

Technical Report Supporting a Minor Modification of a Licensed FM Translator

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

for

*K220EP.L – La Crescent, MN
(Facility ID: 20571)*

The applicant would like to note a request for 47 C.F.R. Section 73.3517 Contingent Processing between applications for FM Translators K220EP – La Crescent, MN (Facility ID: 20571) and W296EH – La Crosse, WI (Facility ID: 145081). Both applications have been filed concurrent with one another and reference this Section 73.3517 Contingent Processing Request within each filing. In this instance, K220EP requests a site change and 47 C.F.R. Section 74.1233(a)(1)(i)(A)(1) adjacent channel change from CH220D to CH223D. To accommodate this frequency change, W296EH will further modify its currently authorized 47 C.F.R. Section 74.1233(a)(1)(i)(A)(2) non-adjacent CH296D to CH224D(W224EL.C) channel change Construction Permit (LMS(cp)-0000197677) from a non-directional antenna to a directional antenna. This NDA-to-DA antenna change for the existing W296EH(W224EL.C) facility will allow both stations to fully protect each other without the need for further contingent special conditioning at the time of each stations' licensing.

as a

*Commercial, Fill-In
FM Translator for*

WKBH-FM(analog) – Onalaska, WI

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 USGS Topographic Aerial Photomap of Existing Site

Exhibit 4 - Vertical Plan of Antenna System

Exhibit 5 - HAAT Calculation & Miscellaneous Coordinate Information

Exhibit 6 - Tabulation of Proposed Allocation

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

Exhibit 8 - Manufacturer's Antenna Documentation

Supplemental Appendix(s):

RF Appendix 1 - Radio Frequency Radiation Compliance Showing

Explanation of Technical Report

1

EXPLANATION OF PROPOSAL: This LMS filing and accompanying technical report supports a Minor Modification of a Licensed Facility (Construction Permit Application) for FM Translator K220EP.L – La Crescent, MN (Facility ID: 20571). This filing requests a 47 C.F.R. Section 74.1233(a)(1)(i)(A)(1) adjacent channel change from CH220D (91.9 MHz) to CH223D (92.5 MHz). As an adjacent channel change is proposed, no showing of reduced interference is required. Operation on the new frequency of CH223D (92.5 MHz) with a non-directional power of 0.020 kW ERP (Horizontal Only Polarization) is requested. The FM Translator will operate from a new COR of 242.7 meters AMSL at the new site location. This filing will specify rebroadcast of new Class C3, FM Primary Station WKBH-FM (analog) – Onalaska, WI (CH274C3; 102.7 MHz); Facility ID No. 72206. The Translator will remain licensed to the community of La Crescent, MN.

The applicant would like to note a request for 47 C.F.R. Section 73.3517 Contingent Processing between applications for FM Translators K220EP – La Crescent, MN (Facility ID: 20571) and W296EH – La Crosse, WI (Facility ID: 145081). Both applications have been filed concurrent with one another and reference this Section 73.3517 Contingent Processing Request within each filing. In this instance, K220EP requests a site change and 47 C.F.R. Section 74.1233(a)(1)(i)(A)(1) adjacent channel change from CH220D to CH223D. To accommodate this frequency change, W296EH will further modify its currently authorized 47 C.F.R. Section 74.1233(a)(1)(i)(A)(2) non-adjacent CH296D to CH224D(W224EL.C) channel change Construction Permit (LMS(cp)-0000197677) from a non-directional antenna to a directional antenna. This NDA-to-DA antenna change for the existing W296EH(W224EL.C) facility will allow both stations to fully protect each other without the need for further contingent special conditioning at the time of each stations' licensing.

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 Translator 60 dBμ contour lies wholly inside of the larger FM Class C3 primary 60 dBμ contour. The primary station service contour relationship has been plotted in **Exhibit 2**. Regarding permission to retransmit the primary station; both WKBH-FM and CH223D.P(K220EP) are under common control or in the process of being acquired by Magnum Communications, Inc. (David R. Magnum); therefore, permission to rebroadcast is implied. The applicant would like to note primary station WKBH-FM (analog) will be rebroadcast on co-owned Fill-In Translator(s) K250AZ.L - La Crosse, WI (FAC ID: 155068) and this CH223D.P - La Crescent, MN (FAC ID: 20571) proposal; however, no Translator will visually serve substantially the same area as noted in **Exhibit 2**.

The facility will be located on a 3.1 meter (10 ft) pole mounted on an existing 15.2 meter (50 ft) building. The building mounted pole will not require Antenna Structure Registration. In support of this filing, a copy of USGS Topographic Aerial Photomapping of the existing tower site 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 FCC 30 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 absent the 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 concerns with the exception of W224EL.C(formerly W296EH) – La Crosse, WI; Construction Permit File Number LMS(cp)-0000197677. A general allocation study for this proposal is found in **Exhibit 6**. There are three (3) 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-c)**. Protection of the aforementioned W224EL.C(formerly W296EH) – La Crosse, WI facility is addressed within the concurrent request for 47 C.F.R. Section 73.3517 Contingent Processing between applications for FM Translators K220EP – La Crescent, MN (Facility ID: 20571) and W296EH – La Crosse, WI (Facility ID: 145081). Both applications have been filed concurrent with one another and reference this Section 73.3517 Contingent Processing Request within each filing. In this instance, K220EP requests a site change and 47 C.F.R. Section 74.1233(a)(1)(i)(A)(1) adjacent channel change from CH220D to CH223D. To accommodate this frequency change, W296EH will further modify its currently authorized 47 C.F.R. Section 74.1233(a)(1)(i)(A)(2) non-adjacent CH296D to CH224D(W224EL.C) channel change Construction Permit (LMS(cp)-0000197677) from a non-directional antenna to a directional antenna. This NDA-to-DA antenna change for the existing W296EH(W224EL.C) facility will allow both stations to fully protect each other without the need for further contingent special conditioning at the time of each stations' licensing (see also **Exhibit 7b**).

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 the restricted roof access. 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 a roof mounted pole, antenna and feedline are being added to 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
February 19, 2024

FCC 30 SEC Terrain Database
US Census 2020 PL Database
NED 1983 Coordinate Datum

Exhibit 1

Service Contour Study: Present vs Proposed Operations

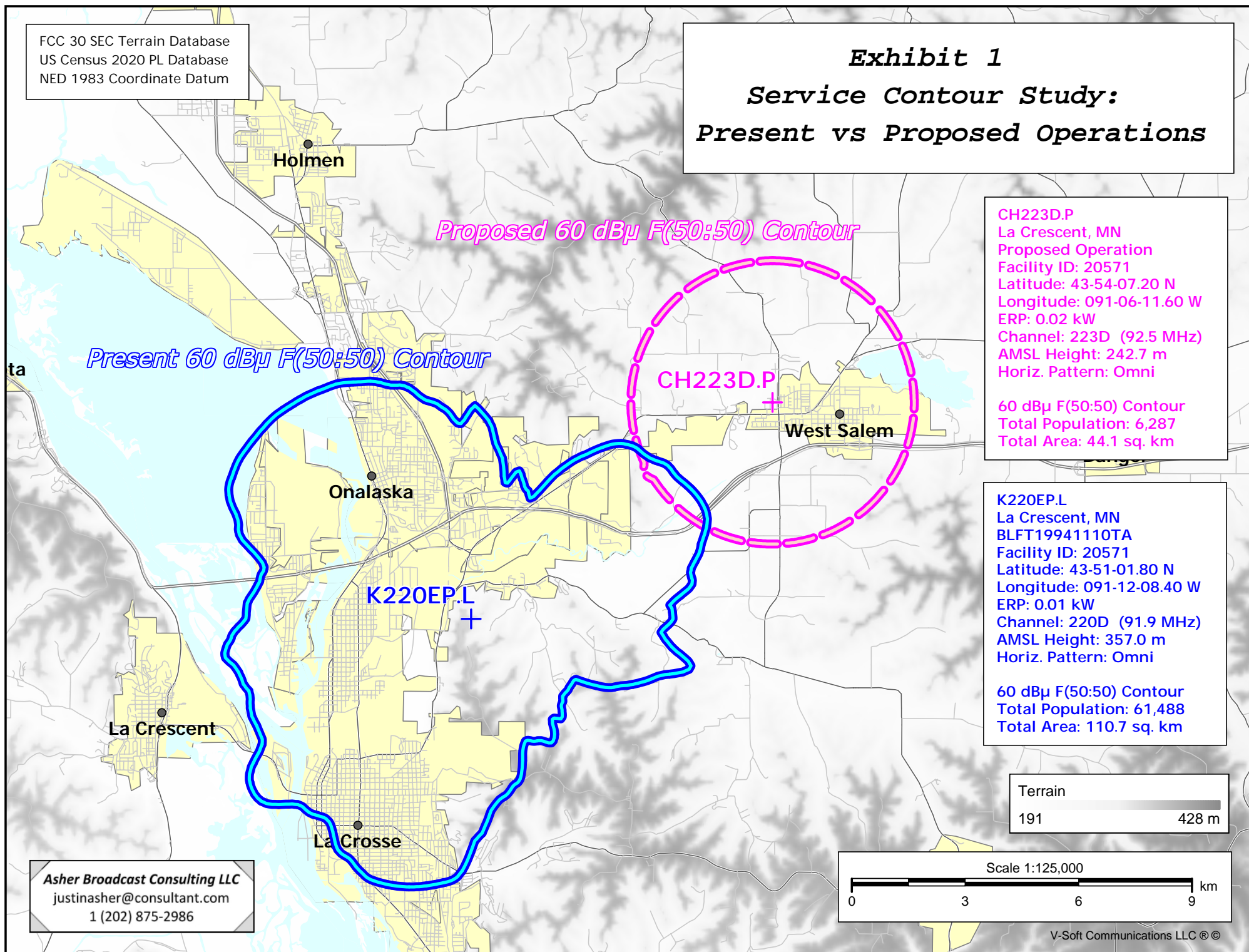


Exhibit 2
Service Contour Study:
Proposed vs Primary Operations

Primary 60.0 dBμ F(50:50) Contour

Licensed 60 dBμ F(50:50) Contour

CH223D.P

Proposed 60 dBμ F(50:50) Contour

K250AZ.L

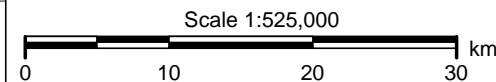
WKBH-FM.L

FCC 30 SEC Terrain Database
US Census 2020 PL Database
NAD 1983 Coordinate Datum

WKBH-FM.L
Onalaska, WI
0000184793
Facility ID: 72206
Latitude: 43-43-17 N
Longitude: 091-17-24.50 W
ERP: 4.00 kW
Channel: 274C3 (102.7 MHz)
AMSL Height: 475.0 m
Pattern: Omni

CH223D.P
La Crescent, MN
Proposed Operation
Facility ID: 20571
Latitude: 43-54-07.20 N
Longitude: 091-06-11.60 W
ERP: 0.02 kW
Channel: 223D (92.5 MHz)
AMSL Height: 242.7 m
Horiz. Pattern: Omni

K250AZ.L
La Crosse, WI
Facility ID: 155068
0000145868
Channel: 250D (97.9 MHz)
Latitude: 43-44-52.30 N
Longitude: 091-17-54.60 W
AMSL Height: 507.4 m
ERP: 0.25 kW
Pattern: Omni



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

The applicant would like to note primary station WKBH-FM (analog) will be rebroadcast on co-owned Fill-In Translator(s) K250AZ.L - La Crosse, WI (FAC ID: 155068) and this CH223D.P - La Crescent, MN (FAC ID: 20571); however, no Translator will visually serve substantially the same area as noted herein.

