
Keene, NH - WKNE(FM) (License Modification)

Compliance with Radiofrequency Radiation Guidelines

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Explanation of Study The studied facilities comply with the maximum permissible radiofrequency electromagnetic exposure limits for controlled and uncontrolled environments as set forth under §1.1310 of the Commission's rules and the RF radiation protection guidelines as set forth in OET Bulletin No. 65 (Edition 97-01), and the accompanying Supplement A, (Edition 97-01). The site is intended to house multiple transmitters of mixed aural and/or visual origin.

Concerning FM contributions, the potential for human exposure to non-ionizing radiofrequency radiation has been evaluated with regard to §1.1310 utilizing the Commission's own *FM Model* web-based software application. The use and implementation of this FCC sanctioned software is a matter of record before the Commission. To ensure complete protection, each maximum FM contribution has been assumed without regard to any restricted access fencing distance. The maximum permissible uncontrolled limit for FM stations is 200 $\mu\text{W}/\text{cm}^2$. The maximum permissible controlled limit is 1000 $\mu\text{W}/\text{cm}^2$. Therefore, contributions of $\leq 200 \mu\text{W}/\text{cm}^2$ remain within the tolerances as allowed by §1.1310 and its governing OET Bulletin No. 65 (Edition 97-01) for the more restrictive of either two protections.

DTV contributions were taken directly from each DTV station's underlying construction permit application as already reviewed and granted by Commission staff. In the event DTV applicant failed to provide a valid RF compliance study (or simply certified compliance with no supporting documentation), Equation 10 of OET Bulletin No. 65 was used to determine the individual contribution of that DTV station. Equation 10 predicts the potential exposure to radiofrequency radiation for human observers on the ground as indicated by total power density expressed in units of $\mu\text{W}/\text{cm}^2$. The maximum permissible uncontrolled and controlled limits as allowed by §1.1310 and its governing OET Bulletin No. 65 (Edition 97-01) for DTV stations is frequency dependent. However, the more restrictive of these two protections has been calculated below.

All RF contributing facilities within a 315 meter radius are as follows:

Call	Channel	Status	City	ST	File Number	FacID	ERP	RCAGL	Dist(km)
WKNE	279B	FM	LIC KEENE	NH	BMLH-20070212AAW	36834	12.0kw	113.0m	0.00km
WKKN	270A	FM	LIC WESTMINSTER	VT	BLH-20080409AAH	46334	1.05kw	DA 49.0m	0.01km
WEVN	214B1	FM	LIC KEENE	NH	BMLD-20030815ADI	48440	1.5kw	DA 88.0m	0.01km
WEKW-TV	18-52	DTV	LIC KEENE	NH	LMS-0000111230	69271	95.0kw	145.2m	0.00km
WVMA-CD	22	DCA	LIC WINCHENDON	MA	LMS-0000095385	48413	15.0kw	125.0m	0.00km

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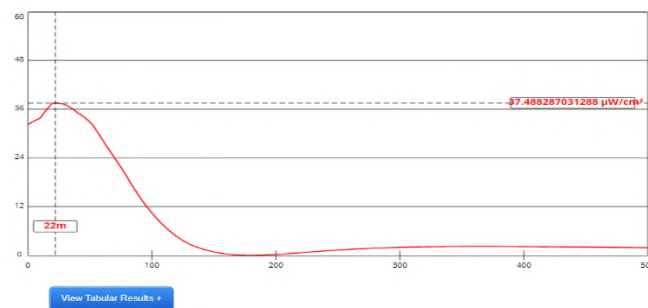
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Results of Study The sum of each individual contribution as a percentage of its each maximum permissible uncontrolled limit has been provided below. As the resulting contribution(s) as a whole is less than 100%, the combined exposure has been calculated to be within the guidelines of OET Bulletin No. 65 (Edition 97-01) for the more restrictive uncontrolled environment as defined by locations accessible by the general public. As stated before, protection of the uncontrolled environment implies protection of the controlled environment. There are no other broadcast sources of radiofrequency non-ionizing radiation present at this site.

