

# **ENGINEERING REPORT**

**FM Translator  
Minor Change  
Permit Application**

for

**K288GA  
Fac ID: 138081**

as a Translator for  
**KNWC(FM) – Sioux Falls, SD**

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***MUNN-REESE***

Broadcast Engineering Consultants  
Coldwater, MI 49036

# Discussion

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This firm of Munn-Reese has been retained to prepare the required engineering report in support of a Minor Change Application for an FM Translator K288GA – Sioux Falls, SD. Presently K288GA is licensed to operate with 220 watts ERP at 509 meters AMSL operating on CH288D. Operation at a different site with 220 watts ERP at 506 meters AMSL operating at CH268D is proposed.

The Translator as proposed will be mounted on a tower bearing Antenna Registration Number: 1275764. The translator will be tri-plexed with W298CY and KNWC-FM(AUX).

A map of the present and proposed service area has been included in **Exhibit 1.0**.

It has been determined the Translator may be used in the area without interference to any existing FM broadcast station or facility. The present and proposed allocation details are found in **Exhibits 2.0**. It is believed sufficient clearance exists precluding the need for additional contour protection showings. Per §74.133(a)((1)((i)(A)(2) upon a showing of interference to or from any other broadcast station, remedial changes to any same band frequency are permissible. The present and proposed allocations are provided in **Exhibits 2.0** and demonstrate the reduction in interference with the proposed move in frequency.

The applicant requests a §74.1204(d) Second/Third Adjacent Channel Given Interference Waiver toward KELO-FM – Sioux Falls, SD (CH270C2) as noted in **Exhibit 2.1**. Protection has been based on the worst case calculated 111.28 dBμ F(50:10) Interference Contour, corresponding to the worst case 71.28 dBμ F(50:50) Protected Contour. Protection has been demonstrated through a downward vertical radiation study. Full protection will be afforded the facility as the interference does not reach the ground when considering the downward radiation characteristics of the antenna as supplied by the antenna manufacturer. The downward radiation study of the proposed facility is also included in **Exhibit 2.1**.

The applicant certifies the proposed translator 34 dBu F(50:10) Interference contour does not enter Canadian territory. Documentation of the proposed 34 dBu F(50:10) Interference contour will be supplied upon request.

This translator is not within the affected distance of any TV Channel 6 stations.

The applicant would like to note use of the NED 03 second terrain database for terrain-based showings contained here-in.

# Exhibit 1.0 - Present and Proposed Service Contours

## K288GA

BLFT20081023ABE  
Latitude: 43-32-02.99 N  
Longitude: 096-44-21.92 W  
ERP: 0.22 kW  
Channel: 288  
Frequency: 105.5 MHz  
AMSL Height: 509.0 m  
Elevation: 457.0 m  
Horiz. Pattern: Omni  
Vert. Pattern: No  
Prop Model: None

## K288GA.P

Proposed Operation  
Latitude: 43-29-14 N  
Longitude: 096-47-04 W  
ERP: 0.22 kW  
Channel: 268  
Frequency: 101.5 MHz  
AMSL Height: 506.0 m  
Elevation: 453.0 m  
Horiz. Pattern: Omni  
Vert. Pattern: No  
Prop Model: None

## K288GA.P - HAAT

N. Lat. = 432914.0 W. Lng. = 964704.0  
HAAT and Distance to Contour,  
FCC, FM 2-10 Mi, 51 pts Method - NED 03 SEC

Azi.	AV EL	HAAT	ERP kW	dBk	60-F5
000	448.7	57.3	0.2200	-6.58	9.64
030	440.9	65.1	0.2200	-6.58	10.22
060	439.7	66.3	0.2200	-6.58	10.30
090	438.4	67.6	0.2200	-6.58	10.39
120	432.3	73.7	0.2200	-6.58	10.81
150	436.2	69.8	0.2200	-6.58	10.55
180	430.2	75.8	0.2200	-6.58	10.95
210	434.3	71.7	0.2200	-6.58	10.68
240	445.1	60.9	0.2200	-6.58	9.92
270	468.6	37.4	0.2200	-6.58	7.61
300	468.5	37.5	0.2200	-6.58	7.62
330	452.9	53.1	0.2200	-6.58	9.26

