U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Specification L-854, Radio Control Equipment

Date: 1/17/2017
Initiated By: AAS-100

AC No: 150/5345-49D
Change:

1 **Purpose.**

This advisory circular (AC) contains the specifications for radio control equipment to be used for controlling airport lighting facilities.

2 **Effective Date.**

Effective six months after the issue date of this AC, only equipment certified per the specifications herein will be listed per AC 150/5345-53, *Airport Lighting Equipment Certification Program.*

3 **Cancellation.**

This AC cancels AC 150/5345-49C, *Specification L-854, Radio Control Equipment,* dated June 27, 2007.

4 **Application.**

The Federal Aviation Administration (FAA) recommends the guidance and specifications in this Advisory Circular for L-854 Radio Control Equipment. In general, use of this AC is not mandatory. However, use of the specifications in this AC is mandatory for all projects funded under the Airport Improvement Program (AIP) or with revenue from the Passenger Facility Charge (PFC) Program. All lighting designs contained in this AC are acceptable to the Administrator to meet the lighting requirements under 14 CFR § 139.311, Marking, Signs and Lighting.

5 **Principal Changes.**

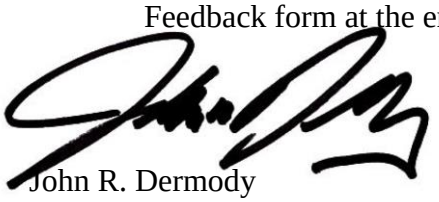
Change low end of environmental temperature range from -67° F (-55° C) to -40° F (-40° C) for better parts availability.

6 **Metric Units.**

To promote an orderly transition to metric units, the specification includes both English and metric units. The metric conversions may not be exact equivalents, and until there is an official changeover to the metric system, the English dimensions will govern.

7 **Feedback on this AC.**

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback form at the end of this AC.



John R. Dermody
Director of Airport Safety and Standards

CONTENTS

Paragraph **Page**

Page intentionally blank

CHAPTER 1. SCOPE AND CLASSIFICATION

1.1 Scope.

This specification covers the equipment requirements for radio control systems to be used for remote control of airport lighting facilities from aircraft, from a ground location, or from both. The basic system elements include radio receivers, radio transmitters, encoders, and decoders.

1.2 Classification.

Three types of L-854 systems are covered by this specification:

Table 1. L-854 Equipment Types

Type I	Air-to-ground - consists of an amplitude modulated (AM) or frequency modulated (FM) carrier detection receiver and a Style A decoder (paragraph 3.4.5.2).
Type II	Ground-to-ground - consists of a frequency modulated (FM) transmitter, an FM receiver, an encoder, and a Style B decoder (paragraph 3.4.5.3).
Type III	Air-to-ground plus ground-to-ground - consists of an FM transmitter, two receivers (AM and FM), an encoder, and Style A and Style B decoders.

Page Intentionally Blank

CHAPTER 2. APPLICABLE DOCUMENTS

2.1 FAA AC.

Copies of Federal Aviation Administration (FAA) ACs may be obtained from www.faa.gov/airports/resources/advisory_circulars/.

AC 150/5345-53	Airport Lighting Equipment Certification Program

2.2 National Telecommunications and Information Administration (NTIA).

The National Telecommunications and Information Administration (NTIA) Red Book may be downloaded free of charge from the NTIA website at www.ntia.doc.gov/page/2011/manual-regulations-and-procedures-federal-radio-frequency-management-redbook.

NTIA	Manual of Regulations and Procedures for Federal Radio Frequency Management (Red Book)

2.3 Federal Communications Commission (FCC).

Copies of Federal Communications Commission (FCC) documents may be obtained from www.ecfr.gov/cgi-in/textidx?tpl=/ecfrbrowse/Title47/47cfr15_main_02.tpl.

