

# **ISDB-T Digital Terrestrial TV Standards of Sri Lanka**





## Foreword

This document consists of:

- ISDB-T Standards
- Annex Details of modifications made to the existing standards
- Appendix Operational Guideline
- Bibliography

The “ISDB-T Standards” is the standard part for digital terrestrial television broadcasting in Sri Lanka. Basically, it is compiled based on the ABNT standards but it also incorporates the specifications of the ARIB standards including the ISDB-T International Forum Harmonization Documents.

The Annex is the integral part of the standards and covers the details of modifications made to the existing standards.

However, the Appendix is not the integral part of but supplementary to the standards. It covers the operational guidelines concerning the general operations at broadcasting stations for digital terrestrial television broadcasting, as well as functional specifications for digital terrestrial television equipment.

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## ISDB-T Standards

### 1. Transmission

Parameters are given in Table 1c) of ITU-R BT.1306. For details, ABNT NBR 15601 shall be referred as listed in Appendix 3 to Annex 1 of ITU-R BT.1306. Because ABNT NBR 15601 is the standards for 6MHz/ch transmission bandwidth, the transmission parameters have been modified for 8MHz/ch transmission bandwidth as mentioned below. (See Annex 1 for details)

- Symbol duration be 8/6 shorter than 6MHz/ch
- Bandwidth be 8/6 wider than 6MHz/ch
- IFFT sample clock be 8/6 faster than 6MHz/ch
- Transmission bitrate be 8/6 faster than 6MHz/ch
- Guard interval length be 6/8 shorter than 6MHz/ch
- Channels be set by every 8MHz and not be used in 1/7MHz frequency shift

### 2. Video Coding

All the technical parameters related to video coding shall be in accordance with ABNT NBR 15602-1. However, the frame rate of 25 Hz and 50 Hz, and the video format of 576i and 576p shall be supported and video coding parameters for full-seg services should be applied to any layers except for the partial reception layer. For full-seg services, video coding scheme shall be H.265/HEVC in accordance with ARIB STD-B32 Fascicle 1 instead of H.264/AVC. (See Annex 2 for details)

### 3. Audio Coding

All the technical parameters related to audio coding shall be in accordance with ABNT NBR 15602-2. However, audio coding parameters for full-seg services are applied to any layers except for the partial reception layer.

### 4. Multiplexing

All the technical parameters related to multiplex shall be in accordance with ABNT NBR 15602-3.

### 5. Service information

Most of all, the technical parameters related to service information shall be in accordance with ABNT NBR15603; however, there is a need for some modifications.

コメントの追加 [A1]: [Info]ABNT NBR 15601 is the technical standard published by ABNT, the Brazilian Association of Technical Standards (Associação Brasileira de Normas Técnicas)<sup>[1]</sup> that is responsible for addressing the aspects regarding transmission on the Brazilian Digital Terrestrial Television Standards, also known as SBTVD<sup>[2]</sup> or ISDB-T version B.<sup>1</sup>

コメントの追加 [A2]: [To EoJ ]: As per the ITU-R BT.1306-8, it is "Attachment 3 to Annex 1 System C Standard" not as "Appendix 3 .....". Therefore, "Appendix 3" to be replaced with "Attachment 3". Pl. confirm.  
Ref. Recommendation ITU-R BT.1306-8 (04/2020) pdf doc.

The main points to be modified are shown below. (See Annex 5 for the details)

- In order to adopt BML instead of Ginga for the data broadcasting, the descriptors specifically for Ginga shall be deleted.
- Network ID, Service ID, and Affiliation ID shall be allocated to be respectively unique within Sri Lanka, whereas Remote Control Key ID shall be allocated to be unique within each of the broadcast service areas.
- Some values of Service Information related to H.265/HEVC shall be in reference to ARIB STD-B10.

## 6. Receiver

While most of all the technical parameters related to receivers shall be in accordance with ABNT NBR15604, some modifications are required. The main points to be modified are shown below. (See Annex 6 for the details)

- In order to adopt BML for data broadcasting, some items that are based on Ginga such as the remote-control key and the demodulator for data broadcasting shall be modified.
- As the analog video format of Sri Lanka is PAL-B, those items of PAL-M format shall be replaced to PAL-B.
- The frame rate of 25 Hz and 50 Hz, and the video format of 576i and 576p shall be supported.
- As for the RF INPUT-TERMINAL of the receivers for Sri Lanka, IEC 61169-2 -type terminal (Belling-Lee) should be recommended.
- The priority parameters of the receiver unit of Annex A are described as the operational guidelines, thus it should be subjected to ISDB-T Harmonization Document PART 1: Hardware.
- Since there is no detailed specification of "Accessibility resources (Audio locution)" in ABNT, it is preferable to remove it.
- Since "Accessibility resources (LIBRAS window)" is a specification unique only to Brazil, it is desirable to remove it.
- Annex B is the information related to GINGA; and it is not necessary to keep.
- Silicon-Tuner is mostly adopted in the recent TV-Front-End products, making outputs of Low-IF below 10MHz. Thus, Low-IF below 10MHz shall also be acceptable. Accordingly, with respect to the frequency conversion, either upper or lower heterodyne conversion shall be acceptable as long as there is no side-effect.
- As for safety standards, it shall be in reference to actual standards in Sri Lanka.

コメントの追加 [A3]: [To EoJ] Shall be PAL G (8MHz) for UHF?

コメントの追加 [A4]: [To EoJ] Sri Lanka is expecting full HD (1080i), so, why is it 576i here?

7. Security issues

All the technical parameters related to security issues shall be in accordance with ABNT NBR 15605-1.

8. Data broadcasting

All the technical methods and parameters for BML data broadcasting, subtitle and superimposed characters coding shall be in accordance with ARIB STD-B24.

About the localization for Sri Lanka, the main points to be modified are character set and character coding. (See Annex 8 for the details)

Data broadcasting standard is also referred in the receiver standard with respect to remote control requirements. (See Annex 6 for the details)

9. Interactive channel

All the technical parameters related to interactive channel shall be in accordance with ABNT NBR 15607-1.

10. EWBS

All the technical methods and parameters shall be in accordance with ISDB-T Harmonization Document PART 3: Emergency Warning Broadcast System (EWBS).

## Annex

### Details of modifications made to the existing standards

#### Annex1 Transmission

The details of the modifications from ABNT NBR 15601 are shown in Table A1-1.

Table A1-1 Modifications from ABNT NBR 15601

Section, (Table) No. and item	Page	Original	Modified
6.1 Table 1 — Parameters of the transmission system	6	6000/14 = 428,57 kHz	8000/14 = 571.43 kHz
		5,575 MHz (mode 1) 5,573 MHz (mode 2) 5,572 MHz (mode 3)	7.433MHz(mode1) 7.431MHz(mode2) 7.429(mode3)
		252µs (mode 1) 504 µs (mode 2) 1 008 µs (mode 3)	189µs (mode 1) 378 µs (mode 2) 756 µs (mode 3)
		Bws/108 = 3,968 kHz (mode 1) Bws/216 = 1,984 kHz (mode 2) Bws/432 = 0,992 kHz (mode 3)	Bws/108 = 5.291... kHz Bws/216 = 2.645... kHz Bws/432 = 1.322... kHz
		63; 31,5; 15,75; 7,875 µs (mode 1) 126; 63; 31,5; 15,75 µs (mode 2) 252; 126; 63; 31,5 µs (mode 3)	47.25, 23.625, 11.8125, 5.90625 µs (mode1) 94.5, 47.25, 23.625, 11.8125 µs (mode2) 189, 94.5, 47.25, 23.625 µs (mode3)
		315; 283,5; 267,75; 259,875 µs (mode 1) 628; 565; 533,5; 517,75 µs (mode 2) 1.260; 1 134; 1 071; 1.039,5 µs (mode 3)	236.25, 212.625, 200.8125, 194.90625 µs (mode1) 472.5, 425.25, 401.625, 389.8125 µs (mode2) 945, 850.5, 803.25, 779.625 µs(mode3)
6.1 Principal parameters	6	Further, pilot signal shall be added to data segment in the OFDM framing section to form an OFDM segment (with a bandwidth of 6/14 MHz).	Further, pilot signal shall be added to data segment in the OFDM framing section to form an OFDM segment (with a bandwidth of 8/14 MHz).

**コメントの追加 [A5]:** [To EoJ] Why 14 here? should it be 13 segment? One seg is for Guard Band? Pl. clarify.

**コメントの追加 [A6]:** [To EoJ] What is 108, 216, 432 here? {571.43/432 = 1.322, is this correct?}

Section, (Table) No. and item	Page	Original	Modified
	7	Up to three hierarchical layers may be transmitted in 6 MHz channel.	Up to three hierarchical layers may be transmitted in 8 MHz channel.
6.1 Table 2 — OFDM segment parameters	8	Table 2 — OFDM-segment parameters	ARIB STD-B31 Version2.2-E1 Page: 84 Table A-5: OFDM Segment Parameters (8 MHz Bandwidth System)
6.1 Table 3 — Transmission signal parameters	9	Table 3 — Transmission signal parameters	ARIB STD-B31 Version2.2-E1 Page: 85 Table A- 6: Transmission Signal Parameters (8 MHz Bandwidth System)
6.1 Table 4 — Data rate of a single segment	10	Table 4 — Data rate of a single segment	ARIB STD-B31 Version2.2-E1 Page: 86 Table A- 7: Data Rate per a Single Segment (8 MHz Bandwidth System)
6.1 Table 5 — Total data rate	11	Table 5 — Total data rate	ARIB STD-B31 Version2.2-E1 Page: 87 Table A- 8: Total Data Rate*1 (8 MHz Bandwidth System)
6.14.4 Table 25 — Examples of transmission capacities for AC carriers (mode1, guard interval of 1/8)	43	Table 25 — Examples of transmission capacities for AC carriers (mode1, guard interval of 1/8)	See Table A1-2 for Examples of transmission capacities for AC carriers (mode1, guard interval of 1/8)
6.15.1 Position of the segments within the 6 MHz spectrum	43	6.15.1 Position of the segments within the 6 MHz spectrum	6.15.1 Position of the segments within the 8 MHz spectrum



Section, (Table) No. and item	Page	Original	Modified
7.1 Frequency bandwidth	51	A frequency bandwidth of 5.7 MHz shall be used for digital terrestrial television broadcasting.	A frequency bandwidth of 7.6 MHz shall be used for digital terrestrial television broadcasting.
		The frequency bandwidth shall be 5.7 MHz when the OFDM carrier bandwidth is 5.572 MHz with 4 kHz spacing between carrier frequencies in Mode 1. This bandwidth shall apply regardless of which mode is chosen, and has been selected to ensure that the bandwidth of 5.610 MHz has some margin to determine that each carrier of the uppermost and lowermost in the 5.572..MHz bandwidth includes 99 % of energy.	The frequency bandwidth shall be 7.6 MHz when the OFDM carrier bandwidth is 7.433 MHz with 5.291 kHz spacing between carrier frequencies in Mode 1. This bandwidth shall apply regardless of which mode is chosen, and has been selected to ensure that the bandwidth of 7.480 MHz has some margin to determine that each carrier of the uppermost and lowermost in the 7.433..MHz bandwidth includes 99 % of energy.
7.3 Frequency offset of the OFDM carriers	52	The frequency of the terrestrial transmission signal shall have a positive offset of 1/7 MHz (142.857 kHz) in relation to the channel central carrier to be used in the current channel allotment plan (see Figure 37).	Offset should not be used.
		Table 39 — High VHF channels	High VHF channels should not be used.
	53	Table 40 — UHF channels	See table A1-3 for 8MHz/ch UHF channels
7.4 IFFT sampling frequency and permissible deviation	54	The IFFT sampling frequency for use with OFDM for digital terrestrial television broadcasting shall be as follows:  $F_s = 512/63 \text{ MHz} = 8\,126\,984 \text{ Hz}$	The IFFT sampling frequency for use with OFDM for digital terrestrial television broadcasting shall be as follows: $F_s = 2048/189 \text{ MHz} = 10\,835\,978 \text{ Hz}$

**コメントの追加 [A7]:** [To EoJ] Before ASO, Sri Lanka uses frequencies beyond 48, such as 50, 59,61,62.

Clarification is needed from DiBEG over here. As per page note below the table, it is upto 806MHz.

However, in the above table, it has informed the new frequency to be set up after ASO will be in this range,

Section, (Table) No. and item	Page	Original	Modified
		The permissible deviation is $\pm 0.3$ Hz/MHz	The permissible deviation is $\pm 0.2$ Hz/MHz
		An IFFT sampling frequency of 512/63 MHz, a theoretical sample frequency, may be used if the permissible deviation requirement is met.	An IFFT sampling frequency of 2048/189 MHz, a theoretical sample frequency may be used if the permissible deviation requirement is met.
7.5.1 Characteristics of the transmission spectrum mask	54	7.5.1 Characteristics of the transmission spectrum mask The out-of-band spectrum level allocated for broadcasting the television signal shall be reduced applying a proper filtering. Figure 38 and Table 41 indicate the minimum attenuation and the out-of-band emission in relation to the transmitter average power, specified in relation to the spacing of the signal central carrier, for critical, sub-critical and non-critical mask.	7.5.1 Characteristics of the spectrum limit mask The out-of-band spectrum level allocated for broadcasting the television signal shall be reduced applying a proper filtering. Figure A1-1 and Table A1-4 indicate the spectrum limit mask for sensitive and non-critical mask, where the relative power level is defined in a reference bandwidth of 4kHz with the 0dB reference level corresponding to the mean output power measured in the channel bandwidth as described in ITU-R Recommendation BT.1206-1.
	54	Figure 38 — Transmission-spectrum limit masks for digital terrestrial television broadcasting	See Figure A1-1 for 8MHz/ch Spectrum limit masks
	55	Table 41 — Specification of the transmission spectrum mask	See Table A1-4 for 8MHz/ch break points

Section, (Table) No. and item	Page	Original	Modified
		The values of Table 41 shall be measured with a spectrum analyzer configured according to Table 42. Table 42 Spectrum settings for mask measurement The cut point shall be measured using a spectrum analyzer adjusted for a 20 MHz span frequency or lower and a 10-kHz bandwidth resolution (RBW).	Deleted. It is not necessary to specify the method to measure them.
7.5.2 Criteria for applying masks	55	Application of masks shall take in account the class of the stations and substations. Digital stations are classified in ...	Two spectrum masks are specified in Fig. A1-1 and the associated Table A1-4. The upper curve defines the spectrum mask for the non-critical cases and the lower curve defines the spectrum mask for the sensitive cases as described in ITU-R Recommendation BT.1206-1.
	56	Table 43 — Maximum power of each class	VHF high should not be used.
7.6 Table 45 — Allowable spurious emission power	56	Table 45 — Allowable spurious emission power	See Table A1-5 for Allowable spurious emission power as described in RR Appendix 3 or ITU-R SM.329.

Table A1-2 Examples of transmission capacities for AC carriers (mode 1, guard interval of 1/8) (See Table A1-1 Column 6.14.4 Table 25)

	Synchronous modulation's segment		Differential modulation's segment	
	1	13	1	13
AC1	9,4 kbps	121,7 kbps	9,4 kbps	121,7 kbps
AC2	-	-	18,7 kbps	243,4 kbps

Table A1-3 8MHz/ch UHF channels <sup>1</sup> (See Table A1-1 Column 7.3 Frequency offset of the OFDM carriers)

Channel	Start Frequency (MHz)	End Frequency (MHz)	Center Frequency (MHz)
21	470	478	474
22	478	486	482
23	486	494	490
24	494	502	498
25	502	510	506
26	510	518	514
27	518	526	522
28	526	534	530
29	534	542	538
30	542	550	546
31	550	558	554
32	558	566	562
33	566	574	570
34	574	582	578
35	582	590	586
36	590	598	594
37	598	606	602
38	606	614	610
39	614	622	618
40	622	630	626
41	630	638	634
42	638	646	642
43	646	654	650
44	654	662	658
45	662	670	666
46	670	678	674
47	678	686	682
48	686	694	690

<sup>1</sup> End Frequency will be up to 806 MHz until Analog Switch Off.

