

## 5 Use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream

### 5.1 Transport Stream Bit-streams

- 5.1.1 The DVB-T2 IRD shall comply with implementation guidelines outlined in § 4 of ETSI TS 101 154 [1], based on the MPEG-2 Transport Stream bit-streams requirements defined in § 2.4 of ITU-T Rec. H.222.0 / ISO/IEC 13818-1 [10].
- 5.1.2 The DVB-T2 IRD shall be able to de-multiplex and present programs according to the Program Specific Information (PSI) defined in § 2.4 of ITU-T Rec. H.222.0 / ISO/IEC 13818-1 [10].
- 5.1.3 The Transport Stream supports the multiplexing of video and audio compressed streams from one program with a common time base or from multiple programs with independent time bases. Programs are composed of one or more elementary streams, each labelled with a Packet Identifier (PID). The DVB-T2 IRD shall be able to handle simultaneously at least 32 PIDs and elementary streams.
- 5.1.4 The DVB-T2 IRD shall be able to skip over data structures which are currently "reserved" (§ 4.1 of ETSI TS 101 154 [1]).
- 5.1.5 The DVB-T2 IRD shall operate over the full tolerance range of the system clock frequency as specified in § 2.4.2.1 of ITU-T Rec. H.222.0 / ISO/IEC 13818-1 [10].
- 5.1.6 The DVB-T2 IRD shall operate correctly with Program Clock References (PCRs) for a program arriving at intervals not exceeding 100 ms as specified in § 2.7.2 of ITU-T Rec. H.222.0 / ISO/IEC 13818-1 [10].

### 5.2 Video Decoding

- 5.2.1 The DVB-T2 IRD shall comply with the implementation guidelines outlined in § 5.1 of ETSI TS 101 154 [1] for decoding MPEG-2 video. The DVB-T2 IRD shall be able to decode video formats as specified in Table 1, based on the ITU-T Rec. H.262 / ISO/IEC 13818-2<sup>5</sup> [11].

DVB-T2 IRD	Bit-stream	Frame Rate	Aspect Ratio	Luminance Resolution
25 Hz MPEG-2 SDTV (§ 5.1 of ETSI TS 101 154)	MP@ ML	25 Hz interlaced	4:3 or 16:9 Use of pan vectors and up sampling	720 x 576 Capable of decoding lower picture resolutions

**Table 1: Video decoding to ITU-T Rec. H.262 / ISO/IEC 13818-2**

<sup>5</sup> Please note that such video formats may be intellectual property of third parties.

- 5.2.2 The DVB-T2 IRD shall comply with the implementation guidelines outlined in § 5.5, § 5.6 and § 5.7 of ETSI TS 101 154 [1] for decoding H.264/AVC video. The DVB-T2 IRD shall be able to decode video formats as specified in Table 2, based on the ITU-T Rec. H.264 / ISO/IEC 14496-10<sup>6</sup> [12].

DVB-T2 IRD	Bit-stream	Frame Rate	Aspect Ratio	Luminance Resolution
25 Hz H.264/AVC SDTV (§ 5.6 of ETSI TS 101 154)	HP@L3	25 Hz interlaced	4:3 or 16:9 Frame cropping	720 x 576 Capable of decoding lower picture resolutions
50 Hz H.264/AVC HDTV With backward compatibility (§ 5.7 of ETSI TS 101 154)	HP@L4	50 Hz progressive	16:9 Up sampling	1280 x 720
25 Hz H.264/AVC HDTV	HP@L4	25 Hz interlaced	16:9 Up sampling	1920 x 1080
25 Hz H.264/AVC HDTV	HP@L4	25 Hz progressive (Optional)	16:9 Up sampling	1920 x 1080

**Table 2: Video decoding to ITU-T Rec. H.264 or ISO/IEC 14496-10**

### 5.2.3 Aspect Ratio

The DVB-T2 IRD shall provide convenient user control for appropriate aspect ratio switching between 4:3 and 16:9 to adapt to display in different size and aspect ratio.

### 5.2.4 Active Format Description (AFD)

When AFD is used, the DVB-T2 IRD shall present the video aspect ratio properly according to the current AFD value and response in next frame as defined in the ETSI EN 101 154 Annex B. The DVB-T2 IRD shall support at least the Active Formats shown in Table 3.

Refer to Annex A for the illustration on the required outputs based on the AFD values specified in Table 3.

Active Format	Aspect ratio of the "area of interest"
1000	Active format is the same as the coded frame.
1001	"Pillar box" 4:3 (centre)
1010	"Letter box" 16:9 (centre)

**Table 3: Active format (Table B.5/ETSI TS 101 154)**

<sup>6</sup> Please note that such video formats may be intellectual property of third parties.