

International Telecommunication Union

ITU-R
Radiocommunication Sector of ITU

Recommendation ITU-R BS.1348-2
(12/2011)

**Service requirements for digital sound
broadcasting at frequencies
below 30 MHz**

BS Series
Broadcasting service (sound)

Foreword

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including satellite services, and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

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Series of ITU-R Recommendations

(Also available online at <http://www.itu.int/publ/R-REC/en>)

Series	Title
BO	Satellite delivery
BR	Recording for production, archival and play-out; film for television
BS	Broadcasting service (sound)
BT	Broadcasting service (television)
F	Fixed service
M	Mobile, radiodetermination, amateur and related satellite services
P	Radiowave propagation
RA	Radio astronomy
RS	Remote sensing systems
S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	Vocabulary and related subjects

Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

Electronic Publication
Geneva, 2011

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RECOMMENDATION ITU-R BS.1348-2

Service requirements for digital sound broadcasting at frequencies below 30 MHz*

(Question ITU-R 217/10)

(1998-2001-2011)

The ITU Radiocommunication Assembly,

considering

- a) that there is an increasing requirement worldwide for suitable means of broadcasting high-quality monophonic or stereophonic sound to vehicular, portable and fixed receivers;
- b) the limitations of the existing LF, MF and HF sound broadcasting services abilities to fulfil such requirements;
- c) that the present congestion in some countries on the utilization of the LF, MF and HF bands causes a high level of interference and limits the number of programmes which can be transmitted;
- d) that technical developments in source and channel coding, modulation and advanced digital signal processing, have demonstrated the technical feasibility and maturity of digital sound-broadcasting systems in other bands;
- e) that a large series of demonstrations and field trials in various parts of the world have confirmed the technical feasibility and economic viability from a system design point of view of digital sound broadcasting systems in other bands;
- f) that an advanced digital sound broadcasting system can provide better coverage and better spectrum and power efficiency as well as better performance in multipath environments than conventional analogue systems;
- g) that a digital broadcasting system can be designed which may be employed in both terrestrial and satellite applications using closely related emission signal parameters, thus allowing common elements in the receiver design;
- h) that sound broadcasting has always used similar modulation techniques, such as AM or FM and similar, if not identical, frequency bands throughout the world, leading to a receiver that could be used worldwide, for the benefit of the listener;
- j) that extensive sound broadcasting services, both public and private, which provide sound programmes to listeners, exist throughout the world,

* This Recommendation should be brought to the attention of the International Electrotechnical Commission (IEC).

recommends

1 that when digital sound-broadcasting services from terrestrial transmitters, intended for vehicular, portable and fixed reception, are introduced into the LF, MF and HF bands, the digital system employed should have the following technical and operational characteristics and capabilities as well as the service requirements in Annex 1:

- be capable of providing high-quality monophonic or stereophonic sound to vehicular, portable and fixed receivers;
- provide better spectrum and power efficiency than conventional analogue systems;
- provide significantly improved performance in a multipath environment;
- allow for a trade-off between extent of coverage and service quality for a given emission power;
- be capable of allowing, with a common receiver, the use of **all** means of programme delivery (e.g. mono, stereo, dual mono);
- be capable of providing facilities for programme-related data;
- be capable of providing additional data services;
- allow the manufacturing of low-cost receivers through mass production.

2 that a receiver designed for digital signals should also be capable of conventional analogue reception with maximum commonality of technology and parts,

invites the ITU membership and radio receiver manufacturers to study

1 economically viable, portable, multiband, multistandard radio receivers designed to work, through manual or preferably automatic selection, with all the different analogue and digital radio broadcasting systems currently in use in all the relevant frequency bands;

2 digital radio receivers allowing downloading of upgrades for some of their specific functionalities, such as decoding, navigation, management capability, etc.

Annex 1

Service requirements for digital sound broadcasting and their relative importance

Systems features	Importance
1 – System standard requirement a. digital receiver should work worldwide.	A
2 – Capability for a gradual transition from analogue to digital a. Simulcast (analogue and digital share a single channel). b. Multicast (analogue and digital occupy separate channels).	A
3 – Data casting a. Audio and data (i.e. data casting capability). b. Provision of access control and scrambling.	B C
4 – Audio performance requirements a. Improve audio quality over that of equivalent analogue systems. b. Multi-language or dual mono. c. Stereo capability. d. Dynamic bit rate division between audio and data (opportunistic data). e. Bit rate selectable in small steps and higher bit rate supported than achievable at the date of introduction.	A B B B B
5 – Spectral efficiency a. Single frequency from geographically separated or co-sited transmitters. b. Comply with ITU RF channel bandwidth and spacing. c. Interference potential no more than equivalent amplitude modulation. d. Interference susceptibility no more than equivalent amplitude modulation.	B A A A
6 – Services reliability a. Improve reception reliability. b. Significantly reduced susceptibility to fading effects. c. 1) Automatic frequency switching of receiver. 2) Inaudible automatic frequency switching of receiver. d. Vehicular, portable and fixed reception. e. Rapid tuning. f. Graceful degradation. g. Maintain coverage area. h. Good indoor reception.	A A A C A A B A A
7 – Service information for tuning selection a. Simplified selection of services by using programme related data to select broadcaster and programme content.	B
8 – Transmission system considerations a. Use of existing modern transmitters capable of digital and analogue. b. Power savings when covering the same service area with the same service reliability. c. Spurious and out of band emissions adhere to ITU regulations.	A C A
9 – Receiver considerations a. System complexity should not preclude low cost receivers. b. System complexity should allow low power consumption battery operated receivers.	A B
10 – Variable trade off a. Possibility to select system parameters depending on broadcaster requirement.	B

Relative importance of the system features:

A = mandatory

B = highly desirable

C = desirable