ADDITIONAL INFORMATION FOR AMATEUR RADIO OPERATORS

FCC Requires Amateur Applicants to Read the RF Safety Certification

The FCC requires all applicants to read the RF Safety Certification. Unfortunately, FCC has not provided this additional information in any of their instructions. As a courtesy, the ARRL VEC has provided the information you will need to read and must comply with.

The certification statement is: "I have READ and WILL COMPLY with Section 97.13(c) of the Commission's Rules regarding RADIOFREQUENCY (RF) RADIATION SAFETY and the amateur service section of OST/OET Bulletin Number 65."

FCC Rules and RF Safety Bulletin

FCC Section 97.13(c) reads: *Before causing or allowing an amateur station to transmit from any place where the operation of the station could cause human exposure to RF electromagnetic field levels in excess of those allowed under §1.1310 of this chapter, the licensee is required to take certain actions.*

1. *The licensee must perform the routine RF environmental evaluation prescribed by §1.1307(b) of this chapter, if the power of the licensee's station exceeds the limits given in the following table:*

Wavelength Band & Evaluation Required if Power* (watts) Exceeds		
MF/HF	***VHF***	***SHF***
160m - 40m = 500 watts	*all bands = 50 watts*	*all bands = 250 watts*
30m = 425 watts		
20m = 225 watts	***UHF***	***EHF***
17m = 125 watts	*70cm = 70 watts*	*all bands = 250 watts*
15m = 100 watts	*33cm = 150 watts*	
12m = 75 watts	*23cm = 200 watts*	
10m = 50 watts	*13cm = 250 watts*	
- Repeater stations (all bands) non-building-mounted antennas: *height above ground level to lowest point of antenna < 10 m and power > 500 W ERP*		
- Building-mounted antennas: power > 500 W ERP		
** Power = PEP input to antenna except, for repeater stations only, power exclusion is based on ERP (effective radiated power).*		

2. *If the routine environmental evaluation indicates that the RF electromagnetic fields could exceed the limits contained in §1.1310 of this chapter in accessible areas, the licensee must take action to prevent human exposure to such RF electromagnetic fields. Further information on evaluating compliance with these limits can be found in the FCC's OET Bulletin 65, "Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields."*

The Amateur Section of OET Bulletin Number 65:

In the FCC's Report and Order, certain amateur radio installations were made subject to routine evaluation for compliance with the FCC's RF exposure guidelines.[1] Also, amateur licensees will be expected to demonstrate their knowledge of the FCC guidelines through examinations. Applicants for new licenses and renewals also will be required to demonstrate that they have read and that they understand the applicable rules regarding RF exposure. Before causing or allowing an amateur station to transmit from any place where the operation of the station could cause human exposure to RF radiation levels in excess of the FCC guidelines amateur licensees are required to take certain actions. A routine RF radiation evaluation is required if the transmitter power of the station exceeds the levels shown and specified in 47 CFR § 97.13(c)(1)[2] (see above). Otherwise the operation is categorically excluded from routine RF radiation evaluation, except as a result of a specific motion or petition as specified in Sections 1.1307(c) and (d) of the FCC's Rules, (see discussion in Section 1 of Bulletin 65 for more information).

The Commission's Report and Order instituted a requirement that operator license examination question pools will include questions concerning RF safety at amateur stations. An additional five questions on RF safety will be required within each of three written examination elements (for Technician, General and Extra written exams).

When routine evaluation of an amateur station indicates that exposure to RF fields are or could be in excess of the exposure limits specified by the FCC (see Bulletin 65, Appendix A {on reverse side}), the licensee must take action to correct the problem and ensure compliance (see Section 4 of Bulletin 65 on controlling exposure). Such actions could be in the form of modifying patterns of operation, relocating antennas, revising a station's technical parameters such as frequency, power or emission type or combinations of these and other remedies.

