Digital terrestrial television broadcasting – Multiplexing

Televisão digital terrestre – Codificação de vídeo, áudio e multiplexação – Parte 3: Sistemas de multiplexação de sinais

Televisión digital terrestre — Codificación de video, audio y multiplexación – Parte 3: Sistemas de multiplexación de señales

Digital terrestrial television – Video coding, audio coding and multiplexing – Part 3: Signal multiplexing systems

デジタル放送における映像符号化、音声符号化及び多重化方式　第３部　伝送信号の多重化方式

Video coding, audio coding, and multiplexing specifications for digital broadcasting – Part 3: Signal multiplexing system

Foreword

This document is the result of the joint efforts of the ABNT, ARIB and SBTVD Forum under the standardization and technical cooperation activities of the Brazil-Japan Digital Television Joint Working Group.

The Brazilian Association for Standardization (ABNT) is the organism responsible for technical standardization in Brazil, providing essential support for Brazilian technical development. It is private, non-profit organization, recognized as the only National Standardization Body. It provides Brazilian society with systematic knowledge, through normative documents, enabling the production, commercialization and use of goods and services, in a competitive and sustainable manner, in the internal and external markets, contributing to scientific and technological development, environmental protection and consumer's protection.

The Association of Radio Industries and Businesses (ARIB) was designated as "the Center for Promotion of Efficient Use of the Radio Spectrum" and "the Designated Frequency Change Support Agency" by the Minister of Internal Affairs and Communications (MIC) of Japan under the provisions of the Radio Law. Under this designation, ARIB conducts studies and R&D, establishes standards, provides consultation services for radio spectrum coordination, cooperates with other overseas organizations and provides frequency change support services for the smooth introduction of digital terrestrial television broadcasting. These activities are carried out in cooperation with and/or participation by telecommunication operators, broadcasters, radio equipment manufacturers and related organizations as well as under the support by MIC.

The Brazilian Digital Terrestrial Television Forum (SBTVD Forum) is a non-profit entity, created with the objective of aiding and stimulating the development and implementation of best practices aiming at the success of systems reality for digital broadcasting of images and sounds in Brazil. Since the creation of the SBTVD Forum in February, 2007, its members have endeavored to establish standards of technical quality which permit deployment of digital television in Brazil. The Technical Module has contributed to the preparation of standards, with active participation by universities, research centers, related industry organizations and broadcasters.

This document does not describe the industrial property rights mandatory to these standards.

This document has no standardization value. Its purpose is to serve as a reference for characterizing the specificities of Brazilian and Japanese digital terrestrial television standards within the scope of the Brazil-Japan Digital Television Joint Working Group.

This document is drafted in accordance with the rules established in the ISO/IEC Directives, Part 2.

In the Brazilian and Japanese harmonized documents, commonalities are described in Clause 5 where Table 1 includes all references to ABNT and ARIB related documents. Differences are described in Clause 6. In each subclause, a reference to the corresponding Brazilian and Japanese related session is included in separate boxes in *italic text*.

No reference is made to the domestic policies of the countries.

1 Scope

This document addresses the data multiplexing structure and transport mechanism for digital terrestrial television broadcasting in Brazil and Japan.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ABNT NBR 15602-3:2007, *Digital terrestrial television – Video coding, audio coding and multiplexing – Part 3: Signal multiplexing systems*

ABNT NBR 15603-1:2007, *Digital terrestrial television – Multiplexing and service information (SI) – Part 1: SI for digital broadcasting systems*

ABNT NBR 15603-2:2007, *Digital terrestrial television – Multiplexing and service information (SI) – Part 2: Data structure and definitions of basic SI information*

ARIB STD-B10:V4.6:2008, Service Information for Digital Broadcasting System

ARIB STD-B25:V5.0:2007, Conditional Access System Specifications for Digital Broadcasting

ARIB STD-B32:V2.1:2007, Video coding, audio coding, and multiplexing specifications for digital broadcasting

ITU-T Recommendation H.222.0:2006, Information technology – Generic coding of moving pictures and associated audio information: Systems

ETSI TS 101 154:V1.7.1:2005, *Digital video broadcasting (DVB); Implementation guidelines for the use of video and audio coding in broadcasting applications based on the MPEG-2 transport stream*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ABNT NBR 15602-3:2007 and ARIB STD-B32:V2.1:2007, part 3, apply.

4 Abbreviated terms

For the purposes of this document, the abbreviated terms given in ABNT NBR 15602-3:2007 and ARIB STD-B32:V2.1:2007, part 3, apply.

5 Commonalities of the signal multiplexing system

The common parts of ABNT NBR 15602-3:2007 and ARIB STD-B32:V2.1:2007, part 3, and how they correspond are described in Table 1.

Table 1 — Correspondence between ABNT NBR 15602-3:2007 and ARIB STD-B32:V2.1:2007, part 3

Description	ABNT NBR 15602-3:2007 reference clause	ARIB STD-32:V2.1:2007, part 3 reference clause
Coded signals	5.1	2.1
Structure of the transmission control signal	5.2.1	2.2 (1)
Broadcasting of the transmission control signal	5.2.2	2.2 (2)
Emergency alarm signal [a]	5.2.3	2.3
PES packet [b]	6.1	3.1
Section	6.2	3.2

TS packet [c]	6.3	3.3
Transmission control signal [d]	6.4	3.4
Identifiers	6.6	3.6
Transmission structure of information related to conditional access [e]	6.7	3.7

[a] The language is different but the same descriptor is defined in the ABNT and ARIB standards.

