

## Revised RF Radiation Guidelines

*By Peter Gutmann*

The Commission has adopted revised guidelines to be followed in evaluating human exposure to radiofrequency (RF) radiation. Although in theory many of the standards have been made more restrictive, in practice some broadcasters will find that they afford relief from previous tower fencing requirements.

Since 1985, the Commission has required broadcast applicants to demonstrate that their facilities protect the environment, including human exposure to RF radiation. The Commission has now replaced its original standards with a new set, derived from the findings and recommendations of various scientific, engineering, medical and industry groups. The Commission has attempted to strike a balance between the need to protect the public and workers from exposure to potentially harmful electromagnetic fields and the desire of the industry to provide communication services to the public in an efficient and practical manner.

It is important to note that the new rules apply to all applications (including renewals) filed after October 15, 1997. They also apply to all facilities to be constructed after October 15, 1997, regardless of the date of application. In addition, all existing facilities must be brought into compliance with the new standards by September 1, 2000, or licenses must file an Environmental Assessment by that date.

The revised guidelines for RF evaluation are contained in a new Bulletin 65 published by the Commission's Office of Engineering and Technology (OET). This is a new edition 97.01, and supersedes the version of Bulletin 65 which has been in effect for the last dozen years. OET emphasizes that its Bulletin is merely advisory and that alternative methods of demonstrating compliance may be acceptable if based on sound engineering practice. Nonetheless, the vast majority of broadcasters will rely on its procedures and recommendations. The Bulletin itself is filled with detailed equations, graphs and other highly technical material, but OET has also released a Supplement that provides more specific rules for radio and TV stations.

Please note that this memorandum attempts to provide only a simplified summary of the Supplement. It is intended only to provide a general overview of the revised guidelines for maximum permissible exposure (MPE) requirements. You should not rely on this summary without consulting an engineer who is familiar with the complexities of these issues.

**AM Stations.** The Supplement provides Tables 1 through 4 (which we attach) to determine the minimum distance to comply with FCC RF radiation limits for towers of various electrical heights (0.1, 0.25, 0.5 and 0.625 wavelengths). (The Commission's previous approach did not account for tower height and in many cases required far more extensive fencing than the present tables.) These tables all assume continuous exposure without time averaging. Multiple tower array calculations generally would be made for each tower, although the areas between them could be affected by their respective RF contributions. The Supplement also provides a Figure 5 (attached) to determine the maximum operating power level which can be used to enable a station to continue operating while workers climb its towers. Figure 5 assumes, quite conservatively, that no gloves or other protective means are used to reduce induction in climbers.

**FM Stations.** The Supplement provides Tables 5 and 6 (also attached) to estimate the minimum antenna height above ground necessary to prevent power densities from exceeding MPE levels. Table 5 is for occupational exposure, which applies both to exposure as a consequence of employment and to exposure of a transient nature as a result of incidental passage through a location; in either event, though, the exposed persons must have been made fully aware of the potential for exposure and must be able to exercise control over his or her exposure by leaving the area or by other appropriate means. Table 6 applies to the general population in uncontrolled situations. For multiple users on a single tower, a conservative estimate could be obtained by attributing total ERP for all antennas to the lowest-mounted one; more accurate estimates can be made by adding the contributions calculated for each specific antenna. These tables refer only to ground level radiation (and conservatively assume the relatively high downward radiation of dipoles); additional calculations may be required to protect occupants of buildings located in the direction of the main lobe.

**Television Stations.** Although the Supplement does provide tables for TV, they are premised upon extremely conservative assumptions that are often unwarranted (i.e.: that downward radiation is equal to that of the main beam) and therefore yield extreme worst-case values. The Commission's formulas can be customized to your actual situation and are likely to yield far more realistic results. Note, though, that the formulas provided in the Supplement are based upon a model that will not necessarily apply to digital television towers.

**Multiple-User Sites.** The Commission has raised its previous exclusion threshold from 1% to 5%. This threshold applies in both of two ways. First, an antenna which does not contribute at least 5% of the applicable power density exposure limit need not be considered at all. Second, only those licensees who contribute 5% or more toward the MPE limit are responsible for controlling access or taking other appropriate measures to protect people from excessive exposure. It is important to note that the Commission rejected suggestions that the site owner, rather than such contributing licensees, be held responsible for determining and ensuring compliance. Nonetheless, the Commission encourages owners to develop agreements and foster cooperation in order to define and coordinate responsibility among all occupants of a site.

Again, we would urge you and your engineers to familiarize yourselves with the complete Supplement (if not the Bulletin itself) in order to be sure that your present or proposed access restrictions will suffice to achieve compliance with the Commission's revised requirements. The Bulletin and Supplement may be downloaded directly from the [FCC's web site](#). If you would like a hard copy, please let us know and we would be glad to provide it.