

ENGINEERING REPORT

FM Translator Minor Change to Construction Permit Application

for

K256CW

File No: BLFT-20161123ABH

Facility ID: 142037

as a non Fill-In Translator for
KRFG(FM) – Nahswauk, MN

File No: BMLED-20160921AAO

Facility ID: 68633

February 2020

COPYRIGHT 2020

MUNN-REESE

Broadcast Engineering Consultants
Coldwater, MI 49036

Table of Contents

Discussion of Report

FM Booster/Fill-in Translator Requirements (See Discussion)

Interference/Overlap Requirements

Exhibit 13.1 - Copy of Existing Antenna Structure Registration (if applicable)

Exhibit 13.2 - Proposed Service and AM Fill-In Contour Map

Exhibit 13.3 - Tabulation of Proposed Allocation

Exhibit 13.4 - §74.1204(d) 2nd/3rd Adjacent Waiver Request (if applicable)

Exhibit 13.5 - Copy of Manufacturer's Vertical Radiation Pattern (if applicable)

TV Channel 6 Protection Requirements (See Discussion)

Multiple Translator Requirements (See Discussion)

RF Radiation Study Requirement

Exhibit 17.1 - RF Compliance Study

Discussion

This firm has been retained to prepare the required engineering report in support of a Minor Change Construction Permit Application for an FM Translator K256CW – Grand Rapids, MN. K256CW is licensed under BLFT-20161123ABH operation with an AMSL of 425 meters and an ERP of 0.250 kW (H&V) operating on CH256D. Operation at an AMSL of 425 meters and an ERP of 0.250 kW (H&V) and at CH254D is requested. The purpose of the application is to change the antenna to a Nicom BKG77 and change the frequency. This non Fill-In Translator will continue to rebroadcast the off air signal of Primary Station KRFG(FM) – Nashwauk, MN, Facility ID: 68633.

The Translator as proposed will be mounted on a tower not bearing an Antenna Structure Registration Number.

The present and proposed contours overlap as shown in **Exhibit 13.2**. The HAAT does need exceed 107 meters on any of the 12 radials allowing for operation at 250 watts. The HAAT table listing each of these radials is shown in **Exhibit 13.2**.

It has been determined the Translator may be used in the area without interference to any existing FM broadcast station or facility. General allocation details are found in **Exhibit 13.3**. It is believed sufficient clearance exists precluding the need for additional contour protection showings.

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.

Discussion (continued)

RADIATION PROTECTION: The Commission requires an engineering study regarding compliance with the guidelines for human protection from radiofrequency radiation. This report section is in response to that provision of the Rules. The current Federal Communications Commission guidelines for RF radiation protection are set forth in OET Bulletin No. 65 (Edition 97-01), and the accompanying Supplement A, (Edition 97-01).

The FM Broadcast facility proposed in this application will not produce human exposure to radiofrequency radiation in excess of the applicable safety standards specified in §1.1307(b)(3) of the Commission's rules concerning RF contributors of less than 5%. **Exhibit 17.1** provides the details of the study that was made to demonstrate compliance. The facility is properly marked with signs, and entry is restricted by means of fencing with locked doors and/or gates. Any other means as may be required to protect employees and the general public will be employed.

In the event work would be required in proximity to the antenna such that the person or persons working in the area would be potentially exposed to fields in excess of the guidelines set forth in OET Bulletin No. 65 (Edition 97-01), the transmitter power will be reduced or the station will cease operation during the critical period.

Exhibit 13.2 - K256CW Present and Proposed Service Contour Study

Munn-Reese.com

K256CW

BLFT20161123ABH
Latitude: 47-14-23 N
Longitude: 093-34-33.92 W
ERP: 0.07 kW
Channel: 256
Frequency: 99.1 MHz
AMSL Height: 425.0 m
Elevation: 396.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

K256CW.P

Proposed Operation
Latitude: 47-14-23 N
Longitude: 093-34-34 W
ERP: 0.25 kW
Channel: 254
Frequency: 98.7 MHz
AMSL Height: 425.0 m
Elevation: 396.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

N. Lat. = 471423.0 W. Lng. = 933434.0
HAAT and Distance to Contour,
FCC, FM 2-10 Mi, 51 pts Method - NED 03 SEC

K256CW.C, University Of Northwestern -, BPFT20170123GER
Azi. AV EL HAAT ERP kW dBk 60-F5