Ave El= 444.65 M HAAT= 61.35 M AMSL= 506.0

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K288GA (288)  
K288GA.P (268)

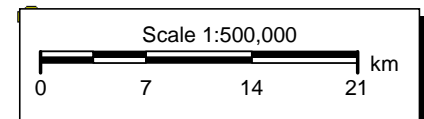
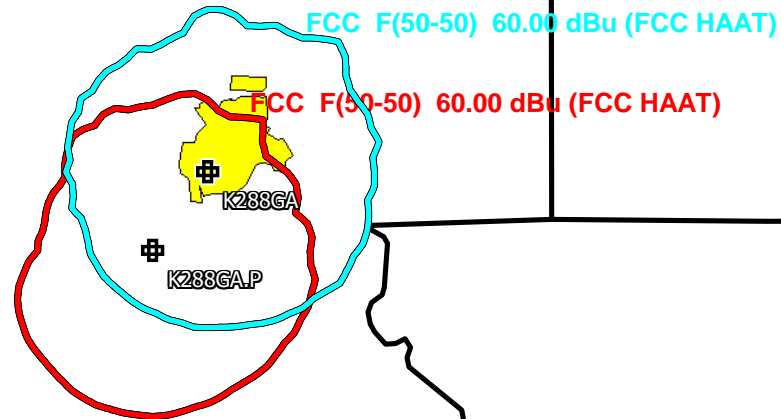


Exhibit 2.0 - Present Allocation  
University Of Northwestern - St. Paul  
CH# 288D - 105.5 MHz, Pwr= 0.22 kw, HAAT= 67.5 M, COR= 509 M  
Average Protected F(50-50)= 10.39 km  
Omni-directional

REFERENCE  
43 32 02.90 N.  
96 44 23.10 W.

DISPLAY DATES  
DATA 08-10-20  
SEARCH 08-11-20

CH CITY	CALL	TYPE STATE	ANT	AZI <--	DIST FILE #	LAT LNG	PWR(kw) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*
288D Sioux Falls	K288GA	LIC SD	___	0.0 0.0	0.00 BLFT20081023ABE	43 32 02.90 96 44 23.10	0.220 68	509	---Reference---		
286D Sioux Falls	K286CN	LIC SD	___	50.1 230.1	1.39 BLFT20171018AAS	43 32 31.90 96 43 35.20	0.250	1.1 493	8.2	-11.5*	-7.8*
287C2 Sheldon	KIWA-FM	LIC IA	___	118.7 299.3	80.79 BLH20140430ACH	43 10 52.90 95 51 57.10	50.000 89	68.2 522	43.1	1.4	21.1
291C2 Slayton	KJOE	LIC MN	___	57.3 237.9	75.41 BLH20160119AAM	43 53 51.90 95 56 51.10	10.000 330	5.2 851	53.0	58.3	21.3
288D Brookings	K288EV	LIC SD	___	356.7 176.7	86.11 BMLFT20030520AAQ	44 18 26.80 96 48 05.10	0.250 53	35.0 549	10.3	40.5	39.5
289C2 Winnebago	KSUX	LIC N NE	___	172.3 352.4	133.68 BLH19910327KA	42 20 32.90 96 31 14.10	50.000 141	82.4 516	55.7	40.9	63.7
290C1 Mitchell	KMIT	LIC SD	___	281.1 100.1	123.17 BLH20010919AAS	43 44 15.90 98 14 40.30	100.000 199	8.5 618	64.9	105.2	57.2
286C2 Tracy	KARL	LIC N MN	___	38.0 218.6	112.09 BMLH20080813ADU	44 19 31.90 95 52 20.10	45.000 153	4.8 594	44.5	95.2	66.4
289C3 Jackson	KUXX	LIC MN	___	85.8 267.0	143.34 BLH19940502KE	43 36 53.80 94 57 48.90	25.000 100	55.3 527	34.8	76.5	93.0
288A Montevideo	KMGH	LIC MN	___	30.7 211.4	171.59 BLH19821019AP	44 51 23.80 95 37 47.10	3.000 90	71.6 398	21.5	88.2	113.7
287C1 Orchard	KGRD	LIC NE	___	226.5 45.4	190.05 BLED19990707KB	42 20 45.00 98 25 06.30	100.000 153	90.3 744	60.4	90.0	116.0
285C3 Spencer	KMRR	LIC IA	___	101.5 282.6	131.85 BLH19970508KE	43 17 12.80 95 08 34.90	25.000 85	3.7 521	35.7	117.1	94.7

