Digital terrestrial television broadcasting– Interactive channel

Televisão digital terrestre – Canal de Inteeravidade – Parte 1: Protocolos, interfaces fíisicas e interfaces de software

Televisión digital terrestre — Canal de interactividad Parte 1: Protocolos, interfaces físicas e interfaces de software

Digital terrestrial television broadcasting– Interactive channel – Part 1: Protocols, physical interfaces and software interfaces

デジタル放送と併用する双方向通信の方式
Interaction channel protocols 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 a 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 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, with the aim of making systems reality for digital broadcasting of images and sounds in Brazil a success. 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 protocols, physical interfaces and software interfaces for each specific communications technologies to be used in interactivity channels of the digital television system 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 15607-1:2011, *Digital terrestrial television – Interactive channel – Part 1: Protocols, physical interfaces and software interfaces*

ARIB STD-B21:V5.9:2016, *Receiver for digital broadcasting*

ARIB STD-B23:V1.2:2009, *Application execution engine platform for digital broadcasting*

ARIB STD-B24:V6.3:2016, *Data coding and transmission specifications for digital broadcasting*

ARIB TR-B14:V6.2:2016*, Operational guidelines for digital terrestrial television broadcasting*

3 Terms and definitions

The following terms and definitions shall be applied to ABNT NBR 15607 standard:

3.1
asymmetric digital subscriber line
ADSL
High speed digital transmission method using common wired telephone subscriber lines.

3.2
ethernet address resolution protocol
ARP
Protocol for dynamic distribution of information use to build translation tables for addresses included in the protocol field to 48-bit Ethernet addresses.
Note: This definition is in accordance with RFC 826.

3.3
AT commands
Hayes commands
AT commands used for modem programming

3.4
BASIC mode data transmission
Basic communication protocol between host to link and data terminals to control data transmission
Note: This definition is in accordance with JIS X5002.

3.5
cable and telecommunication television system
CATV
System for television signals distribution to home using commonly coaxial cables, that allows bidirectional data transmission

3.6
compression control protocol
CCP
Method for negotiation of data compression over PPP links

Note: This definition is in accordance with RFC 1962.

3.7
challenge-handshake authentication protocol
CHAP
protocol for authentication of users or networks, by means of certified authority, which may be used by an internet service provider
Note: This definition is in accordance with RFC 1994.

3.8
domain name service
DNS
protocol to provide hostname and IP addresses mapping services in the network.
Note: This definition is in accordance with RFC 1034 and RFC 1035.

3.9
data over cable service interface specifications
DOCSIS
access and interface standards for data communication over cable television distribution system (CATV)

3.10
data terminal equipment
DTE

3.11   ethernet
method used for communications over local area networks (LAN)

3.12
file transfer protocol
FTP
Protocol used to share and to transfer files between two hosts on TCP/IP networks
Note: This definition is in accordance with RFC 959.

3.13
Fiber-to-the-home
FTTH
technology for home access using fiber optics to provide data communication services.

3.14
high-level data link control
HDLC
protocol used for data transmission control in communications between local area networked computers and the internet

3.15
hypertext transfer protocol
HTTP
protocol used to transfer or carry data worldwide web or intranets
Note: This definition is in accordance with RFC 2616 and shall be complaint with HTTP1.1.

3.16   *internet control message protocol*
ICMP
protocol for messages transmission such as error notifications and operation confirmation generated during data transfers.
Note: This definition is in accordance with RFC 792.

3.17
Internet protocol
IP
protocol for operation on network layers, internet address structure definitions, and data deliver processing
Note: This definition is in accordance with RFC 791.

3.18
IP control protocol
Network control protocol used to set up and to configure the IP protocol over a link PPP
Note: This definition is in accordance with RFC 1332.

3.19
Integrated services digital network
ISDN
an evolution of the plain old telephone network offering data transmission and others

3.20
LCP Extensions
LCP
Protocol for extensible link control for set up, configuration and tests of data link connections
Note: This definition is in accordance with RFC 1570.

3.21
Logic link control
LLC
Logical link control
Note: This definition is in accordance with ETSI TS 301 344.

3.22
network news transfer protocol
NNTP
Application layer protocol used to post, distribute and get news on the internet.
Note: This definition is in accordance with RFC 977.

3.23
open systems Interconnection
OSI
ISO Seven layer architecture model used to define formally common mechanism to interconnect computer devices

3.24
password authentication protocol
PAP
Simple authentication protocol used to user authentication in a server access network . This protocol is used by internet service providers
Note: This definition shall be detailed in RFC 1334 when required.

3.25
packet data convergence protocol
Protocol stands for packet data network convergence

3.26
personal handy-phone system
PHS
Cordless telephone standard
Note: This definition is in accordance with ARIB RCR STD-28.

3.27
post office protocol version 3
POP3
Protocol used to delete and get e-mail lists and e-mails messages from the e-mail server.
Note: This definition is in accordance with RFC 1939.

3.28
Point to point protocol
PPP
Protocol to enable multiple routing protocols over point to point links, using dial up connections.
Note: This definition is in accordance with RFC 1661.

3.29
point to point protocol over Ethernet
PPPoE
Protocol to enable PPP protocol transmission over Ethernet networks
Note: This definition in accordance with RFC 2516.

3.30
Radio link control
RLC
Radio link control
Note: This definition shall be detailed in ETSI TS 301344 and ETSI TS 143051 when required.