Code of Federal Regulation Title 47	Telecommunication, Part 15, Radio Frequency Devices
	Part 2, Frequency Allocations and Radio Treaty Matters; General Rules and Regulations, Part 90, Private Land Mobile Radio Services

2.4 Institute of Electrical and Electronics Engineer (IEEE).

Copies of International Electrical and Electronics Engineers (IEEE) documents may be obtained from www.ieee.org/publications_standards/index.html.

IEEE C62.41	IEEE Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits
IEEE C62.45	IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits

2.5 International Standardization Organization (ISO).

Copies of the International Standardization Organization (ISO) documents are available online from www.iso.ch.

ISO-10012	Measurement Management Systems – Requirements for Measurement Processes

Page Intentionally Blank

CHAPTER 3. REQUIREMENTS

3.1 General Requirements.

Each radio control system must comply with all specifications in this AC for all the equipment types listed in paragraph 1.2. Each set of equipment must be tuned and adjusted for operation at the frequency specified by the purchaser.

Note: The FAA Regional Spectrum Management Office must be notified about the operating frequency of a Type II or III system (FM transmitter) *before* equipment operation.

3.2 Environmental Conditions.

The equipment must be designed to operate in the following indoor or outdoor environmental conditions.

Note: The equipment purchaser will specify either indoor or outdoor equipment.

3.2.1 Indoor Conditions.

1. Temperature from -4° to 131° Fahrenheit (F) (-20° to +55° Celsius (C)).
2. Relative humidity up to 95 percent.

3.2.2 Outdoor Conditions.

1. Temperature from -40° F to 131° F (-40° C to +55° C).
2. Relative humidity up to 100 percent.
3. Wind speeds up to 100 miles per hour (mph) (161 kilometers per hour).
4. Exposure to wind driven rain, snow, or sleet.

3.3 Operating Requirements.

The radio control equipment will be used to operate airport lighting facilities per the following.

3.3.1 Air-to-Ground System.

3.3.1.1 The lighting facility will be operated from aircraft by clicking the aircraft Very High Frequency (VHF) radio microphone button a specified number of times within a 5-second period as follows:

1. 3 clicks - lighting system energized on the low brightness step.
2. 5 clicks - lighting system energized on the medium brightness step.
3. 7 clicks - lighting system energized on the high brightness step.

3.3.1.2 After the system is energized on a brightness step, any other brightness step may be selected by clicking the mike button the specified number of times.

3.3.1.3 The system must turn off automatically 15 minutes after the last brightness step operation.

3.3.2 Ground-to-Ground System.

3.3.2.1 The ground-to-ground system is intended for operating lighting systems from an airport control tower. The basic system can perform a maximum of 8 separate control functions.

3.3.2.2 Additional control functions, in multiples of 8, can be obtained by the addition of decoder modules and associated parts.

3.3.3 Air-to-Ground Plus Ground-to-Ground System.

3.3.3.1 The dual system may be used where there is a part-time airport control tower.

3.3.3.2 When the control tower is in operation, the lighting facility must be controlled through the ground-to-ground unit with the air-to-ground unit deactivated.

3.3.3.3 When the control tower is not in operation, the lighting facility must be controlled by the air-to-ground unit.

3.3.3.4 Transfer of control to and from the air-to-ground unit may be accomplished through the ground-to-ground unit.

3.4 System Design Requirements.

3.4.1 General.

3.4.1.1 For receivers, the equipment must comply with Federal Communications Commission (FCC) 47 CFR Part 15. In addition, the equipment must comply with 47 CFR § 15.107 and § 15.109.

3.4.1.2 For a Type II and Type III FM transmitter, the equipment must be accepted and meet all requirements in 47 CFR Part 90, Private Land Mobile Radio Services, and the requirements in 47 CFR Part 2, Frequency Allocations and Radio Treaty Matters, General Rules and Regulations.

3.4.1.3 Spurious emissions for Type II and III FM transmitting equipment must be per 47 CFR § 2.1051 and § 2.1053.

3.4.2 Power Input.

The equipment must be designed to operate from 120 VAC, ±15%, 60 Hertz (Hz). Power for the encoder and decoders may be obtained from an associated transmitter or receiver.

