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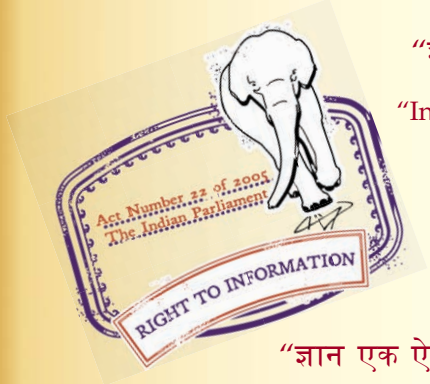
IS 615 (1996): Radio receivers for amplitude modulation broadcast transmission [LITD 7: Audio, Video and Multimedia Systems and Equipment]



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IS 615 : 1996
(Reaffirmed 2001)

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(दूसरा पुनरीक्षण)

Indian Standard

RADIO RECEIVERS FOR AMPLITUDE MODULATION BROADCAST TRANSMISSIONS — SPECIFICATION

(Second Revision)

ICS 33·160·20

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

March 1996

Price Group 2

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Radio Communications Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

This Indian Standard was first published in 1954 and subsequently revised in 1966. This second revision is being brought out in view of the developments in the radio receiver industry in India and in the light of experience gained in actual testing of these receivers. The important changes introduced in this revision are as follows:

a) In earlier version of this standard, the radio receivers were classified as Type A, Type B, and Type C receiver. Now in the revised standard the radio receivers are classified in two types; Type A and Type B based on the frequency range of operation. Type A receivers cater to the requirements of radio receivers operating in medium wave range whereas Type B receivers cover the radio receivers in medium wave and short wave ranges.

b) A few important parameters for general requirements of radio receivers pertaining to the power supply requirements and efficiency of radio receivers have been included in this standard.

c) Cold test, Bump test, Drop test have been included in this standard.

This Indian Standard covers the specification of radio receivers used for reception of amplitude modulation broadcast transmissions. The specification for radio receivers for reception of frequency modulation broadcast transmissions are covered in IS 6759 : 1995.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2:1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard
RADIO RECEIVERS FOR AMPLITUDE MODULATION BROADCAST TRANSMISSIONS — SPECIFICATION
(Second Revision)

1 SCOPE

1.1 This standard covers general requirements applicable to all types of domestic radio receivers intended for reception of amplitude modulation broadcast transmissions.

1.1.1 The minimum performance requirements of specific types of receivers are covered in Sections 1 and 2 of the standard.

1.2 This standard also covers the amplitude modulation section of AM/FM radio receivers.

1.3 This standard does not cover car radios, pocket size and headphone radio receivers.

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 TERMINOLOGY

For the purpose of this standard, the definitions and explanation of terms included in IS 12193(Part 1):1989 shall apply.

4 GENERAL REQUIREMENTS

4.1 The cabinet shall be made of wood, moulded plastic or any other suitable material. The design of the cabinet shall be such as to provide for the receiver, reasonable protection from dust.

4.2 The loudspeaker shall form an integral part of the receiver, either within the same cabinet of the receiver or in a separate cabinet.

4.3 The layout of components, wiring, soldering and workmanship shall conform to good engineering practice.

4.4 Power Supply Requirements

In the case of mains operated receiver, the receiver shall be designed to operate on a nominal supply system of 240 volts, 50 Hz, single phase ac , with a variation of ±10 percent in voltage and ±2 percent in frequency. In case of battery operated receiver, the receiver shall be designed to operate on a battery supply voltage recommended by the manufacturer.

4.5 Efficiency of the Receiver

The receiver shall not draw more than 40 mA current with volume control in zero position (under quiescent conditions) irrespective of power supply system (batteries or mains).

5 SAFETY REQUIREMENTS

5.1 Receivers operating from mains shall conform to the following safety requirements tested in accordance with IS 616 : 1986:

a) Heating under Normal Operating Conditions (*see* **7** of IS 616 : 1986),
b) Shock Hazard under Normal Operating Conditions (*see* **9** of IS 616 : 1986),
c) Insulation Requirements (*see* **10** of IS 616 : 1986),
d) Fault Conditions (*see* **11** of IS 616 : 1986), and
e) Parts Connected to Mains Supply (*see* **13** of IS 616 : 1986).

6 MARKING

6.1 Each receiver shall be legibly and indelibly marked with the following information:

a) Model designation and serial number;
b) Manufacturer's name or trade-mark;
c) Country of manufacture;
d) Input supply voltage and type of batteries in the case of battery operated receivers;
e) Frequency, if ac,
f) Antenna input terminals, with impedance value, if provided; and
g) External speaker terminals, if provided.

