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BUREAU OF INDIAN STANDARDS

FOR COMMENTS

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Draft Indian Standard

DIGITAL TELEVISION RECEIVER FOR SATELLITE BROADCAST TRANSMISSION – SPECIFICATION

(First Revision)

भारतीय मानक

उपग्रह प्रसारण प्रेषण के लिए डिजिटल टेलीविजन रिसीवर - विशिष्ट -

(पहला पुनरीक्षण)

ICS 33.160.25

भारतीय मानक ब्यूरो

BUREAU OF INDIAN STANDARD

9 बहादुर शाह जफर मार्ग नई दिल्ली – 110002

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG

NEW DELHI - 110002

October 2024 **Price Group**

Audio, Video and Multimedia Systems and Equipment Sectional Committee, LITD 07

FOREWORD
(Formal Clauses to be added later on)

This Indian Standard *will be* adopted by the Bureau of Indian Standards, after the draft finalized by Audio, Video and Multimedia Systems and Equipment Sectional Committee *will be* approved by the Electronics and Information Technology Divisional Council.

There is no ISO/IEC Standard on this subject. This standard was formulated based on the proposal received from Prasar Bharti (Doordarshan). Presently the televisions in India come with built in analog tuner to receive the analog terrestrial transmission.

Prasar Bharti (Doordarshan) is in the process of closing analogue terrestrial transmission barring those in strategic areas. Specifications for TV with in-built satellite tuner (DVB-S & DVB-S2) given in this document are for replacement of the analog TV tuner with DVB-S & DVB-S2 compliant Satellite tuner in all TV sets (LED/LCD etc). TV with in-built satellite tuner (DVB-S & DVB-S2) would enable reception of non-encrypted (Free-To-Air) multichannel by connecting an appropriate dish antenna with LNB mounted on a suitable place, that is, at roof top or side wall of the building.

First revision of this has been undertaken to provide further guidance to demonstrate compliance with this standard. Major changes are as follows:

a) Definitions have been included.
b) IS/IEC 62368-1 has been also referred for safety requirements.
c) Column (5) has been included in Table 1 and Table 2 to provide further guidance related to procedures to demonstrate compliance to the requirements.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’.

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DIGITAL TELEVISION RECEIVER FOR SATELLITE BROADCAST TRANSMISSION — SPECIFICATION

1 SCOPE

This document describes a baseline profile, based on open standards for a Digital Television (DTV) receiver for the reception of digital satellite Free-To-Air (FTA) TV and Radio signals. This profile is based predominantly on Digital Video Broadcasting (DVB) standards.

2 REFERENCES

The Standards listed in Annex A and Annex B contains provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A and Annex B.

3 DEFINITIONS

3.1 Aspect ratio—the ratio of the width to the height of a rectangular picture.

Source: IS 1885 (Part 24)/ IEC 60050-723

3.2 Digital television — television in which picture information is represented by a digital signal.

Source: IS 1885 (Part 24)/ IEC 60050-723

3.3 Rated voltage — value of voltage assigned by the manufacturer to a component, device or equipment and to which operation and performance characteristics are referred.

NOTE -Equipment may have more than one rated voltage value or may have a rated voltage range

Source: IS/IEC 62368-1

3.4 Rated voltage range — supply voltage range, as declared by the manufacturer, expressed by its lower and upper rated voltages.

3.5 Satellite broadcasting [direct broadcasting by satellite (DBS)] **—** a radiocommunication service in which the transmissions from space stations are intended for direct reception by the general public.

3.6 Television (TV) —form of telecommunication for the transmission of signals representing scenes, images of the scenes being reproduced on a screen as they are received or recorded for subsequent use.

NOTE -This form of telecommunication finds major application in television broadcasting and the word "television" is often used without qualification to describe this application.

3.7 Television broadcasting — broadcasting service of visual programmes with associated sounds

3.8 Television receiver (TV set) — a receiver designed to reproduce the picture and accompanying sound of a television programme.

4 REQUIREMENTS

4.1 The DTV Digital Television receiver shall support DVB-S & S2 reception for Free-To-Air (FTA) services. The DTV Digital TV receiver shall fully comply with detailed specifications as given in Table 1.

4.2 The manufacturer shall ensure compatibility and interfacing with Consumer Electronic equipment such as Audio and Video systems in the country.

