

# Digital terrestrial television broadcasting – Receivers

Televisão digital terrestre – Receptores

Televisión digital terrestre — Receptores

Digital terrestrial television broadcasting – Receivers

デジタル放送用受信装置

Receiver for digital broadcasting

## 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 characterizes the receiver for digital terrestrial television broadcasting as standardized in Brazil and Japan as of June 2009.

## 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.

ARIB STD-B21:v4.6:2007, *Receiver for digital broadcasting*

ABNT NBR 15604:2007, *Digital terrestrial television – Receivers*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ABNT NBR 15604:2007 and ARIB STD-B21:v4.6:2007 and the following apply.

**3.1  
accessibility**  
condition for utilization, with security and autonomy, of the services, devices, systems and communication and information means, by person with hearing, visual or intellectual impairment

**3.2  
audio description**  
locution in Portuguese language, overlapped to the program's original sound, designed to describe images, sounds, texts and other information that could not be perceived or understood by people with visual impairment

NOTE The information is sent by the content provider in an individual audio PES that, at the user discretion, may be selected.

**3.3  
built-in**  
any functionality embedded at the receiver which can be developed by software or hardware

**3.4  
return channel or interactive channel**  
communication mechanism that enable connection between receiver and a remote provider

**3.5  
data carousel**  
method which send cyclically any ensemble data and these data can be received, via broadcasting, at the time interval as long as it is necessary

**3.6  
life-cycle**  
characterize the period since an application is loaded until it is destroyed

**3.7  
parental rating**  
classification of informative and pedagogical nature, upset toward to promote the interests of children and adolescents, on democratic way, enabling that all the addressees of the recommendation can participate of the process, and on the objective way, ensuring that the contradiction of interests and arguments promote the correction and the social control of the practiced acts

### **3.8 coding**

process of an external signal transformation into bits which represent the original signal

NOTE The coding is done, as an example, by sampling and the information acquire can yet be compressed.

### **3.9 set-top box**

device for digital television reception and signals decoding that is connected to a television set through cables or any other type of connection and for that needs to provide analog or digital audio and video output interfaces

### **3.10 decoding**

process which is responsible to restore the original signal processing the bits received from the encoder

NOTE The decoding process can, eventually, also realize the decompression of the received information

### **3.11 dongle**

device typically connected to a data input port of a computer

### **3.12 downmix**

matrix applied to reduce the number of n channels

### **3.13 DSM-CC**

control method applied on interactive digital service which enable the access to a file or a bit stream

### **3.14 dubbing**

translation of program originally spoken in foreign language, replacing the original locution by dialogs in Portuguese, synchronized with time, intonation, characters' lips movement, etc

NOTE The sound in the original language, as well as of other languages, is simultaneously transmitted in an independent audio PES or, optionally, in a dual mono audio stream.

### **3.15 ECMAScript**

program language defined on standard ECMA 262

### **3.16 elementary stream ES**

basic bit stream which contain information of video or audio or private data

### **3.17 front-end**

set of components, from the antenna input up to the output interface. This module is responsible for retrieving the transport stream

### **3.18 LIBRAS window**

space delimited in the video where the information is interpreted in LIBRAS

### **3.19 LATM/LOAS**

transport mechanism defined by MPEG-4 standard, which are constructed in two layer, one of them for multiplexing and another one for synchronization

NOTE The multiplexing layer LATM (low audio overhead MPEG-4 transport multiplex) manages the multiplexing of several payloads of (audio data) and its configuration data in the elements of AudioSpecificConfig. The synchronization layer LOAS (low overhead audio stream) specify a syntax for auto-synchronism of MPEG-4audio transport stream.

### **3.20**

**closed-caption**

transcription in Portuguese language of dialogs, sound effects, ambient sounds and other information that cannot be perceived or understood by people with hearing impairments

**3.21****profile**

specification of capability classes offering different functionalities levels

**3.22****full-seg receiver**

devices enable to decoder audio, video, data, etc., carried by transport stream layer of the thirteen segments designed to fixed (indoor) and mobile service

NOTE The classification full-seg is applied to the digital converter, also called by set-top box and to the 13 segments receiver integrated with display, but not exclusive to these. This kind of receiver is enabling to receive and to decoder signal from terrestrial digital television in high definition and, by maker criteria, also to receive and to decoder information carried on layer "A" of the transport stream, applied for services recommended to portable receiver, here defined as one-seg.