000	405.3	19.7	0.2500	-6.02	7.09
030	402.6	22.4	0.2500	-6.02	7.09
060	409.1	15.9	0.2500	-6.02	7.09
090	399.7	25.3	0.2500	-6.02	7.09
120	390.0	35.0	0.2500	-6.02	7.60
150	403.9	21.1	0.2500	-6.02	7.09
180	405.2	19.8	0.2500	-6.02	7.09
210	426.7	-1.7	0.2500	-6.02	7.09
240	418.5	6.5	0.2500	-6.02	7.09
270	390.4	34.6	0.2500	-6.02	7.56
300	393.0	32.0	0.2500	-6.02	7.29
330	395.2	29.8	0.2500	-6.02	7.09

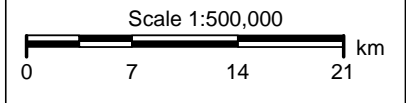
Ave El= 403.30 M HAAT= 21.70 M AMSL= 425 M

K256CW (256)
K256CW.P (254)

FCC F(50-50) 60.00 dBu (FCC HAAT)

FCC F(50-50) 60.00 dBu (FCC HAAT)

K256CW.P
K256CW



University Of Northwestern - St. Paul

DISPLAY DATES
DATA 02-05-20
SEARCH 02-11-20

CH CITY	CALL	TYPE	ANT STATE	AZI <--	DIST FILE #	LAT LNG	PWR(kw) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap	*OUT* in km)
254D Grand	K256CW Rapids	CP	____	0.0	0.00	47 14 22.80	0.250		---Reference---		
		MN		265.5	BMPFT20190916ABA	93 34 34.80		425	University Of Northwestern		
256D Grand	K256CW Rapids	LIC	____	0.0	0.00	47 14 22.80	0.070		---Reference---		
		MN		270.0	BLFT20161123ABH	93 34 34.70		425	University Of Northwestern		
256C1 Walker	KLLZ-FM	LIC	N__	278.8	99.48	47 22 10.80	100.000	7.5	60.5	84.4	37.8
		MN		97.9	BLH20150225ACG	94 52 55.00	160	587	Hbi Radio Bemidji, LLC		
252C1 Blackduck	WBJI	LIC	N__	291.3	98.66	47 33 20.80	100.000	7.3	59.4	83.8	38.1
		MN		110.4	BLH20030825AFY	94 48 05.00	146	566	R.P. Broadcasting, Inc.		
254D Bemidji	K254DJ	CP	____	284.3	96.75	47 26 49.80	0.250	47.9	14.2	41.2	57.1
		MN		103.3	BNPFT20180503AAD	94 49 25.00		533	Real Presence Radio		
252D Hibbing	W252AN	LIC	____	71.2	49.36	47 22 50.70	0.009	0.2	5.5	42.1	42.8
		MN		251.7	BLFT19870410TA	92 57 19.60	29	530	Midwest Communications, In		
255C1 Duluth	KTCO	LIC	____	113.7	121.38	46 47 26.80	100.000	70.8	41.0	43.1	68.6
		MN		294.8	BLH19980211KB	92 06 59.70	183	486	Midwest Communications, In		
254C1 Moorhead	KLTA-FM	LIC	____	258.0	235.96	46 45 34.90	100.000	156.7	59.8	71.9	151.5
		MN		75.8	BMLH20140826ABA	96 36 28.30	177	463	Radio Fargo-Moorhead, Inc.		
256D Eveleth	W256BC	LIC	____	70.5	84.14	47 29 13.70	0.010	0.2	6.9	76.8	76.2
		MN		251.3	BLFT20070614AAD	92 31 13.60	126	570	Minnesota Public Radio		
251C0 St. Cloud	WWJO	LIC	____	192.5	162.17	45 48 51.90	100.000	9.7	70.2	145.4	90.8
		MN		12.1	BLH19890117KF	94 01 38.90	305	669	Townsquare Media Licensee		

