



# ELT Evaluator Instruction Manual

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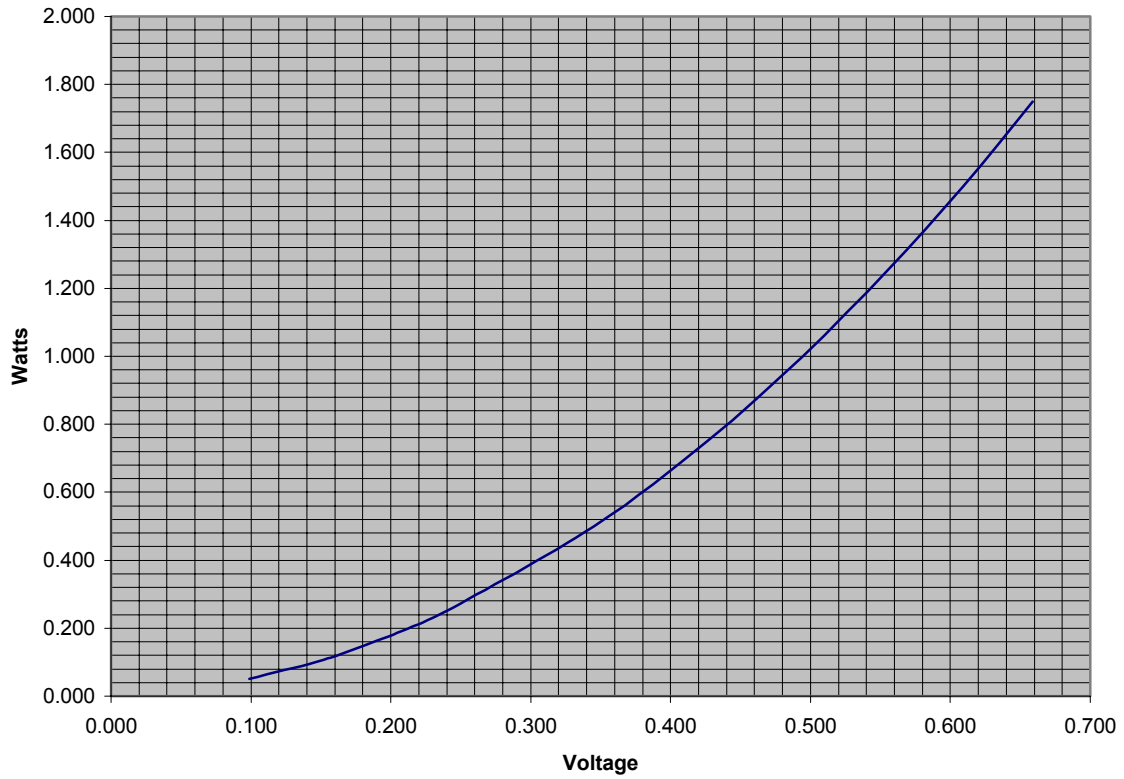
## ELT Evaluator Instruction Manual

Screen for problems by measuring the radiated field strength, power output, antenna system, and modulation of ELTs. The Evaluator also works with Handheld or COM transmitters with less than 10 watts output. To satisfy FAA requirements, you must perform all applicable tests and inspections including those described in ACTION NOTICE A8150.3(copy below).