**3.23****integrated receiver**

device for digital television signals reception integrated to the display not requiring audio and video signals output interfaces

**3.24****one-seg receiver**

devices which exclusively decode audio, video, data, etc information transported on layer A that is located at central segment of the thirteen segments

NOTE The classification one-seg is designed to portable receiver, also called by "handheld", specially recommended for small display, normally up to 7 inch. Among the products classified as one-seg are the receiver integrated with cell phone, PDA, dongle and portable television set which generally are powered by an internal battery and, therefore, without the necessary use of an external power source, as well as those designated to vehicle automotive. This kind of receiver is able to receive and to decode only signal from terrestrial digital television transported on layer "A" and consequently only baseline profile signal designed for portable devices.

**3.25****threshold**

defined as the boundaries of the digital converter to switching to another option of reception according to the quality of digital and analog signal

**3.26****transport stream**

syntax of MPEG-2 transport stream for packetizing and video, audio, data signal multiplexing at the digital broadcasting system

**4 Abbreviated terms**

For the purposes of this document, the abbreviated terms given in ABNT NBR 15604:2007 apply.

AAC	Advanced Audio Coding
AFD	Active Format Description
API	Application Program Interface
AV	Audio and Video
AVC	Advanced Video Coding
BER	Bit Error Ratio
BML	Broadcast Markup Language
CIE	Commision internationale de l'éclairage (International Commission on Illumination)
C/N	Carrier-to-Noise Ratio
CVBS	Composite Video Blanking and Sync
D/A	Digital-to-Analog
DQPSK	Differential Quadrature Phase Shift Keying
DRM	Digital Right Management
DSM-CC	Digital Storage Media Command and Control
DTS	Digital Theater Sound (Digital Theater Systems, Inc.)
DVI	Digital Video Input

ECMA	European Computer Manufacturers Association
ECN	Engineering Change Notices
EIT	Event Information Table
EPG	Electronic Program Guide
ES	Elementary Stream
FEC	Forward Error Correction
FFT	Fast Fourier Transform
IF	Intermediate Frequency
Fps	frames per second
GEM Globally	Executable Multimedia Home Platform
GIF	Graphic Interchange Format
HD D/C	High Definition Down Conversion
HDMI	High Definition Multimedia Interface
HDTV	High Definition Television
HE-AAC	High Efficiency Advanced Audio Coding
I/O	Input/Output
IP	Internet Protocol
IRD	Integrated Receiver Decoder
IRE	Institute of Radio Engineers (composite video measuring unit)
LATM	Low overhead audio transport multiplex
LFE	Low Frequency Enhancement
LOAS	Low Overhead Audio Stream
MPEG	Motion Picture Experts Group
NAL	Network Abstraction Layer
NCL	Nested Context Language
NIT	Network Information Table
OFDM	Orthogonal Frequency Division Multiplexing
PAL-M	Phase Alternation Line – standard M
PAT	Program Association Table
PCR	Program Clock Reference
PDA	Personal Digital Assistant
PES	Packetized Elementary Stream
PID	Packet Identifier
PiP	Picture in Picture
PMT	Program Map Table
PoP	Picture Outside Picture
PS	Parametric Stereo
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase-Shift Keying
RF	Radio Frequency
RS	Reed-Solomon
SAP	Second Audio Program
SBR	Spectral Band Replication
SDT	Service Descriptor Table
SDTV	Standard Definition Television
SI	Service Information
SEI	Supplemental Enhancement Information
SI	Service Information
SMPTE	Society of Motion Picture and Television Engineers
SP	Scattered Pilot
SPDIF	Sony-Philips Digital Interface Format
STB	Set-Top Box
TCP/IP	Transmission Control Protocol/Internet Protocol
TDT	Time and Data Table
TMCC	Transmission and Multiplexing Configuration Control
TOT	Time Offset Table
TS	Transport Stream
UDP/IP	User Datagram Protocol/Internet Protocol
UHF	Ultra High Frequency
USB	Universal Serial Bus
VHF	Very High Frequency
VUI	Video Usability Information

## 5 Commonalities of the receivers

The common parts of ABNT NBR 15604:2007 and ARIB STD-B21:v4.6:2007, and how they correspond are described in Table 1.