3.4.2.1 **Lightning Surge Arrestors.**

3.4.2.1.1 Arresters of the proper rating to protect the equipment from lightning-induced voltage and current surges must be installed at both the AC power input and antenna terminals.

3.4.2.1.2 The lightning arresters must be rated for pulses per IEEE C62.41-1991, Section 9, Table 4: Location Category C1.

3.4.2.1.3 The ground-side of the arresters must be connected to the cabinet grounding lug or other electrically equivalent ground location. If a bonding jumper wire is used, it must not be smaller than 14 American Wire Gauge (AWG).

3.4.2.2 **Transient Voltage and Current Protection.**

Transient protection that does not degrade signal quality must also be provided for all external signal, data, and control lines that enter the equipment enclosure per IEEE C62.41-1991, Table 4: Location Category C1.

Note: *See IEEE C62.41- 1991, IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits, Section 9, Definition of Standard Surge Testing Waveforms, for detailed explanations of surge/transient waveforms.*

3.4.3 Receiver.

The receiver must conform to the following:

1. L-854 Type I receiver: must be a super heterodyne type.
   a. Frequency: the receiver must operate at a single frequency within a band of frequencies from 118 to 136 Megahertz (MHz) and process amplitude modulated (AM) signals.
   b. Alternatively, the receiver may use frequency modulation (FM) with a discriminator and variable squelch to detect the presence of the radio frequency (RF) carrier within the 118 to 136 MHz VHF band.

Note: *The receiver operating frequency must be specified by the customer before delivery. The receiver is typically set to 122.80, 122.7, or 123.00 MHz (Universal Communications/Common Traffic Advisory Frequency - UNICOM/CTAF). Alternatively, the receiver operating frequency may be programmable for 25 kHz channel spacing within the 118 to 136 MHz VHF band.*

c. Frequency tolerance: must be ±0.003 percent (30 parts per million (ppm)) of the carrier center frequency.

d. Receiver sensitivity: must be 5 microvolts (μV) or less for a 10 decibel (dB) signal plus noise to noise ratio ((S+N)/N). The manufacturer must provide a sensitivity adjustment.

i. Receiver selectivity: must be a bandwidth of not less than ±9.0 kilohertz (kHz) from the assigned carrier frequency at 6 decibels below carrier (dBc) and not more than ±40 kHz at 60 dBc.

e. Fidelity: the receiver output must be uniform within ±2.0 dB from 300 - 2450 Hz (not applicable to the alternate FM receiver).

f. Nominal antenna impedance: nominal 50 ohms unbalanced.

g. Audio or carrier detection output:

i. For an AM receiver, 0 decibels referenced to 1.0 milliwatt (0 dBm) or more into a 600 ohm load with signal input of 5 microvolts modulated 30 percent at 1000 Hz. Pulses resulting from bursts of radio frequency energy (clicks of a microphone) must drive a Type A decoder when the receiver input signal is 5 μV or more.

ii. For an FM receiver, pulses arising from the presence of the VHF carrier frequency (clicks of a transmitter microphone) must drive a Type A decoder (see paragraph 3.4.5) when the receiver input signal is 5 μV or less. The presence of the carrier may be indicated by a visual or an audible indication.

2. L-854 Type II Receiver: must be a superheterodyne type.

a. Frequency: the receiver must operate at a single frequency in either of two bands: 150 - 174 MHz. and 450 - 512 MHz and process frequency modulated (FM) signals.

b. Frequency tolerance: must be ±0.003 percent (30 parts per million (ppm)).

Note: Receiver frequency tolerance is the maximum permissible departure of the center frequency of the intermediate frequency passband from the desired center frequency.

c. Sensitivity: 5 microvolts or less for 20 dB of quieting. The manufacturer must provide a sensitivity adjustment.

d. Receiver selectivity: must be not less than ±9.0 kilohertz (kHz) from the assigned carrier frequency at 6 dBc) and not more than ±40 kHz at 60 dBc. Spurious signals must not be less than 50 dB below the desired signal.

e. Fidelity: The receiver output must be uniform within ±2.0 dB from 300 - 2450 Hz.

f. Nominal antenna impedance: Nominal 50 ohms unbalanced.

g. Audio output: 0 decibels (dB) referenced to 1.0 milliwatt (0 dBm) or more into a 600 ohm load with signal input of 5 microvolts. See paragraph 3.4.5.3 Style B Decoder input for additional information.