Terrain database is NED 03 SEC , R= 73.215 qualifying spacings or FCC minimum Spacings in KM, M= Margin in KM  
In & Out distances between contours are shown at closest points. Reference zone= 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.

Exhibit 2.0 - Proposed Allocation University Of Northwestern - St. Paul CH# 268D - 101.5 MHz, Pwr= 0.22 kw, HAAT= 61.4 M, COR= 506 M Average Protected F(50-50)= 9.96 km Omni-directional											
REFERENCE										DISPLAY DATES	
43 29 14.00 N.										DATA 08-20-20	
96 47 04.00 W.										SEARCH 08-25-20	
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)
270C2	KELO-FM	LIC	___	343.9	30.56	43 45 04.90	34.000	5.9	52.5	14.9	-23.0*
Sioux Falls		SD		163.9	BLH19900606KD	96 53 23.10	177	659	Midwest Communications, In		
266C1	KLQL	LIC	___	52.4	58.49	43 48 23.80	100.000	6.9	57.4	40.5	0.1
Luverne		MN		232.8	BLH19830822AA	96 12 24.10	162	657	Alpha 3e Licensee LLC		
215A	KCSD	LIC	D__	46.9	14.22	43 34 27.90	6.000	169.8	84.6	9.5R	4.7M
Sioux Falls		SD		227.0	BLED20071227ABD	96 39 20.10	80	514	South Dakota Board Of Dire		
268D	K268CZ	LIC	___	130.6	67.09	43 05 33.90	0.250	46.3	13.4	10.2	17.1
Sioux Center		IA		311.0	BLFT20161110ABD	96 09 25.10		542	Community First Broadcasti		
268D	K268DP	LIC	___	200.1	66.80	42 55 21.00	0.250	44.0	12.6	12.3	16.9
Vermillion		SD		19.9	0000090155	97 03 58.20		478	5 Star Communications Inc.		
268D	K268DP	CP	___	200.1	66.80	42 55 21.00	0.250	44.0	12.6	12.3	16.9
Vermillion		SD		19.9	BNPFT20180314AAG	97 03 58.20		478	5 Star Communications Inc.		
268C	KCGN-FM	LIC	___	354.6	210.82	45 22 28.90	100.000	166.6	67.7	34.1	111.4
Ortonville		MN		174.4	BMLE20031210ABP	97 02 21.30	305	851	Christian Heritage Broadca		
268C1	KVCX	LIC	___	260.4	218.03	43 07 41.00	100.000	163.5	65.1	45.1	123.7
Gregory		SD		78.5	BMLE2019941019KD	99 26 02.40	195	861	Vcy America, Inc		
267C2	KKYY	LIC	___	156.9	136.35	42 21 25.00	50.000	76.1	50.4	49.6	70.8
Whiting		IA		337.4	BLH20011002AAS	96 08 03.10	150	509	Powell Broadcasting Compan		
268C3	KEMJ	LIC	___	75.5	180.80	43 52 26.80	14.000	104.0	37.0	66.4	110.1
St. James		MN		257.0	BLH20050531AUW	94 36 00.90	136	484	Subarctic Media, LLC		
271D	K271CW	CP	___	217.3	85.36	42 52 29.90	0.250	1.1	8.6	73.7	74.9
Yankton		SD		36.9	BNPFT20180316ABC	97 25 11.20		426	Riverfront Broadcasting, L		
267D	K267CN	CP	___	284.2	100.59	43 42 11.90	0.250	17.1	11.7	75.5	77.7
Mitchell		SD		103.4	BNPFT20171201ABA	97 59 51.30		485	Nedved Media, LLC		
267D	K267CN	LIC	___	284.2	100.59	43 42 11.90	0.250	17.1	11.7	75.5	77.7
Mitchell		SD		103.4	0000091427	97 59 51.30		485	Nedved Media, LLC		
269C2	KAYL-FM	LIC	___	125.3	161.82	42 38 04.90	50.000	68.8	43.9	82.2	102.4
Storm Lake		IA		306.4	BLH20011011AAR	95 10 11.00	122	538	Community First Broadcasti		
214A	KSDJ	LIC	___	0.0	92.18	44 19 00.80	1.000	169.8	84.6	9.5R	82.7M
Brookings		SD		180.0	BLED19940105KB	96 47 03.10	38	534	South Dakota State Univers		
271C2	KUQQ	LIC	Z__	93.2	137.56	43 24 19.80	50.000	5.7	50.2	121.0	86.3
Milford		IA		274.4	BLH19960920KA	95 05 01.90	128	572	Community First Broadcasti		