Bulletin 65, Appendix A, Table 1 -- LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1	30

Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

(f = frequency in MHz *Plane-wave equivalent power density)

In complying with the Commission's Report and Order, amateur operators should follow a policy of systematic avoidance of excessive RF exposure. The Commission has said that it will continue to rely upon amateur operators, in constructing and operating their stations, to take steps to ensure that their stations comply with the MPE limits for both occupational/controlled and general public/uncontrolled situations, as appropriate. In that regard, amateur radio operators and members of their immediate household are considered to be in a "controlled environment" and are subject to the occupational/controlled MPE limits. Neighbors or others who are not members of an amateur operator's household are considered to be members of the general public, since they cannot reasonably be expected to exercise control over their exposure. In those cases general population/uncontrolled exposure MPE limits will apply.

In order to qualify for use of the occupational/controlled exposure criteria, appropriate restrictions on access to high RF field areas must be maintained and educational instruction in RF safety must be provided to individuals who are members of the amateur operator's household. Persons who are not members of the amateur operator's household but who are present temporarily on an amateur operator's property may also be considered to fall under the occupational/controlled designation provided that appropriate information is provided them about RF exposure potential if transmitters are in operation and such persons are exposed in excess of the general population/uncontrolled limits.

Amateur radio facilities represent a special case for determining exposure, since there are many possible antenna types that could be designed and used for amateur stations. However, several relevant points can be made with respect to analyzing amateur radio antennas for potential exposure that should be helpful to amateur operators in performing evaluations.

First of all, the generic equations described in Bulletin 65 can be used for analyzing fields due to almost all antennas, although the resulting estimates for power density may be overly-conservative in some cases. Nonetheless, for general radiators and for aperture antennas, if the user is knowledgeable about antenna gain, frequency, power and other relevant factors, the equations in this section can be used to estimate field strength and power density as described earlier. In addition, other resources are available to amateur radio operators for analyzing fields near their antennas. The ARRL Handbook For Radio Amateurs contains an excellent section on analyzing amateur radio facilities for compliance with RF guidelines. Also, the FCC and the EPA conducted a study of several amateur radio stations in 1990 that provides a great deal of measurement data for many types of antennas commonly used by amateur operators[3] (see the FCC OET Web site at: http://www.fcc.gov/oet/info/documents/reports/#ASD-9601 see also http://www.fcc.gov/oet/rfsafety/).

Amateur radio organizations and licensees are encouraged to develop their own more detailed evaluation models and methods for typical antenna configurations and power/frequency combinations. The FCC has an Amateur Supplement "B" that is available from the FCC's OET Web site at: http://www.fcc.gov/oet/rfsafety/ . Information on availability of the supplement, as well as other RF-related questions, can be directed to the FCC's "RF Safety Program" at: (202) 418-2464 or Email to: rfsafety@fcc.gov

See also: Sections 1 and 2 of the FCC Regulations; FCC's "Amateur" Supplement B to OET Bulletin 65; the ARRL's publication entitled "RF Exposure and You" (to be available in early 1998); the ARRL Web at: http://www.arrl.org/rf-radiation-and-electromagnetic-field-safety; and our RF Safety article in January 1998 QST (Pages 50-55) for more information. FCC also has a very helpful Q&A discussing RF Biological Effects and Potential RF Hazards of RF Electromagnetic Fields - see "OET Bulletin 56, 4th Edition", published 8/99 http://www.fcc.gov/oet/info/documents/bulletins/#56 .

[footnotes] -

1 See para. 160 of Report and Order, ET Dkt 93-62. See also, 47 CFR § 97.13, as amended.

2 These levels were chosen to roughly parallel the frequency of the MPE limits of Table 1 in Appendix A. These levels were modified from the Commission's original decision establishing a flat 50 W power threshold for routine evaluation of amateur stations (see Second Memorandum Opinion and Order, ET Docket 93-62, FCC 97-303, adopted August 25, 1997).

3 Federal Communications Commission (FCC), "Measurements of Environmental Electromagnetic Fields at Amateur Radio Stations," FCC Report No. FCC/OET ASD-9601, February 1996. FCC, Office of Engineering and Technology (OET), Washington, D.C. 20554. NTIS Order No. PB96-145016. Copies can also be downloaded from OET's Home Page on the World Wide Web at: http://www.fcc.gov/oet/