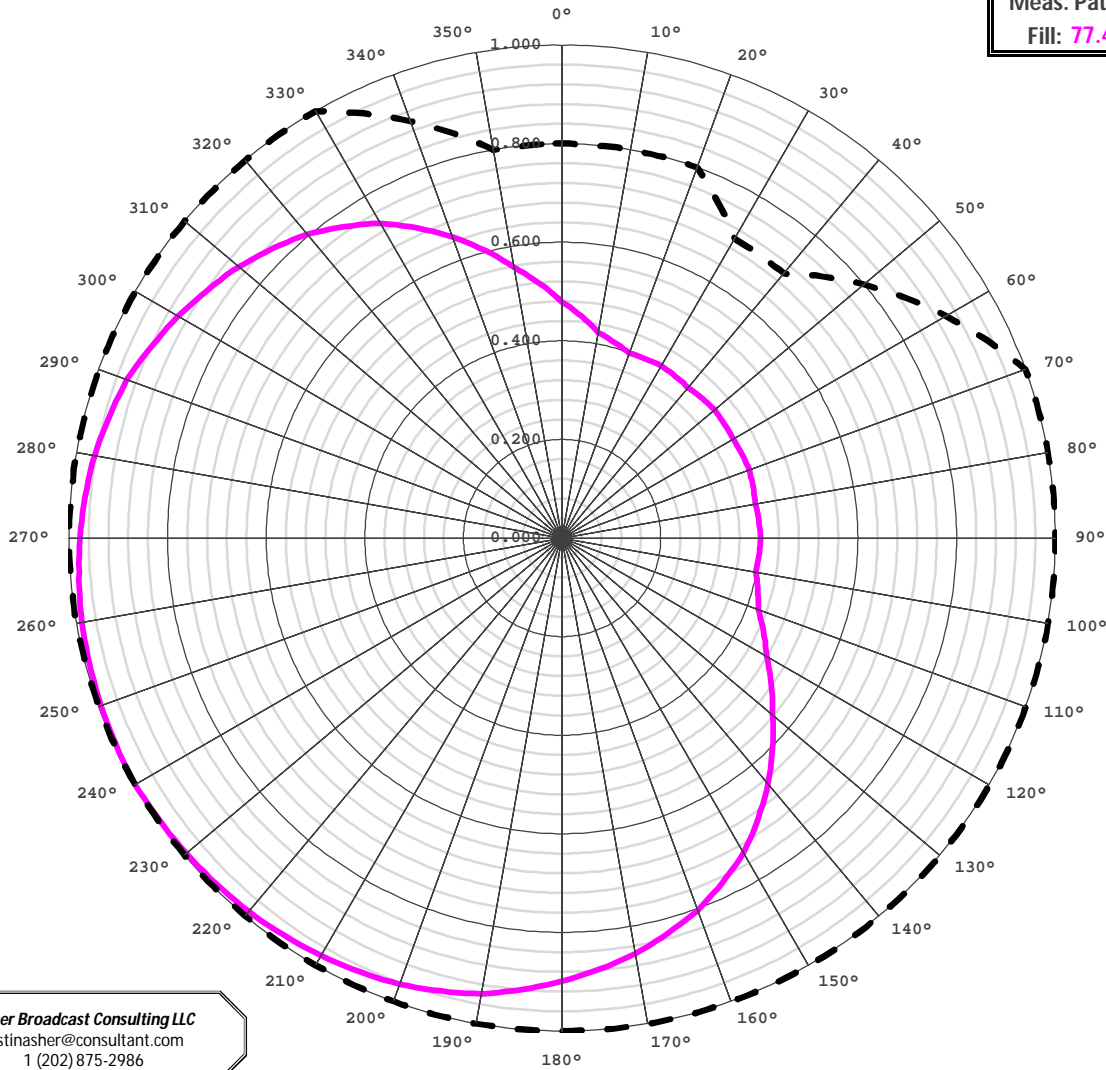
Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
131.0	000.2500	0009.0	007.1	325.1	000.2500	0053.4	042.2	35.97
132.0	000.2500	0009.2	007.1	324.9	000.2500	0053.3	042.2	35.97
133.0	000.2500	0009.0	007.1	324.7	000.2500	0053.1	042.1	35.95
134.0	000.2500	0009.3	007.1	324.6	000.2500	0052.9	042.1	35.94
135.0	000.2500	0009.8	007.1	324.4	000.2500	0052.9	042.1	35.94
136.0	000.2500	0008.8	007.1	324.2	000.2500	0052.9	042.1	35.94
137.0	000.2500	0006.6	007.1	324.1	000.2500	0052.8	042.1	35.94
138.0	000.2500	0005.0	007.1	323.9	000.2500	0052.6	042.0	35.92
139.0	000.2500	0003.9	007.1	323.7	000.2500	0052.4	042.0	35.89
140.0	000.2500	0003.5	007.1	323.6	000.2500	0052.1	042.0	35.85
141.0	000.2500	0002.8	007.1	323.4	000.2500	0051.8	042.0	35.80
142.0	000.2500	0002.4	007.1	323.2	000.2500	0051.5	042.0	35.76
143.0	000.2500	0002.1	007.1	323.1	000.2500	0051.2	042.0	35.72
144.0	000.2500	0001.6	007.1	322.9	000.2500	0051.0	042.0	35.68
145.0	000.2500	0000.3	007.1	322.7	000.2500	0050.8	042.0	35.65
146.0	000.2500	-0001.0	007.1	322.5	000.2500	0050.5	042.0	35.60
147.0	000.2500	-0002.2	007.1	322.4	000.2500	0050.2	042.0	35.56
148.0	000.2500	-0003.0	007.1	322.2	000.2500	0050.0	042.0	35.52
149.0	000.2500	-0003.5	007.1	322.0	000.2500	0049.8	042.1	35.48
150.0	000.2500	-0004.5	007.1	321.9	000.2500	0049.5	042.1	35.43
151.0	000.2500	-0005.4	007.1	321.7	000.2500	0049.2	042.1	35.38
