

ENGINEERING REPORT

FM Translator Minor Change to Licensed Facility Construction Permit Application

for

**W230AN – Hayward, WI
(Facility ID: 86422)**

License:

BMLFT20050127AIL

as an FM Translator for

KDNW(FM) – Duluth, MN

ERP Change

February 2021

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Table of Contents

Discussion of Report

FM Translator Requirements (See Discussion)

Interference and Contour Overlap Requirements

Exhibit 1.0 - Proposed Service Contour Map

Exhibit 2.0 - Tabulation of Proposed Allocation

RF Radiation Study Requirement

Exhibit 3.0 - RF Compliance Study

Discussion

This firm has been retained to prepare the required engineering report in support of a minor modification of license to FM Translator W230AN, License No. BMLFT20050127AIL. The facility serves as a translator for non-commercial FM station KDNW(FM), Duluth, MN. KDNW(FM) operates on Channel 247C1, 97.3 MHz. This application proposes an increase in ERP from 50 watts to 250 watts. The Translator will continue to serve Hayward, WI.

Given overlap will remain to a CH232C2 Vacancy for Hayward, WI. W230AN acknowledges it may continue to operate on its present frequency until forced to relocate due to licensing of CH232C2. There is also given overlap to a deleted translator CH232D for Hayward, WI. It has been determined the Translator may be used in the area without interference to any existing FM broadcast stations. The proposed operating parameters have been changed from the present values. Exhibits 1.0 and 2.0 show present and proposed service contours and a tabulation of the proposed allocation. The translator is within 320 kilometers from the border between the United States of America and Canada. Full protection will be afforded all Canadian stations as the operating parameters will not increase or decrease any service or interference contours. Exhibit 3.0 demonstrates compliance with RF Radiation guidelines.

Regarding protection of international concerns, the facility is and will remain within 320 km of the common border between the United States and Canada. The applicant certifies the proposed Translator 34 dB μ F(50:10) interference contour does not enter Canadian territory. Documentation of the proposed 34 dB μ F(50:10) interference contour will be supplied upon request.

Exhibit 1.0 - W230AN Present and Proposed

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W230AN
 BMLFT20050127AIL
 Latitude: 46-00-51.98 N
 Longitude: 091-29-05.96 W
 ERP: 0.05 kW
 Channel: 230
 Frequency: 93.9 MHz
 AMSL Height: 378.0 m
 Elevation: 364.0 m
 Horiz. Pattern: Omni
 Vert. Pattern: No
 Prop Model: None

W230AN.P
 BMLFT20050127AIL
 Latitude: 46-00-51.98 N
 Longitude: 091-29-05.96 W
 ERP: 0.25 kW
 Channel: 230
 Frequency: 93.9 MHz
 AMSL Height: 378.0 m
 Elevation: 364.0 m
 Horiz. Pattern: Omni
 Vert. Pattern: No
 Prop Model: None

■ W230AN (230)
■ W230AN.P (230)

Height above Average Terrain
 N. Lat. = 460051.8 W. Lng. = 912906.6
 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	393.8	-15.8	0.2500	-6.02	7.09
030	404.1	-26.1	0.2500	-6.02	7.09
060	407.5	-29.5	0.2500	-6.02	7.09
090	413.7	-35.7	0.2500	-6.02	7.09
120	410.2	-32.2	0.2500	-6.02	7.09
150	393.3	-15.3	0.2500	-6.02	7.09
180	395.2	-17.2	0.2500	-6.02	7.09
210	362.7	15.3	0.2500	-6.02	7.09
240	368.7	9.3	0.2500	-6.02	7.09
270	358.5	19.5	0.2500	-6.02	7.09
300	369.9	8.1	0.2500	-6.02	7.09
330	387.0	-9.0	0.2500	-6.02	7.09