Contributing Station	Individual Contribution	Individual Uncontrolled Limit	Percent of Uncontrolled Limit
WKNE (FM) .L (Analog & Digital)	37.488 $\mu\text{W}/\text{cm}^2$	200 $\mu\text{W}/\text{cm}^2$	18.744%
WKKN (FM) .L (Analog)	19.112 $\mu\text{W}/\text{cm}^2$	200 $\mu\text{W}/\text{cm}^2$	9.556%
WEVN (FM) .L (Analog)	8.073 $\mu\text{W}/\text{cm}^2$	200 $\mu\text{W}/\text{cm}^2$	4.037%
WEKW- (D) TV.L (Digital)	2.466 $\mu\text{W}/\text{cm}^2$	331 $\mu\text{W}/\text{cm}^2$	0.745%
WVMA-CD (DTV) .L (Digital)	2.980 $\mu\text{W}/\text{cm}^2$	347 $\mu\text{W}/\text{cm}^2$	0.859%
Total of Uncontrolled Limit:			33.940%

The facility is, or will be, properly marked with signs. Entry is, or will be, restricted by means of fencing with locked doors or gates. Furthermore, 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.

Summary of Stations: The licensed (modified) WKNE(FM).L - Keene, NH analog FM Station (Facility ID: 36834), operates on CH279B (103.7 MHz) with 12.0 kW ERP circular polarization (H&V). This facility operates with an antenna COR mounted 113 meters above ground level (AGL). The facility employs a two bay, Shively Model 6814-2/3R antenna employing EPA Type 1 elements as defined by the Commission's own FM Model - Appendix B (issued March 31, 2016). The antenna elements are spaced 0.95 wavelength (λ) apart. WKNE-FM.L operates with (modified) HD/IBOC facilities of -18.6 dBc power (0.164 kW ERP) circular polarization (H&V) (or $\text{Log}[0.0137]*10 = -18.6 \text{ dBc}$) from the main antenna mounted 113 meters AGL. Therefore, a combined power of 12.164 kW (H&V) has been assumed for this contribution.



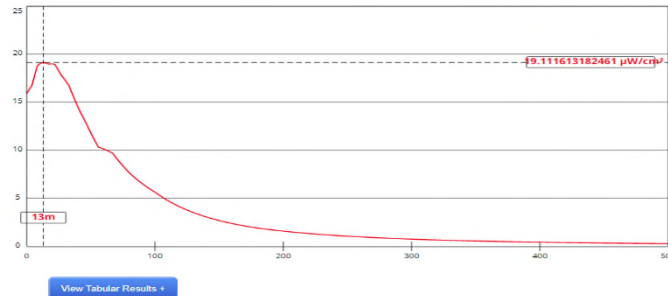
Channel Selection	Channel 279 (103.7 MHz)		
Antenna Type	EPA Type 1: Ring-and-Stub or "Other"		
Height (m)	113	Distance (m)	500
ERP-H (W)	12164	ERP-V (W)	12164
Num of Elements	2	Element Spacing (λ)	0.95
Num of Points	500	Apply	

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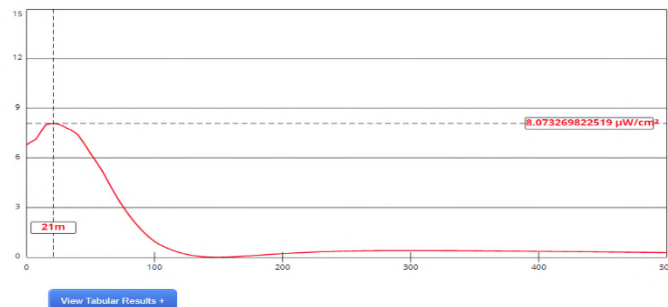
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Summary of Stations: The licensed WKKN(FM).L - Westminster, VT analog FM Station (Facility ID: 46334) operates on CH270A (101.9 MHz) with 1.05 kW ERP circular polarization (H&V). The licensed operation broadcasts from an antenna COR mounted 49 meters above ground level (AGL). The facility employs a one (1) bay, Shively Model 6810-1R-DA antenna. The element is spaced 1.0 wavelength (λ) apart. The antenna employs an EPA Type 1 element as defined by the Commission's own FM Model - Appendix B (issued March 31, 2016). WKKN(FM).L does not operate with HD/IBOC facilities at this time.