152.0	000.2500	-0005.8	007.1	321.5	000.2500	0048.9	042.1	35.33
153.0	000.2500	-0006.1	007.1	321.4	000.2500	0048.6	042.1	35.27
154.0	000.2500	-0006.1	007.1	321.2	000.2500	0048.3	042.2	35.22
155.0	000.2500	-0006.1	007.1	321.1	000.2500	0048.1	042.2	35.17
156.0	000.2500	-0006.2	007.1	320.9	000.2500	0047.9	042.2	35.12
157.0	000.2500	-0006.0	007.1	320.7	000.2500	0047.7	042.3	35.08
158.0	000.2500	-0005.9	007.1	320.6	000.2500	0047.5	042.3	35.04
159.0	000.2500	-0006.1	007.1	320.4	000.2500	0047.4	042.3	35.00
160.0	000.2500	-0006.5	007.1	320.3	000.2500	0047.2	042.4	34.96
161.0	000.2500	-0007.0	007.1	320.1	000.2500	0047.0	042.4	34.92
162.0	000.2500	-0007.1	007.1	319.9	000.2500	0046.8	042.5	34.86
163.0	000.2500	-0006.8	007.1	319.8	000.2500	0046.6	042.5	34.82
164.0	000.2500	-0006.9	007.1	319.6	000.2500	0046.4	042.6	34.77
165.0	000.2500	-0007.9	007.1	319.5	000.2500	0046.2	042.6	34.72
166.0	000.2500	-0007.8	007.1	319.3	000.2500	0046.0	042.7	34.67
167.0	000.2500	-0008.0	007.1	319.2	000.2500	0045.8	042.7	34.61
168.0	000.2500	-0009.3	007.1	319.0	000.2500	0045.6	042.8	34.57
169.0	000.2500	-0009.9	007.1	318.9	000.2500	0045.5	042.9	34.53
170.0	000.2500	-0010.2	007.1	318.8	000.2500	0045.4	042.9	34.49
171.0	000.2500	-0010.5	007.1	318.6	000.2500	0045.3	043.0	34.44
172.0	000.2500	-0010.6	007.1	318.5	000.2500	0045.1	043.1	34.40
173.0	000.2500	-0010.5	007.1	318.3	000.2500	0045.0	043.1	34.35
174.0	000.2500	-0009.7	007.1	318.2	000.2500	0044.9	043.2	34.32