Figure A1-1: Transmission spectrum limit masks for 8 MHz (See Table A1-1 Column 7.5 Transmission spectrum mask)

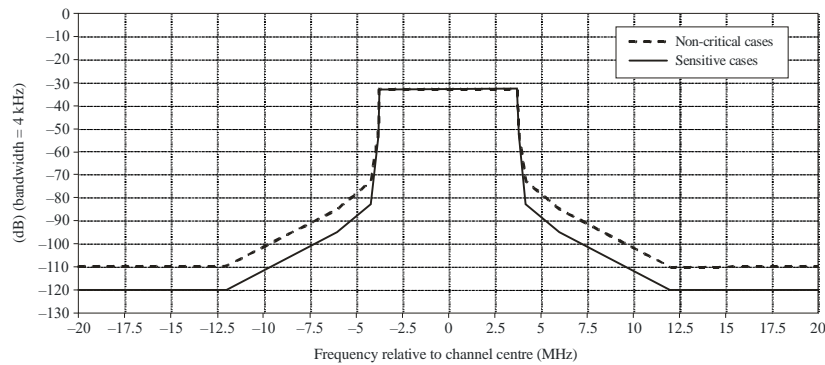


Table A1-4: Break points corresponding to Figure A1-1 (See Table A1-1 Column 7.5 Specification of the transmission spectrum mask)

Frequency relative to the center of the 8 MHz channel (MHz)	Relative level in a 4-kHz measurement bandwidth (dB)	
	Non-critical emission mask	Sensitive cases
-20	-110	-120
-12	-110	-120
-6	-85	-95
-4.2	-73	-83
-3.81	-52.7	-52.7
-3.72	-32.7	-32.7
+3.72	-32.7	-32.7
+3.81	-52.7	-52.7
+4.2	-73	-83
+6	-85	-95
+12	-110	-120
+20	-110	-120

Table A1-5: Allowable spurious emission power (See Table A1-1 Column 7.6 Table 45 — Allowable spurious emission power)

Separation in relation to the digital signal central carrier	Attenuation (dB) below the power supplied to the antenna transmission line
> 20 MHz	46+10log(P), or 60dBc, whichever is less stringent, without exceeding the absolute mean power level of 12mW for UHF stations. However, greater attenuation may be necessary on a case by case basis.
< - 20 MHz	

## Annex 2 Video coding

The details of the modifications from ABNT NBR 15602-1 are shown in Table A2-1. Video coding parameters for full-seg services shown in Table A2-2 are applied to any layers except for the partial reception layer.

Table A2-1 Modifications from ABNT NBR 15602-1

Section No. and item	Page	Original	Modified
2 Normative references	1	<p>ISO/IEC 14496-10:2005, Information technology — Coding of audio-visual objects — Part 10: Advanced Video Coding</p> <p>ITU-T Recommendation H.264:2005, Advanced video coding for generic audiovisual services</p>	<p>Add the following references to the original reference documents:</p> <p>ISO/IEC 23008-2:2020, Information technology — High efficiency coding and media delivery in heterogeneous environments — Part 2: High efficiency video coding</p> <p>ITU-T Recommendation H.265:2021, High efficiency video coding</p> <p>ARIB STD-B32 Version 3.11, Video coding, audio coding, and multiplexing specifications for digital broadcasting (Fascicle 1)</p>
5.4 Parameters for video signals	4	NOTE See ITU Recommendation BT.709-5 and ITU Recommendation BT.601-5 for additional information.	NOTE Table 5 to 14 and Figures 1 to 13 are for 60Hz field frequency. See ITU Recommendation BT.709-5 and ITU Recommendation BT.601-5 for 50Hz field frequency. Video coding parameters for Full-Seg services should meet the parameters indicated in Table A2-2.

Section No. and item	Page	Original	Modified
6.1 General	14	The video compression tool to be used in the Brazilian digital terrestrial television system shall be compliant with the ITU-T Recommendation H.264.	The video compression tool to be used in the <b>Sri Lankan</b> digital terrestrial television system shall be compliant with <b>the ITU-T Recommendation H.265 for full-seg services and ITU-T Recommendation H.264 for one-seg services.</b>
6.3 Inter and intra coding	14	The reduction of spatial redundancy can be performed using either transform or sub-band coding.	The reduction of spatial redundancy can be performed using transform.
6.4.1 Baseline profile	14	6.4.1 Baseline profile	6.4.1 Baseline profile of ITU-T Recommendation H.264 for one-seg services
6.4.2 Main profile	15	<p>6.4.2 Main profile</p> <p>– only I, P and B slice types can be present;</p> <p>– NAL units streams cannot contain nal_unit_type values in the range of 2 to 4, inclusive;</p> <p>– arbitrary slice order shall not be used;</p> <p>– the syntactic elements chroma_format_idc, bit_depth_luma_minus8, bit_depth_chroma_minus8, pprime_y_zero_transform_by_pass_flag, and seq_scaling_matrix_present_flag shall not be present in sequence parameter sets;</p> <p>– picture parameter sets shall have num_slice_groups_minus1 equal to 0 only;</p> <p>– picture parameter sets shall have redundant_pic_cnt_present_flag equal to 0 only;</p> <p>– the syntactic elements</p>	<p>6.4.2 Main profile of ITU-T Recommendation H.265 for full-seg services</p> <p><b>Deleted.</b></p> <p><b>– NAL units streams cannot contain nal_unit_type values in the range of 4 to 5, 10 to 18, 22 to 31, 37 and 40 to 63, inclusive;</b></p> <p><b>Deleted.</b></p> <p><b>Deleted.</b></p> <p><b>Deleted.</b></p> <p><b>Deleted.</b></p> <p><b>Deleted.</b></p> <p><b>Deleted.</b></p>

コメントの追加 [A8]: [EoJ] what is the expected outcome in one seg using H.264?

Section No. and item	Page	Original	Modified
		<p>transform_8x8_mode_flag, pic_scaling_matrix_present_flag, and second_chroma_qp_index_offset shall not be present in picture parameter sets;</p> <p>– the syntactic element level_prefix shall not be greater than 15 (when present);</p> <p>– the level constraints specified for the Main profile in ITU-T Recommendation H.264, Subclause 3, shall be fulfilled;</p> <p>Conformance of a bitstream to the main profile shall be specified by profile_idc being equal to 77;</p> <p>Decoders conforming to the main profile at a specific level shall be capable of decoding all bitstreams in which profile_idc is equal to 77 or constraint_set1_flag is equal to 1 and in which level_idc and constraint_set3_flag represent a level less than or equal to the specified level.</p>	<p><b>Deleted.</b></p> <p>– the level constraints specified for the Main profile in ITU-T Recommendation <b>H.265, Annex A.4</b>, shall be fulfilled;</p> <p>Conformance of a bitstream to the main profile shall be specified by <b>general_profile_idc</b> being equal to <b>1</b>;</p> <p>Decoders conforming to the main profile at a specific level shall be capable of decoding all bitstreams in which <b>general_profile_idc</b> is equal to <b>1</b> and in which <b>general_level_idc</b> represents a level less than or equal to the specified level.</p>
<b>6.4.3 High profile</b>	<b>16</b>		<b>Deleted.</b>
<b>6.5 Levels</b>	<b>17</b>	The Table 15 specifies the limitation imposed by each video coding level.	The Table 15 specifies the limitation imposed by each video coding level <b>of ITU-T Recommendation H.264 for one-seg services.</b>
	<b>17</b>	Table 15 – Restriction determined by the coding level	Table 15 – Restriction determined by the coding level <b>for ITU-T Recommendation H.264</b>
	<b>17</b>	Table 15	Delete <b>table entries</b> for Level numbers 2 to 5.1.
	<b>17</b>		<p>Add the following sentence below Table 15:</p> <p><b>The limitation imposed by each video coding level of ITU-T Recommendation H.265 for full-seg services shall be in accordance with</b></p>



Section No. and item	Page	Original	Modified
			Table A2-3.
7.1 Compression and transmission procedure	17		Add the following subsection, and move sentences of 7.1 to 7.1.1:  7.1.1 Compression and transmission procedure for ITU-T Recommendation H.264
	18		Add the following subsection:  7.1.2 Compression and transmission procedure for ITU-T Recommendation H.265 Refer to ARIB STD-B32 Fascicle 1, Part 1, 4.3.1.
7.2 Signal configuration	18		Add the following subsection, and move sentences of 7.2 to 7.2.1:  7.2.1 Signal configuration for ITU-T Recommendation H.264
	19		Add the following subsection:  7.2.2 Signal configuration for ITU-T Recommendation H.265 A video sequence can be composed by one or more access units (AU). Each sequence shall be initiated by one AU of IDR type and it extends until an AU that finishes with an EOS_NUT. The set of video sequences finishing with an EOS_NUT determines a video stream. Each video sequence is composed by NAL units that can be of visual content or auxiliary structures used to configure parameters or transmission of complementary information. The visual content NAL units can contain slices of I (coded using self contained information of the current picture), B (coded using information contained in

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			<p>current and two previously coded pictures) and P (coded using information contained in current and one previously coded picture) types. A video sequence shall contain at least one picture of I type.</p> <p>A picture refers to a simple image. A slice is formed by an arbitrary number of coding tree unit, not necessarily in the same horizontal row. A coding tree unit consists of a luminance signal of 64 x 64 to 16 x 16 pixels and two chrominance signals whose dimension is dependent on the actual format using during the coding process. A coding unit of size 2N x 2N may be recursively divided in four N x N coding units.</p> <p>A coding unit can be partitioned in prediction units of sizes 2N x 2N, 2N x N, N x 2N, N x N, 2N x nU, 2N x nD, nL x 2N and nR x 2N samples.</p> <p>A coding unit can be partitioned in transform units of sizes 2N x 2N, and N x N samples to apply the Integer transform, as specified on ITU-T Recommendation H.265 and on ISO/IEC 23008-2.</p>
8.1 General	19	<p>The restrictions of this Standard are applied to the following IRD and bitstreams:</p> <ul style="list-style-type: none"> <li>– H.264/AVC decoder and bitstream for SDTV;</li> <li>– H.264/AVC decoder and bitstream for HDTV;</li> <li>– H.264/AVC decoder and bitstream for portable devices.</li> </ul>	<p>The restrictions of this Standard are applied to the following IRD and bitstreams:</p> <ul style="list-style-type: none"> <li>– H.265/HEVC decoder and bitstream for SDTV;</li> <li>– H.265/HEVC decoder and bitstream for HDTV;</li> <li>– H.264/AVC decoder and bitstream for portable devices.</li> </ul>
	20	Video coding shall be in accordance to the ITU-T Recommendation H.264 and also to ISO/IEC 14496-10, on which the constraints	Video coding for one-seg services shall be in accordance to the ITU-T Recommendation H.264 and also to ISO/IEC 14496-10, on

Section No. and item	Page	Original	Modified
		described in 8.2 and 8.3 shall be applied.	which the constraints described in 8.3 shall be applied. Video coding for full-seg services shall be in accordance to the ITU-T Recommendation H.265 and also to ISO/IEC 23008-2, on which the constraints described in 8.2 shall be applied.
8.2.1 General	20	ITU-T Recommendation H.264 and also to ISO/IEC 14496-10:2005, Appendixes D and E.	ITU-T Recommendation H.265 and also to ISO/IEC Annexes D and E.
8.2.2 Sequence parameter set and picture parameter set	20	pic_parameter_set_id	pps_pic_parameter_set_id
8.2.3 pic_width_in_mbs_minus1 and pic_height_in_map_units_minus1	20	pic_width_in_mbs_minus1  pic_height_in_map_units_minus1	pic_width_in_luma_samples  pic_height_in_luma_samples
	20	If the number of luminance samples in the width or height is not a multiple of 16, extra samples shall be added to the picture in order to reach a number multiple of 16.	If the number of luminance samples in the width or height is not a multiple of 8, extra samples shall be added to the picture in order to reach a number multiple of 8.
8.2.4.1 General	20	time_scale num_units_in_ticks fixed_frame_rate_flag pic_struct_present_flag	vui_time_scale vui_num_units_in_ticks fixed_pic_rate_flag frame_field_info_present_flag
8.2.4.3.1 Encoder	20	Chroma sample type equal to 0 should be used for both fields.	Chroma sample type equal to 0 or 2 should be used for interlaced fields or progressive frame, respectively.
8.2.4.4 Timing information	21	num_units_in_tick fixed_frame_rate_flag	vui_num_units_in_tick fixed_pic_rate_flag
8.2.4.5 Picture structure information	21	pic_struct_present_flag memorization	frame_field_info_present_flag buffering
8.2.5.2.1 Encoder	21	pic_struct_present_flag	frame_field_info_present_flag
8.2.7 Sequence parameters	22	– gaps_in_frame_num_value_allowed_flag = 0	Deleted.
8.2.8.1 Encoder	22	The coding process shall be compliant with the constraints imposed by the High profile, which implies in it fitting into Main or High profile, being the choice on the coding source discretion.	The coding process shall be compliant with the constraints imposed by the Main profile,

Section No. and item	Page	Original	Modified
		The bitstream can fit into the constraints imposed by level 4.0 or any inferior level.	The bitstream can fit into the constraints imposed by level 4.1 or any inferior level of Main tier (general_tier_flag=0).
	22	Table 16  Main High profile_idc 77 100 constraint_set0_flag 0 0 constraint_set1_flag 1 0 constraint_set2_flag 0 0 constraint_set3_flag 0 0	Replace with the followings:  Main general_profile_idc 1 Deleted. Deleted. Deleted. Deleted.
8.2.8.2 Decoder	23	The decoders shall be able to fully decode bitstreams created with the constraints associated with the High profile, supporting up to level 4.0 constraints.	The decoders shall be able to fully decode bitstreams created with the constraints associated with the Main profile, supporting up to level 4.1 Main tier constraints.
8.2.9 Luminance resolutions	23	The resolutions 720 x 480, 1280 x 720 and 1920 x 1080 resolutions shall be allowed	The resolutions 720 x 576, 1280 x 720 and 1920 x 1080 resolutions shall be allowed
	23	Table 17	Delete a table entry of 720x480 luminance resolution.
8.2.10 Frame rate - Encoder	23	The supported frame rates shall be 30 000/1 001 Hz and 60 000/1 001.  Optionally modes 25 Hz and 50 Hz can also be used.  This value shall be specified in VUI, properly setting the parameters time_scale and num_units_in_tick, according to Table 18.  Table 18  time_scale  num_units_in_ticks	The supported frame rates shall be 25 Hz and 50Hz.  Deleted.  This value shall be in VUI, properly setting the parameters vui_time_scale and vui_num_units_in_tick, according to Table 18.  Delete entries of 30000/1001P, 30000/1001I and 60000/1001P.  vui_time_scale  vui_num_units_in_ticks
8.2.11.2 Bitstream	24	pic_height_in_map_units_minus1  pic_width_in_mbs_minus1	pic_width_in_luma_samples  pic_height_in_luma_samples

Section No. and item	Page	Original	Modified
8.2.12.1 Encoder	24	coulour_primaries 4/6 1 transfer_characteristics 4/6 1 matrix_coefficients 4/6 1	colour_primaries 5 1 transfer_characteristics 5 1 matrix_coefficients 5 1
8.2.13 Active coding area	25	Table 20 – Active coding area  525p 483 480 Lines 45 - 524 525i 483 480 Lines 23–262 and Lines 286- 525	Add the following entries:  625p 576 576 Lines 45 - 620 625i 576 576 Lines 23–310 and Lines 316- 623
8.3.1 General specifications	25	5 Hz, 10 Hz, 12Hz, 15 Hz, 24 Hz, 30Hz	5 Hz, 10 Hz, 12 Hz, 15 Hz, 24 Hz, 25 Hz, 30 Hz
8.3.6.2 Luminance resolutions	28	pic_height_in_map units minus1	pic_height_in_mbs units minus1
9.2 Transmission of the end of sequence descriptor	29	NAL end_of_seq unit shall be transmitted.  NAL end_of_stream unit shall not be broadcasted.  NAL end_of_seq unit broadcasting shall be used only on video bitstream  Although ITU-T Recommendation H.264 does not define GOP structures	NAL end_of_seq unit (in case of ITU-T Recommendation H.264) and EOS_NUT (in case of ITU-T Recommendation H.265) shall be transmitted.  NAL end_of_stream unit (in case of ITU-T Recommendation H.264) and EOS_NUT (in case of ITU-T Recommendation H.265) shall not be broadcasted.  NAL end_of_seq unit (in case of ITU-T Recommendation H.264) and EOS_NUT (in case of ITU-T Recommendation H.265) broadcasting shall be used only on video bitstream  Although ITU-T Recommendation H.264 and ITU-T Recommendation H.265 do not define GOP structures
9.3.1 Transmission procedure	30	cbp_size_scale	cpb_size_scale
9.4 Modification on the image aspect ratio for the 525i television system	30	525i	625i
9.5.1 Transmission procedure	30	hrd_parameter()	sub_layer_hrd_parameters()
9.6 Switching video	31-34	480p 480i	576p 576i

コメントの追加 [A9]: [EoJ] 1. Can you clarify on Luminance resolutions  
2. Can you detail this parameter, where it is considered only the 'height' where "map" has become "mbs" when modified.

