

Technical Report Supporting a Minor Modification of a FM Translator Station Construction Permit Application

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

for

*W296EH.L(W224EL.C) – La Crosse, WI
LMS(lic)-0000145864 (license)
LMS(cp)- 0000197677 (construction permit)
(Facility ID: 145081)*

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(HD3) – Onalaska, WI

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Explanation of Technical Report

1

EXPLANATION OF PROPOSAL: This LMS filing and accompanying technical report supports a Minor Modification of a FM Translator Station Construction Permit Application for FM Translator W296EH.L – La Crosse, WI (Facility ID: 145081). W296EH.L is licensed under LMS(lic)-0000145864. W296EH(W224EL.C) also holds existing Construction Permit LMS(cp)-0000197677. This Schedule 349 filing modifies existing W296EH(W224EL.C) Construction Permit LMS(cp)-0000197677 against the current License. This filing requests a continued 47 C.F.R. Section 74.1233(a)(1)(i)(A)(2) non-adjacent channel change from CH296D (107.1 MHz) to CH224D (92.7 MHz) based upon a showing of reduced interference. Operation on the new frequency of CH224D (92.7 MHz) with a directional power of 0.225 kW ERP circular polarization (H&V) is requested. The FM Translator will operate from the same COR of 498.4 meters AMSL at the same site location. This filing will specify continued rebroadcast of the HD3 subchannel of Class C3, FM Primary Station WKBH-FM(HD3) – Onalaska, WI (CH274C3; 102.7 MHz); Facility ID No. 72206. The Translator will remain licensed to the community of La Crosse, WI.

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 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(HD3) and CH224D.P(W296EH) 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 1026950. 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 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 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 concerns with the exception of WIZM-FM - La Crosse, WI (CH227C0) and K222AG - La Crosse, WI (CH222D). 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)**.

The applicant would like to note the existence of a 47 C.F.R. Section 74.1204(d) Second/Third Adjacent Channel Given Interference Waiver Request toward WIZM-FM - La Crosse, WI (CH227C0) and K222AG – La Crosse, WI (CH222D) as included in **Exhibit 8**. Protection of the worst case calculated 122.3 dBμ F(50:10) Interference Contour, corresponding to the worst case calculated 82.3 dBμ F(50:50) Protected Contour, has been demonstrated through a downward radiation study. Full protection will be afforded all concerns as this area will not reach the ground nor a five meter artificial plane representing a standard two story house when taking into account the downward radiation characteristics of the antenna as supplied by the antenna manufacturer. A copy of the manufacturer's directional and vertical antenna specifications has been included in **Exhibit 9**.

The applicant would further note the previously request for 47 C.F.R. Section 73.3517 Contingent Processing between K220EP – La Crescent, MN (Facility ID: 20571) and W296EH – La Crosse, WI (Facility ID: 145081). 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 as noted in **Exhibit 7b**. This NDA-to-DA antenna change for the authorized 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.

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 is being replaced 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
February 21, 2024

Exhibit 1
Service Contour Study:
Present vs Proposed Operations

Present 60 dBμ F(50:50) Contour
Proposed 60 dBμ F(50:50) Contour

W296EH.L
La Crosse, WI
0000145864
Facility ID: 145081
Latitude: 43-44-52.30 N
Longitude: 091-17-54.60 W
ERP: 0.25 kW
Channel: 296D (107.1 MHz)
AMSL Height: 498.4 m
Horiz. Pattern: Directional

60 dBμ F(50:50) Contour
Total Population: 106,940
Total Area: 1,118.9 sq. km

W224EL.P
La Crosse, WI
Proposed Operation
Facility ID: 145081
Latitude: 43-44-52.30 N
Longitude: 091-17-54.60 W
ERP: 0.225 kW
Channel: 224D (92.7 MHz)
AMSL Height: 498.4 m
Horiz. Pattern: Directional

60 dBμ F(50:50) Contour
Total Population: 78,795
Total Area: 1,090.2 sq. km

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

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

Terrain
187 437 m

Scale 1:275,000
0 4 8 12 km

W3Soft Communications LLC ©

Exhibit 2
Service Contour Study:
Proposed vs Primary Operations

WKBH-FM(HD3)
Onalaska, WI
0000184793
BDNH-20100112AEL
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

W224EL.P
La Crosse, WI
Proposed Operation
Facility ID: 145081
Latitude: 43-44-52.30 N
Longitude: 091-17-54.60 W
ERP: 0.225 kW
Channel: 224D (92.7 MHz)
AMSL Height: 498.4 m
Horiz. Pattern: Directional

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

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

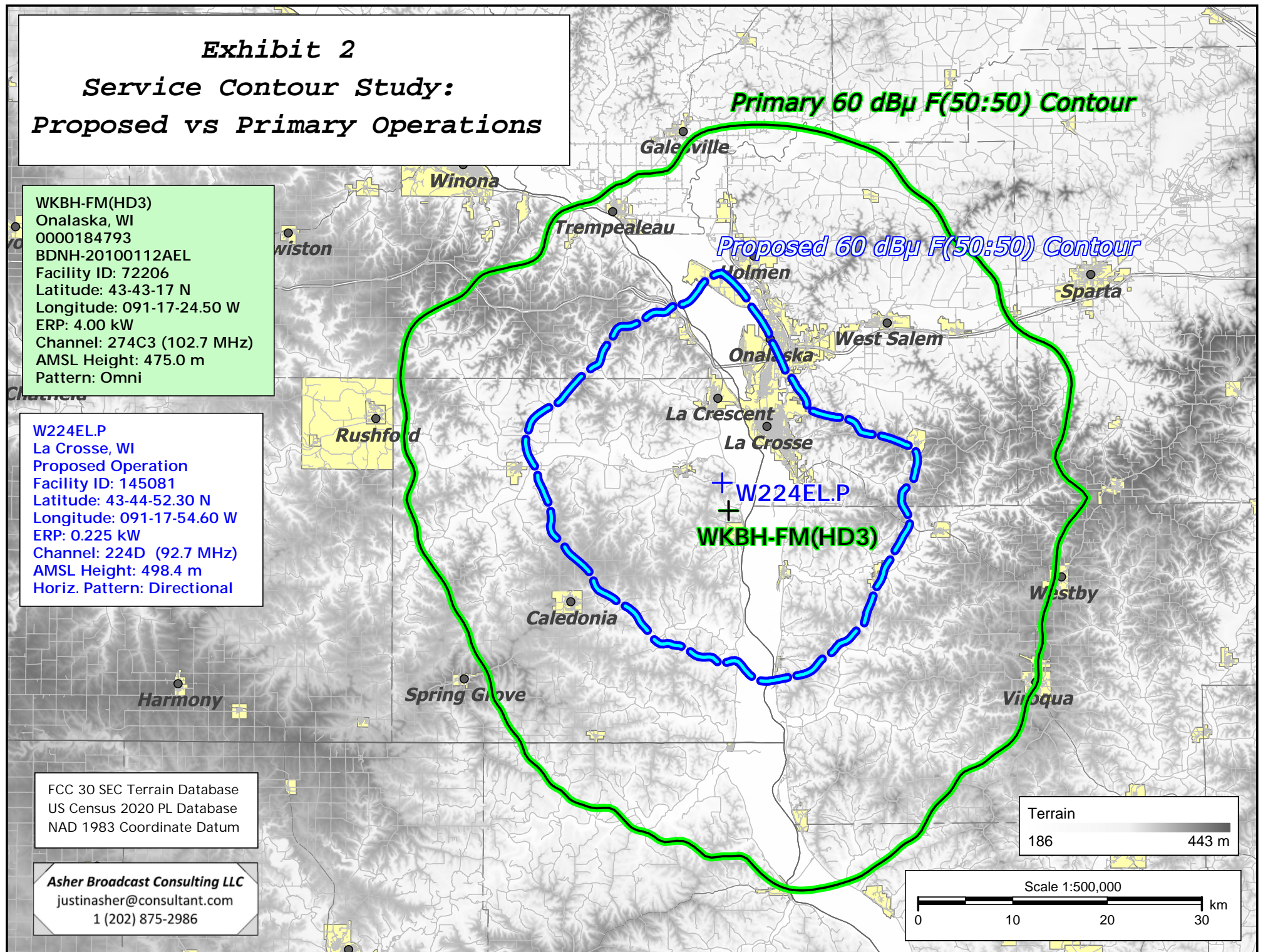


Exhibit 3

Copy of Existing Antenna Structure Registration

(public record copy)

Registration Detail

Reg Number	1026950	Status	Constructed
File Number	A1192356	Constructed	07/27/1998
EMI	No	Dismantled	
NEPA	No		

Antenna Structure

Structure Type GTOWER - Guyed Structure Used for Communication Purposes

Location (in NAD83 Coordinates)

Lat/Long	43-44-52.3 N 091-17-54.6 W	Address	1.3 miles west of SR 26 7 KM S (372424 / Talon)
City, State	Hokah , MN		
Zip	55941-8703	County	HOUSTON

Center of AM Array

Position of Tower in Array

Heights (meters)

Elevation of Site Above Mean Sea Level	358.4	Overall Height Above Ground (AGL)	153.9
Overall Height Above Mean Sea Level	512.3	Overall Height Above Ground w/o Appurtenances	152.1

Painting and Lighting Specifications

FAA Chapters 4, 8, 12
Paint and Light in Accordance with FAA Circular Number 70/7460-1L

FAA Notification

FAA Study	2021-AGL-2500-OE	FAA Issue Date	04/19/2021
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Owner & Contact Information

FRN	0011498342	Owner Entity Type	Limited Liability Company
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Owner

American Towers LLC
Attention To: Regulatory Compliance FAA FCC
10 Presidential Way
Woburn , MA 01801

P: (678)564-3236
F:
E: faa-fcc@americantower.com

Contact

Attention To: Regulatory Compliance FAA FCC
10 Presidential Way
Woburn , MA 01801

P: (678)564-3236
F:
E: faa-fcc@americantower.com

Last Action Status

Status	Constructed	Received	04/21/2021
Purpose	Notification	Entered	04/21/2021
Mode	Interactive		

Related Applications

04/21/2021	A1192356 - Notification (NT)
04/21/2021	A1192355 - Modification (MD)
06/29/2016	A1040972 - Notification (NT)

Related applications (12)

Comments

Comments

None

History

Date

04/22/2021
04/21/2021
04/21/2021
All History (28)

Event

Registration Printed
Construction Notification Received
Modification Received

Pleadings

Pleading Type	Filer Name	Description	Date Entered
None			

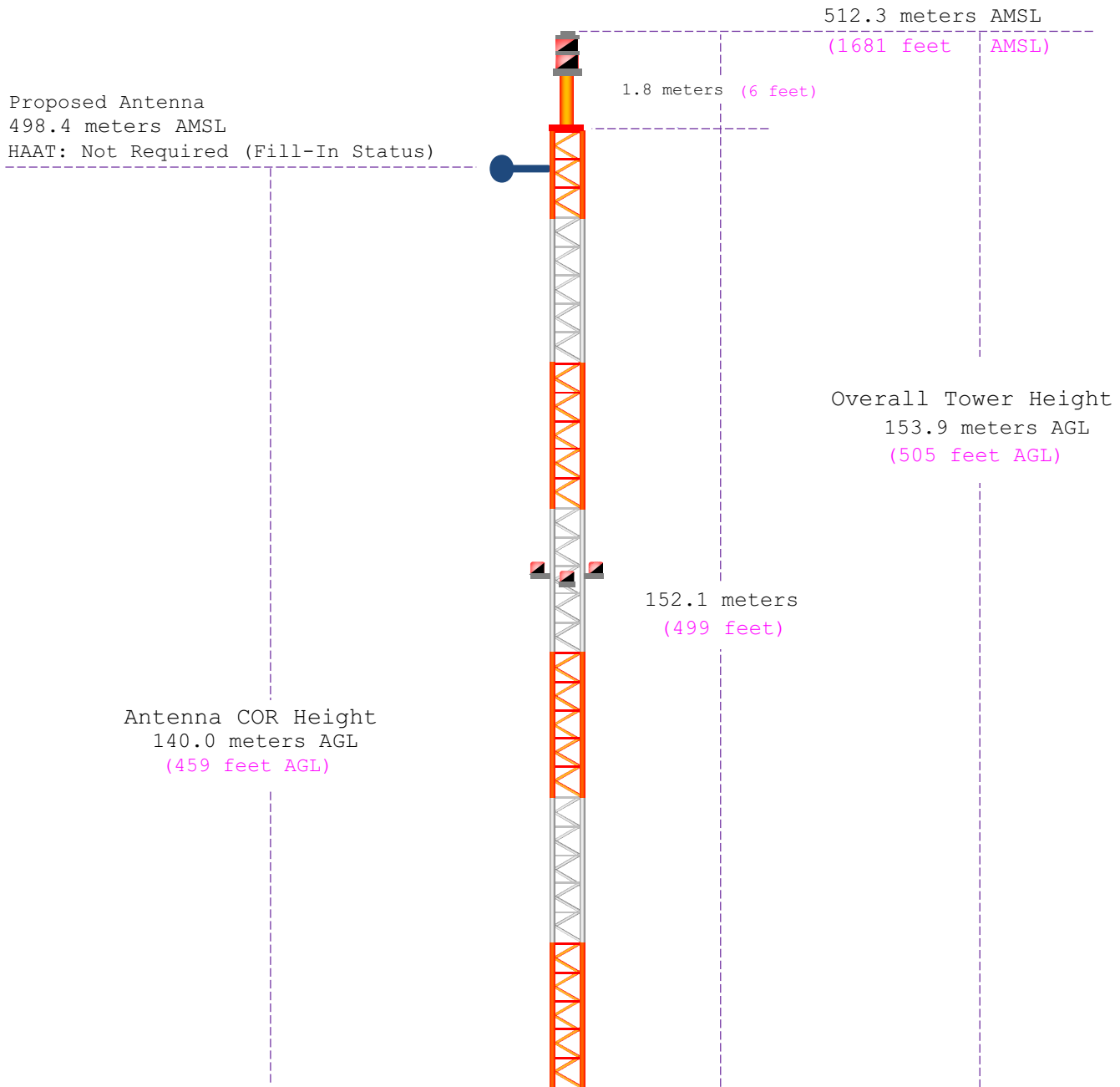
Automated Letters

08/30/2014	Ownership Change, Reference 819740
07/07/2009	Ownership Change, Reference 627904
03/21/2005	Ownership Change, Reference 410003