Manufacturer's	Make/Model	Orientation	Power
Element 1:	BKG1/P(Slant45)	240° True	100.0%
Element 2:			
Element 3:			
Element 4:			

Composite Power: 100%

Exhibit 8 - Copy of Manufacturer's Directional Antenna Pattern Data

Meas. Pattern
Fill: 77.4%



Azimuth ° True	FCC Pattern	Manufacturer's Pattern
0°	0.800	0.479
10°	0.800	0.423
20°	0.800	0.399
30°	0.700	0.403
40°	0.700	0.398
50°	0.800	0.404
60°	0.900	0.401
70°	1.000	0.404
80°	1.000	0.398
90°	1.000	0.403
100°	1.000	0.399
110°	1.000	0.423
120°	1.000	0.479
130°	1.000	0.557
140°	1.000	0.650
150°	1.000	0.737
160°	1.000	0.804
170°	1.000	0.856
180°	1.000	0.899
190°	1.000	0.939
200°	1.000	0.963
210°	1.000	0.978
220°	1.000	0.989
230°	1.000	0.995
240°	1.000	1.000
250°	1.000	0.995
260°	1.000	0.989
270°	1.000	0.978
280°	1.000	0.963
290°	1.000	0.939
300°	1.000	0.899
310°	1.000	0.856
320°	1.000	0.804
330°	1.000	0.737
340°	0.900	0.650
350°	0.800	0.557

Asher Broadcast Consulting LLC
justinasher@consultant.com
1 (202) 875-2986

Allocation (FCC) Pattern: ---
Manufacturer's Pattern: ———

Exhibit 8

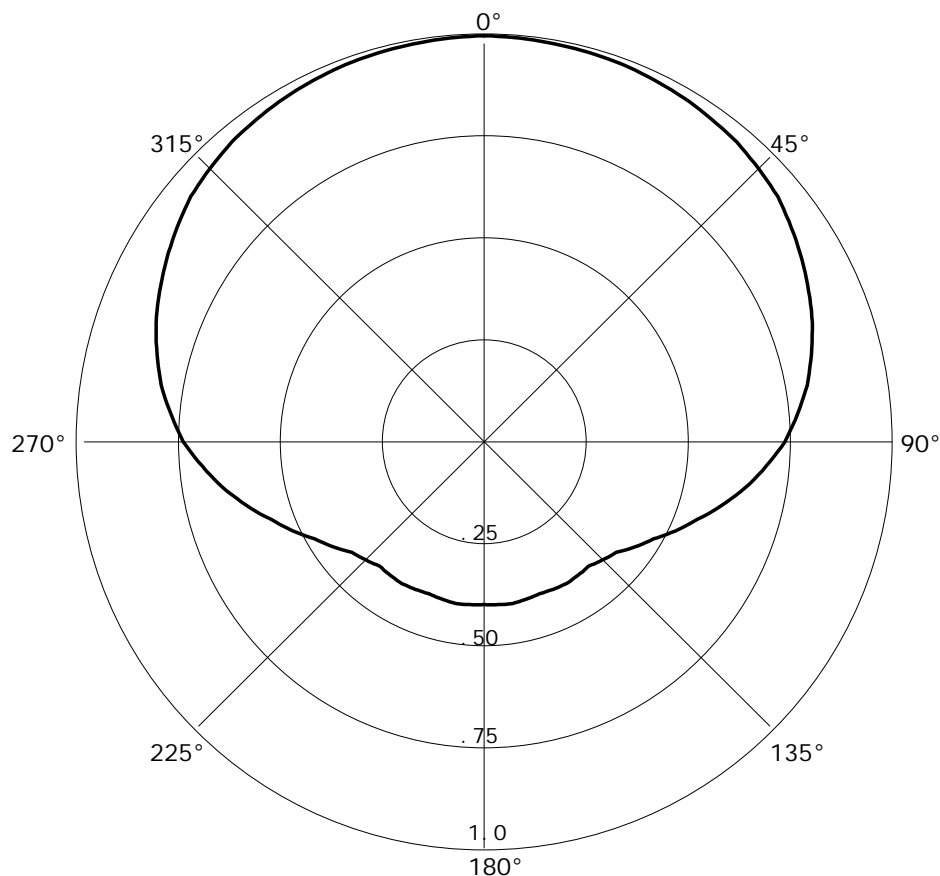
Copy of Manufacturer's Directional Antenna Documentation (Actual Antenna Pattern rotated to 240.0°T) (public record copy)