コメントの追加 [A10]: [EoJ] Why do we use here 576 since it is full HD, shd it be 1080i and 1080p? in terrestrial broadcasting, we will use single profile and it shd be 1080! Pl clarify.

Section No. and item	Page	Original	Modified
formats			
Bibliography	38	[4] ARIB STD-B32:2006, Video coding, audio coding and multiplexing specification for digital broadcasting	Deleted.

Table A2-2: Video coding parameters for Full-Seg services

Number of horizontal pixels	Number of vertical pixels	Frame rate [Hz]	Scanning system	Aspect ratio	Profile and level
720	576	25	Interlaced	4:3 16:9	H.265 MPEG-H HEVC MP@L3
720	576	50	Progressive	16:9	H.265 MPEG-H HEVC MP@L3.1
1280	720	50	Progressive	16:9	H.265 MPEG-H HEVC MP@L4
1920	1080	25	Interlaced	16:9	H.265 MPEG-H HEVC MP@L4.1
1920	1080	25	Progressive	16:9	H.265 MPEG-H HEVC MP@L4.1

Note: Although picture resolutions of 720x576 and 1280x720 are not defined for television services in ARIB STD-B32, Fascicle 1, they follow the restrictions for the television services except for level restriction. Levels for 720x576 and 1280x720 are specified in the above table.

Table A2-3: Restrictions determined by the coding level ITU-T Recommendation

H.265

Level	Max luma picture size MaxLumaPs (samples)	Max CPB size MaxCPB (CpbVcIFactor or CpbNaIFactor bits)	Max bit rate MaxBR (BrVcIFactor or BrNaIFactor bits/s)	Min compression ratio MinCrBase
		Main tier	Main tier	Main tier
3	552 960	6 000	6 000	2
3.1	983 040	10 000	10 000	2
4	2 228 224	12 000	12 000	4
4.1	2 228 224	20 000	20 000	4

### Annex 3 Audio coding

There is no amendment to ABNT 15602-2. However, audio coding parameters for full-seg services are applied to any layers except for the partial reception layer.

### Annex 4 Multiplexing

There is no amendment to ABNT 15602-3

### Annex 5 Service information

The details of the modifications from ABNT NBR 15603-1, 15603-2 and 15603-3 are shown in Table A5-1, A5-2 and A5-3, respectively.

Table A5-1 Modification from ABNT NBR 15603-1

Section No. and item	Page	Original	Modified
6.1 PID used for tables transmission	8	... specified by the Brazilian Ministry of Communications or signal of broadcasters.	... specified by signal of broadcasters.

**コメントの追加 [A11]:** 1.[To the Ministry of Mass Media] MMM needs to develop a transparent criteria to assign channel numbers to the 26 FTA TV channels from no 1 to 26.  
2. [To EoJ] a. Can the PID and the Channel number be same or some equivalent relationship?  
b. who can decide the PID of their channel ? is it a job of the DBNOC or the individual broadcasters?

TableA5-2 Modifications from ABNT NBR 15603-2

Section No. and item	Page	Original	Modified
8.1 Table 26: Location and requirements of SI descriptors	45	- Carousel ID descriptor - Association tag descriptor - Deferred association tag descriptor	Deleted Deleted Deleted
8.3.4 Component descriptor	49	Table 28	Add video formats described in table A5-4 to Table 28.
8.3.30 Video decode control descriptor	80	Table 66 — Video encoding format	Add video encoding format as described in Table A5-5.
8.3.31 Terrestrial delivery system descriptor	80	$(473 + 6 \times (X - 14) + 1/7) \times 7 = (xxx)d$	$(474 + 8 \times (X - 21)) \times 7 = (xxx)d$
Annex E: Area_code specification	116 117	(Whole of Annex E)	Assignment of area_code is in compliance with Appendix 10 in this document
Annex G Specification for tuning physical and logical channel	120	- 6MHz	- 8MHz
Annex H.2: Original_network_id	122	(Whole of Annex H.2)	Refer to Annex A5-1 in this document about the structure of original_network_id.
3.2 8.3.21 Annex A Annex I.1: Annex I.6	3 61 103 124 126	- Brazilian - Brazil	- Sri Lankan - Sri Lanka
7.2.7.1 7.2.8 7.2.9.1 7.2.12 8.3.25 Annex A	28 29 30 35 67 103	- Brazil (UTC-3) - UTC-3	- Sri Lanka (UTC+5:30) - UTC+5:30
8.3.4 8.3.7 8.3.15	48 52 59	EXAMPLE Portuguese, Brazilian official language, has 3 coded characters "por", which is coded as: "0111 0000 0110 1111 0111 0010".	EXAMPLE English has 3-character code "eng", which is coded as: "0110 0101 0110 1110 0110 0111", and Sinhala has 3-character code "sin", which is coded as: "0111 0011 0110 1001 0110 1110", and Tamil has 3-character code "tam", which is coded as: "0111 0100 0110 0001 0110 1101",
8.3.6 8.3.11 8.3.25 8.3.26	52 55 67 69	EXAMPLE Brazilian country has 3-character code "BRA", which is coded as: "0100 0010 0101 0010 0100 0001"	EXAMPLE Sri Lankan country has 3-character code "LKA", which is coded as: "0100 1100 0100 1011 0100 0001"
Annex J	128	Table J.1	Add video stream type in table A5-6 to Table J.1



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Table A5-3 Modifications from ABNT NBR 15603-3

Section No. and item	Page	Original	Modified
8.2.2 8.2.6 8.2.6 Table 13 B.1.4.3 B.5	15 19 19 30 50	- UTC-3	- UTC+5:30
8.2.5 Short node information descriptor	17	EXAMPLE Portuguese, Brazilian official language, has 3 coded characters "por", which is coded as: "0111 0000 0110 1111 0111 0010".	EXAMPLE English has 3-character code "eng", which is coded as: "0110 0101 0110 1110 0110 0111", and Sinhala has 3-character code "sin", which is coded as: "0111 0011 0110 1001 0110 1110", and Tamil has 3-character code "tam", which is coded as: "0111 0100 0110 0001 0110 1101",
B.1.4.3 B.2.7	30 42	- Brazilian	- Sri Lankan

Table A5-4 Stream\_content and component\_type (additional items)

(See Table A5-2 Column 8.3.4 Component descriptor)

Stream_content	Component_type	Description
0x09	0x05	H.265/HEVC video 625i(576i), 4:3 aspect ratio
0x09	0x06	H.265/HEVC video 625i(576i), 16:9 aspect ratio with pan vectors
0x09	0x07	H.265/HEVC video 625i(576i), 16:9 aspect ratio without pan vectors
0x09	0x08	H.265/HEVC video 625i(576i), > 16:9 aspect ratio
0x09	0xA5	H.265/HEVC video 625p(576p), 4:3 aspect ratio
0x09	0xA6	H.265/HEVC video 625p(576p), 16:9 aspect ratio with pan vectors
0x09	0xA7	H.265/HEVC video 625p(576p), 16:9 aspect ratio without pan vectors
0x09	0xA8	H.265/HEVC video 625p(576p), > 16:9 aspect ratio
0x09	0xB2	H.265/HEVC video 1125i(1080i), 16:9 aspect ratio with pan vectors
0x09	0xB3	H.265/HEVC video 1125i(1080i), 16:9 aspect ratio without pan vectors
0x09	0xB4	H.265/HEVC video 1125i(1080i), > 16:9 aspect ratio
0x09	0xC2	H.265/HEVC video 750p(720p), 16:9 aspect ratio with pan vectors
0x09	0xC3	H.265/HEVC video 750p(720p), 16:9 aspect ratio without pan vectors
0x09	0xC4	H.265/HEVC video 750p(720p), > 16:9 aspect ratio
0x09	0xE2	H.265/HEVC video 1125p(1080p), 16:9 aspect ratio with pan vectors
0x09	0xE3	H.265/HEVC video 1125p(1080p), 16:9 aspect ratio without pan vectors
0x09	0xE4	H.265/HEVC video 1125p(1080p), > 16:9 aspect ratio

(NOTE) Combinations of 0x09 0xC3 and 0x09 0xE3 of Stream\_content and Component\_type are in reference to ARIB STD-B10.

Table A5-5 Video encoding format  
(See Table A5-2 Column 8.3.30 Video decode control descriptor)

Video encoding format	Description
0000	1080p
0001	1080i
0010	720p
0011	480p or 576p
0100	480i or 576i
0101	240p
0110	120p
0111	Reserved
1000	180p
1001-1011	Reserved
1100-1111	For video encoding format extension

A5-1 Original\_network\_id (See Table A5-2 Column Annex H.2: Original\_network\_id)

Refer to Figure A5-1 about the structure of original\_network\_id.

Original\_network\_id

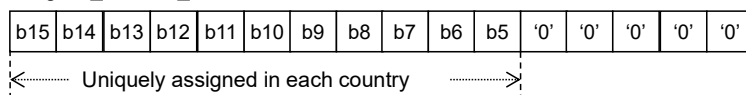


Figure A5-1 Structure of original\_network\_id

Table A5-6 Stream type

(See Table A5-2 Column Annex J Stream type)

Value	Description
0x24	HEVC video stream or HEVC temporal video sub-bit stream

(NOTE) Value of 0x24 is in reference to ARIB STD-B10.

## Annex 6 Receiver

The details of the modifications from ABNT NBR 15604 are shown in Table A6-1.

The details of the modification from Table 1 of ISDB-T HARMONIZATION DOCUMENT PART1:HARDWARE(November/2015) are shown in Table A6-2.

Table A6-1 Modifications from ABNT NBR 15604

Section No. and item	Page	Original	Modified
Contents	v, vi	Annex B (normative) Priority parameters of middleware Ginga Annex C (normative) Measurement method C.1 Sensitivity C.2 Selectivity (protection ratio)	Deleted
Introduction Table 1 – Patent rights applicable to the receivers	viii	MPEG LA MPEG2 System Transport Stream, AVC AVC/H.264 Decoder, High Profile	MPEG LA MPEG2 System Transport Stream, AVC AVC/H.264 Decoder, High Profile HEVC/H.265 Decoder
		-	Add new row ACCESS Advance HEVC/H.265 Decoder
			Add new row Velos Media HEVC/H.265 Decoder
4	6	PAL-M Phase Alternation Line - Standard M	PAL-B Phase Alternation Line – Standard B
5.2 Figure 2:	8	- PAL-M encoding	- PAL-B encoding Analog output is optional.
6: Environment and safety conditions	10	Environment and safety conditions	About safety regulations, it shall be in reference to actual standards in Sri Lanka.
7.1: Reception antenna	12	a) the antenna shall allow the reception of digital terrestrial television signals that are comprehended between VHF channels from 07 to 13 and the UHF channels from 14 to 69, for the fixed and mobile (full-seg) receivers and at least the channels	a) the antenna shall allow the reception of digital terrestrial television signals that are comprehended between the UHF channels from 21 to 48; <sup>2</sup>

コメントの追加 [A12]: [To EOJ] Why do we need both decoders (H.264 and H.265) in the STB at home?

コメントの追加 [A13]: [To EOJ] What is “ACCESS Advance”?

コメントの追加 [A14]: [To EOJ] What is “Velos Media”?

コメントの追加 [A15]: [To EOJ] It should be PAL-G for UHF (8MHz)

コメントの追加 [A16]: [To EOJ] Same as above?

コメントの追加 [A17]: [To TRCSL] Who is the respective agency in Sri Lanka to get this? Is it TRCSL?

<sup>2,3</sup> Channels will be from 21 to 62 until Analog Switch Off.

Section No. and item	Page	Original	Modified
		comprehended in the UHF band between the channels 14 to 69 for the portable (one-seg) receivers;	
		b) optionally, the antenna may yet allow the reception of analog terrestrial television signals that are comprehended between the VHF channels from 02 to 13 and UHF from 14 to 62;	Deleted
7.2.1.1 7.2.1.2	12	type F	type IEC 61169-2
7.2.2.1: Fixed or mobile (full-seg) reception devices	13	The receiver unit shall be able to tune television channels limited by the VHF high band, comprehended between the channels 07 to 13 and the receiver unit shall be able to tune the television channels limited by the UHF band, comprehended between the channels 14 to 69.	The receiver unit shall be able to tune the television channels limited by the UHF band, comprehended between the channels 21 to 48. <sup>3</sup>
7.2.2.2: Portable devices for partial reception (one-seg)	13	The partial reception unit shall be able to tune, at least, the television channels limited by the UHF band, comprehended between the channels 14 to 69.	The partial reception unit shall be able to tune, at least, the television channels limited by the UHF band, comprehended between the channels 21 to 48. <sup>4</sup>
		The VHF high band channels reception is optional in the portable receivers (one-seg).	Deleted
7.2.3 Channel bandwidth	13	a) fixed or mobile (full-seg) reception devices: 5.7 MHz; b) portable (one-seg) devices: 0.43 MHz.	a) fixed or mobile (full-seg) reception devices: 7.6 MHz; b) portable (one-seg) devices: 0.58 MHz.
7.2.4: Table 3 – Frequencies of channels of UHF band	13	Table 3 – Frequencies of channels of UHF band	See Table A1-3 for 8MHz/ch UHF channels
7.2.5: Sensitivity	16		Add following condition.  Measurement Condition

<sup>4</sup> Channels will be from 21 to 62 until Analog Switch Off.

