

# Technical Report Supporting a Minor Modification of a Licensed Facility Construction Permit Application

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

*for*

*W239CD.L - Beloit, WI  
(Facility ID: 155647)*

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*Non-Adjacent Channel Change per  
47 C.F.R. Section 74.1233(a)(1)(i)(A)(2);  
Site Relocation;  
Increase in Antenna COR;  
& Decrease in Power*

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*as a Commercial,  
Fill-In Translator  
for WSJY(FM) - Fort Atkinson, WI*

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RF Appendix 1 - Radio Frequency Radiation Compliance Showing

**EXPLANATION OF PROPOSAL:** This LMS filing and accompanying technical report supports a Minor Modification of a Licensed Facility Construction Permit Application for FM Translator W239CD.L - Beloit, WI (Facility ID: 155647). This filing requests a 47 C.F.R. Section 74.1233(a)(1)(i)(A)(2) non-adjacent channel change from CH239D (95.7 MHz) to CH234D (94.7 MHz) based upon a showing of reduced interference. Operation on the new frequency of CH234D (94.7 MHz) with a non-directional power of 0.130 kW ERP circular polarization (H&V) is requested. The FM Translator will operate from a new COR of 374.6 meters AMSL at a new site location. This LMS Filing will specify rebroadcast of new Class B FM Primary Station WSJY(FM) - Fort Atkinson, WI (CH297B, 107.3 MHz); Facility ID No. 24442. The Translator will continue to provide service to the community of Beloit, WI.

**FACILITY COMPLIANCE SHOWINGS:** A map of the proposed 60 dB $\mu$  service contour in relation to the present 60 dB $\mu$  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 54 dB $\mu$  contour of the Translator lies wholly inside the larger FM Class B primary 54 dB $\mu$  contour. The primary station service contour relationship has been plotted in ***Exhibit 2***. Regarding permission to retransmit new Primary Station, WSJY(FM) - Fort Atkinson, WI; both WSJY(FM) and W239CD(CH234D) 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 1044696. 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 has been included in ***Exhibit 5***.

**ALLOCATION COMPLIANCE SHOWINGS:** The proposed Translator remains in compliance with 47 C.F.R. Section 74.1204 toward all allocation protection concerns with the exception of WJJO(FM) - Watertown, WI (CH231B). A general allocation study for this proposal is found in **Exhibit 6**.

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 WJJO(FM) - Watertown, WI (CH231B) as included in **Exhibit(s) 8(a-b)**. In this instance, the worst case affected station's signal strength at the Translator site has been identified as the 57.9 dBμ F(50:50) service contour, associated with a Translator interference contour adjusted by +40 dBμ per 47 C.F.R. Section 74.1204(a). Concerning distances between 250 meters from the Translator site to the extent of the interference contour, protection has been demonstrated through a downward radiation study as included in **Exhibit 8a**. Full protection will be afforded all concerns as this portion of the interference area will not reach the ground nor a five meter artificial plane representing a standard two story home when taking into account the downward radiation characteristics of the antenna. A copy of the antenna manufacturer's vertical radiation pattern data has been included in **Exhibit 9**. Concerning distances within 250 meters of the Translator site, protection has been demonstrated through aerial photography of the site as included in **Exhibit 8b**. Full protection will be afforded all concerns as this portion of the interference area is void of all housing, buildings or major roads representing locations where people live, work or travel on a regular basis. The applicant would like to note the existence of a dedicated transmitter building or other unoccupied buildings within this affected radius; however, buildings of this nature have been routinely exempt as a matter of FCC Policy (see similar grant under BPFT-20160129ALR).

There are two (2) facilities, existing or proposed, close enough to merit further study. Therefore, a supplemental contour protection study has been provided toward each facility as included in **Exhibit(s) 7(a-b)**. It is believed sufficient clearance exists precluding the need for additional contour protection showings.

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 guidelines for 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**. The facility is, or will be, properly marked with signs. Entry is, or will be, restricted by means of fencing, locked doors or gates. In addition, coordination with other users of the site will be secured to reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic fields in excess of FCC guidelines.

Regarding compliance with the NEPA, Nationwide Programmatic Agreement and NHPA Section 106 for tower co-location, compliance with the Agreement is not required where no new tower construction is being proposed and the tower is not being substantially altered. Specifically, compliance is not necessary where only an antenna and feedline are being 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-two 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  
May 26, 2021

FCC 30 SEC Terrain Database  
US Census 2010 PL Database  
NED 1983 Coordinate Datum

# Exhibit 1

## Service Contour Study: Present vs Proposed Operations

*Proposed 60 dBμ F(50:50) Contour*

*Present 60 dBμ F(50:50) Contour*

**W239CD.L**  
Beloit, WI  
BLFT20161230AAM  
Facility ID: 155647  
Latitude: 42-31-44.10 N  
Longitude: 089-00-14.40 W  
ERP: 0.25 kW  
Channel: 239D (95.7 MHz)  
AMSL Height: 256.0 m  
Horiz. Pattern: Omni

60 dBμ F(50:50) Contour  
Total Population: 54,184  
Total Area: 158.4 sq. km

**CH234D.P**  
Beloit, WI  
Proposed Operation  
Facility ID: 155647  
Latitude: 42-33-12 N  
Longitude: 088-57-42 W  
ERP: 0.13 kW  
Channel: 234D (94.7 MHz)  
AMSL Height: 374.6 m  
Horiz. Pattern: Omni

60 dBμ F(50:50) Contour  
Total Population: 73,269  
Total Area: 440.0 sq. km

Terrain  
216 320 m

Scale 1:150,000

0 3 6 9 km

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

V-Soft Communications LLC ©

**Exhibit 2**  
**Service Contour Study:**  
**Proposed vs Primary Operations**

**Primary 54 dBu F(50:50) Contour**

**WSJY.L**  
Fort Atkinson, WI  
BLH19900817KC  
Facility ID: 24442  
Latitude: 42-48-02 N  
Longitude: 089-03-16.40 W  
ERP: 26.00 kW  
Channel: 297B (107.3 MHz)  
AMSL Height: 474.0 m  
Pattern: Omni

**WSJY.L**  
**Proposed 54 dBu F(50:50) Contour**

**CH234D.P**  
Beloit, WI  
Proposed Operation  
Facility ID: 155647  
Latitude: 42-33-12 N  
Longitude: 088-57-42 W  
ERP: 0.13 kW  
Channel: 234D (94.7 MHz)  
AMSL Height: 374.6 m  
Pattern: Omni

FCC 30 SEC Terrain Database  
US Census 2010 PL Database  
NAD 1983 Coordinate Datum

Terrain  
176 522 m

Scale 1:825,000

0 15 30 45 km

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

V-Soft Communications LLC ©

# Exhibit 3

## Copy of Existing Antenna Structure Registration

(public record copy)

### Registration Detail

Reg Number	1044696	Status	Constructed
File Number	A0748851	Constructed	01/01/1983
EMI	No	Dismantled	
NEPA	No		

### Antenna Structure

Structure Type TOWER - Free standing or Guyed Structure used for Commu

#### Location (in NAD83 Coordinates)

Lat/Long	42-33-12.0 N 088-57-42.0 W	Address	INTERSECTION OF I-90 AND ROUTE 43
City, State	BELOIT , WI		
Zip	53511	County	ROCK
Center of AM Array		Position of Tower in Array	

#### Heights (meters)

Elevation of Site Above Mean Sea Level	Overall Height Above Ground (AGL)
257.6	121.9
Overall Height Above Mean Sea Level	Overall Height Above Ground w/o Appurtenances
379.5	121.9

#### Painting and Lighting Specifications

FCC Paragraphs 1, 3, 12, 21

#### FAA Notification

FAA Study	86-AGL-464-OE	FAA Issue Date	03/12/1986
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#### Owner & Contact Information

FRN	0005803622	Owner Entity Type	
<b>Owner</b>			
COMMUNICATIONS PROPERTIES, LLC		P: (219)871-6411	
Attention To: WILLIAM L. EISELE		F:	
6745 W. Johnson Rd		E: cpladmin@indianapaging.com	
La Porte , IN 46350			
<b>Contact</b>			
Dryden , Angie		P: (219)871-6411	
6745 W. Johnson Rd		F:	
La Porte , IN 46350		E: cpladmin@indianapaging.com	

#### Last Action Status

Status	Constructed	Received	01/25/2012
Purpose	Admin Update	Entered	01/25/2012
Mode	Interactive		

#### Related Applications

01/25/2012	A0748851 - Admin Update (AU)
04/14/1998	A0052734 - New (NE)

#### Comments

##### Comments

None

#### History

##### Date

##### Event

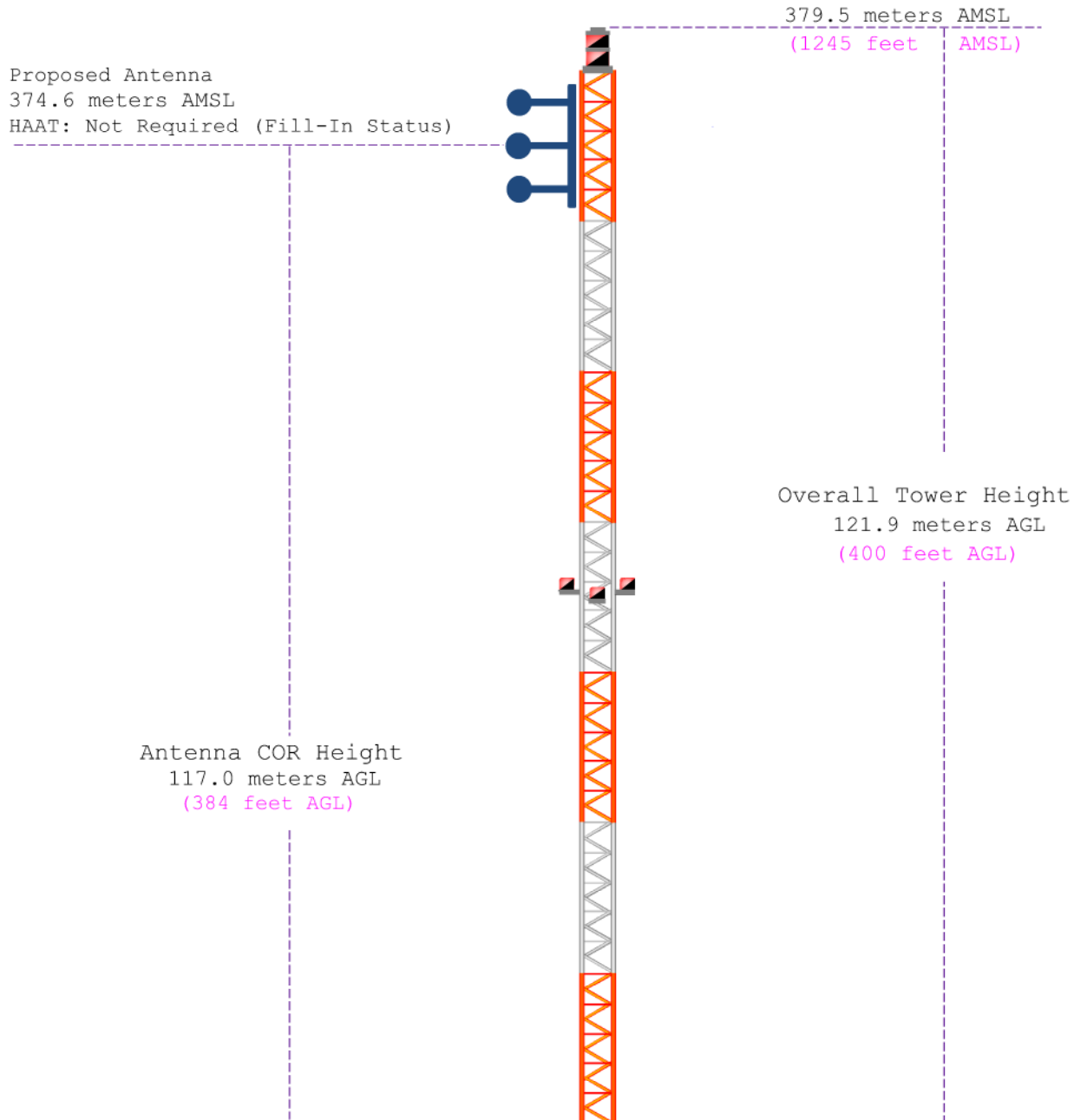
01/26/2012	Registration Printed
01/26/2012	ASR Application receipt letter sent
01/25/2012	ASR Application receipt email failed: Tower email
All History (6)	