**Table 1 — Correspondence between ABNT NBR 15604:2007 and ARIB STD-B21:v4.6:2007**

ABNT NBR 15604:2007 DTV receivers description	ABNT NBR 15604:2007 DTV reference clause	ARIB STD-B21:v4.6:2007 DTV receivers description	ARIB STD-B21:v4.6:2007 DTV reference clause
Reception antenna	7.1	Receiving antenna	5.1
Specification of the receiver unit (IRD)	7.2	Specifications of the DIRD	5.2
Antenna input	7.2.1	Input	5.2.1
Channels reception	7.2.2	Input	5.2.1
Channel bandwidth	7.2.3	Minimum input level	Appendix 10 - 1.3
Frequency of the central carrier of channels	7.2.4	The range of receiving frequency	Appendix 10 - 1.1
Sensitivity	7.2.5	Characteristics of the tuning unit	5.2.5
Selectivity – Protection ratio	7.2.6	Protection	Appendix 10 - 1.4
First intermediate frequency (IF)	7.2.7	First intermediate frequency	5.2.2
Synchronization range of the received frequency (catch-up)	7.2.8	Synchronization range of the received frequency	5.2.3
Synchronization range of the received clock	7.2.9	Synchronization range of the received clock	5.2.4
Front-end signal processing	7.2.10	Front-end signal processing	5.2.6
Signal intensity meter	7.2.11	Descriptor, command, and tuner model of terrestrial adapter	11
Signal quality meter	7.2.12	Descriptor, command, and tuner model of terrestrial adapter	11
BER meter	7.2.13	Descriptor, command, and tuner model of terrestrial adapter	11
Emergency warning reception	7.2.14	Preferable specifications of the receiver	12.3.1
Analog television signals reception	7.2.15	The range of receiving frequency	Appendix 10 - 1.1
One-seg contents exhibitions in a full-seg receivers	7.2.16	Not available	-
Transport processing	7.2.17	Transport processing	5.2.7
Memories	7.2.18	Memories	5.2.9

<b>ABNT NBR 15604:2007 DTV receivers description</b>	<b>ABNT NBR 15604:2007 DTV reference clause</b>	<b>ARIB STD-B21:v4.6:2007 DTV receivers description</b>	<b>ARIB STD-B21:v4.6:2007 DTV reference clause</b>
Video decoding and its output interfaces	7.2.19	Video decoding and its output	5.2.10
Audio decoding and its output interfaces	7.2.20	Audio decoding and its output	5.2.11
Primary data decoder	7.2.21	Primary data decoder	5.2.12
EPG Function	7.2.22	EPG function	5.2.13
Parental rating	7.2.23	Not available	-
Acessibility	7.2.24	Not available	-
Channels storage and access	7.2.25	Memory for storage data common to all receivers	4.4.8.3
High speed digital interfaces	7.2.26	High-speed digital interface	5.2.14
External interfaces	7.2.27	External interfaces	5.2.16
Remote control	7.2.28	Remote controller and channel access	5.2.17
Audio and video decoding processing and output signals \ General considerations	8.1.1	Video decoding process and output signals / Audio decoding process and output signals	6.1 / 6.2
Video profiles and levels	8.1.2	Video decoding process	6.1.1
Primary service decoding	8.1.3	Video decoding process	6.1.1
Video output format, aspect ratio and resolution	8.1.4	Video decoding process	6.1.1
Frame rate	8.1.5	Video decoding process	6.1.1
Video output signals	8.1.6	Video output signals	6.1.2
Analog video output	8.1.7	Analog output	6.1.3.1
Digital video output	8.1.8	Digital output	6.1.3.3
Identification of output format	8.1.9	Identification output of the format type	6.1.3.2
Continuous switch of video (seamless switch)	8.1.10	Method of switching the video format	Appendix 1
Pan & scan	8.1.11	Not available	-
Audio decoding processing and its output signals	8.2	Audio decoding process and output	6.2
Parameters for audio decoding	8.2.1	Audio decoding process	6.2.1
Audio profiles and levels	8.2.2	Audio decoding process	6.2.2
Primary audio stream decoding	8.2.3	Audio decoding process	6.2.3
Analog audio output interface	8.2.4	Analog audio output	6.2.3.2
Digital audio output interface for multi-channel	8.2.5	Audio-signal output interface for multi-channel	6.2.3.3
Audio output via bluetooth	8.2.6	Audio output using Bluetooth	6.2.3.4

