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2004-03

Baseline specifications of satellite and terrestrial receivers for ISDB (Integrated Service for Digital Broadcast)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

BASELINE SPECIFICATIONS OF SATELLITE AND TERRESTRIAL RECEIVERS FOR ISDB

FOREWORD

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International Standard IEC 62360 has been prepared by Technical Area 1: Digital receiving equipment of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this standard is based on the following documents:

FDIS	Report on voting
100/667/FDIS	100/769/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until 2008. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

INTRODUCTION

This International Standard is based on, and is the subset of ARIB[1] STD-B21 Version 3.2 which is established with regard to digital broadcasting receivers. It contains baseline specifications of receivers for satellite and terrestrial ISDB systems. It does not contain EPG (Electronic Program Guide), CA (Conditional Access), bi-directional communication function, data decoder function and high speed digital interface connector specification which were covered by the ARIB STD-B21.

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1 The Association of Radio Industries and Businesses establishes ARIB standards for the basic technical requirements such as various radio-equipment specifications for various radio signal utilization systems, with the participation of broadcasting-equipment manufacturers, broadcasting service providers, radio-equipment manufacturers, telecommunication companies, and their users.

ARIB standards are private standards established by compiling private and voluntary standards that have been developed to increase convenience for broadcasting-equipment manufacturers, broadcasting service providers, radio-equipment manufacturers, telecommunication companies, and their users, such as by ensuring the appropriate quality of and compatibility between broadcasting and radio facilities. These standards are intended to be used in conjunction with national technical standards established to ensure the efficient use of available frequencies and to avoid radio interference between users.

In order to ensure fairness and transparency in the establishment process, the standard was determined by consensus of all participants in our standard meeting, selected without bias from a broad range of interested parties – foreign and domestic, firms and individuals – including broadcasting-equipment manufacturers, broadcasting service providers, radio equipment manufacturers, common carriers, and their users.

BASELINE SPECIFICATIONS OF SATELLITE AND TERRESTRIAL RECEIVERS FOR ISDB

1 Scope

This International Standard specifies the basic functions, ratings, and performance of receivers for the Integrated Services Digital Broadcasting (ISDB) system. It applies to: receivers for standard digital television broadcasting, high-definition television broadcasting, and radio broadcasting from satellite broadcasting stations in the frequency band of 11,7 GHz to 12,2 GHz (hereinafter referred to as “BS digital broadcasting”); receivers for standard digital television broadcasting with a bandwidth of 34,5 MHz from satellite broadcasting stations in the frequency band of 12,2 GHz to 12,75 GHz (hereinafter referred to as “broadband CS digital broadcasting”); and receivers for the standard digital television broadcasting and high-definition television broadcasting from terrestrial broadcasting stations (hereinafter referred to as “digital terrestrial television broadcasting”).

With regard to the receiver, it may be designed for receiving only one broadcast service from the above-mentioned digital broadcasting or for receiving multiple broadcast services. Various types of receivers for receiving digital terrestrial television broadcasts may be designed, that is, receivers intended for fixed, for mobile and for portable reception.

This standard defines the BS digital-broadcasting receiver, the dual-purpose receiver for BS digital broadcasting and broadband CS digital-broadcasting (hereinafter referred to as a “BS and broadband CS digital broadcasting dual-purpose receiver”), as well as the receiver for digital terrestrial television broadcasting using an outdoor fixed receiving antenna and with a large display. For a small-sized simple receiver, a vehicle-mounted receiver, a portable receiver, and the like, this standard should be applied as far as practical.

In this standard, the BS digital-broadcasting receiver and the BS and broadband CS digital-broadcasting dual-purpose receiver are generically described as digital satellite broadcasting receivers.

In addition, when it is necessary to distinguish between the BS digital-broadcasting receiver and the BS and broadband CS digital-broadcasting dual-purpose receiver, [BS] is additionally used to specify a BS digital-broadcasting receiver, and [BS • CS] is used likewise to specify a BS and broadband CS digital-broadcasting dual-purpose receiver.

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.

ISO/IEC 13818-1, *Information technology – Generic coding of moving pictures and associated audio information: Systems*

ISO/IEC 13818-2, *Information technology – Generic coding of moving pictures and associated audio information: Video*

ISO/IEC 13818-7, *Information technology – Generic coding of moving pictures and associated audio information – Part 7: Advanced Audio Coding (AAC)*

ITU-R BT.419-3, *Directivity and polarization discrimination of antennas in the reception of television broadcasting*

ITU-R BT.709, *Parameter values for the HDTV standards for production and international programme exchange*

ITU-R BT.1361, *Worldwide unified colorimetry and related characteristics of future television and imaging systems*