#### Automated Letters

01/26/2012	Authorization, Reference
01/26/2012	Application Receipt, Reference 705763
01/19/2012	FRN Re-association, Reference 705182

# Exhibit 4

## Vertical Plan of Antenna System and Support Tower



Ground Elevation: 257.6 meters AMSL (845 feet AMSL)		
Address: Intersection of I-90 and Route 43		
City: Beloit	Latitude (D M S) Longitude (D M S)	
County: Rock	--- (NAD 1927)	
State: Wisconsin	Lat/Long 42-33-12.0 N 088-57-42.0 W (NAD 1983)	
Antenna Structure Registration 1044696	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. = 423312.0    W. Lng. = 885742.0  
 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	258.3	116.3	0.1300	-8.86	1.000	11.80
030	273.5	101.1	0.1300	-8.86	1.000	11.04
060	268.4	106.2	0.1300	-8.86	1.000	11.31
090	286.2	88.4	0.1300	-8.86	1.000	10.36
120	284.1	90.5	0.1300	-8.86	1.000	10.48
150	274.9	99.7	0.1300	-8.86	1.000	10.97
180	250.8	123.8	0.1300	-8.86	1.000	12.14
210	229.6	145.0	0.1300	-8.86	1.000	13.15
240	236.8	137.8	0.1300	-8.86	1.000	12.80
270	252.0	122.6	0.1300	-8.86	1.000	12.08
300	233.8	140.8	0.1300	-8.86	1.000	12.95
330	242.9	131.7	0.1300	-8.86	1.000	12.51

Ave El= 257.62 M    HAAT= 116.98 M    AMSL= 374.6

#### **NAD 1983 to NAD 1927 Conversion:**

#### **Various Coordinate Conversion Calculations (NAD 1983):**

<b>Position Type</b>	Lat Lon
<b>Degrees Lat Long</b>	42.55333333°, -088.96166667°
<b>Degrees Minutes</b>	42°33.20000', -088°57.70000'
<b>Degrees Minutes Seconds</b>	42°33'12.0000", -088°57'42.0000"
<b>UTM</b>	16T 338951mE 4713080mN
<b>UTM centimeter</b>	16T 338951.74mE 4713080.00mN
<b>MGRS</b>	16TCN3895113080
<b>Grid North</b>	-1.3°
<b>GARS</b>	183MB37
<b>Maidenhead</b>	EN52MN42OT31
<b>GEOREF</b>	GJBN02303320

# **Exhibit 6**

## **Tabulation of Proposed Allocation**

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

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(s) 8(a-b)**.

REFERENCE		CH# 234D - 94.7 MHz, Pwr= 0.13 kW, HAAT= 117.0 M, COR= 374.6 M							DISPLAY DATES		
42 33 12.00 N.		Average Protected F(50-50)= 11.83 km							DATA 05-25-21		
88 57 42.00 W.		Omni-directional							SEARCH 05-25-21		
CH	CALL	TYPE	ANT	AZI	DIST	LAT	PWR (kW)	INT (km)	PRO (km)	*IN*	*OUT*
CITY		STATE		<--	FILE #	LNG	HAAT (M)	COR (M)	LICENSEE	(Overlap in km)	
231B	WJJO	LIC_CN		351.7	56.80	43 03 32.00	50.000	6.0	65.3	38.8	-10.1*
Watertown		WI		171.6	BMLH20160921AAN	89 03 45.40	150	416	Mid-West Management, Inc.		
234B	WLS-FM	LIC_CN		124.0	132.45	41 52 44.00	4.400	127.3	65.7	-5.5	15.8
Chicago		IL		304.9	0000140705	87 38 08.00	468	649	Radio License Holdings LLC		
235B	WOLX-FM	LIC_CN		330.2	112.34	43 25 39.90	37.000	102.3	84.0	-2.5	1.6
Baraboo		WI		149.7	BLH4952	89 39 14.40	396	686	Entercom License, LLC		
233D	W233AD	LIC_CN		196.0	33.18	42 15 59.10	0.038	10.0	6.9	10.2	6.7
Rockford		IL		16.0	BLFT20190703ADR	89 04 23.40		293	Family Stations, Inc.		
237A	WRTB	LIC_CN		209.7	33.61	42 17 26.10	1.250	2.0	24.1	18.5	8.7
Winnebago		IL		29.6	BLH19850108LQ	89 09 51.40	156	400	Long Nine, Inc.		
237A	WRTB	APP_CN		211.1	33.29	42 17 48.30	3.000	2.2	23.1	17.9	9.2
Winnebago		IL		31.0	0000146554	89 10 15.00	100	341	Long Nine, Inc.		
237A	WRTB	APP_CN		211.1	33.29	42 17 48.30	3.000	2.2	23.1	17.9	9.2
Winnebago		IL		31.0	0000146554	89 10 15.00	100	341	Long Nine, Inc.		
233B	WTKI	LIC_CN		54.9	105.09	43 05 29.00	14.000	76.2	64.9	17.6	16.2
Milwaukee		WI		235.7	BLH19991020ABM	87 54 07.30	291	498	Good Karma Brands Milwaukee		
235A	WDKB	LIC_CN		175.4	67.38	41 56 57.10	3.000	37.9	25.0	17.4	24.6
Dekalb		IL		355.4	BLH19980109KC	88 53 44.30	100	361	Long Nine, Inc.		
236B	WIIL	LIC_CN		89.7	87.44	42 33 10.10	50.000	5.1	58.4	72.0	27.4
Union Grove		WI		270.4	BLH20100402ACK	87 53 38.30	117	326	Alpha Media Licensee LLC D		
234A	KMCN	LIC_CN		235.9	126.22	41 54 34.10	3.000	79.7	26.5	33.5	56.2
Clinton		IA		55.0	BLH19980909KD	90 13 28.50	100	307	Gendreau Broadcast LLC		
233D	W233CN	LIC_CN		326.0	63.30	43 01 29.00	0.250	10.4	7.3	40.2	36.0
Madison		WI		145.7	BLFT20171010AED	89 23 48.40		320	Mid-West Management Inc.,		

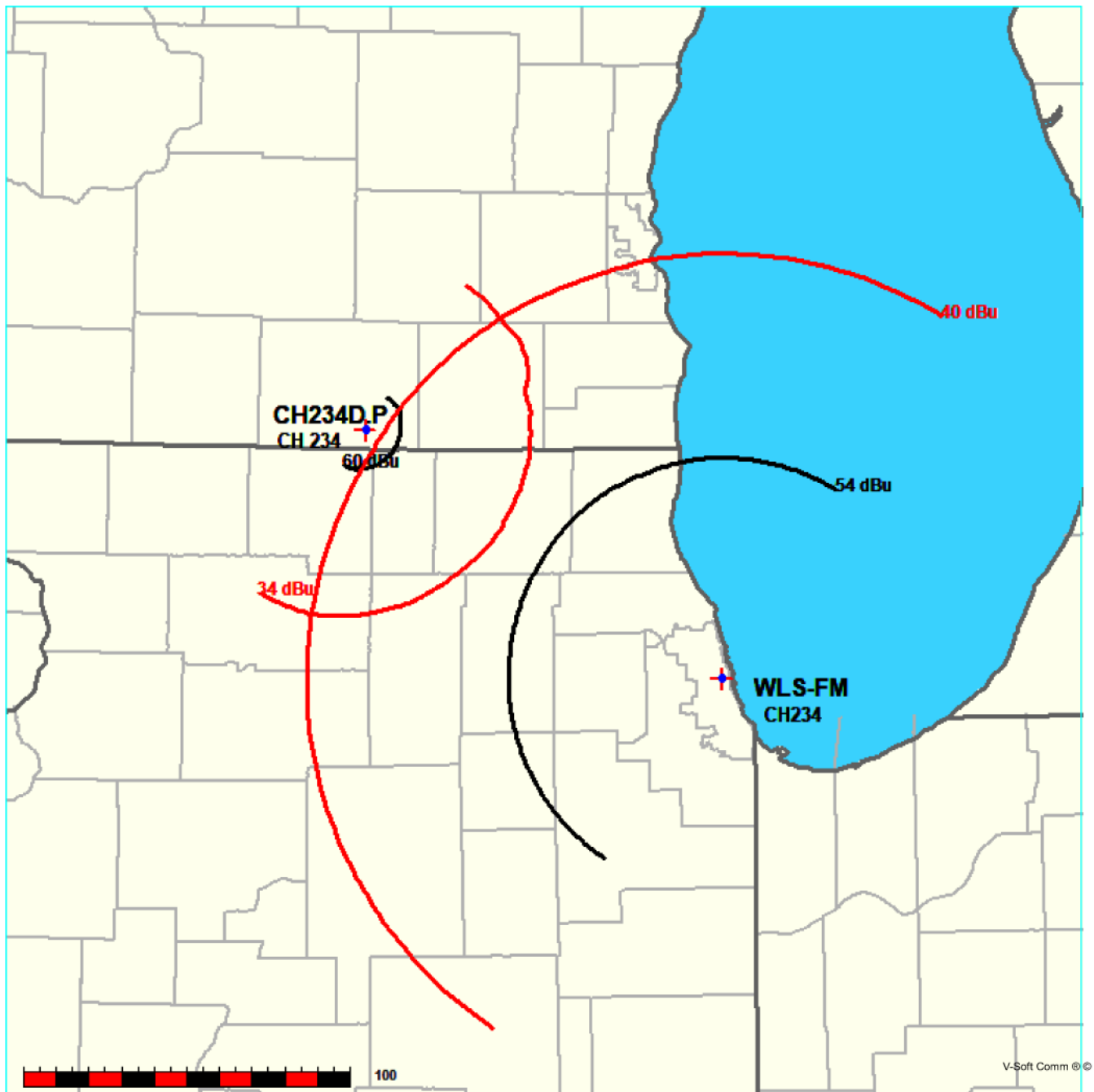
Terrain database is FCC NGDC 30 Sec , R= 73.215 qualifying spacings or FCC minimum Spacings in KM, M= Margin in KM  
In & Out distances between contours are shown at closest points. Reference zone= East Zone, Co to 3rd adjacent.  
All separation margins (if shown) include rounding.  
Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, \_= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)  
\*\*\*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 - 05-25-2021 - FCC NGDC 30 Sec  
CH234D.P's Overlaps (In= -5.53 km, Out= 15.76 km)

CH234D.P CH 234 D  
Lat= 42 33 12.00, Lng= 88 57 42.00  
0.13 kW 117 m HAAT, 374.6 m COR  
Prot.= 60 dBu, Intef.= 34 dBu

WLS-FM CH 234 B 0000140705  
Lat= 41 52 44.00, Lng= 87 38 08.00  
4.4 kW 468 m HAAT, 649 m COR  
Prot.= 54 dBu, Intef.= 40 dBu



# ***Exhibit 7a***

## **Contour Protection Studies Toward Select Allocation Concern(s)**

05-25-2021      Terrain Data: FCC NGDC 30 Sec      FMOver Analysis

CH234D.P

WLS-FM 0000140705

Channel = 234D  
 Max ERP = 0.13 kW  
 RCAMSL = 374.6 m  
 N. Lat. 42 33 12.00  
 W. Lng. 88 57 42.00  
 Protected  
 60 dBu