4.3 Specifications

The specifications for the various features and capabilities for the Digital TV receiver shall be as given in Table 1.

NOTE – Transport stream for testing the compliance with requirements of Table 1 should be provided by service providers.

4.4 Performance Requirements

The requirements for various performance parameters for the DTV receiver shall be as given in Table 2.

4.5 Safety Requirements

The safety requirements of DTV receivers shall conform to IS 616 or IS/IEC 62368-1.

NOTE - Conformance to IS 616 or IS/IEC 62368-1 shall be selected based on the compulsory registration order and associated guidelines issued by Ministry of Electronics & IT (MeitY) and Bureau of Indian Standards (BIS).

4.6 Electromagnetic Compatibility (EMC) Requirements

The EMC requirements of the DTV receiver shall conform to IS/CISPR 32.

5 MARKING

5.1 Each DTV receiver shall be legibly and indelibly marked with at least the following information:

a) Manufacturer's name or trade mark (if any);
b) Model designation and Serial Number;
c) Country of manufacture;
d) Input supply voltage and frequency (If an external power adapter is provided, DC input voltage, polarity and wattage shall be marked on the TV and AC input voltage, frequency and wattage shall be marked on the power adapter);
e) Power consumption;
f) Input Terminals as applicable; and
g) All Connectors.

5.2 The User Interface (UI) of the DTV receiver shall display all the hardware input ports available, serial number and model number of the DTV receiver unit at appropriate place.

5.3 BIS Certification Marking

5.3.1 The DTV receiver may also be marked with the Standard Mark. The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulation made there under. Details of conditions under which a license for the use of Standard Mark may be granted to manufacturers and producers may be obtained from the Bureau of Indian Standards.

6 OPERATING LIFE TEST

The DTV receiver shall be subjected to operating life test while viewing Live Free-To-Air TV Channel via the in-built satellite tuner. The test shall consist of 48h of operation at 1.1 times of upper voltage of Input voltage range (declared by the TV manufacturer) and at ambient temperature (45 ºC). For supply voltage and temperature to be maintained during the test, tolerance of ± 5 percent is allowed.

The DTV Receiver shall be considered to have failed the test:

a) if there is loss of video and/or Audio longer than 5 seconds;
b) if the DTV Receiver reboots or is non-responsive to the Remote Control at the end of the test.

At the end of the operating life duration, the requirements specified in Table 2 shall also be met with.

Table 1 Specifications
(*Clause* 4.1 *and* 4.3)

Sl No. (1)	Specification (2)	Mandatory (3)	Optional (4)	Compliance criteria and Test Method(s) (5)
i)	**BASIC DTV RECEIVER PROFILE:**			
a)	Hardware specification	The processing power and memory configuration of the DTV receiver shall be suitable for the routine operation of the digital reception of the DVB-S and DVB S2 signals, and DTV receiver shall have provision of the routine upgradation or replacement of software.	—	DTV receiver is said to be compliant with this requirement if it is complying with all other mandatory requirements of Table 1 and Table 2.
b)	Decompression and decoding of SDTV video	Capability to decompress and decode SDTV signals compressed using MPEG-2 MP@ML (see Sl No. 2 and Sl No. 3 of Annex B) and MPEG-4 Part 10 AVC MP @ L3 (see Sl No. 3 of Annex A and Sl No. 4 of Annex B).	—	Compliance is checked by reception of SDTV signals compressed using MPEG-2 MP@ML and MPEG-4 Part 10 AVC MP @ L3.
c)	Decompression and decoding of HDTV video	a) Capability to decompress and decode HDTV signals compressed using MPEG-4 Part 10 AVC HP@L4 (see Sl No. 3 of Annex A and Sl No. 4 of Annex B). b) The DTV receiver shall be capable of decoding both 1080i and 720p formats and up scaling/down scaling it to the best format supported by it.		a) Compliance is checked by reception of HDTV signals compressed MPEG-4 Part 10 AVC HP@L4. b) Compliance is checked by reception of 1080i and 720p formats.
d)	Decompression and decoding of audio	a) Capability to decompress and decode Audio using MPEG-1 Layer 2 (see Sl No. 5 of Annex B). b) Capability to pass through the multi-channel audio formats over compatible outputs such as HDMI ARC,S/PDIF etc. NOTES **1** Capability to decompress and decode using other audio codecs should be provided by TV manufacturers based on the market dynamics. **2** The requirement of Multi-Channel with surround sound audio decoder shall be reviewed from time to time based on the status of available Free-	a) Capability to decompress and decode the multi-channel audio formats.	a) Compliance is checked by reception of Audio using MPEG-1 Layer 2. b) Compliance is checked by passing through the multi-channel audio formats over HDMI ARC,S/PDIF etc.