Terrain database is NED 03 SEC , R= 73.215 qualifying spacings or FCC minimum Spacings in KM, M= Margin in KM  
 In & Out distances between contours are shown at closest points. Reference zone= 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 2.1 - K288GA.P vs. KELO-FM

### KELO-FM Signal Strength at K288GA.P in Support of 74.1204(d) Waiver Request

#### K288GA

BLFT20081023ABE  
Latitude: 43-32-02.99 N  
Longitude: 096-44-21.92 W  
ERP: 0.22 kW  
Channel: 288  
Frequency: 105.5 MHz  
AMSL Height: 509.0 m  
Elevation: 457.0 m  
Horiz. Pattern: Omni  
Vert. Pattern: No  
Prop Model: None




#### K288GA.P

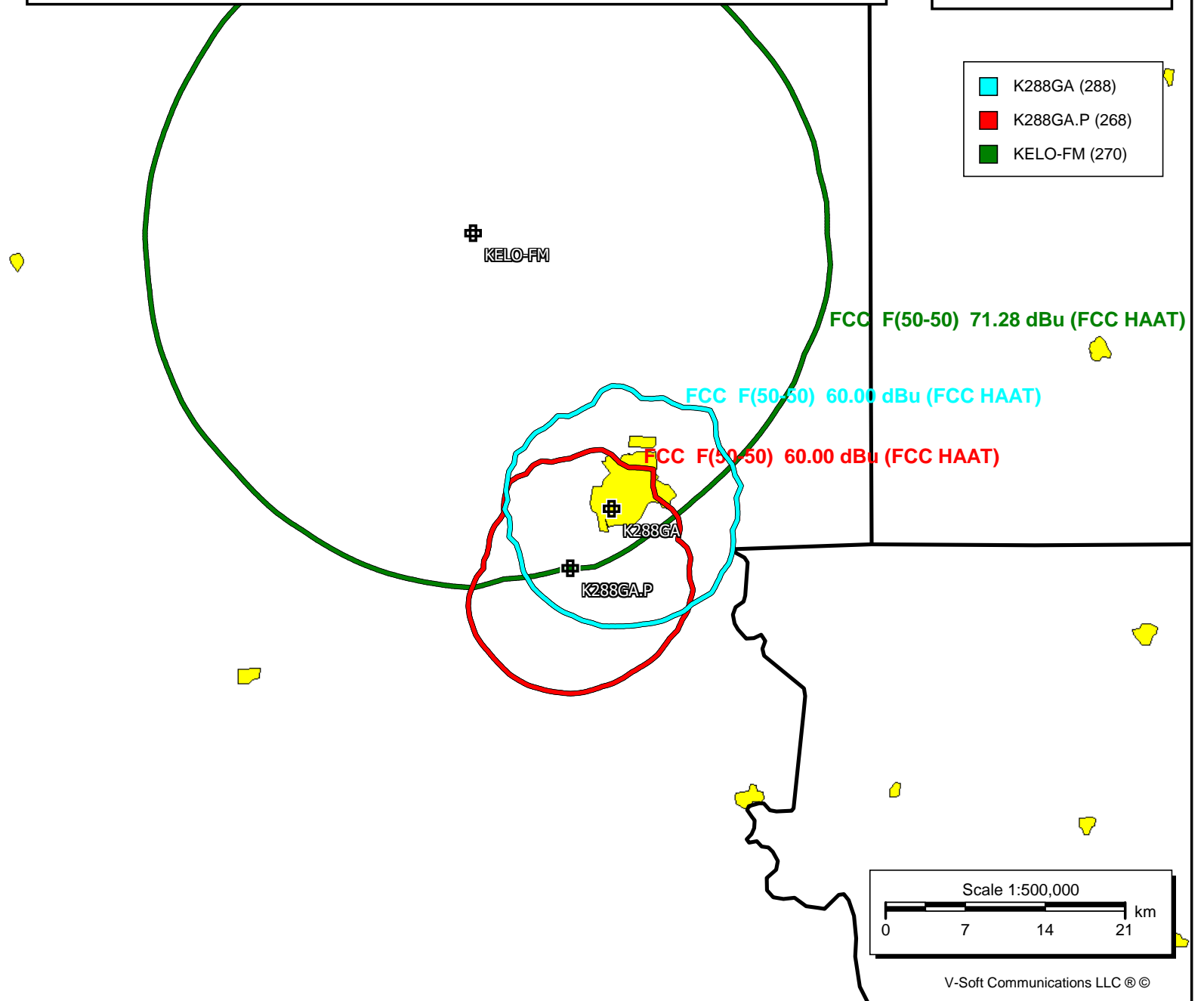
BLFT20081023ABE  
Latitude: 43-29-14 N  
Longitude: 096-47-04 W  
ERP: 0.22 kW  
Channel: 268  
Frequency: 101.5 MHz  
AMSL Height: 506.0 m  
Elevation: 453.0 m  
Horiz. Pattern: Omni  
Vert. Pattern: No  
Prop Model: None

