

FM Station KPEK • 100.3 MHz • Albuquerque, New Mexico
Auxiliary Antenna Radio Frequency Exposure Measurements

Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained to evaluate the radio frequency exposure conditions due to the proposed operation of a standby antenna for FM Station KPEK at the Sandia Crest Electronics Site near Albuquerque, New Mexico.

Electromagnetic Field Exposure Standard

The U.S. Congress requires that the Federal Communications Commission (“FCC”) evaluate its actions for possible significant impact on the environment. In Docket 93-62, effective October 15, 1997, the FCC adopted the human exposure limits for field strength and power density recommended in Report No. 86, “Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields,” published in 1986 by the Congressionally chartered National Council on Radiation Protection and Measurements (“NCRP”). Separate limits apply for occupational and public exposure conditions, with the latter limits generally five times more restrictive. The more recent Institute of Electrical and Electronics Engineers (“IEEE”) Standard C95.1-1999, “Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,” includes nearly identical exposure limits. A summary of the FCC’s exposure limits is shown in Figure 1. These limits apply for continuous exposures and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

The guidelines allow higher exposures for short time periods. Exposures can be averaged over a six-minute period, allowing, for example, a two-minute exposure to fields three times the limit if the remainder of the six-minute period does not include any significant exposure. Restrictions on the access to strong fields may be achieved in different manners for casual public exposure than for occupational exposure. Persons who are authorized to be in a site area can be educated to follow procedures that will limit time-averaged exposures to levels not exceeding the guidelines.

Site Description

The Sandia Crest Electronics Site, located approximately 24 kilometers northwest of Albuquerque, New Mexico, in the Cibola National Forest, contains the transmitting facilities of numerous TV, FM, microwave, and communications stations serving the greater Albuquerque area. Neighboring the “high-power” Electronics Site is a “low-power site” to the north. KPEK has installed a single-bay ERI SHPX-1AE “rototiller” antenna operating at 1.0 kW effective radiated power as a standby antenna. The antenna is currently located on Tower 15 in the high-power site, at a height above ground level of 19.8 meters and is utilized to broadcast the station’s IBOC digital audio signal.



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Measurement Procedure

Measurements were made by the undersigned engineer on August 18, 2005, throughout the area of the communications site in the vicinity of Tower 15. The measurement equipment used was a Wandel & Goltermann Type EMR-300 Radiation Meter with a Type 25 Isotropic Electric Field Probe (Serial No. E-0001). Both meter and probe were under current calibration by manufacturer. The probe is frequency shaped to reflect the occupational exposure limits detailed in the FCC standard, allowing the meter to measure correctly the total exposure levels from various emitters at the site. The meter conveniently reads directly in percent of the occupational limits of the standard. Measurements were made first with KPEK operating on its main antenna. Comparison measurements were then made with the station operating only on the proposed standby antenna.

Results of Measurements

With all broadcast facilities operating under normal operating conditions, typical peak readings in the vicinity of Tower 15 were 30% to 40% of the FCC occupational exposure limit. The maximum peak RF exposure level anywhere within this area measured 65% of the FCC occupational exposure limit, in an area at the base of Tower 15. Higher levels were recorded at the base of several towers and adjacent to some guy anchors due to localized re-radiation with maximum peak readings at the base of Tower 15 of about 200% of the occupational limit.* With KPEK operating from the proposed standby antenna, peak readings again were typically between 30% and 40% of the FCC occupational exposure limit. The maximum peak RF exposure level anywhere within this area measured 60% of the occupational limit, with most points measuring 2% to 5% below levels recorded with KPEK operating on its main antenna. Localized re-radiation was observed, which again exceeded the occupational limit at the base of several towers and guys anchors.

No Mitigation Measures Required

Mitigation measures have been recommended for all facilities at the Sandia Crest Broadcast Site in Hammett & Edison's report dated March 4, 2005. No additional mitigation measures are required for operation of the standby facility for KPEK at an ERP of 1.0 kW.

Conclusion

Based on observations and measurements during the visit to the Sandia Crest Broadcast Site, it is the undersigned's professional opinion that the standby facility proposed by FM Station KPEK does

* Hammett & Edison's full report on RF exposure conditions at the Sandia Crest Broadcast Site, dated March 4, 2005, provides complete details of conditions at the site, and recommended mitigation measures.



