QUESTION ITU-R 135-2/6[[1]](#footnote-1)

System parameters for and management of digital sound systems  
with and without accompanying picture

(2010-2014-2019)

The ITU Radiocommunication Assembly,

considering

*a)* that the improvements in picture quality associated with high-definition, ultra-high definition and three-dimensional television systems may warrant continued study of the sound systems that should be used in order to keep in step with the higher level of realism available in the picture;

*b)* that Recommendation ITU-R BS.646 – Source encoding for digital sound signals in broadcasting studios, specifies sampling frequency and bit resolution per sample for the digital coding of sound signals;

*c)* that Recommendation ITU-R BS.775 specifies hierarchic multichannel sound systems up to 3/2 multichannel sound system for broadcasting;

*d)* that Recommendation ITU-R BS.2051 specifies an advanced sound system with and without accompanying picture, beyond the sound systems specified in Recommendation ITU-R BS.775, that can support channel-based, object-based and a scene-based audio, or a combination of these, with the use of metadata to fully describe the audio contents of the sound production;

*e)* that Recommendations ITU-R BS.2076, ITU-R BS.2094 and ITU-R BS.2125 provide a set of audio-related metadata called Audio Definition Model (ADM) and related specifications for advanced sound systems;

*f)* that Recommendation ITU-R BS.2127-0 specifies reference rendering method for the ADM metadata specified in Recommendation ITU-R BS.2076-1;

*g)* that it will be necessary to tailor sound programmes produced in advanced sound system in order to deliver them through 2-channel stereo and 3/2 multichannel sound delivery systems;

*h)* that the audience awareness of, and interest in advanced sound system could be boosted if the benefits of those systems in terms of an enhanced listening experience could be at least partly preserved when they are tailored for 2-channel stereo or 3/2 multichannel sound presentation;

*i)* that Recommendation ITU-R BS.1909 specifies as typical viewing/listening environments public environments, home environments and mobile environments, and further states that the coincidence of position between sound images and video images should be maintained over a wide image and listening area;

*j)* that the angular width of the screen at the listening/viewing positions in the production and reproduction environments will not always be equal, and so consequently there will be a benefit to adapting the reproduction of the audio content in a way that audio-visual coherence is maintained to a sufficient level across various screen environments;

*k)* that listeners desire audio programmes to be uniform in subjective loudness for different sources and programme types even if broadcast programmes are provided to the other media including Internet delivery services;

*l)* that Recommendation ITU-R BS.1770 specifies a loudness measurement algorithm for channel-based audio programmes,

decides that the following Questions should be studied

1 What are the optimum arrangements for monitoring multichannel sound during production, such as:

– loudspeakers/room responses;

– suitable methods for aligning the reproduction levels of the monitor loudspeakers;

– suitable methods for visual monitoring of multichannel sound signal parameters such as level, phase, delay, etc.?

2 What are the requirements for allocation of channels on channel interfaces, when multichannel operation is envisaged?

3 What are the optimum methods to ensure appropriate system compatibility, such as:

– backward compatibility of higher order multichannel sound systems specified in Recommendation ITU-R BS.2051 with lower order sound systems already specified in Recommendation ITU-R BS.775 while retaining at least part of the enhanced listening experience inherent in the use of advanced sound systems, in terms of greater impression of presence and sound depth, without providing a sub-optimal experience if the sound reproduction system differs from that envisioned by the method employed;

– forward compatibility of lower order sound systems already specified in Recommendation ITU-R BS.775 with higher order multichannel sound systems;

4 Which methods may be employed in order to scale audio programmes for different screen sizes using channel-based, object-based or scene-based paradigms in order to maintain audio-visual coherence for screens varying in size, including from personal/mobile consumption to large screen representations?

5 Which methods may be employed for the conversion between advanced sound programmes with different metadata sets?

6 What audio metering characteristics should be used to provide accurate indication of subjective loudness of programmes produced in the object-based and scene-based sound systems?

7 What operational practices can be established on a globally harmonised basis for achieving consistency in the sound quality?

8 What sound parameters, including loudness characteristics should be used to ensure accurate and consistent sound quality?

9 What considerations should be made by the broadcaster for end user listening conditions in a number of environments?

10 How should user interactivity be considered in the methods being studied in this Question?

11 What forms of user interactivity are most beneficial to broadcast application?

further decides

1 that the results of the above studies should be included in (a) Recommendation(s) or (a) Report(s);

2 that the above studies should be completed by 2027.

Category: S2

1. In the year 2023, Radiocommunication Study Group 6 extended the completion date of studies for this Question. [↑](#footnote-ref-1)