<b>ABNT NBR 15604:2007 DTV receivers description</b>	<b>ABNT NBR 15604:2007 DTV reference clause</b>	<b>ARIB STD-B21:v4.6:2007 DTV receivers description</b>	<b>ARIB STD-B21:v4.6:2007 DTV reference clause</b>
Audio mode discrimination and indication	8.2.7	Audio mode discrimination and indication	6.2.2
Primary data decoding \ General considerations	9.1	Not available	-
Full-seg receivers (13 segments)	9.2	Not available	-
One-seg receiver	9.3	Not available	-
Functionalities	9.4	Not available	-
Test suit	9.5	Not available	-
EPG function implementation	10.1	Specifications of EPG	8
EPG types	10.2	Specifications of EPG	8
Parental rating \ Interpretation of information	11.1	Not available	-
Parental rating descriptor	11.2	Not available	-
Semantics for parental rating descriptor	11.3	Not available	-
Cases in which the receiver shall not block the event	11.4	Not available	-
Receiver configuration	11.5	Not available	-
Showing the event in the receiver	11.5.1	Not available	-
Block exclusively by the age rating	11.5.2	Not available	-
Block by the age rating and by the objective content description	11.5.3	Not available	-
Showing message of blocked event	11.6	Not available	-
Showing parental rating when selecting the event	11.7	Not available	-
Mean to implement the block function	11.8	Not available	-
Accessibility resources	12	Not available	-
Storage and access to channels	13	Parameter information to be accumulated by the terrestrial-compatible BS/BS and broadband CS digital receiver and by the terrestrial adapter	10
Channels search and storage	13.1	Signal processing functions of DIRD	13
Automatic channels search	13.1.1	Signal processing functions of DIRD	14
Channels auto-search at the first installation	13.1.2	Signal processing functions of DIRD	15
Manual channels adding	13.1.3	Signal processing functions of DIRD	16
Continuous reception for mobile	13.1.4	Signal processing functions of DIRD	17
Virtual channel	13.2	Not available	-
Numeration of digital channels	13.2.1	Not available	-
Logical channel presentation form	13.2.2	Not available	-
Receiver integrated with analog and digital tuners	13.2.3	Not available	-
Browsing sequentially through the channels	13.3	Not available	-
Browsing through the primary logical channels	13.3.1	Not available	-
Browsing through all logical channels	13.3.2	Not available	-



<b>ABNT NBR 15604:2007 DTV receivers description</b>	<b>ABNT NBR 15604:2007 DTV reference clause</b>	<b>ARIB STD-B21:v4.6:2007 DTV receivers description</b>	<b>ARIB STD-B21:v4.6:2007 DTV reference clause</b>
Primary selection of language, subtitle and closed-caption	13.3.3	Not available	-
USB 2.0 port \ General considerations	14.1.1	Interfaces on the receiver side	6.5.1.3
Full-seg receiver	14.1.2	Interfaces on the receiver side	6.5.1.3
One-seg receiver	14.1.3	Interfaces on the receiver side	6.5.1.3
IP Interface (ethernet) \ General considerations	14.2.1	Interfaces on the receiver side	6.5.1.3
Physical interface protocol stack	14.2.2	Interfaces on the receiver side	6.5.1.3
Contents output	14.2.3	Technical conditions on the content rights protection scheme compatible with BS digital broadcast receivers	6.6
Channels tuner description	14.2.4	Tuner description specifications	9.2.3
Contents control	14.2.5	Technical conditions on the content rights protection scheme compatible with BS digital broadcast receivers	6.6
Signal interface \ General considerations	14.3.1	Specifications of the serial interface	9.1
Signal identification, pins function and schematics	14.3.2	Signal name, functions, and pin layout of the interface	9.1.1
Signal voltage level and impedance	14.3.3	Signal voltage level and impedance	9.1.2
Connector	14.3.4	Connector	9.1.3
Protocol of the serial interface	14.3.5	Protocol of the serial interface	9.1.4
Descriptors, commands and models of channels tuners	14.3.6	Descriptors, commands and models of channels tuners	9.1.5
Serial interface for transport stream input and output	14.3.7	I/O transport stream of serial interface	9.1.6
Interactivity channel implementation	15.1	Specifications of bidirectional communication function	11
Architecture of the receiver's software	15.2	Transmission phases in bidirectional communication	11
Architecture of the interactivity channel	15.2.1	Transmission phases in bidirectional communication	11
Software architecture on the full-seg receiver	15.2.2	Transmission phases in bidirectional communication	11
Software architecture on the one-seg receiver	15.2.3	Transmission phases in bidirectional communication	11