All letters (4)

Exhibit 4

Vertical Plan of Antenna System and Support Tower



Ground Elevation: 358.4 meters AMSL (1176 feet AMSL)		
Address: 1.3 miles west of SR 26 7 KM S (372424 / Talon)		
City: Hokah	Latitude (D M S) Longitude (D M S) (NAD 1927)	
County: Houston	-----	
State: Minnesota	Lat/Long: 43-44-52.3 N 091-17-54.6 W (NAD 1983)	
Antenna Structure Registration 1026950	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. = 434452.30 W. Lng. = 911754.60
 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	193.8	304.6	0.2250	-6.48	1.000	22.16
030	196.2	302.2	0.0316	-15.00	0.375	13.48
060	257.7	240.7	0.0563	-12.50	0.500	13.81
090	253.6	244.8	0.2250	-6.48	1.000	19.94
120	262.2	236.2	0.2250	-6.48	1.000	19.59
150	215.7	282.7	0.2250	-6.48	1.000	21.37
180	273.7	224.7	0.2250	-6.48	1.000	19.11
210	318.4	180.0	0.2250	-6.48	1.000	17.14
240	318.6	179.8	0.2250	-6.48	1.000	17.13
270	269.5	228.9	0.2250	-6.48	1.000	19.29
300	277.0	221.4	0.2250	-6.48	1.000	18.97
330	272.5	225.9	0.2250	-6.48	1.000	19.16

Ave El= 259.06 M HAAT= 239.34 M AMSL= 498.4 M

NAD 1983 to NAD 1927 Conversion:

Various Coordinate Conversion Calculations (NAD 1983):

Position Type	Lat Lon
Degrees Lat Long	43.7478611°, -091.2985000°
Degrees Minutes	43°44.87167', -091°17.91000'
Degrees Minutes Seconds	43°44'52.3000", -091°17'54.6000"
UTM	15T 636993mE 4845275mN
UTM centimeter	15T 636993.54mE 4845275.73mN
MGRS	15TXJ3699345275
Grid North	1.2°
GARS	178MD33
Maidenhead	EN43IR49EL36
GEOREF	FJPP42094487
Plus Code	86MCPX2+4J
Plus Code Extended	86MCPX2+4JXH95H
what3words	weddings.rental.distracted

Exhibit 6

Tabulation of Proposed Allocation

Grey Text indicates Allotment (ALO), Reservation (RSV), Deleted (DEL) 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)**.

Yellow Text denotes the existence of a 47 C.F.R. Section 74.1204(d) Second/Third Adjacent Channel Given Interference Waiver Request as included in **Exhibit 8**.

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 43 44 52.30 N. 91 17 54.60 W.		CH# 224D - 92.7 MHz, Pwr= 0.225 kW DA, HAAT= 239.3 M, COR= 498.4 M Average Protected F(50-50)= 19.72 km Standard Directional								DISPLAY DATES DATA 02-20-24 SEARCH 02-20-24	
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*	
224D La Crosse	W224EL/W2	CP _CN WI	0.0 0.0	0.00 0000197677	43 44 52.30 91 17 54.60	0.225 498	67.2 498	22.2	-89.4*	-89.4*	
227C0 La Crosse	WIZM-FM	LIC _CN WI	319.6 139.6	8.54 0000163946	43 48 23.00 91 22 03.00	100.000 311	10.9 579	75.9	-21.2*	-68.4*	Family Radio, Inc.
222D La Crosse	K222AG	LIC DCN WI	35.6 215.6	1.31 BLFT20160406ABR	43 45 26.80 91 17 20.40	0.250 397	0.2 397	4.1	-11.9*	-3.2*	Family Radio, Inc.
223D Peterson	K223AH	LIC DVN MN	277.8 97.4	44.67 BLFT19960125TD	43 48 02.80 91 51 00.50	0.119 83	19.7 408	13.0	3.9	0.7	Faith Sound, Inc.
223D La Crescent	CH223D	PRO _CN WI	42.4 222.5	23.23 Contingent-PRO	43 54 07.20 91 06 11.60	0.020 -50	5.5 302	3.7	4.9	0.7	
224A Neillsville	WPKG	LIC _CN WI	29.8 210.2	108.32 BMLH20060228AOL	44 35 29.90 90 37 09.50	3.400 134	86.1 461	30.1	3.7	31.2	Central Wisconsin Broadcas
223D Winona	KSMR	LIC _CN MN	316.4 136.1	45.96 BLED19921005KB	44 02 46.80 91 41 43.50	0.004 -43	3.5 250	2.5	23.2	15.4	Real Presence Radio
225C1 Dubuque	KATF	LIC NCN IA	157.6 338.0	146.39 BLH20030130ACU	42 31 44.00 90 36 58.50	92.000 309	108.9 556	73.6	16.4	39.0	Radio Dubuque, Inc.
225A Rochester	KFSI	LIC _CN MN	287.5 106.7	104.38 BLED19810507AJ	44 01 26.80 92 32 36.60	6.000 97	46.4 443	30.2	36.8	42.8	Faith Sound, Inc.
225D Mauston	W225BF	LIC DCN WI	86.7 267.5	88.47 BLFT20110719AAG	43 47 15.90 90 11 52.50	0.250 152	10.4 457	7.4	57.3	49.8	Murphy's Law Media Group,
222C0 Oelwein	KOEL-FM	LIC _CN IA	201.9 21.5	127.50 BLH20160217AAE	42 40 56.60 91 52 50.60	100.000 297	9.8 627	70.9	99.5	55.6	Townsquare License, LLC

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= West 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.

Exhibit 7a

Contour Protection Studies Toward Select Allocation Concern(s)

FMCommander Single Allocation Study - 02-20-2024 - FCC NGDC 30 Sec
CH224D.P's Overlaps (In= 3.94 km, Out= 0.68 km)

CH224D.P CH 224 D DA
Lat= 43 44 52.30, Lng= 91 17 54.60
0.225 kW 239.3 m HAAT, 498.4 m COR
Prot.= 60 dBu, Intef.= 54 dBu

K223AH CH 223 D DA BLFT19960125TD
Lat= 43 48 02.80, Lng= 91 51 00.50
0.119 kW 83 m HAAT, 408 m COR
Prot.= 60 dBu, Intef.= 54 dBu

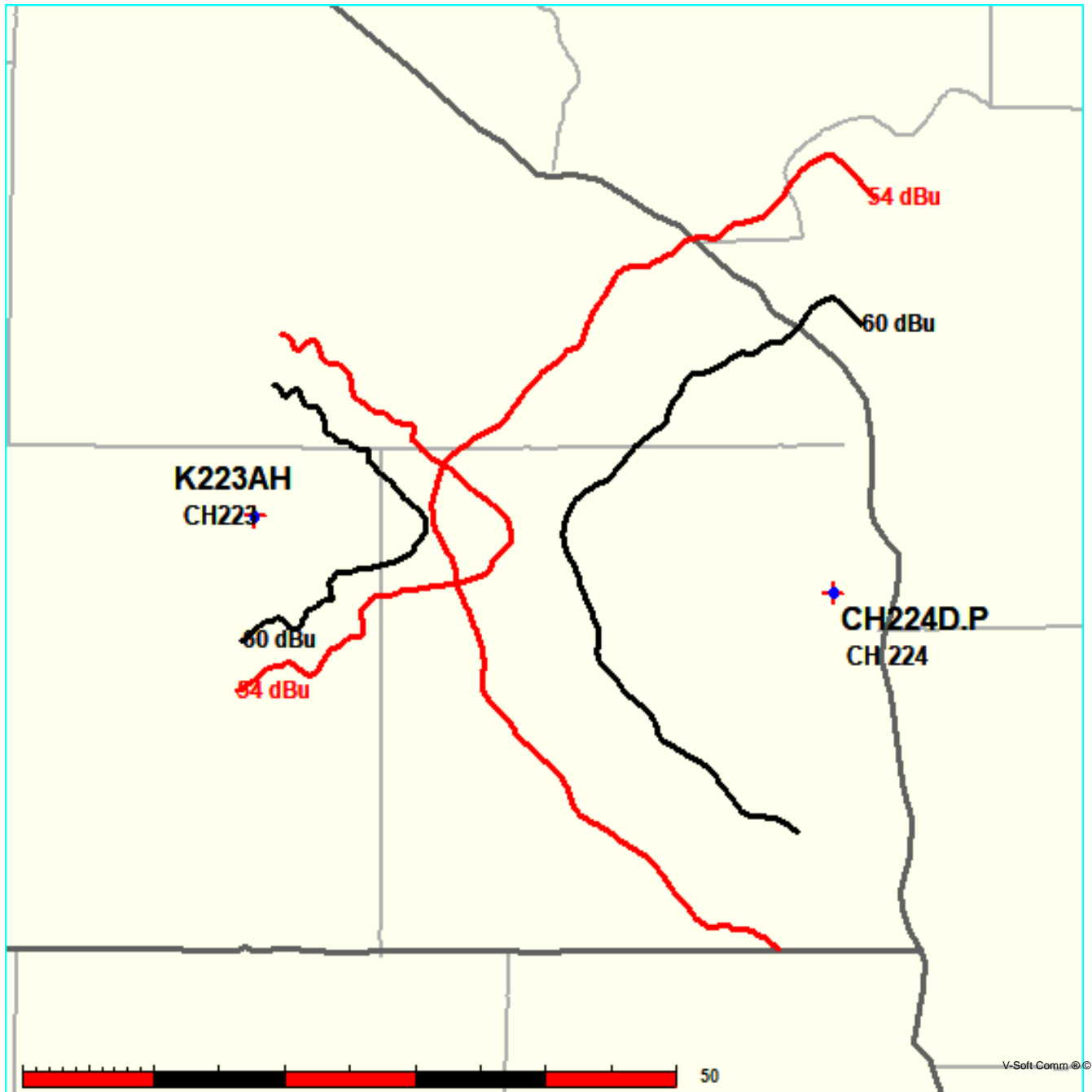


Exhibit 7a

Contour Protection Studies Toward Select Allocation Concern(s)