Channel = 234B  
 Max ERP = 4.4 kW  
 RCAMSL = 649 m  
 N. Lat. 41 52 44.00  
 W. Lng. 87 38 08.00  
 Interfering  
 40 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
085.0	000.1300	0089.4	010.4	307.9	004.4000	0465.9	124.5	40.75*	2.95
086.0	000.1300	0088.4	010.4	307.9	004.4000	0465.9	124.5	40.76*	3.02
087.0	000.1300	0087.3	010.3	307.8	004.4000	0465.8	124.4	40.78*	3.09
088.0	000.1300	0086.8	010.3	307.7	004.4000	0465.8	124.3	40.80*	3.17
089.0	000.1300	0087.6	010.3	307.7	004.4000	0465.7	124.2	40.84*	3.32
090.0	000.1300	0088.4	010.4	307.6	004.4000	0465.7	124.0	40.87*	3.46
091.0	000.1300	0089.1	010.4	307.5	004.4000	0465.7	123.9	40.91*	3.60
092.0	000.1300	0089.1	010.4	307.5	004.4000	0465.6	123.8	40.94*	3.70
093.0	000.1300	0088.6	010.4	307.4	004.4000	0465.6	123.7	40.95*	3.77
094.0	000.1300	0088.2	010.4	307.3	004.4000	0465.6	123.6	40.97*	3.84
095.0	000.1300	0088.1	010.3	307.3	004.4000	0465.5	123.5	40.99*	3.93
096.0	000.1300	0088.4	010.4	307.2	004.4000	0465.5	123.4	41.02*	4.03
097.0	000.1300	0089.0	010.4	307.1	004.4000	0465.5	123.3	41.05*	4.15
098.0	000.1300	0089.7	010.4	307.1	004.4000	0465.4	123.2	41.08*	4.27
099.0	000.1300	0090.4	010.5	307.0	004.4000	0465.4	123.0	41.11*	4.38
100.0	000.1300	0091.0	010.5	306.9	004.4000	0465.3	122.9	41.13*	4.49
101.0	000.1300	0090.7	010.5	306.8	004.4000	0465.3	122.9	41.15*	4.55
102.0	000.1300	0090.2	010.5	306.8	004.4000	0465.3	122.8	41.16*	4.59
103.0	000.1300	0089.6	010.4	306.7	004.4000	0465.2	122.8	41.17*	4.63
104.0	000.1300	0089.1	010.4	306.6	004.4000	0465.2	122.7	41.18*	4.67
105.0	000.1300	0089.0	010.4	306.5	004.4000	0465.1	122.7	41.20*	4.72
106.0	000.1300	0089.2	010.4	306.4	004.4000	0465.1	122.6	41.21*	4.79
107.0	000.1300	0089.4	010.4	306.3	004.4000	0465.1	122.5	41.23*	4.86
108.0	000.1300	0089.6	010.4	306.3	004.4000	0465.0	122.5	41.25*	4.92
109.0	000.1300	0089.8	010.4	306.2	004.4000	0465.0	122.4	41.26*	4.98
110.0	000.1300	0089.9	010.4	306.1	004.4000	0465.0	122.3	41.27*	5.03
111.0	000.1300	0090.1	010.5	306.0	004.4000	0464.9	122.3	41.29*	5.08
112.0	000.1300	0090.2	010.5	305.9	004.4000	0464.9	122.2	41.30*	5.12
113.0	000.1300	0090.2	010.5	305.9	004.4000	0464.8	122.2	41.31*	5.16
114.0	000.1300	0090.1	010.5	305.8	004.4000	0464.8	122.2	41.31*	5.19

***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)	
115.0	000.1300	0090.0	010.5	305.7	004.4000	0464.8	122.1	41.32*	5.21
116.0	000.1300	0090.1	010.5	305.6	004.4000	0464.7	122.1	41.33*	5.24
117.0	000.1300	0090.2	010.5	305.5	004.4000	0464.7	122.1	41.33*	5.27
118.0	000.1300	0090.3	010.5	305.4	004.4000	0464.7	122.1	41.34*	5.30
119.0	000.1300	0090.4	010.5	305.4	004.4000	0464.7	122.0	41.35*	5.32
120.0	000.1300	0090.5	010.5	305.3	004.4000	0464.6	122.0	41.35*	5.34
121.0	000.1300	0090.7	010.5	305.2	004.4000	0464.6	122.0	41.36*	5.36
122.0	000.1300	0091.1	010.5	305.1	004.4000	0464.6	122.0	41.36*	5.38
123.0	000.1300	0091.5	010.5	305.0	004.4000	0464.5	121.9	41.37*	5.41
124.0	000.1300	0092.1	010.6	304.9	004.4000	0464.5	121.9	41.38*	5.44
125.0	000.1300	0092.6	010.6	304.8	004.4000	0464.5	121.9	41.38*	5.46
126.0	000.1300	0093.2	010.6	304.8	004.4000	0464.5	121.8	41.39*	5.49
127.0	000.1300	0093.6	010.7	304.7	004.4000	0464.4	121.8	41.39*	5.50
128.0	000.1300	0094.1	010.7	304.6	004.4000	0464.4	121.8	41.40*	5.51
129.0	000.1300	0094.7	010.7	304.5	004.4000	0464.4	121.8	41.40*	5.52
130.0	000.1300	0095.3	010.7	304.4	004.4000	0464.4	121.8	41.40*	5.53
131.0	000.1300	0095.6	010.8	304.3	004.4000	0464.3	121.8	41.40*	5.53
132.0	000.1300	0095.9	010.8	304.2	004.4000	0464.3	121.8	41.40*	5.51
133.0	000.1300	0096.0	010.8	304.1	004.4000	0464.3	121.8	41.39*	5.49
134.0	000.1300	0096.0	010.8	304.0	004.4000	0464.3	121.9	41.38*	5.45
135.0	000.1300	0095.9	010.8	304.0	004.4000	0464.3	121.9	41.37*	5.41
136.0	000.1300	0095.8	010.8	303.9	004.4000	0464.3	121.9	41.36*	5.36
137.0	000.1300	0095.8	010.8	303.8	004.4000	0464.2	122.0	41.34*	5.31
138.0	000.1300	0095.9	010.8	303.7	004.4000	0464.2	122.0	41.33*	5.27
139.0	000.1300	0096.0	010.8	303.6	004.4000	0464.2	122.1	41.32*	5.22
140.0	000.1300	0096.1	010.8	303.5	004.4000	0464.2	122.1	41.31*	5.17
141.0	000.1300	0096.2	010.8	303.4	004.4000	0464.2	122.2	41.29*	5.11
142.0	000.1300	0096.4	010.8	303.4	004.4000	0464.1	122.2	41.28*	5.06
143.0	000.1300	0096.6	010.8	303.3	004.4000	0464.1	122.3	41.27*	5.00
144.0	000.1300	0096.9	010.8	303.2	004.4000	0464.1	122.3	41.25*	4.95
145.0	000.1300	0097.4	010.9	303.1	004.4000	0464.1	122.4	41.24*	4.89
146.0	000.1300	0097.8	010.9	303.0	004.4000	0464.1	122.4	41.23*	4.84
147.0	000.1300	0098.3	010.9	302.9	004.4000	0464.1	122.5	41.21*	4.78
148.0	000.1300	0098.7	010.9	302.8	004.4000	0464.0	122.6	41.19*	4.72
149.0	000.1300	0099.1	010.9	302.8	004.4000	0464.0	122.6	41.18*	4.65
150.0	000.1300	0099.6	011.0	302.7	004.4000	0464.0	122.7	41.16*	4.58
151.0	000.1300	0100.3	011.0	302.6	004.4000	0464.0	122.8	41.14*	4.52
152.0	000.1300	0100.9	011.0	302.5	004.4000	0464.0	122.8	41.13*	4.45
153.0	000.1300	0101.4	011.1	302.4	004.4000	0464.0	122.9	41.11*	4.37
154.0	000.1300	0101.9	011.1	302.3	004.4000	0463.9	123.0	41.08*	4.29
155.0	000.1300	0102.4	011.1	302.3	004.4000	0463.9	123.1	41.06*	4.20
156.0	000.1300	0102.9	011.1	302.2	004.4000	0463.9	123.2	41.04*	4.11
157.0	000.1300	0103.6	011.2	302.1	004.4000	0463.9	123.2	41.02*	4.03
158.0	000.1300	0104.6	011.2	302.0	004.4000	0463.9	123.3	41.00*	3.95

# ***Exhibit 7a***

## **Contour Protection Studies Toward Select Allocation Concern(s)**

05-25-2021      Terrain Data: FCC NGDC 30 Sec      FMOver Analysis

WLS-FM    0000140705

CH234D.P

Channel = 234B  
 Max ERP = 4.4 kW  
 RCAMSL = 649 m  
 N. Lat. 41 52 44.00  
 W. Lng. 87 38 08.00  
 Protected  
     54 dBu

Channel = 234D  
 Max ERP = 0.13 kW  
 RCAMSL = 374.6 m  
 N. Lat. 42 33 12.00  
 W. Lng. 88 57 42.00  
 Interfering  
     34 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
260.0	004.4000	0468.6	065.9	152.5	000.1300	0101.2	097.6	20.55	
261.0	004.4000	0468.5	065.9	152.3	000.1300	0101.1	096.5	20.82	
262.0	004.4000	0468.5	065.9	152.1	000.1300	0100.9	095.4	21.08	
263.0	004.4000	0468.5	065.9	151.9	000.1300	0100.8	094.3	21.35	
264.0	004.4000	0468.2	065.9	151.6	000.1300	0100.7	093.2	21.62	
265.0	004.4000	0467.8	065.9	151.3	000.1300	0100.5	092.2	21.88	
266.0	004.4000	0467.1	065.8	151.0	000.1300	0100.3	091.2	22.15	
267.0	004.4000	0466.5	065.8	150.7	000.1300	0100.1	090.1	22.42	
268.0	004.4000	0465.9	065.8	150.3	000.1300	0099.8	089.1	22.68	
269.0	004.4000	0465.6	065.7	150.0	000.1300	0099.6	088.1	22.94	
270.0	004.4000	0465.4	065.7	149.6	000.1300	0099.4	087.1	23.21	
271.0	004.4000	0465.1	065.7	149.2	000.1300	0099.2	086.1	23.47	
272.0	004.4000	0464.9	065.7	148.8	000.1300	0099.0	085.2	23.73	
273.0	004.4000	0464.8	065.7	148.4	000.1300	0098.9	084.2	23.98	
274.0	004.4000	0464.8	065.7	147.9	000.1300	0098.7	083.3	24.24	
275.0	004.4000	0464.8	065.7	147.5	000.1300	0098.5	082.3	24.49	
276.0	004.4000	0464.8	065.7	147.0	000.1300	0098.3	081.4	24.73	
277.0	004.4000	0464.8	065.7	146.5	000.1300	0098.1	080.5	24.97	
278.0	004.4000	0464.8	065.7	146.0	000.1300	0097.8	079.7	25.20	
279.0	004.4000	0464.7	065.7	145.4	000.1300	0097.5	078.8	25.42	
280.0	004.4000	0464.7	065.7	144.8	000.1300	0097.3	078.0	25.64	
281.0	004.4000	0464.7	065.7	144.2	000.1300	0097.0	077.2	25.86	
282.0	004.4000	0464.7	065.7	143.6	000.1300	0096.8	076.4	26.06	
283.0	004.4000	0464.6	065.7	142.9	000.1300	0096.6	075.6	26.27	
284.0	004.4000	0464.5	065.7	142.3	000.1300	0096.4	074.9	26.47	
285.0	004.4000	0464.4	065.7	141.6	000.1300	0096.3	074.2	26.66	
286.0	004.4000	0464.5	065.7	140.9	000.1300	0096.2	073.5	26.85	
287.0	004.4000	0464.5	065.7	140.1	000.1300	0096.2	072.8	27.04	
288.0	004.4000	0464.4	065.7	139.4	000.1300	0096.1	072.2	27.21	