Sl No. (1)	Specification (2)	Mandatory (3)	Optional (4)	Compliance criteria and Test Method(s) (5)
		to-Air satellite channels supporting Multi-Channel with surround sound audio.		
e)	Active Format descriptors	Ability to handle 16 : 9 widescreen and 4 : 3 picture format changes as detailed in the 'transmission rules' including support for correct aspect ratio and Active Format Descriptors. (*see* Sl No. 6 of Annex B).	—	Compliance is checked by display 16:9 and 4:3 video signals. Displayed signal should not be distorted.
f)	Captioning and Sub-titling	Capability to receive and process DVB Subtitle Streams. (*see* Sl No. 11 and Sl No. 12 of Annex B). DVB subtitles shall be invoked from a remote control.		Compliance is checked by reception of DVB Subtitle Streams.
g)	Teletext	—	The DTV receiver shall include a Teletext decoder (as laid down in Sl No. 13 of Annex B) including up to Teletext Ver 1.5. A suitable remote control button should be provided to launch the Teletext OSD display.	Compliance is checked by reception of Teletext.
h)	Multi-language support	The DTV receiver is to at least support the setting of a primary and secondary audio language based on the language descriptors associated with the audio-streams transport stream (*see* Sl No. 2 and Sl No. 3 of Annex B). If the primary language is not present then the DTV receiver shall automatically select the secondary audio language.	When the secondary audio language is also not available then the 'country default language' shall be selected. When the default language is also not available then the DTV receiver shall select the first audio PID appearing in the PMT elementary stream loop.	Compliance is checked by Inspection.
j)	DTV Receiver mixed Audio Description	—	DTV receivers that are capable of presenting audio description should provide at least the minimum user	Compliance is checked by Inspection.

Sl No. (1)	Specification (2)	Mandatory (3)	Optional (4)	Compliance criteria and Test Method(s) (5)
			controls. (as per SI No. 6 of Annex B)	
k)	Broadcast mixed audio description	In addition to multi-language support specifications mentioned at Sl No. i) h) of Table 1 specified above, DTV receivers shall provide a user preference to enable or prioritize broadcast mixed audio description.	—	Compliance is checked by Inspection.
m)	Service demultiplexing	Capability to receive and process Sl (Service Information) (*see* Sl No. 10 and Sl No. 11 of Annex B).	—	Compliance is checked by Inspection.
n)	Data services	If DVB SSU is supported then Capability to receive and process data streams (*see* Sl No. 7 and Sl No. 8 of Annex B).	—	Manufacturer shall give declaration to this effect and shall provide associated documents to demonstrate this capability. Compliance is checked based on the manufacturer's declaration and documents.
p)	OSD	Video layer (a full colour layer displaying the output of the MPEG video decoder) to support: a) Y=8 bit, CB=8 bit, CR=8 bit; b) Chroma to be sub-sampled to either 4 : 2 : 0 or 4 : 2 : 2; c) Alpha blending need not be supported, but the layer may be shown or hidden. OSD/Graphics Layer (an 8-bit palletized layer which can display region-based graphics): 1) each CLUT palette entry to support: Y= 6 bit, CB = 4 bit, CR= 4 bit; 2) Chroma to be sub-sampled to either 4 : 2 : 0 or 4 : 2 : 2; 3) alpha blending to be either 6 bit across the entire layer, or 2 bit per pixel	—	Manufacturer shall give declaration to this effect and shall provide associated documents to demonstrate this capability. Compliance is checked based on the manufacturer's declaration and documents.

