W9AY STUDY GUIDE · ELEMENT 4 · FREE SAMPLE

Amateur Extra Class

NCVEC 2024–2028 question pool, 4th errata of February 4, 2026

50	599	50	4.1 h
EXAM QUESTIONS	IN THE POOL	QUESTION GROUPS	TO READ ONCE

This is one section, free. E0, Safety: all 12 of its pool questions, each with its answer. Read the notes, then cover the answers and work through the questions, and watch how quickly the answers start to stick. The rest of the guide works the same way.

Get the full guide: w9ay.com/study/extra. It adds a Start Here chapter, all 10 sections and every one of the 599 pool questions. Pay through Stripe; your download link appears as soon as you pay and is emailed to you.

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Contents

50 questions on the exam, drawn from 599 in the pool.

SECTION	TOPIC	ON THE EXAM	IN THE POOL	READING
E0	Safety	1	12	~6 min

E0 — Safety

1 of your 50 exam questions · 1 group (E0A) · 12 questions in the pool

The smallest subelement in the entire pool, worth exactly one question on the exam. It covers RF (radio frequency) exposure evaluation (MPE (maximum permissible exposure) limits, duty cycle, who is exempt), a handful of grounding and hazard facts, and tower-climbing safety. There is no math here and only one group to learn — it is quick to master completely.

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E0A — Safety: RF radiation hazards; hazardous materials; grounding

One exam question comes from this group. 12 questions in the pool.

RF exposure basics. The FCC's (Federal Communications Commission) human body RF (radio frequency) exposure limits are **most restrictive from 30-300 MHz** — the range where a standing adult body is roughly resonant and absorbs energy most efficiently. **SAR** (Specific Absorption Rate) measures **the rate at which RF energy is absorbed by the body**. There are separate electric (E) field and magnetic (H) field MPE (maximum permissible exposure) limits below 300 MHz because the body reacts to both fields, ground reflections and scattering make field strength vary with location, and the E- and H-field intensity peaks can occur at different spots — **all these choices are correct**.

Controlled vs. uncontrolled. When your own signals reach a **neighbor's** property, that neighbor is in an *uncontrolled* environment (someone with no awareness of or control over the exposure), so you must keep signal levels below the tighter **uncontrolled MPE limits** — not the looser controlled limits that apply to you and people who know about and can control their own exposure. Watch the distractor pairs here: "controlled" vs. "uncontrolled," and "exposure" vs. "emission" (MPE is always about *exposure*, never "emission").

Multiple transmitters at one site. Each transmitter's operator and licensee is responsible for fixing an over-exposure situation only if that transmitter contributes **5 percent or more of its own MPE limit** in an area where the combined total exceeds the limit — a low bar, so a lot of co-located stations end up sharing responsibility.

Microwave-specific hazard. Microwaves aren't ionizing and don't travel faster — the real hazard is that the **high-gain antennas commonly used at microwave frequencies concentrate energy**, producing higher exposure levels than the same transmitter power would at lower frequencies with a less directional antenna.

Who is exempt from RF exposure evaluation. Handheld transceivers **sold before May 3, 2021** carry a grandfathered exemption. Power-level thresholds and near-field-only antennas are distractors — they are not how the exemption works. On the flip side, for a station like 80 meters, an evaluation **must always be performed** — there's no automatic pass based on power or mode alone.

Grounding. The primary purpose of an external earth ground rod is **lightning charge dissipation** — it is a safety ground, not a way to cut RF current between equipment (that's station bonding, a different topic) and not surge protection for a breaker panel.

Tower and climbing safety. "100% tie-off" means **at least one lanyard is attached to the tower at all times** — as one lanyard releases to reposition, the other stays connected, so the climber is never fully detached. Lanyards clip to the **tower legs** (not the antenna mast, guy brackets, or rungs — legs are the structural member rated for a fall). A **shock-absorbing lanyard** should be attached **above the climber's head level**, so a fall is arrested before much slack can develop, minimizing fall distance and impact force.