BKG1/P-1DA(Slant45) COMPOSITE PATTERN

RMS(V) = .739

Graph is Relative Field

Azi	Field	dBk
000	1.000	-10.000
010	0.995	-10.044
020	0.989	-10.096
030	0.978	-10.193
040	0.963	-10.327
050	0.939	-10.547
060	0.899	-10.925
070	0.856	-11.351
080	0.804	-11.895
090	0.737	-12.651
100	0.650	-13.742
110	0.557	-15.083
120	0.479	-16.393
130	0.423	-17.473
140	0.399	-17.981
150	0.403	-17.894
160	0.398	-18.002
170	0.404	-17.872
180	0.401	-17.937
190	0.404	-17.872
200	0.398	-18.002
210	0.403	-17.894
220	0.399	-17.981
230	0.423	-17.473
240	0.479	-16.393
250	0.557	-15.083
260	0.650	-13.742
270	0.737	-12.651
280	0.804	-11.895
290	0.856	-11.351
300	0.899	-10.925
310	0.939	-10.547
320	0.963	-10.327
330	0.978	-10.193
340	0.989	-10.096
350	0.995	-10.044



The directional antenna pattern will be produced by means of a Nicom Dipole BKG1/P broadcast element mounted at a 45° (degree) slant orientation to achieve horizontal and vertical polarization. The BKG1/P-1DA(Slant45) Directional Pattern is therefore a maximum composite pattern of the current horizontal and vertical broadcast patterns as notified by Nicom USA, Inc.

The maximum antenna gain for a single BKG1/P-1DA(Slant45) element will be -3.0 dBd or the common horizontal or vertical maximum antenna gain of 0.0 dBd adjusted by 3 dBd for dual broadcast in the Horizontal and Vertical planes (-3.0 dBd = 0.0 dBd - 3.0 dBd). The maximum gain for multiple bay options of the Nicom BKG1/P-1DA(Slant45) antenna would therefore also be adjusted by -3 dBd to account for operation in the horizontal and vertical planes.

The antenna proposed in this application will be mounted in accordance with specific instructions provided by the antenna manufacturer. The directional antenna will be mounted on the tower which is of uniform cross section. No other antennas of any type are or will be mounted on the same tower level as the directional antenna.

No antenna is or will be mounted within any vertical or horizontal distance specified by the antenna manufacturer as being necessary for proper operation of the directional antenna. In addition, the antenna will be assembled under the supervision of a qualified engineer and installed pursuant to the manufacturer's instructions and manufacturer specified antenna orientation.

Exhibit 8

Copy of Manufacturer's Directional Antenna Documentation

(Actual Antenna Pattern rotated to 240.0°T) (public record copy)



BKG1/P

Medium Power Portable Broadband FM Dipole

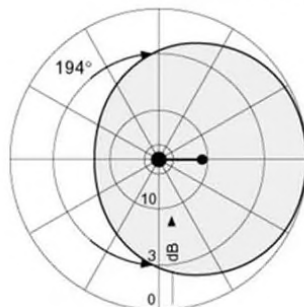
This broadband dipole antenna is constructed of stainless steel and is designed to last a long time in any weather condition. Because of its sturdy construction, it can support up to 2.5 KW of input power with the appropriate connector. Since it has a wide angle of radiation, it is strongly recommended for omni-directional arrays. Due to the fact that it is easily disassembled and reassembled, it can be placed in a compact container making it very portable and inexpensive to ship.

TECHNICAL SPECIFICATIONS

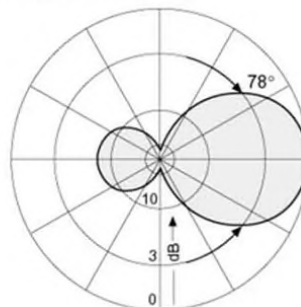
Antenna Type: dipole
Front-to-Back Ratio: 7 dB
Frequency Range: 87.5 - 108 MHz
Polarization: vertical
Gain: 0 dBd (unity gain)
Bandwidth: 20 MHz Max
VSWR: < 1.3
H Plane: 194 degrees
V Plane: 78 degrees
Impedance: 50 Ohms
Connectors: N type (1 kw) - 7/8 type (2 kw)
Power Rating: 2000 Watts max.
Wind Load: 39.6 Lbs (18 kg)
Wind Velocity: 119 mph (190 km/h)
Wind Surface: 1.2 ft² (0.11 m²)
Lightning Protection: all parts grounded
Material: (external) stainless steel
Mounting: from 2" to 4"
Weight: 18 Lbs (8.1kg)
Average Dimensions: 50"×30"×2"
Packing: 46"×22"×4"



Radiation Patterns (at mid-band)



in H-plane
Horizontal Radiation Pattern



in E-plane
Vertical Radiation Pattern

Exhibit 8

Copy of Manufacturer's Directional Antenna Documentation (Actual Antenna Pattern rotated to 240.0°T) (public record copy)