Section No. and item	Page	Original	Modified
		a) minimum antenna signal input level: - 77 dBm or lower, as shown in Annex C, sub clause C.1. b) maximum antenna signal input level: equal or higher than - 20 dBm;	Guard Interval : 1/8 Modulation : 64QAM Code Rate : 3/4 Interleave : 2  a) minimum antenna signal input level: - 78,4 dBm or lower; b) maximum antenna signal input level: equal or higher than 0 dBm;
7.2.6: Selectivity – Protection ratio	16	The measurement method is demonstrated in Annex C.	Deleted
7.2.7: First intermediate frequency (IF)	16	The central frequency of the IF shall be of 44 MHz, and optionally direct conversion in base band. The local oscillator frequency shall be located at the upper side of the received frequency.	The central frequency of the IF shall be of 36 MHz, and optionally direct conversion in base band. Low-IF under 10MHz is also acceptable such as for Silicon-Tuner use. As for frequency conversion, either upper or lower heterodyne conversion is acceptable as long as there is no side-effect.
7.2.10.1 Figure 5 7.2.10.2 Figure 6	17 18	44MHz or base band	36MHz or base band
7.2.19 Video decoding and its output interfaces	20	The receiver shall be able to decode a H.264/AVC video stream, according to ABNT NBR 15602-1.	The receiver shall be able to decode a H.264/AVC video stream, according to ABNT NBR 15602-1, and a H.265/HEVC video stream, according to ARIB STD B32 Fascicle 1.
7.2.21: Primary data decoder	20	The porting of middleware Ginga is optional; however, when it is embedded in the receiver, the minimum requirements defined in Table B.1 shall necessarily be implemented (see Clause 9).	All the technical methods and parameters for BML data broadcasting shall be in accordance with ARIB STD-B24.
7.2.24: Accessibility	21	c) locution;	"Locution" specification is not necessary since there is no detail in ABNT.
	21	e) LIBRAS window.	"LIBRAS window" is a unique item to Brazilian standard. So, it is not necessary.
7.2.27.1	21	"F" type	"IEC 61169-2" type
7.2.27.1	21		
7.2.27.7:	22	encoded in PAL-M	encoded in PAL-B

コメントの追加 [A18]: [To EOJ] Are there any unique reason for selection of these parameters, mainly 64QAM as we see in Appendix-1, it is QPSK

コメントの追加 [A19]: [To EOJ] What is the advantage in having bigger dynamic range? Will that effect the cost?

コメントの追加 [A20]: [To EOJ] Will that effect the cost of STB with both decoders: H.264/5 and why do we need H.264?

コメントの追加 [A21]: [To EOJ] It should be PAL-G on UHF-8MHz?

Section No. and item	Page	Original	Modified
RF Output		according to Clause 8, Table 9.	according to Clause 8, Table 10.
7.2.28: Remote control	22	7.2.28 Remote control	See Table A6-3 for remote control keys used for data broadcasting; and Fig A6-1 for examples of remote controllers.
8.1.1 General considerations	23	The receiver shall be capable to decode a H.264/AVC video stream specified by ISO/IEC 14496-10, compatible with parameters defined in the ABNT NBR 15602-1.	The full-seg receiver shall be capable to decode a H.265/HEVC video stream specified by ISO/IEC 23008-2, compatible with parameters defined in the ARIB STD-B32 Fascicle 1.  The one-seg receiver shall be capable to decode a H.264/AVC video stream specified by ISO/IEC 14496-10, compatible with parameters defined in the ABNT NBR 15602-1.
8.1.1 Table 6	23	Table 6 – Used index codes in the video encryption	See Table A6-5 for used index codes in the video encryption.
8.1.2.1: Profiles and levels of the H.264/AVC standard	24	Profiles and levels of the H.264/AVC standard	Profiles and levels
	24	The following profiles and levels of the H.264/AVC standard, described in subclauses 8.1.2.2 and 8.1.2.3 and specified in the ABNT NBR 15602-1:2007, subclauses 8.2 and 8.3, shall be recognized by the receivers considering that they shall be able to process the video object:	The following profiles and levels of the H.265/HEVC standard, described in subclause 8.1.2.2 and specified in the ARIB STD-B32 Fascicle 1, subclause 5.1.3 and Attachment 5, shall be recognized by the full-seg receivers considering that they shall be able to process the video object:  The following profiles and levels of the H.264/AVC standard, described in subclause 8.1.2.3 and specified in the ABNT NBR 15602-1:2007, subclause 8.3, shall be recognized by the one-seg receivers considering that they shall be able to process the video object:

Section No. and item	Page	Original	Modified
8.1.2.2 Full-seg receiver	24	The full-seg receivers shall be able to decode bitstreams with all the encoder tools described in the high profile: a) H.264/AVC HP @ L4.0	The full-seg receivers shall be able to decode bitstreams with all the encoder tools described in the <b>main</b> profile: a) H.265/HEVC MP@L3, MP@L3.1, MP@L4, MP@L4.1
8.1.4.2: Full-seg receiver	26	The full-seg receivers shall support at least the video decoding in the 525i, 525p, 750p and 1125i formats, according to the specification in the ABNT NBR 15602-1.	The full-seg receivers shall support at least the video decoding in the 576i, 576p, 720p, 1080i and 1080p formats.
8.1.4.4: Full-seg receiver with support to the one-seg exhibition	26	Table 8 – Resolutions which shall be supported	See Table A6-4 for resolutions which shall be supported.
8.1.5.1 Full-seg receivers	26	The full-seg receivers shall at least support the frames rate of 30/1.001 Hz and 60/1.001 Hz.	The full-seg receivers shall at least support the frames rate of 25 Hz and 50 Hz.
8.1.5.2 One-seg receiver	26	The one-seg receivers shall at least support the frames rate 5fps, 10fps, 12fps, 15fps, 24fps and 30fps	The one-seg receivers shall at least support the frames rate 5fps, 10fps, 12fps, 15fps, 24fps, 25fps and 30fps
8.1.6.1: Full-seg receivers type digital converter	27	8.1.6.1 Full-seg receivers type digital converter The digital converter receiver (set-top box) shall have a RCA connector, 75 Ω, for composite video 525i output encoded in PAL-M. The video signal with the specified configuration shall always be present independently of the encoder parameters of a video pertaining to a stream received for decoding. This requirement is optional for integrated receivers with the display, fixed or portable.	8.1.6.1 Full-seg receivers type digital converter The digital converter receiver (set-top box) shall have an RCA connector, 75 Ω, for composite video 625i output encoded in PAL-B. The video signal with the specified configuration shall always be present independently of the encoder parameters of a video pertaining to the stream received for decoding. This requirement is optional for integrated receivers with the display, fixed or portable.
8.1.7 Analog video output	27	8.1.7 Analog video output	8.1.7 Analog video output <b>Analog video output is to be optional.</b>
8.1.7.1 to 8.1.7.1.5	27-29		Deleted
9: Primary data	34	9 Primary data decoding	About Data broadcasting, all the technical methods and parameters for

コメントの追加 [A22]: [To EOJ] PAL-G?

コメントの追加 [A23]: [To EOJ] HDMI output is expected in the STB. Here it discusses only for analog output.



Section No. and item	Page	Original	Modified
decoding			BML shall be in accordance with ARIB STD-B24.
11.3 Semantics for parental rating descriptor	35	EXAMPLE Brazilian country has 3-character code "BRA", which is coded as: "0100 0010 0101 0010 0100 0001"	EXAMPLE Sri Lankan country has 3-character code "LKA", which is coded as: "0100 1100 0100 1011 0100 0001"
11.4 Cases in which the receiver shall not block the event	36	"BRA" (0x425241)	LKA" = 0x4C4B41
12: Accessibility resources	39	Portuguese	English, Sinhala, and Tamil
	39	c) Audio locution	"Locution" specification is not necessary since there is no detail in ABNT.
	39	e) LIBRAS window	"LIBRAS window" is an item unique to Brazilian standard. So, it is not necessary.
13.2.1 Numeration of digital channels	40	within the 6 MHz frequency range.	within the 8 MHz frequency range
14.1.2: Full-seg receiver	42	It is optional for the full-seg receiver's manufacturers the implementation of the USB port, since such equipment do not have interactivity channel, even if the middleware Ginga is embedded on them.	It is optional for the full-seg receiver manufacturers to provide the USB port.
Annex A: Priority parameters of the receiver unit	47	In Table A.1	In Table 1 of "ISDB-T HARMONIZATION DOCUMENT PART 1: HARDWARE (November/2015)"
	48 - 57	Table A.1	Deleted
Annex B: Priority parameters of middleware Ginga	58-62	Annex B Priority parameters of middleware Ginga	Deleted
Annex C(normative) Measurement method	63-64	Annex C(normative) Measurement method	Deleted

Table A6-2 Modifications from Table 1 of ISDB-T HARMONIZATION DOCUMENT

## PART1:HARDWARE(November/2015)

Section No. and item	Page	Original	Modified
Antenna input and output Antenna input	10	Country remarks	Sri Lanka: IEC61169-2 type (Belling-Lee);
Channel reception High VHF band	10	Country remarks	Sri Lanka: High VHF not required;
External interfaces Antenna input	15	Country remarks	Sri Lanka: IEC61169-2 type (Belling-Lee);
H.264/AVC HP @ L4.0	17	Country remarks	Sri Lanka: H.265/HEVC MP @ L3, MP @ L3.1, MP @ L4, MP @ L4.1;
Video display format, aspect ratio and resolution	18	-	Add 1 row 1125p(1080p), 16:9, 1920x1080, Optional for Full-seg, Not applicable for one-seg
Composite video output (CVBS)	19	Country remarks	Sri Lanka: Optional for set-top-box;
Spanish Language	30	Botswana, Maldives and Sri Lanka: English	Botswana, Maldives: English Sri Lanka: Sinhalese, Tamil, English;

Table A6-3 Remote control keys used for data broadcasting

(See Table A6-1 Column 7.2.28: Remote control)

Key type	Guidelines
↑、↓、←、→ (up, down, left, right keys)	To move up, down, left, right.
0 - 9 (number keys)	To input numbers
Confirm	Separator of operation (enter)
Back	Cancel operation
	Back space of user input character (or bulk erase)
	Disconnection of a call to a communication server During connection, receiver units will take the instruction; after connection, instruction is carried out in the contents. (A display to the effect that the connection will be terminated is desirable when the back key is pressed.)
	It is okay to use BML documents for the purpose of going back. However, whether there is something after returning, should be considered.
Data	Switches display/non-display of multi-media data broadcasting. Separated "Data" button is recommended.
Red, green, yellow, and blue (color keys)	Selection of operation (execution) Location of buttons on the remote control should be in order of red, green, yellow, blue from the left.
Bookmark (Optional)	Recording of bookmark.

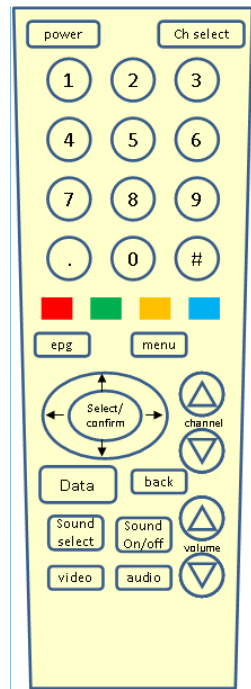


Fig A6-1 Example of Remote Controller  
(See Table A6-1 Column 7.2.28: Remote control)

コメントの追加 [A24]: [To EOJ] What is the function of “Ch select”?

Table A6-4 Resolutions which shall be supported

Output video format	Aspect ratio	Number of lines to be decoded	Aspect ratio info	Output video format	Aspect ratio	Number of lines to be decoded	Aspect ratio idc
SQVGA	4:3	160 x 120	1	576i	4:3	720 x 576	2
SQVGA	16:9	160 x 90	1	576i	16:9	720 x 576	4
QVGA	4:3	320 x 240	1	576p	16:9	720 x 576	4
QVGA	16:9	320 x 180	1	720p	16:9	1280 x 720	1
CIF	4:3	352 x 288	2	1080i	16:9	1920 x 1080	1
				1080p	16:9	1920 x 1080	1

Table A6-5 Used index codes in the video encryption

aspect_ratio_idc	1 = 1:1
	2 = 12:11
	4 = 16:11
frame_rate_code	1 = 25 H.264/AVC: time_scale = 25, num_units_in_ticks = 1 H.265/HEVC: vui_time_scale = 25, vui_num_units_in_tick = 1
ct_type(H.264/AVC) source_scan_type(H.265/HEVC)	H.264/AVC: 0 = progressive, 1 = interlaced H.265/HEVC: 0 = interlaced, 1 = progressive
color_primaries	1 = ITU-R BT.709-5 5 = Rec. ITU-R BT.601-6 625
transfer_characteristics	1 = ITU-R BT.709-5 5 = Rec. ITU-R BT.601-6 625
matrix_coefficients	1 = ITU-R BT.709-5 / SMPTE RP177(1993) 5 = Rec. ITU-R BT.601-6 625

## Annex 7 Security issue

There is no amendment to ABNT NBR 15605-1.

## Annex 8 Data broadcasting

All the technical methods and parameters for BML data broadcasting, subtitle and superimposed characters coding shall be in accordance with ARIB STD-B24.

ARIB STD-B24 includes the usage of UCS (Universal multi-octet coded Character Set) and UTF-8 (UCS Transformation Format—8-bit) in it, yet it is intended for the usage in Japan only.

Therefore, for the usage in Sri Lanka, some modifications are needed.

#### A8-1 Modifications for BML data broadcasting

The details of the modifications from ARIB STD-B24 necessary for BML data broadcasting in Sri Lanka are shown in Table A8-1-1.

Table A8-1-1 Modifications from ARIB STD-B24 (BML data broadcasting)

Section No. and item		Page	Original	Modified
Volume 1 Chapter 7	7.1 JIS 8 bit character code	34	Whole section	No use in Sri Lanka.
	7.2 Universal multi-octet coded Character Set (UCS)	102	<ul style="list-style-type: none"> <li>- Table 7-19 Code Values for Added Symbols Set</li> <li>- Table 7-20 Revision to Table 7-19: Modification of code values of Additional Symbols Set to comply with JIS X0213:2004</li> <li>- 7.2.1.2 Supplemental characters (Gajji)</li> </ul>	No use in Sri Lanka. For Sri Lankan localized character set, see Table A8-1-2.
		105	7.2.2 Coding of control code The control codes available to this standard are limited to 0x007F (DEL); 0x000D and 0x000A (CR/LF); and 0x0009 (TAB).	See "7.1.2 Coding of control function" and Tables 7-14, 7-15, 7-16, and 7-17.
		105	7.2.3 Character encoding scheme	Adding descriptions about UTF-8. <ul style="list-style-type: none"> <li>- No use "Byte Order Mark".</li> <li>- C0 control codes (0x00 – 0x1F) are 0x0000 – 0x001F in UTF-8.</li> <li>- C1 control codes (0x80 – 0x9F) are 0xC280 – 0xC29F in UTF-8.</li> </ul>
	7.3 Shift-JIS Character Codes	105	Whole section	No use in Sri Lanka.

