

Bellingham, WA - Auxiliary FM Operation

Compliance with Radiofrequency Radiation Guidelines

The potential for human exposure to non-ionizing radiofrequency radiation has been evaluated at the proposed transmitter site. This site will house multiple AM and FM operations. The standards employed here-in are detailed in OET Bulletin No. 65 (Edition 97-01). There are no other known broadcast facilities within 315 meters of the shared transmitter site which operate with a power greater than 99 watts ERP.

The existing KPUG(AM) - Bellingham, WA analog AM facility (Facility ID: 58887) operates on a frequency of 1170 kHz with a daytime non-directional power of 10.0 kW and a nighttime directional power of 5.0 kW. Both modes of operation employ equal vertical radiators of 92.1° or 0.256 λ (wavelengths) for operation on 1170 kHz. Existing fencing is no less than 2.0 meters (6.6 feet) for each tower.

The KISM(FM) - Bellingham, WA analog Auxiliary FM facility (Facility ID: 34469) operates on CH225C (92.9 MHz) with 0.68 kW ERP circular polarization (H&V). The auxiliary facility broadcasts from an antenna COR mounted 62 meters above ground level (AGL). The auxiliary facility operates with a three bay Nicom BKG77-3, "Opposed V Dipole" antenna employing EPA Type 2 approved elements as defined by *FM Model - Appendix B* issued March 31, 2016. This station will not operate with HD/IBOC facilities at this time.

The KAFE(FM) - Bellingham, WA analog Auxiliary FM facility (Facility ID: 58886) operates on CH281C (104.1 MHz) with 0.68 kW ERP circular polarization (H&V). The auxiliary facility broadcasts from an antenna COR mounted 62 meters above ground level (AGL). The auxiliary facility operates with a three bay Nicom BKG77-3, "Opposed V Dipole" antenna employing EPA Type 2 approved elements as defined by *FM Model - Appendix B* issued March 31, 2016. This station will not operate with HD/IBOC facilities at this time.

The CH243D.P - Bellingham, WA analog FM Translator (Facility ID: 144175) operates on CH243D (96.5 MHz) with 0.250 kW ERP circular polarization (H&V). The FM Translator broadcasts from an antenna COR mounted 62 meters above ground level (AGL). The FM Translator operates with a three bay Nicom BKG77-3, "Opposed V Dipole" antenna employing EPA Type 2 approved elements as defined by *FM Model - Appendix B* issued March 31, 2016. This station will not operate with HD/IBOC facilities at this time.

The CH247D.P - Bellingham, WA analog FM Translator (Facility ID: 143909) operates on CH247D (97.3 MHz) with 0.250 kW ERP circular polarization (H&V). The FM Translator broadcasts from an antenna COR mounted 62 meters above ground level (AGL). The FM Translator operates with a three bay Nicom BKG77-3, "Opposed V Dipole" antenna employing EPA Type 2 approved elements as defined by *FM Model - Appendix B* issued March 31, 2016. This station will not operate with HD/IBOC facilities at this time.

The CH255D.P - Bellingham, WA analog FM Translator (Facility ID: 142903) operates on CH255D (98.9 MHz) with 0.250 kW ERP circular polarization (H&V). The FM Translator broadcasts from an antenna COR mounted 62 meters above ground level (AGL). The FM Translator operates with a three bay Nicom BKG77-3, "Opposed V Dipole" antenna employing EPA Type 2 approved elements as defined by *FM Model - Appendix B* issued March 31, 2016. This station will not operate with HD/IBOC facilities at this time.

As all five (5) FM facilities operate into the same common antenna, the sum FM power of 2.11 kW ERP circular polarization has been assumed as one single contribution from the common antenna height of 62 meters AGL. As stated before, a three (3) bay common antenna employing EPA Type 2 elements as defined by FM Model - Appendix B issued March 31, 2016 has been employed.

FCC supplied software was used to determine the individual contribution of each FM station. The *FM Model Version 2.1b* software 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 for the AM restricted access fencing distance.

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FCC supplied MININEC interpolated graphs were used to determine the individual contribution of each AM station. MININEC AM Model Figure(s) 1-4 have been taken directly from, and employ the standards of, OET Bulletin No. 65 (Edition 97-01). The relevant MININEC AM Model Figure has been shown in graphical form at the end of this report with the predicted electrical field (V/m) and magnetic field (A/m) noted. For each AM contribution, the maximum contribution has been assumed using the maximum power regardless of mode of operation or directional tower power distribution. The AM contribution(s) have been interpolated at the measured fencing distance.