TX station: BKG1/P

Site name:

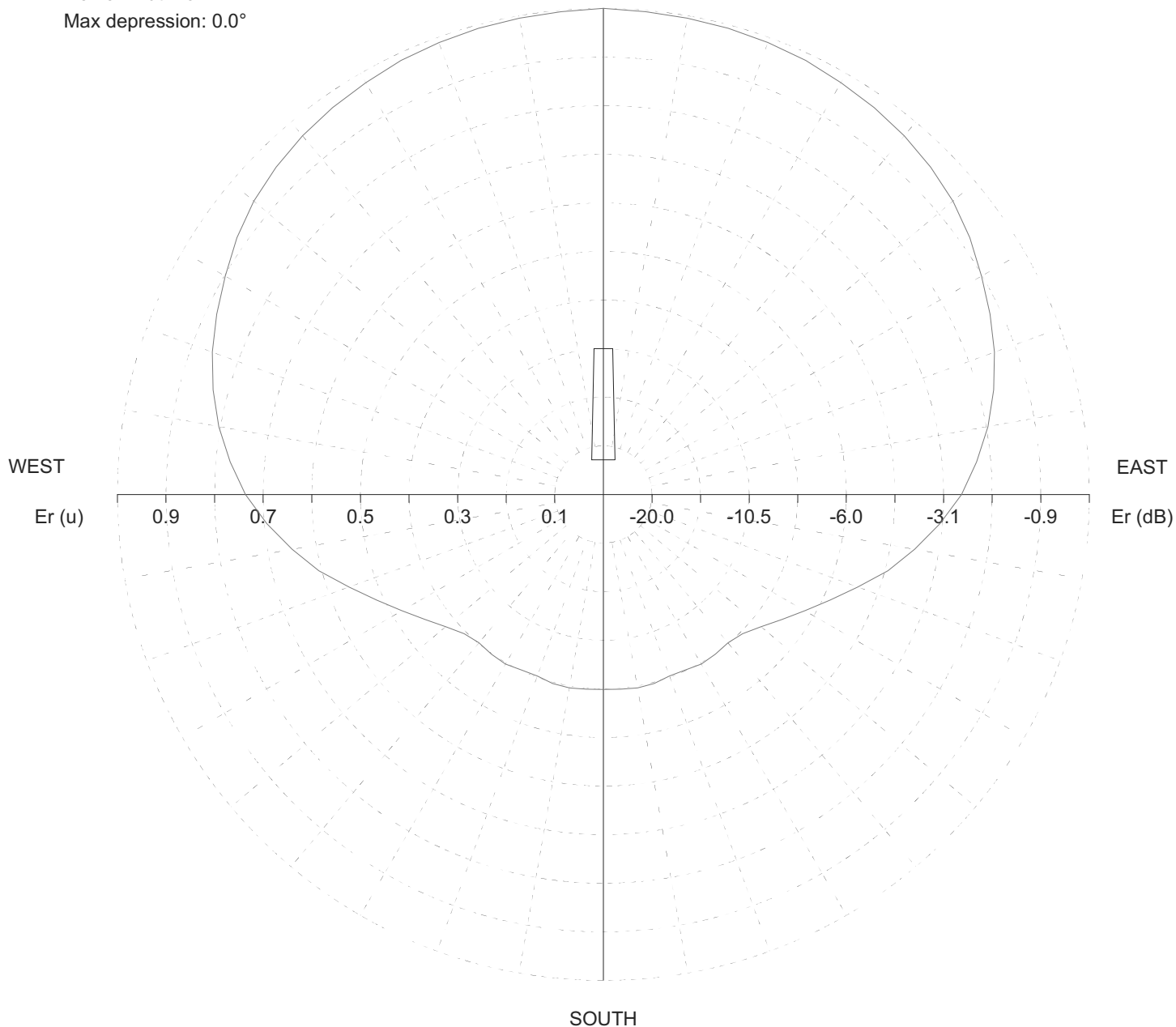
Frequency: 100.00 MHz

Horizontal diagram of Maxima

NORTH

Max azimuth: 0°

Max depression: 0.0°



—— 0.0° depres. (Total antenna), Gain (dBd): 0.00 ERP T.max (KW): 1.