3. L-854 Type III Receiver: A type III receiver uses both Type 1 and Type II equipment. See paragraph 3.4.3, items 1and 2, above for receiver requirements. See paragraph 1.2 for equipment description.

3.4.4 Transmitter.

Type II and III equipment uses an FM pulse RF burst for a ground-to-ground link and must conform to the following requirements:

1. Type: the transmitter must be fixed frequency operation with a frequency modulated (FM) carrier.

2. Frequency: the transmitter must operate within 150-174 MHz or 450-512 MHz band with a frequency tolerance of 0.00025 percent (2.5 ppm). The purchaser must specify the operating frequency.

Note: *The transmitter frequency bands stated are for guidance only and may not be inclusive of frequencies authorized by the FAA for use at all airports. See the NTIA Red Book, Section 4, for additional guidance concerning the allocation of U.S. Government frequencies with fixed stations. In addition, consult 47 CFR Part 2, Frequency Allocations and Radio Treaty Matters; General Rules and Regulations, for additional guidance about frequency usage. Advise the FAA Regional Spectrum Management Office before equipment installation about the intended transmitter operating frequency. This note must be included in the equipment instruction book, paragraph 3.5, item 3.*

3. RF Power Output: must be not less than 1 watt (30 dBm) but not more than 3 watts (34.8 dBm).

4. Modulation: FM with a frequency deviation of ±2.5 kHz with a signal input of -10 dBm within the frequency band of 300 to 2450 Hz.

5. Spectrum: the transmitter output spectrum must be per the limits described in 47 CFR Part 90, Subpart I, General Technical Standards.

6. Output Impedance: the transmitter output impedance must be a nominal 50 ohms unbalanced.

7. Input Impedance: the transmitter input impedance must be 600 ohms.

8. Transmitting antenna: No other antenna type other than that originally furnished with the equipment must be used.

Note: The transmitting antenna must be included in the equipment instruction book per paragraph 3.5.

3.4.5 Decoders.

3.4.5.1 **General.**

1. The Style A decoder must decode a series of electrical pulses, (example: clicking a transmitter microphone), to control the desired function.
2. Style B decoders must detect a series of 3 tone burst characters per control function or address.
3. The decoders must not respond to signal element durations of less than 50 milliseconds or require signal elements of more than 100 milliseconds.

3.4.5.1.1 Output Relays.

1. Output relays must be a plug-in type having single pole single throw (SPST) normally open (NO) contacts rated at 3 amps (resistive load), 120 volts AC.
2. The output relays must have a mechanical life of 100,000 cycles or more.

3.4.5.1.2 Output Terminals.

The decoder output signal terminals must be a screw-type barrier terminal strip rated not less than 250 volts AC.

3.4.5.1.3 Input Terminals.

1. When the decoder or decoders are installed in an enclosure with a receiver, the input terminals are not required.
2. When the decoder or decoders are installed in a separate enclosure, use a screw-type barrier terminal strip of proper voltage rating and size.

3.4.5.2 **Style A Decoder.**

3.4.5.2.1 The Style A decoder must energize 1, 2, or 3 relays upon the receipt of a series (7 pulses maximum) of electrical pulses (microphone clicks) within a 5-second period, hold the relays energized for 15 minutes, and de-energize the relays after 15 minutes.

1. A 5-second gate period must be started by the first pulse received.
2. At the third pulse, the first relay must be energized.
3. At the fifth pulse, the second relay must be energized.
4. At the seventh pulse, the third relay must be energized.

3.4.5.2.2 If 2 or 3 relays are energized and a new series of pulses are received, at the third pulse, all relays except the first must be de-energized and the timer reset for a full 15 minutes.