The National Map Advanced Viewer

Exhibit 3 - Copy of USGS Topographic Aerial Photomap of Existing Site

#1:736.3509866865903 ft/224.44 m

Site Coordinates

(NGS NADCON)

Latitude

Longitude

NAD 27 datum values: - - - - -

- - - - -

NAD 83 datum values: 43-54-07.2 N

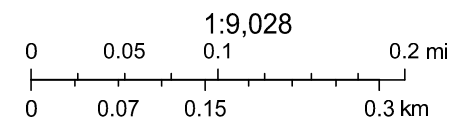
091-06-11.6 W

Asher Broadcast Consulting LLC

justinasher@consultant.com

1 (202) 875-2986

2/15/2024, 12:25:46 PM

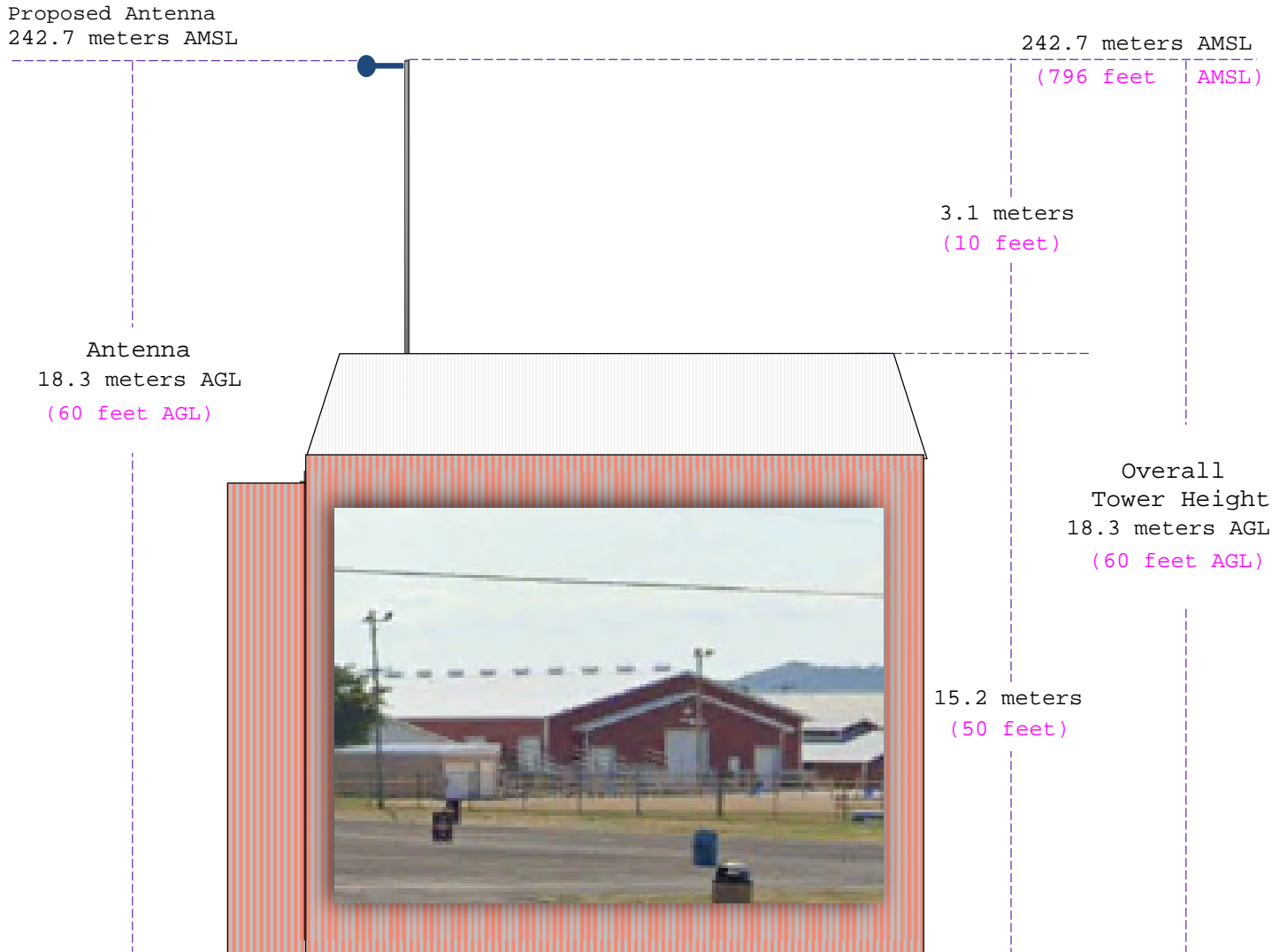


USGS The National Map: Orthoimagery and US Topo. Data refreshed August, 2023.

USGS
2021 USGS

Exhibit 4

Vertical Plan of Antenna System and Support Tower



Ground Elevation: 224.4 meters AMSL (736 feet AMSL)		
Address: La Crosse Fairgrounds; N4985 Co Rd M		
City: West Salem	Latitude (D M S) Longitude (D M S)	
County: La Crosse	----- (NAD 1927)	
State: Wisconsin	Lat/Long: 43-54-07.2 N 091-06-11.6 W (NAD 1983)	
Antenna Structure Registration Not Required	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. = 435407.2 W. Lng. = 910611.6
 HAAT and Distance to Contour,
 FCC, FM 2-10 Mi, 51 pts Method - FCC 30 SEC

Azi.	AV EL	HAAT	ERP kW	dBk	Field	60-F5
000	286.9	-44.2	0.0200	-16.99	1.000	3.74
030	289.0	-46.3	0.0200	-16.99	1.000	3.74
060	261.5	-18.8	0.0200	-16.99	1.000	3.74
090	223.4	19.3	0.0200	-16.99	1.000	3.74
120	291.8	-49.1	0.0200	-16.99	1.000	3.74
150	313.5	-70.8	0.0200	-16.99	1.000	3.74
180	285.1	-42.4	0.0200	-16.99	1.000	3.74
210	277.6	-34.9	0.0200	-16.99	1.000	3.74
240	210.8	31.9	0.0200	-16.99	1.000	3.85
270	242.4	0.3	0.0200	-16.99	1.000	3.74
300	273.4	-30.7	0.0200	-16.99	1.000	3.74
330	292.2	-49.5	0.0200	-16.99	1.000	3.74

Ave El= 270.65 M HAAT= -27.95 M AMSL= 242.7 M

NAD 1983 to NAD 1927 Conversion:

Various Coordinate Conversion Calculations (NAD 1983):

Position Type	Lat Lon
Degrees Lat Long	43.9020000°, -091.1032222°
Degrees Minutes	43°54.12000', -091°06.19333'
Degrees Minutes Seconds	43°54'07.2000", -091°06'11.6000"
UTM	15T 652323mE 4862736mN
UTM centimeter	15T 652323.67mE 4862736.98mN
MGRS	15TXJ5232362736
Grid North	1.3°
GARS	178MD25
Maidenhead	EN43KV76OL75
GEOREF	FJPP53805412
Plus Code	86MCWV2W+RP
Plus Code Extended	86MCWV2W+RPRXWRX
what3words	meatball.buffalo.superhero

Exhibit 6

Tabulation of Proposed Allocation

Grey Text indicates Allotment (ALO), Reservation (RSV), Deleted (DEL), Special Temporary Authority (STA) or the facility to be modified herein. These concerns need not be protected.

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

The applicant would like to note a request for 47 C.F.R. Section 73.3517 Contingent Processing between applications for FM Translators K220EP – La Crescent, MN (Facility ID: 20571) and W296EH – La Crosse, WI (Facility ID: 145081). Both applications have been filed concurrent with one another and reference this Section 73.3517 Contingent Processing Request within each filing. In this instance, K220EP requests a site change and 47 C.F.R. Section 74.1233(a)(1)(i)(A)(1) adjacent channel change from CH220D to CH223D. To accommodate this frequency change, W296EH will further modify its currently authorized 47 C.F.R. Section 74.1233(a)(1)(i)(A)(2) non-adjacent CH296D to CH224D(W224EL.C) channel change Construction Permit (LMS(cp)-0000197677) from a non-directional antenna to a directional antenna. This NDA-to-DA antenna change for the existing W296EH(W224EL.C) facility will allow both stations to fully protect each other without the need for further contingent special conditioning at the time of each stations' licensing. (See ***Exhibit 7b***)

REFERENCE		CH# 223D - 92.5 MHz, Pwr= 0.02 kW, HAAT= -28.0 M, COR= 242.7 M								DISPLAY DATES	
43 54 07.20 N.		Average Protected F(50-50)= 3.74 km								DATA	02-15-24
91 06 11.60 W.		Omni-directional								SEARCH	02-15-24
CH CITY	CALL	TYPE ANT STATE	AZI <--	DIST FILE #	LAT LNG	PWR (kW) HAAT (M)	INT (km) COR (M)	PRO (km) LICENSEE	*IN* (Overlap in km)	*OUT*	
222D La Crosse	K222AG	LIC DCN WI	222.9 42.8	21.91 BLFT20160406ABR	43 45 26.80 91 17 20.40	0.250	21.1 397	13.1 Family Radio, Inc.	-2.1	2.4	
224D La Crosse	CH224D.P	PRO DCN WI	222.5 42.4	23.21 Contingent-PROP	43 44 52.30 91 17 54.60	0.225	18.9 498	12.6	0.7	4.9	
220D La Crescent	K220EP	LIC _CN MN	234.2 54.2	9.79 BLFT19941110TA	43 51 01.80 91 12 08.40	0.010 162	0.2 357	6.6 Faith Sound, Inc.	5.8	2.8	
220A Viroqua	WDRT	LIC ZCN WI	152.3 332.4	36.92 0000200685	43 36 28.00 90 53 24.00	3.000 141	2.6 484	29.2 Driftless Community Radio,	30.5	7.3	
223D Peterson	K223AH	LIC DVN MN	259.6 79.1	60.93 BLFT19960125TD	43 48 02.80 91 51 00.50	0.119 83	37.5 408	10.9 Faith Sound, Inc.	19.8	36.4	
223C Golden Valley	KQRS-FM	LIC _CN MN	309.4 128.0	205.49 BLH19910814KB	45 03 29.80 93 07 27.70	100.000 315	172.3 593	72.6 Radio License Holdings LLC	29.5	120.7	
223D Winona	KSMR	LIC _CN MN	288.9 108.5	50.02 BLED19921005KB	44 02 46.80 91 41 43.50	0.004 -43	8.0 250	2.5 Real Presence Radio	38.3	34.8	
224A Neillsville	WPKG	LIC _CN WI	26.5 206.9	85.81 BMLH20060228AOL	44 35 29.90 90 37 09.50	3.400 134	45.8 461	30.3 Central Wisconsin Broadcas	36.3	50.1	
222C0 Oelwein	KOEL-FM	LIC _CN IA	205.2 24.6	149.48 BLH20160217AAE	42 40 56.60 91 52 50.60	100.000 297	103.2 627	70.8 Townsquare License, LLC	42.6	73.3	
221A Mauston	WRJC-FM	LIC _CN WI	99.6 280.2	73.69 BLH19980630KE	43 47 15.90 90 11 52.50	2.000 174	2.2 479	25.5 Murphy's Law Media Group,	67.7	46.9	
225D Mauston	W225BF	LIC DCN WI	99.6 280.2	73.69 BLFT20110719AAG	43 47 15.90 90 11 52.50	0.250 152	0.3 457	7.7 Murphy's Law Media Group,	69.6	64.4	
222A Spencer	WOSQ	LIC _CN WI	30.1 210.6	116.79 BLH20030310AUL	44 48 31.90 90 21 41.50	6.000 91	44.4 490	28.7 Central Wisconsin Broadcas	68.7	82.7	
221C2 Menomonie	WMEQ-FM	LIC NCN WI	337.5 157.0	122.29 BLH20010605ABD	44 54 58.90 91 41 55.60	17.500 219	5.5 512	50.8 Ihm Licenses, LLC	113.1	71.2	