ERP E.max (KW): 0.776

Exhibit 8

Copy of Manufacturer's Directional Antenna Documentation

(Actual Antenna Pattern rotated to 240.0°T) (public record copy)

TX station: BKG1/P

Site name:

Frequency: 100.00 MHz

Horizontal diagram of Maxima

Az (°)	Dep (°)	Er (%)	ERP (W)	Az (°)	Dep (°)	Er (%)	ERP (W)	Az (°)	Dep (°)	Er (%)	ERP (W)
0.0	0.0	100.0	776.2	120.0	0.0	47.9	178.0	240.0	0.0	47.9	178.0
5.0	0.0	99.7	772.1	125.0	0.0	44.8	156.0	245.0	0.0	51.5	205.9
10.0	0.0	99.5	768.1	130.0	0.0	42.3	139.1	250.0	0.0	55.7	240.8
15.0	0.0	99.3	765.7	135.0	0.0	40.5	127.4	255.0	0.0	60.6	285.0
20.0	0.0	98.9	759.7	140.0	0.0	39.9	123.3	260.0	0.0	65.0	328.3
25.0	0.0	98.5	753.4	145.0	0.0	40.1	125.1	265.0	0.0	69.5	374.7
30.0	0.0	97.8	743.2	150.0	0.0	40.3	126.0	270.0	0.0	73.7	421.3
35.0	0.0	97.2	733.2	155.0	0.0	39.9	123.5	275.0	0.0	77.1	461.6
40.0	0.0	96.3	720.1	160.0	0.0	39.8	122.8	280.0	0.0	80.4	501.4
45.0	0.0	95.2	703.9	165.0	0.0	40.3	126.1	285.0	0.0	83.2	536.8
50.0	0.0	93.9	684.4	170.0	0.0	40.4	126.9	290.0	0.0	85.6	569.2
55.0	0.0	92.1	658.3	175.0	0.0	40.3	125.8	295.0	0.0	87.8	598.3
60.0	0.0	89.9	627.1	180.0	0.0	40.1	125.0	300.0	0.0	89.9	627.1
65.0	0.0	87.8	598.3	185.0	0.0	40.3	125.8	305.0	0.0	92.1	658.3
70.0	0.0	85.6	569.2	190.0	0.0	40.4	126.9	310.0	0.0	93.9	684.4
75.0	0.0	83.2	536.8	195.0	0.0	40.3	126.1	315.0	0.0	95.2	703.9
80.0	0.0	80.4	501.4	200.0	0.0	39.8	122.8	320.0	0.0	96.3	720.1
85.0	0.0	77.1	461.6	205.0	0.0	39.9	123.5	325.0	0.0	97.2	733.2
90.0	0.0	73.7	421.3	210.0	0.0	40.3	126.0	330.0	0.0	97.8	743.2
95.0	0.0	69.5	374.7	215.0	0.0	40.1	125.1	335.0	0.0	98.5	753.4
100.0	0.0	65.0	328.3	220.0	0.0	39.9	123.3	340.0	0.0	98.9	759.7
105.0	0.0	60.6	285.0	225.0	0.0	40.5	127.4	345.0	0.0	99.3	765.7
110.0	0.0	55.7	240.8	230.0	0.0	42.3	139.1	350.0	0.0	99.5	768.1
115.0	0.0	51.5	205.9	235.0	0.0	44.8	156.0	355.0	0.0	99.7	772.1

Exhibit 8

Copy of Manufacturer's Directional Antenna Documentation (Actual Antenna Pattern rotated to 240.0°T) (public record copy)

TX station: BKG1/P

Site name:

Frequency: 100.00 MHz

Vertical diagram

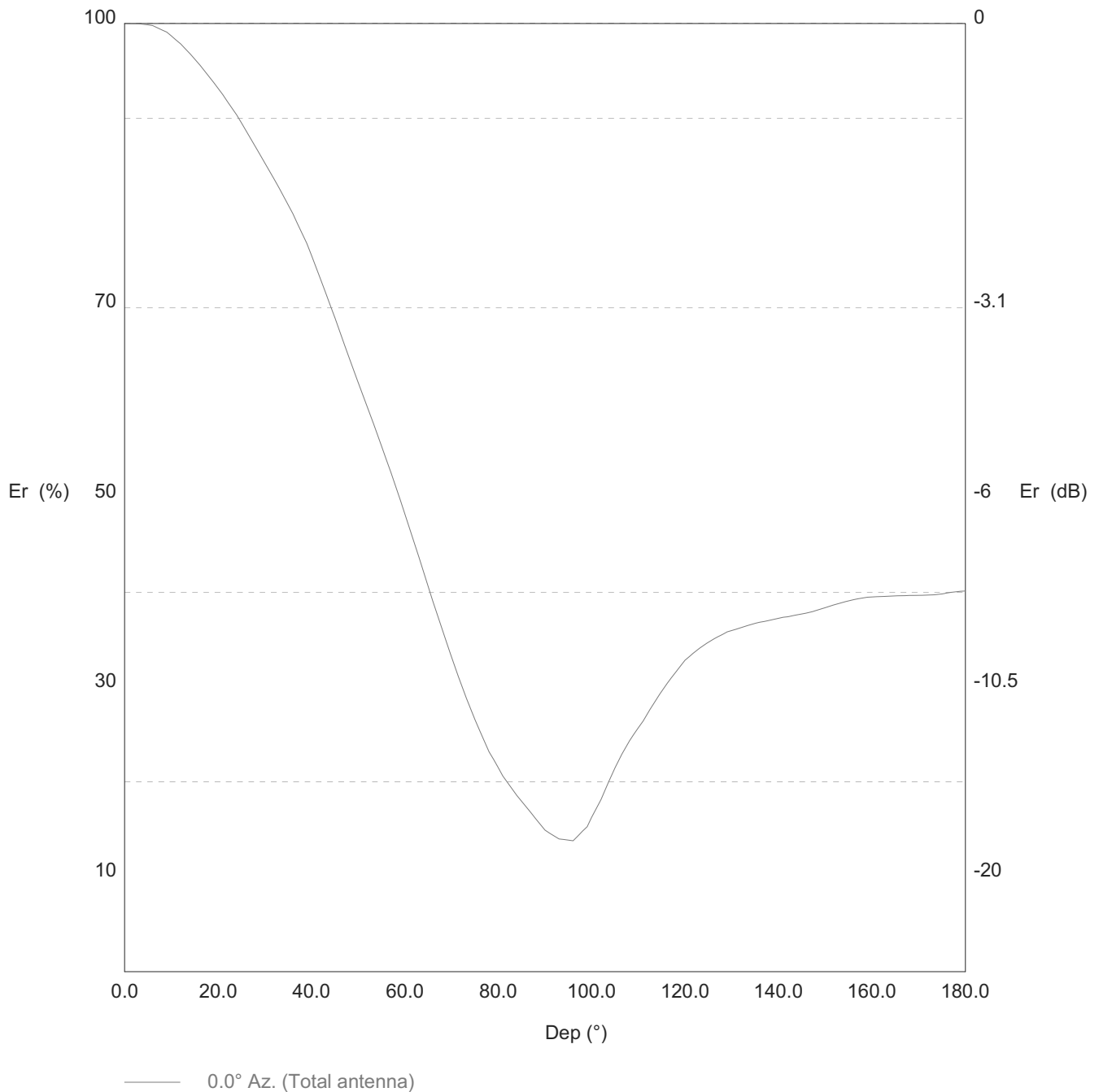


Exhibit 8

Copy of Manufacturer's Directional Antenna Documentation

(Actual Antenna Pattern rotated to 240.0°T) (public record copy)

TX station: BKG1/P

Site name:

Frequency: 100.00 MHz

Vertical diagram at an azimuth of 0° degrees

Dep (°)	Er (%)	ERP (W)	Dep (°)	Er (%)	ERP (W)	Dep (°)	Er (%)	ERP (W)
0.0	100.0	776.2	60.0	48.3	180.9	120.0	32.8	83.6
1.0	100.0	776.1	61.0	46.8	169.7	121.0	33.2	85.8
2.0	100.0	775.9	62.0	45.2	158.9	122.0	33.7	88.0
3.0	100.0	775.7	63.0	43.7	148.5	123.0	34.1	90.2
4.0	99.9	774.8	64.0	42.2	138.1	124.0	34.4	91.9
5.0	99.8	773.8	65.0	40.6	128.0	125.0	34.7	93.6
6.0	99.8	772.9	66.0	39.1	118.4	126.0	35.0	95.3
7.0	99.5	769.2	67.0	37.6	109.6	127.0	35.3	96.8
8.0	99.3	765.6	68.0	36.1	101.1	128.0	35.6	98.2
9.0	99.1	762.0	69.0	34.6	92.9	129.0	35.8	99.6
10.0	98.7	755.7	70.0	33.2	85.4	130.0	36.0	100.4
11.0	98.3	749.5	71.0	31.7	78.1	131.0	36.1	101.3
12.0	97.9	743.2	72.0	30.3	71.2	132.0	36.3	102.1
13.0	97.3	735.2	73.0	29.0	65.4	133.0	36.4	103.0
14.0	96.8	727.2	74.0	27.8	59.9	134.0	36.6	103.8
15.0	96.3	719.2	75.0	26.5	54.6	135.0	36.7	104.7
16.0	95.7	710.3	76.0	25.4	50.1	136.0	36.8	105.3
17.0	95.1	701.4	77.0	24.3	45.8	137.0	36.9	105.9
18.0	94.5	692.6	78.0	23.2	41.7	138.0	37.0	106.5
19.0	93.8	683.0	79.0	22.3	38.7	139.0	37.1	107.1
20.0	93.1	673.5	80.0	21.5	35.8	140.0	37.2	107.7
21.0	92.5	664.1	81.0	20.6	33.1	141.0	37.3	108.2
22.0	91.8	653.7	82.0	19.9	30.9	142.0	37.4	108.8
23.0	91.0	643.4	83.0	19.2	28.8	143.0	37.5	109.3
24.0	90.3	633.1	84.0	18.6	26.7	144.0	37.6	109.8
25.0	89.5	621.6	85.0	17.9	25.0	145.0	37.7	110.4
26.0	88.7	610.3	86.0	17.3	23.4	146.0	37.8	111.0
27.0	87.8	599.0	87.0	16.7	21.8	147.0	37.9	111.6
28.0	87.0	587.3	88.0	16.1	20.2	148.0	38.1	112.5
29.0	86.1	575.7	89.0	15.5	18.7	149.0	38.2	113.4
30.0	85.3	564.3	90.0	14.9	17.3	150.0	38.4	114.2
31.0	84.4	552.9	91.0	14.6	16.5	151.0	38.5	115.2
32.0	83.5	541.7	92.0	14.3	15.8	152.0	38.7	116.1
33.0	82.7	530.6	93.0	14.0	15.2	153.0	38.8	117.1
34.0	81.7	518.8	94.0	13.9	15.0	154.0	39.0	117.9
35.0	80.8	507.1	95.0	13.9	14.9	155.0	39.1	118.6
36.0	79.9	495.6	96.0	13.8	14.8	156.0	39.2	119.4
37.0	78.9	482.9	97.0	14.3	15.9	157.0	39.3	119.9
38.0	77.8	470.4	98.0	14.8	17.0	158.0	39.4	120.4
39.0	76.8	458.0	99.0	15.3	18.1	159.0	39.5	120.9
40.0	75.5	442.7	100.0	16.2	20.5	160.0	39.5	121.1
41.0	74.2	427.7	101.0	17.2	23.0	161.0	39.5	121.3
42.0	72.9	412.9	102.0	18.1	25.5	162.0	39.5	121.4
43.0	71.6	398.0	103.0	19.3	28.8	163.0	39.6	121.6
44.0	70.3	383.3	104.0	20.4	32.3	164.0	39.6	121.7
45.0	68.9	368.9	105.0	21.5	35.9	165.0	39.6	121.9
46.0	67.5	354.2	106.0	22.4	39.1	166.0	39.6	122.0
47.0	66.2	339.7	107.0	23.4	42.4	167.0	39.6	122.0
48.0	64.8	325.5	108.0	24.3	45.8	168.0	39.7	122.1
49.0	63.4	312.3	109.0	25.0	48.5	169.0	39.7	122.1
50.0	62.1	299.4	110.0	25.7	51.3	170.0	39.7	122.2
51.0	60.8	286.8	111.0	26.4	54.2	171.0	39.7	122.2
52.0	59.5	274.4	112.0	27.2	57.6	172.0	39.7	122.4
53.0	58.1	262.3	113.0	28.1	61.1	173.0	39.7	122.5
54.0	56.8	250.4	114.0	28.9	64.6	174.0	39.8	122.7
55.0	55.4	238.3	115.0	29.6	67.9	175.0	39.8	123.2
56.0	54.0	226.6	116.0	30.3	71.1	176.0	39.9	123.7
57.0	52.6	215.1	117.0	31.0	74.4	177.0	40.0	124.2
58.0	51.2	203.3	118.0	31.6	77.5	178.0	40.0	124.5
59.0	49.7	191.9	119.0	32.2	80.5	179.0	40.1	124.7