Table A8-1-2 Character set for Sri Lanka (See Table A8-1-1 Column 7.2 Universal multi-octet coded Character Set (UCS))

U+0021	U+002E	U+003B	U+0048	U+0055	U+0062	U+006F	U+007C	U+00B5	U+0B87	U+0B9C	U+0BB3	U+0BC7
!	.	;	H	U	b	o		μ	இ	ஜ	ள	ே
U+0022	U+002F	U+003C	U+0049	U+0056	U+0063	U+0070	U+007D	U+00B6	U+0B88	U+0B9E	U+0BB4	U+0BC8
"	/	<	I	V	c	p	}	¶	ஈ	ஞ	ழ	ை
U+0023	U+0030	U+003D	U+004A	U+0057	U+0064	U+0071	U+007E	U+00B7	U+0B89	U+0B9F	U+0BB5	U+0BCA
#	0	=	J	W	d	q	~	·	உ	ட	வ	ொ
U+0024	U+0031	U+003E	U+004B	U+0058	U+0065	U+0072	U+00A2	U+00BB	U+0B8A	U+0BA3	U+0BB6	U+0BCB
\$	1	>	K	X	e	r	¢	»	ஊ	ண	ஸ	ோ
U+0025	U+0032	U+003F	U+004C	U+0059	U+0066	U+0073	U+00A3	U+00BC	U+0B8E	U+0BA4	U+0BB7	U+0BCC
%	2	?	L	Y	f	s	£	¼	எ	த	ஷ	ௌ
U+0026	U+0033	U+0040	U+004D	U+005A	U+0067	U+0074	U+00A4	U+00BD	U+0B8F	U+0BA8	U+0BB8	U+0BCD
&	3	@	M	Z	g	t	¤	½	ஏ	ந	ஸ	ஐ
U+0027	U+0034	U+0041	U+004E	U+005B	U+0068	U+0075	U+00A5	U+00BE	U+0B90	U+0BA9	U+0BB9	U+0BD0
'	4	A	N	[	h	u	¥	¾	ஐ	ன	ஹ	ௌ
U+0028	U+0035	U+0042	U+004F	U+005C	U+0069	U+0076	U+00A7	U+00D7	U+0B92	U+0BAA	U+0BBE	U+0BD7
(	5	B	O	¥	i	v	§	×	ஒ	ப	ா	ௌ
U+0029	U+0036	U+0043	U+0050	U+005D	U+006A	U+0077	U+00A9	U+00F7	U+0B93	U+0BAE	U+0BBF	U+0BE6
)	6	C	P	]	j	w	©	÷	ஓ	ம	ி	o
U+002A	U+0037	U+0044	U+0051	U+005E	U+006B	U+0078	U+00AB	U+0B82	U+0B94	U+0BAF	U+0BC0	U+0BE7
*	7	D	Q	^	k	x	«	◌	ஒள	ய	ஃ	க
U+002B	U+0038	U+0045	U+0052	U+005F	U+006C	U+0079	U+00AE	U+0B83	U+0B95	U+0BB0	U+0BC1	U+0BE8
+	8	E	R	_	l	y	®	ஃ	க	ர	ு	உ
U+002C	U+0039	U+0046	U+0053	U+0060	U+006D	U+007A	U+00B0	U+0B85	U+0B99	U+0BB1	U+0BC2	U+0BE9
,	9	F	S	`	m	z	°	அ	ங	ற	ு	ந
U+002D	U+003A	U+0047	U+0054	U+0061	U+006E	U+007B	U+00B1	U+0B86	U+0B9A	U+0BB2	U+0BC6	U+0BEA
-	:	G	T	a	n	{	±	ஆ	ச	ல	ெ	ச

Table A8-1-2 Character set for Sri Lanka (Cont.)

U+00B8	U+00B9	U+00D8	U+00D9	U+00DA	U+00DB	U+00DC	U+00DD	U+00E8	U+00E9	U+00F8	U+00F9	U+00FA	U+00FB	U+00FC	U+00FD	U+00FE	U+00FF
⸢	⸣	⸤	⸥	⸦	⸧	⸨	⸩	⸪	⸫	⸬	⸭	⸮	ⸯ	⸰	⸱	⸲	⸳
U+00EC	U+00ED	U+00F0	U+00F1	U+00FA	U+00FB	U+00FC	U+00FD	U+00A1	U+00AE	U+0103	U+0158	U+0166					
⸴	⸵	⸶	⸷	⸸	⸹	⸺	⸻	⸼	⸽	°C	¼	VII					
U+00ED	U+00FA	U+00DF	U+009F	U+00AC	U+00BA	U+00DD1	U+00DF2	U+00A2	U+00AF	U+0109	U+0159	U+0167					
௪	௬	௮	௯	௰	௱	௲	௳	௴	௵	°F	⅙	VIII					
U+00EE	U+0082	U+00D90	U+00DA0	U+00DAD	U+00DBB	U+00DD2	U+00DF3	U+00A3	U+00B0	U+0116	U+015A	U+0168					
அ	ஂ	ஃ	஄	அ	ஆ	இ	ஈ	ஐ	஑	No.	⅕	IX					
U+00EF	U+0083	U+00D91	U+00DA1	U+00DAE	U+00DBD	U+00DD3	U+00DF4	U+00A4	U+00B1	U+0121	U+015B	U+0169					
ஊ	ஃ	஄	அ	ஆ	இ	ஈ	ஊ	£	₣	₤	⅛	X					
U+00F0	U+0085	U+00D92	U+00DA2	U+00DAF	U+00DC0	U+00DD4	U+0018	U+00A5	U+00B2	U+0122	U+015C	U+016A					
ய	ஐ	ஃ	஄	அ	ஆ	இ	ஈ	₹	₠	₡	⅜	XI					
U+00F1	U+0086	U+00D93	U+00DA3	U+00DB0	U+00DC1	U+00DD6	U+0019	U+00A6	U+00B3	U+0150	U+015D	U+016B					
஋	஌	஍	எ	ஏ	உ	ஊ	஋	₳	₴	⅙	⅝	XII					
U+00F2	U+0087	U+00D94	U+00DA4	U+00DB1	U+00DC2	U+00DD8	U+001C	U+00A7	U+00B4	U+0151	U+015E	U+0170					
஑	ஒ	ஓ	ஔ	க	஖	஗	஘	₵	₶	⅑	⅞	i					
U+00F3	U+0088	U+00D95	U+00DA5	U+00DB3	U+00DC3	U+00DD9	U+001D	U+00A8	U+00B5	U+0152	U+0160	U+0171					
ஒ	ஓ	ஔ	க	஖	஗	஘	ங	₷	₸	⅒	I	ii					
U+00F4	U+0089	U+00D96	U+00DA6	U+00DB4	U+00DC4	U+00DDA	U+003C	U+00A9	U+00B6	U+0153	U+0161	U+0172					
ஐ	஑	ஒ	ஓ	ஔ	க	஖	஗	₹	₹	⅓	II	iii					
U+00F5	U+008A	U+00D9A	U+00DA7	U+00DB5	U+00DC5	U+00ddb	U+0047	U+00AA	U+00B7	U+0154	U+0162	U+0173					
ஔ	க	஖	஗	஘	ங	ஊ	஋	₹	₹	⅔	III	iv					
U+00F6	U+008B	U+00D9B	U+00DA8	U+00DB6	U+00DC6	U+00ddc	U+0048	U+00AB	U+00B8	U+0155	U+0163	U+0174					
ஐ	஑	ஒ	ஓ	ஔ	க	஖	஗	₹	₹	⅓	IV	v					
U+00F7	U+008C	U+00D9C	U+00DA9	U+00DB7	U+00DCA	U+00ddd	U+0049	U+00AC	U+00B9	U+0156	U+0164	U+0175					
ஔ	க	஖	஗	஘	ங	ஊ	஋	₹	₹	⅔	V	vi					

Table A8-1-2 Character set for Sri Lanka (Cont.)

U+2176	U+2197	U+25B2	U+2610	U+2661	U+266F
vii	↗	▲	□	♥	#
U+2177	U+2198	U+25B3	U+2611	U+2662	U+26C4
viii	↘	△	☑	♦	☺
U+2178	U+2199	U+25BC	U+2612	U+2663	U+26C5
ix	↙	▼	☒	♣	☁
U+2179	U+21D0	U+25BD	U+2613	U+2664	U+26C6
x	⇐	▽	✕	♠	▨
U+217A	U+21D1	U+2600	U+2614	U+2665	U+26C7
xi	⇑	☀	☂	♥	🐛
U+217B	U+21D2	U+2601	U+261C	U+2666	U+26C8
xii	⇒	☁	☞	♦	☁
U+2190	U+21D3	U+2602	U+261D	U+2667	
←	⇓	☂	☞	♣	
U+2191	U+21D4	U+2603	U+261E	U+2669	
↑	⇔	☺	☞	♪	
U+2192	U+21D5	U+2604	U+261F	U+266A	
→	⇕	⊖	☞	♪	
U+2193	U+21D6	U+2605	U+2639	U+266B	
↓	↗	★	☹	♪	
U+2194	U+21D7	U+2606	U+263A	U+266C	
↔	↗	☆	☺	♪	
U+2195	U+21D8	U+260E	U+263B	U+266D	
↕	↘	☎	☺	♭	
U+2196	U+21D9	U+260F	U+2660	U+266E	
↖	↙	☎	♠	♯	



## A8-2 Modifications for subtitle and superimposed characters

The details of the modifications from ARIB STD-B24 necessary for subtitle and superimposed characters are shown in Table A8-2.

Table A8-2 Modifications from ARIB STD-B24 (Subtitle and superimposed characters)

Section No. and item	Page	Original	Modified
Volume 1 Part 3 4 Presentation function of caption and superimposed Table 4-1: Presentation function of caption	142	Kanji, hiragana, katakana, symbol, alphanumeric, Greece characters, Russian characters, ruled line, DRCS	Characters defined in UTF-8-character code
Volume 1 Part 3 5.2 Character set	144	Standard character set should be kanji, hiragana, katakana, symbol, alphanumeric, Greece characters, Russian characters, box drawing, and DRCS.	Character set defined in UCS should be used.
Volume 1 Part 3 5.5 Character coding	144	For character coding, 8 bitcode shall be used.	For character coding, UTF-8-character code shall be used.
Volume 1 Part 3 5.6 Control code	144	Control code used for caption is in compliance with Volume 1, Part 2 of this standard.	Control code used for caption is in compliance with Annex A8-1 in this document.
Volume 1 Part 3 9.3.1 Table 9-8: Character coding	155	Reserved for UCS	UCS

## Annex 9 Interactive channel

There is no amendment to ABNT NBR 15607-1.

## Annex 10 EWBS

There is no amendment to ISDB-T Harmonization Document PART 3: Emergency Warning Broadcast System (EWBS).

Country name (English short name)	Alpha-3 code	Country code (24bits)
Sri Lanka	LKA	0100 1100 0100 1011 0100 0001

## Appendix

### Operational Guideline

#### Appendix1 Transmission

Operational guideline of transmission should be referred to ABNT NBR 15608-1 with the modifications as follows:

- Delete or ignore all the descriptions of VHF
- Replace DQPSK with QPSK

For more details, please refer to the table AP1-1.

Concerning the channel planning described in the above document, coverage parameters can be defined by Sri Lanka based on other materials: The recommendation ITU-R BT.1368 is one of the useful materials for the planning criteria. The recommendation ITU-R BT.2036 is also useful for a reference receiving system.

Available parameters according to hierarchical transmission mode should be referred to the table AP1-2.

Table AP1-1 Modifications from ABNT NBR 15608-1

Section No. and item	page	Original	modified
5.2 Frequency assignment	4	tables 2, 3, 4, 5 and 6	Table A1-3 8MHz/ch UHF channels
		table2 -VHF Channels	N/A
		table4-High VHF channels	N/A
	5	table 5 14ch-69ch	21-48ch <sup>5</sup>
6.1 Outline	7	6.1 Outline DQPSK or 16QAM is employed	QPSK or 16QAM is employed
6.2.1 Multiplexing ...	7	6.2.1, DQPSK is preferable ...	Deleted
	8	table8	Ignore DQ and DQPSK
6.3 channel-coding...	12	DQPSK	QPSK
	13-16	Figure7, 8, 9 and 10 DQPSK	QPSK
8.3.1 Broadcasting...	19	0.3ppm	0.2ppm
9.4.3 Data arrangement...	38	d) EXEMPLO DQPSK	QPSK
10 Transmission...	42	Table 30 Delay time	Delay time values are to be replaced to the ones multiplied by 6/8.

コメントの追加 [A25]: [To EoJ] What is the reason to shift from DQPSK to QPSK?(This is for knowledge base)

<sup>5</sup> Channel will be 21-62ch until Analog Switch Off.

Section No. and item	page	Original	modified
11.5 Example of link budget	57	Table42 DQPSK 1/2: 6.2 2/3: 7.7 3/4: 8.7 5/6: 9.6 7/8: 10.4	QPSK 1/2: 4.9 2/3: 6.6 3/4: 7.5 5/6: 8.5 7/8: 9.1
	58	Table43 DQPSK Data rate	QPSK All data rates are to be replaced to the one multiplied by 8/6.

Table AP1-2 Available Parameters According to Hierarchical Transmission Mode

Patterns	Layer	Layer Name	Number of segments	Transmission (See Table AP1-3)
(1)	A	Low Protection Layer	13	a
(2)	A	Low Protection Layer	13	b
(3)	A	High Protection Layer	1 (Partial reception)	c
	B	Low Protection Layer	12	a
(4)	A	High Protection Layer	8 to 2	b
	B	Low Protection Layer	5 to 11	a
(5)	A	High Protection Layer	1 (Partial reception)	c
	B	Low Protection Layer	12	b
(6)	A	High Protection Layer	1 (Partial reception)	c
	B	Middle Protection Layer	7 to 1	b
	C	Low Protection Layer	5 to 11	a

(Note) With regard to combinations of transmission parameters, Type c of transmission mode shall take transmission parameters with an equal or lower CN ratio than Type b of transmission mode and Type b of transmission mode shall take transmission parameters with a lower CN ratio than Type a of transmission mode. The required CN ratios are shown in Table 42 of ABNT NBR 15608-1, modified according to the table AP1-1. For example, if layer A in (5) uses 16QAM and 1/2, layer B may use only 16QAM and 1/2, or 16QAM and 2/3 as shown in Type b in Table AP1-3 as modulation and error correction parameters.

Layers: A, B and C represent layers described in the TMCC signal.

Layer name: The name of the layer used in Hierarchical transmission described in ABNT NBR 15608-3.

The services provided by the layers to which transmission mode -Type a, transmission mode -Type b and transmission mode -Type c shown in Table AP1-2 are respectively applied may be called the “fixed service”, “mobile service” and “portable service”, respectively.

No digital audio service will be provided.

Table AP1-3 Transmission Parameters

Type	Mode (Note 1)			Guard Ratio (Note 1)				Time Interleave (Note 2)				Modulation and Error Correction														
												64QAM					16QAM					QPSK				
	1	2	3	1/4	1/8	1/16	1/32	I=0	I=1	I=2	I=4	7/8	5/6	3/4	2/3	1/2	7/8	5/6	3/4	2/3	1/2	7/8	5/6	3/4	2/3	1/2
a	X	X	O	O	O	O	X	X	O	O	O	O	O	O	O	O	X	X	X	O	O	X	X	X	X	X
b	X	X	O	O	O	O	X	X	O	O	O	X	X	X	X	X	X	X	X	O	O	X	X	X	O	O
c	X	X	O	O	O	O	X	X	O	O	O	X	X	X	X	X	X	X	X	X	O	X	X	X	O	O

O: Transmission parameters that can be used

X: Transmission parameters that cannot be used

Note 1: The mode and guard ratio are specified and applied to all layers and they cannot be individually specified for each layer.

