



Federal Communications Commission
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Small Entity Compliance Guide

Human Exposure to Radiofrequency Electromagnetic Fields

First Report and Order
FCC 13-39
ET Docket No. 03-137
Adopted: March 27, 2013

This Guide is prepared in accordance with the requirements of Section 212 of the Small Business Regulatory Enforcement Fairness Act of 1996. It is intended to help small entities—small businesses, small organizations (non-profits), and small governmental jurisdictions—comply with the new rules adopted in the above-referenced FCC rulemaking docket. This Guide is not intended to replace the rules and, therefore, final authority rests solely with the rules. Although we have attempted to cover all parts of the rules that might be especially important to small entities, the coverage may not be exhaustive. This Guide may, perhaps, not apply in a particular situation based upon the circumstances, and the FCC retains the discretion to adopt approaches on a case-by-case basis that may differ from this Guide, where appropriate. Any decisions regarding a particular small entity will be based on the statute and regulations.

In any civil or administrative action against a small entity for a violation of rules, the content of the Small Entity Compliance Guide may be considered as evidence of the reasonableness or appropriateness of proposed fines, penalties or damages. Interested parties are free to file comments regarding this Guide and the appropriateness of its application to a particular situation; the FCC will consider whether the recommendations or interpretations in the Guide are appropriate in that situation. The FCC may decide to revise this Guide without public notice to reflect changes in the FCC's approach to implementing a rule, or to clarify or update the text of the Guide. Direct your comments and recommendations, or calls for further assistance, to the FCC's Consumer Center or the FCC's RF Safety office:

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TTY: 1-888-TELL-FCC (1-888-835-5322)
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Human Exposure to Radiofrequency Electromagnetic Fields

1. Introduction and Background

In the *First Report and Order (Order)* in ET Docket 03-137 adopted March 27, 2013, the Commission amended Part 1, 2, and 95 of its rules governing compliance with its radiofrequency (RF) exposure limits adopted under the National Environmental Policy Act (NEPA). The *Order* made minor changes to the rules. These changes support and clarify existing compliance procedures in ways that increase flexibility in methods to show compliance and reduce the potential burden from misinterpreting the rules. These changes alone should not significantly affect most small entities. However, compliance with the exposure limits continues to be a general requirement affecting both manufacturers and operators of RF devices and transmitters alike, and existing reference material on evaluating compliance is a significant body of information. This material, available on the Commission's website, is continually being updated as necessary to keep up with changes in technology. Given that the *Order* only makes minor adjustments to the rules and compliance with the exposure limits is an on-going requirement, the purpose of this document is to supplement existing guidance, noting any changes due to the *Order* that affect the steps that small entities are already required to perform to show compliance with the Commission's RF Safety rules.

Compliance with the RF exposure limits in section 1.1310 of the Commission's rules, 47 C.F.R. § 1.1310, is a requirement that applies to all entities holding an FCC authorization, including radio station licenses and equipment authorizations. While the rules state – as a National Environmental Policy Act (NEPA) processing requirement – that a formal *Environmental Assessment* must be submitted in the event that the exposure limits are to be exceeded, this wording was not intended to suggest that exposure over these limits could be allowed with the submission of an Environmental Assessment. In fact, given the potential negative impact on the quality of the human environment of such an allowance, the Commission has never accepted an Environmental Assessment for this purpose. The Commission does, as part of its licensing and equipment authorization processes, accept and publish various showings of compliance with the exposure limits. These showings are often referred to as *routine environmental evaluations*, not to be confused with Environmental Assessments. The Commission's rules also include various *categorical exclusions* for particular services, but such exclusions, or any lack of questions pertaining to RF exposure on a form, do not imply that the exposure limits are not applicable to that service. For example, some services are categorically excluded from routine evaluation, but many transmitting antennas operating in these services are capable of exceeding the exposure limits when very close to a person. Therefore, consideration of RF levels and necessary restriction of access to transmitting antennas to ensure compliance with the exposure limits is a general underlying requirement for all services even when routine evaluation is not required.