Terrain database is FCC NGDC 30 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)

Exhibit 7a

Contour Protection Studies Toward Select Allocation Concern(s)

FMCommander Single Allocation Study - 02-16-2024 - FCC NGDC 30 Sec
CH223D.P's Overlaps (In= -2.08 km, Out= 2.43 km)

CH223D.P CH 223 D
Lat= 43 54 07.20, Lng= 91 06 11.60
0.02 kW -28 m HAAT, 242.7 m COR
Prot.= 60 dBu, Intef.= 54 dBu

K222AG CH 222 D DA BLFT20160406ABR
Lat= 43 45 26.80, Lng= 91 17 20.40
0.25 kW 0 m HAAT, 397 m COR
Prot.= 60 dBu, Intef.= 54 dBu

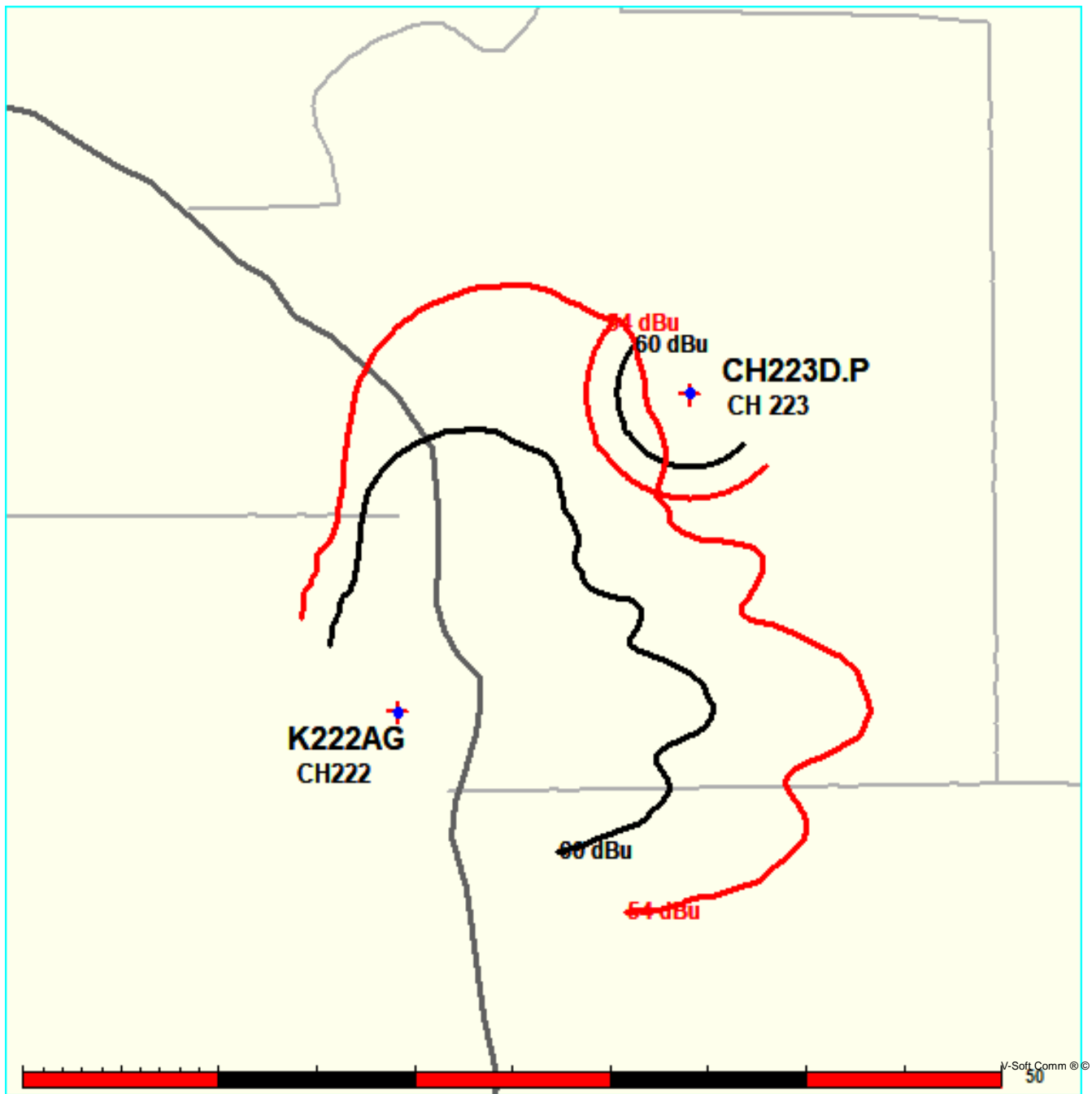


Exhibit 7a

Contour Protection Studies Toward Select Allocation Concern(s)

02-16-2024 Terrain Data: FCC NGDC 30 Sec FMOver Analysis

CH223D.P

K222AG BLFT20160406ABR

Channel = 223D
 Max ERP = 0.02 kW
 RCAMSL = 242.7 m
 N. Lat. 43 54 07.20
 W. Lng. 91 06 11.60
 Protected
 60 dBu

Channel = 222D
 Max ERP = 0.25 kW
 RCAMSL = 397 m
 N. Lat. 43 45 26.80
 W. Lng. 91 17 20.40
 Interfering
 54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
185.0	000.0200	-0023.6	003.7	049.7	000.0956	0135.3	019.1	52.53	
186.0	000.0200	-0020.0	003.7	049.5	000.0957	0136.0	019.1	52.62	
187.0	000.0200	-0018.1	003.7	049.4	000.0957	0136.8	019.0	52.71	
188.0	000.0200	-0015.9	003.7	049.2	000.0958	0137.6	019.0	52.80	
189.0	000.0200	-0014.6	003.7	049.1	000.0958	0138.5	018.9	52.89	
190.0	000.0200	-0013.8	003.7	048.9	000.0959	0139.5	018.9	52.99	
191.0	000.0200	-0014.6	003.7	048.8	000.0959	0140.6	018.8	53.10	
192.0	000.0200	-0015.2	003.7	048.6	000.0960	0141.7	018.8	53.21	
193.0	000.0200	-0018.1	003.7	048.5	000.0960	0142.9	018.8	53.32	
194.0	000.0200	-0022.7	003.7	048.3	000.0961	0144.0	018.7	53.43	
195.0	000.0200	-0027.5	003.7	048.1	000.0962	0145.0	018.7	53.52	
196.0	000.0200	-0032.9	003.7	048.0	000.0962	0146.0	018.7	53.62	
197.0	000.0200	-0039.1	003.7	047.8	000.0963	0147.0	018.6	53.71	
198.0	000.0200	-0044.3	003.7	047.6	000.0964	0148.0	018.6	53.81	
199.0	000.0200	-0046.2	003.7	047.5	000.0964	0149.1	018.6	53.91	
200.0	000.0200	-0046.2	003.7	047.3	000.0965	0150.0	018.5	54.00	
201.0	000.0200	-0045.2	003.7	047.1	000.0966	0150.9	018.5	54.08*	0.10
202.0	000.0200	-0042.9	003.7	046.9	000.0966	0151.6	018.5	54.15*	0.19
203.0	000.0200	-0040.4	003.7	046.7	000.0967	0152.3	018.4	54.22*	0.27
204.0	000.0200	-0039.1	003.7	046.5	000.0968	0152.9	018.4	54.28*	0.35
205.0	000.0200	-0039.6	003.7	046.4	000.0968	0153.6	018.4	54.35*	0.43
206.0	000.0200	-0041.4	003.7	046.2	000.0969	0154.3	018.4	54.41*	0.51
207.0	000.0200	-0042.5	003.7	046.0	000.0970	0155.0	018.3	54.48*	0.59
208.0	000.0200	-0040.5	003.7	045.8	000.0971	0155.5	018.3	54.53*	0.65
209.0	000.0200	-0037.2	003.7	045.6	000.0971	0156.0	018.3	54.58*	0.71
210.0	000.0200	-0034.9	003.7	045.4	000.0972	0156.5	018.3	54.63*	0.77
211.0	000.0200	-0033.2	003.7	045.2	000.0973	0157.0	018.3	54.68*	0.84
212.0	000.0200	-0031.7	003.7	045.0	000.0973	0157.6	018.3	54.72*	0.89
213.0	000.0200	-0030.5	003.7	044.8	000.0974	0158.1	018.2	54.77*	0.95

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)
214.0	000.0200	-0028.8	003.7	044.6	000.0975	0158.5	018.2	54.81* 1.00
215.0	000.0200	-0025.8	003.7	044.4	000.0976	0159.0	018.2	54.85* 1.05
216.0	000.0200	-0021.5	003.7	044.2	000.0976	0159.5	018.2	54.90* 1.11
217.0	000.0200	-0016.3	003.7	044.0	000.0977	0160.0	018.2	54.94* 1.16
218.0	000.0200	-0010.9	003.7	043.8	000.0978	0160.5	018.2	54.97* 1.20
219.0	000.0200	-0006.2	003.7	043.6	000.0979	0160.9	018.2	55.01* 1.24
220.0	000.0200	-0002.5	003.7	043.4	000.0980	0161.3	018.2	55.04* 1.28
221.0	000.0200	0000.1	003.7	043.2	000.0980	0161.8	018.2	55.07* 1.32
222.0	000.0200	0001.7	003.7	043.0	000.0981	0162.2	018.2	55.10* 1.36
223.0	000.0200	0002.7	003.7	042.7	000.0982	0162.6	018.2	55.13* 1.40
224.0	000.0200	0003.7	003.7	042.5	000.0983	0162.9	018.2	55.15* 1.42
225.0	000.0200	0004.9	003.7	042.3	000.0983	0163.2	018.2	55.17* 1.45
226.0	000.0200	0006.5	003.7	042.1	000.0984	0163.5	018.2	55.19* 1.47
227.0	000.0200	0008.1	003.7	041.9	000.0985	0163.8	018.2	55.20* 1.49
228.0	000.0200	0009.7	003.7	041.7	000.0986	0164.1	018.2	55.22* 1.51
229.0	000.0200	0011.4	003.7	041.5	000.0987	0164.4	018.2	55.23* 1.53
230.0	000.0200	0013.2	003.7	041.3	000.0987	0164.6	018.2	55.24* 1.53
231.0	000.0200	0015.5	003.7	041.1	000.0988	0164.7	018.2	55.24* 1.54
232.0	000.0200	0017.8	003.7	040.9	000.0989	0164.9	018.2	55.25* 1.54
233.0	000.0200	0020.6	003.7	040.7	000.0990	0165.1	018.2	55.25* 1.55
234.0	000.0200	0023.4	003.7	040.5	000.0990	0165.3	018.3	55.25* 1.56
235.0	000.0200	0026.0	003.7	040.3	000.0991	0165.6	018.3	55.26* 1.56
236.0	000.0200	0028.1	003.7	040.1	000.0992	0165.9	018.3	55.27* 1.57
237.0	000.0200	0029.7	003.7	039.9	000.0994	0166.2	018.3	55.28* 1.58
238.0	000.0200	0030.8	003.8	039.7	000.0998	0166.5	018.3	55.34* 1.66
239.0	000.0200	0031.5	003.8	039.4	000.1002	0167.1	018.3	55.40* 1.73
240.0	000.0200	0031.9	003.8	039.2	000.1006	0167.6	018.3	55.44* 1.79
241.0	000.0200	0032.0	003.9	039.0	000.1010	0168.1	018.3	55.47* 1.83
242.0	000.0200	0031.9	003.8	038.8	000.1013	0168.7	018.3	55.49* 1.85
243.0	000.0200	0031.4	003.8	038.7	000.1016	0169.2	018.4	55.49* 1.85
244.0	000.0200	0030.7	003.8	038.5	000.1018	0169.6	018.4	55.47* 1.83
245.0	000.0200	0029.9	003.7	038.4	000.1021	0170.1	018.5	55.45* 1.81
246.0	000.0200	0028.9	003.7	038.2	000.1024	0170.8	018.5	55.48* 1.85
247.0	000.0200	0027.7	003.7	038.0	000.1027	0171.5	018.6	55.51* 1.88
248.0	000.0200	0026.4	003.7	037.9	000.1030	0172.1	018.6	55.53* 1.91
249.0	000.0200	0025.0	003.7	037.7	000.1033	0172.7	018.6	55.55* 1.93
250.0	000.0200	0023.5	003.7	037.5	000.1036	0173.4	018.7	55.56* 1.96
251.0	000.0200	0022.2	003.7	037.4	000.1039	0174.0	018.7	55.58* 1.98
252.0	000.0200	0021.1	003.7	037.2	000.1042	0174.7	018.7	55.60* 2.00
253.0	000.0200	0020.2	003.7	037.0	000.1045	0175.3	018.8	55.61* 2.02
254.0	000.0200	0019.3	003.7	036.9	000.1048	0175.9	018.8	55.62* 2.04
255.0	000.0200	0018.1	003.7	036.7	000.1051	0176.5	018.9	55.63* 2.05