6.2 BIS Certification Marking

6.2.1 The receivers may also be marked with the Standard Mark.

6.2.2 The use of Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and Rules and Regulations made thereunder. Details of conditions under which a licence for the use of Standard Mark may be granted to manufacturers and producers may be obtained from the Bureau of Indian Standards.

7 TESTS

7.1 Classification of Tests

7.1.1 *Type Tests*

The following tests shall constitute the type tests:

a) Ease of tuning,
b) Noise limited sensitivity,

c) Selectivity,
d) Output power,
e) Electrical frequency response,
f) Acoustical frequency response,
g) Image ratio,
h) IF ratio,
j) Spurious response ratio,
k) Frequency stability,
m) Distortion, and
n) Automatic gain control (in case of Type B receivers).

7.1.1.1 *Number of samples*

For type tests, three receivers of the same model, type and make shall be selected preferably at random from a regular production lot.

7.1.1.2 *Criteria of acceptance*

There shall be no single failure in any of the type tests.

7.1.2 *Routine Tests*

The following shall constitute the routine tests and shall be carried on each and every receiver:

a) Functional check — There shall be no audible rattling or buzzing while listening at nominal volume control,
b) Output power,
c) Noise limited sensitivity, and
d) Distortion.

7.1.3 *Acceptance Tests*

The following shall constitute acceptance tests which shall be carried on receivers that have successfully passed the routine tests:

a) Selectivity,
b) Electrical frequency response,
c) Image ratio,
d) IF ratio,
e) Spurious response ratio,
f) Frequency stability, and
g) AGC (for Type B receivers only).

7.2 Environmental Tests

7.2.1 The receivers shall be capable of withstanding following environmental tests at the severities indicated therein. The post measurements specified in **7.2.2** shall be carried out after each environmental test and shall meet the requirements stated in the standard.

a) *Dry Heat Test*

Test Method : In accordance with IS 9000 (Part 3/Sec 5) : 1977

Severity : 55°C for 16 h

Recovery Period : 2 h

b) *Damp Heat Cyclic Test*

Test Method : In accordance with IS 9000 (Part 5 /Sec1) : 1981

No. of Cycles: 2
Recovery Period : 24 h

c) *Cold Test*

Test Method : In accordance with IS 9000 (Part 2/Sec 4) : 1977

Severity : –10°C for 2 h

Recovery : 2 h

d) *Bump Test*

Test Method : In accordance with IS 9000 (Part 7/ Sec 2) : 1979. The receivers shall be tested in packed condition

No. of Bumps : 1 000 at 400 m/s^2

e) *Drop Test*

Test Method : In accordance with IS 9000 (Part 7/ Sec 3) : 1979. The receiver shall be tested under unpacked conditions

Height of drop : 25 mm

7.2.2 *Post Measurement After Each Environmental Test*

a) Noise limited sensitivity,
b) Output power,
c) Frequency stability, and
d) Distortion.

7.3 Measurement of Performance

7.3.1 The characteristics specified in subsequent sections of this standard shall be measured in accordance with the procedures laid down in IS 12193(Part 1):1989 and IS 12193(Part 2):1987.

7.3.2 The performance requirements specified in this standard refer to normal voltage operation in case of mains-operated receivers and to reduced voltage operation in case of battery-operated receivers.

SECTION 1 TYPE A RECEIVERS

8 SCOPE

This section of the standard covers minimum performance requirements of Type A radio receivers designed for reception of amplitude modulation broadcast transmission in the medium wave range only, having a frequency coverage from 531 kHz to 1 602 kHz and operating either from mains or from batteries.

NOTE — The receivers covered by this section of the standard are presumed to be provided with built-in antenna and with facility for using external antenna.

9 PERFORMANCE REQUIREMENTS

9.1 Ease of Tuning

The ease of tuning shall be not less than 2.0 mm per 9 kHz in the medium wave range.

9.2 Noise Limited Sensitivity

The noise limited sensitivity over the entire frequency range shall not be worse than 1 mV/m with a 30 percent modulation at 1 kHz or 400 Hz and at a signal-to-noise ratio of not less than 26 dB.

9.3 Selectivity

The selectivity shall be measured at 1 MHz. The pass band shall be not greater than ±9 kHz at the – 20 dB points and not greater than ±18kHz at the – 40 dB points.

9.4 Output Power

The minimum output power for receivers operating on battery shall be not less than 100 mW.

9.5 Electrical Frequency Response

The variation in the electrical frequency response in the frequency range 100 Hz to 4 kHz shall not exceed 10 dB.

9.6 Acoustical Frequency Response (Optional)

The variation in acoustical response in the frequency range 250 Hz to 3 150 Hz shall not exceed 15 dB.