02-20-2024 Terrain Data: FCC NGDC 30 Sec FMOVer Analysis

CH224D.P

K223AH BLFT19960125TD

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 = 0.119 kW
 RCAMSL = 408 m
 N. Lat. 43 48 02.80
 W. Lng. 91 51 00.50
 Interfering
 54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
239.0	000.2250	0177.9	017.0	116.1	000.1011	0082.7	033.2	39.16	
240.0	000.2250	0179.8	017.1	116.0	000.1013	0083.4	032.9	39.38	
241.0	000.2250	0182.1	017.2	115.9	000.1015	0084.0	032.5	39.60	
242.0	000.2250	0184.7	017.4	115.7	000.1017	0084.7	032.2	39.83	
243.0	000.2250	0187.7	017.5	115.6	000.1019	0085.3	031.9	40.06	
244.0	000.2250	0190.9	017.6	115.5	000.1021	0086.0	031.6	40.29	
245.0	000.2250	0193.8	017.8	115.3	000.1023	0086.7	031.3	40.55	
246.0	000.2250	0195.9	017.9	115.1	000.1026	0087.8	031.0	40.82	
247.0	000.2250	0197.2	017.9	114.7	000.1031	0089.0	030.7	41.11	
248.0	000.2250	0198.4	018.0	114.4	000.1035	0090.3	030.4	41.41	
249.0	000.2250	0200.1	018.0	114.1	000.1040	0091.4	030.1	41.69	
250.0	000.2250	0202.7	018.2	113.8	000.1043	0092.3	029.8	41.96	
251.0	000.2250	0206.2	018.3	113.6	000.1047	0093.0	029.5	42.24	
252.0	000.2250	0210.3	018.5	113.4	000.1050	0093.7	029.2	42.52	
253.0	000.2250	0214.2	018.7	113.1	000.1054	0094.5	028.8	42.82	
254.0	000.2250	0216.5	018.8	112.7	000.1059	0095.7	028.5	43.13	
255.0	000.2250	0216.6	018.8	112.2	000.1067	0097.4	028.3	43.45	
256.0	000.2250	0215.3	018.7	111.6	000.1075	0099.7	028.2	43.79	
257.0	000.2250	0211.7	018.6	110.9	000.1086	0103.1	028.1	44.19	
258.0	000.2250	0209.4	018.5	110.2	000.1095	0106.8	028.0	44.61	
259.0	000.2250	0208.0	018.4	109.6	000.1102	0110.0	027.9	44.98	
260.0	000.2250	0207.8	018.4	109.0	000.1108	0112.8	027.7	45.31	
261.0	000.2250	0207.4	018.4	108.4	000.1113	0115.7	027.6	45.64	
262.0	000.2250	0207.4	018.4	107.8	000.1118	0118.5	027.5	45.96	
263.0	000.2250	0209.2	018.4	107.3	000.1123	0120.8	027.2	46.27	
264.0	000.2250	0211.4	018.5	106.8	000.1128	0122.9	027.0	46.57	
265.0	000.2250	0213.6	018.6	106.2	000.1133	0125.1	026.8	46.87	
266.0	000.2250	0216.5	018.8	105.6	000.1138	0127.8	026.6	47.22	
267.0	000.2250	0218.6	018.9	105.0	000.1144	0130.9	026.4	47.58	
268.0	000.2250	0221.3	019.0	104.4	000.1149	0133.8	026.2	47.94	

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)
269.0	000.2250	0225.1	019.1	103.8	000.1155	0135.5	025.9	48.24
270.0	000.2250	0229.0	019.3	103.2	000.1161	0136.2	025.7	48.47
271.0	000.2250	0232.6	019.4	102.5	000.1167	0136.4	025.5	48.66
272.0	000.2250	0233.5	019.5	101.8	000.1173	0136.3	025.4	48.75
273.0	000.2250	0235.8	019.6	101.1	000.1180	0136.3	025.2	48.88
274.0	000.2250	0238.2	019.7	100.3	000.1187	0138.2	025.1	49.13
275.0	000.2250	0242.4	019.8	099.6	000.1188	0141.2	024.9	49.47
276.0	000.2250	0249.3	020.1	098.8	000.1184	0143.8	024.6	49.84
277.0	000.2250	0256.1	020.4	098.0	000.1179	0146.4	024.3	50.19
278.0	000.2250	0262.7	020.6	097.2	000.1175	0148.9	024.0	50.52
279.0	000.2250	0268.4	020.8	096.3	000.1170	0150.1	023.8	50.72
280.0	000.2250	0272.3	021.0	095.4	000.1165	0151.0	023.7	50.86
281.0	000.2250	0275.6	021.1	094.5	000.1160	0152.2	023.6	50.98
282.0	000.2250	0278.5	021.2	093.6	000.1155	0150.7	023.6	50.91
283.0	000.2250	0279.3	021.3	092.7	000.1150	0149.6	023.6	50.80
284.0	000.2250	0279.1	021.2	091.8	000.1145	0148.5	023.7	50.65
285.0	000.2250	0278.0	021.2	090.9	000.1141	0147.4	023.8	50.48
286.0	000.2250	0277.8	021.2	090.1	000.1136	0144.2	023.9	50.18
287.0	000.2250	0278.2	021.2	089.2	000.1127	0141.4	024.0	49.90
288.0	000.2250	0276.8	021.2	088.4	000.1118	0138.9	024.1	49.58
289.0	000.2250	0273.6	021.0	087.7	000.1110	0136.6	024.4	49.23
290.0	000.2250	0268.1	020.8	087.1	000.1103	0134.7	024.7	48.84
291.0	000.2250	0261.9	020.6	086.5	000.1097	0132.5	025.1	48.42
292.0	000.2250	0255.8	020.4	086.0	000.1092	0129.7	025.4	47.96
293.0	000.2250	0249.3	020.1	085.6	000.1087	0127.2	025.8	47.51
294.0	000.2250	0242.3	019.8	085.2	000.1082	0125.4	026.2	47.09
295.0	000.2250	0235.4	019.6	084.8	000.1079	0124.0	026.6	46.71
296.0	000.2250	0229.3	019.3	084.5	000.1075	0122.9	027.0	46.36
297.0	000.2250	0225.5	019.1	084.0	000.1070	0121.5	027.3	46.05
298.0	000.2250	0223.6	019.1	083.5	000.1065	0120.0	027.6	45.76
299.0	000.2250	0222.6	019.0	083.0	000.1059	0118.9	027.8	45.52
300.0	000.2250	0221.4	019.0	082.5	000.1054	0118.4	028.1	45.32
301.0	000.2250	0220.0	018.9	082.1	000.1049	0117.8	028.3	45.10
302.0	000.2250	0218.9	018.9	081.6	000.1044	0116.7	028.5	44.85
303.0	000.2250	0218.0	018.8	081.2	000.1040	0115.3	028.8	44.58
304.0	000.2250	0216.7	018.8	080.8	000.1035	0114.2	029.1	44.32
305.0	000.2250	0215.6	018.7	080.4	000.1031	0113.0	029.3	44.06
306.0	000.2250	0215.0	018.7	080.0	000.1027	0112.1	029.6	43.83
307.0	000.2250	0214.0	018.7	079.6	000.1022	0111.7	029.8	43.62
308.0	000.2250	0212.0	018.6	079.3	000.1018	0111.4	030.1	43.42
309.0	000.2250	0209.7	018.5	079.0	000.1015	0111.2	030.4	43.22
310.0	000.2250	0208.3	018.4	078.7	000.1011	0110.9	030.7	43.02
311.0	000.2250	0207.7	018.4	078.4	000.1007	0110.7	031.0	42.84
312.0	000.2250	0206.3	018.3	078.1	000.1003	0110.5	031.3	42.65

Exhibit 7a

Contour Protection Studies Toward Select Allocation Concern(s)

02-20-2024 Terrain Data: FCC NGDC 30 Sec FMOver Analysis

K223AH BLFT19960125TD

CH224D.P

Channel = 223D
 Max ERP = 0.119 kW
 RCAMSL = 408 m
 N. Lat. 43 48 02.80
 W. Lng. 91 51 00.50
 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)
052.0	000.0759	0084.0	008.8	287.0	000.2250	0278.2	039.0	50.37	
053.0	000.0767	0084.9	008.9	287.0	000.2250	0278.2	038.8	50.44	
054.0	000.0775	0085.4	009.0	286.9	000.2250	0278.2	038.7	50.52	
055.0	000.0783	0085.7	009.0	286.8	000.2250	0278.2	038.5	50.58	
056.0	000.0791	0086.2	009.0	286.7	000.2250	0278.2	038.4	50.65	
057.0	000.0799	0087.1	009.1	286.7	000.2250	0278.2	038.2	50.73	
058.0	000.0807	0089.4	009.3	286.7	000.2250	0278.2	038.0	50.83	
059.0	000.0815	0093.7	009.5	286.8	000.2250	0278.2	037.7	50.97	
060.0	000.0824	0097.7	009.7	286.8	000.2250	0278.2	037.4	51.10	
061.0	000.0831	0099.7	009.8	286.8	000.2250	0278.2	037.2	51.19	
062.0	000.0839	0098.8	009.8	286.6	000.2250	0278.2	037.1	51.24	
063.0	000.0847	0095.8	009.7	286.3	000.2250	0277.9	037.1	51.25	
064.0	000.0855	0092.4	009.6	285.9	000.2250	0277.7	037.1	51.24	
065.0	000.0863	0090.6	009.5	285.6	000.2250	0277.6	037.0	51.26	
066.0	000.0871	0091.3	009.5	285.5	000.2250	0277.6	036.9	51.33	
067.0	000.0879	0092.7	009.6	285.4	000.2250	0277.6	036.7	51.42	
068.0	000.0887	0094.2	009.7	285.3	000.2250	0277.7	036.5	51.51	
069.0	000.0895	0094.9	009.8	285.1	000.2250	0277.9	036.4	51.58	
070.0	000.0903	0095.1	009.8	284.9	000.2250	0278.1	036.2	51.65	
071.0	000.0915	0096.6	009.9	284.8	000.2250	0278.3	036.0	51.74	
072.0	000.0927	0097.9	010.0	284.6	000.2250	0278.5	035.9	51.83	
073.0	000.0939	0099.7	010.1	284.5	000.2250	0278.7	035.7	51.93	
074.0	000.0952	0101.4	010.3	284.3	000.2250	0278.8	035.5	52.03	
075.0	000.0964	0104.0	010.4	284.2	000.2250	0278.9	035.3	52.14	
076.0	000.0976	0106.9	010.6	284.1	000.2250	0279.0	035.0	52.25	
077.0	000.0989	0109.4	010.7	283.9	000.2250	0279.1	034.8	52.36	
078.0	000.1002	0110.3	010.8	283.7	000.2250	0279.2	034.7	52.44	
079.0	000.1014	0111.2	010.9	283.5	000.2250	0279.3	034.5	52.51	
080.0	000.1027	0112.1	011.0	283.2	000.2250	0279.3	034.4	52.58	
081.0	000.1038	0114.8	011.1	283.0	000.2250	0279.3	034.2	52.68	
082.0	000.1048	0117.6	011.3	282.8	000.2250	0279.3	033.9	52.79	
083.0	000.1059	0118.8	011.3	282.5	000.2250	0279.1	033.8	52.85	
084.0	000.1070	0121.4	011.5	282.3	000.2250	0278.9	033.6	52.94	

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)
085.0	000.1081	0124.8	011.7	282.0	000.2250	0278.6	033.4	53.04
086.0	000.1092	0129.7	011.9	281.8	000.2250	0278.1	033.1	53.17
087.0	000.1103	0134.5	012.1	281.6	000.2250	0277.3	032.8	53.29
088.0	000.1114	0137.6	012.3	281.3	000.2250	0276.5	032.6	53.38
089.0	000.1125	0140.8	012.5	281.0	000.2250	0275.6	032.4	53.46
090.0	000.1136	0144.0	012.7	280.7	000.2250	0274.6	032.1	53.54
091.0	000.1141	0147.5	012.9	280.3	000.2250	0273.4	031.9	53.61
092.0	000.1147	0148.8	012.9	279.9	000.2250	0272.1	031.8	53.62
093.0	000.1152	0150.0	013.0	279.6	000.2250	0270.7	031.7	53.63
094.0	000.1157	0151.6	013.1	279.2	000.2250	0269.1	031.6	53.64
095.0	000.1163	0151.5	013.1	278.7	000.2250	0267.0	031.6	53.58
096.0	000.1168	0150.5	013.1	278.3	000.2250	0264.5	031.6	53.49
097.0	000.1174	0149.2	013.0	277.9	000.2250	0262.1	031.6	53.39
098.0	000.1179	0146.4	012.9	277.5	000.2250	0259.6	031.8	53.25
099.0	000.1185	0143.2	012.8	277.1	000.2250	0256.8	031.9	53.09
100.0	000.1190	0139.5	012.6	276.7	000.2250	0254.2	032.1	52.91
101.0	000.1181	0136.4	012.4	276.4	000.2250	0251.8	032.3	52.74
102.0	000.1172	0136.3	012.4	276.0	000.2250	0249.2	032.3	52.63
103.0	000.1162	0136.3	012.4	275.6	000.2250	0246.6	032.4	52.52
104.0	000.1153	0135.2	012.3	275.3	000.2250	0244.0	032.5	52.38
105.0	000.1144	0131.1	012.1	274.9	000.2250	0242.1	032.7	52.20
106.0	000.1135	0126.0	011.8	274.7	000.2250	0240.9	033.0	52.01
107.0	000.1126	0122.1	011.7	274.4	000.2250	0239.6	033.2	51.85
108.0	000.1117	0117.7	011.4	274.1	000.2250	0238.6	033.5	51.69
109.0	000.1108	0113.0	011.2	273.9	000.2250	0238.0	033.8	51.53
110.0	000.1099	0108.1	010.9	273.7	000.2250	0237.5	034.1	51.36
111.0	000.1084	0102.6	010.7	273.6	000.2250	0237.1	034.4	51.18
112.0	000.1070	0098.2	010.4	273.4	000.2250	0236.7	034.7	51.02
113.0	000.1056	0094.9	010.2	273.3	000.2250	0236.3	035.0	50.88
114.0	000.1041	0091.8	010.0	273.1	000.2250	0236.0	035.2	50.75
115.0	000.1027	0088.0	009.8	273.0	000.2250	0235.7	035.5	50.60
116.0	000.1013	0083.4	009.5	272.9	000.2250	0235.6	035.8	50.43
117.0	000.0999	0078.9	009.2	272.9	000.2250	0235.5	036.2	50.27
118.0	000.0985	0075.2	008.9	272.8	000.2250	0235.4	036.5	50.12
119.0	000.0971	0073.6	008.8	272.7	000.2250	0235.1	036.6	50.02
120.0	000.0957	0072.8	008.7	272.5	000.2250	0234.7	036.8	49.94
121.0	000.0942	0071.3	008.6	272.4	000.2250	0234.5	037.0	49.84
122.0	000.0927	0068.3	008.4	272.4	000.2250	0234.4	037.2	49.71
123.0	000.0913	0064.5	008.1	272.4	000.2250	0234.5	037.6	49.57
124.0	000.0898	0061.3	007.8	272.4	000.2250	0234.5	037.8	49.44
125.0	000.0883	0059.3	007.7	272.4	000.2250	0234.4	038.0	49.33
126.0	000.0869	0059.2	007.6	272.3	000.2250	0234.1	038.1	49.27
127.0	000.0854	0060.0	007.7	272.1	000.2250	0233.7	038.2	49.23
128.0	000.0840	0061.3	007.7	271.9	000.2250	0233.3	038.3	49.19

Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

FMCommander Single Allocation Study - 02-20-2024 - FCC NGDC 30 Sec
CH224D.P's Overlaps (In= 4.88 km, Out= 0.69 km)

CH224D.P CH 224 D DA
Lat= 43 44 52.30, Lng= 91 17 54.60
0.225 kW 239.3 m HAAT, 498.4 m COR
Prot.= 60 dBu, Intef.= 54 dBu

CH223D CH 223 D Contingent-PROP
Lat= 43 54 07.20, Lng= 91 06 11.60
0.02 kW -49.6 m HAAT, 242.7 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.

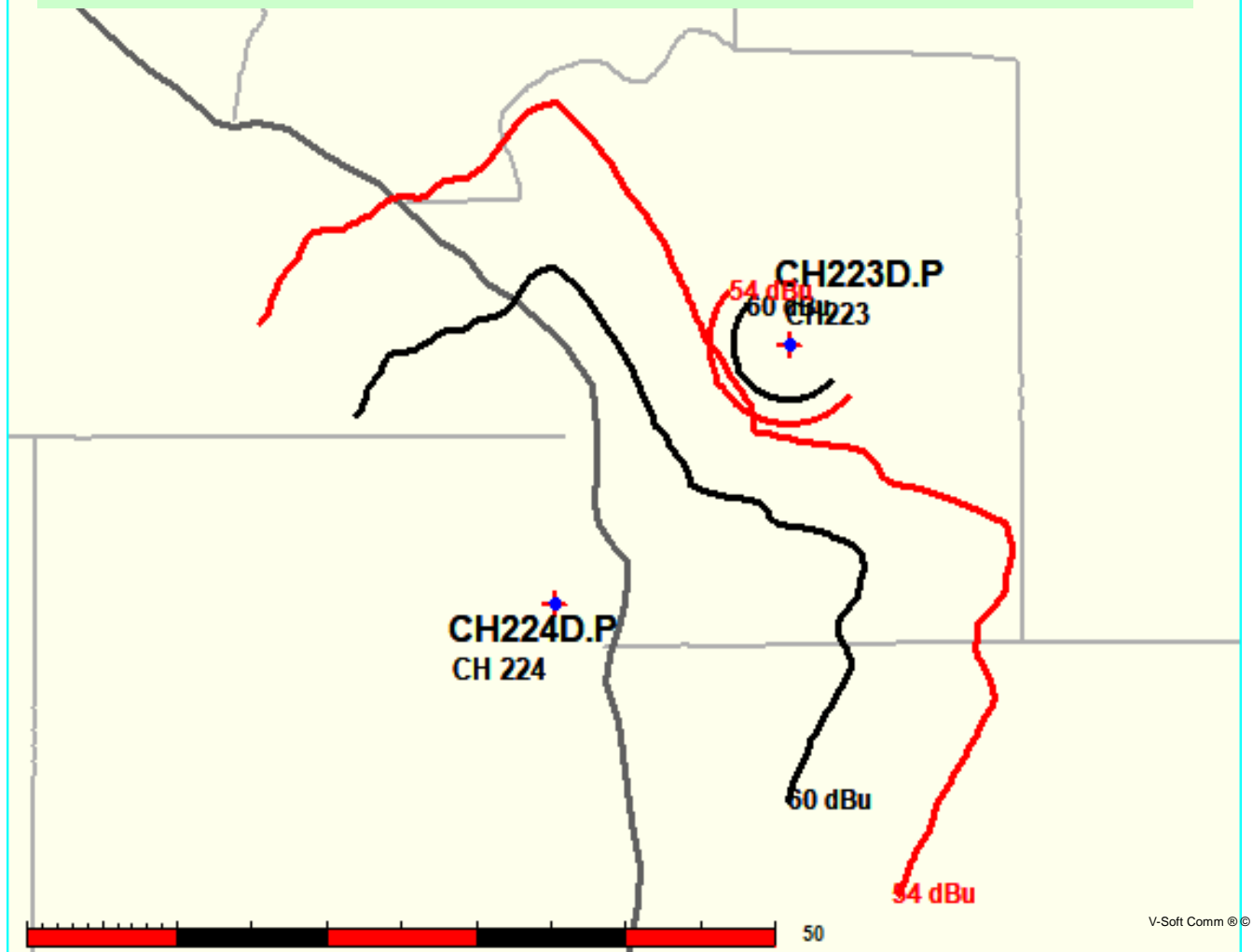


Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

02-20-2024 Terrain Data: FCC NGDC 30 Sec FMOver Analysis

CH224D.P

CH223D Contingent-PROP

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)
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	000.0536	0305.8	015.4	255.0	000.0200	0018.2	010.5	42.47	
022.0	000.0508	0304.5	015.2	253.0	000.0200	0020.2	010.4	42.58	
023.0	000.0482	0303.1	015.0	251.1	000.0200	0022.1	010.4	42.66	
024.0	000.0456	0301.9	014.7	249.2	000.0200	0024.8	010.3	42.70	
025.0	000.0432	0301.1	014.5	247.3	000.0200	0027.3	010.3	42.73	
026.0	000.0406	0300.8	014.3	245.5	000.0200	0029.5	010.3	42.73	
027.0	000.0382	0300.8	014.1	243.6	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	000.0337	0302.0	013.7	240.2	000.0200	0031.9	010.4	43.08	
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	

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)
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	000.0337	0234.8	012.1	213.4	000.0200	-0030.0	011.4	40.91
052.0	000.0360	0233.4	012.2	212.1	000.0200	-0031.6	011.3	41.03
053.0	000.0382	0231.7	012.4	210.8	000.0200	-0033.4	011.3	41.10
054.0	000.0406	0230.5	012.5	209.5	000.0200	-0035.9	011.2	41.19
055.0	000.0432	0230.2	012.7	208.1	000.0200	-0040.1	011.2	41.28
056.0	000.0456	0230.8	012.9	206.7	000.0200	-0042.5	011.1	41.37
057.0	000.0482	0231.9	013.1	205.1	000.0200	-0039.8	011.1	41.47
058.0	000.0508	0234.0	013.3	203.5	000.0200	-0039.5	011.0	41.56
059.0	000.0536	0237.1	013.5	201.7	000.0200	-0043.6	010.9	41.68
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
074.0	000.1513	0236.0	017.7	173.8	000.0200	-0051.4	012.4	39.47
075.0	000.1626	0240.9	018.2	171.2	000.0200	-0058.8	012.6	39.12

Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

02-20-2024 Terrain Data: FCC NGDC 30 Sec FMOver Analysis

CH223D 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

CH224D.P

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)
177.0	000.0200	-0050.4	003.7	049.7	000.0316	0236.1	020.8	51.40	
178.0	000.0200	-0051.3	003.7	049.6	000.0316	0236.3	020.7	51.44	
179.0	000.0200	-0049.4	003.7	049.5	000.0316	0236.5	020.7	51.49	
180.0	000.0200	-0042.4	003.7	049.4	000.0316	0236.8	020.6	51.54	
181.0	000.0200	-0035.1	003.7	049.3	000.0316	0237.1	020.6	51.59	
182.0	000.0200	-0028.1	003.7	049.2	000.0316	0237.5	020.5	51.64	
183.0	000.0200	-0025.7	003.7	049.0	000.0316	0237.9	020.5	51.69	
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	

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)
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
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

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

FMCommander Single Allocation Study - 02-20-2024 - FCC NGDC 30 Sec
CH224D.P's Overlaps (In= 3.66 km, Out= 31.17 km)

CH224D.P CH 224 D DA
Lat= 43 44 52.30, Lng= 91 17 54.60
0.225 kW 239.3 m HAAT, 498.4 m COR
Prot.= 60 dBu, Intef.= 40 dBu

WPKG CH 224 A BMLH20060228AOL
Lat= 44 35 29.90, Lng= 90 37 09.50
3.4 kW 134 m HAAT, 461 m COR
Prot.= 60 dBu, Intef.= 40 dBu

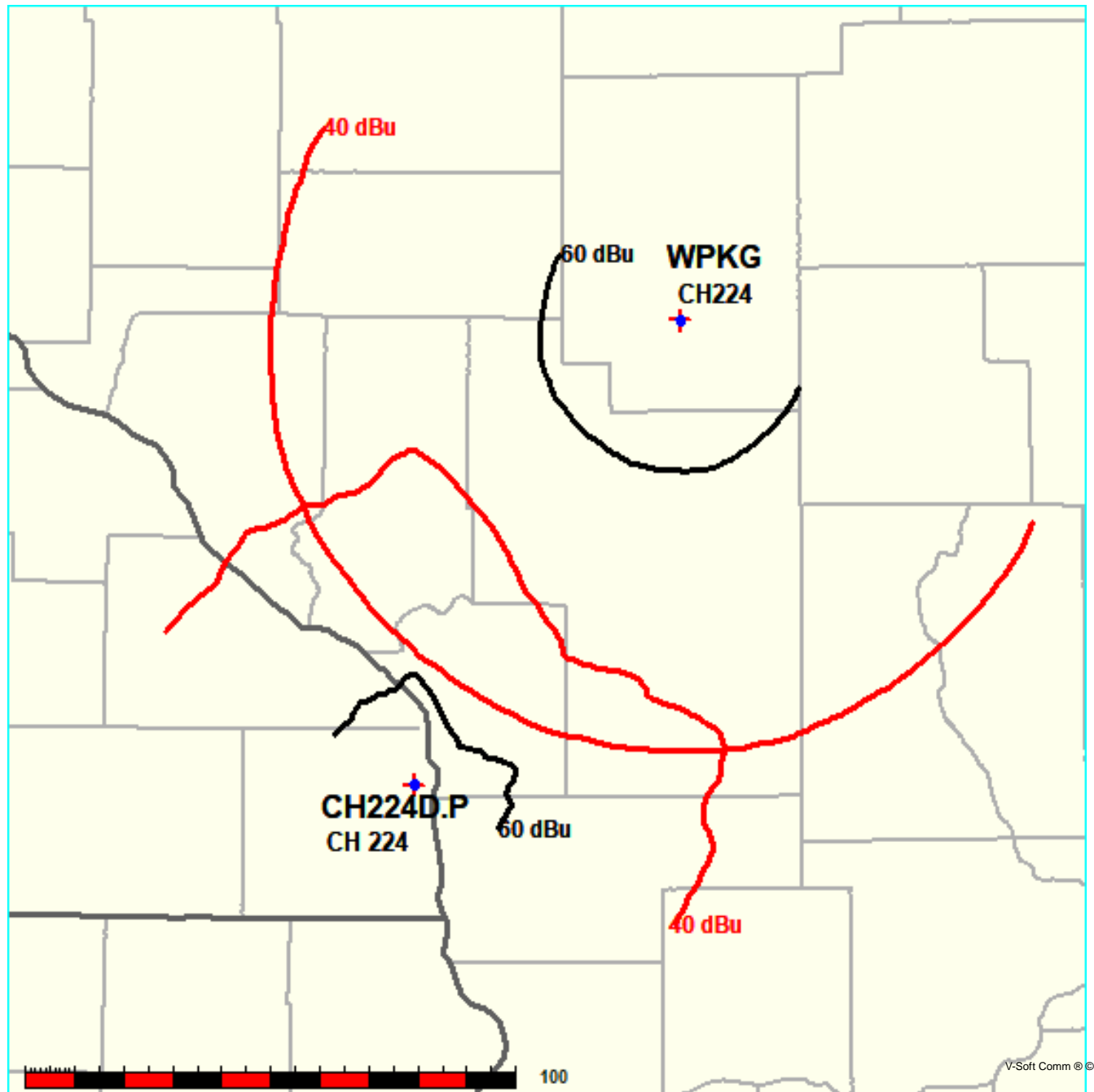


Exhibit 7c

Contour Protection Studies Toward Select Allocation Concern(s)

