

# Digital terrestrial television broadcasting – Video coding

Televisão digital terrestre – Codificação de vídeo, áudio e multiplexação – Parte 1: Codificação de vídeo

Televisión digital terrestre — Codificación de video, audio y multiplexación – Parte 1: Codificación de video

Digital terrestrial television – Video coding, audio coding and multiplexing – Part 1: Video coding

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1部 映像信号と符号化方式

Video coding, audio coding, and multiplexing specifications for digital broadcasting – Part 1: Video signal and coding 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 way, 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 video coding 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 15602-1:2007, *Digital terrestrial television – Video coding, audio coding and multiplexing – Part 1: Video coding*

ARIB STD-B24:V5.2:2008, *Data coding and transmission specification for digital broadcasting*

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

ARIB TR-B14:V2.8:2006, *Operational guidelines for digital terrestrial television broadcasting*

ITU-T Recommendation H.262:2000, *Information technology – Generic coding of moving pictures and associated audio information: Video*

ITU-T Recommendation H.264:2005, *Advanced video coding for generic audiovisual services*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ABNT NBR 15602-1:2007 and ARIB STD-B24:V5.2:2008, volume 1, part 2, apply.

## 4 Abbreviated terms

For the purposes of this document, the abbreviated terms given in ABNT NBR 15602-1:2007, ARIB STD-B24:V5.2:2008, volume 1, part 2, and ARIB STD-B32:V2.1:2007, part 1, apply.

## 5 Commonalities of the video coding system

For the full-seg service, the common parts of ABNT NBR 15602-1:2007 and ARIB STD-B32:V2.1:2007, part 1, and how they correspond are described in Table 1.

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

Description	ABNT NBR 15602-1:2007 reference clause	ARIB STD-B32:V2.1:2007, part 1 reference clause
Video signal <sup>a</sup>	5.1	2.1
Sampled values of signals	5.2	2.2
Scanning direction	5.3	2.3
Parameters for video signals	5.4	2.4
Active coding area	8.2.13	5.2
Video format switching method	9.6.1	Appendix, 4.4
Procedure for perfect seamless switching – Transmitting side	9.6.2.1	Appendix, 4.4.1 (1)
Procedure for perfect seamless switching – Receiver operation – A seamless switching-capable receiver	9.6.2.2	Appendix, 4.4.1 (2) (a)
Procedure for perfect seamless switching – Receiver operation – A seamless switching-incapable receiver	9.6.2.3	Appendix, 4.4.1 (2) (b)
Simple procedure for switching between SDTV and HDTV	9.6.3.1	Appendix, 4.4.2

Simple procedure for switching between SDTV and HDTV – Procedure for the transmitting side	9.6.3.2	Appendix, 4.4.2 (1)
Simple procedure for switching between SDTV and HDTV – Receiver operation	9.6.3.3	Appendix, 4.4.2 (2)
<sup>a</sup> ABNT NBR 15602-1:2007 shows specific colorimetric parameters/equations for SDTV signals; ARIB STD-B32:V2.1:2007, part 1 specifies common colorimetric parameters/equations for all the TV signals.		

For the one-seg service, the correspondence between ABNT NBR 15602-1:2007 and ARIB STD-B24:V5.2:2008, volume 1, part 2 is described in Table 2. Both the Brazilian and the Japanese video coding systems are based on H.264|MPEG-4 AVC, but there are significant structural differences between the ABNT and ARIB standards. ARIB STD-B24:V5.2:2008, volume 1, part 2 describes only the general specifications and leaves the details to the operational guidelines of ARIB TR-B14:V2.8:2006.

**Table 2 — Related sections of ABNT NBR 15602-1:2007 and ARIB STD-B24:V5.2:2008, volume 1, part 2**

Description	ABNT NBR 15602-1:2007 reference clause	ARIB STD-B24:V5.2:2008, volume 1, part 2 reference clause
Restrictions in video coding	8.3	4.4 and Annex G

## 6 Differences in the video coding system

### 6.1 General considerations

For the full-seg service, the Brazilian video coding system is based on H.264|MPEG-4 AVC and the Japanese video coding system is based on H.262|MPEG-2 Video. Therefore, there are more differences than similarities among the proposed standards. However, since the standardization documents have a similar structure, some ARIB and ABNT sections deal with similar procedures as defined by the respective international standard, ITU-T Recommendation H.264:2005. Nevertheless, no direct comparison could be established.

Table 3 lists all related sections of ABNT NBR 15602-1:2007 and ARIB STD-B32:V2.1:2007, part 1.

**Table 3 — Related sections of ABNT NBR 15602-1:2007 and ARIB STD-B32:V2.1:2007, part 1**

Description	ABNT NBR 15602-1:2007 reference clause	ARIB STD-B32:V2.1:2007, part 1, reference clause
Video coding system	6	3
Compression and transmission procedures	7.1	4.1
Signal configuration	7.2	4.2
Restrictions on coding parameters	8.2	5.1
Seamless switching - General	9.1	Appendix, 4
Transmission of the end of sequence descriptor	9.2	Appendix, 2.2
Seamless switching - Changing the number of active samples – Transmitting side	9.3.1	Appendix, 4.1 (1)
Seamless switching - Changing the number of active samples – Receiver operation	9.3.2	Appendix, 4.1 (2)
Seamless switching - Changing picture aspect ratio with 525i television system – Transmitting side	9.4.1	Appendix, 4.2 (1)
Seamless switching - Changing picture aspect ratio with 525i television system –	9.4.2	Appendix, 4.2 (2)

Receiving operation		
Seamless switching - Changing bitrate – Transmitting side	9.5.1	Appendix, 4.3 (1)
Seamless switching - Changing bitrate – Receiver operation	9.5.2	Appendix, 4.3 (2)

## 6.2 Video coding schemes

ABNT NBR 15602-1:2007, Clauses 6 and 7 correspond to ARIB STD B32:V2.1:2007, part 1, chapters 3 and 4. However, the contents are different due to the distinct compression schemes used by the systems.

## 6.3 Restriction on coding parameters

Since ABNT NBR 15602-1:2007 is based on H.264/AVC video compression, ABNT NBR 15602-1:2007, Clause 8.2 is entirely absent from ARIB STD B32:V2.1:2007. No direct comparison could be established.

## 6.4 Active format description (AFD)

There is no direct correspondence of ABNT NBR 15602-1:2007, Clause 10, to any section of the ARIB STD-B-32:V2.1:2007, part 1.

Indirectly, using different methods, ARIB STD-B32:V2.1:2007, part 1, Clause 5 describes restrictions on coding parameters with references on how to display different source formats on different display formats.