## ***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)
289.0	004.4000	0464.1	065.6	138.6	000.1300	0096.0	071.6	27.38
290.0	004.4000	0463.7	065.6	137.8	000.1300	0095.9	071.1	27.53
291.0	004.4000	0463.4	065.6	136.9	000.1300	0095.8	070.6	27.67
292.0	004.4000	0463.2	065.6	136.1	000.1300	0095.8	070.1	27.81
293.0	004.4000	0463.2	065.6	135.2	000.1300	0095.9	069.6	27.95
294.0	004.4000	0463.3	065.6	134.4	000.1300	0095.9	069.2	28.09
295.0	004.4000	0463.5	065.6	133.5	000.1300	0096.0	068.8	28.21
296.0	004.4000	0463.7	065.6	132.6	000.1300	0096.0	068.4	28.32
297.0	004.4000	0463.8	065.6	131.7	000.1300	0095.9	068.1	28.41
298.0	004.4000	0463.8	065.6	130.7	000.1300	0095.5	067.8	28.48
299.0	004.4000	0463.7	065.6	129.8	000.1300	0095.1	067.5	28.52
300.0	004.4000	0463.7	065.6	128.8	000.1300	0094.6	067.3	28.55
301.0	004.4000	0463.7	065.6	127.9	000.1300	0094.0	067.2	28.57
302.0	004.4000	0463.9	065.6	126.9	000.1300	0093.6	067.0	28.59
303.0	004.4000	0464.1	065.6	125.9	000.1300	0093.1	066.9	28.59
304.0	004.4000	0464.3	065.6	124.9	000.1300	0092.6	066.8	28.58
305.0	004.4000	0464.5	065.7	124.0	000.1300	0092.1	066.8	28.56
306.0	004.4000	0464.9	065.7	123.0	000.1300	0091.5	066.8	28.52
307.0	004.4000	0465.4	065.7	122.0	000.1300	0091.0	066.8	28.49
308.0	004.4000	0465.9	065.8	121.0	000.1300	0090.7	066.9	28.45
309.0	004.4000	0466.4	065.8	120.0	000.1300	0090.5	067.0	28.41
310.0	004.4000	0466.9	065.8	119.1	000.1300	0090.4	067.1	28.35
311.0	004.4000	0467.2	065.8	118.1	000.1300	0090.3	067.3	28.29
312.0	004.4000	0467.4	065.9	117.1	000.1300	0090.2	067.6	28.21
313.0	004.4000	0467.7	065.9	116.2	000.1300	0090.1	067.9	28.12
314.0	004.4000	0468.0	065.9	115.3	000.1300	0090.0	068.2	28.03
315.0	004.4000	0468.3	065.9	114.3	000.1300	0090.0	068.5	27.93
316.0	004.4000	0468.7	065.9	113.4	000.1300	0090.1	068.9	27.82
317.0	004.4000	0468.9	066.0	112.6	000.1300	0090.2	069.3	27.70
318.0	004.4000	0469.0	066.0	111.7	000.1300	0090.1	069.8	27.56
319.0	004.4000	0469.0	066.0	110.8	000.1300	0090.1	070.3	27.41
320.0	004.4000	0469.0	066.0	110.0	000.1300	0089.9	070.9	27.25
321.0	004.4000	0469.0	066.0	109.2	000.1300	0089.8	071.4	27.08
322.0	004.4000	0468.9	066.0	108.4	000.1300	0089.7	072.1	26.90
323.0	004.4000	0468.8	066.0	107.7	000.1300	0089.6	072.7	26.71
324.0	004.4000	0468.6	065.9	107.0	000.1300	0089.4	073.4	26.51
325.0	004.4000	0468.4	065.9	106.2	000.1300	0089.2	074.1	26.30
326.0	004.4000	0468.6	065.9	105.5	000.1300	0089.1	074.8	26.10
327.0	004.4000	0468.9	066.0	104.9	000.1300	0089.0	075.5	25.89
328.0	004.4000	0469.0	066.0	104.2	000.1300	0089.0	076.3	25.68
329.0	004.4000	0468.9	066.0	103.6	000.1300	0089.3	077.1	25.47
330.0	004.4000	0468.8	066.0	103.0	000.1300	0089.6	077.9	25.26
331.0	004.4000	0468.6	065.9	102.4	000.1300	0090.0	078.8	25.05
332.0	004.4000	0468.2	065.9	101.9	000.1300	0090.2	079.6	24.82

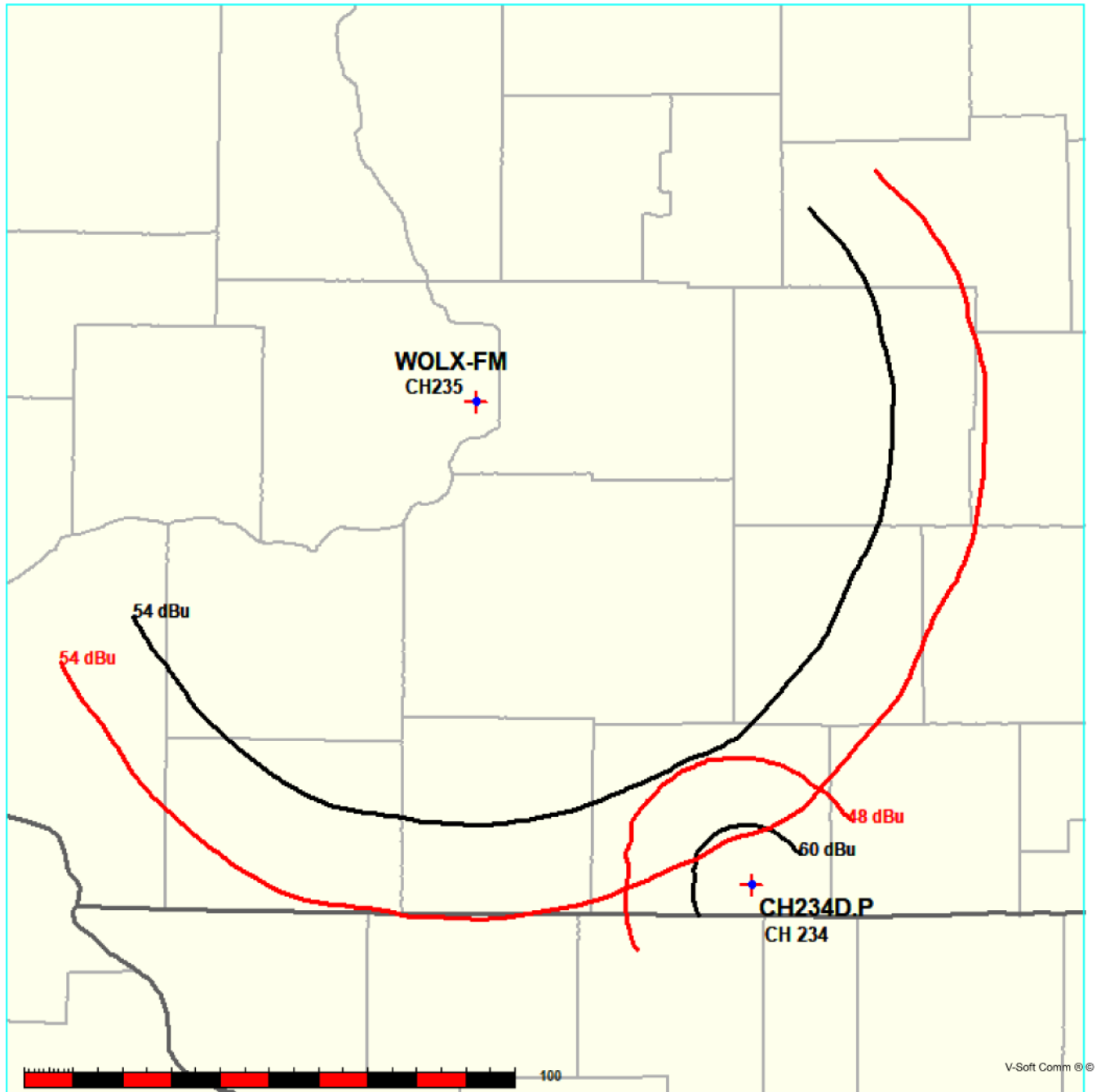
## *Exhibit 7b*

### *Contour Protection Studies Toward Select Allocation Concern(s)*

FMCommander Single Allocation Study - 05-25-2021 - FCC NGDC 30 Sec  
CH234D.P's Overlaps (In= -2.51 km, Out= 1.6 km)

CH234D.P CH 234 D  
Lat= 42 33 12.00, Lng= 88 57 42.00  
0.13 kW 117 m HAAT, 374.6 m COR  
Prot.= 60 dBu, Intef.= 48 dBu

WOLX-FM CH 235 B BLH4952  
Lat= 43 25 39.90, Lng= 89 39 14.40  
37.0 kW 396 m HAAT, 686 m COR  
Prot.= 54 dBu, Intef.= 54 dBu



## Exhibit 7b

### Contour Protection Studies Toward Select Allocation Concern(s)

05-25-2021

Terrain Data: FCC NGDC 30 Sec

FMOver Analysis

CH234D.P

WOLX-FM BLH4952

Channel = 234D

Max ERP = 0.13 kW

RCAMSL = 374.6 m

N. Lat. 42 33 12.00

W. Lng. 88 57 42.00

Protected

60 dBu

Channel = 235B

Max ERP = 37 kW

RCAMSL = 686 m

N. Lat. 43 25 39.90

W. Lng. 89 39 14.40

Interfering

54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
290.0	000.1300	0129.2	012.4	154.1	037.0000	0405.8	103.2	53.81	
291.0	000.1300	0130.3	012.4	154.1	037.0000	0405.8	103.0	53.86	
292.0	000.1300	0132.3	012.5	154.0	037.0000	0405.8	102.8	53.92	
293.0	000.1300	0134.9	012.7	154.0	037.0000	0405.8	102.5	53.99	
294.0	000.1300	0137.5	012.8	153.9	037.0000	0405.9	102.3	54.06*	0.21
295.0	000.1300	0139.5	012.9	153.9	037.0000	0405.9	102.1	54.12*	0.43
296.0	000.1300	0140.8	012.9	153.8	037.0000	0405.9	101.9	54.17*	0.62
297.0	000.1300	0141.5	013.0	153.7	037.0000	0405.9	101.7	54.21*	0.78
298.0	000.1300	0141.6	013.0	153.6	037.0000	0405.9	101.6	54.25*	0.92
299.0	000.1300	0141.3	013.0	153.5	037.0000	0405.9	101.5	54.29*	1.04
300.0	000.1300	0140.8	012.9	153.4	037.0000	0405.9	101.4	54.31*	1.15
301.0	000.1300	0140.3	012.9	153.3	037.0000	0405.8	101.3	54.34*	1.25
302.0	000.1300	0140.0	012.9	153.1	037.0000	0405.8	101.1	54.37*	1.35
303.0	000.1300	0139.7	012.9	153.0	037.0000	0405.7	101.0	54.40*	1.45
304.0	000.1300	0139.4	012.9	152.9	037.0000	0405.7	100.9	54.42*	1.54
305.0	000.1300	0138.8	012.8	152.8	037.0000	0405.6	100.9	54.44*	1.61
306.0	000.1300	0137.8	012.8	152.7	037.0000	0405.5	100.8	54.46*	1.67
307.0	000.1300	0136.7	012.7	152.5	037.0000	0405.4	100.7	54.47*	1.71
308.0	000.1300	0135.7	012.7	152.4	037.0000	0405.3	100.7	54.48*	1.75
309.0	000.1300	0135.0	012.7	152.3	037.0000	0405.2	100.6	54.49*	1.79
310.0	000.1300	0134.5	012.6	152.2	037.0000	0405.1	100.6	54.51*	1.85
311.0	000.1300	0134.4	012.6	152.1	037.0000	0405.0	100.5	54.53*	1.91
312.0	000.1300	0134.5	012.6	151.9	037.0000	0404.9	100.4	54.55*	1.98
313.0	000.1300	0134.8	012.7	151.8	037.0000	0404.7	100.3	54.57*	2.06
314.0	000.1300	0135.4	012.7	151.7	037.0000	0404.6	100.2	54.59*	2.15
315.0	000.1300	0135.9	012.7	151.6	037.0000	0404.5	100.1	54.61*	2.22
316.0	000.1300	0135.8	012.7	151.5	037.0000	0404.4	100.1	54.63*	2.27
317.0	000.1300	0135.3	012.7	151.3	037.0000	0404.2	100.0	54.63*	2.29
318.0	000.1300	0134.7	012.7	151.2	037.0000	0404.1	100.0	54.64*	2.31
319.0	000.1300	0134.2	012.6	151.1	037.0000	0404.0	100.0	54.64*	2.32
320.0	000.1300	0133.8	012.6	151.0	037.0000	0403.9	100.0	54.64*	2.34