02-20-2024

Terrain Data: FCC NGDC 30 Sec

FMOver Analysis

CH224D.P

WPKG BMLH20060228AOL

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 = 224A
Max ERP = 3.4 kW
RCAMSL = 461 m
N. Lat. 44 35 29.90
W. Lng. 90 37 09.50
Interfering
40 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
351.0	000.2250	0240.5	019.8	217.8	003.4000	0152.4	093.7	37.78	
352.0	000.2250	0248.3	020.1	217.8	003.4000	0152.4	093.3	37.91	
353.0	000.2250	0257.6	020.4	217.8	003.4000	0152.4	092.8	38.05	
354.0	000.2250	0269.8	020.9	217.9	003.4000	0152.3	092.2	38.22	
355.0	000.2250	0280.3	021.3	217.8	003.4000	0152.3	091.6	38.37	
356.0	000.2250	0288.7	021.6	217.8	003.4000	0152.4	091.2	38.51	
357.0	000.2250	0294.5	021.8	217.7	003.4000	0152.4	090.8	38.63	
358.0	000.2250	0299.0	022.0	217.6	003.4000	0152.4	090.4	38.73	
359.0	000.2250	0303.0	022.1	217.5	003.4000	0152.4	090.0	38.84	
000.0	000.2250	0304.6	022.2	217.3	003.4000	0152.4	089.8	38.92	
001.0	000.2117	0305.5	021.9	217.0	003.4000	0152.2	089.8	38.91	
002.0	000.1988	0306.4	021.6	216.7	003.4000	0152.0	089.8	38.89	
003.0	000.1863	0307.1	021.3	216.4	003.4000	0151.7	089.8	38.87	
004.0	000.1742	0307.5	020.9	216.0	003.4000	0151.4	089.9	38.83	
005.0	000.1626	0307.8	020.6	215.7	003.4000	0151.2	090.0	38.79	
006.0	000.1513	0308.1	020.3	215.4	003.4000	0151.0	090.2	38.75	
007.0	000.1404	0308.3	019.9	215.1	003.4000	0150.9	090.3	38.70	
008.0	000.1300	0308.0	019.5	214.8	003.4000	0150.9	090.5	38.65	
009.0	000.1199	0307.4	019.1	214.5	003.4000	0151.0	090.7	38.59	
010.0	000.1102	0306.7	018.7	214.2	003.4000	0151.2	091.0	38.52	
011.0	000.1040	0306.4	018.4	214.0	003.4000	0151.4	091.1	38.49	
012.0	000.0980	0306.1	018.1	213.7	003.4000	0151.7	091.2	38.46	
013.0	000.0922	0306.0	017.8	213.5	003.4000	0151.9	091.4	38.42	
014.0	000.0865	0306.1	017.5	213.2	003.4000	0152.2	091.6	38.39	
015.0	000.0810	0306.3	017.2	213.0	003.4000	0152.4	091.8	38.34	
016.0	000.0757	0306.8	017.0	212.8	003.4000	0152.6	091.9	38.30	
017.0	000.0706	0307.4	016.7	212.5	003.4000	0152.8	092.2	38.25	
018.0	000.0656	0307.6	016.3	212.3	003.4000	0153.0	092.4	38.19	
019.0	000.0608	0307.4	016.0	212.1	003.4000	0153.2	092.6	38.12	
020.0	000.0562	0306.7	015.7	211.9	003.4000	0153.4	092.9	38.05	

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)
021.0	000.0536	0305.8	015.4	211.7	003.4000	0153.6	093.1	38.01
022.0	000.0508	0304.5	015.2	211.5	003.4000	0153.7	093.3	37.96
023.0	000.0482	0303.1	015.0	211.3	003.4000	0153.8	093.5	37.91
024.0	000.0456	0301.9	014.7	211.1	003.4000	0154.0	093.7	37.85
025.0	000.0432	0301.1	014.5	211.0	003.4000	0154.1	093.9	37.81
026.0	000.0406	0300.8	014.3	210.8	003.4000	0154.1	094.1	37.75
027.0	000.0382	0300.8	014.1	210.7	003.4000	0154.2	094.3	37.70
028.0	000.0360	0301.4	013.9	210.5	003.4000	0154.3	094.4	37.65
029.0	000.0337	0302.0	013.7	210.3	003.4000	0154.4	094.6	37.60
030.0	000.0316	0302.2	013.5	210.2	003.4000	0154.4	094.8	37.54
031.0	000.0316	0301.6	013.5	210.1	003.4000	0154.4	094.9	37.54
032.0	000.0316	0299.7	013.4	209.9	003.4000	0154.5	094.9	37.53
033.0	000.0316	0296.3	013.4	209.8	003.4000	0154.5	095.0	37.51
034.0	000.0316	0291.6	013.2	209.6	003.4000	0154.6	095.1	37.48
035.0	000.0316	0286.5	013.1	209.5	003.4000	0154.6	095.3	37.44
036.0	000.0316	0282.0	013.0	209.4	003.4000	0154.7	095.4	37.40
037.0	000.0316	0277.9	012.9	209.3	003.4000	0154.7	095.5	37.37
038.0	000.0316	0273.7	012.8	209.1	003.4000	0154.8	095.6	37.34
039.0	000.0316	0270.4	012.7	209.0	003.4000	0154.9	095.8	37.31
040.0	000.0316	0268.5	012.7	208.9	003.4000	0154.9	095.8	37.29
041.0	000.0316	0267.6	012.7	208.8	003.4000	0155.0	095.9	37.27
042.0	000.0316	0266.2	012.6	208.6	003.4000	0155.0	096.0	37.25
043.0	000.0316	0264.1	012.6	208.5	003.4000	0155.1	096.1	37.22
044.0	000.0316	0261.8	012.5	208.4	003.4000	0155.2	096.2	37.19
045.0	000.0316	0258.9	012.5	208.3	003.4000	0155.2	096.3	37.16
046.0	000.0316	0255.2	012.4	208.2	003.4000	0155.3	096.5	37.12
047.0	000.0316	0249.8	012.3	208.1	003.4000	0155.3	096.7	37.07
048.0	000.0316	0243.3	012.1	208.0	003.4000	0155.4	096.9	37.01
049.0	000.0316	0238.0	012.0	207.9	003.4000	0155.4	097.1	36.96
050.0	000.0316	0235.7	011.9	207.8	003.4000	0155.5	097.2	36.93
051.0	000.0337	0234.8	012.1	207.7	003.4000	0155.5	097.2	36.95
052.0	000.0360	0233.4	012.2	207.5	003.4000	0155.6	097.1	36.96
053.0	000.0382	0231.7	012.4	207.4	003.4000	0155.7	097.1	36.97
054.0	000.0406	0230.5	012.5	207.2	003.4000	0155.7	097.0	36.99
055.0	000.0432	0230.2	012.7	207.0	003.4000	0155.8	097.0	37.00
056.0	000.0456	0230.8	012.9	206.9	003.4000	0155.8	096.9	37.02
057.0	000.0482	0231.9	013.1	206.7	003.4000	0155.9	096.9	37.04
058.0	000.0508	0234.0	013.3	206.5	003.4000	0155.9	096.8	37.06
059.0	000.0536	0237.1	013.5	206.3	003.4000	0156.0	096.7	37.08
060.0	000.0562	0240.7	013.8	206.1	003.4000	0156.0	096.6	37.11
061.0	000.0608	0244.1	014.2	205.9	003.4000	0156.0	096.5	37.15
062.0	000.0656	0246.6	014.5	205.6	003.4000	0156.1	096.4	37.19
063.0	000.0706	0248.0	014.8	205.4	003.4000	0156.1	096.3	37.21
064.0	000.0757	0247.7	015.1	205.2	003.4000	0156.2	096.2	37.22

Exhibit 7c

Contour Protection Studies Toward Select Allocation Concern(s)

02-20-2024

Terrain Data: FCC NGDC 30 Sec

FMOver Analysis

WPKG BMLH20060228AOL

CH224D.P

Channel = 224A

Max ERP = 3.4 kW

RCAMSL = 461 m

N. Lat. 44 35 29.90

W. Lng. 90 37 09.50

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

40 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
165.0	003.4000	0160.6	030.7	043.9	000.0316	0262.0	089.4	22.71	
166.0	003.4000	0161.2	030.8	043.7	000.0316	0262.3	088.9	22.88	
167.0	003.4000	0161.3	030.8	043.6	000.0316	0262.8	088.4	23.04	
168.0	003.4000	0161.4	030.8	043.4	000.0316	0263.3	088.0	23.19	
169.0	003.4000	0161.6	030.8	043.2	000.0316	0263.7	087.5	23.35	
170.0	003.4000	0161.9	030.8	043.0	000.0316	0264.2	087.1	23.51	
171.0	003.4000	0162.1	030.9	042.8	000.0316	0264.6	086.7	23.66	
172.0	003.4000	0162.1	030.9	042.6	000.0316	0265.0	086.2	23.81	
173.0	003.4000	0161.8	030.8	042.3	000.0316	0265.6	085.8	23.95	
174.0	003.4000	0161.5	030.8	042.1	000.0316	0266.1	085.4	24.09	
175.0	003.4000	0161.3	030.8	041.8	000.0316	0266.5	085.1	24.23	
176.0	003.4000	0161.3	030.8	041.6	000.0316	0266.8	084.7	24.37	
177.0	003.4000	0161.3	030.8	041.3	000.0316	0267.2	084.3	24.50	
178.0	003.4000	0161.1	030.8	041.0	000.0316	0267.6	083.9	24.63	
179.0	003.4000	0160.9	030.7	040.8	000.0316	0267.9	083.6	24.75	
180.0	003.4000	0160.4	030.7	040.5	000.0316	0268.1	083.3	24.86	
181.0	003.4000	0159.9	030.6	040.2	000.0316	0268.4	082.9	24.97	
182.0	003.4000	0159.5	030.6	039.9	000.0316	0268.7	082.6	25.08	
183.0	003.4000	0159.9	030.6	039.6	000.0316	0269.1	082.3	25.21	
184.0	003.4000	0160.2	030.7	039.3	000.0316	0269.6	081.9	25.33	
185.0	003.4000	0160.2	030.7	039.0	000.0316	0270.4	081.6	25.46	
186.0	003.4000	0159.9	030.7	038.7	000.0316	0271.3	081.4	25.57	
187.0	003.4000	0160.0	030.7	038.3	000.0316	0272.3	081.1	25.70	
188.0	003.4000	0160.2	030.7	038.0	000.0316	0273.6	080.8	25.83	
189.0	003.4000	0160.4	030.7	037.7	000.0316	0274.9	080.5	25.97	
190.0	003.4000	0160.2	030.7	037.4	000.0316	0276.3	080.2	26.09	
191.0	003.4000	0159.7	030.6	037.0	000.0316	0277.9	080.0	26.20	
192.0	003.4000	0159.5	030.6	036.7	000.0316	0279.2	079.8	26.31	
193.0	003.4000	0159.3	030.6	036.3	000.0316	0280.7	079.6	26.43	
194.0	003.4000	0159.1	030.6	035.9	000.0316	0282.3	079.4	26.53	
195.0	003.4000	0159.2	030.6	035.6	000.0316	0283.8	079.2	26.65	
196.0	003.4000	0159.9	030.6	035.2	000.0316	0285.4	079.0	26.78	
197.0	003.4000	0160.6	030.7	034.9	000.0316	0287.0	078.7	26.91	