Note 2: The use of “no time interleaving (I=0)” shall be restricted even in fixed reception, considering the tolerance to pulse noise.

## Appendix2 Video Coding

The operational guideline of video coding should be referred to ABNT NBR 15608-2 and ARIB STD-B32 Fascicle 1. However, video coding parameters for full-seg services are applied to any layers except for the partial reception layer.

## Appendix3 Audio Coding

The operational guideline of audio coding should be referred to ABNT NBR 15608-2. However, audio coding parameters for full-seg services are applied to any layers except for the partial reception layer.

## Appendix4 Multiplexing

The operational guideline of multiplexing should be referred to ABNT NBR 15608-3.

## Appendix5 Service Information

Operational guideline of service information should be referred to ABNT NBR 15608-3 with the modifications as shown in Table AP5-1.

## AP5-1 Modifications from ABNT NBR 15608-3

Section No. and item	Page	Original	Modified
2 Normative references	1	ABNT NBR 15606-2, Digital terrestrial television	Deleted
5.1 Coding table	3	The PSI/SI table coding, including tis descriptors adheres to ISO/IEC 8859-15, as shown in Table 1.	The PSI/SI table coding, including tis descriptors adheres to UTF-8, as shown in Appendix 8. Table1, 2 and 3 should be ignored.
	4	For caption strings and data packages coding, the coding table and the control characters shown in Table 2 should be used.	For caption strings and data packages coding, the coding table and the control characters shown in Appendix 8 should be used.
	4	Furthermore, in caption string coding, it is recommended that the special G3 characters shown on Table 3 be used as specified in ABNT NBR 15606-1. Since the G3 special characters are attributed hexadecimal values coincident with the character map defined by ISO/IEC 8859-15, for correct decoding, it is recommended that each G3 special characters value be preceded by the control code <SG3> (0x1D).	Deleted
Table 28 — Attribution of component_tag values	22	- 0x40 to 0x6F: Mono media and objects carousel - 0x70 to 0x7F: Events messages and data carousel (DII and DDB)	- 0x40 to 0x7F: Mono media - 0x40 to 0x7F: Events messages and data carousel (DII and DDB)
Table 30 — ES for transmission in different layers from that intended for partial reception	25	- MPEG-4 AAC Audio (48kHz) - Mono-media Component tag value: 0x40 to 0x6F - Objects carousel - Event messages and data carousel (DII and DDB) Component tag value: 0x70 to 0x7F	- MPEG-4 AAC Audio - Mono-media Component tag value: 0x40 to 0x7F - Deleted - Event messages and data carousel (DII and DDB) Component tag value: 0x40 to 0x7F
19.2 Local_offset_time_descriptor configuration	31-32	-BRA -0x425241 -UTC-3 -Brazilian	-LKA -0x4C4B41 -UTC+5:30 - Sri Lankan

Section No. and item	Page	Original	Modified
Table 35 — Details of TOT sections	32	- UTC-3 - official Brazilian time - ="BRA"=0x425241 - See Table 36	- UTC+5:30 - official Sri Lankan time - ="LKA"=0x4C4B41 - =0
Table 36 — Sections of the local_offset_Time_descriptor	33	Table 36	Deleted
21.2 Additional specification concerning data components  Table 39	37	- data_component_id 0x0007 Ginga_XML base multimedia coding - data_component_id 0x00A4 Ginga - Application executing engine - data_component_id 0x00A3 Ginga - Application - data_component_id 0x00A0 Ginga - Application executing engine information table	• data_component_id 0x000C A profile BML (for Home TV) • data_component_id 0x000D C profile BML (for One-seg)
Table 44 - Data structure of the data content descriptor	41	"por"=0x706F72 (defines the language used in "text char")	"eng"=0x656E67, "sin"=0x73696E or "tam"=0x74616D can be used
23.5 Operating rules for transmission Table 49	46	- 0011: 480p - 0100: 480i - 0111: 288p - 1001 up to 1111: video_encode_format (extended)	- 0011: 480p or 576p - 0100: 480i or 576i - 0111: Reserved - 1001 up to 1011: Reserved  - 1100 up to 1111: video_encode_format (extended)
29.5.1 SDTT Data structure	60	The identification should be made using the prefixes defined by ANATEL.	Deleted
29.9.1.6 Band width	71	-0.25/0.38 quantity -0.25 used segments - 10x1024x1024x8/(351.07x1000) =238,94 s -The bandwidth of the network of 1 segment is 1 404,29 Kbit/s -1404,29x0,25=351,07 [Kbits/s] -86400/238,94/2=180,8 times	-0.18/0.28 quantity -0.18 used segments - 10x1024x1024x8/(337.03x1000) =248.90 s - The bandwidth of the network of 1 segment is 1 872.39 Kbit/s -1872.39x0.18=337.03 [Kbits/s]. Note that the bandwidth limitation is 0.35207 Mbit/s as described above in order to keep consistency with 6 MHz countries about the bandwidth limitation. -86400/248.9/2=173.5 times

コメントの追加 [A26]: [To EOJ] What is the consistency required here ?



Section No. and item	Page	Original	Modified
29.9.5 Daylight saving time operations (SDTT method)	78	Brazilian time (UTC-3)	Sri Lankan time (UTC+5:30)
31.2 Affiliation_id	83	The affiliation_id field allows identifying which network (Globo, SBT, Record, Band, RedeTV, etc.) a broadcaster belongs to.	The affiliation_id field allows identifying which network a broadcaster belongs to.
31.2 Affiliation_id	83	For standardization of affiliation_id value, the characters codes shown in Table 76 should be used in order to generate the affiliation_id value for each network. The main TV networks and your affiliation_id are shown in Table 80.	Deleted
31.2 Affiliation_id	83	Table 80	Deleted
31.2 Affiliation_id	83	The networks that are not listed in Table 80 should request the affiliation_id value to the SBTVO Forum.	Deleted

## Appendix6 Receiver

The operational guideline on receiver should be based on "ISDB-T HARMONIZATION DOCUMENT PART 1: HARDWARE" (at least mandatory and recommended items)

(Note). Guard interval mask characteristics should be referred to the recommendation ITU-R BT.2036. Any other items should be in accordance with the Chapter 6 of the main body.

## Appendix7 Security Issues

The operational guideline on Security Issues should be in accordance with the Chapter 7 of the main body.

## Appendix8 Data broadcasting

Operational guideline of BML data broadcasting, subtitle and superimposed characters coding should be in accordance with ARIB TR-B14 Vol.3 "DIGITAL TERRESTRIAL TELEVISION BROADCASTING Specifications for Data Broadcasting Operations".

There are some modifications for the Sri Lankan guideline as shown in the Table AP8-1. Data broadcasting guideline is referred also in Service Information guideline in point of

data\_component\_descriptor. (See Appendix 5 for the details)

Table AP8-1 Modifications from ARIB TR-B14

Section No. and item	Page	Original	Modified
<b>Fascicle 1-(2/2)</b> <b>Volume 3 Section 1</b> 3 Definitions	3-2	- 8-bit character encoding - DRCS - EUC-JP	Deleted Deleted UTF-8
	3-3	- Kana-Kanji conversion	Deleted
<b>Section 2</b> 1.2.1 Table 1-2 Presentation restrictions on the screen plane	3-16	- MPEG-2 - MPEG-1 - 8-bit character codes including (*) EUC-JP - 8-bit character codes	H.264   <b>MPEG-4 AVC</b> <b>H.265   HEVC</b> Deleted UTF-8  UTF-8.
1.2.3 Table 1-4 Overview of restriction conditions for mono-media encoding presented in each screen plane	3-21	- MPEG-2 - Stream format identification = 0x02 - MPEG-1  - 8-bit character codes (*) Including EUC-JP	- H.264 MPEG-4 AVC - Stream format identification = 0x1B <b>- H.265   HEVC</b> <b>- Stream format identification = 0x24</b> - Deleted - UTF-8
1.2.4 Table 1-5 Audio playing function	3-25	- AAC-LC - Audio PES; Stream format identification = 0x0F - 48kHz,32kHz	- MPEG4-AAC standard - Audio PES; Stream format identification = 0x11 - 48kHz,44.1kHz
1.2.5 Table 1-6 Fonts	3-25	Character type	See Annex8 Table A8-1-2 for Character set for Sri Lanka
1.4.2 Table 1-9 Type and capacity of BproNV	3-27	Whole of Table	The number of affiliations has been fixed as 24.
1.6 Character entry function	3-28	Functions not defined in this document such as the kana kanji conversion function are implementation dependent.	Deleted
1.6.1 Table 1-12 "character type" attribute	3-30	- hankaku - zenkaku - katakana - hiragana	- Deleted - Deleted - Deleted - Deleted
1.6.1 Function specifications	3-30	EUC-JP encoding	UTF-8 encoding
1.6.2 Table 1-14 character type	3-32	- 2-byte characters	- Deleted
1.6.3 Kana Kanji conversion function	3-32	Whole of section	Deleted
3.1.1 MPEG-1 Video	3-80	Whole of section	Deleted
3.1.2 MPEG-2 Video	3-80	Whole of section	Deleted

Section No. and item	Page	Original	Modified
3.1.3 MPEG-4 Visual	3-85	Encoding methods using MPEG-4 Visual are not operated.	Deleted
3.1.4 MPEG-4 AVC Video	3-85	-	Add new subsection 3.1.4 MPEG-4 AVC Video Encoding methods using H.264   MPEG-4 AVC are operated. Details in ABNT NBR 15608-2.
3.1.5 MPEG-H HEVC Video	3-85	-	Add new subsection 3.1.5 MPEG-H HEVC Video Encoding methods using H.265   HEVC are operated. .Refer to Annex 2 Video coding.
3.3.1 MPEG-2 AAC	3-88	Whole of section	Deleted
3.3.2 AIFF-C	3-89	Whole of section	Deleted
3.3.3 MPEG-4 Audio	3-89	Audio encoding method using MPEG-4 is not operated.	Adding MPEG4-AAC operation. Details in ABNT NBR 15608-2.
3.3.6.2 Simultaneous playable encoding method	3-90	- AAC-LC	- MPEG-4 AAC
3.4 Character encoding	3-91	Whole of section	No use in Sri Lanka
<del>Volume 3</del> <del>Section 2</del> 4.2.8.7 Data Contents Descriptor Table 4-10 Setup parameters of the Data Content Descriptor for caption	3-107	Fixed to jpn(Japanese).	"eng"=0x656E67, "sin"=0x646976, or "tam"=0x74616D can be used
<del>Volume 3</del> <del>Section 2</del> 4.4.1 Character codes	3-109	The character encoding method used for caption/superimpose is 8-bit character codes.	The character encoding method used for caption/superimpose is UTF-8 character code.
<del>Volume 3</del> <del>Section 2</del> 4.4.3 Character size control	3-109	Restrictions related to character display are stipulated in Table 4-14	Deleted

Section No. and item	Page	Original	Modified
<del>Volume 3</del> <del>Section 2</del> 4.4.3 Character size control Table 4-14 Area of coding group that can be used for specification of display format and specification of character size controls	3-110	Whole table	Deleted
<del>Volume 3</del> <del>Section 2</del> 4.4.3 Character size control	3-111	Whole of paragraph (1)	Deleted
<del>Volume 3</del> <del>Section 2</del> 4.4.3 Character size control	3-111	(2)	Deleted
<del>Volume 3</del> <del>Section 2</del> 4.5.1 Control codes	3-123	Control codes used in caption are in compliance with ARIB STD-B24 Vol. 1 Part 2, 7.1.2.	Control codes used in caption are in compliance with Annex A8-1 in this document
<del>Volume 3</del> <del>Section 2</del> 4.5.2 Operation of flashing	3-132	Flashing of the 8-bit character codes character string does the character flashing	Flashing string ("FLC") of the UTF-8 enables the character flashing
<del>Volume 3</del> <del>Section 2</del> 4.6 Operation of the DRCS	3-135 3-136	Whole section	Deleted
5.2 Operation of NVRAM	3-142	Table 5-1 NVRAM used in Digital Terrestrial Television Broadcasting	The maximum number of Affiliations and Networks in one broadcasting area should be set as 24. See Table AP8-2 as the exact list of NVRAM when using the number of 24.
5.5 Operation of character codes	3-159	Refer to ARIB STD-B24 Vol. 2 Appendix 2 "4.1. Character codes".	UTF-8
5.5.1 Transmission of DRCS pattern data	3-159	Whole of section	Deleted
5.6 Operation area of media type and mono-media	3-160	charset='euc-jp'	charset='UTF-8'
5.7.3 Table 5-9 Operational guidelines relating to the attributes of elements	3-164	- Fixed to "ja" - Fixed to "EUC-JP" - ...and type attribute is either "audio/X-arib-aiff" or "audio/X-arib-mpeg2-aac".	- "si" or "ta" can be used - Fixed to "UTF-8" - ...and type attribute is "audio/X-arib-mpeg4-aac".

Section No. and item	Page	Original	Modified
5.11 Presentation control of BML document	3-175	- "video/X-arib-mpeg1" or "video/X-arib-mpeg2" - "audio/X-arib-mpeg2-aac"	- "video/X-arib-H264-high" - "video/X-arib-hevc" - "audio/X-arib-mpeg4-aac"
5.14.6.6 Interaction channel function-TCP/IP	3-201 3-202	EUC-JP	UTF-8
5.14.6.12 External character function	3-209	Whole of section	Deleted
5.14.8 Operation guideline for transmission of communication contents	3-215 ~3-220	- ja - audio/X-arib-mpeg2-aac - audio/X-arib-aiff - application/X-arib-dracs - EUC-JP	- "si" or "ta" can be used - audio/X-arib-mpeg4-aac - Deleted - Deleted - UTF-8
Appendix 5-1 DTD	3-280	EUC-JP	UTF-8
<b>Section 4</b> 1 Introduction	3-301	MPEG-2 AAC	MPEG-4 AAC
3.2.4 Table 3-6 Desired audio mono-media to be presented	3-310	- MPEG-2 AAC - stream format identifier = 0x0F - Sampling frequency 24kHz, 48kHz	- MPEG-4 AAC - stream format identifier = 0x11 - Sampling frequency 32kHz, 44.1kHz, 48kHz
3.2.5 Table 3-7 Fonts	3-310	- Kanji (level 1, 2) - Hirakana - Katakana	- Deleted - Deleted - Deleted
3.4.2 Table 3-10 Type and capacity of BpronV	3-313	- 288KB (12 affiliations x 24KB)	The number of affiliations has been fixed as 24.
3.6.3 Character types	3-314	- refer to ARIB STD-B24, Vol. 1, Part 2, 7.3 - Kanji	- refer to ARIB STD-B24, Vol. 1, Part 2, 7.2 (Refer Annex8 A8-1) - Deleted
3.6.4 Kana Kanji conversion function	3-314	Whole of section	Deleted
4.1.2.4 Configuration of the ES transmitted by 1 service	3-330	MPEG-2 AAC	MPEG-4 AAC

Section No. and item	Page	Original	Modified
4.1.5.1 Receiver operation at the beginning of data broadcasting	3-333	Moreover, Playback is executed as an audio stream of MPEG-2 AAC (sampling frequency = 24KHz) if the component of the component_tag=0x83 or 0x84 is included. Similarly, Playback is executed out as an audio stream of MPEG-2 AAC (sampling frequency = 48KHz) if the component of the component_tag=0x85 or 0x86 is included.	Moreover, Playback is executed as an audio stream of MPEG-4 AAC (sampling frequency = 48KHz) if the component of the component_tag=0x83 or 0x84 is included. Similarly, Playback is executed out as an audio stream of MPEG-4 AAC (sampling frequency = 44.1KHz) if the component of the component_tag=0x85 or 0x86 is included. Similarly, Playback is executed out as an audio stream of MPEG-4 AAC (sampling frequency = 32KHz) if the component of the component_tag=0x90 or 0x91 is included.
5.1.1 H.264 MPEG-4 AVC	3-355	Whole section	Details in ABNT NBR 15608-2.
5.3.1 MPEG-2 AAC	3-369	Whole section	MPEG-4 AAC Follows ABNT NBR 15608-2
5.3.5 Audiosynthesis of receiver units	3-371	MPEG-2 AAC	-MPEG-4 AAC
5.4 Character codes	3-372	- 5.4.1 8-bit character codes for C-profile - 5.4.2 Shift JIS	- Deleted - 5.4.1 UTF-8
<del>Volume 3</del> <del>Section 4</del> 6.2.4 Operation of closed caption management data Table 6-3: Closed caption management data parameters	3-376	Used language code ("jpn" fixed)	Used language code ("eng"=0x656E67, "sin"=0x73696E or "tam"=0x74616D can be used)
<del>Volume 3</del> <del>Section 4</del> 6.4.1 Character entity	3-379	Whole sentences and Table 6-2	Deleted
<del>Volume 3</del> <del>Section 4</del> 6.4.1 Character entity	3-379		The character encoding method used for closed caption is UTF-8-character code. Control code range is from 0x0000 to 0x001F (inclusive) and from 0xC280 to 0xC29F (inclusive).

