Non-Ionizing Radiation Calculations
KZSC FM Auxiliary Facility
UCSC Campus Santa Cruz, California

Introduction

In accordance with the Commission's rules, an assessment was made of the existing broadcast and cellular facilities, as well as the proposed Cellular modifications, and the proposed 300 watt KZSC(FM) auxiliary facility and it's impact at the site. Table 1 of O.E.T. Bulletin 65 (Edition 97-01) was utilized to determine the extent of radio frequency radiation, as defined by the Commission's MPE limits, which are based upon those of ANSI/IEEE C95.1-1992 and the NCRP Report No. 86 (1986). The existing and proposed KZSC(FM) antenna and effective radiated powers were taken into consideration, in addition to the two low power FM stations, and the existing Cellular One (AT&T) facilities, utilizing the FCC/EPA computer model (FM Model) for estimating ground-level power densities.

Standards Definition

The ANSI standard for RF exposure at 30 to 300 Mhz is as follows:

Uncontrolled (Public) Standard: 200 Microwatts per centimeter squared
Controlled (Occupied) Standard: 1000 Microwatts per centimeter squared

The ANSI standard for RF exposure at 900 Mhz (Center of Cellular Band) is as follows:

Uncontrolled (Public) Standard: 600 Microwatts per centimeter squared
Controlled (Occupied) Standard: 3000 Microwatts per centimeter squared

Note 1: Occupational/Controlled limits apply in situations in which persons are exposed as a consequence of their employment, provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply, provided he or she is made aware of the potential for exposure.
Note 2: General Population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure, or cannot exercise control over their exposure.

Facilities Discussion

The KZSC auxiliary facility will utilize an existing tower. This location has two other operating broadcast users, and a number of highly directional cellular panel antennas. The KZSC auxiliary antenna system will be a circularly polarized full wave spaced two-bay design. The proposed effective radiated power is 300 watts. The proposed center of radiation is 20 meters above ground. This will

produce a calculated field intensity level of 12.6 Microwatts per square centimeter at a distance of 9.8 meters distant from the base of the tower (at a height of two meters above ground level). The existing KZSC facility operates with 10 KW at a height of 23 meters above ground, using a 9/10 wave spaced directional three-bay system. KZSC is also constructing a modified facility, utilizing 20 kw ERP and a directional antenna to be mounted 4 meters above this proposed auxiliary antenna (BPED-20040121ADA). At no time will the auxiliary antenna be energized while the main facility is in operation, and vice-versa, so the calculated KZSC RFR values shown above are that of the proposed KZSC auxiliary facility.

The tower has two other broadcast users. KUFX-1 (98.5 MHz) is an FM booster, broadcasting with 34 watts. Because it is less than 100 watts, it is categorically exempt from environmental processing. The other FM facility, KSRI-FM (90.7 MHz) operates with 320 watts with an antenna 50 feet above ground. All of these facilities combined contribute less than 2% of the uncontrolled (Public) standard for RF exposure, and are not considered to be a hazard or a significant contributor with regards to this study.

The existing cellular antennas involve a three-sector coverage pattern, and utilize three Model EMS FQ90 type directional panels. The effective radiated power from each panel is less than 100 watts, and is therefore exempt from environment processing, per CFR 47, subpart H of Part 22, which specifies that only Cellular antennas mounted at a height of 10 meters or less and a total power of more than 1640 watts EIRP are to be considered under the ANSI rules for public exposure. The cellular antennas are to be mounted at a height of 130 to 140 feet (well over 10 meters in height), and therefore cannot present a hazard to the public on the ground below the structure.

Conclusion

Because the predicted field intensity of any of the services present or proposed on the tower do not exceed the maximum levels for controlled or uncontrolled exposure at ground level, the existing and proposed facilities will be in compliance with the limits set forth in OET Bulletin 65, Edition 97-01 (Table 1, Limits for Maximum Permissible Exposure).

Precautions and procedures have been formulated to deal with workers involved in tower and antenna maintenance, thereby maintaining compliance with the limits imposed by the Federal Standard, as well as the restrictions imposed by the KSRI License and the KZSC license, which states:

6. The permittee/licensee in coordination with other users of the site must 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.

RF Warning signs and a list of procedures for tower maintenance are posted on site, and should be sufficient to satisfy the Federal Regulations concerning the controlled/occupied standards.

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