

Approval Standard

Land Mobile Radios
for Use in Class 1,
Division 1 Hazardous
(Classified) Locations

Class Number 3640
June 2013



Approval Standard for Land Mobile Radios for use in Class I, Division 1 Hazardous (Classified) Locations

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Foreword

The FM Approvals certification mark is intended to verify that the products and services described will meet FM Approvals' stated conditions of performance, safety and quality useful to the ends of property conservation. The purpose of Approval Standards is to present the criteria for FM Approval of various types of products and services, as guidance for FM Approvals personnel, manufacturers, users and authorities having jurisdiction.

Products submitted for certification by FM Approvals shall demonstrate that they meet the intent of the Approval Standard, and that quality control in manufacturing shall ensure a consistently uniform and reliable product. Approval Standards strive to be performance-oriented. They are intended to facilitate technological development.

For examining equipment, materials and services, Approval Standards:

- a) must be useful to the ends of property conservation by preventing, limiting or not causing damage under the conditions stated by the Approval listing; and
- b) must be readily identifiable.

Continuance of Approval and listing depends on compliance with the Master Agreement, satisfactory performance in the field, on successful re-examinations of equipment, materials, and services as appropriate, and on periodic follow-up audits of the manufacturing facility.

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1 INTRODUCTION

1.1 Purpose

1.1.1 This standard states Approval requirements for Land Mobile Radios for use in Class I, Division 1 Hazardous (Classified) Locations.

1.1.2 Approval criteria may include, but are not limited to, performance requirements, marking requirements, examination of manufacturing facility(ies), audit of quality assurance procedures, and a follow-up program.

1.2 Scope

This standard specifies the particular requirements for construction, test and marking for Land Mobile Radio (LMR) equipment and accessories for use in Class I, Division 1, locations as defined by the National Electrical Code, ANSI/NFPA 70. This LMR equipment, within the operational parameters specified by the manufacturer, ensures a very high level of protection that includes rare malfunctions related to the equipment or two expected malfunctions occurring independently of each other.

NOTE 1: A malfunction may result from a failure of the component parts of the electrical equipment or from anticipated externally applied influences. Two independent expected malfunctions which, separately, would not create a source of ignition, but which, in combination, do create a source of ignition, are regarded as a single rare malfunction.

NOTE 2: This LMR equipment is intended for use in Class I, Division 1, locations where ignitable mixtures of flammable gases or vapors are present frequently during normal operations.

This standard applies to equipment with a nominal battery voltage not exceeding 24 Vdc.

1.3 Basis for Requirements

For general basis of requirements, see Approval Standard 3600, Paragraph 1.5.

1.4 Basis for Approval

See Approval Standard 3600, Paragraph 1.3.

1.5 Basis for Continued Approval

See Approval Standard 3600, Paragraph 1.4.

1.6 Effective Date

Land Mobile Radios and accessories currently FM Approved for Class I, Division 1 hazardous (classified) locations shall be re-examined to confirm compliance with FM Approval Standard Class 3640 by the effective date of January 1, 2016.

1.7 System of Units

Units of measurement used in this Standard are United States (U.S.) customary units. These are followed by their arithmetic equivalents in International System (SI) units, enclosed in parentheses. The first value stated shall be regarded as the requirement. The converted equivalent value may be approximate. Appendix A lists the selected units and conversions to SI units for measures appearing in this standard. Conversion of U.S. customary units is in accordance with the American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)/American Society for Testing Materials

(ASTM) SI 10-97, "Standard for Use of the International System of Units (SI): The Modern Metric System."

1.8 Definitions

For the purposes of this document, the terms and definitions given in the standards referenced in Clause 1.9 and the following, apply:

land mobile radio (LMR)

A LMR is hand-held or portable communication equipment that is a component of a wireless communications system based on broadcasting electromagnetic waves.

protection concept

protection measures applied to electrical equipment for use in hazardous (classified) locations as defined by the National Electrical Code, ANSI/NFPA 70, to avoid ignition of a surrounding flammable atmosphere.

normal operation

operation of equipment conforming electrically and mechanically with its design specification and used within the limits specified by the manufacturer

portable equipment

equipment that has been designed to be readily carried from place to place and to be used while it is being carried. Portable equipment is battery powered and includes, but is not limited to:

- a) a hand-held apparatus, typically less than 1 kg, which requires use of only one hand to operate;
- b) larger equipment that can be operated by the user while it is carried either by hand, by a shoulder strap, or by a carrying harness.

radio frequency

electromagnetic waves from 9 kHz to 60 GHz

continuous transmission

transmission where the duration of the pulse is greater than the half of the thermal initiation time

threshold power P_{th}

product of the effective output power of the transmitter multiplied by the antenna gain

NOTE For LMRs, the threshold power is considered to be equal to the effective Isotropic Radiated Power (EIRP) per ITU-R BS.561-2.

antenna gain

gain produced by an antenna concentrating radiation in a particular direction

NOTE The gain of LMR antennas is frequently less than unity