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comply with the prevailing standards for limiting public exposure to radio frequency energy and, therefore, does not for this reason cause a significant impact on the environment.


List of Figures

In carrying out these engineering studies, the following attached figures were prepared under my direct supervision:

1. FCC Radio Frequency Exposure Guidelines
2. Site Map.

October 13, 2005




Mark D. Neumann, P.E.

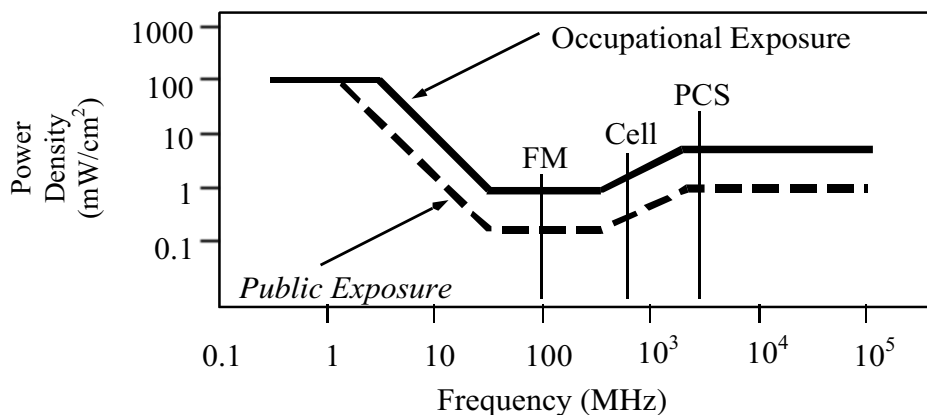


FCC Radio Frequency Protection Guide

The U.S. Congress required (1996 Telecom Act) the Federal Communications Commission (“FCC”) to adopt a nationwide human exposure standard to ensure that its licensees do not, cumulatively, have a significant impact on the environment. The FCC adopted the limits from Report No. 86, “Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields,” published in 1986 by the Congressionally chartered National Council on Radiation Protection and Measurements, which are nearly identical to the more recent Institute of Electrical and Electronics Engineers Standard C95.1-1999, “Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.” These limits apply for continuous exposures from all sources and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

As shown in the table and chart below, separate limits apply for occupational and public exposure conditions, with the latter limits (in *italics* and/or dashed) up to five times more restrictive:

Frequency Applicable Range (MHz)	Electromagnetic Fields (f is frequency of emission in MHz)					
	Electric Field Strength (V/m)		Magnetic Field Strength (A/m)		Equivalent Far-Field Power Density (mW/cm ²)	
0.3 – 1.34	614	<i>614</i>	1.63	<i>1.63</i>	100	<i>100</i>
1.34 – 3.0	614	<i>823.8/f</i>	1.63	<i>2.19/f</i>	100	<i>180/f²</i>
3.0 – 30	1842/ f	<i>823.8/f</i>	4.89/ f	<i>2.19/f</i>	900/ f ²	<i>180/f²</i>
30 – 300	61.4	<i>27.5</i>	0.163	<i>0.0729</i>	1.0	<i>0.2</i>
300 – 1,500	3.54√f	<i>1.59√f</i>	√f/106	<i>√f/238</i>	f/300	<i>f/1500</i>
1,500 – 100,000	137	<i>61.4</i>	0.364	<i>0.163</i>	5.0	<i>1.0</i>



Higher levels are allowed for short periods of time, such that total exposure levels averaged over six or thirty minutes, for occupational or public settings, respectively, do not exceed the limits, and higher levels also are allowed for exposures to small areas, such that the spatially averaged levels do not exceed the limits. However, neither of these allowances is incorporated in the conservative calculation formulas in the FCC Office of Engineering and Technology Bulletin No. 65 (August 1997) for projecting field levels. Hammett & Edison has built those formulas into a proprietary program that calculates, at each location on an arbitrary rectangular grid, the total expected power density from any number of individual radio sources. The program allows for the description of buildings and uneven terrain, if required to obtain more accurate projections.



Sandia Crest Electronics Site • Albuquerque, New Mexico

Tower Locations and Identifications – South Side of High Power Portion