Section No. and item	Page	Original	Modified
<del>Volume 3</del> <del>Section 4</del> 6.5 Control code used in closed caption	3-381	The control code used in the closed caption is in compliance with ARIB STD-B24, Vol. 1, Part 2, 7.1.2.	The control code used in the closed caption is in compliance with Annex A8-1 in this document.
7.2 Operation of NVRAM in Digital Terrestrial Television C-profile broadcasting	3-388	Table 7-1 NVRAM used by Digital Terrestrial Television C-profile broadcasting	The maximum number of Affiliations and Networks in one broadcasting area should be set as 24. See Table AP8-3 as the exact list of NVRAM when using the number of 24.
7.5 Operation of character coding schemes	3-393	See ARIB STD-B24, Vol. 2, Appendix 4, "4.1. Character Coding Schemes".	Using UTF-8
7.7.1 Declaration of XML and DOCTYPE	3-393	Shift_JIS	UTF-8
7.7.3 Table 7-5 Operations for attributes of elements	3-397	- Shift_JIS - audio/X-arib-mpeg2-aac	- UTF-8 - audio/X-arib-mpeg4-aac
7.9 extended property specification	3-414	- Refer to the ARIB STD-B24, Vol. 1, Part 2, Chapter 7, 7.3 "Shift-JIS character codes" - Kanji set	- Refer to ARIB STD-B24, Vol. 1, Part 2, 7.2 (Refer Annex8 A8-1) - Deleted
7.10.7 Extended function provided by digital terrestrial broadcasting (2)	3-447	- tokyo_dgree - tokyo_dms	- Deleted - Deleted
7.12.6.1 Table 7-27 Attribute operation related to stream presentation	3-465	audio/X-arib-mpeg2-aac	audio/X-arib-mpeg4-aac



Table AP8-2 NVRAM usage for Sri Lankan A-profile Data broadcasting  
(See Table AP8-1 Column 5.2 Operation of NVRAM)

Type	Meaning	NVRAM amount
A-profile memory area for all the broadcasters	Common area available for use by all terrestrial digital broadcasters.	2KB (Fixed length block of 64bytes * 32)
A-profile memory area for the affiliation	Common area available for use by broadcasters that belong to the same system.	•4KB for one Affiliation (Fixed length block of 64bytes * 64) •Number of systems: more than 24
A-profile memory area for the specified broadcaster	Area occupied by each broadcaster	•4KB for one broadcaster (Fixed length block of 64bytes * 64) •Number of broadcasters that should be secured by receiver units simultaneously: more than 24
A-profile memory area of communication purpose for the specified broadcaster	Area to share information with broadcasting contents and communication contents	•2KB for 1 broadcaster. (Fixed length block of 64bytes *32) •Number of broadcasters that should be secured by receiver simultaneously: more than 24
Memory area for bookmark service	Area available to use for the bookmark service	•Total of more than 50 blocks of variable length block with maximum of 320 bytes.
Memory area for root CA certificates	Area to store root CA certificate of general purpose transmitted by carousels in memory.	•3KB for one certificate •Quantity: 8
Memory area for registration transmission	Area to store messages that carry out registration transmission	•More than 3 blocks of variable length block with maximum of 1.5 KB.

Table AP8-3 NVRAM usage for Sri Lankan C-profile Data broadcasting (See Table AP8-1 Column 7.2 Operation of NVRAM in Digital Terrestrial Television C-profile broadcasting)

Class	Purpose	Capacity of NVRAM
Digital Terrestrial Television C-profile area for the affiliation	Area used commonly by operators belonging to the same affiliation area	<ul style="list-style-type: none"> <li>• 24KB per affiliation (64-byte fixed block * 384)</li> <li>• 8KB out of 24KB is for inner affiliation common area, and the remaining 16KB is divided by 8 and used as the individual operator area.</li> <li>• Affiliation number: 24 affiliations</li> </ul>
TVlink area	Area used for TVlink service	<ul style="list-style-type: none"> <li>• Maximum of 256 bytes variable block</li> <li>• Writable block number: 50 or more</li> </ul>

## Appendix9 Interactive channel

The operational guideline on the Interactive channel should be in accordance with the Chapter 9 of the main body.

## Appendix10 EWBS

The operational guideline on EWBS should be in accordance with the Chapter 10 of the main body.

If there is a TV broadcaster not operating the EWBS, the TV receivers tuned to that channel cannot receive the EWBS signal. Therefore, it is required for all broadcasters to operate the EWBS.

Area codes in Sri Lanka are as follows.

### AP10-1 Area code

For the EWBS application purpose, receivers should pre-store the area code allocation table. In accordance with ABNT15603-2, area code uses a 12-bit string, with the left bit first, as shown in Fig AP10-1

Fig AP10-1 12-bit string for area code

b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
-----	-----	----	----	----	----	----	----	----	----	----	----

(Note) Area code should be proposed to be included in the “ISDB-T HARMONIZATION DOCUMENT PART 3: Emergency Warning Broadcast System”, in its Annex, for the next ISDB-T International Forum.

### AP10-2 Actual allocation table

The actual allocation table of area code in Sri Lanka is shown in Table AP10-1.

Table AP10-1 Area code allocation Table

Common	District	District code	Division	Division code	Area Code (Binary)	Area Code (Hexadecimal)	Area Code (Decimal)
National	Jaffna	01	-	00	000001000000	040	0064
		02	-	00	000010000000	080	0128
			Thenmaradchi (Chavakachcheri)	01	000010000001	081	0129
			Valikamam South -West (Sandili)	02	000010000010	082	0130
			Jaffna	03	000010000011	083	0131
			Valikamam South (Uduvil)	04	000010000100	084	0132
			Vadamaradchi South-west (Karav)	05	000010000101	085	0133
			Valikamam East (Kopay)	06	000010000110	086	0134
			Vadamaradchi North (Point Pedr	07	000010000111	087	0135
			Nallur	08	000010001000	088	0136
			Valikamam West (Chankanai)	09	000010001001	089	0137
			Valikamam North	10	000010001010	08A	0138

コメントの追加 [A27]: [To EoJ] In the case of Sri Lanka, we hope this to be operated centrally for all channels, preferably from the DBNOC. What is your recommendations/comments on that? Should it be mentioned in the standard document that who will decide EWBS on each channel and all channel will have same EWBS?

Common	District	District code	Division	Division code	Area Code (Binary)	Area Code (Hexadecimal)	Area Code (Decimal)
			(Tellipallai)				
			Vadamaradchi East (Maruthnkern)	11	000010001011	08B	0139
			Island North (Kayts)	12	000010001100	08C	0140
			Island South (Velanai)	13	000010001101	08D	0141
			Kareinagar	14	000010001110	08E	0142
	Kilinochchi	03	Delft	15	000010001111	08F	0143
			-	00	000011000000	0C0	0192
			Kandavalai	01	000011000001	0C1	0193
			Karachchi	02	000011000010	0C2	0194
			Poonakary	03	000011000011	0C3	0195
	Mannar	04	Pachchilaipalli	04	000011000100	0C4	0196
			-	00	000100000000	100	0256
			Mannar Town	01	000100000001	101	0257
			Madhu	02	000100000010	102	0258
			Musalai	03	000100000011	103	0259
	Mullaitivu	05	Nanadhan	04	000100000100	104	0260
			Manthai West	05	000100000101	105	0261
			-	00	000101000000	140	0320
			Maritimepattu	01	000101000001	141	0321
			Puthukudiyiruppu	02	000101000010	142	0322
	Vavuniya	06	Oddusuddan	03	000101000011	143	0323
			Thunukkai	04	000101000100	144	0324
			Manthai East	05	000101000101	145	0325
			Weli Oya	06	000101000110	146	0326
			-	00	000110000000	180	0384
	Anuradhapura	07	Vavuniya (Tamil)	01	000110000001	181	0385
			Vengalcheddikulam	02	000110000010	182	0386
			Vavuniya North	03	000110000011	183	0387
			Vavuniya South	04	000110000100	184	0388
			-	00	000111000000	1C0	0448
			Kahatagasdigiliya	01	000111000001	1C1	0449
			Welioya	02	000111000010	1C2	0450
			Nuwaragam Palatha East	03	000111000011	1C3	0451
			Horowpothana	04	000111000100	1C4	0452
			Nochchiyagama	05	000111000101	1C5	0453
			Nachchadoowa	06	000111000110	1C6	0454
			Rajanganaya	07	000111000111	1C7	0455
			Nuwaragam Palatha Central	08	000111001000	1C8	0456
			Ipalogama	09	000111001001	1C9	0457
			Thalawa	10	000111001010	1CA	0458
			Galenbindunuwewa	11	000111001011	1CB	0459
			Thambuttegama	12	000111001100	1CC	0460
			Kekirawa	13	000111001101	1CD	0461
			Rambewa	14	000111001110	1CE	0462
			Palagala	15	000111001111	1CF	0463
	Polonnaruwa	08	Padaviya	16	000111010000	1D0	0464
			-	00	001000000000	200	0512
			Medirigiriya	01	001000000001	201	0513
			Lankapura	02	001000000010	202	0514
			Higurakgoda	03	001000000011	203	0515
	Trincomalee	09	Thamankaduwa	04	001000000100	204	0516
			Dibulagala	05	001000000101	205	0517
			Elahera	06	001000000110	206	0518
			Welikanda	07	001000000111	207	0519
			-	00	001001000000	240	0576

Common	District	District code	Division	Division code	Area Code (Binary)	Area Code (Hexadecimal)	Area Code (Decimal)
			Trincomalee Town and Gravets	01	001001000001	241	0577
			Kinniya	02	001001000010	242	0578
			Muttur	03	001001000011	243	0579
			Kuchchaveli	04	001001000100	244	0580
			Verugal/ Echchalampattai	05	001001000101	245	0581
			Thambalagamuwa	06	001001000110	246	0582
			Kanthalai	07	001001000111	247	0583
			Seruvila	08	001001001000	248	0584
			Padavi Sri Pura	09	001001001001	249	0585
			Gomarankadawala	10	001001001010	24A	0586
			Morawewa	11	001001001011	24B	0587
	Batticaloa	10	-	00	001010000000	280	0640
			Eravur Town (Eravur)	01	001010000001	281	0641
			Manmunai South & Eruvilpattu	02	001010000010	282	0642
			Kattankudy	03	001010000011	283	0643
			Eravur Pattu (Chenkalady)	04	001010000100	284	0644
			Manmunai North (Batti Town)	05	001010000101	285	0645
			Porativu Pattu (Ellavul)	06	001010000110	286	0646
			Koralai Pattu (Valachchenai)	07	001010000111	287	0647
			Manmunai Pattu (Araipattai)	08	001010001000	288	0648
			Manmunai West (Vavunatheivu)	09	001010001001	289	0649
			Koralai Pattu West (Oddamavadi)	10	001010001010	28A	0650
			Koralai Pattu North (Vakarai)	11	001010001011	28B	0651
			Koralai Pattu Central	12	001010001100	28C	0652
			Koralai Pattu South (Kiran)	13	001010001101	28D	0653
			Manmunai South - West (Peddipe)	14	001010001110	28E	0654
	Ampara	11	-	00	001011000000	2C0	0704
			Ninthavur	01	001011000001	2C1	0705
			Sayinthamarathu	02	001011000010	2C2	0706
			Thirukkivil	03	001011000011	2C3	0707
			Pothuvil	04	001011000100	2C4	0708
			Akkaraipattu(Karunkoditivu)	05	001011000101	2C5	0709
			Addalachchenai	06	001011000110	2C6	0710
			Karativu	07	001011000111	2C7	0711
			Samanthurai	08	001011001000	2C8	0712
			Alayadiwembu	09	001011001001	2C9	0713
			Kalmunai	10	001011001010	2CA	0714
			Kalmunai Tamil	11	001011001011	2CB	0715
			Navithanveli	12	001011001100	2CC	0716
			Lahugala	13	001011001101	2CD	0717
			Mahaoya	14	001011001110	2CE	0718
			Ampara	15	001011001111	2CF	0719
	Puttalam	12	Dehiattakandiya	16	001011010000	2D0	0720
			-	00	001100000000	300	0768
			Mundalama	01	001100000001	301	0769
			Arachchikattuwa	02	001100000010	302	0770
			Chilaw	03	001100000011	303	0771
			Puttalam	04	001100000100	304	0772
			Nattandiya	05	001100000101	305	0773

Common	District	District code	Division	Division code	Area Code (Binary)	Area Code (Hexadecimal)	Area Code (Decimal)
			Kalpitiya	06	001100000110	306	0774
			Mahawewa	07	001100000111	307	0775
			Karuwalagaswewa	08	001100001000	308	0776
			Madampe	09	001100001001	309	0777
			Wennappuwa	10	001100001010	30A	0778
			Vanathavilluwa	11	001100001011	30B	0779
			Nawagattegama	12	001100001100	30C	0780
			Dankotuwa	13	001100001101	30D	0781
			Anamaduwa	14	001100001110	30E	0782
			Mahakumbukkadawala	15	001100001111	30F	0783
			Pallama	16	001100010000	310	0784
	Kurunegala	13	-	00	001101000000	340	0832
			Bingiriya	01	001101000001	341	0833
			Pannala	02	001101000010	342	0834
			Polpithigama	03	001101000011	343	0835
			Udubaddawa	04	001101000100	344	0836
			Polgahawela	05	001101000101	345	0837
			Kurunegala	06	001101000110	346	0838
			Wariyapola	07	001101000111	347	0839
			Ibbagamuwa	08	001101001000	348	0840
			Galgamuwa	09	001101001001	349	0841
			Rasnayakapura	10	001101001010	34A	0842
			Narammala	11	001101001011	34B	0843
			Panduwasnuwara East	12	001101001100	34C	0844
			Kuliyapitiya West	13	001101001101	34D	0845
			Kobeigane	14	001101001110	34E	0846
			Nikaweratiya	15	001101001111	34F	0847
	Matale	14	Rideegama	16	001101010000	350	0848
			-	00	001110000000	380	0896
			Dambulla	01	001110000001	381	0897
			Rattota	02	001110000010	382	0898
			Wilgamuwa	03	001110000011	383	0899
			Naula	04	001110000100	384	0900
			Ukuwela	05	001110000101	385	0901
			Laggala-Pallegama	06	001110000110	386	0902
			Galewela	07	001110000111	387	0903
			Matale	08	001110001000	388	0904
			Ambanganga Korale	09	001110001001	389	0905
			Yatawatta	10	001110001010	38A	0906
			Pallepola	11	001110001011	38B	0907
	Kandy	15	-	00	001111000000	3C0	0960
			Ganga ihala Koralya	01	001111000001	3C1	0961
			Udawalpala	02	001111000010	3C2	0962
			Gangawata koralya	03	001111000011	3C3	0963
			Akurana	04	001111000100	3C4	0964
			Medadumbara	05	001111000101	3C5	0965
			Minipe	06	001111000110	3C6	0966
			Udunuwara	07	001111000111	3C7	0967
			Doluwa	08	001111001000	3C8	0968
			Pathahewaheta	09	001111001001	3C9	0969
			Yatinuwara	10	001111001010	3CA	0970
			Delthota	11	001111001011	3CB	0971
			Ududumbara	12	001111001100	3CC	0972
			Pasbagekoralya	13	001111001101	3CD	0973
			Poojapitiya	14	001111001110	3CE	0974
			Panvila	15	001111001111	3CF	0975
			Thumpane	16	001111010000	3D0	0976