## 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)
321.0	000.1300	0133.5	012.6	150.8	037.0000	0403.9	099.9	54.65* 2.36
322.0	000.1300	0133.4	012.6	150.7	037.0000	0403.8	099.9	54.66* 2.38
323.0	000.1300	0133.5	012.6	150.6	037.0000	0403.8	099.9	54.67* 2.41
324.0	000.1300	0133.7	012.6	150.5	037.0000	0403.8	099.8	54.68* 2.45
325.0	000.1300	0133.9	012.6	150.3	037.0000	0403.8	099.8	54.69* 2.49
326.0	000.1300	0133.8	012.6	150.2	037.0000	0403.8	099.8	54.69* 2.51
327.0	000.1300	0133.2	012.6	150.1	037.0000	0403.9	099.8	54.69* 2.50
328.0	000.1300	0132.6	012.5	150.0	037.0000	0404.0	099.8	54.69* 2.49
329.0	000.1300	0132.1	012.5	149.8	037.0000	0404.1	099.8	54.69* 2.49
330.0	000.1300	0131.7	012.5	149.7	037.0000	0404.3	099.8	54.69* 2.49
331.0	000.1300	0130.9	012.5	149.6	037.0000	0404.4	099.9	54.68* 2.47
332.0	000.1300	0129.9	012.4	149.5	037.0000	0404.6	099.9	54.67* 2.44
333.0	000.1300	0129.3	012.4	149.3	037.0000	0404.8	100.0	54.67* 2.43
334.0	000.1300	0128.9	012.4	149.2	037.0000	0405.1	100.0	54.67* 2.43
335.0	000.1300	0128.8	012.4	149.1	037.0000	0405.5	100.0	54.67* 2.44
336.0	000.1300	0128.7	012.4	149.0	037.0000	0405.8	100.0	54.68* 2.45
337.0	000.1300	0128.6	012.4	148.8	037.0000	0406.2	100.1	54.68* 2.46
338.0	000.1300	0128.6	012.4	148.7	037.0000	0406.6	100.1	54.68* 2.48
339.0	000.1300	0128.8	012.4	148.6	037.0000	0407.0	100.1	54.69* 2.50
340.0	000.1300	0128.8	012.4	148.5	037.0000	0407.5	100.2	54.69* 2.50
341.0	000.1300	0127.7	012.3	148.4	037.0000	0408.0	100.3	54.68* 2.47
342.0	000.1300	0126.0	012.2	148.3	037.0000	0408.5	100.4	54.66* 2.40
343.0	000.1300	0124.4	012.2	148.1	037.0000	0409.0	100.5	54.64* 2.33
344.0	000.1300	0123.3	012.1	148.0	037.0000	0409.5	100.6	54.63* 2.29
345.0	000.1300	0123.0	012.1	147.9	037.0000	0410.1	100.7	54.63* 2.28
346.0	000.1300	0122.9	012.1	147.8	037.0000	0410.7	100.8	54.63* 2.27
347.0	000.1300	0122.3	012.1	147.7	037.0000	0411.3	100.8	54.62* 2.25
348.0	000.1300	0121.3	012.0	147.6	037.0000	0411.8	101.0	54.60* 2.20
349.0	000.1300	0120.3	012.0	147.5	037.0000	0412.4	101.1	54.59* 2.15
350.0	000.1300	0119.6	011.9	147.4	037.0000	0413.0	101.2	54.58* 2.10
351.0	000.1300	0119.1	011.9	147.3	037.0000	0413.7	101.3	54.57* 2.07
352.0	000.1300	0118.8	011.9	147.2	037.0000	0414.3	101.4	54.56* 2.04
353.0	000.1300	0118.9	011.9	147.1	037.0000	0414.9	101.5	54.56* 2.02
354.0	000.1300	0118.6	011.9	147.0	037.0000	0415.4	101.6	54.54* 1.98
355.0	000.1300	0118.2	011.9	146.9	037.0000	0416.0	101.7	54.53* 1.93
356.0	000.1300	0118.0	011.9	146.8	037.0000	0416.5	101.8	54.52* 1.88
357.0	000.1300	0117.9	011.9	146.7	037.0000	0417.1	101.9	54.50* 1.83
358.0	000.1300	0117.7	011.9	146.6	037.0000	0417.6	102.0	54.49* 1.78
359.0	000.1300	0117.0	011.8	146.5	037.0000	0418.1	102.1	54.47* 1.70
000.0	000.1300	0116.3	011.8	146.4	037.0000	0418.5	102.3	54.44* 1.60
001.0	000.1300	0115.5	011.8	146.3	037.0000	0419.0	102.4	54.41* 1.51
002.0	000.1300	0115.3	011.8	146.2	037.0000	0419.5	102.5	54.39* 1.43
003.0	000.1300	0115.1	011.7	146.1	037.0000	0419.9	102.7	54.37* 1.35
004.0	000.1300	0114.8	011.7	146.0	037.0000	0420.3	102.8	54.35* 1.27
005.0	000.1300	0114.1	011.7	146.0	037.0000	0420.7	103.0	54.32* 1.16

# ***Exhibit 7b***

## **Contour Protection Studies Toward Select Allocation Concern(s)**

05-25-2021      Terrain Data: FCC NGDC 30 Sec      FMOver Analysis

WOLX-FM    BLH4952

CH234D.P

Channel = 235B  
 Max ERP = 37 kW  
 RCAMSL = 686 m  
 N. Lat. 43 25 39.90  
 W. Lng. 89 39 14.40  
 Protected  
     54   dBu

Channel = 234D  
 Max ERP = 0.13 kW  
 RCAMSL = 374.6 m  
 N. Lat. 42 33 12.00  
 W. Lng. 88 57 42.00  
 Interfering  
     48   dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
105.0	037.0000	0426.6	085.5	019.6	000.1300	0106.2	079.2	25.75	
106.0	037.0000	0426.2	085.5	019.6	000.1300	0106.2	077.7	26.17	
107.0	037.0000	0425.5	085.5	019.6	000.1300	0106.2	076.2	26.60	
108.0	037.0000	0424.6	085.4	019.6	000.1300	0106.2	074.7	27.03	
109.0	037.0000	0423.5	085.3	019.6	000.1300	0106.2	073.2	27.47	
110.0	037.0000	0421.2	085.2	019.4	000.1300	0106.2	071.8	27.91	
111.0	037.0000	0417.8	084.9	019.2	000.1300	0106.3	070.3	28.35	
112.0	037.0000	0414.1	084.7	018.9	000.1300	0106.4	068.8	28.79	
113.0	037.0000	0411.5	084.5	018.7	000.1300	0106.5	067.4	29.24	
114.0	037.0000	0409.8	084.3	018.5	000.1300	0106.6	065.9	29.70	
115.0	037.0000	0409.2	084.3	018.3	000.1300	0106.7	064.4	30.16	
116.0	037.0000	0409.8	084.3	018.1	000.1300	0106.8	063.0	30.63	
117.0	037.0000	0411.4	084.5	018.0	000.1300	0106.9	061.5	31.13	
118.0	037.0000	0413.4	084.6	017.9	000.1300	0107.0	060.0	31.66	
119.0	037.0000	0415.1	084.7	017.8	000.1300	0107.1	058.6	32.20	
120.0	037.0000	0416.4	084.8	017.5	000.1300	0107.3	057.1	32.76	
121.0	037.0000	0418.4	085.0	017.3	000.1300	0107.6	055.6	33.33	
122.0	037.0000	0421.1	085.2	017.1	000.1300	0107.8	054.1	33.92	
123.0	037.0000	0423.6	085.3	016.9	000.1300	0108.1	052.6	34.51	
124.0	037.0000	0425.2	085.4	016.5	000.1300	0108.6	051.2	35.10	
125.0	037.0000	0425.3	085.4	016.0	000.1300	0109.2	049.8	35.69	
126.0	037.0000	0424.3	085.4	015.3	000.1300	0109.7	048.4	36.25	
127.0	037.0000	0422.9	085.3	014.5	000.1300	0110.1	047.1	36.79	
128.0	037.0000	0421.8	085.2	013.7	000.1300	0110.1	045.7	37.32	
129.0	037.0000	0421.2	085.2	012.8	000.1300	0110.2	044.4	37.85	
130.0	037.0000	0420.7	085.1	011.8	000.1300	0110.4	043.1	38.40	
131.0	037.0000	0420.5	085.1	010.8	000.1300	0110.5	041.8	38.94	
132.0	037.0000	0420.9	085.1	009.8	000.1300	0110.6	040.5	39.50	
133.0	037.0000	0421.8	085.2	008.7	000.1300	0110.8	039.3	40.06	

***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)
134.0	037.0000	0423.0	085.3	007.5	000.1300	0111.6	038.0	40.68
135.0	037.0000	0424.3	085.4	006.2	000.1300	0113.0	036.8	41.33
136.0	037.0000	0425.3	085.4	004.7	000.1300	0114.3	035.6	41.97
137.0	037.0000	0426.1	085.5	003.2	000.1300	0115.0	034.5	42.56
138.0	037.0000	0427.5	085.6	001.5	000.1300	0115.4	033.4	43.11
139.0	037.0000	0429.6	085.8	359.7	000.1300	0116.5	032.3	43.73
140.0	037.0000	0432.0	085.9	357.8	000.1300	0117.8	031.2	44.37
141.0	037.0000	0433.3	086.0	355.6	000.1300	0118.0	030.2	44.90
142.0	037.0000	0432.7	086.0	353.1	000.1300	0118.9	029.5	45.40
143.0	037.0000	0430.6	085.8	350.4	000.1300	0119.3	028.9	45.78
144.0	037.0000	0427.7	085.6	347.5	000.1300	0121.8	028.4	46.22
145.0	037.0000	0424.6	085.4	344.5	000.1300	0123.1	028.1	46.51
146.0	037.0000	0420.6	085.1	341.5	000.1300	0127.0	027.9	46.87
147.0	037.0000	0415.3	084.7	338.3	000.1300	0128.7	028.0	46.96
148.0	037.0000	0409.7	084.3	335.2	000.1300	0128.7	028.1	46.86
149.0	037.0000	0405.7	084.1	332.2	000.1300	0129.8	028.3	46.82
150.0	037.0000	0403.9	083.9	329.2	000.1300	0132.1	028.4	46.90
151.0	037.0000	0404.0	083.9	326.3	000.1300	0133.7	028.5	46.96
152.0	037.0000	0404.9	084.0	323.4	000.1300	0133.5	028.6	46.88
153.0	037.0000	0405.7	084.1	320.5	000.1300	0133.7	028.8	46.75
154.0	037.0000	0405.8	084.1	317.7	000.1300	0134.9	029.2	46.61
155.0	037.0000	0405.2	084.0	315.0	000.1300	0135.9	029.7	46.37
156.0	037.0000	0403.9	083.9	312.5	000.1300	0134.6	030.4	45.92
157.0	037.0000	0403.1	083.9	310.0	000.1300	0134.5	031.1	45.54
158.0	037.0000	0403.6	083.9	307.7	000.1300	0135.9	031.7	45.27
159.0	037.0000	0405.0	084.0	305.4	000.1300	0138.4	032.4	45.06
160.0	037.0000	0405.9	084.1	303.2	000.1300	0139.7	033.2	44.74
161.0	037.0000	0406.4	084.1	301.2	000.1300	0140.2	034.1	44.32
162.0	037.0000	0407.2	084.2	299.4	000.1300	0141.1	035.1	43.92
163.0	037.0000	0408.9	084.3	297.5	000.1300	0141.6	036.0	43.49
164.0	037.0000	0411.1	084.4	295.8	000.1300	0140.6	037.0	42.96
165.0	037.0000	0413.0	084.6	294.2	000.1300	0137.9	038.0	42.31
166.0	037.0000	0414.6	084.7	292.7	000.1300	0134.1	039.1	41.58
167.0	037.0000	0415.2	084.7	291.4	000.1300	0131.1	040.3	40.87
168.0	037.0000	0415.1	084.7	290.3	000.1300	0129.5	041.6	40.22
169.0	037.0000	0414.4	084.7	289.3	000.1300	0128.9	042.8	39.63
170.0	037.0000	0414.5	084.7	288.4	000.1300	0128.8	044.1	39.08
171.0	037.0000	0415.6	084.8	287.5	000.1300	0129.2	045.4	38.57
172.0	037.0000	0416.6	084.8	286.6	000.1300	0129.6	046.7	38.06
173.0	037.0000	0417.7	084.9	285.8	000.1300	0130.3	048.1	37.57
174.0	037.0000	0418.9	085.0	285.1	000.1300	0131.1	049.4	37.09
175.0	037.0000	0420.3	085.1	284.4	000.1300	0131.7	050.8	36.59
176.0	037.0000	0421.2	085.2	283.8	000.1300	0131.9	052.2	36.06
177.0	037.0000	0421.9	085.2	283.3	000.1300	0131.9	053.6	35.51