Ave EI= 388.73 M HAAT= -10.73 M AMSL= 378.0

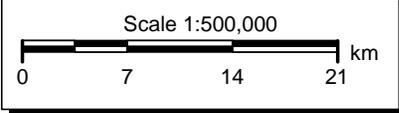
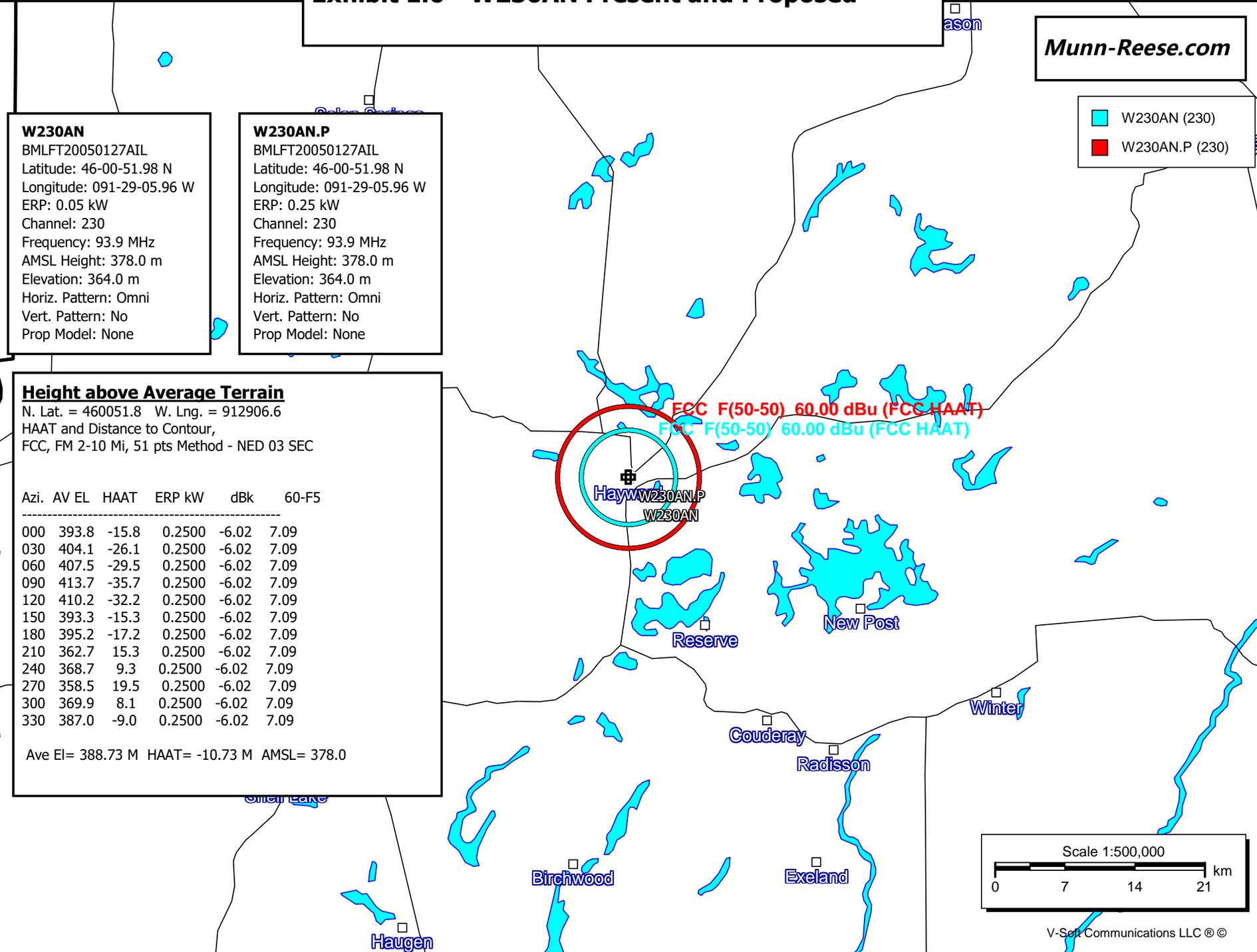
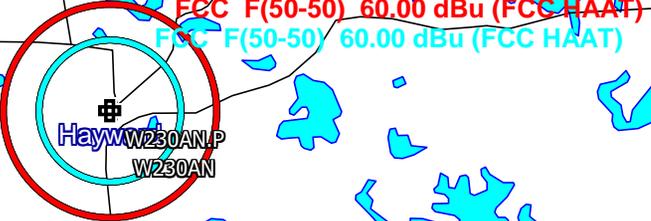


Exhibit 2.0 - Proposed Allocation
 University Of Northwestern-St. Paul
 CH# 230D - 93.9 MHz, Pwr= 0.25 kw, HAAT= -9.0 M, COR= 378 M
 Average Protected F(50-50)= 7.09 km
 Omni-directional

REFERENCE
 46 00 51.80 N.
 91 29 06.60 W.

