

Recommendation

ITU-T J.1292 (10/2024)

SERIES J: Cable networks and transmission of television,
sound programme and other multimedia signals

Cable set-top box – part 2

Functional requirements for cable set-top box supporting ultra-high-definition video and virtual reality services

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Recommendation ITU-T J.1292

Functional requirements for cable set-top box supporting ultra-high-definition video and virtual reality services

Summary

A set-top box (STB) capable of decoding ultra-high definition (UHD) video i.e., 4K, 8K, or higher resolutions and supporting virtual reality (VR) is a crucial component in the ever-evolving landscape of home entertainment. With the rapid growth of UHD video content, such a device ensures that users can enjoy the highest quality video, offering stunning resolution and visual clarity. Moreover, as technology advances, UHD content is becoming more prevalent, making a set-top box that supports UHD essential for future-proofing home entertainment systems. In the realm of VR, high-quality visuals are paramount for creating immersive and realistic experiences. A set-top box that can decode UHD video enhances VR content by providing intricate detail and making the virtual world more engaging. Furthermore, it ensures the smooth performance of VR applications and UHD video, delivering lag-free experiences. Whether it is watching UHD movies or engaging in VR gaming, a set-top box equipped for both technologies, expands entertainment possibilities and offers a versatile and engaging media experience.

Recommendation ITU-T J.1292 elaborates the functional requirements for a cable set-top box capable of supporting ultra-high-definition video and virtual reality services. It introduces the system architecture and specifies the minimum requirements for the STB to decode and output UHD video with resolutions of 4K, 8K, or higher. Additionally, the STB should be compatible with VR services, utilizing either cable or WLAN IEEE 802.11be technology.

History *

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Recommendation ITU-T J.1292

Functional requirements for cable set-top box supporting ultra-high-definition video and virtual reality services

1 Scope

This Recommendation aims to outline the functional requirements for a cable set-top box (STB) capable of supporting ultra-high definition (UHD) video and virtual reality (VR) services. It introduces the system architecture and specifies the minimum requirements for the STB to decode and output UHD video with resolutions of 4K, 8K, or higher. Additionally, the STB should be compatible with VR services, utilizing either cable or WLAN IEEE 802.11be technology.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T H.262] Recommendation ITU-T H.262 (2012), *Information technology – Generic coding of moving pictures and associated audio information: Video*.
- [ITU-T H.264] Recommendation ITU-T H.264 (2024), *Advanced video coding for generic audiovisual services*.
- [ITU-T H.265] Recommendation ITU-T H.265 (2024), *High efficiency video coding*.
- [ITU-T H.266] Recommendation ITU-T H.266 (2023), *Versatile video coding*.
- [ITU-T J.83] Recommendation ITU-T J.83 (2007), *Digital multi-programme systems for television, sound and data services for cable distribution*.
- [ITU-T J.222.1] Recommendation ITU-T J.222.1 (2007), *Third-generation transmission systems for interactive cable television services – IP cable modems: Physical layer specification*.
- [ITU-T J.222.2] Recommendation ITU-T J.222.2 (2007), *Third-generation transmission systems for interactive cable television services – IP cable modems: MAC and Upper Layer protocols Volume 1: Core Recommendation*.
- [ISO/IEC 60958-1] ISO/IEC 60958-1:2021, *Digital audio interface – Part 1: General*.
- [ISO/IEC 11172-3] ISO/IEC 11172-3:1993, *Information technology – Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s – Part 3: Audio*.
- [ISO/IEC 13818-3] ISO/IEC 13818-3:1998, *Information technology – Generic coding of moving pictures and associated audio information – Part 3: Audio*.
- [ISO/IEC 13818-7] ISO/IEC 13818-7:2006, *Information technology, Generic coding of moving pictures and associated audio information, Part 7: Advanced Audio Coding (AAC)*.
- [ISO/IEC 14496-2] ISO/IEC 14496-2:2004, *Information technology – Coding of audio-visual objects – Part 2: Visual*.

- [ISO/IEC 14496-3] ISO/IEC 14496-3:2009, *Information technology – Coding of audio-visual objects – Part 3: Audio*.
- [ISO/IEC 23003-3] ISO/IEC 23003-3:2020, *Information technology – MPEG audio technologies – Part 3: Unified speech and audio coding*.
- [ISO/IEC 23003-4] ISO/IEC 23003-4:2020, *Information technology – MPEG audio technologies – Part 4: Dynamic range control*.
- [ISO/IEC 23008-3] ISO/IEC 23008-3:2019, *Information technology – High efficiency coding and media delivery in heterogeneous environments – Part 3: 3D audio*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 cable television [b-ITU-T J.142]: Communications systems distributes broadcast and non-broadcast signals, as well as a multiplicity of satellite signals originating programming and other signals by means of coaxial cable and/or optical fibre.

3.1.2 transport stream (TS) [b-ITU-T J.296]: The transport stream defined by the MPEG-2 system standard (in digital terrestrial television broadcasting, one TS is assigned to a master transmitter).

3.1.3 4K UHD TV [b-ITU-T J.297]: Supports $3,840 \times 2,160$ resolution and 60p frame frequency specified in [b-ITU-R BT.2020].

3.1.4 4K video [b-ITU-T J.482]: A video that supports $3\,840 \times 2\,160$ resolution and ~60p frame frequency.

3.1.5 8K UHD [b-ITU-T F.780.1]: A video format in which the horizontal screen resolution is 7 680 and the vertical screen resolution is 4 320 pixels (4320p).

3.1.6 content [b-ITU-R BT.1852-1]: This is any form of digital data that can be acquired and presented by a device.

3.1.7 immersion [b-ITU-T G.1035]: A psychological state characterized by perceiving oneself to be enveloped by, included in, and interacting with an environment that provides a continuous stream of stimuli and experiences.

3.1.8 motion-to-photon latency [b-ITU-T G.1035]: The time it takes between the user moving their head and this motion being reflected on the screen of the head-mounted display (HMD).

NOTE – Definition based on [Brandenburg].

3.1.9 service [b-ITU-R BT.1852-1]: This is one or more data flows intended to be presented together.

3.1.10 ultra-high definition [b-ITU-T F.780.1]: A video format of digital display and camera in which the horizontal screen resolution is on the order of over 4 000 pixels.

3.1.11 virtual reality [b-ITU-R BT.2420-6]: A technology that replicates an environment, real or imagined, and simulates a user's physical presence and environment to allow for user interaction. Virtual reality artificially creates a sensory experience, which in principle can include sight, touch, hearing, and smell. The current VR devices primarily present content to the visual and auditory systems. On occasion, haptics information is also included.

3.1.12 full-view transmission [b-ITU-T J.1631]: Involves sending 360° images to terminals. When users turn their heads and images they see, are switched according to their Field of View