Exhibit 7a

Contour Protection Studies Toward Select Allocation Concern(s)

02-16-2024 Terrain Data: FCC NGDC 30 Sec FMOver Analysis

K222AG BLFT20160406ABR

CH223D.P

Channel = 222D
 Max ERP = 0.25 kW
 RCAMSL = 397 m
 N. Lat. 43 45 26.80
 W. Lng. 91 17 20.40
 Protected
 60 dBu

Channel = 223D
 Max ERP = 0.02 kW
 RCAMSL = 242.7 m
 N. Lat. 43 54 07.20
 W. Lng. 91 06 11.60
 Interfering
 54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
358.0	000.0528	0205.9	012.6	257.4	000.0200	0016.7	015.7	35.41	
359.0	000.0560	0206.4	012.8	257.9	000.0200	0016.4	015.5	35.63	
000.0	000.0593	0206.5	013.0	258.4	000.0200	0016.1	015.2	35.85	
001.0	000.0621	0206.7	013.1	258.8	000.0200	0015.7	014.9	36.08	
002.0	000.0650	0206.8	013.3	259.1	000.0200	0015.4	014.7	36.38	
003.0	000.0679	0207.0	013.4	259.5	000.0200	0015.0	014.4	36.68	
004.0	000.0709	0207.0	013.6	259.8	000.0200	0014.5	014.2	37.00	
005.0	000.0740	0206.8	013.7	260.1	000.0200	0014.1	013.9	37.34	
006.0	000.0771	0206.3	013.8	260.3	000.0200	0013.7	013.6	37.68	
007.0	000.0803	0205.6	013.9	260.5	000.0200	0013.4	013.4	38.03	
008.0	000.0836	0205.1	014.1	260.7	000.0200	0013.1	013.1	38.40	
009.0	000.0869	0204.8	014.2	260.9	000.0200	0012.8	012.8	38.78	
010.0	000.0903	0204.7	014.3	261.1	000.0200	0012.6	012.6	39.18	
011.0	000.0923	0204.7	014.4	261.0	000.0200	0012.7	012.3	39.57	
012.0	000.0944	0204.6	014.5	260.9	000.0200	0012.8	012.0	39.96	
013.0	000.0964	0204.4	014.6	260.8	000.0200	0012.9	011.8	40.37	
014.0	000.0985	0204.4	014.6	260.7	000.0200	0013.1	011.5	40.78	
015.0	000.1006	0204.6	014.7	260.5	000.0200	0013.3	011.2	41.21	
016.0	000.1028	0204.5	014.8	260.3	000.0200	0013.6	011.0	41.65	
017.0	000.1049	0204.0	014.9	260.0	000.0200	0014.2	010.7	42.08	
018.0	000.1071	0203.0	014.9	259.5	000.0200	0014.9	010.5	42.50	
019.0	000.1093	0201.6	014.9	259.0	000.0200	0015.5	010.2	42.91	
020.0	000.1116	0200.2	014.9	258.3	000.0200	0016.1	010.0	43.32	
021.0	000.1122	0198.6	014.9	257.3	000.0200	0016.7	009.8	43.67	
022.0	000.1128	0196.9	014.9	256.2	000.0200	0017.3	009.6	44.01	
023.0	000.1134	0195.6	014.8	255.2	000.0200	0018.0	009.4	44.35	
024.0	000.1140	0194.7	014.8	254.1	000.0200	0019.1	009.2	44.71	
025.0	000.1146	0194.1	014.8	253.0	000.0200	0020.2	009.0	45.06	
026.0	000.1152	0193.5	014.8	251.9	000.0200	0021.2	008.8	45.41	

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)
027.0	000.1158	0193.4	014.8	250.7	000.0200	0022.6	008.6	45.77
028.0	000.1164	0194.3	014.9	249.7	000.0200	0023.9	008.4	46.18
029.0	000.1170	0195.8	015.0	248.7	000.0200	0025.5	008.2	46.61
030.0	000.1176	0196.3	015.0	247.4	000.0200	0027.2	008.0	46.98
031.0	000.1157	0195.6	014.9	245.5	000.0200	0029.4	007.9	47.15
032.0	000.1138	0193.8	014.8	243.4	000.0200	0031.1	007.9	47.50
033.0	000.1120	0190.8	014.6	241.2	000.0200	0032.0	007.9	47.66
034.0	000.1101	0186.9	014.4	238.9	000.0200	0031.5	008.0	47.39
035.0	000.1082	0182.9	014.2	236.7	000.0200	0029.3	008.1	46.86
036.0	000.1064	0179.2	014.0	234.6	000.0200	0025.0	008.2	46.67
037.0	000.1046	0175.5	013.8	232.6	000.0200	0019.4	008.3	46.44
038.0	000.1028	0171.7	013.6	230.6	000.0200	0014.6	008.4	46.16
039.0	000.1010	0168.2	013.4	228.8	000.0200	0011.0	008.6	45.87
040.0	000.0992	0166.0	013.3	227.1	000.0200	0008.3	008.7	45.66
041.0	000.0988	0164.8	013.2	225.6	000.0200	0005.8	008.7	45.58
042.0	000.0985	0163.7	013.1	224.0	000.0200	0003.7	008.8	45.49
043.0	000.0981	0162.1	013.1	222.6	000.0200	0002.3	008.9	45.34
044.0	000.0977	0160.0	012.9	221.1	000.0200	0000.3	009.0	45.13
045.0	000.0973	0157.5	012.8	219.8	000.0200	-0003.2	009.1	44.88
046.0	000.0970	0154.9	012.7	218.5	000.0200	-0008.7	009.3	44.60
047.0	000.0966	0151.3	012.5	217.3	000.0200	-0014.7	009.5	44.22
048.0	000.0962	0145.8	012.3	216.3	000.0200	-0019.9	009.8	43.70
049.0	000.0959	0139.1	011.9	215.5	000.0200	-0023.6	010.1	43.08
050.0	000.0955	0133.7	011.7	214.8	000.0200	-0026.6	010.4	42.57
051.0	000.0975	0131.1	011.6	213.8	000.0200	-0029.2	010.5	42.38
052.0	000.0995	0130.5	011.7	212.7	000.0200	-0030.8	010.6	42.33
053.0	000.1016	0129.8	011.7	211.6	000.0200	-0032.3	010.6	42.25
054.0	000.1037	0127.0	011.6	210.7	000.0200	-0033.6	010.7	42.01
055.0	000.1058	0124.0	011.6	209.9	000.0200	-0035.1	010.9	41.76
056.0	000.1079	0121.8	011.5	209.1	000.0200	-0037.0	011.0	41.55
057.0	000.1101	0121.5	011.6	208.0	000.0200	-0040.4	011.1	41.46
058.0	000.1122	0122.2	011.6	206.9	000.0200	-0042.5	011.1	41.42
059.0	000.1144	0123.5	011.8	205.7	000.0200	-0040.9	011.1	41.39
060.0	000.1166	0125.5	011.9	204.4	000.0200	-0039.1	011.1	41.39
061.0	000.1207	0128.1	012.1	202.9	000.0200	-0040.7	011.1	41.47
062.0	000.1248	0131.3	012.4	201.2	000.0200	-0044.8	011.0	41.56
063.0	000.1290	0135.1	012.6	199.4	000.0200	-0046.4	011.0	41.66
064.0	000.1333	0138.9	012.9	197.5	000.0200	-0042.1	010.9	41.73
065.0	000.1376	0141.9	013.2	195.7	000.0200	-0031.2	010.9	41.73
066.0	000.1421	0143.0	013.3	194.3	000.0200	-0024.1	011.0	41.60
067.0	000.1465	0142.0	013.4	193.3	000.0200	-0019.6	011.1	41.35
068.0	000.1511	0139.3	013.4	192.8	000.0200	-0017.4	011.4	41.00
069.0	000.1557	0135.1	013.2	192.6	000.0200	-0016.8	011.6	40.60

Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

FMCommander Single Allocation Study - 02-16-2024 - FCC NGDC 30 Sec
CH223D.P's Overlaps (In= 0.69 km, Out= 4.88 km)

CH223D.P CH 223 D
Lat= 43 54 07.20, Lng= 91 06 11.60
0.02 kW -28 m HAAT, 242.7 m COR
Prot.= 60 dBu, Intef.= 54 dBu

CH224D CH 224 D DA Contingent-PROP
Lat= 43 44 52.30, Lng= 91 17 54.60
0.225 kW 0 m HAAT, 498.4 m COR
Prot.= 60 dBu, Intef.= 54 dBu

The applicant would like to note a request for 47 C.F.R. Section 73.3517 Contingent Processing between applications for FM Translators K220EP – La Crescent, MN (Facility ID: 20571) and W296EH – La Crosse, WI (Facility ID: 145081). Both applications have been filed concurrent with one another and reference this Section 73.3517 Contingent Processing Request within each filing. In this instance, K220EP requests a site change and 47 C.F.R. Section 74.1233(a)(1)(i)(A)(1) adjacent channel change from CH220D to CH223D. To accommodate this frequency change, W296EH will further modify its currently authorized 47 C.F.R. Section 74.1233(a)(1)(i)(A)(2) non-adjacent CH296D to CH224D(W224EL.C) channel change Construction Permit (LMS(cp)-0000197677) from a non-directional antenna to a directional antenna. This NDA-to-DA antenna change for the existing W296EH(W224EL.C) facility will allow both stations to fully protect each other without the need for further contingent special conditioning at the time of each stations' licensing.

