

RECOMMENDATION ITU-R BO.789-2<sup>\*,\*\*</sup>**Service for digital sound broadcasting to vehicular portable  
and fixed receivers for broadcasting-satellite service  
(sound) in the frequency range 1 400-2 700 MHz**

(Question ITU-R 93/10)

(1992-1994-1995)

The ITU Radiocommunication Assembly,

*considering*

- a) that there is an increasing requirement worldwide for suitable means of broadcasting a range of sound qualities up to high-quality stereophonic two-channel/multi-channel sound with subjective quality indistinguishable from high-quality consumer digital recorded media (“CD quality”) to vehicular, portable and fixed receivers;
- b) 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;
- c) that a large series of demonstrations and field trials in various parts of the world have confirmed the technical and economic viability of digital sound broadcasting systems from a system design point of view;
- d) that a digital sound broadcasting system can provide better spectrum and power efficiency, as well as better performance in multipath environments, than conventional analogue systems;
- e) that satellite-based digital sound broadcasting systems can provide full coverage for sub-national, national or supra-national service areas;
- f) that the complementary use of satellite and terrestrial systems can result in better power and spectrum efficiency through the implementation of hybrid and mixed satellite/terrestrial digital sound broadcasting services;
- g) that a digital broadcasting system can be employed efficiently in both satellite and terrestrial applications using closely related emission signal parameters, thus allowing common receiver design with common processing VLSI circuits;
- h) that sound broadcasting has always used similar modulation techniques, such as AM or FM, and similar, if not identical, frequency bands, leading to a receiver that could be used worldwide, for the benefit of the listener,

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\* Reports ITU-R BO.955 and ITU-R BS.1203 were used as the basis for this Recommendation.

\*\* Radiocommunication Study Group 6 made editorial amendments to this Recommendation in 2001 in accordance with Resolution ITU-R 44.

*further considering*

j) that the World Administrative Radio Conference (Geneva, 1979) (WARC-79) adopted Resolution No. 505 which encouraged technical experiments in the band 1 429-1 525 MHz and that the Second Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and on the Planning of Space Services Utilizing It (Geneva, 1988) (WARC ORB-88) adopted Resolution No. 520 which proposed to give a mandate for a frequency allocation for one or more bands in the frequency range from 500-3 000 MHz to a competent ITU conference;

k) that the World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992) (WARC-92) has allocated the band 1 452-1 492 MHz to the broadcasting-satellite service (BSS) (sound) and complementary terrestrial broadcasting service for the provision of digital audio broadcasting. Also, additional footnote allocations were included for specific countries in the band 2 310-2 360 MHz and in the band 2 535-2 655 MHz in Radio Regulations Nos. 5.393 and 5.418,

*recommends*

that, when sound broadcasting from satellite and complementary terrestrial services, intended for vehicular, portable and fixed reception (see Note 1), are introduced into the frequency ranges allocated by WARC-92 to BSS (sound), digital sound broadcasting systems should be used and should have the following technical and operational characteristics and capabilities for the transmitter/receiver components of a total BSS/BS (sound) system:

NOTE 1 – It is understood that some administrations may wish to develop BSS(S) and BS systems that do not provide the entire range of characteristics listed under *recommends*. For example an administration may wish to have a service that provides the equivalent of monophonic FM audio intended primarily for reception by very low cost fixed or portable receivers, rather than vehicular-mounted receivers. Nevertheless, it is understood that such administrations would endeavour to develop digital sound broadcasting systems that conform, to the extent practicable, with the characteristics cited in this Recommendation.

**1** be capable of providing a range of audio qualities up to high-quality stereophonic two-channel/multi-channel sound with subjective quality indistinguishable from high-quality consumer digital recorded media (“CD quality”) to vehicular, portable and fixed receivers;

**2** provide better spectrum efficiency than conventional analogue FM systems;

**3** provide significantly improved performance in a multipath and shadowing environment through the use of the service concepts, systems and mitigation techniques outlined in relevant ITU-R texts;

**4** be capable of utilizing common signal processing in receivers for any satellite and terrestrial broadcasting applications;

**5** allow configuration/reconfiguration in order to transmit sound programmes with lower bit rates to trade-off quality and the number of sound programmes available;

**6** allow for a trade-off between extent of coverage for a given emission power, service quality and number of sound programmes and data services;

**7** be capable of allowing, with a common receiver, the use of all means of programme delivery, such as:

- sub-national, national or supra-national UHF satellite services,
- mixed/hybrid use of satellite and complementary terrestrial services,
- local, sub-national and national VHF/UHF terrestrial services,
- cable distribution networks;

**8** be capable of providing enhanced facilities for programme-related data (e.g. service identification, programme labelling, programme delivery control, copyright control, conditional access, dynamic programme linking, services for visually and hearing-impaired, etc.);

**9** be capable of providing value-added services with different data capacities (e.g. traffic message channels, business data, paging, still picture/graphics, future integrated services digital broadcasting (ISDB), low bit rate video/audio multiplex, etc.);

**10** allow for flexible assignment of services within a given multiplex;

**11** a system multiplex structure capable of complying with the layered International Organization for Standardization (ISO) open system interconnect model and permitting interfacing to information technology equipment and communications networks;

**12** allow manufacturing low-cost receivers and antennas through mass production.

NOTE 1 – An example of a digital sound broadcasting system (Digital System A) that meets the above technical and operational requirements is described in Annex 1 to Recommendation ITU-R BO.1130. Another example is given in Annex 2 to Recommendation ITU-R BO.1130 (Digital System B) which is under development and test in the United States of America. Technology in this area is developing rapidly. Studies are being conducted in various parts of the world on several methods for digital sound broadcasting that take these requirements into account.

NOTE 2 – System and service characteristics as well as radio-frequency aspects of digital sound broadcasting systems are considered in detail in relevant ITU-R texts.

NOTE 3 – Recommendation ITU-R BS.774 is closely related for terrestrial digital sound broadcasting.

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