DISPLAY DATES
 DATA 02-05-21
 SEARCH 02-05-21

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*
230D Hayward	W230AN	LIC _HN WI		0.0 0.0	0.00 BMLFT20050127AIL	46 00 51.80 91 29 06.60	0.050 -9		---Reference--- University Of Northwestern		
232C2 Hayward	AL4630	VAC _ WI		16.5 196.6	27.44 RM9819	46 15 03.81 91 23 01.69	50.000 150	5.8 559	51.2 Escanaba License Corp	14.5	-24.9*
230C1 Hibbing	WTBX	LIC _CN MN		322.9 141.8	191.01 BLH20051102AAP	47 22 23.80 93 00 48.70	100.000 162	160.4 596	62.7 Midwest Communications, In	23.5	104.5
227C1 Ashland	WBSZ	LIC NCN WI		37.2 217.7	78.36 BLH19940805KB	46 34 24.80 90 51 56.70	71.000 75	3.4 296	32.9 Heartland Comm. License, L	67.9	44.3
231C1 Elk Mound	WIAL	CP _CN WI		178.7 358.7	131.70 BPH20170303ABH	44 49 46.90 91 26 48.60	84.000 114	79.7 394	51.4 Clear Water Brands, Inc.	44.9	69.5
231C1 Eau Claire	WIAL	LIC _CN WI		178.7 358.7	131.67 BLH19810519AE	44 49 47.80 91 26 48.50	84.000 107	79.1 391	50.9 Clear Water Brands, Inc.	45.5	70.0
228D Rice Lake	W228BQ	LIC _CN WI		203.0 22.8	60.08 BLFT20110823ACG	45 30 59.80 91 47 10.60	0.038 129	0.4 492	8.8 Zoe Communications Inc	52.6	50.0
229C Minneapolis	KXXR	LIC _CN MN		230.8 49.6	166.38 BLH19910814KF	45 03 29.80 93 07 27.70	100.000 315	106.2 593	73.2 Radio License Holdings LLC	53.1	82.9
231D Duluth	K231BI	LIC _CN MN		330.8 150.4	98.89 BLFT20170901AAD	46 47 20.00 92 07 05.00	0.250	34.6 504	23.1 Minnesota Public Radio	57.2	65.6
284C2 Washburn	WHWA	LIC _CN WI		26.6 206.9	84.34 BLED20131105ALR	46 41 29.80 90 59 27.70	17.500 184	169.8 478	84.6 State Of Wisconsin - Educa	14.5R	69.8M
229L1 Superior	WGHF-LP	LIC _CN WI		329.6 149.1	91.98 BLL20050121ACY	46 43 32.70 92 05 45.60	0.100 -8	214		76.9	76.2
229C1 Three Lakes	WCYE	LIC NCN WI		97.9 279.5	175.60 BLH20040728ABY	45 46 29.80 89 14 55.50	100.000 124	83.6 619	54.2 Heartland Comm. License, L	84.9	111.0
233C St. Paul	KSTP-FM	LIC _CN MN		231.2 50.0	167.01 BMLH19910923KF	45 03 44.80 93 08 22.70	100.000 372	11.1 647	77.3 Kstp-Fm FCC License Sub, L	148.8	88.5