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)
198.0	003.4000	0161.1	030.8	034.5	000.0316	0288.8	078.5	27.03
199.0	003.4000	0161.5	030.8	034.2	000.0316	0290.7	078.4	27.16
200.0	003.4000	0160.9	030.7	033.8	000.0316	0292.7	078.3	27.25
201.0	003.4000	0159.5	030.6	033.4	000.0316	0294.7	078.3	27.31
202.0	003.4000	0158.1	030.5	033.0	000.0316	0296.5	078.3	27.36
203.0	003.4000	0157.1	030.4	032.6	000.0316	0298.1	078.3	27.41
204.0	003.4000	0156.5	030.3	032.2	000.0316	0299.3	078.2	27.46
205.0	003.4000	0156.2	030.3	031.8	000.0316	0300.2	078.2	27.51
206.0	003.4000	0156.0	030.3	031.4	000.0316	0301.0	078.2	27.54
207.0	003.4000	0155.8	030.3	031.0	000.0316	0301.6	078.1	27.57
208.0	003.4000	0155.4	030.2	030.6	000.0316	0301.9	078.1	27.58
209.0	003.4000	0154.9	030.2	030.2	000.0316	0302.1	078.2	27.58
210.0	003.4000	0154.5	030.1	029.9	000.0319	0302.2	078.2	27.61
211.0	003.4000	0154.1	030.1	029.5	000.0327	0302.2	078.2	27.70
212.0	003.4000	0153.3	030.0	029.1	000.0335	0302.1	078.3	27.78
213.0	003.4000	0152.4	029.9	028.7	000.0344	0301.9	078.4	27.84
214.0	003.4000	0151.4	029.9	028.3	000.0352	0301.6	078.6	27.89
215.0	003.4000	0150.9	029.8	028.0	000.0361	0301.4	078.7	27.96
216.0	003.4000	0151.4	029.9	027.6	000.0369	0301.1	078.7	28.04
217.0	003.4000	0152.2	029.9	027.2	000.0378	0300.9	078.7	28.13
218.0	003.4000	0152.3	029.9	026.8	000.0386	0300.8	078.8	28.20
219.0	003.4000	0151.7	029.9	026.5	000.0395	0300.7	078.9	28.24
220.0	003.4000	0150.7	029.8	026.1	000.0404	0300.7	079.1	28.27
221.0	003.4000	0150.0	029.7	025.8	000.0413	0300.8	079.3	28.30
222.0	003.4000	0150.0	029.7	025.4	000.0422	0300.9	079.5	28.36
223.0	003.4000	0150.4	029.8	025.0	000.0431	0301.1	079.6	28.42
224.0	003.4000	0150.6	029.8	024.7	000.0440	0301.3	079.7	28.47
225.0	003.4000	0150.9	029.8	024.3	000.0448	0301.6	079.9	28.51
226.0	003.4000	0151.2	029.8	024.0	000.0457	0301.9	080.0	28.55
227.0	003.4000	0151.2	029.8	023.6	000.0466	0302.3	080.2	28.58
228.0	003.4000	0150.6	029.8	023.3	000.0475	0302.7	080.5	28.59
229.0	003.4000	0149.8	029.7	023.0	000.0483	0303.1	080.8	28.59
230.0	003.4000	0149.1	029.6	022.7	000.0491	0303.6	081.1	28.58
231.0	003.4000	0148.7	029.6	022.4	000.0499	0304.0	081.3	28.57
232.0	003.4000	0148.7	029.6	022.0	000.0507	0304.5	081.6	28.58
233.0	003.4000	0149.0	029.6	021.7	000.0516	0304.9	081.8	28.59
234.0	003.4000	0149.6	029.7	021.4	000.0525	0305.3	082.0	28.61
235.0	003.4000	0150.4	029.8	021.0	000.0534	0305.7	082.3	28.63
236.0	003.4000	0151.2	029.8	020.7	000.0543	0306.1	082.5	28.63
237.0	003.4000	0151.7	029.9	020.4	000.0552	0306.4	082.7	28.62
238.0	003.4000	0151.7	029.9	020.1	000.0559	0306.6	083.1	28.59
239.0	003.4000	0151.6	029.9	019.8	000.0570	0306.8	083.4	28.57
240.0	003.4000	0151.3	029.8	019.6	000.0582	0307.0	083.7	28.56
241.0	003.4000	0151.0	029.8	019.3	000.0594	0307.2	084.1	28.54

Exhibit 8

47 C.F.R. Section 74.1204(d) Second / Third Adjacent Given Interference Waiver Request

The applicant would like to note the existence of a 47 C.F.R. Section 74.1204(d) Second/Third Adjacent Channel Given Interference Waiver Request toward WIZM-FM - La Crosse, WI (CH227C0) and K222AG - La Crosse, WI (CH222D) as included in **Exhibit 8**. Protection of the worst case calculated 122.3 dBμ F(50:10) Interference Contour, corresponding to the worst case calculated 82.3 dBμ F(50:50) Protected Contour, has been demonstrated through a downward radiation study. Full protection will be afforded all concerns as this area will not reach the ground nor a five meter artificial plane representing a standard two story house when taking into account the downward radiation characteristics of the antenna as supplied by the antenna manufacturer. A copy of the manufacturer's antenna specifications has been included in **Exhibit 9**.

Signal Report ✕

WIZM-FM Signal value at Reference site = 103.7 dBu. Distance to CH224D.P interference signal contour = 6.9 m

Signal Report ✕

K222AG Signal value at Reference site = 82.3 dBu. Distance to CH224D.P interference signal contour = 80.7 m

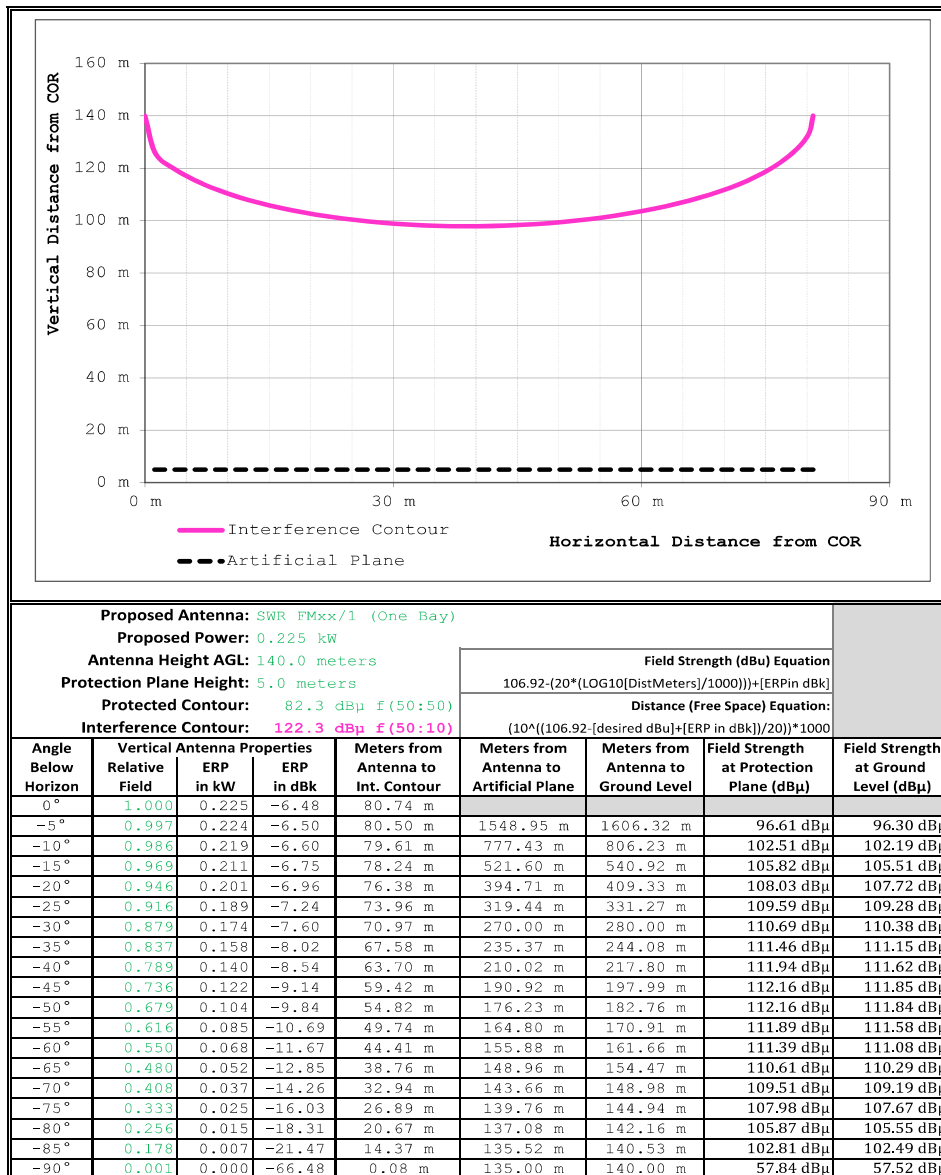


Exhibit 9

Tabulation of Proposed Directional Antenna Pattern

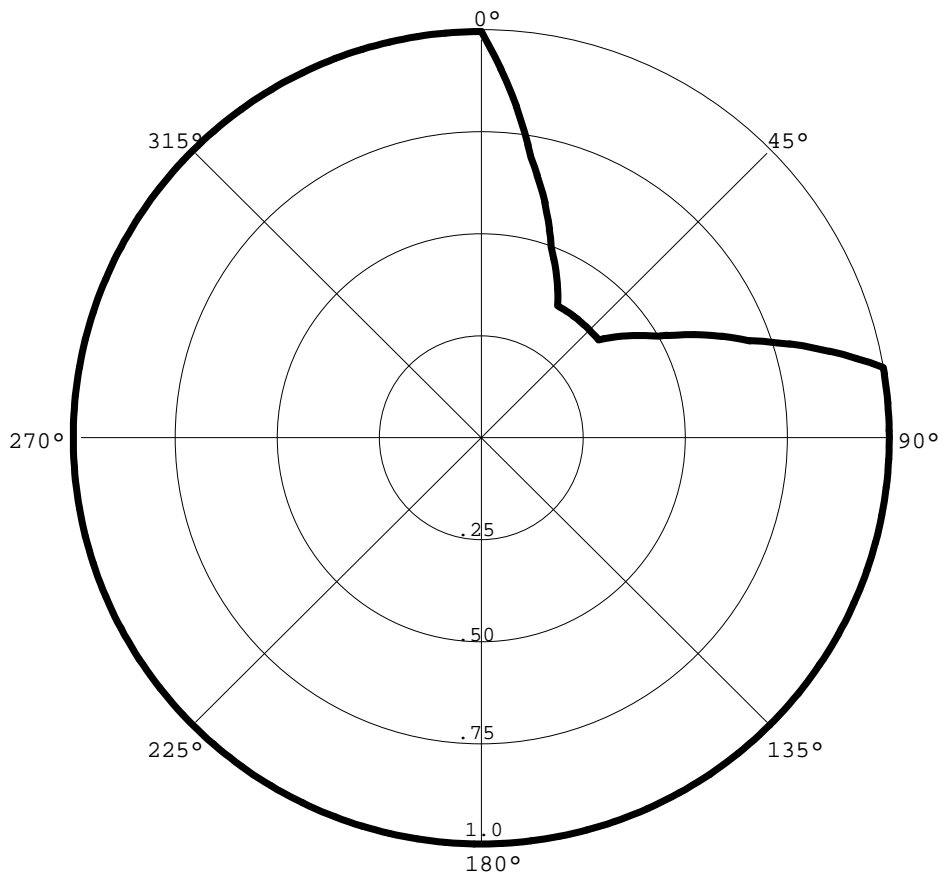
W224EL

02-15-2024

RMS(V)= .926

Azi	Field	dBk	kW
000	1.000	-06.478	0.225
010	0.700	-09.576	0.110
020	0.500	-12.499	0.056
030	0.375	-14.998	0.032
040	0.375	-14.998	0.032
050	0.375	-14.998	0.032
060	0.500	-12.499	0.056
070	0.700	-09.576	0.110
080	1.000	-06.478	0.225
090	1.000	-06.478	0.225
100	1.000	-06.478	0.225
110	1.000	-06.478	0.225
120	1.000	-06.478	0.225
130	1.000	-06.478	0.225
140	1.000	-06.478	0.225
150	1.000	-06.478	0.225
160	1.000	-06.478	0.225
170	1.000	-06.478	0.225
180	1.000	-06.478	0.225
190	1.000	-06.478	0.225
200	1.000	-06.478	0.225
210	1.000	-06.478	0.225
220	1.000	-06.478	0.225
230	1.000	-06.478	0.225
240	1.000	-06.478	0.225
250	1.000	-06.478	0.225
260	1.000	-06.478	0.225
270	1.000	-06.478	0.225
280	1.000	-06.478	0.225
290	1.000	-06.478	0.225
300	1.000	-06.478	0.225
310	1.000	-06.478	0.225
320	1.000	-06.478	0.225
330	1.000	-06.478	0.225
340	1.000	-06.478	0.225
350	1.000	-06.478	0.225

Graph is Relative Field



The antenna proposed in this application will be mounted in accordance with specific instructions provided by the antenna manufacturer. The antenna will be tested by the manufacturer using the type of mounting which will be employed in the field.

No other antennas of any type are or will be mounted on the same tower level as the directional antenna nor in will any antenna be mounted within any vertical or horizontal distance specified by the antenna manufacturer as being necessary for proper operation of the directional antenna. The antenna will be assembled under the supervision of a qualified engineer, who will provide the required certification. This statement will certify that the antenna has been installed pursuant to the manufacturer's instructions. Also upon completion of antenna construction, a statement from a licensed surveyor will be submitted with the application for license certifying the antenna has been installed in the proper orientation.

The antenna pattern will be measured by the manufacturer on the test range, and the measurement results will be supplied to the Commission at the time Form 302-FM is filed covering the construction.