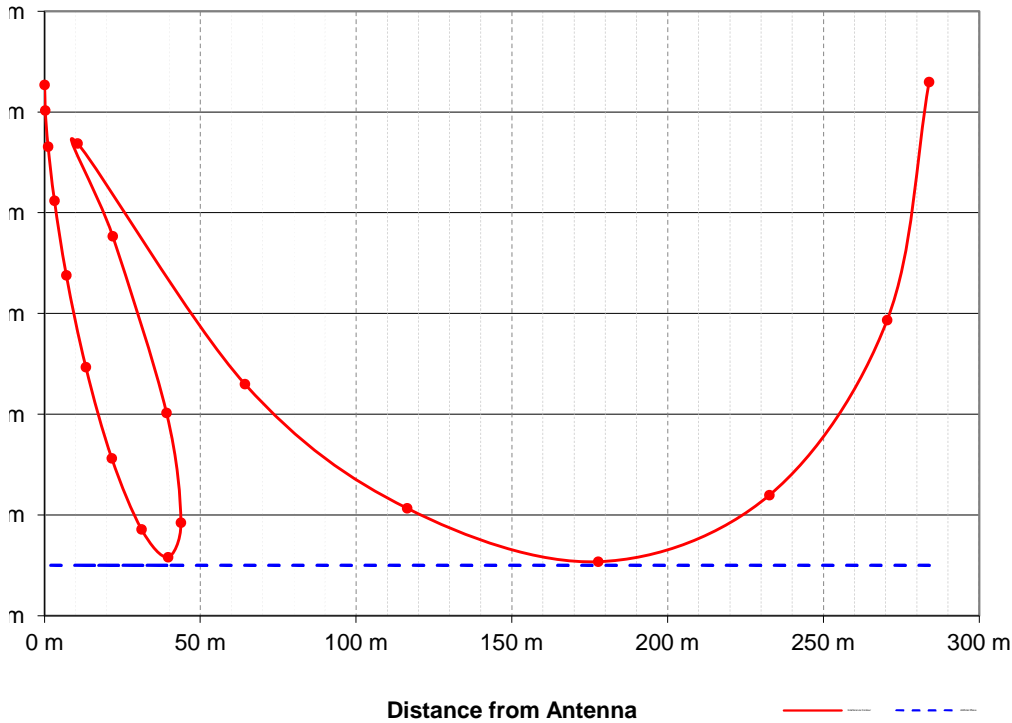
#### KELO-FM

BLH19900606KD  
Latitude: 43-45-04.99 N  
Longitude: 096-53-21.90 W  
ERP: 34.00 kW  
Channel: 270  
Frequency: 101.9 MHz  
AMSL Height: 659.0 m  
Elevation: 488.0 m  
Horiz. Pattern: Omni  
Vert. Pattern: No  
Prop Model: None

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-  K288GA (288)
-  K288GA.P (268)
-  KELO-FM (270)





**Proposed Antenna:** Shively 6832-2

**Proposed Power:** 0.22 kW

**Antenna Height AGL:** 53 meters

**Interference Contour:** 111.28 dBu f(50:10)

**Ground Plane Height:** 5 meters

**Free Space) Equation:**  $=(10^{((106.92-[\text{desired dBu}]+[\text{ERP in dBk}])/20))} \times 1000$

**Length (dBu) Equation:**  $=106.92-(20 \times (\text{LOG10}[\text{DistMeters}/1000]))+[\text{ERP in dBk}]$

Antenna	ERP	ERP	Distance	Distance	Field Strength	Distance	Field Strength
Relative	in kW	in dBk	from Ant.	from Ant. to	in dBu @	from Ant.	in dBu @
Field			Interference	Artificial Plan	Artificial Plan	Ground Level	Ground Level
1	0.220	-6.58	283.93 m	infinite	---	---	---
0.956	0.201	-6.97	271.44 m	550.74 m	105.13 dBu	608.11 m	104.27 dBu