1. At the fifth pulse, the second relay must be energized.
2. At the seventh pulse, the third relay must be energized.

3.4.5.2.3 The decoder must be designed so that a simple connection change disables the circuit that de-energizes the relays when additional pulses are received.

3.4.5.2.4 The decoder must have terminals for connecting a switch or relay to disable the decoder.

3.4.5.3 **Style B Decoder.**

1. The Style B decoder must recognize 8 discrete addresses.
2. Each address must cause a relay to close, a relay to open, or a relay to close and another relay to open.
3. The relay operating scheme must be specified by the purchaser.

3.4.5.3.1 Address.

1. A decoder address must be a series of 3 characters that are received within 3 seconds.
2. The address may be any combination of 1, 2, or 3 individual characters such as l-l-l, l-4-1, 4-4-1, l-2-4, etc., and must be specified by the purchaser.

3.4.5.3.2 Characters.

Each character must be a burst of the paired tones per Table 2.

Table 2. Frequencies

Character	Frequencies	Character	Frequencies
1	697 Hz and 1209 Hz	7	852 Hz and 1209 Hz
2	697 Hz and 1339 Hz	8	852 Hz and 1339 Hz
3	697 Hz and 1477 Hz	9	852 Hz and 1477 Hz
4	770 Hz and 1209 Hz	0	941 Hz and 1209 Hz
5	770 Hz and 1339 Hz	*	941 Hz and 1339 Hz
6	770 Hz and 1477 Hz	#	941 Hz and 1477 Hz

3.4.5.3.3 Security Tone.

The decoder must recognize tone burst characters only if a security tone of 1633 Hz is also present.

3.4.5.3.4 Sensitivity.

The Style B decoder must operate with input signal amplitudes of -10 dBm or more.

3.4.6 Encoder.

3.4.6.1 **General.**

1. The encoder must have a capacity of not less than 16 unique addresses.
2. Each address must be represented by a single pole switch. Closing a switch must cause the encoder to generate the address that is represented by the switch.
3. An address switch remaining closed or opened and re-closed must have no further effect until a canceling address is generated.

3.4.6.2 **Output.**

1. The encoder output must be a security tone of 1633 Hz and the selected address.
2. Each character of the address must be generated for no less than 100 milliseconds and the address transmitted within 1.5 seconds.
3. The address must be per paragraph 3.4.5.3.1.

3.4.6.3 **Control Panel.**

1. The control panel for the basic encoder must be no larger than 4 inches × 8 inches (101.6 mm × 203.2 mm).
2. The control panel must use a single pole normally open momentary switch for each address bit.
3. The address switches must have a minimum rated life of 50,000 cycles.
4. Each switch must be marked in indelible characters of not less than 3/16 inch (4.8 millimeters) and not more than 1/4 inch (6.4 millimeters) in height formed by engraving, etching, or stamping.
5. The control panel must also use indicator lights (color scheme to be selected by purchaser) to indicate the status of each address bit.
6. The control panel must be designed to be removed from the encoder and installed up to 25 feet (7.5 m) away.

3.4.6.4 **Output Terminals.**

1. When installed in an enclosure with a radio transmitter, the terminals must be per paragraph 3.4.5.1.2.
2. When installed in a separate enclosure, output terminals must be a screw type barrier terminal strip of the proper voltage rating and size.

3.4.7 Mean Time Between Failure (MTBF).

1. The L-854 receiver, encoder, and decoders must be designed for 10,000 hours MTBF.
2. The transmitter must be designed for a minimum of 2,000 hours MTBF.
3. The manufacturer must show his method of determining MTBF.

3.4.8 Materials and Workmanship.

Materials used and workmanship must be of the highest commercial quality and practices for equipment of this type.

3.4.9 Nameplate.

Each unit of the L-854 system must have a permanently-attached nameplate with the following information:

1. Identification - Radio Control Equipment Type FAA L-854.
2. Unit (Receiver/Decoder, Transmitter/Encoder, etc.).
3. Input voltage.
4. Frequency range(s).
5. Manufacturer’s name or trademark.