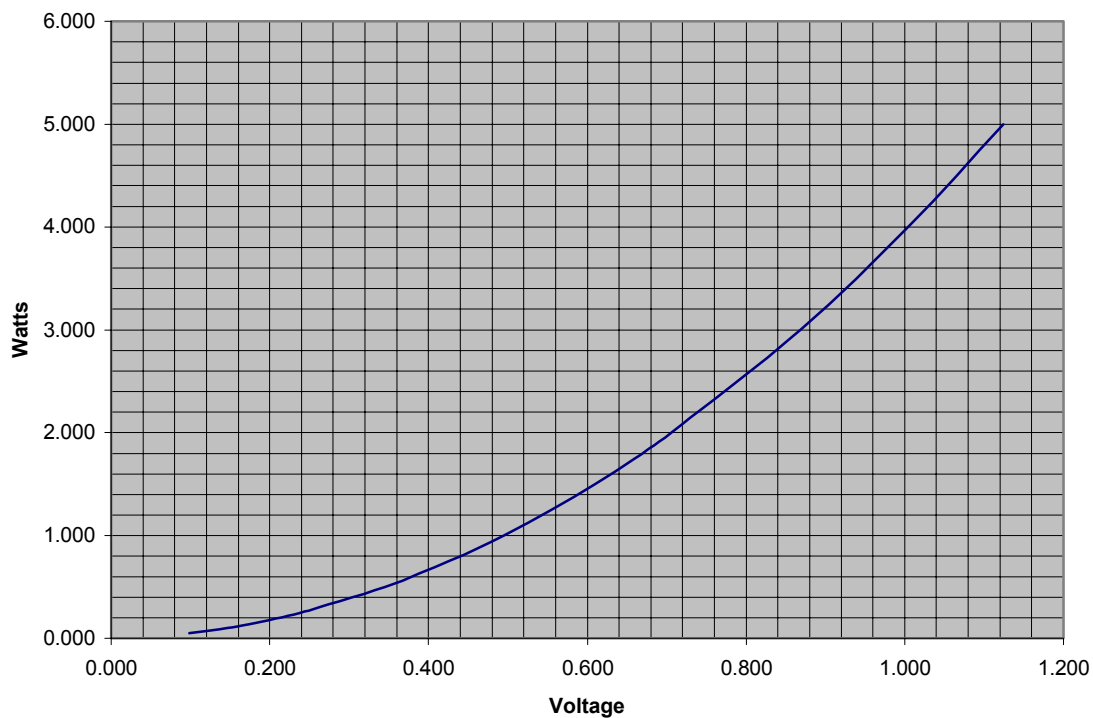
1. Charge battery for at least 24 hours before using the Evaluator. The battery charger can be plugged in full time without damaging the battery.
2. **Field Strength:** Test ELT or COM and its antenna system by measuring the Field Strength radiated from the antenna.
  - a. **Field Strength/Power** Switch in **Field** position.
  - b. ELT – Test only in the first 5 minutes of any hour as required by FARs. Minimum reading of .100 with ELT antenna 6 inches from the ELT Evaluator antenna. Be sure the Evaluator antenna is on or slightly above the plane of the ELT antenna. A low reading indicates that, most likely, there is something wrong with the antenna system. Check the connectors, cable and the antenna. If the antenna system is ok, measure the power output of the ELT.
  - c. COM – Minimum reading of 1.000 with antennas 2 feet apart.
  - d. You can also measure the frequency but you may have to move the Evaluator antenna closer to the ELT antenna to get an accurate reading.
3. **Output power:** Evaluator has a built-in 50-ohm load so very little is actually radiated when the ELT or COM is plugged into the **Power In** port. Note: The 50-ohm load can tolerate power greater than 2 watts for only 10 seconds so care must be taken when testing COM radios. Never try to measure the power of devices with a rated power of more than 10 watts.
  - a. Connect output of ELT or COM to the **Power In** Connector using the 50-ohm cable with BNC connectors.
  - b. Set **Field Strength/Power** switch to **Power**.
  - c. Turn on the ELT.
    - i. Minimum specified power for and ELT is 50 milliwatts corresponding to a meter reading of .100. Use the Power Conversion Charts to determine actual power output.
    - ii. An accurate frequency measurement can also be made at this time.
  - d. COM – Set the **Field Strength/Power** switch to **Power**.
    - i. Hold transmit button long enough to get a reading to avoid burning out the 50-ohm dummy load, no more than 10 seconds for power over 2 Watts. Use the conversion chart to translate the meter reading to power.
    - ii. Typical power is around 7 Watts. Some radios are as low as 4 Watts. Handheld radios are typically around 1 Watt.
4. **Frequency**
  - a. You can measure frequency in either Field Strength or Power-measuring mode.
  - b. Recommendation: Plug unit into **Power In** port to avoid actually transmitting and interfering with others.
  - c. ELT - Between 121.496 MHz to 121.504 MHz is acceptable. Note: many ELTs radiate on both 121.5MHz and its second harmonic, 243 MHz or 242.992 MHz to 243.008 MHz, and the counter can be confused as it receives both signals. Since the ELT's 243.0 MHz signal is derived from the 121.5 MHz signal source, the Evaluator's frequency counter is designed to respond to only the 121.5 MHz signal. Power measurements include both frequencies
  - d. Some ELTs are pulse modulated and tend to transmit on several frequencies simultaneously making it nearly impossible to get the frequency counter to lock. In these cases the frequency counter will not give a stable reading but should read in the range of 121.5 MHz. Listening on a Com radio you will be able to hear the ELT several tens of KHz above and below 121.5 MHz.
  - e. COM – Hold transmit button long enough to get a reading and no longer to avoid burning out the 50 ohm load. Acceptable frequency error is plus or minus 0.005 MHz/5KHz.
5. **Modulation**
  - a. ELT – Listen to the chirp in the first five minutes of the hour in Field Strength mode or anytime with the ELT plugged into the **Power In** port.
  - b. COM or Handheld – Listen to the audio in either Field Strength or Power mode. Be careful not to cause interference in Field Strength mode. Also, keep the Tester volume down to avoid audio feedback.

