UNOFFICIAL LAY-FLAT EXAM WORKBOOK | ELEMENT 2

FCC Amateur Radio Technician Class Study & Exam Drill Workbook

Element 2 Complete Concept Guide: Band Privileges, Ohm's Law, Antennas, Propagation & 80 Practice Drills

Imprint: STILL HUMAN TECHNICAL PRESS
Format: 8.5 x 11 in. 360-Degree Lay-Flat Coil Study & Field Workbook
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Educational & Examination Notice: Independent amateur radio study workbook aligned to FCC Part 97 rules and NCVEC Element 2 topics. Not affiliated with the FCC, ARRL, or NCVEC. Always verify current 47 CFR Part 97 band plans and licensing procedures prior to transmitting.

Technician Class Core Formulas & Band Plan Essentials

Topic / Rule	Specification / Threshold	Reference
Ohm's Law	E = I x R (Volts = Amps x Ohms)	Element 2 T5D
DC Power Formula	P = E x I (Watts = Volts x Amps)	Element 2 T5C
Wavelength / Freq	Wavelength (meters) = 300 / Frequency (MHz)	Element 2 T3B
2-Meter Band	144.000 - 148.000 MHz (FM Repeater offsets +/- 600 kHz)	47 CFR 97.301
70-cm Band	420.000 - 450.000 MHz (Repeater offset +/- 5 MHz)	47 CFR 97.301
Technician HF	10m (28.300-28.500 MHz SSB phone, 200W PEP max); CW on 80/40/15m	47 CFR 97.301(e)
Station ID Rule	Every 10 minutes and at end of communication	47 CFR 97.119
License Term	10 years (2-year grace period after expiration)	47 CFR 97.25

How to Use This Lay-Flat Workbook:

1. Fold the plastic coil 360 degrees flat on your desk, kneeboard, or clinical station.
2. Work each Worked Scenario before reading the step-by-step solution.
3. Complete the Module Drill Questions without peeking at the Answer Key & Distractor Rationales.
4. Log missed topics in the Self-Audit Grid at the end of each module and drill them again 48 hours later.

Module 1: FCC Part 97 Rules, Licensing, Station ID & Control Operator Duties

Module 1 introduces FCC Part 97 rules governing amateur radio operations in the United States. These rules define permissible uses of amateur radio frequencies, licensing requirements, station identification procedures, control operator responsibilities, and prohibitions against certain types of transmissions such as music, commercial activity, encryption, and broadcasting. Understanding these rules ensures compliance during both routine amateur radio operations and emergency communications.

Learning Objectives

- Understand FCC Part 97 rules governing amateur radio.
- Recognize valid amateur radio call sign structures.
- Identify prohibited transmissions including music, commercial activity, encryption.
- Apply emergency communication exceptions and station identification requirements.

High-Yield Reference Matrix

Concept / Rule	Threshold / Value	Practical Application
Amateur Call Sign Structure	Prefix + Number + Suffix	K1ABC, W2XYZ
ITU Region	Region 2	Applies to U.S., Canada
Prohibited Transmissions	Music, commercial, encryption	Cannot transmit music or encrypted data
Station Identification	Every 10 minutes	Must identify station during transmission
Control Operator	Must be licensed operator	Operator must be present and authorized
Emergency Communication Exceptions	Allowed during emergencies	Transmitting non-standard signals during disasters

Worked Scenarios & Field Calculations

Scenario 1: Call Sign Identification

Prompt: You hear a station transmitting with the call sign K1ABC. What type of license does this station likely hold?

Your Scratchpad / Calculation Work Area:

Worked Solution: The call sign K1ABC follows the format Prefix + Number + Suffix typical of Technician-class licenses issued under FCC Part 97.

Module 1 Practice Drill Questions

1. Which transmission is prohibited under FCC Part 97?

A. Emergency weather updates
B. Encrypted data
C. Morse code practice
D. Voice contact between amateurs

2. What is required during amateur radio transmissions?

A. Transmitting in Morse code
B. Station identification every hour
C. Station identification every ten minutes
D. Transmitting commercial advertisements

3. Which of the following is NOT part of FCC Part 97?

A. Prohibition against commercial activity
B. Prohibition against transmitting music
C. Prohibition against transmitting encrypted data
D. Prohibition against transmitting emergency weather updates

4. What is the structure of Technician-class amateur radio call signs?

A. Prefix + Number + Suffix
B. Prefix + Suffix
C. Number + Suffix
D. Suffix + Prefix

5. What region does FCC Part 97 apply?

A. ITU Region 1
B. ITU Region 2
C. ITU Region 3
D. ITU Region 4

6. Which activity violates FCC Part 97?

A. Transmitting voice contacts
B. Transmitting commercial advertisements
C. Transmitting Morse code practice
D. Transmitting emergency communications

Module 2 Answer Key & Distractor Rationales

Q1 Correct Answer: A - Line-of-sight propagation limits signal range due to Earth curvature.

Q2 Correct Answer: B - Tropospheric ducting occurs during temperature inversions.

Q3 Correct Answer: A - Sporadic-E propagation reflects signals off ionized layers during summer daytime.

Q4 Correct Answer: B - Simplex communication uses same frequency for transmit and receive.

Q5 Correct Answer: B - CTCSS/PL tones filter unwanted signals.

Q6 Correct Answer: A - Repeaters typically use ±6 MHz offset.

Q7 Correct Answer: A - FT8 is used primarily for low-power HF communication.

Q8 Correct Answer: B - APRS provides real-time GPS tracking.

Q9 Correct Answer: C - DMR supports voice communication.

Q10 Correct Answer: A - Sporadic-E propagation reflects signals off ionized layers.

Module Self-Audit Log (Topics Missed / Formula Errors / Re-Test Date):

7. What is skywave propagation?

A. Signals traveling along Earth's surface
B. Signals bouncing off satellites
C. Signals bouncing off the ionosphere
D. Signals bouncing off buildings

8. What is the frequency range of the HF bands?

A. Below 3 MHz
B. Between 3 MHz and 30 MHz
C. Between 3 GHz and 30 GHz
D. Above 3 GHz

9. What is the most common type of coaxial cable used in amateur radio?

A. RG-58
B. RG-8
C. RG-6
D. RG-11

10. What is the primary function of a SWR meter?

A. To measure signal strength
B. To measure power output
C. To measure impedance mismatch
D. To measure frequency

11. What is the typical length of a quarter-wave vertical antenna?

A. Half the wavelength
B. One wavelength
C. A quarter wavelength
D. Two wavelengths

12. What is the frequency range of the 2-meter band?

A. 144 MHz to 148 MHz
B. 2 MHz to 2.5 MHz
C. 2 GHz to 2.5 GHz
D. 1 MHz to 2 MHz

Practice Log Sheet #7 (Date: _____ Score: _____ / _____)

Topic / Code	Error Diagnosis	Verified Rule / Fix

Practice Log Sheet #8 (Date: _____ Score: _____ / _____)

Topic / Code	Error Diagnosis	Verified Rule / Fix