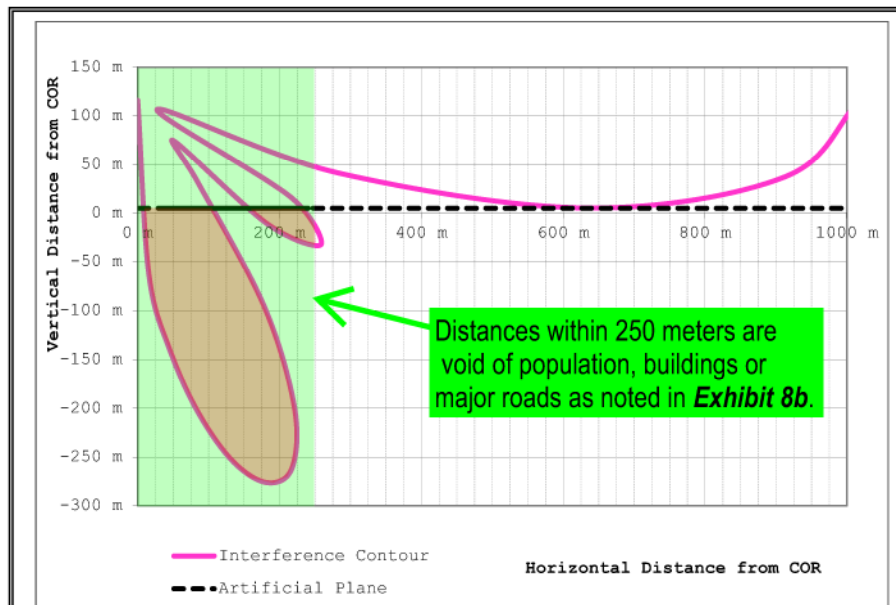
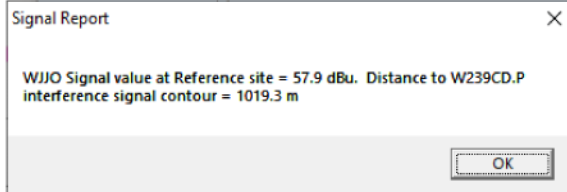
## Exhibit 8a

### 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 WJJO(FM) - Watertown, WI (CH231B) as included in **Exhibit(s) 8(a-b)**. In this instance, the worst case affected station's signal strength at the Translator site has been identified as the 57.9 dBμ F(50:50) service contour, associated with a Translator interference contour adjusted by +40 dBμ per 47 C.F.R. Section 74.1204(a).

Concerning distances between 250 meters from the Translator site to the extent of the interference contour, protection has been demonstrated through a downward radiation study as included in **Exhibit 8a**. Full protection will be afforded all concerns as this portion of the interference area will not reach the ground nor a five meter artificial plane representing a standard two story home when taking into account the downward radiation characteristics of the antenna. A copy of the antenna manufacturer's vertical radiation pattern data has been included in **Exhibit 9**.

Concerning distances within 250 meters of the Translator site, protection has been demonstrated through aerial photography of the site as included in **Exhibit 8b**. Full protection will be afforded all concerns as this portion of the interference area is void of all housing, buildings or major roads representing locations where people live, work or travel on a regular basis. The applicant would like to note the existence of a dedicated transmitter building or other unoccupied buildings within this affected radius; however, buildings of this nature have been routinely exempt as a matter of FCC Policy (see similar grant under BPFT-20160129ALR).



Proposed Antenna: SWR FMxx/3-1.00WS (Three Bay)					Field Strength (dBμ) Equation			
Proposed Power: 0.130 kW					106.92-[20*(LOG10[DistMeters]/1000)]+[ERP in dBk]			
Antenna Height AGL: 117.0 meters					Distance (Free Space) Equation:			
Protection Plane Height: 5.0 meters					{10^{((106.92-[desired dBμ]+[ERP in dBk])/20)}}*1000			
Protected Contour: 57.9 dBμ f(50:50)								
Interference Contour: 97.9 dBμ f(50:10)								
Angle Below Horizon	Vertical Antenna Properties	ERP in kW	ERP in dBk	Meters from Antenna to Int. Contour	Meters from Antenna to Artificial Plane	Meters from Antenna to Ground Level	Field Strength at Protection Plane (dBμ)	Field Strength at Ground Level (dBμ)
0°	1.000	0.130	-8.86	1018.52 m				
-5°	0.899	0.105	-9.79	915.65 m	1285.06 m	1342.42 m	94.96 dBμ	94.58 dBμ
-10°	0.632	0.052	-12.85	643.71 m	644.98 m	673.78 m	97.88 dBμ	97.50 dBμ
-15°	0.287	0.011	-19.70	292.32 m	432.73 m	452.05 m	94.49 dBμ	94.11 dBμ
-20°	0.029	0.000	-39.61	29.54 m	327.47 m	342.09 m	77.00 dBμ	76.62 dBμ
-25°	0.234	0.007	-21.48	238.33 m	265.01 m	276.85 m	96.98 dBμ	96.60 dBμ
-30°	0.293	0.011	-19.52	298.43 m	224.00 m	234.00 m	100.39 dBμ	100.01 dBμ
-35°	0.220	0.006	-22.01	224.08 m	195.27 m	203.98 m	99.10 dBμ	98.72 dBμ
-40°	0.065	0.001	-32.60	66.20 m	174.24 m	182.02 m	89.49 dBμ	89.12 dBμ
-45°	0.115	0.002	-27.65	117.13 m	158.39 m	165.46 m	95.28 dBμ	94.90 dBμ
-50°	0.272	0.010	-20.17	277.04 m	146.21 m	152.73 m	103.45 dBμ	103.07 dBμ
-55°	0.378	0.019	-17.31	385.00 m	136.73 m	142.83 m	106.89 dBμ	106.51 dBμ
-60°	0.428	0.024	-16.23	435.93 m	129.33 m	135.10 m	108.45 dBμ	108.08 dBμ
-65°	0.426	0.024	-16.27	433.89 m	123.58 m	129.10 m	108.81 dBμ	108.43 dBμ
-70°	0.389	0.020	-17.06	396.21 m	119.19 m	124.51 m	108.33 dBμ	107.95 dBμ
-75°	0.328	0.014	-18.54	334.08 m	115.95 m	121.13 m	107.09 dBμ	106.71 dBμ
-80°	0.256	0.009	-20.70	260.74 m	113.73 m	118.80 m	105.11 dBμ	104.73 dBμ
-85°	0.178	0.004	-23.85	181.30 m	112.43 m	117.45 m	102.05 dBμ	101.67 dBμ
-90°	0.001	0.000	-68.86	1.02 m	112.00 m	117.00 m	57.08 dBμ	56.70 dBμ

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 WJJO(FM) - Watertown, WI (CH231B) as included in **Exhibit(s) 8(a-b)**. In this instance, the worst case affected station's signal strength at the Translator site has been identified as the 57.9 dBμ F(50:50) service contour, associated with a Translator interference contour adjusted by +40 dBμ per 47 C.F.R. Section 74.1204(a).

Concerning distances between 250 meters from the Translator site to the extent of the interference contour, protection has been demonstrated through a downward radiation study as included in **Exhibit 8a**. Full protection will be afforded all concerns as this portion of the interference area will not reach the ground nor a five meter artificial plane representing a standard two story home when taking into account the downward radiation characteristics of the antenna. A copy of the antenna manufacturer's vertical radiation pattern data has been included in **Exhibit 9**.

Concerning distances within 250 meters of the Translator site, protection has been demonstrated through aerial photography of the site as included in **Exhibit 8b**. Full protection will be afforded all concerns as this portion of the interference area is void of all housing, buildings or major roads representing locations where people live, work or travel on a regular basis. The applicant would like to note the existence of a dedicated transmitter building or other unoccupied buildings within this affected radius; however, buildings of this nature have been routinely exempt as a matter of FCC Policy (see similar grant under BPFT-20160129ALR).

## ***Exhibit 8b***

### ***§74.1204(d) 2nd/3rd Adjacent Channel Given Interference Waiver Request***

#### **Site Coordinates**

	<u>Latitude</u>	<u>Longitude</u>
NAD 27 datum:	---	---
NAD 83 datum:	42-33-12.0	088-57-42.0

Plastic covered hay bales

Dedicated Transmitter Building

Unoccupied Pump House

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

Google Earth

© 2021 Google

Stathers Rd

250 meter arc

Google Earth Pro™  
Account #4375669785  
Used with Permission



1000 ft

# Exhibit 9

## Copy of Manufacturer's Vertical Antenna 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.

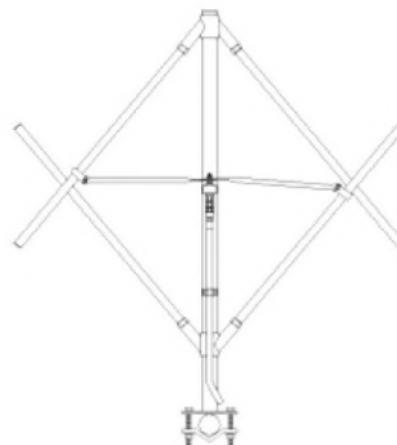
•**WEATHERIZATION (OPTIONAL).** Radomes or electrical deicers available for areas that experience periods of heavy icing and/or snow conditions.