**Power Conversion Chart**

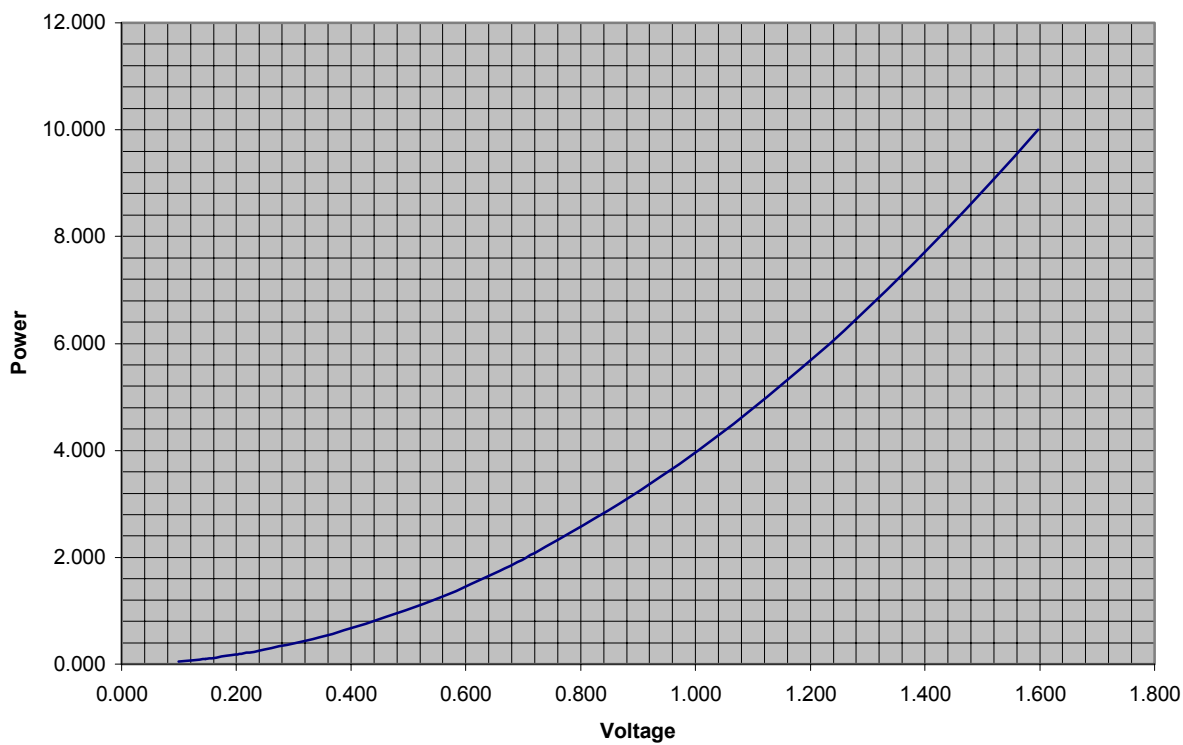
<b>Voltage</b>	<b>Power W</b>	<b>Voltage</b>	<b>Power W</b>
0.100	0.050	0.609	1.500
0.146	0.100	0.659	1.750
0.165	0.125	0.706	2.000
0.182	0.150	0.868	3.000
0.198	0.175	1.004	4.000
0.213	0.200	1.125	5.000
0.240	0.250	1.233	6.000
0.345	0.500	1.333	7.000
0.426	0.750	1.426	8.000
0.494	1.000	1.514	9.000
0.555	1.250	1.597	10.000



**For Power Up to 1.75 Watts**



**For Power up to 5 Watts**



**For Power up to 10 Watts**

(Hold transmit button long enough to get a reading to avoid burning out the 50-ohm dummy load, no more than 10 seconds for power over 2 Watts.)

**ACTION:** Emergency Locator Transmitters (ELT's) - Date Expiration Date: July 23, 1991 Recommended Supplemental Inspection Procedure (FAR Part 91 Operations)

**ACTION NOTICE A8150.3**

From: Action Manager, Aircraft Engineering Division, AIR-100

To: All Aircraft Certification Directorate Managers  
All Aircraft Certification Office Managers  
All Flight Standards Division Managers

This action notice (AN) is a continuing effort to improve the maintenance of emergency locator transmitters (ELT). Poor or no ELT maintenance is a significant cause of ELT failures (2 out of 3) in general aviation airplane accidents. Additionally, it has had an effect on causing the high number of ELT false alarms.