All 12 pool questions for E0A

E0A01

What is the primary function of an external earth connection or ground rod?

- A. Prevent static build up on power lines
- B. Lightning charge dissipation
- C. Reduce RF current flow between pieces of equipment
- D. Protect breaker panel from power surges

Answer: B

E0A02

When evaluating RF exposure levels from your station at a neighbor’s home, what must you do?

- A. Ensure signals from your station are less than the controlled maximum permissible exposure (MPE) limits
- B. Ensure signals from your station are less than the uncontrolled maximum permissible exposure (MPE) limits
- C. Ensure signals from your station are less than the controlled maximum permissible emission (MPE) limits
- D. Ensure signals from your station are less than the uncontrolled maximum permissible emission (MPE) limits

Answer: B

E0A03

Over what range of frequencies are the FCC human body RF exposure limits most restrictive?

- A. 300 kHz - 3 MHz
- B. 3 - 30 MHz
- C. 30 - 300 MHz
- D. 300 - 3000 MHz

Answer: C

E0A04

When evaluating a site with multiple transmitters operating at the same time, the operators and licensees of which transmitters are responsible for mitigating over-exposure situations?

- A. Each transmitter that produces 20 percent or more of its MPE limit in areas where the total MPE limit is exceeded
- B. Each transmitter operating with a duty cycle greater than 25 percent
- C. Each transmitter that produces 5 percent or more of its MPE limit in areas where the total MPE limit is exceeded
- D. Each transmitter operating with a duty cycle greater than 50 percent

Answer: C

E0A05

What hazard is created by operating at microwave frequencies?

- A. Microwaves are ionizing radiation
- B. The high gain antennas commonly used can result in high exposure levels
- C. Microwaves are in the frequency range where wave velocity is higher
- D. The extremely high frequency energy can damage the joints of antenna structures

Answer: B

E0A06

Why are there separate electric (E) and magnetic (H) MPE limits at frequencies below 300 MHz?

- A. The body reacts to electromagnetic radiation from both the E and H fields
- B. Ground reflections and scattering cause the field strength to vary with location
- C. E field and H field radiation intensity peaks can occur at different locations
- D. All these choices are correct

Answer: D

E0A07

What is meant by “100% tie-off” regarding tower safety?

- A. All loose ropes and guys secured to a fixed structure
- B. At least one lanyard attached to the tower at all times
- C. All tools secured to the climber’s harness
- D. All circuit breakers feeding power to the tower must be tied closed with tape, cable, or ties

Answer: B

E0A08

What does SAR measure?

- A. Signal attenuation ratio
- B. Signal amplification rating
- C. The rate at which RF energy is absorbed by the body

- D. The rate of RF energy reflected from stationary terrain

Answer: C

E0A09

Which of the following types of equipment are exempt from RF exposure evaluations?

- A. Transceivers with less than 7 watts of RF output
- B. Antennas that radiate only in the near field
- C. Hand-held transceivers sold before May 3, 2021
- D. Dish antennas less than one meter in diameter

Answer: C

E0A10

When must an RF exposure evaluation be performed on an amateur station operating on 80 meters?

- A. An evaluation must always be performed
- B. When the ERP of the station is less than 10 watts
- C. When the station’s operating mode is CW
- D. When the output power from the transmitter is less than 100 watts

Answer: A

E0A11

To what should lanyards be attached while climbing?

- A. Antenna mast
- B. Guy brackets
- C. Tower rungs
- D. Tower legs

Answer: D

E0A12

Where should a shock-absorbing lanyard be attached to a tower when working above ground?

- A. Above the climber’s head level
- B. To the belt of the fall-arrest harness
- C. Even with the climber's waist
- D. To the next lowest set of guys

Answer: A

Want the rest?

Get the full guide

The complete Amateur Extra Class guide is one PDF: a Start Here chapter (where the exam's 50 questions come from and what to learn first), all 10 sections and every one of the 599 pool questions, each with its answer.

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What the full guide covers

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