Channel Selection	Channel 270 (102.9 MHz)	
Antenna Type +	EPA Type 1: Ring-and-Stub or "Other"	
Height (m)	49	Distance (m)
ERP-H (W)	1050	ERP-V (W)
Num of Elements	1	Element Spacing (λ)
Num of Points	500	Apply

Summary of Stations: The licensed WEVN(FM).L - Keene, NH analog FM Station (Facility ID: 48440) operates on CH214B1 (90.7 MHz) with 1.5 kW ERP circular polarization (H&V). The licensed operation broadcasts from an antenna COR mounted 88 meters above ground level (AGL). The facility employs a two (2) bay, Shively Model 6810-2R-DA antenna. The elements are spaced 1.0 wavelength (λ) apart. The antenna employs EPA Type 1 elements as defined by the Commission's own FM Model - Appendix B (issued March 31, 2016). WEVN(FM).L does not operate with HD/IBOC facilities at this time.



Channel Selection	Channel 214 (90.7 MHz)	
Antenna Type +	EPA Type 1: Ring-and-Stub or "Other"	
Height (m)	88	Distance (m)
ERP-H (W)	1500	ERP-V (W)
Num of Elements	2	Element Spacing (λ)
Num of Points	500	Apply

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Summary of Stations The non-co-owned, but collocated WEKW-D(TV).L - Keene, NH digital TV facility (Facility ID: 69271) specifies digital primary operation on TV Channel 18DT with a maximum effective radiated power (ERP) of 95 kW horizontal only polarization with a COR mounted 145.2 meters AGL. Pursuant to License LMS-000011230 and underlying Construction Permit LMS-0000100752, this digital TV facility was granted and authorized with a listed contribution of $2.466 \mu\text{W}/\text{cm}^2$ or 0.745% of the FCC's $331 \mu\text{W}/\text{cm}^2$ limit for uncontrolled environments. A copy of the LMS-0000100752 RF Study is as follows:

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terrain along eight equally spaced cardinal radials from 3 kilometers to 16 kilometers from the site and beginning from true north.

4.0 RADIO FREQUENCY RADIATION COMPLIANCE

A theoretical analysis has been conducted of the human exposure to radio frequency radiation ("RFR") using the calculation methodology described in OET Bulletin 65, Edition 97-01. The RFR analysis is conducted pursuant to the following methodology:

Terrain² extraction is compiled from the proposed tower site to radial lengths of 0.25 miles in 0.001 mile increments for 360 radials. The power density is calculated for each terrain point at 6 feet above ground level using the elevation and azimuth pattern of the proposed broadcast antenna. The power density calculations are conducted using the lower edge of the proposed channel frequency. To account for ground reflections, a coefficient of 1.6 was included in the calculation.

The resulting cylindrical polar analysis is then summarized into a coordinate plane graph using the following methodology:

Starting from the origin the maximum calculated RFR value is determined among the 360-degree radials for each 0.001 mile increment, the value is then converted into a percentage of the maximum allowable general population or uncontrolled exposure and plotted as a function of perpendicular distance from the tower.

The resulting RFR study in Appendix D demonstrates that the peak exposure is 0.745% of the most restrictive permissible exposure threshold. Pursuant to OET

² Terrain extraction is based upon a 3 arc second point spacing terrain database.