•**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 C 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	7.369	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

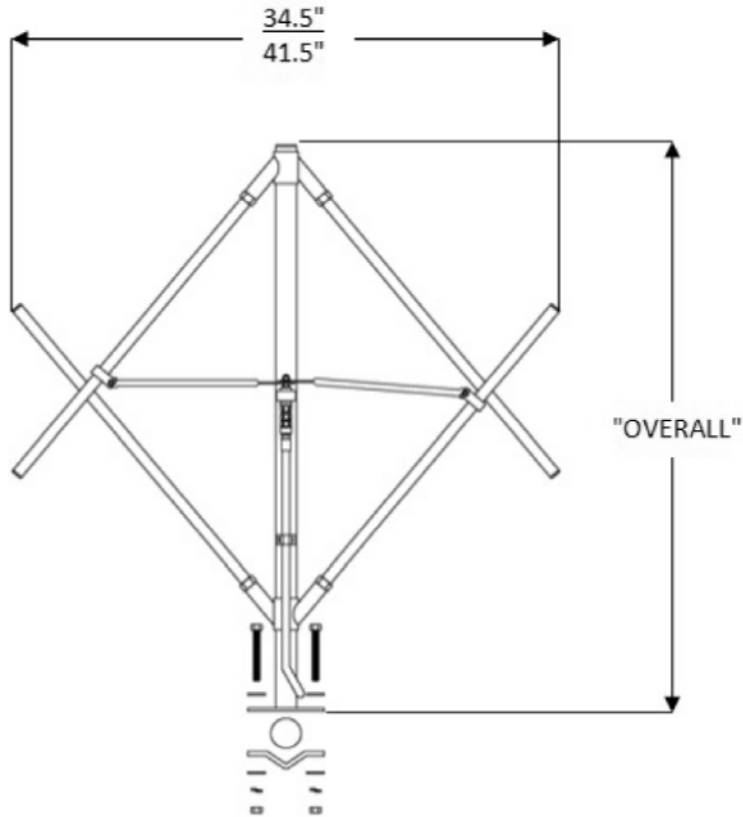
#### 3/4 Wave Spaced Electrical and Mechanical Specifications

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

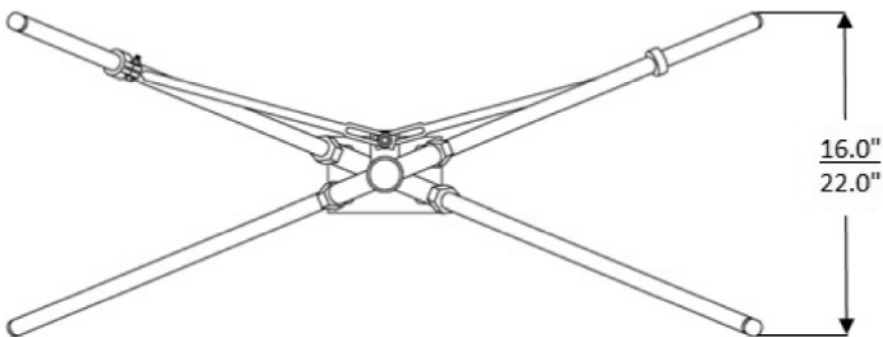
## Exhibit 9

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

#### Dimensions



"OVERALL"	
88.1-91.9	47.00"
92.1-94.7	45.50"
94.9-97.7	44.50"
97.9-100.9	43.50"
101.1-104.3	42.50"
104.5-107.9	41.25"



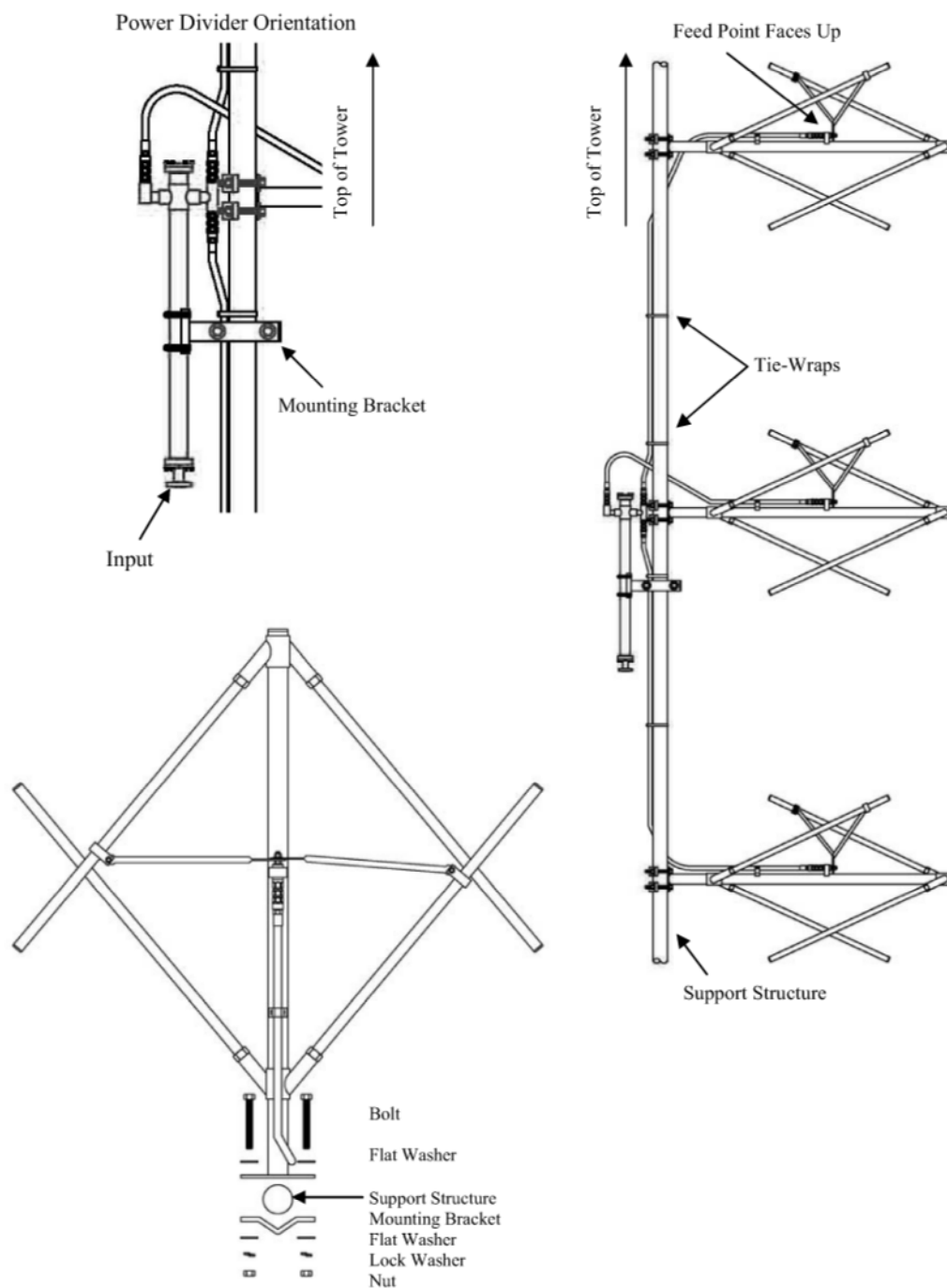
## Exhibit 9

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

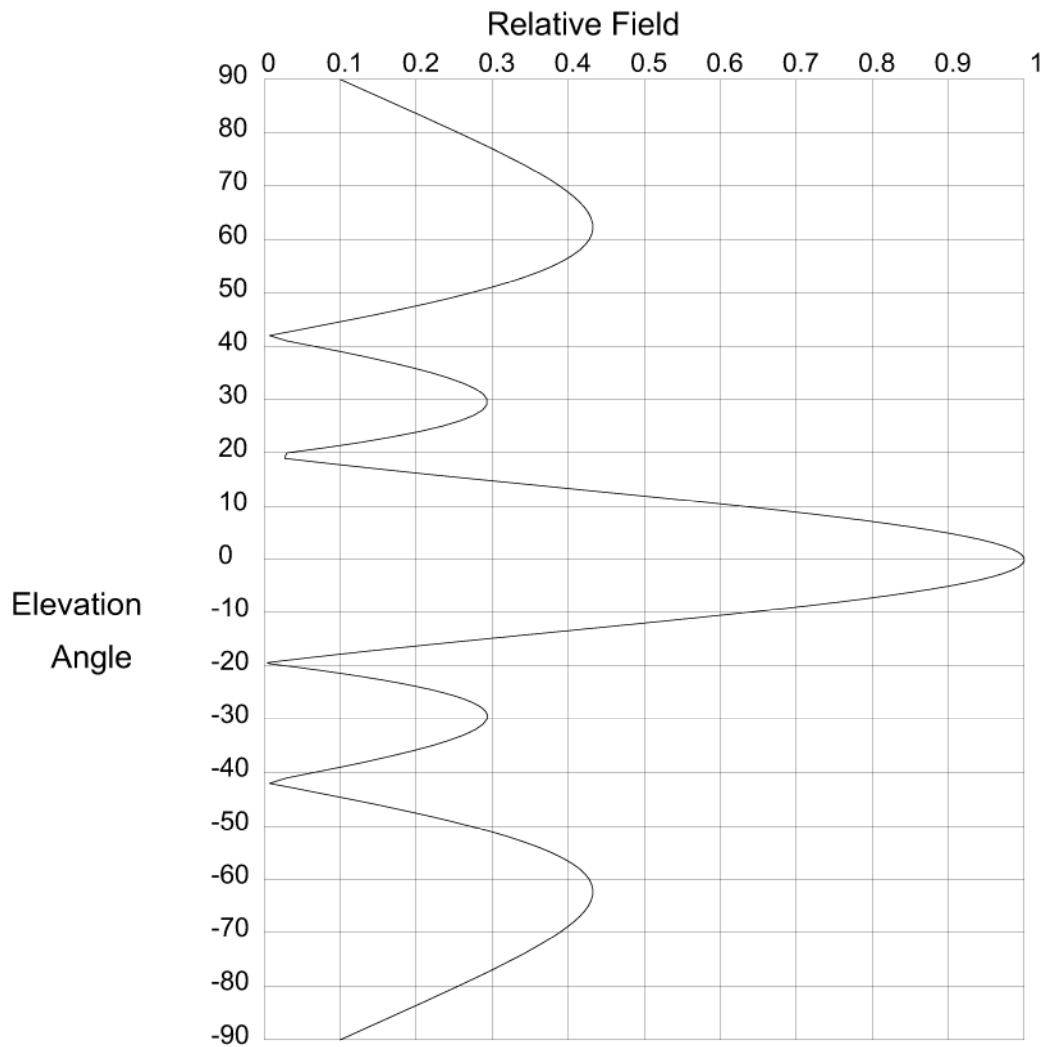
### 3 Or More Odd Bays (3, 5, 7, etc.)

#### Considerations:

1. Your FMEC three bay antenna includes jumpers, tie-wraps, and weatherproofing kit.
2. Your FMEC three bay antenna will be fed with a three-way power divider.
3. Note the direction and orientation of feed points, feed arms, power divider, hardware, and jumpers.
4. Standard mounting bracket fits from 1" to 4" tower leg or pole.
5. SWR, LP. reserves the right to change product specifications at any time.



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



**Elevation Pattern**

Scale: Linear

Units: Field, Relative

**Systems With Reliability**

CLIENT:

Date: 11/28/2016

ANTENNA TYPE: FMxx/3

FREQUENCY: 98.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 2.991/4.758 dBd