Maintenance of ELT's is a shared responsibility of the manufacturer, the inspector, and the aircraft owner or operator. A summary of the requirements in the Federal Aviation Regulations (FAR) and Technical Standard Orders (TSO) is as follows:

The FAR, Part 91, Subpart C, requires inspection and maintenance for the continued airworthiness of the aircraft and all of its components. Section 91.207 of the FAR requires that each ELT be in an operable condition and provides specific requirements for battery replacement. Technical Standard Order C91a requires that instructions for periodic maintenance and calibration, which are necessary for the continued airworthiness of an ELT, be provided to each person who receives units manufactured under this TSO. These required instructions must provide specific information to ensure that appropriately rated persons will be able to inspect and maintain ELT's to confirm adequate performance necessary to meet the needs of the flying public and the search rescue community. Manufacturers of ELT's approved to the requirements of TSO-91 were not required to submit or obtain Federal Aviation Administration (FAA) approval of their maintenance instructions. The content and usefulness of any instructions that are provided may vary depending on the approach used by each manufacturer. Section 43.13(A) of the FAR requires persons performing inspection and maintenance to use the manufacturer's instructions or those acceptable to the FAA Administrator. The aircraft owner or operator is responsible for ensuring that the ELT is included in these inspections and is maintained accordingly.

The Aircraft Certification Offices (ACO's) are asked to review manufacturers' instruction for ELT's currently being produced to determine adequacy for continued airworthiness, and to make appropriate recommendations to the manufacturers. Inspectors are asked to monitor persons responsible for maintaining and/or inspecting aircraft to ensure that they include the ELT in inspections for the continued airworthiness of the airplane. The following recommended supplemental ELT inspection procedures should be used when there is not adequate information:

EMERGENCY LOCATOR TRANSMITTER  
RECOMMENDED SUPPLEMENTAL INSPECTION PROCEDURE  
(FAR PART 91 OPERATIONS)

1. Remove all interconnections to the ELT unit and ELT antenna. Visually inspect and confirm proper seating of all connector pins. Special attention should be given to coaxial Center conductor pins which are prone to retracting into the connector housing.
2. Remove the ELT from the mount and inspect the mounting hardware. All required mounting hardware should be reinstalled and secured.
3. Gain access to the ELT battery and inspect. No corrosion should be detectable. Verify that the ELT battery is approved and check its expiration date.
4. Activate the ELT using an applied force. The direction for mounting and force activation is indicated on the ELT. A TSO-C91: ELT: can be activated by a quick rap with palm. A TSO-C91a: ELT: can be activated by using a rapid forward (throwing) motion coupled with a rapid reversing action. Manufacturers' instructions should be referred to prior to activation. Verify that the ELT has been activated by use of a wattmeter, the airplane's VHF radio communications receiver when tuned to 121.5 MHz or other means (see Note 1.)
5. Reinstall the ELT into its mount and verify the proper direction for crash activation. Reconnect all cables. They should have some slack at each end and be properly secured to the airplane structure for support and protection.
6. Activate the ELT using the "on" or "test" switch. A low-quality AM broadcast radio receiver should be used to determine if energy is being transmitted from the antenna. When the antenna of this radio (tuning dial on any setting) is held about 6 inches from the activated ELT antenna, the ELT aural tone will be heard (see Notes 2 and 3).
7. Verify that all switches are properly labeled and positioned.
  - Note 1: This not a measured check; it only indicates that the G-switch is working.
  - Note 1: This is not a measured check, but it does provide confidence that the antenna is radiating with sufficient power to aid search and rescue. The aircraft's VHF receiver, tuned to 121.5 MHz, may also be used. This receiver, however, is more sensitive and could pick up a weak signal even if the radiating ELT's antenna is disconnected. Thus it does not check the integrity of the ELT system or provide the same level of confidence as does an AM radio.
  - Note 3: Because the ELT radiates on the emergency frequency, the Federal Communications Commission allows these tests to be conducted only within the first 5 minutes after any hour and limits the tests to 3 sweeps of the transmitter audio modulation.

This AN includes ELT maintenance information which has been issued with A 8310.1, dated September 23, 1998, ELT supplemental Inspection Procedure- Part 91 Operation; the February issue of Advisor Circular 43-16, General Aviation Airworthiness Alerts; and Notice of Proposed Rulemaking 90-11, published in the Federal Register on April 3, 1990, (55 FR 12316).

For further information, please contact Phil Akers, Technical Analysis Branch, AIR-120, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591; telephone FTS 267-9571.

This guidance will subsequently be incorporated in the next revision to Order 8150 series.