0.832	0.152	-8.17	236.23 m	276.42 m	109.92 dBu	305.21 m	109.05 dBu
0.648	0.092	-10.34	183.99 m	185.46 m	111.21 dBu	204.78 m	110.35 dBu
0.436	0.042	-13.79	123.79 m	140.34 m	110.19 dBu	154.96 m	109.33 dBu
0.25	0.014	-18.62	70.98 m	113.58 m	107.20 dBu	125.41 m	106.34 dBu
0.043	0.000	-33.91	12.21 m	96.00 m	93.37 dBu	106.00 m	92.51 dBu
0.094	0.002	-27.11	26.69 m	83.69 m	101.35 dBu	92.40 m	100.49 dBu
0.18	0.007	-21.47	51.11 m	74.67 m	107.99 dBu	82.45 m	107.13 dBu
0.218	0.010	-19.81	61.90 m	67.88 m	110.48 dBu	74.95 m	109.62 dBu
0.217	0.010	-19.85	61.61 m	62.66 m	111.13 dBu	69.19 m	110.27 dBu
0.191	0.008	-20.96	54.23 m	58.60 m	110.61 dBu	64.70 m	109.75 dBu
0.152	0.005	-22.94	43.16 m	55.43 m	109.11 dBu	61.20 m	108.25 dBu
0.11	0.003	-25.75	31.23 m	52.96 m	106.69 dBu	58.48 m	105.83 dBu
0.072	0.001	-29.43	20.44 m	51.08 m	103.33 dBu	56.40 m	102.47 dBu
0.043	0.000	-33.91	12.21 m	49.69 m	99.09 dBu	54.87 m	98.23 dBu
0.023	0.000	-39.34	6.53 m	48.74 m	93.82 dBu	53.82 m	92.96 dBu
0.01	0.000	-46.58	2.84 m	48.18 m	86.69 dBu	53.20 m	85.83 dBu
0.001	0.000	-66.58	0.28 m	48.00 m	66.72 dBu	53.00 m	65.86 dBu