Beam Tilt (Deg.) : 0

DIRECTIVITY(Horiz): 2.991/4.758 dBd

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

# Exhibit 9

## Copy of Manufacturer's Vertical Antenna 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	.321 (-9.865)	14.0	.357 (-8.938)
89.0	.116 (-18.733)	51.0	.298 (-10.529)	13.0	.428 (-7.377)
88.0	.131 (-17.628)	50.0	.272 (-11.318)	12.0	.498 (-6.062)
87.0	.147 (-16.648)	49.0	.244 (-12.26)	11.0	.566 (-4.942)
86.0	.163 (-15.769)	48.0	.214 (-13.395)	10.0	.632 (-3.982)
85.0	.178 (-14.972)	47.0	.182 (-14.784)	9.8	.645 (-3.807)
84.0	.194 (-14.244)	46.0	.149 (-16.526)	9.6	.658 (-3.637)
83.0	.21 (-13.575)	45.0	.115 (-18.805)	9.4	.671 (-3.472)
82.0	.225 (-12.957)	44.0	.079 (-22.009)	9.2	.683 (-3.312)
81.0	.24 (-12.385)	43.0	.043 (-27.275)	9.0	.695 (-3.157)
80.0	.256 (-11.852)	42.0	.007 (-43.22)	8.8	.707 (-3.006)
79.0	.271 (-11.356)	41.0	.029 (-30.637)	8.6	.719 (-2.86)
78.0	.285 (-10.893)	40.0	.065 (-23.719)	8.4	.731 (-2.719)
77.0	.30 (-10.462)	39.0	.10 (-19.999)	8.2	.743 (-2.582)
76.0	.314 (-10.06)	38.0	.133 (-17.494)	8.0	.754 (-2.449)
75.0	.328 (-9.686)	37.0	.165 (-15.651)	7.8	.766 (-2.321)
74.0	.341 (-9.339)	36.0	.194 (-14.237)	7.6	.777 (-2.196)
73.0	.354 (-9.018)	35.0	.22 (-13.132)	7.4	.787 (-2.076)
72.0	.366 (-8.724)	34.0	.243 (-12.271)	7.2	.798 (-1.959)
71.0	.378 (-8.455)	33.0	.263 (-11.612)	7.0	.808 (-1.847)
70.0	.389 (-8.211)	32.0	.278 (-11.131)	6.8	.819 (-1.738)
69.0	.398 (-7.995)	31.0	.288 (-10.815)	6.6	.829 (-1.633)
68.0	.407 (-7.804)	30.0	.293 (-10.658)	6.4	.838 (-1.532)
67.0	.415 (-7.642)	29.0	.293 (-10.662)	6.2	.848 (-1.434)
66.0	.421 (-7.507)	28.0	.287 (-10.834)	6.0	.857 (-1.34)
65.0	.426 (-7.403)	27.0	.276 (-11.192)	5.8	.866 (-1.249)
64.0	.43 (-7.329)	26.0	.258 (-11.764)	5.6	.875 (-1.162)
63.0	.432 (-7.287)	25.0	.234 (-12.598)	5.4	.883 (-1.078)
62.0	.432 (-7.281)	24.0	.205 (-13.772)	5.2	.891 (-0.998)
61.0	.431 (-7.31)	23.0	.169 (-15.43)	5.0	.899 (-0.921)
60.0	.428 (-7.38)	22.0	.128 (-17.86)	4.8	.907 (-0.847)
59.0	.422 (-7.491)	21.0	.081 (-21.813)	4.6	.914 (-0.777)
58.0	.415 (-7.648)	20.0	.029 (-30.657)	4.4	.922 (-0.709)
57.0	.405 (-7.856)	19.0	.027 (-31.323)	4.2	.928 (-0.645)
56.0	.393 (-8.119)	18.0	.088 (-21.139)	4.0	.935 (-0.584)
55.0	.378 (-8.442)	17.0	.152 (-16.379)	3.8	.941 (-0.527)
54.0	.362 (-8.835)	16.0	.219 (-13.21)	3.6	.947 (-0.472)
53.0	.343 (-9.305)	15.0	.287 (-10.833)	3.4	.953 (-0.421)

### Systems With Reliability

Page 1 of 3

CLIENT:

Date: 11/28/2016

ANTENNA TYPE: FMxx/3

FREQUENCY: 98.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 2.991/4.758 dBd

Beam Tilt (Deg.): 0

DIRECTIVITY(Horiz): 2.991/4.758 dBd

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

## Exhibit 9

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

## Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
3.2	.958 (-0.372)	-4.4	.922 (-0.709)	-12.0	.498 (-6.062 )
3.0	.963 (-0.327)	-4.6	.914 (-0.777)	-12.2	.484 (-6.308 )
2.8	.968 (-0.284)	-4.8	.907 (-0.847)	-12.4	.47 (-6.562 )
2.6	.972 (-0.245)	-5.0	.899 (-0.921)	-12.6	.456 (-6.825 )
2.4	.976 (-0.208)	-5.2	.891 (-0.998)	-12.8	.442 (-7.096 )
2.2	.98 (-0.175)	-5.4	.883 (-1.078)	-13.0	.428 (-7.377 )
2.0	.983 (-0.145)	-5.6	.875 (-1.162)	-13.2	.414 (-7.667 )
1.8	.987 (-0.117)	-5.8	.866 (-1.249)	-13.4	.40 (-7.968 )
1.6	.989 (-0.092)	-6.0	.857 (-1.34)	-13.6	.385 (-8.28 )
1.4	.992 (-0.071)	-6.2	.848 (-1.434)	-13.8	.371 (-8.603 )
1.2	.994 (-0.052)	-6.4	.838 (-1.532)	-14.0	.357 (-8.938 )
1.0	.996 (-0.036)	-6.6	.829 (-1.633)	-14.2	.343 (-9.287 )
.8	.997 (-0.023)	-6.8	.819 (-1.738)	-14.4	.329 (-9.65 )
.6	.999 (-0.013)	-7.0	.808 (-1.847)	-14.6	.315 (-10.027 )
.4	.999 (-0.006)	-7.2	.798 (-1.959)	-14.8	.301 (-10.421 )
.2	1.00 (-0.001)	-7.4	.787 (-2.076)	-15.0	.287 (-10.833 )
.0	1.00 (0)	-7.6	.777 (-2.196)	-15.2	.273 (-11.263 )
-.2	1.00 (-0.001)	-7.8	.766 (-2.321)	-15.4	.26 (-11.714 )
-.4	.999 (-0.006)	-8.0	.754 (-2.449)	-15.6	.246 (-12.187 )
-.6	.999 (-0.013)	-8.2	.743 (-2.582)	-15.8	.232 (-12.685 )
-.8	.997 (-0.023)	-8.4	.731 (-2.719)	-16.0	.219 (-13.21 )
-1.0	.996 (-0.036)	-8.6	.719 (-2.86)	-16.2	.205 (-13.766 )
-1.2	.994 (-0.052)	-8.8	.707 (-3.006)	-16.4	.192 (-14.356 )
-1.4	.992 (-0.071)	-9.0	.695 (-3.157)	-16.6	.178 (-14.984 )
-1.6	.989 (-0.092)	-9.2	.683 (-3.312)	-16.8	.165 (-15.656 )
-1.8	.987 (-0.117)	-9.4	.671 (-3.472)	-17.0	.152 (-16.379 )
-2.0	.983 (-0.145)	-9.6	.658 (-3.637)	-17.2	.139 (-17.16 )
-2.2	.98 (-0.175)	-9.8	.645 (-3.807)	-17.4	.126 (-18.01 )
-2.4	.976 (-0.208)	-10.0	.632 (-3.982)	-17.6	.113 (-18.943 )
-2.6	.972 (-0.245)	-10.2	.619 (-4.163)	-17.8	.10 (-19.978 )
-2.8	.968 (-0.284)	-10.4	.606 (-4.349)	-18.0	.088 (-21.139 )
-3.0	.963 (-0.327)	-10.6	.593 (-4.541)	-18.2	.075 (-22.464 )
-3.2	.958 (-0.372)	-10.8	.58 (-4.739)	-18.4	.063 (-24.008 )
-3.4	.953 (-0.421)	-11.0	.566 (-4.942)	-18.6	.051 (-25.862 )
-3.6	.947 (-0.472)	-11.2	.553 (-5.153)	-18.8	.039 (-28.188 )
-3.8	.941 (-0.527)	-11.4	.539 (-5.37)	-19.0	.027 (-31.323 )
-4.0	.935 (-0.584)	-11.6	.525 (-5.593)	-19.2	.016 (-36.185 )
-4.2	.928 (-0.645)	-11.8	.511 (-5.824)	-19.4	.004 (-47.865 )

## Systems With Reliability

Page 2 of 3

CLIENT:

Date: 11/28/2016

ANTENNA TYPE: FMxx/3

FREQUENCY: 98.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 2.991/4.758 dBd

Beam Tilt (Deg.) : 0

DIRECTIVITY(Horiz): 2.991/4.758 dBd

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

# Exhibit 9

## Copy of Manufacturer's Vertical Antenna Documentation

(public record copy)

### Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
-19.6	.007 (-42.787)	-27.2	.278 (-11.104)	-54.0	.362 (-8.835 )
-19.8	.018 (-34.715)	-27.4	.281 (-11.025)	-55.0	.378 (-8.442 )
-20.0	.029 (-30.657)	-27.6	.283 (-10.953)	-56.0	.393 (-8.119 )
-20.2	.04 (-27.943)	-27.8	.285 (-10.89)	-57.0	.405 (-7.856 )
-20.4	.051 (-25.91)	-28.0	.287 (-10.834)	-58.0	.415 (-7.648 )
-20.6	.061 (-24.292)	-28.2	.289 (-10.785)	-59.0	.422 (-7.491 )
-20.8	.071 (-22.952)	-28.4	.29 (-10.744)	-60.0	.428 (-7.38 )
-21.0	.081 (-21.813)	-28.6	.291 (-10.71)	-61.0	.431 (-7.31 )
-21.2	.091 (-20.825)	-28.8	.292 (-10.682)	-62.0	.432 (-7.281 )
-21.4	.101 (-19.956)	-29.0	.293 (-10.662)	-63.0	.432 (-7.287 )
-21.6	.11 (-19.183)	-29.2	.293 (-10.648)	-64.0	.43 (-7.329 )
-21.8	.119 (-18.489)	-29.4	.294 (-10.641)	-65.0	.426 (-7.403 )
-22.0	.128 (-17.86)	-29.6	.294 (-10.64)	-66.0	.421 (-7.507 )
-22.2	.137 (-17.288)	-29.8	.294 (-10.646)	-67.0	.415 (-7.642 )
-22.4	.145 (-16.765)	-30.0	.293 (-10.658)	-68.0	.407 (-7.804 )
-22.6	.153 (-16.284)	-31.0	.288 (-10.815)	-69.0	.398 (-7.995 )
-22.8	.161 (-15.84)	-32.0	.278 (-11.131)	-70.0	.389 (-8.211 )
-23.0	.169 (-15.43)	-33.0	.263 (-11.612)	-71.0	.378 (-8.455 )
-23.2	.177 (-15.049)	-34.0	.243 (-12.271)	-72.0	.366 (-8.724 )
-23.4	.184 (-14.695)	-35.0	.22 (-13.132)	-73.0	.354 (-9.018 )
-23.6	.191 (-14.366)	-36.0	.194 (-14.237)	-74.0	.341 (-9.339 )
-23.8	.198 (-14.059)	-37.0	.165 (-15.651)	-75.0	.328 (-9.686 )
-24.0	.205 (-13.772)	-38.0	.133 (-17.494)	-76.0	.314 (-10.06 )
-24.2	.211 (-13.505)	-39.0	.10 (-19.999)	-77.0	.30 (-10.462 )
-24.4	.217 (-13.254)	-40.0	.065 (-23.719)	-78.0	.285 (-10.893 )
-24.6	.223 (-13.021)	-41.0	.029 (-30.637)	-79.0	.271 (-11.356 )
-24.8	.229 (-12.802)	-42.0	.007 (-43.22)	-80.0	.256 (-11.852 )
-25.0	.234 (-12.598)	-43.0	.043 (-27.275)	-81.0	.24 (-12.385 )
-25.2	.24 (-12.407)	-44.0	.079 (-22.009)	-82.0	.225 (-12.957 )
-25.4	.245 (-12.229)	-45.0	.115 (-18.805)	-83.0	.21 (-13.575 )
-25.6	.249 (-12.063)	-46.0	.149 (-16.526)	-84.0	.194 (-14.244 )
-25.8	.254 (-11.908)	-47.0	.182 (-14.784)	-85.0	.178 (-14.972 )
-26.0	.258 (-11.764)	-48.0	.214 (-13.395)	-86.0	.163 (-15.769 )
-26.2	.262 (-11.63)	-49.0	.244 (-12.26)	-87.0	.147 (-16.648 )
-26.4	.266 (-11.507)	-50.0	.272 (-11.318)	-88.0	.131 (-17.628 )
-26.6	.269 (-11.393)	-51.0	.298 (-10.529)	-89.0	.116 (-18.733 )
-26.8	.273 (-11.288)	-52.0	.321 (-9.865)	-90.0	.10 (-20 )
-27.0	.276 (-11.192)	-53.0	.343 (-9.305)	90.0	.00 (-50 )

### Systems With Reliability

Page 3 of 3

CLIENT:

Date: 11/28/2016

ANTENNA TYPE: FMxx/3

FREQUENCY: 98.1 MHz

PATTERN POL.: Circular

DIRECTIVITY(Peak): 2.991/4.758 dBd

Beam Tilt (Deg.) : 0

DIRECTIVITY(Horiz): 2.991/4.758 dBd

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