

Radio Teacher General Test Subelement G0 Notes

These notes cover the information needed to answer the questions on Subelement G0 of the Amateur Radio General Test. They can be used by instructors as a reference to make sure that all of the information in this subelement is addressed in class.

Subelement G0 covers Radio Frequency (RF) safety principles, rules, guidelines, conducting a regular station safety evaluation, safety in the ham shack, electrical shock and treatment, grounding, fusing, interlocks, wiring, antenna and tower safety.

Radio Frequency Exposure:

You can determine that your station complies with FCC RF exposure regulations by calculation based on FCC OET Bulletin 65, by calculation based on computer modeling and by measurement of field strength using calibrated equipment.

One must take action to prevent human exposure to the excessive RF fields if their station shows RF energy radiated from your station exceeds permissible limits. One affect that RF energy exhibits in the human body is the heating of body tissue. If evaluation shows that a neighbor might receive more than the allowable limit of RF exposure from the main lobe of a directional antenna take precautions to ensure that the antenna cannot be pointed at their house. If you install an indoor transmitting antenna make sure that MPE limits are not exceeded in occupied areas.

The total RF exposure averaged over a certain time also known as "time averaging" is used to determine RF radiation exposure. The power level and frequency of the energy has the most direct effect on the permitted exposure level of RF radiation.

An antenna's critical angle is one property that is NOT important in estimating if an RF signal exceeds the maximum permissible exposure (MPE).

Radio Frequency Evaluation:

An amateur operator must perform a routine RF exposure evaluation to ensure compliance with RF safety regulations. As stated above, a calibrated field-strength meter with a calibrated antenna can be used to accurately measure an RF field. When installing a ground-mounted antenna take steps so that no one can be exposed to RF radiation in excess of maximum permissible limits.

When the maximum power output capability of an otherwise compliant station is reduced no action is required since this would lower any possible RF exposure. (Editors note: The sentence states that if you reduce the power of a station that is OK it is still OK. It is a silly statement to make but since there is a question on the test like this it has to be included.) A lower transmitter duty cycle permits greater short-term RF exposure levels.

Radio Frequency Safety:

For safety, turn off the transmitter and disconnect the feedline when making adjustments or repairs to an antenna.

Radio Frequency Compliance:

If your club's repeater is on a tower with many other transmitters keep in mind that any transmitter that contributes 5% or more of the MPE at a multiple user site is/are responsible for RF safety compliance.

Electrical Safety:

Electrical shock can be lethal when current passes through the heart causing the heart to stop pumping. Fifty microamperes is the maximum amount of electrical current flow through the human body that can be safely tolerated. Sixty cycle alternating current is the most hazardous type of electrical energy.

Only the "hot" (black and red) wires in a four-conductor line cord should be attached to fuses or circuit breakers in a device operated from a 240-VAC single-phase source.

American Wire Gauge (AWG) number 12 may be safely used for a circuit that draws up to 20 amperes of continuous current. A fuse or circuit breaker rated at 15 amperes would be appropriate to use with a circuit that uses AWG number 14 wiring.

Current flowing from the hot wire to ground will cause a Ground Fault Circuit Interrupter (GFCI) to disconnect the 120 or 240 Volt AC line power to a device.

Power supply safety interlocks inside a transmitter are designed to ensure that dangerous voltages are removed if the cabinet is opened.

Tower Safety:

Any person preparing to climb a tower that supports electrically powered devices should physically make sure all circuits that supply power to the tower are locked out and tagged. Always attach the belt safety hook to the belt "D" ring with the hook opening away from the tower. This should be observed for safety when climbing on a tower using a safety belt or harness.

Grounding:

It is not safe to use soldered joints with the wires that connect the base of a tower to a system of ground rods since a soldered joint will likely be destroyed by the heat of a lightning strike. Good engineering practice for lightning protection grounds states that they must all be bonded together with all other grounds. Grounding the metal chassis of every item of station equipment ensures that hazardous voltages cannot appear on the chassis.

Chemical Safety:

Lead from lead-tin solder can contaminate food if hands are not washed carefully after handling and use.

*The General Question Pool and Rules for Amateur Radio, Part 97 are the source documents of these notes. This information is available to the public.

If you have any questions, comments or corrections please email a message to RadioTeacher @ gmail.com