3.5 **Instruction Book.**

An instruction book with following information must be furnished with each L-854 system:

1. Schematic and wiring diagrams showing all components cross-indexed to the parts list.
2. Parts list with the rating and characteristics of each part and with manufacturer’s part number.
3. Installation instructions.
4. Maintenance instructions.
5. Troubleshooting charts.
6. Theory of operation.

Page Intentionally Blank.

CHAPTER 4. EQUIPMENT QUALIFICATION REQUIREMENTS

4.1 Qualification Procedures.

Procedures for obtaining equipment certification are in AC 150/5345-53, *Airport Lighting Equipment Certification Program.*

4.2 Qualification Tests.

4.2.1 Environmental Tests.

4.2.1.1 High Temperature (Outdoor Enclosure).

1. Install the equipment in an outdoor enclosure.
2. Subject the equipment under test (EUT) with AC power ON to high temperature of 131 degrees F (55 degrees C) for not less than 8 hours.
3. After 8 hours have elapsed and not more than 10 minutes after the chamber becomes accessible, turn the EUT AC power on and perform testing per paragraph 4.2.2.
4. The failure of any tests will be cause for rejection of the equipment.

4.2.1.2 Low Temperature (Outdoor Enclosure).

1. Install the equipment in an outdoor enclosure.
2. Subject the EUT to -40° F (-40° C) for not less than 4 hours with the AC power ON.
3. After 4 hours have elapsed and not more than 10 minutes after the test chamber is accessible, perform testing per paragraph 4.2.2.
4. The failure of any tests will be cause for rejection of the equipment.

4.2.1.3 Low Temperature (Indoor Enclosure).

1. Install the equipment in an indoor enclosure.
2. Subject the EUT to a temperature of -4° F (-20° C) for no less than 4 hours with the AC power ON.
3. After 4 hours have elapsed and not more than ten minutes after the test chamber is accessible, perform testing per paragraph 4.2.2.
4. The failure of any tests will be cause for rejection of the equipment.

4.2.1.4 Humidity.

1. Place the EUT in a humidity test chamber.
2. Subject the EUT to 86° F (30° C) and a relative humidity of 95 percent for no less than 8 hours with the AC power ON.

3. After 8 hours have elapsed and not more than ten minutes after the test chamber is accessible, perform testing per paragraph 4.2.2.
4. The failure of any tests will be cause for rejection of the equipment.

4.2.1.5 **Lightning Surge Testing.**

Note: *The equipment might be damaged by the following test; perform them only after all other testing is complete.*

1. Subject the AC power input of the equipment to 2 pulses (one pulse per 15 seconds) of the combination (1.2 microsecond/50 microsecond and 8 microsecond/20 microsecond) test pulse per paragraph 3.4.2.1.
   a. See IEEE C62.41-1991 Section 9.3 for test condition and test generator information.
   b. See IEEE C62.41-1991 Section 9.4 for a detailed combination and ring wave generation and parameters discussion.
   c. See also IEEE C62.45, *IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits* for guidance about equipment test methods.
2. Perform an operational test of the equipment per paragraph 4.2.2, item 9.
3. Any equipment failures will be cause for rejection.

4.2.1.6 **Conducted and Radiated Emissions For Type I L-854.**

1. Test the equipment for radiated and conducted emissions per paragraph 3.4.1.1.
2. If the equipment is not per the limits in paragraph 3.4.1.1, the manufacturer must be advised that there is a potential for harmful interference with the operation of FAA or other airport equipment.

4.2.1.7 **Antenna Radiation for Receivers.**

See 47 CFR § 15.111 for information about how to conduct radiation measurements for an unintentional radiator antenna. Sections 15.33(b)(3) and 15.33(c) must also be applied. If the equipment is not per the limits in this paragraph, the manufacturer must be advised that there is a potential for harmful interference with the operation of FAA or other airport equipment.