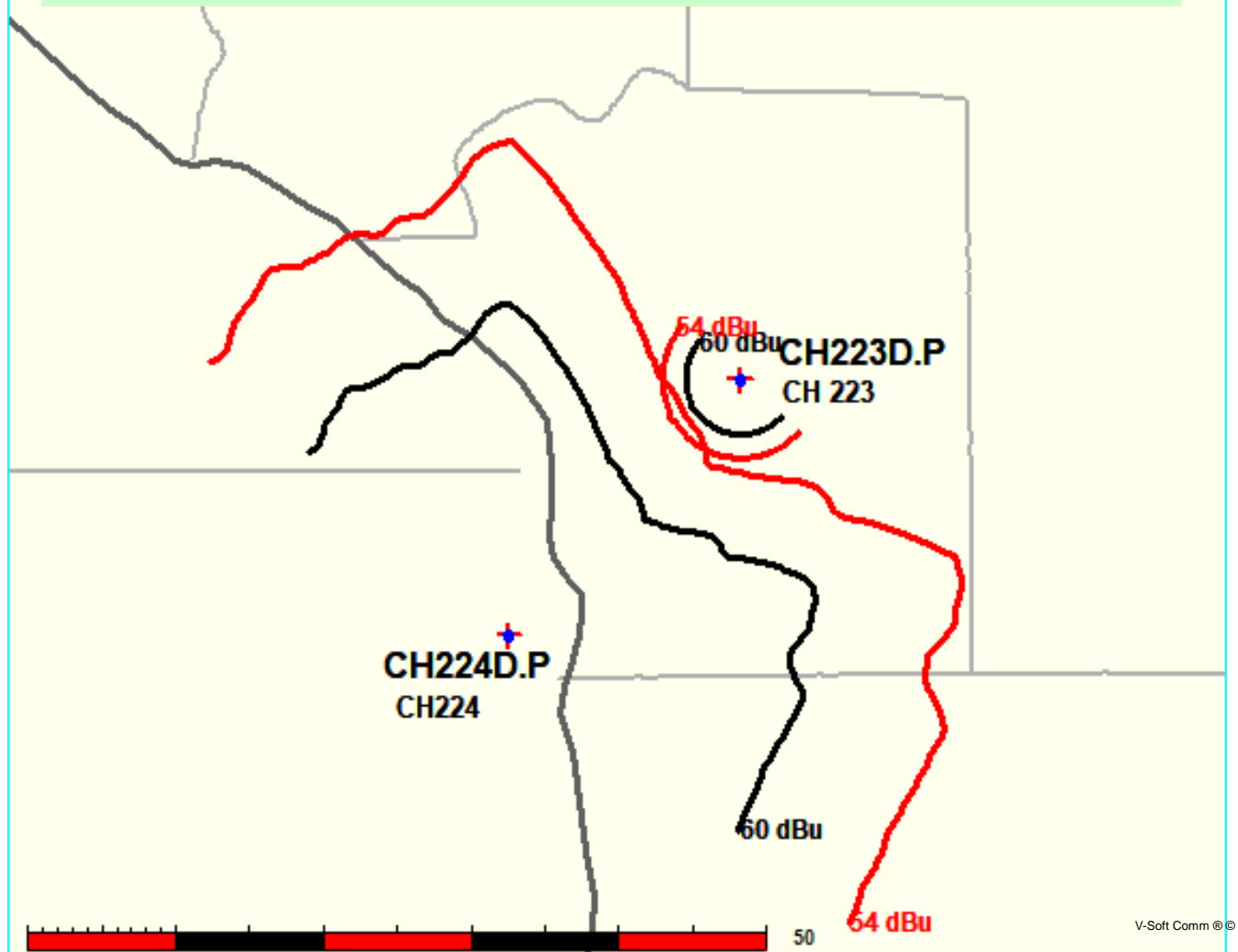


Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

02-16-2024

Terrain Data: FCC NGDC 30 Sec

FMOver Analysis

CH223D.P

CH224D Contingent-PROP

Channel = 223D

Max ERP = 0.02 kW

RCAMSL = 242.7 m

N. Lat. 43 54 07.20

W. Lng. 91 06 11.60

Protected

60 dBu

Channel = 224D

Max ERP = 0.225 kW

RCAMSL = 498.4 m

N. Lat. 43 44 52.30

W. Lng. 91 17 54.60

Interfering

54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
184.0	000.0200	-0024.4	003.7	048.9	000.0316	0238.4	020.4	51.75	
185.0	000.0200	-0023.6	003.7	048.8	000.0316	0239.0	020.4	51.80	
186.0	000.0200	-0020.0	003.7	048.6	000.0316	0239.7	020.3	51.86	
187.0	000.0200	-0018.1	003.7	048.5	000.0316	0240.4	020.3	51.92	
188.0	000.0200	-0015.9	003.7	048.4	000.0316	0241.2	020.2	51.98	
189.0	000.0200	-0014.6	003.7	048.2	000.0316	0242.0	020.2	52.04	
190.0	000.0200	-0013.8	003.7	048.1	000.0316	0242.8	020.2	52.10	
191.0	000.0200	-0014.6	003.7	047.9	000.0316	0243.7	020.1	52.16	
192.0	000.0200	-0015.2	003.7	047.8	000.0316	0244.6	020.1	52.22	
193.0	000.0200	-0018.1	003.7	047.6	000.0316	0245.7	020.0	52.29	
194.0	000.0200	-0022.7	003.7	047.5	000.0316	0246.7	020.0	52.35	
195.0	000.0200	-0027.5	003.7	047.3	000.0316	0247.8	020.0	52.42	
196.0	000.0200	-0032.9	003.7	047.2	000.0316	0248.9	019.9	52.48	
197.0	000.0200	-0039.1	003.7	047.0	000.0316	0249.8	019.9	52.53	
198.0	000.0200	-0044.3	003.7	046.8	000.0316	0250.7	019.9	52.59	
199.0	000.0200	-0046.2	003.7	046.7	000.0316	0251.6	019.8	52.64	
200.0	000.0200	-0046.2	003.7	046.5	000.0316	0252.5	019.8	52.70	
201.0	000.0200	-0045.2	003.7	046.3	000.0316	0253.5	019.8	52.75	
202.0	000.0200	-0042.9	003.7	046.2	000.0316	0254.4	019.8	52.80	
203.0	000.0200	-0040.4	003.7	046.0	000.0316	0255.2	019.7	52.85	
204.0	000.0200	-0039.1	003.7	045.8	000.0316	0255.9	019.7	52.89	
205.0	000.0200	-0039.6	003.7	045.6	000.0316	0256.6	019.7	52.93	
206.0	000.0200	-0041.4	003.7	045.5	000.0316	0257.2	019.7	52.97	
207.0	000.0200	-0042.5	003.7	045.3	000.0316	0257.9	019.6	53.01	
208.0	000.0200	-0040.5	003.7	045.1	000.0316	0258.6	019.6	53.04	
209.0	000.0200	-0037.2	003.7	044.9	000.0316	0259.2	019.6	53.08	
210.0	000.0200	-0034.9	003.7	044.7	000.0316	0259.7	019.6	53.11	
211.0	000.0200	-0033.2	003.7	044.5	000.0316	0260.3	019.6	53.14	
212.0	000.0200	-0031.7	003.7	044.4	000.0316	0260.8	019.6	53.17	

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)
213.0	000.0200	-0030.5	003.7	044.2	000.0316	0261.3	019.5	53.20
214.0	000.0200	-0028.8	003.7	044.0	000.0316	0261.8	019.5	53.22
215.0	000.0200	-0025.8	003.7	043.8	000.0316	0262.2	019.5	53.24
216.0	000.0200	-0021.5	003.7	043.6	000.0316	0262.7	019.5	53.26
217.0	000.0200	-0016.3	003.7	043.4	000.0316	0263.2	019.5	53.29
218.0	000.0200	-0010.9	003.7	043.2	000.0316	0263.6	019.5	53.31
219.0	000.0200	-0006.2	003.7	043.0	000.0316	0264.1	019.5	53.32
220.0	000.0200	-0002.5	003.7	042.8	000.0316	0264.4	019.5	53.34
221.0	000.0200	0000.1	003.7	042.6	000.0316	0264.8	019.5	53.35
222.0	000.0200	0001.7	003.7	042.5	000.0316	0265.2	019.5	53.37
223.0	000.0200	0002.7	003.7	042.3	000.0316	0265.7	019.5	53.38
224.0	000.0200	0003.7	003.7	042.1	000.0316	0266.1	019.5	53.39
225.0	000.0200	0004.9	003.7	041.9	000.0316	0266.4	019.5	53.40
226.0	000.0200	0006.5	003.7	041.7	000.0316	0266.7	019.5	53.40
227.0	000.0200	0008.1	003.7	041.5	000.0316	0266.9	019.5	53.41
228.0	000.0200	0009.7	003.7	041.3	000.0316	0267.2	019.5	53.41
229.0	000.0200	0011.4	003.7	041.1	000.0316	0267.5	019.5	53.41
230.0	000.0200	0013.2	003.7	040.9	000.0316	0267.7	019.5	53.41
231.0	000.0200	0015.5	003.7	040.7	000.0316	0267.9	019.5	53.41
232.0	000.0200	0017.8	003.7	040.5	000.0316	0268.1	019.5	53.40
233.0	000.0200	0020.6	003.7	040.4	000.0316	0268.2	019.6	53.40
234.0	000.0200	0023.4	003.7	040.2	000.0316	0268.4	019.6	53.39
235.0	000.0200	0026.0	003.7	040.0	000.0316	0268.6	019.6	53.38
236.0	000.0200	0028.1	003.7	039.8	000.0316	0268.8	019.6	53.38
237.0	000.0200	0029.7	003.7	039.6	000.0316	0269.1	019.6	53.37
238.0	000.0200	0030.8	003.8	039.4	000.0316	0269.4	019.6	53.40
239.0	000.0200	0031.5	003.8	039.2	000.0316	0269.9	019.6	53.43
240.0	000.0200	0031.9	003.8	039.0	000.0316	0270.4	019.6	53.44
241.0	000.0200	0032.0	003.9	038.8	000.0316	0270.9	019.6	53.44
242.0	000.0200	0031.9	003.8	038.6	000.0316	0271.5	019.6	53.43
243.0	000.0200	0031.4	003.8	038.5	000.0316	0271.9	019.7	53.40
244.0	000.0200	0030.7	003.8	038.3	000.0316	0272.4	019.7	53.37
245.0	000.0200	0029.9	003.7	038.2	000.0316	0272.8	019.8	53.33
246.0	000.0200	0028.9	003.7	038.0	000.0316	0273.5	019.8	53.32
247.0	000.0200	0027.7	003.7	037.9	000.0316	0274.2	019.9	53.32
248.0	000.0200	0026.4	003.7	037.7	000.0316	0274.9	019.9	53.31
249.0	000.0200	0025.0	003.7	037.6	000.0316	0275.5	019.9	53.31
250.0	000.0200	0023.5	003.7	037.4	000.0316	0276.1	020.0	53.30
251.0	000.0200	0022.2	003.7	037.2	000.0316	0276.8	020.0	53.29
252.0	000.0200	0021.1	003.7	037.1	000.0316	0277.5	020.0	53.28
253.0	000.0200	0020.2	003.7	036.9	000.0316	0278.2	020.1	53.27
254.0	000.0200	0019.3	003.7	036.8	000.0316	0278.7	020.1	53.26
255.0	000.0200	0018.1	003.7	036.6	000.0316	0279.3	020.2	53.24

Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

02-16-2024 Terrain Data: FCC NGDC 30 Sec FMOver Analysis

CH224D Contingent-PROP

CH223D.P

Channel = 224D
 Max ERP = 0.225 kW
 RCAMSL = 498.4 m
 N. Lat. 43 44 52.30
 W. Lng. 91 17 54.60
 Protected
 60 dBu

Channel = 223D
 Max ERP = 0.02 kW
 RCAMSL = 242.7 m
 N. Lat. 43 54 07.20
 W. Lng. 91 06 11.60
 Interfering
 54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
357.0	000.2250	0294.5	021.8	285.5	000.0200	-0014.7	017.4	33.98	
358.0	000.2250	0299.0	022.0	286.4	000.0200	-0016.4	017.1	34.24	
359.0	000.2250	0303.0	022.1	287.3	000.0200	-0018.0	016.8	34.51	
000.0	000.2250	0304.6	022.2	287.9	000.0200	-0018.9	016.4	34.80	
001.0	000.2117	0305.5	021.9	287.3	000.0200	-0018.0	016.0	35.19	
002.0	000.1988	0306.4	021.6	286.6	000.0200	-0016.8	015.5	35.57	
003.0	000.1863	0307.1	021.3	285.8	000.0200	-0015.4	015.1	35.95	
004.0	000.1742	0307.5	020.9	284.9	000.0200	-0013.4	014.7	36.40	
005.0	000.1626	0307.8	020.6	283.8	000.0200	-0010.9	014.3	36.90	
006.0	000.1513	0308.1	020.3	282.6	000.0200	-0008.9	013.9	37.40	
007.0	000.1404	0308.3	019.9	281.2	000.0200	-0007.7	013.5	37.90	
008.0	000.1300	0308.0	019.5	279.6	000.0200	-0006.8	013.1	38.39	
009.0	000.1199	0307.4	019.1	277.8	000.0200	-0005.5	012.8	38.87	
010.0	000.1102	0306.7	018.7	275.8	000.0200	-0006.0	012.5	39.31	
011.0	000.1040	0306.4	018.4	274.4	000.0200	-0004.9	012.2	39.75	
012.0	000.0980	0306.1	018.1	272.8	000.0200	-0003.0	011.9	40.17	
013.0	000.0922	0306.0	017.8	271.2	000.0200	-0001.0	011.6	40.57	
014.0	000.0865	0306.1	017.5	269.4	000.0200	0001.0	011.4	40.94	
015.0	000.0810	0306.3	017.2	267.6	000.0200	0003.2	011.2	41.28	
016.0	000.0757	0306.8	017.0	265.7	000.0200	0006.7	011.0	41.58	
017.0	000.0706	0307.4	016.7	263.7	000.0200	0009.3	010.8	41.85	
018.0	000.0656	0307.6	016.3	261.5	000.0200	0012.1	010.7	42.06	
019.0	000.0608	0307.4	016.0	259.2	000.0200	0015.3	010.6	42.21	
020.0	000.0562	0306.7	015.7	256.8	000.0200	0017.0	010.6	42.31	
021.0	000.0535	0305.8	015.4	254.9	000.0200	0018.2	010.5	42.46	
022.0	000.0508	0304.5	015.2	253.0	000.0200	0020.2	010.4	42.58	
023.0	000.0481	0303.1	015.0	251.1	000.0200	0022.1	010.4	42.65	
024.0	000.0456	0301.9	014.7	249.2	000.0200	0024.8	010.3	42.70	
025.0	000.0431	0301.1	014.5	247.3	000.0200	0027.4	010.3	42.72	
026.0	000.0406	0300.8	014.3	245.5	000.0200	0029.5	010.3	42.73	
027.0	000.0383	0300.8	014.1	243.7	000.0200	0031.0	010.3	42.95	
028.0	000.0360	0301.4	013.9	241.9	000.0200	0031.9	010.4	43.14	
029.0	000.0338	0302.0	013.7	240.2	000.0200	0031.9	010.4	43.09	

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)
030.0	000.0316	0302.2	013.5	238.5	000.0200	0031.2	010.5	42.80
031.0	000.0316	0301.6	013.5	237.3	000.0200	0030.1	010.4	42.70
032.0	000.0316	0299.7	013.4	236.1	000.0200	0028.2	010.3	42.78
033.0	000.0316	0296.3	013.4	234.7	000.0200	0025.3	010.3	42.81
034.0	000.0316	0291.6	013.2	233.3	000.0200	0021.4	010.3	42.78
035.0	000.0316	0286.5	013.1	231.9	000.0200	0017.5	010.3	42.71
036.0	000.0316	0282.0	013.0	230.5	000.0200	0014.3	010.4	42.64
037.0	000.0316	0277.9	012.9	229.2	000.0200	0011.7	010.4	42.57
038.0	000.0316	0273.7	012.8	227.8	000.0200	0009.5	010.5	42.47
039.0	000.0316	0270.4	012.7	226.6	000.0200	0007.4	010.5	42.40
040.0	000.0316	0268.5	012.7	225.3	000.0200	0005.4	010.5	42.36
041.0	000.0316	0267.6	012.7	224.1	000.0200	0003.8	010.5	42.35
042.0	000.0316	0266.2	012.6	222.9	000.0200	0002.6	010.6	42.31
043.0	000.0316	0264.1	012.6	221.7	000.0200	0001.3	010.6	42.22
044.0	000.0316	0261.8	012.5	220.6	000.0200	-0000.8	010.7	42.11
045.0	000.0316	0258.9	012.5	219.4	000.0200	-0004.3	010.8	41.96
046.0	000.0316	0255.2	012.4	218.4	000.0200	-0009.2	010.9	41.77
047.0	000.0316	0249.8	012.3	217.3	000.0200	-0014.5	011.0	41.51
048.0	000.0316	0243.3	012.1	216.4	000.0200	-0019.4	011.2	41.20
049.0	000.0316	0238.0	012.0	215.5	000.0200	-0023.6	011.4	40.93
050.0	000.0316	0235.7	011.9	214.6	000.0200	-0027.2	011.5	40.76
051.0	000.0338	0234.8	012.1	213.3	000.0200	-0030.0	011.4	40.92
052.0	000.0360	0233.4	012.2	212.1	000.0200	-0031.6	011.3	41.03
053.0	000.0383	0231.7	012.4	210.8	000.0200	-0033.4	011.3	41.11
054.0	000.0406	0230.5	012.5	209.5	000.0200	-0035.9	011.2	41.19
055.0	000.0431	0230.2	012.7	208.1	000.0200	-0040.1	011.2	41.27
056.0	000.0456	0230.8	012.9	206.7	000.0200	-0042.5	011.1	41.37
057.0	000.0481	0231.9	013.1	205.2	000.0200	-0039.9	011.1	41.46
058.0	000.0508	0234.0	013.3	203.5	000.0200	-0039.5	011.0	41.56
059.0	000.0535	0237.1	013.5	201.8	000.0200	-0043.6	011.0	41.67
060.0	000.0562	0240.7	013.8	199.9	000.0200	-0046.2	010.9	41.77
061.0	000.0608	0244.1	014.2	197.7	000.0200	-0042.9	010.8	41.94
062.0	000.0656	0246.6	014.5	195.5	000.0200	-0030.0	010.7	42.04
063.0	000.0706	0248.0	014.8	193.3	000.0200	-0019.5	010.7	42.07
064.0	000.0757	0247.7	015.1	191.4	000.0200	-0014.8	010.8	41.99
065.0	000.0810	0246.0	015.3	189.6	000.0200	-0013.8	010.8	41.85
066.0	000.0865	0241.9	015.4	188.3	000.0200	-0015.5	011.0	41.59
067.0	000.0922	0235.8	015.5	187.4	000.0200	-0017.2	011.2	41.26
068.0	000.0980	0229.3	015.5	186.6	000.0200	-0018.7	011.4	40.90
069.0	000.1040	0223.2	015.5	185.8	000.0200	-0020.5	011.7	40.54
070.0	000.1102	0219.0	015.6	184.9	000.0200	-0024.0	011.9	40.22
071.0	000.1199	0219.2	016.0	182.7	000.0200	-0026.1	012.0	40.05
072.0	000.1300	0223.1	016.5	180.0	000.0200	-0042.6	012.1	39.91
073.0	000.1404	0229.3	017.1	176.9	000.0200	-0050.3	012.2	39.73

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

FMCommander Single Allocation Study - 02-16-2024 - FCC NGDC 30 Sec
CH223D.P's Overlaps (In= 30.55 km, Out= 7.33 km)

CH223D.P CH 223 D
Lat= 43 54 07.20, Lng= 91 06 11.60
0.02 kW -28 m HAAT, 242.7 m COR
Prot.= 60 dBu, Intef.= 100 dBu

WDRT CH 220 A 73.215 Z 0000200685
Lat= 43 36 28.00, Lng= 90 53 24.00
3.0 kW 141 m HAAT, 484 m COR
Prot.= 60 dBu, Intef.= 100 dBu

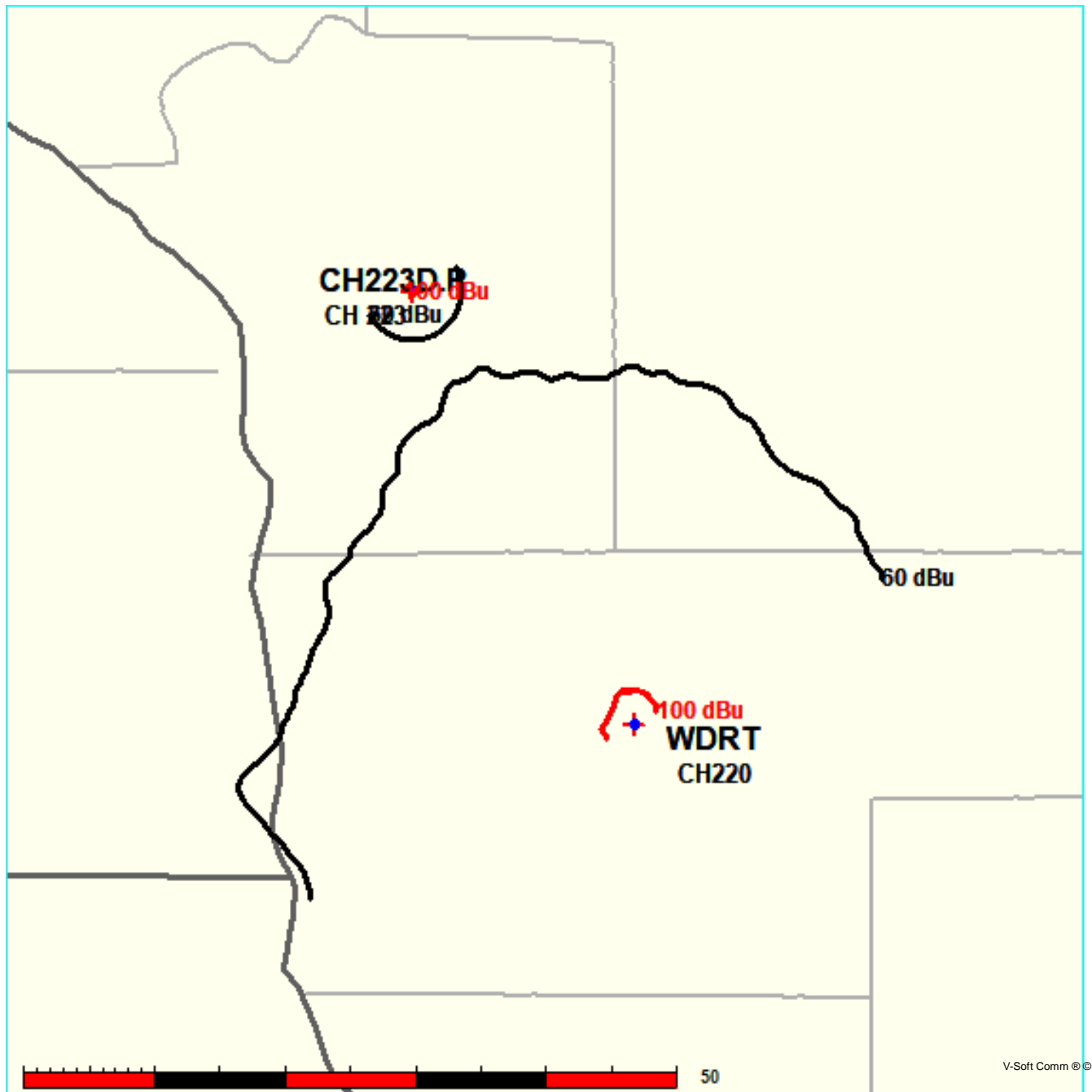


Exhibit 7c

Contour Protection Studies Toward Select Allocation Concern(s)