Common	District	District code	Division	Division code	Area Code (Binary)	Area Code (Hexadecimal)	Area Code (Decimal)
	Nuwara Eliya	16	-	00	010000000000	400	1024
			Walapane	01	010000000001	401	1025
			NuwaraEliya	02	010000000010	402	1026
			Haguranketha	03	010000000011	403	1027
			Ambagamuwa	04	010000000100	404	1028
			Kothmale	05	010000000101	405	1029
	Badulla	17	-	00	010001000000	440	1088
			Haldummulla	01	010001000001	441	1089
			Welimada	02	010001000010	442	1090
			Haputale	03	010001000011	443	1091
			Mahiyanganaya	04	010001000100	444	1092
			Lunugala	05	010001000101	445	1093
			Badulla	06	010001000110	446	1094
			Bandarawela	07	010001000111	447	1095
			Hali-Ela	08	010001001000	448	1096
			Ella	09	010001001001	449	1097
			Uva Paranagama	10	010001001010	44A	1098
			Passara	11	010001001011	44B	1099
			Soranathota	12	010001001100	44C	1100
			Kandaketiya	13	010001001101	44D	1101
			Meegahakivula	14	010001001110	44E	1102
			Rideemaliyadda	15	010001001111	44F	1103
	Moneragala	18	-	00	010010000000	480	1152
			Katharagama	01	010010000001	481	1153
			Siyambalanduwa	02	010010000010	482	1154
			Badalkumbura	03	010010000011	483	1155
			Bibile	04	010010000100	484	1156
			Buttala	05	010010000101	485	1157
			Medagama	06	010010000110	486	1158
			Wellawaya	07	010010000111	487	1159
			Thanamalvila	08	010010001000	488	1160
			Moneragala	09	010010001001	489	1161
			Madulla	10	010010001010	48A	1162
			Sevanagala	11	010010001011	48B	1163
	Kegalle	19	-	00	010011000000	4C0	1216
			Dehiowita	01	010011000001	4C1	1217
			Yatinyanthota	02	010011000010	4C2	1218
			Kegalle	03	010011000011	4C3	1219
			Bulathkohupitiya	04	010011000100	4C4	1220
			Galigamuwa	05	010011000101	4C5	1221
			Warakapola	06	010011000110	4C6	1222
			Ruwanwella	07	010011000111	4C7	1223
			Deraniyagala	08	010011001000	4C8	1224
			Aranayake	09	010011001001	4C9	1225
			Mawanella	10	010011001010	4CA	1226
			Rabukkana	11	010011001011	4CB	1227
	Ratnapura	20	-	00	010100000000	500	1280
			Ratnapura	01	010100000001	501	1281
			Elapatha	02	010100000010	502	1282
			Kuruvita	03	010100000011	503	1283
			Ayagama	04	010100000100	504	1284
			Kiriella	05	010100000101	505	1285
			Pelmadulla	06	010100000110	506	1286
			Nivithigala	07	010100000111	507	1287
			Kalawana	08	010100001000	508	1288
			Eheliyagoda	09	010100001001	509	1289
			Kahawatta	10	010100001010	50A	1290

Common	District	District code	Division	Division code	Area Code (Binary)	Area Code (Hexadecimal)	Area Code (Decimal)
			Balangoda	11	010100001011	50B	1291
			Imbulpe	12	010100001100	50C	1292
			Kolonna	13	010100001101	50D	1293
			Embilipitiya	14	010100001110	50E	1294
			Godakawela	15	010100001111	50F	1295
			Opanayaka	16	010100010000	510	1296
	Gampaha	21	-	00	010101000000	540	1344
			Wattala	01	010101000001	541	1345
			Katana	02	010101000010	542	1346
			Kelaniya	03	010101000011	543	1347
			Biyagama	04	010101000100	544	1348
			Ja-Ela	05	010101000101	545	1349
			Negombo	06	010101000110	546	1350
			Gampaha	07	010101000111	547	1351
			Mahara	08	010101001000	548	1352
			Attanagalla	09	010101001001	549	1353
			Dompe	10	010101001010	54A	1354
			Minuwangoda	11	010101001011	54B	1355
			Divulapitiya	12	010101001100	54C	1356
			Mirigama	13	010101001101	54D	1357
	Colombo	22	-	00	010110000000	580	1408
			Kolonnawa	01	010110000001	581	1409
			Colombo	02	010110000010	582	1410
			Thimbirigasyaya	03	010110000011	583	1411
			Sri Jayawardanapura	04	010110000100	584	1412
			Moratuwa	05	010110000101	585	1413
			Rathmalana	06	010110000110	586	1414
			Kaduwela	07	010110000111	587	1415
			Seethawaka	08	010110001000	588	1416
			Dehiwala	09	010110001001	589	1417
			Kesbewa	10	010110001010	58A	1418
			Homagama	11	010110001011	58B	1419
			Maharagama	12	010110001100	58C	1420
			Padukka	13	010110001101	58D	1421
	Kalutara	23	-	00	010111000000	5C0	1472
			Bulathsinhala	01	010111000001	5C1	1473
			Beruwala	02	010111000010	5C2	1474
			Dodangoda	03	010111000011	5C3	1475
			Kalutara	04	010111000100	5C4	1476
			Panadura	05	010111000101	5C5	1477
			Millaniya	06	010111000110	5C6	1478
			Palindanuwara	07	010111000111	5C7	1479
			Madurawala	08	010111001000	5C8	1480
			Walalavita	09	010111001001	5C9	1481
			Bandaragama	10	010111001010	5CA	1482
			Ingiriya	11	010111001011	5CB	1483
			Mathugama	12	010111001100	5CC	1484
			Horana	13	010111001101	5CD	1485
	Galle	24	Agalawatta	14	010111001110	5CE	1486
			-	00	011000000000	600	1536
			Nagoda	01	011000000001	601	1537
			Hikkaduwa	02	011000000010	602	1538
			Galle Four Gravets	03	011000000011	603	1539
			Thawalama	04	011000000100	604	1540
			Welivitiya-Divithura	05	011000000101	605	1541
			Neluwa	06	011000000110	606	1542
			Habaraduwa	07	011000000111	607	1543

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Common	District	District code	Division	Division code	Area Code (Binary)	Area Code (Hexadecimal)	Area Code (Decimal)
			Balapitiya	08	011000001000	608	1544
			Niyagama	09	011000001001	609	1545
			Elpitiya	10	011000001010	60A	1546
			Baddegama	11	011000001011	60B	1547
			Ambalangoda	12	011000001100	60C	1548
			Karandeniya	13	011000001101	60D	1549
			Benthota	14	011000001110	60E	1550
			Bope-Poddala	15	011000001111	60F	1551
			Akmeemana	16	011000010000	610	1552
	Hambantota	25	-	00	011001000000	640	1600
			Hambantota	01	011001000001	641	1601
			Thissamaharama	02	011001000010	642	1602
			Tangalle	03	011001000011	643	1603
			Ambalantota	04	011001000100	644	1604
			Walasmulla	05	011001000101	645	1605
			Okewela	06	011001000110	646	1606
			Katuwana	07	011001000111	647	1607
			Weeraketiya	08	011001001000	648	1608
			Beliatta	09	011001001001	649	1609
			Sooriyawewa	10	011001001010	64A	1610
			Lunugamvehera	11	011001001011	64B	1611
			Angunakolapelessa	12	011001001100	64C	1612
	Matara	26	-	00	011010000000	680	1664
			Matara Four Gravets	01	011010000001	681	1665
			Akuressa	02	011010000010	682	1666
			Kamburupitiya	03	011010000011	683	1667
			Thihagoda	04	011010000100	684	1668
			Weligama	05	011010000101	685	1669
			Athuraliya	06	011010000110	686	1670
			Malimbada	07	011010000111	687	1671
			Kotapola	08	011010001000	688	1672
			Pitabeddara	09	011010001001	689	1673
			Devinuwara	10	011010001010	68A	1674
			Dickwella	11	011010001011	68B	1675
			Welipitiya	12	011010001100	68C	1676
			Mulatiyana	13	011010001101	68D	1677
			Pasgoda	14	011010001110	68E	1678
			Hakmana	15	011010001111	68F	1679
			Kirinda Puhulwella	16	011010010000	690	1680



## Appendix 11 Outline of operational parameters

Some operation parameters for Sri Lankan digital terrestrial television broadcasting are shown in Table AP11-1

Table AP11-1

Item		Contents
DTTB system		ISDB-T system
Operating channel		470-694MHz (channels 21 to 48) <sup>6</sup>
Channel bandwidth	Full-seg	7.6 MHz
	One-seg	0.58 MHz
Central carrier frequency		474 - 690 MHz <sup>7</sup>
Transmission mode		Mode 3
Guard interval ratio		1/4, 1/8, 1/16
Carrier modulation	Full-seg	QPSK, 16QAM, 64QAM
	One-seg	QPSK, 16QAM
Error correction (Inner code)		Convolutional Code (Coding Rate: 1/2, 2/3, 3/4, 5/6 or 7/8)
Error correction (Outer code)		(204,188) Reed-Solomon Code
Interleave	Full-seg	Frequency and Time Interleave
	One-seg	Time interleaving length: l=1,2 or 4
Video coding	Full-seg	H.265/MPEG-H HEVC (ISO/IEC 23008-2)
	One-seg	H.264/MPEG-4 AVC (ISO/IEC 14496-10)
Video profile	Full-seg	Up to MP @ L4.1
	One-seg	Up to BP @ L1.3
Video format	Full-seg	576i, 576p, 720p, 1080i, 1080p
	One-seg	SQVGA, QVGA, CIF
Video frame rate	Full-seg	25, 50fps
	One-seg	5, 10, 12, 15, 24, 25, 30fps
Audio coding		MPEG-4 AAC (ISO/IEC 14496-3)
Audio profile	Full-seg	LC AAC @L2, L4 HE-AAC+SBR v.1 @ L2, L4
	One-seg	HE-AAC+SBR+PS v.2 @ L2
Audio sampling frequency	Full-seg	48kHz, 44.1kHz
	One-seg	48kHz, 44.1kHz, 32kHz (AAC sampling frequency: 24kHz, 22.05kHz, 16kHz)
Multiplexing		MPEG-2 Systems (ISO/IEC 13818-1)
Data broadcasting		BML
EWBS		ISDB-T Harmonization Document PART 3

コメントの追加 [A28]: [To EOJ] What is the reason to use H.264 for one seg? What is the expected outcome?

<sup>6</sup> Operating channel will be 470-806 MHz (channels 21 to 62) until Analog Switch Off.

<sup>7</sup> Central carrier frequency will be 474-802 MHz until Analog Switch Off.

## Bibliography

(ITU Recommendation)

<http://www.itu.int/en/publications/Pages/default.aspx>

(ISO/IEC standards)

[http://www.iso.org/iso/home/store/catalogue\\_tc/catalogue\\_tc\\_browse.htm?commid=45316](http://www.iso.org/iso/home/store/catalogue_tc/catalogue_tc_browse.htm?commid=45316)

(ARIB Standards)

[http://www.arib.or.jp/english/html/overview/sb\\_ej.html](http://www.arib.or.jp/english/html/overview/sb_ej.html)

The versions of ARIB Standards referred in the Sri Lankan ISDB-T Standards are as follows.

Standrd		Version
Number	Title	
ARIB STD-B10	SERVICE INFORMATION FOR DIGITAL BROADCASTING SYSTEM	5.13
ARIB STD-B24	Data Coding and Transmission Specification for Digital Broadcasting	5.2
ARIB STD-B31	TRANSMISSION SYSTEM FOR DIGITAL TERRESTRIAL TELEVISION BROADCASTING	2.2
ARIB STD-B32	VIDEO CODING, AUDIO CODING, AND MULTIPLEXING SPECIFICATIONS FOR DIGITAL BROADCASTING	3.11
ARIB TR-B14	OPERATIONAL GUIDELINES FOR DIGITAL TERRESTRIAL TELEVISION BROADCASTING	3.8

(ABNT Standards)

<http://forumsbtvd.org.br/acervo-online/normas-brasileiras-de-tv-digital/>

The versions of ABNT Standards referred in the Sri Lankan ISDB-T Standards are as follows.

Standrd		Version
Number	Title	
ABNT NBR 15601	Digital terrestrial television – Transmission system	2007
ABNT NBR 15602-1	Digital terrestrial television – Video coding, audio coding and multiplexing Part 1: Video coding	2007
ABNT NBR 15602-2	Digital terrestrial television – Video coding, audio coding and multiplexing Part 2: Audio coding	2007
ABNT NBR 15602-3	Digital terrestrial television – Video coding, audio coding and multiplexing Part 3: Signal multiplexing systems	2007
ABNT NBR 15603-1	Digital terrestrial television – Multiplexing and service information (SI) Part 1: SI for digital broadcasting systems	2008

Standrd		Version
Number	Title	
ABNT NBR 15603-2	Digital terrestrial television – Multiplexing and service information (SI) Part 2: Data structure and definitions of basic information of SI Descriptors:	2009
ABNT NBR 15603-3	Digital terrestrial television – Multiplexing and service information (SI) Part 3: Syntaxes and definitions of extension information of SI Descriptors:	2009
ABNT NBR 15604	Digital terrestrial television – Receivers	2007
ABNT NBR 15605-1	Digital terrestrial television — Security issues Part 1: Copy control	2009
ABNT NBR 15607-1	Digital terrestrial television — Interactive channel Part 1: Protocols, physical interfaces and software interfaces	2011
ABNT NBR 15608-1	Digital terrestrial television – Operational guideline Part 1: Transmission system – Guide for implementation of ABNT NBR 15601:2007	2008
ABNT NBR 15608-2	Digital terrestrial television – Operational guideline Part 2: Video coding, audio coding and multiplexing – Guideline for implementation of ABNT NBR 15602:2007	2010
ABNT NBR 15608-3	Digital terrestrial television — Operational guideline Part 3: Multiplexing and service information (SI) – Guideline for implementation of ABNT NBR 15603:2007	2012

(ISDB-T Harmonization Document)

<http://www.dibeg.org/techp/aribstd/harmonization.html>