Sl No. (1)	Specification (2)	Mandatory (3)	Optional (4)	Compliance criteria and Test Method(s) (5)
q)	DTV Receiver character set	The main character set of the DTV receiver shall be the character code table 00 – Latin Alphabet (as per Sl No. 15 of Annex B)	—	Manufacturer shall give declaration to this effect and shall provide associated documents to demonstrate this capability. Compliance is checked based on the manufacturer's declaration and documents.
r)	Electronic Service Guide (ESG) 'Now/Next'	'Now/Next' information for use in an on-screen banner shall be derived using information from DVB SI EIT p/f tables (see Sl No. 10 of Annex B). The actual appearance of the Now/Next banner is left to the manufacturer but it is recommended that the following information be displayed in the bottom third of the screen: a) Current time; b) Start time of now and next program; c) End time of now and next program; d) Channel Number; e) Channel Name; and f) Date.	a) The ESG "Now and next" shall be displayed when the user changes channels for approximately 2 seconds and shall also be launched using the *i* (info) button on the remote control. b) ESG 'Schedule': An Electronic Program Guide (EPG) application may be provided using EIT schedule information from the SI.	Compliance is checked by Inspection
s)	Time	The DTV receiver shall have a time clock or calendar running continuously (*see* Sl No. 10 of Annex B). The clock shall be updated by the incoming TDT and TOT table in the Sl. The time displayed by the DTV receiver shall be the current time based on time zone.	—	Compliance is checked by Inspection

Sl No. (1)	Specification (2)	Mandatory (3)	Optional (4)	Compliance criteria and Test Method(s) (5)
t)	Digital TV output	—	The DTV receiver may offer output(s) for connection to a recording device.	Compliance is checked by Inspection
ii)	**DIGITAL SATELLITE RECEPTION:**			
a)	Demodulation and FEC decoding	Capability to demodulate and decode satellite signals, channel coded and modulated (*see* Sl No. 1 of Annex B).	—	Compliance is checked by reception of DVB-S and DVB-S2 signals.
b)	DTV Receiver Installation	During DTV receiver installation, the user shall be able to perform tuning by: a) tuning to a list of user selectable transponders or performing a linear scan of all frequencies and polarisations, and b) manually entering the tuning parameters of the transponder. NOTE - For details of tuning parameters, DTV OEM shall discuss with the respective service providers. Details of tuning parameters related to DD Free Dish are available on Doordarshan's website.	—	Compliance is checked by Inspection.
c)	Network evolution	The DTV receiver shall support dynamic SI/PSI on tuned transponder in order to automatically detect and suitably handle service changes without the need for user intervention. The DTV receiver shall also have the capability to update the service list, including suitably handle transponder changes based on the installation method selected by the user, and appropriate menu options, where applicable. The DTV receiver should not delete transponder parameters and channels due to low signal.		Compliance is checked by Inspection
d)	Services available	After DTV receiver installation, all services that may be received shall be available to the viewer. The actual services being broadcast may subsequently change [*see* ii) c) of Table 1].	—	Compliance is checked by Inspection

Sl No. (1)	Specification (2)	Mandatory (3)	Optional (4)	Compliance criteria and Test Method(s) (5)
e)	Selection via Service List	The service list displayed immediately following a full automatic scan shall present services in ascending Channel Number or Service ID.	—	Compliance is checked by Inspection
f)	Selection via Numeric Entry	Selection of a service using numeric entry shall always select a service with that Channel Number regardless of any viewer favourites.	—	Compliance is checked by Inspection
g)	Favourite Channel list	The user shall be able to move, sort, swap and delete channels and lock in those changes to update the main channel list based on their preferences. The user shall also be able to add channels and remove channels for one or more Favourite lists, which shall be separate to the main channel list.		Compliance is checked by Inspection
h)	Hidden Services		Services marked as 'hidden' in the Logical Channel Number (LCN) descriptor shall not appear in the service list presented to the viewer.Services may also be identified as not selectable by numeric entry in a similar way. The DTV receiver shall locate conflict services and store the same.	Compliance is checked by Inspection
j)	Logical Channel Number for Satellite services		The DTV receiver service list shall be managed by Logical Channel Number Descriptors (LCN) carried by the SDT (Service description table) or NIT (Network Information table). The DTV receiver shall locate, store and handle services with Logical	Compliance is checked by Inspection

