

## RECOMMENDATION ITU-R BS.415-2\*

**Minimum performance specifications for low-cost  
sound-broadcasting receivers**

(1963-1982-1986)

The ITU Radiocommunication Assembly,

*considering*

- a) that the advantages of broadcasting should be made more easily available to the populations of the countries where, at present, the density of receivers is particularly low due to economic, geographical or technical reasons;
- b) that to this end, it is desirable that efficient broadcasting receivers should be available at prices low enough to secure their wide distribution in those countries;
- c) that general agreement on the performance of suitable broadcasting receivers would prove most useful to radio receiver manufacturers by assisting them to produce suitable receivers, having an agreed adequate standard of performance, at the lowest possible cost,

*recommends*

that the minimum performance specifications, contained in Annex 1, be used to assist in the design and development of low-cost sound broadcasting receivers suitable for production in large quantities.

**ANNEX 1**

These specifications apply to the following types of receivers:

Type A : a low sensitivity receiver for operation in band 6 (MF),

Type B : a combined receiver for operation in bands 6 (MF) and 7 (HF),

Type C : a medium sensitivity frequency-modulation receiver for operation in band 8 (VHF).

**1 General**

**1.1** Each of the three types of receiver should be available for either mains or battery operation. For battery operation, all three types of receiver should be fully solid state to ensure economy of power consumption. For mains operation, either valves or transistors may be used, consideration of cost being the guiding factor.

**1.2** For battery-operated receivers, the minimum performance specifications listed in this Recommendation should be achieved for the nominal battery voltage less 30% as specified in the relevant IEC publication.

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\* Radiocommunication Study Group 6 made editorial amendments to this Recommendation in 2002 in accordance with Resolution ITU-R 44.

**1.3** The methods of measurement employed should be those recommended in the relevant IEC publications for amplitude-modulation receivers and frequency-modulation receivers.

**1.4** The receivers should be simple, robust and well protected against dust. Those intended for use in regions of high temperature and humidity should be treated so that they can be used under the climatic conditions laid down by the Administration concerned. The appropriate tests required by the Administration procuring such receivers should comply with the relevant IEC publications.

**1.5** If national regulations prescribe methods of measurement or tests differing from the standard IEC methods, Administrations will, where necessary, draw attention to this difference.

**1.6** In the case of community listening, higher output powers are necessary, whereas the other requirements remain unchanged.

## 2 Specification for Type A receivers

|            |  |  |
|------------|--|--|
| <b>2.1</b> | Frequency coverage (kHz)   | 526.5-1 606.5 (Regions 1 and 3)<br>525-1 705 (Region 2)                        |
| <b>2.2</b> | Sensitivity for 50 mW output 30% modulation at 400 Hz            | 5 mV/m (with a built-in antenna with facilities for using an external antenna) |
| <b>2.3</b> | Signal/noise ratio for input as under § 2.2                      | 20 dB (mains-operated tube receivers)<br>26 dB (transistor receivers)          |
| <b>2.4</b> | Power output, for less than 10% distortion                       | not less than 0.1 W  |
| <b>2.5</b> | Overall selectivity<br>at – 6 dB points<br>at –20 dB points      | passband not less than $\pm 3$ kHz<br>passband not greater than $\pm 10$ kHz   |
| <b>2.6</b> | Image, intermediate frequency and spurious response ratio        | not less than 30 dB  |
| <b>2.7</b> | Overall fidelity including acoustic response of loudspeaker, or, | 250-3 150 Hz, within 18 dB limits  |

Alternatively, it may be more convenient for some manufacturers to consider only the electrical characteristics which should be

100-4 000 Hz within 12 dB limits (in a graphical presentation 400 Hz should be taken as the reference 0 dB level)

### 3 Specification for Type B receiver (the two types differing only in frequency range)

- 3.1** Frequency coverage (MHz)
- B1: 0.5265-1.6065; 2.3-15.6 (Regions 1 and 3)  
0.5250-1.7050; 2.3-15.6 (Region 2)
- B2: 0.5265-1.6065; 2.3-21.85 (Regions 1 and 3)  
0.5250-1.7050; 2.3-21.85 (Region 2)
- The receiver shall be provided with adequate mechanical and/or electrical means for easy tuning.
- 3.2** Sensitivity for 50 mW output 30% modulation at 400 Hz
- not worse than 150  $\mu$ V
- 3.3** Signal-to-noise ratio, for input as under § 3.2
- 20 dB (mains-operated tube receivers)  
26 dB (transistor receivers)
- 3.4** Power output, for less than 10% distortion
- not less than 0.1 W
- 3.5** Overall selectivity
- at – 6 dB points  
at –20 dB points  
at –40 dB points
- passband not less than  $\pm 3$  kHz  
passband not greater than  $\pm 10$  kHz  
passband not greater than  $\pm 20$  kHz
- 3.6** Image, intermediate frequency and spurious response ratio
- Intermediate frequency and spurious response ratio
- Image response ratio
- MF – not less than 30 dB
- HF – not less than 12 dB
- HF – not less than 5 dB
- 3.7** Overall fidelity including acoustic response of loudspeaker, or,
- Alternatively, it may be more convenient for some manufacturers to consider only the electrical characteristics which should be
- 250-3 150 Hz within 18 dB limits
- 100-4 000 Hz within 12 dB limits (in a graphical presentation 400 Hz should be taken as the reference 0 dB level)
- 3.8** A.g.c. performance: change in output when the input is reduced by 30 dB from 0.1 V
- not greater than 10 dB
- 3.9** Frequency stability
- must be such that the receiver does not require frequent retuning

## 4 Specification for Type C receivers

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|-------------|---|---|
| <b>4.1</b>  | Frequency coverage (MHz)  | 87.5-108 (Region 1)<br>88 -108 (Region 2)<br>87 -108 (Region 3)   |
| <b>4.2</b>  | Signal-to-noise ratio   | 30 dB   |
| <b>4.3</b>  | Sensitivity (noise limited)   | -75 dB rel. 1 mW (at a signal-to-noise ratio of 30 dB and 50 mW output power)   |
| <b>4.4</b>  | Intermediate frequency  | 10.7 MHz  |
| <b>4.5</b>  | Amplitude-modulation suppression ratio  | 20 dB   |
| <b>4.6</b>  | Power output  | not less than 0.1 W   |
| <b>4.7</b>  | Overall selectivity   | -30 dB at $\pm 300$ kHz   |
| <b>4.8</b>  | Overall fidelity including acoustic response of loudspeaker, or,<br><br>Alternatively, it may be more convenient for some manufacturers to consider only the electrical characteristics which should be | 200-5 000 Hz within 18 dB limits<br><br>100-5 000 Hz within 6 dB limits (in a graphical presentation 400 Hz should be taken as the reference 0 dB level)                                    |
| <b>4.9</b>  | Radiation   | the local oscillator radiation should be less than the limits specified by CISPR. However, where national regulations exist, the radiation should be less than the limits specified therein |
| <b>4.10</b> | Distortion  | the distortion should be less than 5% for a frequency deviation varying between $\pm 15$ kHz and $\pm 75$ kHz with a modulation frequency of 400 Hz and an output power of 50 mW            |
| <b>4.11</b> | Frequency stability   | must be such that the receiver does not require frequent retuning.  |
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