[b] Stream_ID range of values 0xFC to 0xFE have different assignments in ABNT NBR 15602-3:2007 from those in ITU Recommendation H.222.0:2006.

[c] Assignment for "transport scrambling control" is specified in ARIB STD-B32:V2.1:2007, part 3, but not in ABNT NBR 15602-3:2007.

[d.] In stream type assignments, ABNT NBR 15602-3:2007, Table 5, has different assignments or descriptions from those in ITU Recommendation H.222.0:2006; that is, 0x05 is identified as "section" instead of "ITU-T Recommendation H.222.0:2006 private_sections", 0x06 is identified as "PES packet" instead of ITU-T Recommendation H.222.0:2006 PES packets containing private data, 0x7E is assigned for "data pipe" instead of "ITU-T Recommendation H.222.0:2006 reserved" and 0x80 to 0xFF is defined as "private use" where this range is not covered on ARIB STD-B32:V2.1:2007.

[e] The language is different between ABNT NBR 15602-3:2007 and ARIB STD-B32:V2.1:2007 but there are no contradictions between the ABNT and ARIB standards on the issues related to conditional access specification.

The correspondence between ARIB STD-B32:V2.1:2007, part 3, Subclause 3.5 and ARIB STD-B10:V4.6:2008 and ABNT NBR 15603-1:2007 and ABNT NBR 15603-2:2007 is described in Table 2.

Table 2 — Correspondence of descriptor references between ARIB STD-B32:V2.1:2007 part 3, ARIB STD-B10:V4.6:2008, ABNT NBR 15603-1:2007 and ABNT NBR 15603-2:2007

Description	ARIB STD-B32:2007 V2.1, part 3 reference figure	ARIB STD-B10:2007 V4.6, part 1 reference figure	ARIB STD-B10:2007 V4.6, part 2 reference subclause	ABNT NBR 15603-1:2007 reference figure	ABNT NBR 15603-2:2007 reference subclause
Conditional access descriptor	1	6-19	-	19	8.3.3
Conditional playback descriptor	2	6-72	- 1 [a]	71	8.3.49
Partial reception descriptor	3	6-57	6.2.32	56	8.3.32
Terrestrial delivery system descriptor	4	6-56	6.2.31	55	8.3.31
Satellite delivery system descriptor	5	6-23	6.2.6	-	-
Service list descriptor	6	6-21	6.2.14	21	8.3.14
System management descriptor	7	6-40	6.2.21	39	8.3.21
Data component descriptor	8	6-39	6.2.20	38	8.3.20
Carousel compatible composite descriptor	9	6-71	6.2.46	70	8.3.46
Copyright descriptor	10	6-41	-	40	-
Emergency information descriptor	11	6-44	6.2.24	43	8.3.24

[a] Specified in ARIB STD-B25:V5.0:2007.

6 Differences in the signal multiplexing system

The characterization of the audio description descriptor is specified in ABNT NBR 15602-3:2007 in accordance with ETSI TS 101 154:V1.7.1:2005. There is no relevant specification in ARIB standards.

In the Brazilian digital terrestrial television system, according to ABNT NBR 15602-3:2007, Subclause 6.5.2:

6.5.2 Audio description signaling

The signaling for the audio description service shall be coded in the PES_private_data of the PES associated with

the audio description component.

For the AD service, loud music or sound effects in the main program may prejudice comprehension of the scene, therefore it is important to adjust, within the appropriate passages, the relative intensity of the main sound in the final mix to be heard. The intensity level at which the main program is to be attenuated during the passage of an AD description may be specified using the AD_fade_byte parameter, within the AD_descriptor structure shown in Table 6.

Table 6 — Audio description descriptor (AS_descriptor)

Syntax	***Value***	***Number of bits***
AD_descriptor {		
Reserved	*1111*	*4*
AD_descriptor_length	*0111*	*4*
AD_text_tag	*0x4454474144*	*40*
revision_text_tag	*0x31*	*8*
AD_fade_byte	*0xXX*	*8*
AD_pan_byte	*0xYY*	*8*
Reserved	*0xFFFFFFFFFFFFFF*	*56*
}		

The permitted attenuation values are between 0x00 and 0xFE (0 to 254), the value 0xFF being a full fade (mute). Each attenuation step should correspond to 0.3 dB of intensity reduction.

The AD_descriptor is a PES_private_data type structure within the PES encapsulation of the coded AD component in accordance with ISO/IEC 13818-1, Annex H.

The AD_descriptor_length parameter indicates the number of significant bytes following the length field. The parameter AD_text_tag is an identification of this DA descriptor, as specified in ETSI TS 101 154:2007.

In the presence of a valid AD descriptor in the selected audio program, the playing device shall mix the AD program with the main audio program, attenuating the main audio program, whenever signaled.

An additional pan control (AD_pan_byteI) may be included in the same transmitted structure, utilizing a reserved field which allows the receiver to spacialize the DA sound positioning within the sound field.