ABNT NBR 15604:2007 DTV receivers description	ABNT NBR 15604:2007 DTV reference clause	ARIB STD-B21:v4.6:2007 DTV receivers description	ARIB STD-B21:v4.6:2007 DTV reference clause
Software of installation architecture	15.3	Transmission phases in bidirectional communication	11
Architecture of the receiver's hardware	15.4	Transmission phases in bidirectional communication	11
Full-seg receiver	15.4.1	Transmission phases in bidirectional communication	11
One-seg receiver	15.4.2	Transmission phases in bidirectional communication	11
Installation mode	15.5	Transmission phases in bidirectional communication	11
Connection type switching	15.6	Transmission phases in bidirectional communication	11
Receiver's software update - Download function	16.1	Download function	12
Terms definition	16.2.1	Definition of terms	12.1.1
Services content	16.2.2	Service contents	12.1.2
Relevant broadcasting scheme for downloading	16.3	Transmission scheme relevant to downloading	12.2
Scheduling and transference of content	16.3.1	Transmission scheme of notification information	12.2.1
Preferable specification of the receiver	16.4	Preferable specifications of the receiver	12.3
Necessary functions for update	16.4.1	Necessary functions	12.3.1
Hardware capacity and performance necessary on receiver	16.4.2	Hardware capacity and performance necessary on receiver	12.3.2
Receiver signal processing functions	17	Necessary capacity and performance of receiver hardware	13
Service information	17.1	Service information	13.1
Broadcasting and non-broadcasting identification	17.2	Identification between broadcasting and non-broadcasting	13.2
Number of PID simultaneously processed	17.3	Number of PIDs to be simultaneously processed	13.3
Flow of program selection	17.4	Flow of program selection	13.5
Uniqueness of contents - Criteria for uniqueness guarantee	18	Not available	-
Receiver architecture	18.1	Not available	-
Automatically cut or skip advertisement	18.2	Not available	-
Insertion of uncorrelated contents	18.3	Not available	-

## 6 Differences in the receivers

The two main commonalities between ABNT NBR 15604:2007 and ARIB STD-B21:v4.6:2007 standards, refers to the ISDB-T demodulator and the protection interface tools used for the digital high speed data outputs and the digital video outputs (HDMI/DVI).

Regarding the differences of the specifications presented on ABNT NBR 15604:2007 standard, there are several items like the security which is based on ABNT NBR 5163 instead of JIS, the use of UHF channels up to Japanese channel 68 and specification of VHF protection ratios, use of mode 1 and guard interval of 1/32, intermediate frequency of 44 MHz instead of 57 MHz, sensibility requirement of -77 dBm, no conditional access implementation, channel browsing based only on main channels, virtual channel numbering not based on "One touch button rules", but rather associated with analogue current channel numbers and changes on audio, video and data coding (middleware).

For each of the ABNT NBR 15604:2007 clauses, Table 1 describes its reference on ARIB STD-B21:v4.6:2007.

Practical differences are shown in Table 2. Each items related to DTV receivers are described in detail on reference clause.