3 Abbreviations and symbols

AAC	Advanced Audio Coding
ADTS	Audio Data Transport Stream
ARIB	Association of Radio Industries and Businesses
BS	Broadcast Satellite
bslbf	bit string, left bit first
CRC	Cyclic Redundancy Check
CS	Communication Satellite
DDB	Download Data Block Message
DEMUX	de-Multiplex
DII	Download Info Indication Message
DIRD	Digital Integrated Receiver Decoder
DQPSK	Differential Quadrature Phase Shift Keying
DSM-CC	Digital Storage Media Command and Control
DTS	Display Time-Stamp
ECM	Entitlement Control Message
EPG	Electronic Program Guide
HDTV	High Definition Television
IEC	International Electrotechnical Commission
IF	Intermediate Frequency
IRD	Integrated Receiver Decoder
ISDB	Integrated Services Digital Broadcasting
ISO	International Organization for Standardization
LC	Low Complexity
LFE	Low Frequency Enhancement
MJD	Modified Julian Date
MPEG	Moving Picture Experts Group
MSB	Most Significant Bit
OFDM	Orthogonal Frequency Division Multiplex
PCR	Program Clock Reference
PES	Packetized Elementary Stream
PID	Packet IDentifier
PMT	Program Map Table
PSI	Program System Information
PTS	Presentation Time-Stamp
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
RS	Reed-Solomon

SDTT	Software Download Trigger Table
SDTV	Standard Definition Television
SHB	Super Hi-Band
SP	Scattered Pilot
TMCC	Transmission and Multiplexing Configuration Control
uimsbf	unsigned integer most significant bit first
16QAM	16-level Quadrature Amplitude Modulation
64QAM	64-level Quadrature Amplitude Modulation

4 Configuration of the receiver

4.1 General

The basic configuration of the “receiver” specified here is shown in Figure 1.

The basic configuration of the DIRD is shown in Figure 2.