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

Exhibit 3.0 Compliance with Radiofrequency Radiation Guidelines

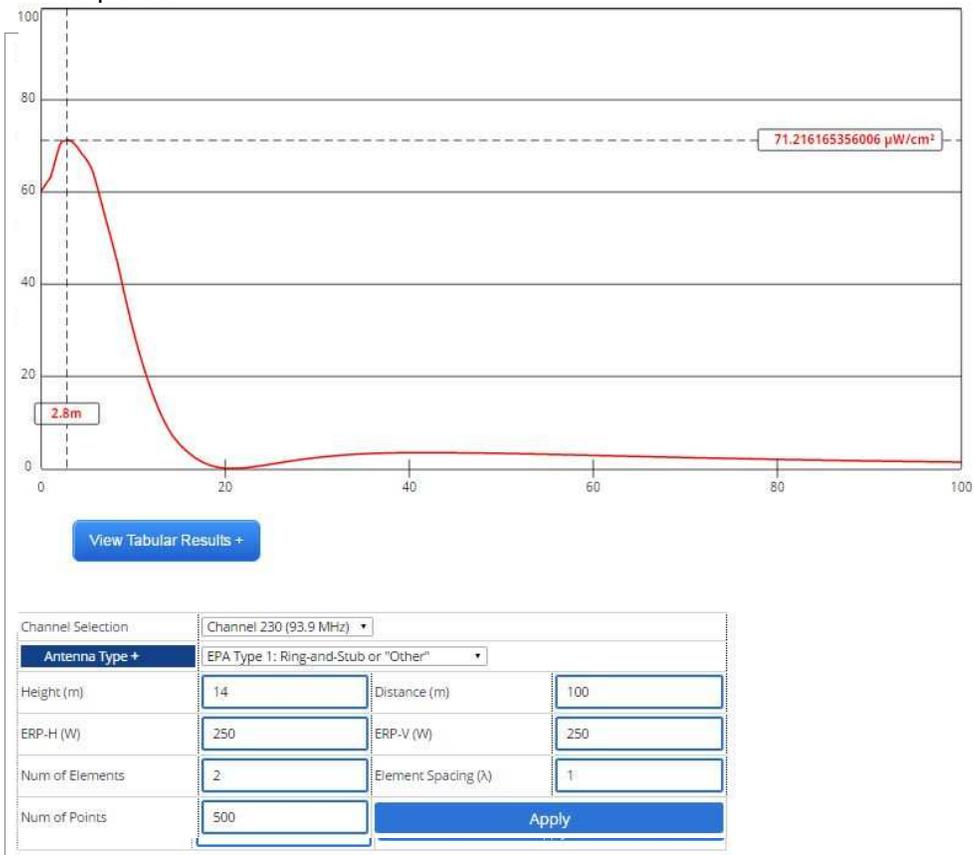
The RF Compliance Study has been evaluated for human exposure to non-ionizing radiofrequency radiation at this single source transmitter site. Therefore the potential for human exposure to non-ionizing radiofrequency radiation at the proposed transmitter site has therefore been evaluated with regards to §1.1310 concerning contributions for single source sites. There are no other sources of RF radiation within 315 meters of this site.

The proposed W230AN – Hayward, WI analog FM Translator station (Facility ID: 86422) operates on CH230D (93.9 MHz) with 0.25 kW ERP circular polarization (H&V). The facility broadcasts from an antenna COR mounted 14 meters above ground level (AGL). The facility operates with a two bay, Shively 6812-2 antenna employing EPA Type 1 elements as defined by *FM Model - Appendix B* issued March 31, 2016¹. The elements are spaced one wavelength (λ) apart. This facility will not operate with HD/IBOC facilities at this time.

To evaluate the total exposure to non-ionizing radio-frequency radiation with regards to the single source contribution rules, the individual contribution may be expressed directly in $\mu\text{W}/\text{cm}^2$ units relative to the maximum permissible uncontrolled environment limit of $200 \mu\text{W}/\text{cm}^2$. If the resulting contribution is less than or equal to $200 \mu\text{W}/\text{cm}^2$, the exposure is concluded to be within the guidelines of OET Bulletin No. 65 (Edition 97-01) and §1.1310 for the more restrictive uncontrolled limit. Protection of the uncontrolled limit ($200 \mu\text{W}/\text{cm}^2$) implies protection of the controlled limit ($1000 \mu\text{W}/\text{cm}^2$).

Inspection of the graph below shows the maximum contribution for the uncontrolled environment to be less than $200 \mu\text{W}/\text{cm}^2$ as set forth by §1.1310. Therefore, the facility is in compliance with FCC guidelines. In addition to the protection afforded by the proposed antenna height above ground, the facility is or will be properly marked with signs, and/or entry to the facility will be restricted by means of fencing with locked doors and/or gates if required. Any other means that may be required to protect employees and the general public will also be employed.

In the event work is required in proximity to the antenna(s) such that the person or persons working in the area will be potentially exposed to fields in excess of the current guidelines, an agreement signed by all broadcast parties at the site will be in effect for the offending transmitter(s) to reduce power, or cease operation during the critical period.



¹ The current *FM Model* web-based software application employs the standards as detailed in OET Bulletin No. 65 (Edition 97-01). FM radiofrequency radiation levels have been predicted using both the array pattern, the calculations of which are based on the number of bays in the antenna and wavelength spacing between the bays, and the element pattern. The element pattern has been determined by using measured element data prepared by the EPA and published in "An Engineering Assessment of the Potential Impact of Federal Radiation Protection Guidance on the AM, FM and TV Services," by Paul C. Gailey and Richard Tell - April 1985, U.S. Environmental Protection Agency. The results of the evaluation for the FM station have been shown at the end of this RF compliance discussion. To ensure complete protection, the maximum FM contribution has been assumed without regard to any restricted access fencing distance.