The Commission maintains two regulatory approval tracks that apply to RF transmitters and are relevant to RF exposure compliance: (1) licensing and (2) equipment authorization (EA). A license is an authorization to operate one or more transmitters in a specific frequency range and geographic area (or at a specific site) according to the Commission's rules for a particular service. A license does not generally specify all of the equipment to be used by a licensee. In contrast, the EA program requires certification of specific transmitting devices and associated equipment for use in particular services. Some services are licensed by rule, where the licensees do not require individualized licenses. In such services, the transmitters used by these licensees are only subject to equipment certification. The Commission also allows some devices to be operated on an unlicensed basis, and those devices are also subject only to

equipment certification. (In contrast to services licensed by rule, however, the operators of devices used in unlicensed services are not classified as licensees.)

The Commission's Bureaus and Offices administer licensing through various computer system and databases. Those systems which provide information about RF transmitters can be searched at: http://fjallfoss.fcc.gov/General_Menu_Reports/. The EA system, administered by the FCC Office of Engineering and Technology's Laboratory, offers information about RF equipment and devices, and can be accessed at: <http://transition.fcc.gov/oet/ea/>. Within the EA system, the Knowledge Database (KDB) offers guidance on many topics, including RF exposure compliance. Major documents in the KDB can be found at: <https://apps.fcc.gov/oetcf/kdb/reports/GuidedPublicationList.cfm>.

Generally, application forms for licenses and grants of equipment authorization for RF transmitters contain a set of certifications where the applicant attests to a set of facts. Among this set, there is typically a requirement to certify compliance with the exposure limits. In many cases, this certification is the only routine requirement to demonstrate compliance with the exposure limits. However, the Commission may at any time request technical information to support a determination of exposure levels for any transmitter, device, or site. These requests are not uncommon during the Commission's standard application and renewal processes in situations where the exposure limits have been drawn close to the level at which the transmitters at issue are capable of meeting. For broadcast sites, application forms include worksheets that the applicant may use to determine compliance and support a certification of compliance without a requirement to submit the worksheet itself. In cases where the worksheet cannot be used to show compliance, an exhibit showing compliance with the exposure limits is typically required to be filed with the application. Such exhibits do not have a standard format but previously-filed exhibits can be readily accessed at the Commission's website (URLs listed above). Similarly, applications for equipment authorization for various portable and mobile transmitters require submission of RF evaluations that show compliance with the exposure limits.

Note that the terms "portable," "mobile," and "fixed" in regard to transmitters have particular meanings with respect to implementation of the RF exposure limits (see sections 2.1091 and 2.1093 of the Commission's rules, 47 C.F.R. §§ 2.1091 and 2.1093). Devices which by design are intended to be used with the antenna within 20 centimeters (approximately 8 inches) of the body are classified as portable, and when operated above a certain power threshold, are required to be tested for compliance with applicable specific absorption rate (SAR) limits under specified conditions. Testing considerations and test reduction procedures can be found in KDB 447498 and other published RF exposure KDB procedures, which can be found via the links above for the KDB system. All other devices and transmitters that are normally operated with the antenna or radiating structure more than 20 centimeters from the body are classified as either mobile or fixed (depending on whether they are rendered physically immobile when installed) and for these transmitters compliance is generally measured against the maximum permissible exposure (MPE) field strength or power density limits in section 1.1310 of the Commission's rules, 47 C.F.R. § 1.1310.

Also, members of the general public and small entities that operate or provide space for transmitters but are not required to submit applications to the Commission have a role to play in ensuring compliance with the exposure limits. These entities should be informed about practices that may result in exposure over the limits. For example, a Wi-Fi access point or utility "Smart Meter" may be authorized for use only at distances greater than 20 centimeters (approximately 8 inches) from all persons and this requirement needs to be effectively communicated to both the installer and consumer. Similarly, owners of buildings and towers that host transmitting antennas are encouraged to cooperate with the efforts of licensees to limit access to areas exceeding the Commission's exposure limits.