4.2.1.8 **Spurious Emission Limits for Type II and III L-854 Transmitter.**

1. Test for spurious emission limits per paragraph 3.4.1.3.
2. If the equipment is not per the limits in paragraph 3.4.1.3, the manufacturer must be advised that there is a potential for harmful interference with the operation of FAA or other airport equipment.

4.2.2 Electrical Tests.

Perform the following performance tests to determine equipment compliance with the requirements of this AC.

1. Frequency tolerance:
   a. For Type I and III AM/FM receivers, per paragraph 3.4.3, items 1.a and 1.b.
   b. For Type II and III FM receivers, per paragraph 3.4.3, item 2.b.
   c. For Type II transmitter, per paragraph 3.4.4, item 2.
2. Transmitter spectrum:
   a. For Type II and III transmitters, per paragraph 3.4.4, item 5.
3. Receiver sensitivity:
   a. For Type I and III AM/FM receivers, per paragraph 3.4.3, item 1.c .
   b. For Type II and III FM receivers, paragraph 3.4.3, item 2.c.
4. Receiver selectivity:
   a. For Type I and III AM/FM receivers, per paragraph 3.4.3, item 1.d.
   b. For Type II and III FM receivers, paragraph 3.4.3, item 2.d.
5. AC input power: applies to all types, per paragraph 3.4.2.
6. Output RF power: for Type II and III FM transmitters, per paragraph 3.4.4, item 3.
7. Decoder response time:
   a. For Type I and III AM/FM receivers, per paragraph 3.4.5.1, item 3.
   b. For Type II and III FM receivers, per paragraph 3.4.5.1, item 3.
8. Receiver fidelity:
   a. For Type I and III AM receivers, per paragraph 3.4.3, item 1.e.

Note: Not applicable to FM Type I receiver.

   b. For Type II and III FM receivers, per paragraph 3.4.3, item 2.e.
9. Equipment operation:
   a. For Type I and III AM/FM equipment, per paragraph 3.4.5.2.
   b. For Type II and III FM equipment, paragraph 3.4.5.3.

4.2.2.1 **Test Data.**

Test reports from paragraph 4.2.2 must be included in a test report that must include, but is not limited to the following:

1. The results of equipment performance tests. The performance standard must be listed along with the measured value.
2. Test equipment used (must be calibrated by a certified laboratory).

3. Block diagrams of test setups.
4. Measurements, calculations, and test procedures.

CHAPTER 5. PRODUCTION

5.1 Production Testing.

5.1.1 The equipment must be visually inspected for workmanship, fabrication, finish, painting, and adequacy of selected parts.

5.1.2 All production units must be energized (AC power ON) for a minimum of two hours prior to testing.

5.1.3 The electrical tests of paragraph 4.2.2 must be conducted on all units.

5.1.4 Units failing any part of the production test must be repaired and undergo a complete retest.

5.2 Production Test Equipment.

All measuring and test equipment used in the production of discharge lighting equipment classified under paragraph 1.2 must have its accuracy and precision maintained by a calibration program with traceability to ISO-10012 *Measurement Management Systems – Requirements for Measurement Processes* or current industry accreditation criteria.

5.3 Production Test Records.

The manufacturer must maintain records showing actual test results of all tests required by paragraph 5.1 for a period of three years. These records must be traceable to the units tested by serial number.

Advisory Circular Feedback

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by (1) mailing this form to Manager, Airport Safety and Operations Division, Federal Aviation Administration ATTN: AAS-100, 800 Independence Avenue SW, Washington DC 20591 or (2) faxing it to the attention of the Office of Airport Safety and Standards at (202) 267-5383.

Subject: AC 150/5345-49D Date: _____

Please check all appropriate line items:

☐ An error (procedural or typographical) has been noted in paragraph _____ on page _____.

☐ Recommend paragraph _____ on page _____ be changed as follows:

_____
_____
_____

☐ In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

_____
_____
_____

☐ Other comments:

_____
_____
_____

☐ I would like to discuss the above. Please contact me at (phone number, email address).

Submitted by: _____ Date: _____