To evaluate the total exposure to non-ionizing radiofrequency radiation it is necessary to sum the individual contributions as a decimal fraction of the maximum permissible limit. If the resulting sum is less than or equal to unity, the exposure is concluded to be within the guidelines of OET Bulletin No. 65 (Edition 97-01). The table that follows provides the same information with respect to those locations defined as an "uncontrolled environment." This includes locations where there could be exposure to the general public. The total decimal fraction is also shown.

<u>Contributing Station</u>	<u>Maximum Contribution</u>	<u>Uncontrolled Environment Limit</u>	<u>Decimal Fraction of Limit</u>
Common FM Contribution	6.090 $\mu\text{W}/\text{cm}^2$	200 $\mu\text{W}/\text{cm}^2$	0.03045
KPUG(AM)	1.265 A/m	1.630 A/m	<u>0.77602</u>
		Total Decimal Fraction:	0.80647

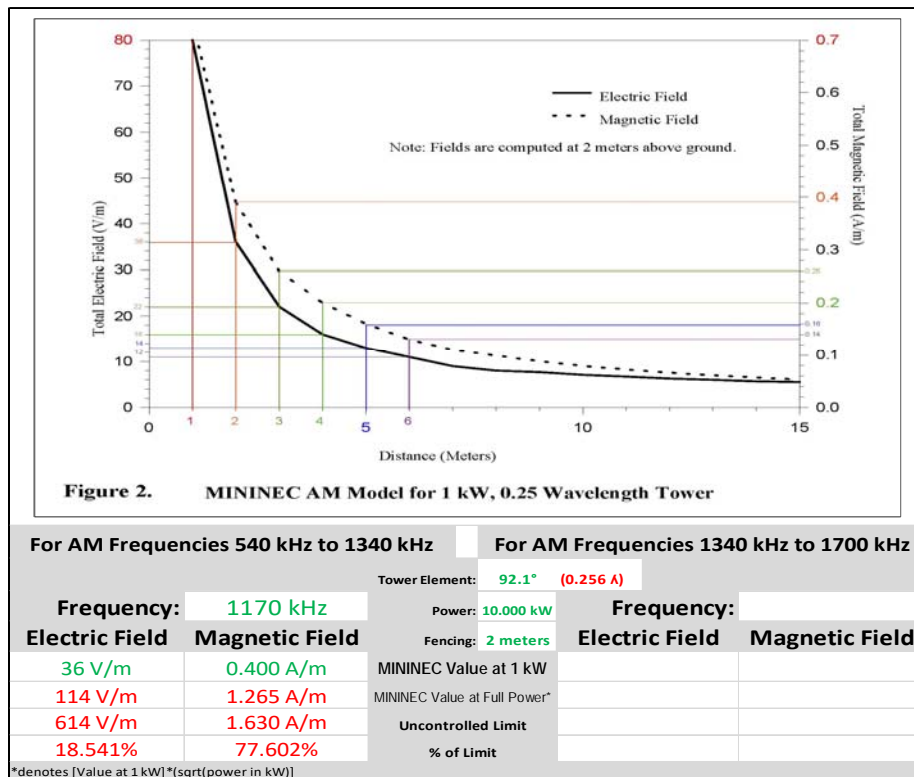
Since the Total Decimal Fraction is less than unity for the uncontrolled environment, the operation of the combined transmitting plants is in compliance with the provisions of OET Bulletin No. 65 (Edition 97-01). Protection of the uncontrolled environment implies protection of the controlled environment. There are no other broadcast sources of radiofrequency non-ionizing radiation present at this site.

In addition to the protection afforded by the existing AM fencing and the FM antenna heights above ground, the facility is properly marked with signs, and entry to the facility 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 FCC guidelines, an agreement, signed by all broadcast parties at the site, is in effect for the offending transmitter(s) to reduce power, or cease operation during the critical period.

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PLOT AND TAB OF ELECTRIC AND MAGNETIC FIELD STRENGTHS KPUG(AM) - 1170 kHz - Bellingham, WA



PLOT AND TAB OF TOTAL POWER DENSITY Common FM Operation - Bellingham, WA