Exhibit 9

Copy of Manufacturer's Vertical Antenna Pattern Documentation (public record copy)

FMEC SERIES CIRCULAR POLARIZED LOW POWER FM ANTENNAS

Product Specifications:

Frequency Range	88 – 108 MHz
Polarization	Circular
Power Rating	500 Watts per bay
System Input	Type N Male
VSWR	1.3:1 ± 150 kHz
Bay Dimensions	H 43.50" / W 38.5" / D 19"

Features:

•**BUILT WITH LOW POWER BROADCASTERS IN MIND.** Stations or translators that require circular, horizontal, or vertical polarizations.

•**POWER RATING.** Each bay is rated at 500 watts with a maximum power of 2 kW for four bays.

•**RUGGED CONSTRUCTION.** Each bay is constructed from rugged, heavy wall copper and naval brass. All joints are tig-welded.

•**PRESSURIZATION NOT REQUIRED.**

•**CUSTOM DIRECTIONAL PATTERNS.** FM directional antennas designed to the customer's specified mounting structure and FCC filing documentation are available.

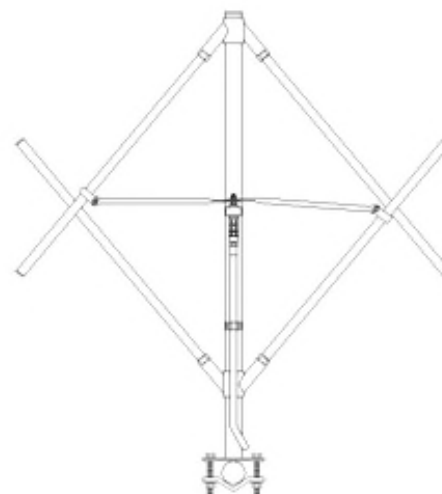
•**WEATHERIZATION (OPTIONAL).** Radomes or electrical deicers available for areas that experience periods of heavy icing and/or snow conditions.

•**STANDARD MOUNTING BRACKETS.** Fits up to 4" tower leg or pipe. Supplied with antenna.

•**WARRANTY.** 2-year limited warranty on defects and workmanship to the original purchaser.

Notes:

1. Power rating is based on 40 degrees Celsius ambient. Degeneration occurs above 2000 ft.
2. Antenna weight, windload, aperture and dimensions are based on mid-band operation (98.1 MHz).
3. Antennas with 3 or more bays come with input power divider.
4. SWR, Inc. maintains a continuous program of product improvement and therefore reserves the right to change specifications without notice.



Full Wave Spaced Electrical and Mechanical Specifications

Bays	Power Rating (watts)	Power Gain	dB Gain	Net. Weight (lbs)	Windload (lbs)
1	500	0.441	-3.556	15	35
2	1000	0.959	-0.182	35	85
3	1500	1.495	1.746	50	120
4	2000	2.044	3.105	65	155
5	2000	2.590	4.133	80	190
6	2000	3.160	4.997	95	225
8	2000	4.311	6.346	110	260
10	2000	5.456	7.309	130	295

Half Wave Spaced Electrical and Mechanical Specifications

Bays	Power Rating (watts)	Power Gain	dB Gain	Net. Weight (lbs)	Windload (lbs)
1	500	0.441	-3.556	15	35
2	1000	0.695	-1.580	35	85
3	1500	1.012	0.052	50	120
4	2000	1.313	1.183	65	155
5	2000	1.623	2.103	80	190
6	2000	1.924	2.842	95	225
8	2000	2.528	4.028	110	260
10	2000	3.129	4.954	125	295

3/4 Wave Spaced Electrical and Mechanical Specifications

Bays	Power Rating (watts)	Power Gain	dB Gain	Net. Weight (lbs)	Windload (lbs)
1	500	0.441	-3.556	15	35
2	1000	.935	-0.292	35	85
3	1500	1.396	1.449	50	120
4	2000	1.845	2.660	65	155
5	2000	2.301	3.619	80	190
6	2000	2.756	4.403	95	225
8	2000	3.664	5.640	110	260
10	2000	4.590	6.618	125	295

Exhibit 9
Copy of Manufacturer's Vertical Antenna Pattern Documentation
 (public record copy)

Full-Wave Spaced Specifications

Bays	Power Rating (watts)	Power Gain	dB Gain	Net. Weight (lbs)	Windload (lbs)
1	500	0.441	-3.556	15	35
2	1000	0.959	-0.182	35	85
3	1500	1.495	1.746	50	120
4	2000	2.044	3.105	65	155
5	2000	2.590	4.133	80	190
6	2000	3.160	4.997	95	225
8	2000	4.311	6.346	110	260
10	2000	5.456	7.369	130	295

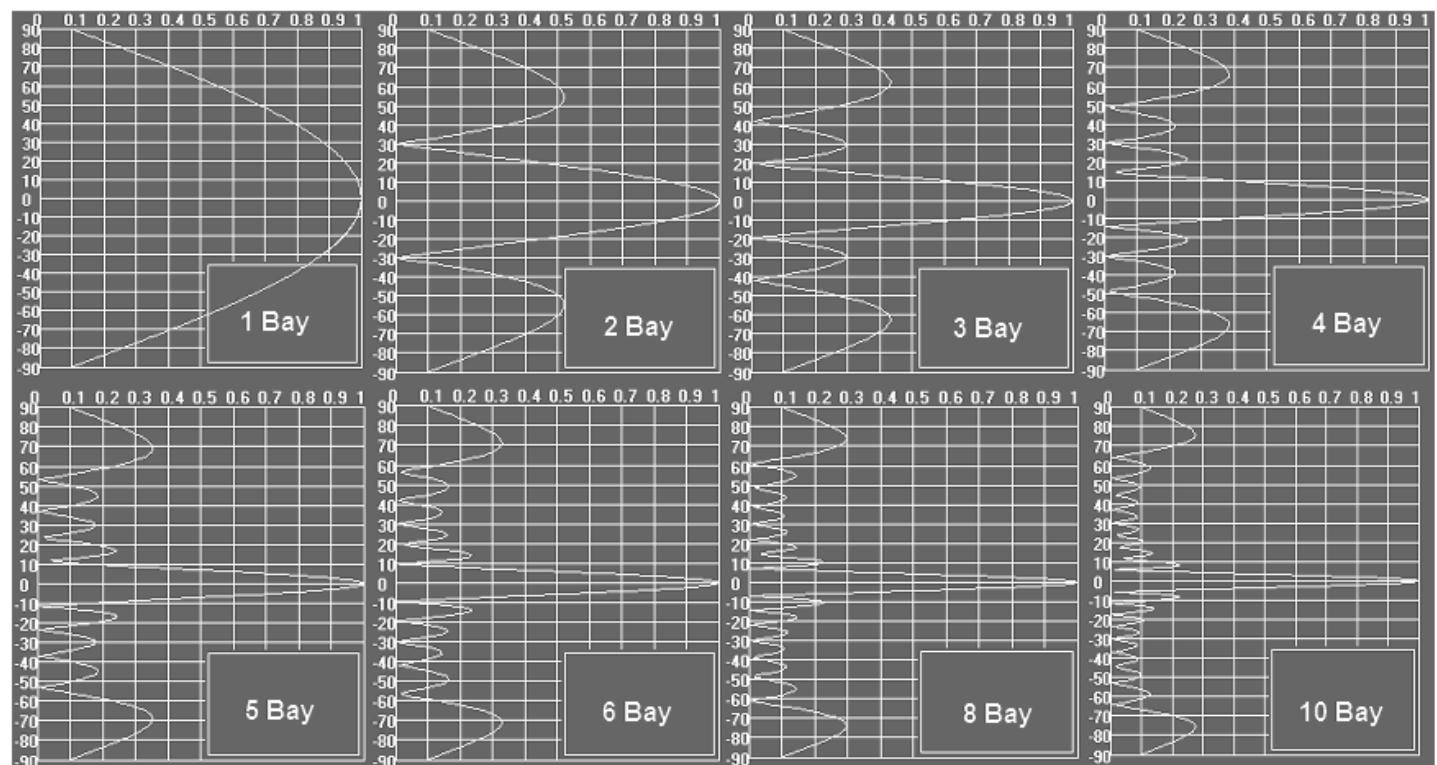
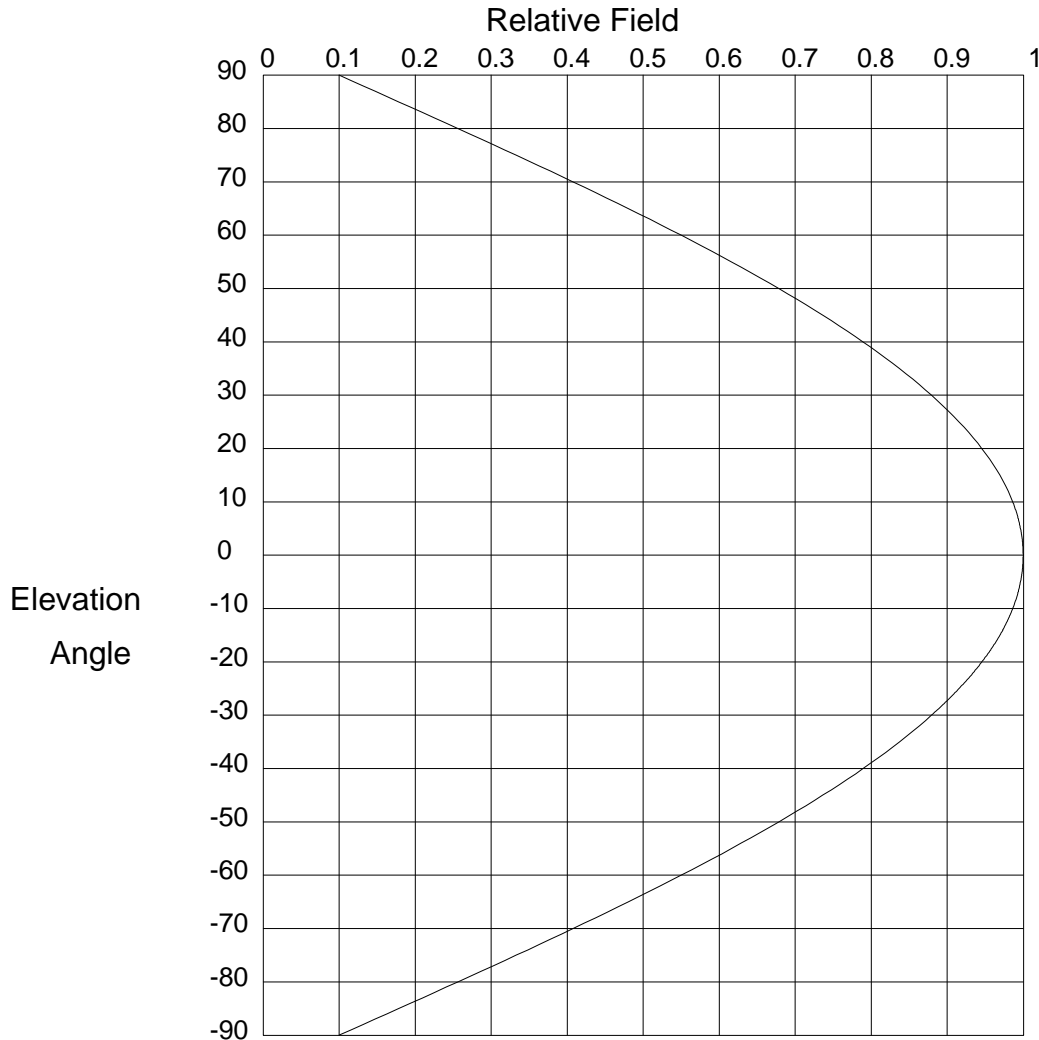


Exhibit 9
Copy of Manufacturer's Vertical Antenna Pattern Documentation
(public record copy)



Elevation Pattern

Systems With Reliability

Scale: Linear

Units: Field, Relative

CLIENT:

Date: 11/28/2016

ANTENNA TYPE: FMxx/1

FREQUENCY: 98.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 0.883/-0.539 dBd

Beam Tilt (Deg.) : 0

DIRECTIVITY(Horiz): 0.883/-0.539 dBd

Null Fill(s)(%) : 0, 0, 0

Exhibit 9

Copy of Manufacturer's Vertical Antenna Pattern Documentation (public record copy)

Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
90.0	.10 (-20)	52.0	.654 (-3.687)	14.0	.973 (-0.235)
89.0	.116 (-18.733)	51.0	.666 (-3.525)	13.0	.977 (-0.203)
88.0	.131 (-17.627)	50.0	.679 (-3.369)	12.0	.98 (-0.173)
87.0	.147 (-16.648)	49.0	.69 (-3.217)	11.0	.983 (-0.145)
86.0	.163 (-15.768)	48.0	.702 (-3.071)	10.0	.986 (-0.12)
85.0	.178 (-14.97)	47.0	.714 (-2.928)	9.8	.987 (-0.115)
84.0	.194 (-14.241)	46.0	.725 (-2.791)	9.6	.987 (-0.11)
83.0	.21 (-13.569)	45.0	.736 (-2.658)	9.4	.988 (-0.106)
82.0	.225 (-12.946)	44.0	.747 (-2.529)	9.2	.988 (-0.101)
81.0	.241 (-12.367)	43.0	.758 (-2.404)	9.0	.989 (-0.097)
80.0	.256 (-11.826)	42.0	.769 (-2.283)	8.8	.989 (-0.093)
79.0	.272 (-11.317)	41.0	.779 (-2.167)	8.6	.99 (-0.088)
78.0	.287 (-10.839)	40.0	.789 (-2.054)	8.4	.99 (-0.084)
77.0	.302 (-10.387)	39.0	.799 (-1.944)	8.2	.991 (-0.08)
76.0	.318 (-9.959)	38.0	.809 (-1.839)	8.0	.991 (-0.076)
75.0	.333 (-9.553)	37.0	.819 (-1.737)	7.8	.992 (-0.073)
74.0	.348 (-9.167)	36.0	.828 (-1.638)	7.6	.992 (-0.069)
73.0	.363 (-8.799)	35.0	.837 (-1.543)	7.4	.993 (-0.065)
72.0	.378 (-8.448)	34.0	.846 (-1.451)	7.2	.993 (-0.062)
71.0	.393 (-8.112)	33.0	.855 (-1.363)	7.0	.993 (-0.058)
70.0	.408 (-7.791)	32.0	.863 (-1.277)	6.8	.994 (-0.055)
69.0	.423 (-7.483)	31.0	.871 (-1.195)	6.6	.994 (-0.052)
68.0	.437 (-7.187)	30.0	.879 (-1.116)	6.4	.994 (-0.049)
67.0	.452 (-6.904)	29.0	.887 (-1.04)	6.2	.995 (-0.046)
66.0	.466 (-6.631)	28.0	.895 (-0.967)	6.0	.995 (-0.043)
65.0	.48 (-6.369)	27.0	.902 (-0.897)	5.8	.995 (-0.04)
64.0	.495 (-6.116)	26.0	.909 (-0.83)	5.6	.996 (-0.037)
63.0	.509 (-5.873)	25.0	.916 (-0.765)	5.4	.996 (-0.035)
62.0	.523 (-5.638)	24.0	.922 (-0.704)	5.2	.996 (-0.032)
61.0	.536 (-5.411)	23.0	.928 (-0.645)	5.0	.997 (-0.03)
60.0	.55 (-5.193)	22.0	.934 (-0.589)	4.8	.997 (-0.027)
59.0	.564 (-4.982)	21.0	.94 (-0.535)	4.6	.997 (-0.025)
58.0	.577 (-4.778)	20.0	.946 (-0.485)	4.4	.997 (-0.023)
57.0	.59 (-4.58)	19.0	.951 (-0.437)	4.2	.998 (-0.021)
56.0	.603 (-4.39)	18.0	.956 (-0.391)	4.0	.998 (-0.019)
55.0	.616 (-4.205)	17.0	.961 (-0.348)	3.8	.998 (-0.017)
54.0	.629 (-4.027)	16.0	.965 (-0.308)	3.6	.998 (-0.015)
53.0	.642 (-3.854)	15.0	.969 (-0.271)	3.4	.998 (-0.014)

Systems With Reliability

Page 1 of 3

CLIENT:

Date: 11/28/2016

ANTENNA TYPE: FMxx/1

FREQUENCY: 98.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 0.883/-0.539 dBd

Beam Tilt (Deg.): 0

DIRECTIVITY(Horiz): 0.883/-0.539 dBd

Null Fill(s)(%) : 0, 0, 0

Exhibit 9

Copy of Manufacturer's Vertical Antenna Pattern Documentation (public record copy)

Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
3.2	.999 (-0.012)	-4.4	.997 (-0.023)	-12.0	.98 (-0.173)
3.0	.999 (-0.011)	-4.6	.997 (-0.025)	-12.2	.98 (-0.178)
2.8	.999 (-0.009)	-4.8	.997 (-0.027)	-12.4	.979 (-0.184)
2.6	.999 (-0.008)	-5.0	.997 (-0.03)	-12.6	.978 (-0.19)
2.4	.999 (-0.007)	-5.2	.996 (-0.032)	-12.8	.978 (-0.196)
2.2	.999 (-0.006)	-5.4	.996 (-0.035)	-13.0	.977 (-0.203)
2.0	.999 (-0.005)	-5.6	.996 (-0.037)	-13.2	.976 (-0.209)
1.8	1.00 (-0.004)	-5.8	.995 (-0.04)	-13.4	.975 (-0.215)
1.6	1.00 (-0.003)	-6.0	.995 (-0.043)	-13.6	.975 (-0.222)
1.4	1.00 (-0.002)	-6.2	.995 (-0.046)	-13.8	.974 (-0.229)
1.2	1.00 (-0.002)	-6.4	.994 (-0.049)	-14.0	.973 (-0.235)
1.0	1.00 (-0.001)	-6.6	.994 (-0.052)	-14.2	.973 (-0.242)
.8	1.00 (-0.001)	-6.8	.994 (-0.055)	-14.4	.972 (-0.249)
.6	1.00 (0)	-7.0	.993 (-0.058)	-14.6	.971 (-0.256)
.4	1.00 (0)	-7.2	.993 (-0.062)	-14.8	.97 (-0.263)
.2	1.00 (0)	-7.4	.993 (-0.065)	-15.0	.969 (-0.271)
.0	1.00 (0)	-7.6	.992 (-0.069)	-15.2	.969 (-0.278)
-.2	1.00 (0)	-7.8	.992 (-0.073)	-15.4	.968 (-0.285)
-.4	1.00 (0)	-8.0	.991 (-0.076)	-15.6	.967 (-0.293)
-.6	1.00 (0)	-8.2	.991 (-0.08)	-15.8	.966 (-0.3)
-.8	1.00 (-0.001)	-8.4	.99 (-0.084)	-16.0	.965 (-0.308)
-1.0	1.00 (-0.001)	-8.6	.99 (-0.088)	-16.2	.964 (-0.316)
-1.2	1.00 (-0.002)	-8.8	.989 (-0.093)	-16.4	.963 (-0.324)
-1.4	1.00 (-0.002)	-9.0	.989 (-0.097)	-16.6	.962 (-0.332)
-1.6	1.00 (-0.003)	-9.2	.988 (-0.101)	-16.8	.962 (-0.34)
-1.8	1.00 (-0.004)	-9.4	.988 (-0.106)	-17.0	.961 (-0.348)
-2.0	.999 (-0.005)	-9.6	.987 (-0.11)	-17.2	.96 (-0.357)
-2.2	.999 (-0.006)	-9.8	.987 (-0.115)	-17.4	.959 (-0.365)
-2.4	.999 (-0.007)	-10.0	.986 (-0.12)	-17.6	.958 (-0.374)
-2.6	.999 (-0.008)	-10.2	.986 (-0.124)	-17.8	.957 (-0.383)
-2.8	.999 (-0.009)	-10.4	.985 (-0.129)	-18.0	.956 (-0.391)
-3.0	.999 (-0.011)	-10.6	.985 (-0.134)	-18.2	.955 (-0.4)
-3.2	.999 (-0.012)	-10.8	.984 (-0.14)	-18.4	.954 (-0.409)
-3.4	.998 (-0.014)	-11.0	.983 (-0.145)	-18.6	.953 (-0.418)
-3.6	.998 (-0.015)	-11.2	.983 (-0.15)	-18.8	.952 (-0.427)
-3.8	.998 (-0.017)	-11.4	.982 (-0.156)	-19.0	.951 (-0.437)
-4.0	.998 (-0.019)	-11.6	.982 (-0.161)	-19.2	.95 (-0.446)
-4.2	.998 (-0.021)	-11.8	.981 (-0.167)	-19.4	.949 (-0.456)

Systems With Reliability

Page 2 of 3

CLIENT:

Date: 11/28/2016

ANTENNA TYPE: FMxx/1

FREQUENCY: 98.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 0.883/-0.539 dBd

Beam Tilt (Deg.) : 0

DIRECTIVITY(Horiz): 0.883/-0.539 dBd

Null Fill(s)(%) : 0, 0, 0

Exhibit 9

Copy of Manufacturer's Vertical Antenna Pattern Documentation (public record copy)

Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
-19.6	.948 (-0.465)	-27.2	.90 (-0.911)	-54.0	.629 (-4.027)
-19.8	.947 (-0.475)	-27.4	.899 (-0.924)	-55.0	.616 (-4.205)
-20.0	.946 (-0.485)	-27.6	.898 (-0.939)	-56.0	.603 (-4.39)
-20.2	.945 (-0.495)	-27.8	.896 (-0.953)	-57.0	.59 (-4.58)
-20.4	.944 (-0.505)	-28.0	.895 (-0.967)	-58.0	.577 (-4.778)
-20.6	.942 (-0.515)	-28.2	.893 (-0.981)	-59.0	.564 (-4.982)
-20.8	.941 (-0.525)	-28.4	.892 (-0.996)	-60.0	.55 (-5.193)
-21.0	.94 (-0.535)	-28.6	.89 (-1.01)	-61.0	.536 (-5.411)
-21.2	.939 (-0.546)	-28.8	.889 (-1.025)	-62.0	.523 (-5.638)
-21.4	.938 (-0.556)	-29.0	.887 (-1.04)	-63.0	.509 (-5.873)
-21.6	.937 (-0.567)	-29.2	.886 (-1.055)	-64.0	.495 (-6.116)
-21.8	.936 (-0.578)	-29.4	.884 (-1.07)	-65.0	.48 (-6.369)
-22.0	.934 (-0.589)	-29.6	.883 (-1.085)	-66.0	.466 (-6.631)
-22.2	.933 (-0.6)	-29.8	.881 (-1.101)	-67.0	.452 (-6.904)
-22.4	.932 (-0.611)	-30.0	.879 (-1.116)	-68.0	.437 (-7.187)
-22.6	.931 (-0.622)	-31.0	.871 (-1.195)	-69.0	.423 (-7.483)
-22.8	.93 (-0.633)	-32.0	.863 (-1.277)	-70.0	.408 (-7.791)
-23.0	.928 (-0.645)	-33.0	.855 (-1.363)	-71.0	.393 (-8.112)
-23.2	.927 (-0.656)	-34.0	.846 (-1.451)	-72.0	.378 (-8.448)
-23.4	.926 (-0.668)	-35.0	.837 (-1.543)	-73.0	.363 (-8.799)
-23.6	.925 (-0.68)	-36.0	.828 (-1.638)	-74.0	.348 (-9.167)
-23.8	.923 (-0.692)	-37.0	.819 (-1.737)	-75.0	.333 (-9.553)
-24.0	.922 (-0.704)	-38.0	.809 (-1.839)	-76.0	.318 (-9.959)
-24.2	.921 (-0.716)	-39.0	.799 (-1.944)	-77.0	.302 (-10.387)
-24.4	.92 (-0.728)	-40.0	.789 (-2.054)	-78.0	.287 (-10.839)
-24.6	.918 (-0.74)	-41.0	.779 (-2.167)	-79.0	.272 (-11.317)
-24.8	.917 (-0.753)	-42.0	.769 (-2.283)	-80.0	.256 (-11.826)
-25.0	.916 (-0.765)	-43.0	.758 (-2.404)	-81.0	.241 (-12.367)
-25.2	.914 (-0.778)	-44.0	.747 (-2.529)	-82.0	.225 (-12.946)
-25.4	.913 (-0.791)	-45.0	.736 (-2.658)	-83.0	.21 (-13.569)
-25.6	.912 (-0.803)	-46.0	.725 (-2.791)	-84.0	.194 (-14.241)
-25.8	.91 (-0.816)	-47.0	.714 (-2.928)	-85.0	.178 (-14.97)
-26.0	.909 (-0.83)	-48.0	.702 (-3.071)	-86.0	.163 (-15.768)
-26.2	.908 (-0.843)	-49.0	.69 (-3.217)	-87.0	.147 (-16.648)
-26.4	.906 (-0.856)	-50.0	.679 (-3.369)	-88.0	.131 (-17.627)
-26.6	.905 (-0.87)	-51.0	.666 (-3.525)	-89.0	.116 (-18.733)
-26.8	.903 (-0.883)	-52.0	.654 (-3.687)	-90.0	.10 (-20)
-27.0	.902 (-0.897)	-53.0	.642 (-3.854)	90.0	.00 (-50)

Systems With Reliability

Page 3 of 3

CLIENT:

Date: 11/28/2016

ANTENNA TYPE: FMxx/1

FREQUENCY: 98.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 0.883/-0.539 dBd

Beam Tilt (Deg.) : 0

DIRECTIVITY(Horiz): 0.883/-0.539 dBd

Null Fill(s)(%) : 0, 0, 0