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 17.1

Compliance with Radiofrequency Radiation Guidelines

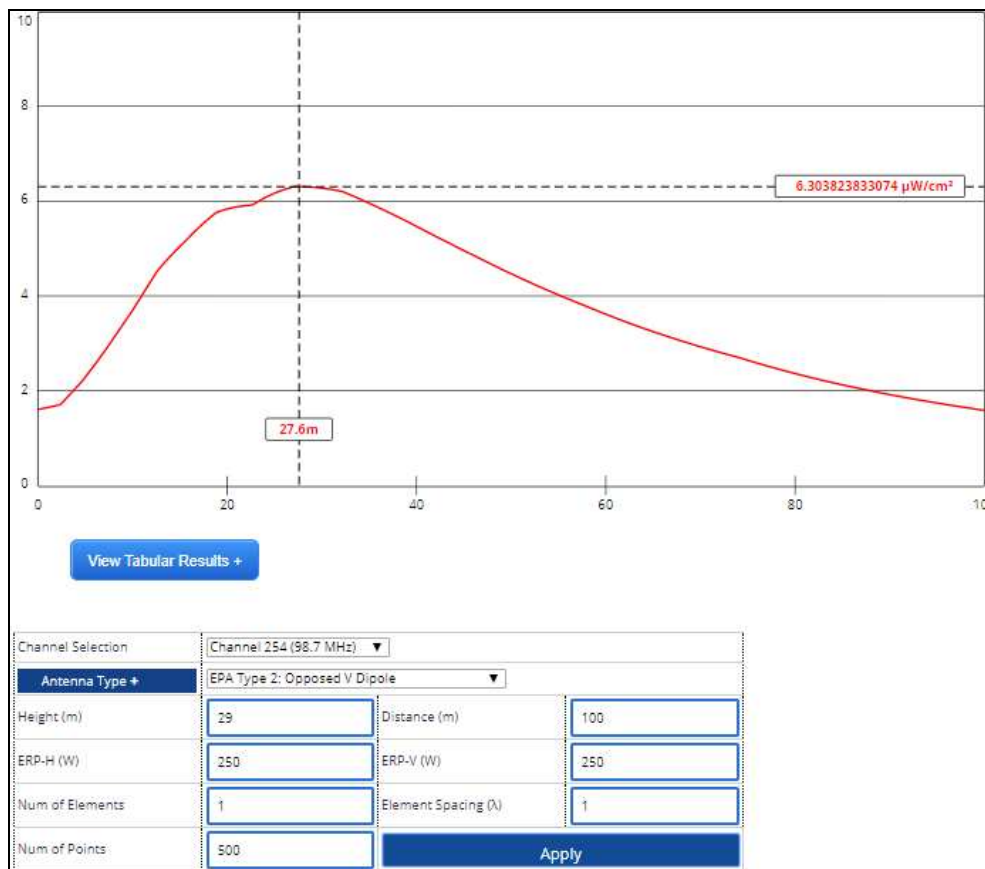
The RF Compliance Study has been evaluated for human exposure to non-ionizing radiofrequency radiation at the transmitter site. The site is intended to house multiple transmitters. The potential for human exposure to non-ionizing radiofrequency radiation at the proposed transmitter site has therefore been evaluated with regards to the §1.1307(b)(3), five percent (5%) contribution rule, for multiple transmitter sites.

The proposed operation will broadcast from an antenna COR mounted 29 meters above ground level (AGL). The facility will operate with a one bay antenna employing EPA Type 2 elements as defined by *FM Model - Appendix B* issued March 31, 2016¹. 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 five percent contribution exclusion rule, it is necessary to establish 5.0% of the maximum permissible limit. 5.0% of the 200 $\mu\text{W}/\text{cm}^2$ results in 10 $\mu\text{W}/\text{cm}^2$. Therefore if the resulting contribution is less than or equal to 10 $\mu\text{W}/\text{cm}^2$ or 5.0%, the exposure is concluded to be within the guidelines of OET Bulletin No. 65 (Edition 97-01) and §1.1307(b)(3). Protection of the more restrictive uncontrolled limit implies protection of the controlled limit.

Inspection of the graph below indicates the maximum contribution for the uncontrolled environment is less than the 10 $\mu\text{W}/\text{cm}^2$ (5.0%) limit as set forth by §1.1307(b)(3), therefore the facility is in compliance with FCC guidelines. §1.1307(b)(3) states that facilities contributing less than five percent of the exposure limit at locations with multiple transmitters are categorically excluded from responsibility for taking any corrective action in the areas where its contribution is less than five percent. Since this instant application meets the five percent exclusion test at all ground level areas, the impact of the proposed facility may be considered independently from other facilities operating at or nearby this site. It is believed the impact of the proposed operation should not be considered to be a factor at ground level as defined under §1.1307(b)(3).

In addition to the protection afforded by the proposed antenna height above ground, the facility is or will be properly marked with signs, and 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.