9.7 Image, IF and Spurious Response Ratio

9.7.1 *Image Ratio*

The image ratio shall not be less than 30 dB.

9.7.2 *IF Ratio*

The IF ratio shall not be less than 20 dB.

9.7.3 *Spurious Response Ratio*

The spurious response ratio shall not be less than 40 dB.

9.8 Frequency Stability

Frequency drift due to heating shall not exceed 0.3 percent of the frequency at which measurement is made.

9.9 Distortion

The distortion shall be less than 5.0 percent measured at 1 mV/m signal strength at 50 mW output power with a modulation frequency of 1 kHz, modulated 30 percent.

SECTION 2 TYPE B RECEIVERS

10 SCOPE

This section of the standard covers minimum performance requirements of Type B radio receivers designed for reception of amplitude modulation broadcast transmission in the range from 525 kHz to 26.1 MHz and operating from either mains or batteries.

11 PERFORMANCE REQUIREMENTS

11.1 Ease of Tuning

The ease of tuning shall not be less than 2.0 mm per 9 KHz in the short wave range.

11.2 Calibration Error

The calibration error shall not exceed ±5 percent in all the frequency ranges.

11.3 Noise Limited Sensitivity

The noise limited sensitivity over the entire frequency range at a signal-to-noise ratio of not less than 26 dB shall not be worse than 1 mV/m for medium wave range and of 500 uV/m for short wave range for receivers with built-in antenna.

11.4 Selectivity

The selectivity shall be measured at 1MHz. The pass band shall be not greater than ±9 kHz at the – 20 dB points and not greater than ±18 kHz at – 40 dB points.

11.5 Automatic Gain Control (AGC)

For an input signal level variation of 40 dB, the output variation shall not exceed 6 dB.

11.6 Output Power

The minimum useful output power shall be not less than 100 mW.

11.7 Image, IF and Spurious Response Ratio

11.7.1 *Image Ratio*

The image ratio shall be not less than 30 dB in medium wave range, not less than 10 dB in short wave range up to 10 MHz and not less than 4 dB beyond 10 MHz.

11.7.2 *IF Ratio*

IF ratio shall be not less than 20 dB in both medium wave and short wave ranges.

11.7.3 *Spurious Response Ratio*

For fundamental mixing	-	Not less than 40 dB
For second harmonic mixing	-	Under consideration

11.8 Electrical Frequency Response

The variation in the electrical frequency response in the frequency range 100 Hz to 4 KHz shall not exceed 10 dB.

11.9 Acoustical Frequency Response (Optional)

The variation in acoustical response in the frequency range 250 Hz to 3 150 Hz shall not exceed 15 dB.

11.10 Acoustic Feed Back — Under consideration.

11.11 Frequency Stability

11.11.1 *Stability Due to Heating*

The frequency drift due to heating shall not exceed 0.3 percent of the frequency at which measurement is made.

11.11.2 *Stability Due to Supply Voltage Variation*

In the case of mains-operated receivers, the frequency stability for variation of 10 percent in the supply voltage shall not exceed 4 KHz in all the frequency ranges.

11.12 Distortion

The distortion shall be not less than 5 percent measured at 1 mV/m signal at 50 mW output power with a modulation frequency of 1 kHz, modulated 30 percent.

ANNEX A
(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
616 : 1986	Safety requirements for mains operated electronic and related apparatus for household and similar general use (*second revision*)
6759 : 1995	Radio receivers for frequency modulation broadcast transmissions—Specification (*first revision*)
9000 (Part 2/ Sec 4) : 1977	Basic environmental testing procedures for electronic and electrical items: Part 2 Cold test, Section 4 Cold test for heat dissipating items with gradual change of temperature
9000 (Part 3/ Sec 5) : 1977	Basic environmental testing procedures for electronic and electrical items: Part 3 Dry heat test, Section 5 Dry heat test for heat dissipating items with gradual change of temperature
9000 (Part 5/ Sec 1) : 1981	Basic environmental testing proceudres for electronic and electrical items: Part 5 Damp heat (cyclic) test, Section 1 16 + 8 h cycle
9000 (Part 7/ Sec 2) : 1979	Basic environmental testing procedures for electronic and electrical items: Part 7 Impact test, Section 2 Bump
9000 (Part 7/ Sec 3) : 1979	Basic environmental testing procedures for electronic and electrical items: Part 7 Impact test, Section 3 Drop and topple
12193 (Part 1): 1989	Methods of measurement on radio receivers for various classes of emission : Part 1 General considerations and methods of measurements including audio frequency measurements
12193 (Part 2) : 1987	Methods of measurement for radio receivers for various classes of emission: Part 2 Radio frequency measurements on receivers for amplitude-modulated sound broadcast emissions

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Additions'.

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