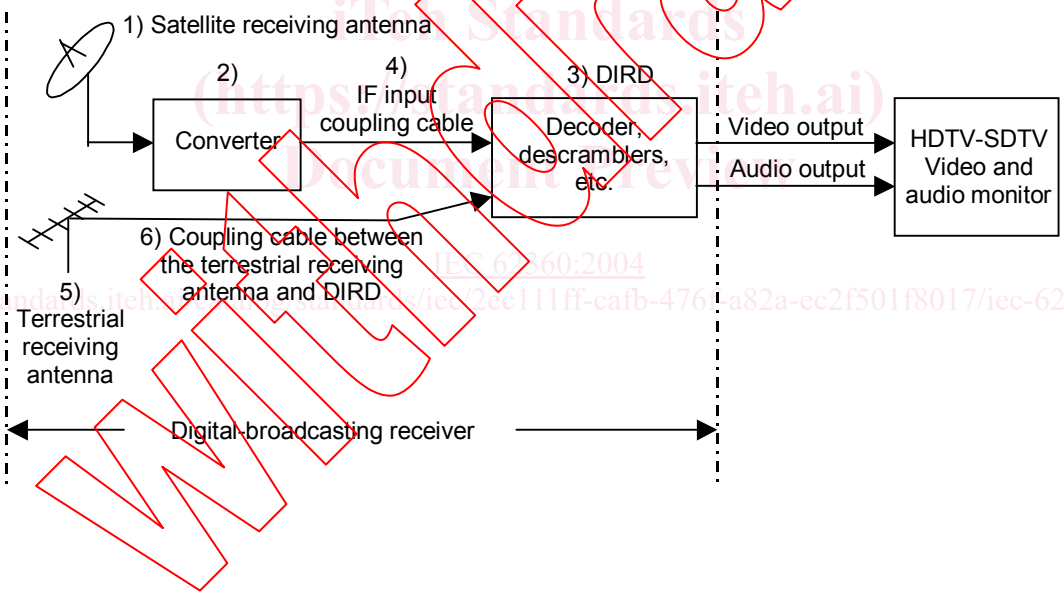

Figure 1 – Basic configuration of the receiver

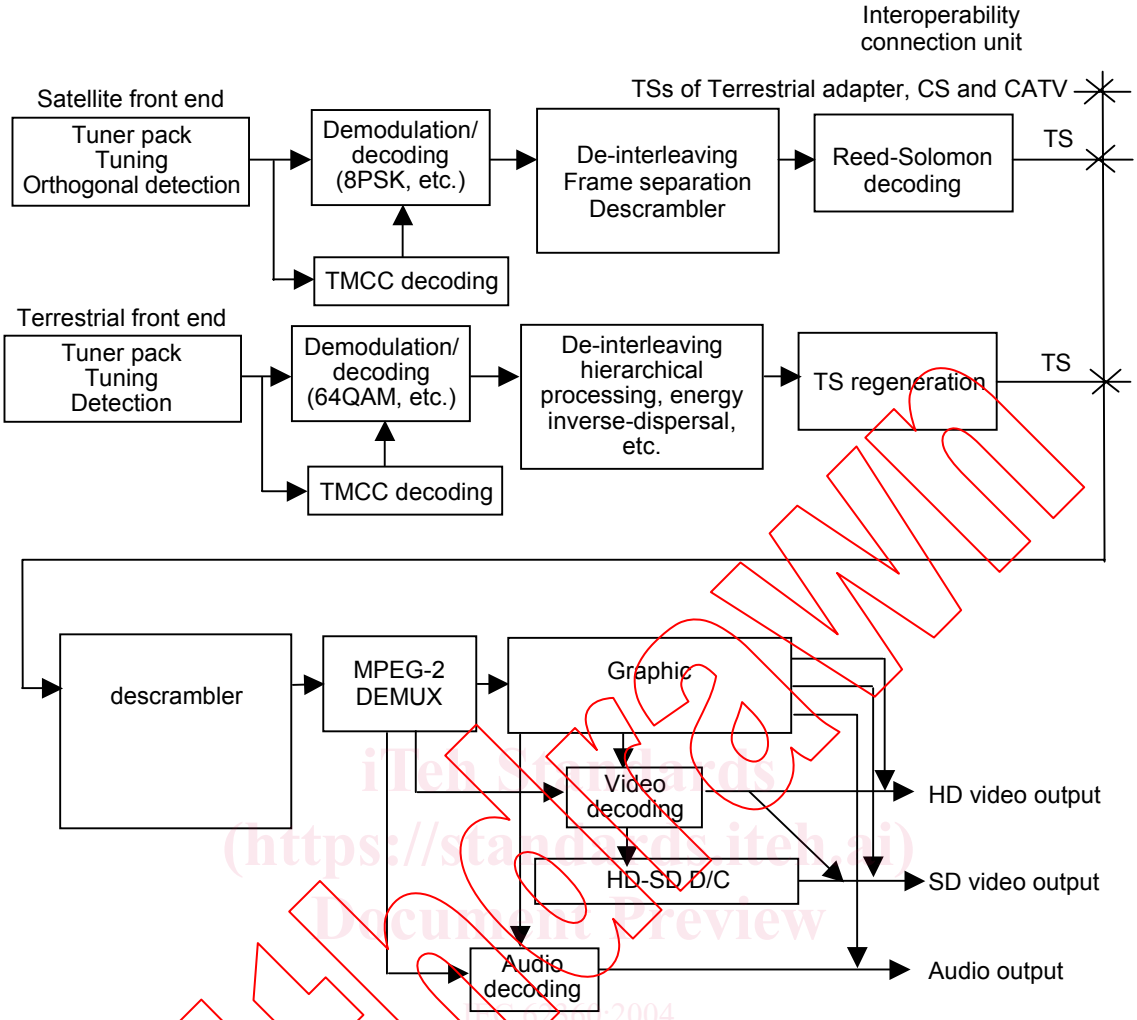

Figure 2 – Basic configuration of DIRD

4.2 Satellite receiver

The satellite receiver is composed of the following units:

- satellite receiving antenna;
- converter;
- DIRD;
- coupling cable between the converter and the DIRD.

However, the satellite receiving antenna (including a feed horn) may be integrated with the converter.

4.3 Terrestrial receiver

The terrestrial receiver is composed of the following units:

- terrestrial receiving antenna;
- DIRD;
- coupling cable between the terrestrial receiving antenna and the DIRD.

5 Ratings and specifications of the units of the digital satellite broadcasting receiver

5.1 General

In the descriptions in this clause, [BS] indicates the ratings and specifications only for BS digital broadcast receivers, and [BS • CS] indicates those of the BS and broadband CS digital broadcast dual-purpose receivers.

5.2 Satellite receiving antenna

Table 1 – Satellite receiving antenna rating

Item	Rating
Received frequency range	[BS] 11,71023 GHz to 12,16669 GHz [BS • CS] 11,71023 GHz to 12,74825 GHz
Receiving polarization	[BS] Right-hand circular [BS • CS] Right-hand/left-hand circular
Antenna diameter	The desired antenna diameter is not specified, as the necessary antenna diameter varies depending on the receiving conditions
Output structure	The output structure shall be composed of a WRJ-120-type wave-guide and a BRJ-120 flange, and shall be provided with waterproof packing. Not applicable to the all-in-one type with a converter

5.3 Converter

Table 2 – Converter rating

Item	Rating
Input structure	The input structure shall be composed of a WRJ-120-type wave-guide and a BRJ-120 flange, and shall be provided with waterproof packing. Not applicable to the all-in-one type with a converter.
Range of input-signal level	For one channel: BS band: –90 dB(mW) to –70 dB(mW) CS band: –94 dB(mW) to –70 dB(mW)
Overall gain	BS band: 52 dB ± 4 dB CS band: 52 dB ± 6 dB
Intermediate frequency	BS band: 1032,23 MHz to 1488,69 MHz CS band: 1575,75 MHz to 2070,25 MHz
First local frequency	10,678 GHz
Output impedance	75 Ω
Output structure	Waterproof receptacle equivalent to a high-frequency coaxial C15-type connector
Power supply	[BS] DC +15 V +10 % –12 %, 4 W or less [BS • CS] Right-hand circular, DC 13,5 V to 16,5 V (15 V), 4 W or less Left-hand circular, DC 9,5 V to 12,0 V (11 V), 3 W or less