3.31
radio resource control
RRC
Radio resource control
Note: This definition shall be detailed in ETSI TS 143051 when required.

3.32
Simple mail transfer protocol
SMTP
Protocol used to deliver and relay e-mail messages.
Note: This definition is in accordance with RFC 821.

3.33
Sub-network dependent convergence protocol
SNDCP
Protocol used to provide sub-network convergence
Note: This definition is in accordance with ETSI TS 301344.

3.34
Public Switching Telephone Network
PSTN
Note: Subscriber accesses are in major part analog and run over metallic wiring /cabling, but they can afford digital technologies like ISDN and wireless accesses (WLL – wireless local loop)

3.35
Personal Mobile Service
PMS
Public telecommunications mobile service for personal use over wireless communication accesses and using a cellular networking topology.

3.36
transmission control protocol
TCP
Transport layer protocol oriented to an end-to-end connection and using delivering methods oriented to a reliable and ordered packet data communication.

Note: This definition is in accordance with RFC 793.

3.37
telnet
Protocol to implement virtual data terminal communications, enabling servers to be remotely operated over TCP/IP networks
Note: This definition is in accordance with RFC 854 and RFC 855.

3.38
User datagram protocol
UDP
Transport layer protocol used to connect two hosts without delivery confirmation function, but providing overload reduction on traffic and no connection oriented. This protocol is suited to transmission services with high communication efficiency.
Note: This definition is in accordance with RFC 768.

3.39
Universal serial bus
USB
Universal serial communication interface to connect several information technology peripheral devices over a data bus.

3.40
X.25
ITU-T protocol used on packet communications network over WAN (wide area network) accesses, using dedicated point to point lines, analog telephone network or ISDN technologies.

3.41
X.28
ITU-T protocol where the asynchronous text data terminal equipment (DTE) defined as a computer terminal is connected through an interface with a packet assembler and disassembler (PAD) which is connected to a packet switching network

4   Similarities of the interactive channel systems

Similarities of ABNT NBR 15607-1 and ARIB STD-B21, and its correspondence are described in Table 1.

Table 1 — Related sections of ABNT NBR 15602-1 and ARIB STD-B21, but with different contents

Description	ABNT NBR 15607-1 reference clause	ARIB STD-B21 reference clause
Bidirectional communication model	4.1	11.1
Connection and disconnection phases	4.2	11.1.1
Link connection and disconnection phases	4.3	11.1.2
Data transfer phases	4.4	11.1.3
Viewing information collection network	5.	11.2
Access by dial-up modems	6.2	11.3.2.2
Ethernet access (ADSL, FTTH, DOCSIS)	6.3	11.3.2.4
ISDN access	6.4	11.3.2.3
Wi-Fi access and router connection	6.10	11.3.2.4
Required functions for bidirectional communication using TCP/IP	9	11.5

Similarities of ABNT NBR 15607-1 and ARIB STD-B24, and its correspondence are described in Table 2.

Table 2 — Related sections of ABNT NBR 15607-1 and ARIB STD-B24, vol. 3, but with different contents

Description	ABNT NBR 15607-1 reference clause	ARIB STD-B24, vol. 3, reference clause
Access by dial-up modems	6.2	8.1.3.1, 8.1.3.2
Data link layer	6.2.3	8.1.3.1, 8.1.3.2
Ethernet access (ADSL, FTTH, DOCSIS)	6.3	8.1.3.2
ISDN access	6.4	8.1.3.2
Wi-Fi access and router connection	6.10	8.1.3.2
Protocol stacks	7.1	8.1.3
Interactivity channel protocols used to load requisitions and broadcasting channel used to load responses	8	8.1.5

Similarities of ABNT NBR 15607-1 and ARIB STD-B23, part 2, and its correspondence are described in Table 3.

Table 3 — Related sections of ABNT NBR 15607-1 and ARIB STD-B23, part 2, but with different contents

Description	ABNT NBR 15607-1 reference clause	ARIB STD-B23, part 2, reference clause
Interactivity communications protocol	10.1	6.12
Control API for the interactivity channel	10.2	11.5.2

5 Differences of interactive network architecture

Return channel function presented on ABNT is primarily executed by external devices.

Table 4 — Related sections of ABNT NBR 15607-1 and ARIB TR-B14, Vol.6 , but with different contents

Description	ABNT NBR 15601-1 reference clause	ARIB TR-B14, vol. 6, reference clause
Interactive Network Architecture	5	4.

6 Differences of interactive channel protocols

A broad set of protocols are defined on ABNT such as GSM-GPRS, GSM-EDGE, CDMA-1xRTT, CDMA-EVDO, WiMAX, Wi-Fi, etc.

Table 5 — Related sections of ABNT NBR 15607-1 and ARIB STD-B24, Vol. 3, but with different contents

Description	ABNT NBR 15607-1 reference clause	ARIB STD-B24, Vol 3, reference clause
Interactive channel protocol	8	8.1.5

7 Differences of control API for interactive channel

The sections 10.3 Complementary interface, 10.4 Specific types of interactivity channels, and 10.5 Descriptions of getISDTVType method are specific for the SBTVD.

Table 6— Related sections of ABNT NBR 15607-1 and ARIB STD-B23, part 2, but with different contents

Description	ABNT NBR 15607-1 reference clause	ARIB STD-B23, part 2, reference clause
Control API for interactive channel	10.2	11.5.2
Complementary interface	10.3	Annex. R