K&A Keeler and Gehring Associates
Consultants - Broadcast - Wireless

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Bulletin 65 concerning multiple-user transmitter sites only those licensees whose transmitters produce power density levels greater than 5.0% of the exposure limit are considered significant contributors to RFR. Since the proposed operation is within 5% of the most permissible exposure at any location 2 meters above the ground, it is not considered a significant contributor to RFR exposure. Thus, contributions to exposure from other RF sources in the vicinity of the proposed facility were not taken into account. The instant application is compliant with the FCC limits for human exposure to RF radiation and is excluded from further environmental processing since no changes are proposed to the tower structure in order to accommodate the proposed antenna.

A chain link fence encloses the support structure and the applicant will cooperate with any other users of the tower by reducing the power to the antenna or if necessary completely cutting it off to protect maintenance workers on the tower.

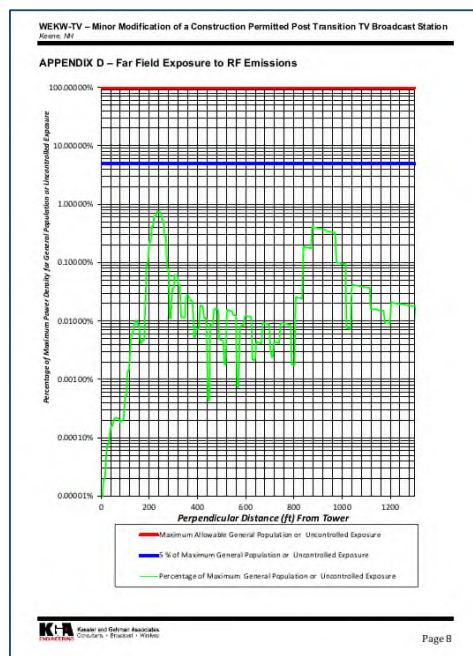
5.0 CERTIFICATION

The foregoing statement and the report regarding the aforementioned engineering work are true and correct to the best of my knowledge. Executed on January 26, 2020

Ryan Wilhour
Ryan Wilhour
Consulting Engineer

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Consultants - Broadcast - Wireless

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Summary of Stations The non-co-owned, but collocated WVMA-CD(DTV).L - Winchendon, MA digital TV facility (Facility ID: 48413) specifies digital primary operation on TV Channel 22DT with a maximum effective radiated power (ERP) of 15 kW horizontal only polarization with a COR mounted 125 meters AGL. Pursuant to License LMS-0000095385 and underlying Construction Permit LMS-0000091716, this digital TV facility was granted and authorized with a listed contribution of 2.98 $\mu\text{W}/\text{cm}^2$ or 0.86% of the FCC's 347 $\mu\text{W}/\text{cm}^2$ limit for uncontrolled environments. A copy of the LMS-0000091716 RF Study is as follows:

Radiofrequency (RFR) Statement of Compliance

As discussed below, the subject station's predicted power density contribution at the multiple-use site is not considered significant and does not require consideration.

Based on worst-case calculations and considering a very conservative vertical relative field factor of 0.3 pursuant to OET Bulletin 65, the proposed television facility is predicted to produce a maximum power density of only 2.98 microwatts per square centimeter at two meters above ground level. This represents only 0.86% of the FCC Guideline value of 347.33 microwatts per square centimeter for uncontrolled RFR environments. Pursuant to Section 1.1307(b)(3) of the FCC Rules, because the proposed facility would contribute less than 5% of the uncontrolled limit and controlled exposure limit, the proposal's power density contribution is insignificant.

Further, the Applicant will continue to cooperate/coordinate with other site users and reduce power and/or cease operation during times of service or maintenance of the transmission systems as necessary to avoid potentially harmful exposure to personnel. In light of the above, the proposed facility should be categorically excluded from RF environmental processing under Section 1.1307(b) of the Commission's Rules.