02-16-2024

Terrain Data: FCC NGDC 30 Sec

FMOver Analysis

CH223D.P

WDRT 0000200685

Channel = 223D
Max ERP = 0.02 kW
RCAMSL = 242.7 m
N. Lat. 43 54 07.20
W. Lng. 91 06 11.60
Protected
60 dBu

Channel = 220A
Max ERP = 3 kW
RCAMSL = 484 m
N. Lat. 43 36 28.00
W. Lng. 90 53 24.00
Interfering
100 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
113.0	000.0200	-0050.9	003.7	336.4	003.0000	0154.7	034.1	58.82	
114.0	000.0200	-0052.9	003.7	336.3	003.0000	0154.9	034.1	58.85	
115.0	000.0200	-0053.6	003.7	336.3	003.0000	0155.1	034.0	58.88	
116.0	000.0200	-0052.9	003.7	336.2	003.0000	0155.3	034.0	58.92	
117.0	000.0200	-0052.5	003.7	336.1	003.0000	0155.3	033.9	58.94	
118.0	000.0200	-0052.1	003.7	336.0	003.0000	0155.3	033.9	58.96	
119.0	000.0200	-0050.8	003.7	335.9	003.0000	0155.3	033.9	58.98	
120.0	000.0200	-0049.1	003.7	335.8	003.0000	0155.3	033.8	59.00	
121.0	000.0200	-0048.1	003.7	335.7	003.0000	0155.3	033.8	59.02	
122.0	000.0200	-0049.7	003.7	335.7	003.0000	0155.2	033.7	59.03	
123.0	000.0200	-0053.6	003.7	335.6	003.0000	0155.0	033.7	59.04	
124.0	000.0200	-0059.4	003.7	335.5	003.0000	0154.8	033.7	59.05	
125.0	000.0200	-0066.5	003.7	335.4	003.0000	0154.6	033.6	59.05	
126.0	000.0200	-0073.3	003.7	335.3	003.0000	0154.4	033.6	59.06	
127.0	000.0200	-0080.5	003.7	335.2	003.0000	0154.1	033.6	59.06	
128.0	000.0200	-0087.7	003.7	335.1	003.0000	0153.8	033.5	59.05	
129.0	000.0200	-0094.2	003.7	335.0	003.0000	0153.5	033.5	59.05	
130.0	000.0200	-0099.5	003.7	334.9	003.0000	0153.3	033.5	59.05	
131.0	000.0200	-0103.3	003.7	334.8	003.0000	0152.9	033.5	59.05	
132.0	000.0200	-0104.8	003.7	334.7	003.0000	0152.7	033.4	59.04	
133.0	000.0200	-0104.4	003.7	334.6	003.0000	0152.4	033.4	59.04	
134.0	000.0200	-0102.0	003.7	334.5	003.0000	0152.2	033.4	59.04	
135.0	000.0200	-0097.6	003.7	334.4	003.0000	0151.9	033.4	59.04	
136.0	000.0200	-0091.7	003.7	334.2	003.0000	0151.8	033.3	59.04	
137.0	000.0200	-0085.2	003.7	334.1	003.0000	0151.7	033.3	59.04	
138.0	000.0200	-0080.0	003.7	334.0	003.0000	0151.6	033.3	59.05	
139.0	000.0200	-0076.0	003.7	333.9	003.0000	0151.5	033.3	59.05	
140.0	000.0200	-0072.4	003.7	333.8	003.0000	0151.5	033.3	59.06	
141.0	000.0200	-0069.3	003.7	333.7	003.0000	0151.5	033.3	59.07	
142.0	000.0200	-0067.0	003.7	333.6	003.0000	0151.6	033.2	59.08	

Exhibit 7c
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)
143.0	000.0200	-0066.3	003.7	333.5	003.0000	0151.7	033.2	59.09
144.0	000.0200	-0065.7	003.7	333.4	003.0000	0151.9	033.2	59.11
145.0	000.0200	-0064.7	003.7	333.3	003.0000	0152.1	033.2	59.13
146.0	000.0200	-0064.5	003.7	333.2	003.0000	0152.3	033.2	59.14
147.0	000.0200	-0065.8	003.7	333.0	003.0000	0152.6	033.2	59.16
148.0	000.0200	-0067.4	003.7	332.9	003.0000	0152.8	033.2	59.18
149.0	000.0200	-0069.0	003.7	332.8	003.0000	0153.0	033.2	59.19
150.0	000.0200	-0070.8	003.7	332.7	003.0000	0153.3	033.2	59.21
151.0	000.0200	-0073.2	003.7	332.6	003.0000	0153.6	033.2	59.23
152.0	000.0200	-0073.3	003.7	332.5	003.0000	0153.8	033.2	59.24
153.0	000.0200	-0069.7	003.7	332.4	003.0000	0154.0	033.2	59.25
154.0	000.0200	-0064.0	003.7	332.3	003.0000	0154.2	033.2	59.26
155.0	000.0200	-0057.8	003.7	332.1	003.0000	0154.4	033.2	59.27
156.0	000.0200	-0051.0	003.7	332.0	003.0000	0154.5	033.2	59.28
157.0	000.0200	-0044.4	003.7	331.9	003.0000	0154.7	033.2	59.29
158.0	000.0200	-0040.0	003.7	331.8	003.0000	0154.8	033.2	59.29
159.0	000.0200	-0039.1	003.7	331.7	003.0000	0154.9	033.2	59.29
160.0	000.0200	-0041.0	003.7	331.6	003.0000	0154.9	033.2	59.29
161.0	000.0200	-0043.9	003.7	331.5	003.0000	0154.9	033.2	59.28
162.0	000.0200	-0047.0	003.7	331.4	003.0000	0154.9	033.2	59.27
163.0	000.0200	-0049.9	003.7	331.2	003.0000	0154.8	033.3	59.26
164.0	000.0200	-0053.4	003.7	331.1	003.0000	0154.8	033.3	59.25
165.0	000.0200	-0057.8	003.7	331.0	003.0000	0154.6	033.3	59.24
166.0	000.0200	-0060.8	003.7	330.9	003.0000	0154.5	033.3	59.22
167.0	000.0200	-0061.8	003.7	330.8	003.0000	0154.2	033.3	59.20
168.0	000.0200	-0061.5	003.7	330.7	003.0000	0154.0	033.3	59.17
169.0	000.0200	-0060.0	003.7	330.6	003.0000	0153.8	033.4	59.15
170.0	000.0200	-0059.3	003.7	330.5	003.0000	0153.5	033.4	59.12
171.0	000.0200	-0058.8	003.7	330.4	003.0000	0153.2	033.4	59.10
172.0	000.0200	-0057.6	003.7	330.3	003.0000	0152.9	033.4	59.07
173.0	000.0200	-0054.2	003.7	330.2	003.0000	0152.6	033.4	59.04
174.0	000.0200	-0050.9	003.7	330.1	003.0000	0152.3	033.5	59.01
175.0	000.0200	-0050.8	003.7	330.0	002.9986	0152.0	033.5	58.97
176.0	000.0200	-0050.4	003.7	329.9	002.9935	0151.6	033.5	58.92
177.0	000.0200	-0050.4	003.7	329.8	002.9884	0151.2	033.6	58.88
178.0	000.0200	-0051.3	003.7	329.7	002.9834	0150.8	033.6	58.83
179.0	000.0200	-0049.4	003.7	329.6	002.9785	0150.4	033.6	58.79
180.0	000.0200	-0042.4	003.7	329.5	002.9736	0150.0	033.7	58.74
181.0	000.0200	-0035.1	003.7	329.4	002.9688	0149.6	033.7	58.69
182.0	000.0200	-0028.1	003.7	329.3	002.9640	0149.1	033.7	58.64
183.0	000.0200	-0025.7	003.7	329.2	002.9593	0148.6	033.8	58.59
184.0	000.0200	-0024.4	003.7	329.1	002.9547	0148.1	033.8	58.53

Exhibit 7c

Contour Protection Studies Toward Select Allocation Concern(s)

02-16-2024 Terrain Data: FCC NGDC 30 Sec FMOver Analysis

WDRT 0000200685

CH223D.P

Channel = 220A
 Max ERP = 3 kW
 RCAMSL = 484 m
 N. Lat. 43 36 28.00
 W. Lng. 90 53 24.00
 Protected
 60 dBu

Channel = 223D
 Max ERP = 0.02 kW
 RCAMSL = 242.7 m
 N. Lat. 43 54 07.20
 W. Lng. 91 06 11.60
 Interfering
 100 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
287.0	001.5539	0149.0	024.9	194.6	000.0200	-0025.6	026.3	27.31	
288.0	001.5200	0150.0	024.8	194.5	000.0200	-0024.9	025.9	27.59	
289.0	001.4864	0152.4	024.9	194.5	000.0200	-0025.1	025.5	27.87	
290.0	001.4532	0156.4	025.0	194.8	000.0200	-0026.5	025.0	28.17	
291.0	001.4495	0160.7	025.3	195.4	000.0200	-0029.5	024.6	28.48	
292.0	001.4457	0165.4	025.6	196.0	000.0200	-0032.9	024.1	28.81	
293.0	001.4420	0169.4	025.9	196.5	000.0200	-0036.1	023.6	29.14	
294.0	001.4383	0171.8	026.1	196.7	000.0200	-0037.5	023.1	29.48	
295.0	001.4345	0171.1	026.0	196.4	000.0200	-0035.5	022.7	29.80	
296.0	001.4308	0168.2	025.8	195.7	000.0200	-0031.3	022.3	30.10	
297.0	001.4271	0165.1	025.6	194.9	000.0200	-0027.1	021.9	30.40	
298.0	001.4233	0163.2	025.4	194.3	000.0200	-0024.1	021.5	30.71	
299.0	001.4196	0162.6	025.4	193.8	000.0200	-0021.9	021.1	31.02	
300.0	001.4159	0162.9	025.4	193.5	000.0200	-0020.4	020.6	31.36	
301.0	001.4528	0162.5	025.5	193.5	000.0200	-0020.2	020.2	31.72	
302.0	001.4902	0161.2	025.5	193.2	000.0200	-0019.1	019.7	32.07	
303.0	001.5281	0159.2	025.5	192.8	000.0200	-0017.3	019.3	32.40	
304.0	001.5665	0155.6	025.4	192.0	000.0200	-0015.2	018.9	32.71	
305.0	001.6053	0151.8	025.3	191.0	000.0200	-0014.7	018.6	32.99	
306.0	001.6446	0148.6	025.2	190.2	000.0200	-0014.0	018.2	33.28	
307.0	001.6844	0146.9	025.2	189.6	000.0200	-0013.8	017.8	33.61	
308.0	001.7246	0145.6	025.2	189.0	000.0200	-0014.6	017.4	33.95	
309.0	001.7653	0144.6	025.3	188.4	000.0200	-0015.4	017.0	34.29	
310.0	001.8065	0144.8	025.4	188.1	000.0200	-0015.8	016.6	34.68	
311.0	001.8718	0146.2	025.7	188.2	000.0200	-0015.7	016.0	35.13	
312.0	001.9383	0148.1	026.1	188.3	000.0200	-0015.5	015.5	35.62	
313.0	002.0059	0148.3	026.3	188.0	000.0200	-0015.8	015.0	36.05	
314.0	002.0747	0145.9	026.3	187.0	000.0200	-0018.1	014.6	36.48	
315.0	002.1446	0142.2	026.2	185.6	000.0200	-0021.5	014.3	36.84	
316.0	002.2157	0141.7	026.3	184.8	000.0200	-0024.1	013.9	37.40	
317.0	002.2880	0144.8	026.8	184.9	000.0200	-0023.9	013.2	38.25	
318.0	002.3614	0148.2	027.2	185.0	000.0200	-0023.5	012.6	39.18	
319.0	002.4359	0149.8	027.5	184.6	000.0200	-0024.5	012.0	40.02	