A copy of the *Order* is available at: <http://apps.fcc.gov/ecfs/document/view?id=7022136644>.

2. First Report and Order General Information

The *Order* includes two major sections: (1) Evaluation of RF Exposure and (2) Mitigation of potential RF exposure in excess of FCC limits. In this context, “evaluation” refers to the determination of potential exposure levels by calculation or measurement, and “mitigation” involves actions that are necessary to ensure compliance with the exposure limits.

3. Evaluation

The *Order* adopted changes to the demonstrations that applicants are required to provide in certain cases to show that their equipment will comply with the Commission’s RF exposure limits. These demonstrations of compliance, known as evaluations, are fundamentally based on SAR, which is a measure of power absorbed per mass of tissue (applicable at frequencies less than 6 GHz), and on MPE, which is a measure of external illuminating power flux density (applicable at frequencies greater than 6 GHz). Both SAR and MPE may be determined by valid measurement or calculation techniques. In many cases for mobile and fixed transmitters below 6 GHz, a practical determination of compliance with the SAR limits continues to be evaluation based on the MPE limits, which were themselves derived from the SAR limits. However, where advantageous, a valid SAR determination may be used as an evaluation to show compliance for any transmitter below 6 GHz, and so would take precedence over an MPE evaluation. For portable devices designed to operate at less than 20 cm from the body and at frequencies less than 6 GHz, an SAR evaluation continues to be required unless the power is less than certain exclusion criteria; see KDB publication 447498 at: <https://apps.fcc.gov/oetcf/kdb/reports/GuidedPublicationList.cfm>.

4. Mitigation

The Commission employs more flexible RF exposure limits in occupational settings, which are defined as settings in which individuals have full awareness of and control over their exposure. In other words, the more flexible RF exposure limits apply in cases where Commission licensees and/or manufacturers holding equipment authorizations give the individuals who are likely to encounter RF radiation appropriate training or education, such as through an RF safety program in a work environment, and/or post “visual advisories” such as signs or labeling. Commission rules require that these safeguards be adequate to ensure that workers are aware of the steps that they must take to protect against exposure to RF levels that exceed the Commission’s limits. For small mobile and portable devices, awareness and control may be supported by instructions and labeling that are visible to the device user. The *Order* changed sections 2.1091(d)(3) and 2.1093(d)(1)(i) of the Commission’s rules to allow the use of visual advisories such as external labeling, embossing, or an equivalent electronic display or “screen flash,” to support awareness of users of mobile and portable devices evaluated under the occupational limits. Visual advisories can be used as part of an applicant’s evidence of device user awareness. Similarly, for fixed transmitter sites, section 1.1310(e)(1) of the rules explains that “awareness” in the occupational context means that an exposed person has received written and/or verbal information fully explaining the potential for RF exposure, and appropriate training regarding work practices relating to controlling or mitigating the exposure. The only exception to the requirement for training is for *transient* persons (persons who traverse a small area in which the public exposure limit is exceeded, but who will not linger or work in that area). Nevertheless, the rules still require that such individuals at least receive written

and/or verbal information and notification (provided, for example, by the posting of signs) concerning their potential exposure and the appropriate means available to mitigate such exposure.

The *Order* also reminded regulated parties of the Commission's existing "5 % rule" and policy. Under this policy, if the Commission finds that a multiple transmitter site exceeds the applicable RF exposure limit, all licensees of transmitters at the site whose operations produce at least 5% of the applicable RF exposure limit are held jointly and severally responsible for any forfeiture penalty resulting from the non-compliance.

5. General Information

The basic document that gives general methods for the determination of compliance with the exposure limits for environmental RF sources continues to be Office of Engineering and Technology (OET) Bulletin 65 available at:

http://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet65/oet65.pdf. Several other related documents and general information are available at: <http://www.fcc.gov/encyclopedia/radio-frequency-safety>. For guidance on compliance for mobile and portable devices see the links above for the KDB.