Table 2 — Summarized differences between ABNT and ARIB documents related to DTV receivers

Description	ABNT NBR 15604 DTV Receivers	ARIB STD-B21 DTV Receivers	Reference clause			
			ABNT		ARIB	
			ABNT NBR 15604	Other ABNT Documents	ARIB STD- B21	Other ARIB Documents
Digital Channels	VHF 07 ~13 UHF 14 ~69	UHF 13 ~ 62	7.2.2	NA	5.2.1	NA
Transmission Mode (OFDM Spacing)	Mode 1, 2 and 3	Mode 2 and 3	NA	ABNT NBR 15601	NA	TR-B14 Vol.7 7.3
Guard Interval	1/32, 1/16, 1/18 and 1/4 of active symbol duration	1/16, 1/18 and 1/4 of active symbol duration	NA	ABNT NBR 15601	NA	TR-B14 Vol.7 7.3.
VHF Protection Ratio	Specified	N/A	7.2.6	NA	NA	NA
C/N	19 dB @ FEC=3/4	22 dB @ FEC=7/8	Annex C	NA	Appendix 10	NA
Sensibility	-77 dBm	-75 dBm	7.2.5	NA	5.2.5	NA
First Intermediary Frequency	44 MHz or base band	57 MHz	7.2.7	NA	5.2.2	NA
Virtual Channel Number	Same number of analogue current channel	One touch Button	13.2	NA	NA	TR-B14 Vol.2 10.1
Channel Browsing	Main Service (primary)	No restrictions	13.3	NA	5.2.17	NA
Conditional Access	N/A	B-CAS	NA	NA	10	STD-B25
Copy Protection	Interfaces protection	B-CAS	NA	ABNT NBR 15605-1	10	TR-B14 Vol.2 7.9
Digital Audio/Video	HDCP (with video scaling in case of authentication failure)	HDCP	NA	ABNT NBR 15605-1	10	TR-B14 Vol.2 7.9
Digital Audio Output		N/A	7.2.27.6	NA	NA	NA
High Speed Data output	DTCP	DTCP	7.2.26	NA	10	TR-B14 Vol.2 7.9
Analog Video Interface	Up to 480p if the content signalizes restriction for copies	Macrovision	NA	ABNT NBR 15605-1	10	TR-B14 Vol.2 7.10.1
I/O TS of Serial Interface	Prohibit	ARIB B-21 (9.1.6)	NA	NA	9.1.6	NA
Video Decoder - Full-seg	H.264   ISO/IEC 14496-10	MPEG-2   ISO/IEC 13818-2	8.1.1	NA	6.1.1	NA
Profile & Level	HP@L4.0	MP@HL	8.1.2.2	NA	6.1.1	NA
Video Decoder - One-seg	H.264   ISO/IEC 14496-10	H.264   ISO/IEC 14496-10	8.1.1	NA	NA	STD-B24 Vol.1 4.4
Profile & Level	BP@L1.3	BP@L1.2	8.1.2.3	NA	NA	TR-B14 Vol.3,(Sec.4) 5.1.1.1
Video Formats	CIF, QVGA and SQVGA (4:3 / 16:9)	QVGA (4:3 / 16:9)	8.1.4	NA	NA	TR-B14 Vol.3,(Sec.4) 5.1.1.2
Frame Rate	5 / 10 / 12 / 15 / 24 / 30 fps	15 fps	8.1.5	NA	NA	NATR-B14 Vol.3,(Sec.4) 5.1.1.3
Composite video output	PAL-M	NTSC-M	8.1.7.1.1	NA	6.1.3.1	NA
Audio decoder	MPEG-4 - AAC	MPEG-2 - AAC	8.2.1	NA	6.2.1	NA
12 seg - Profile & Level	AAC@L2/4 and HE-	LC-AAC	8.2.2	NA	6.2.1	NA

	AAC@L2/4 v.1					
1 seg - Profile & Level	HE-AAC@L2 v.2	AAC + SBR	8.2.2	NA	NA	TR-B14 Vol.3,(Sec.4) 5.3.1.3
Audio Transport Multiplex	LATM/LOAS	ADTS	8.2.1	NA	6.2.1	NA
Parental Control	Mandatory	N/A	11	NA	NA	NA
Captioning	Idiom identified by EIT	Idiom identified by PES	12	NA	NA	STD-B10
Accessibility resources	Optional	N/A	12	NA	NA	NA
SW Update	Channels scanning	Managed by D-PA	13.2.4	NA	NA	NA
Characters Map	ISO/IEC 8859-15 (Latin extension)	ARIB Standard	NA	NA	NA	STD-B24
Security and Environment Conditions	ABNT NBR 5163	JIS	NA	NA	NA	STD-B25
* Items identified with the letters "NA" represent those not directly addressed by the particular technical document.						