Exhibit 7c
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)
320.0	002.5117	0150.2	027.8	183.7	000.0200	-0024.8	011.5	40.80
321.0	002.5586	0149.9	027.9	182.2	000.0200	-0027.5	011.1	41.44
322.0	002.6059	0148.6	027.9	180.2	000.0200	-0040.6	010.8	41.96
323.0	002.6536	0146.9	027.8	178.0	000.0200	-0051.4	010.5	42.40
324.0	002.7018	0145.2	027.8	175.7	000.0200	-0050.7	010.3	42.81
325.0	002.7504	0143.5	027.8	173.3	000.0200	-0053.4	010.1	43.19
326.0	002.7995	0142.0	027.7	170.7	000.0200	-0058.9	009.9	43.54
327.0	002.8490	0140.9	027.8	168.1	000.0200	-0061.3	009.6	43.91
328.0	002.8989	0142.8	028.0	165.9	000.0200	-0060.6	009.2	44.65
329.0	002.9492	0147.5	028.6	163.8	000.0200	-0052.6	008.6	45.85
330.0	003.0000	0152.1	029.1	161.2	000.0200	-0044.6	008.0	47.02
331.0	003.0000	0154.6	029.3	157.8	000.0200	-0040.6	007.7	47.65
332.0	003.0000	0154.6	029.3	154.0	000.0200	-0064.0	007.6	47.74
333.0	003.0000	0152.6	029.1	150.2	000.0200	-0071.5	007.8	47.36
334.0	003.0000	0151.6	029.0	146.6	000.0200	-0065.2	008.0	47.07
335.0	003.0000	0153.6	029.2	142.8	000.0200	-0066.3	007.9	47.27
336.0	003.0000	0155.3	029.4	138.9	000.0200	-0076.5	007.8	47.31
337.0	003.0000	0152.3	029.1	136.1	000.0200	-0091.3	008.3	46.48
338.0	003.0000	0145.4	028.5	134.5	000.0200	-0100.2	009.0	45.06
339.0	003.0000	0140.6	028.1	132.8	000.0200	-0104.6	009.6	43.99
340.0	003.0000	0139.1	027.9	130.6	000.0200	-0102.2	009.9	43.39
341.0	003.0000	0138.4	027.9	128.4	000.0200	-0090.4	010.2	42.87
342.0	003.0000	0137.8	027.8	126.4	000.0200	-0076.0	010.6	42.32
343.0	003.0000	0137.4	027.8	124.4	000.0200	-0062.3	010.9	41.79
344.0	003.0000	0135.1	027.6	123.1	000.0200	-0054.2	011.3	41.04
345.0	003.0000	0130.3	027.2	122.7	000.0200	-0052.3	012.0	40.05
346.0	003.0000	0125.8	026.8	122.3	000.0200	-0050.6	012.6	39.16
347.0	003.0000	0124.7	026.7	121.1	000.0200	-0048.2	013.0	38.59
348.0	003.0000	0126.5	026.8	119.3	000.0200	-0050.4	013.2	38.26
349.0	003.0000	0127.0	026.9	117.8	000.0200	-0052.2	013.5	37.82
350.0	003.0000	0124.2	026.6	117.4	000.0200	-0052.5	014.0	37.15
351.0	003.0240	0121.6	026.5	116.8	000.0200	-0052.6	014.5	36.57
352.0	003.0482	0120.1	026.4	116.1	000.0200	-0052.8	015.0	36.07
353.0	003.0724	0118.7	026.3	115.4	000.0200	-0053.3	015.4	35.70
354.0	003.0968	0116.6	026.2	115.0	000.0200	-0053.6	015.8	35.30
355.0	003.1212	0117.0	026.2	113.9	000.0200	-0052.8	016.2	35.00
356.0	003.1457	0117.8	026.4	112.8	000.0200	-0050.2	016.5	34.70
357.0	003.1704	0120.2	026.6	111.3	000.0200	-0042.1	016.9	34.45
358.0	003.1951	0121.9	026.8	110.0	000.0200	-0034.2	017.2	34.15
359.0	003.2199	0123.4	027.0	108.9	000.0200	-0029.3	017.6	33.84
000.0	003.2448	0122.3	026.9	108.6	000.0200	-0027.7	018.0	33.45
001.0	003.2199	0120.2	026.7	108.8	000.0200	-0028.8	018.6	33.03
002.0	003.1951	0118.2	026.5	109.0	000.0200	-0029.8	019.1	32.61

Exhibit 8

Copy of Manufacturer's Non-Directional Antenna Documentation (public record copy)



BKG1/P

Medium Power Portable Broadband FM Dipole

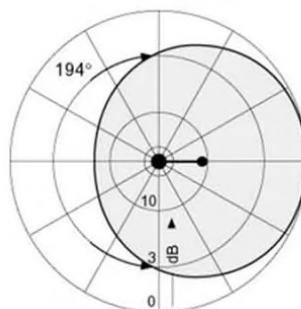
This broadband dipole antenna is constructed of stainless steel and is designed to last a long time in any weather condition. Because of its sturdy construction, it can support up to 2.5 KW of input power with the appropriate connector. Since it has a wide angle of radiation, it is strongly recommended 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

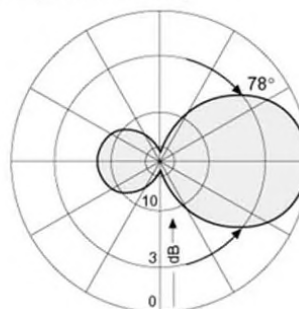
Antenna Type: dipole
Front-to-Back Ratio: 7 dB
Frequency Range: 87.5 - 108 MHz
Polarization: vertical
Gain: 0 dBd (unity gain)
Bandwidth: 20 MHz Max
VSWR: < 1.3
H Plane: 194 degrees
V Plane: 78 degrees
Impedance: 50 Ohms
Connectors: N type (1 kw) - 7/8 type (2 kw)
Power Rating: 2000 Watts max.
Wind Load: 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 Non-Directional Antenna Documentation
(public record copy)

TX station: BKG1/P

Site name:

Frequency: 100.00 MHz

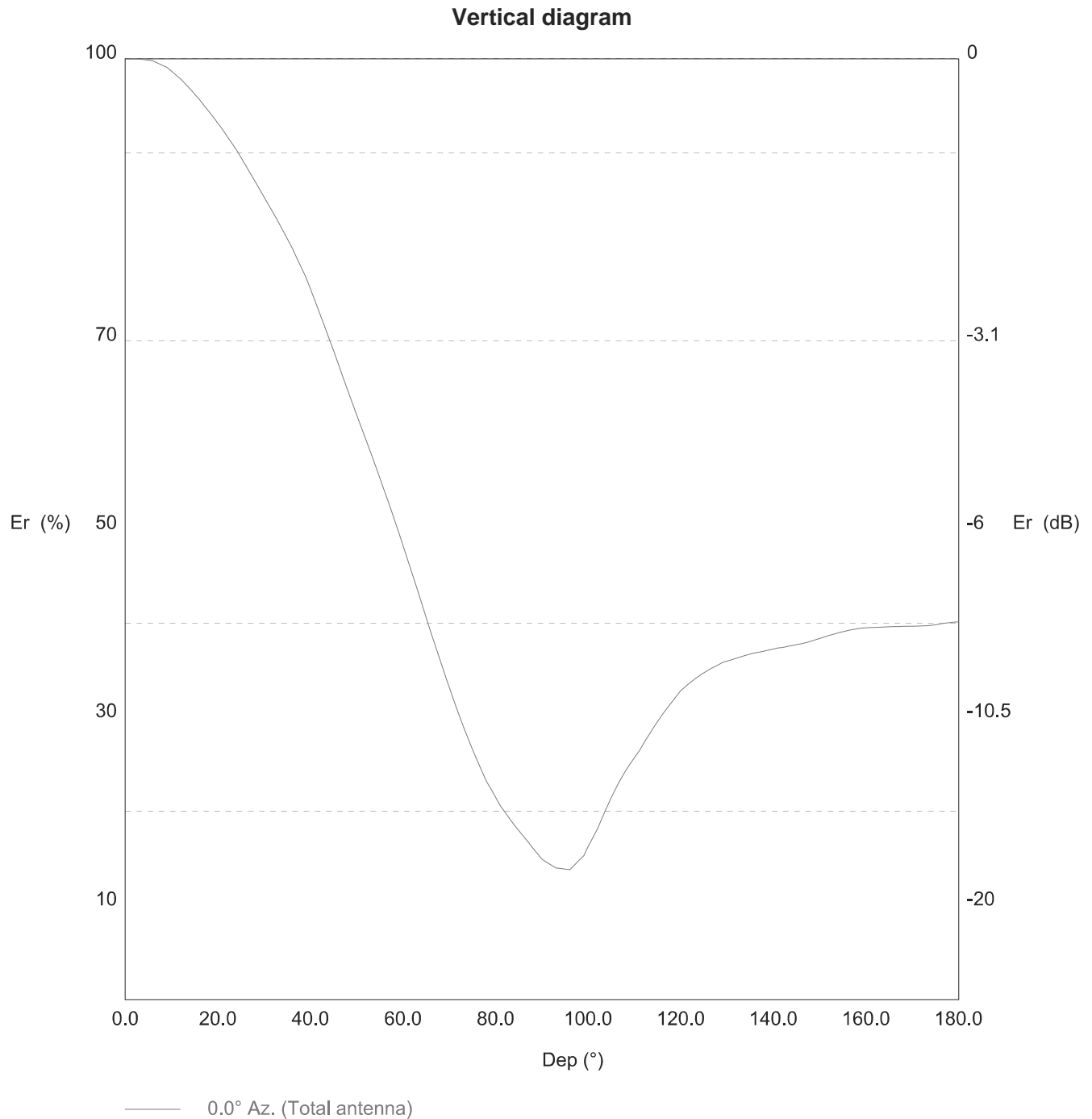


Exhibit 8

Copy of Manufacturer's Non-Directional Antenna Documentation (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