Sl No. (1)	Specification (2)	Mandatory (3)	Optional (4)	Compliance criteria and Test Method(s) (5)
			Channel Numbers (LCNs).	
k)	RF input signal	-65 dBm to -25 dBm	—	Compliance is checked by supplying signal of signal strength -65 dBm to -25 dBm. TV shall be able decode and receive signal of signal strength -65 dBm to -25 dBm. Modulator and attenuator may be utilized to vary signal strength.
m)	LNB supply current	Minimum 300mA	—	Compliance is checked by measuring current through RF port by utilizing appropriate load. TV shall be able to supply at least 300mA to load.
n)	LNB supply voltage	Vertical polarisation: 13 V D.C Horizontal polarisation : 18 V D.C	—	Compliance is checked by measuring voltage through RF port. TV shall supply 13V D.C for Vertical polarisation and 18 V D.C for Horizontal polarisation.
p)	LNB Control	The following control of the LNB shall be provided: a) Low band/High band switching: 1) Low Band: 10.70 GHz to 11.70 GHz 2) High Band: 11.70 GHz to 12.75 GHz b) Polarization: horizontal/vertical selection.	—	Compliance is checked by Inspection
q)	Modulation/Demodulation parameters for DVB-S & DVB-S2 standard	As per SI No. 1 of Annex B	—	DTV receiver is said to be compliant with this requirement if it is complying with all

Sl No. (1)	Specification (2)	Mandatory (3)	Optional (4)	Compliance criteria and Test Method(s) (5)
				other mandatory requirements of Table 1 and Table 2.
iii)	**CONNECTORS:**			
a)	Interfaces, Connectors	a) Satellite Input: 75 Ω , Female Type (*see* Sl No. 14 of Annex B). b) Input: One HDMI version 1.3a port, or higher port. c) Output: Coaxial or Optical compatible connector such as HDMI ARC, S/PDIF etc.	a) Analog Video: RCA Type: Yellow. b) Analog Audio: RCA Stereo: L (White) and R (Red). c) Additional HDMI inputs and/or outputs. d) HDMI inputs having Audio Return Channel (ARC). e) Component (Y, Pb, Pr) Video. f) USB 2.0 Ports. g) RJ11 (for PSTN Modem). h) RJ45 for Fast Ethernet connection. j) 3.5mm Headphone Jack for stereo audio output or Audio Description and Broadcast Mix Audio Description as mentioned in Sl No. i) j) and k) of Table 1 above. k) 15-pin D-sub female connector for PC connectivity. m) DVI-I Connector for PC connectivity. n) ARC capable HDMI inputs should pass through native, input audio bit streams.	Compliance is checked by Inspection

Sl No. (1)	Specification (2)	Mandatory (3)	Optional (4)	Compliance criteria and Test Method(s) (5)
iv)	**MAINTENANCE AND UPGRADE:**			
	Automatic software upgrade mechanism	The software upgrade mechanism shall be DVB SSU, to at least the simple profile (as per Sl No. 9 of Annex B) is required or through a USB port for uploading the control software or via Network.	RS 232C or USB port or RJ 45 Ethernet for uploading control software and/or additional services.	Compliance is checked by Inspection to check the availability and functionality of mechanism as per the manufacturers declaration.
v)	**USER INFORMATION:**			
	a) Remote Control	The manufacture is free to design the remote control. The following remote control functionalities are required: a) numeric 0-9; b) Power – to turn the DTV receiver on and off; c) Program up/down - to switch between programs; d) Volume up/down - to adjust the volume output level; e) Subtitle - to display as per Sl No. of i) f) of Table 1 above; f) Info - to display additional information like reception quality, signal strength indicator and Channel ID etc.; g) EPG/Guide - to display an Electronic Program Guide; h) Back - this function exits from the current menu or OSD and returns to the previous state; and j) Free satellite - user shall be able to access FTA satellite channels from any menu by this shortcut key or functionality. This shortcut key or functionality shall also guide user for scanning of satellite channels.	—	Compliance is checked by Inspection
	b) Easy to use and simple documentation	DTV receivers shall be simple to set up and operate and be provided with clear easy to understand user documentation in line with that requirement.	—	Compliance is checked by Inspection
	c) Support package	The following peripheral items shall be included within a baseline DTV receiver package: a) Remote control and batteries; and	A basic status check should be invoked by a menu driven option or a user selected key.	Compliance is checked by Inspection

Sl No. (1)	Specification (2)	Mandatory (3)	Optional (4)	Compliance criteria and Test Method(s) (5)
		b) An easy to understand user manual.		

Table 2 Performance Requirements
(*Clause* 4.4)

Sl No. (1)	Specifications/Parameters (2)	Mandatory Values (3)	Optional (4)	Compliance and Test Method(s) (5)
i)	Electrical specifications a) Input voltage range b) Frequency	a) 110 – 240 V a.c. b) 50 Hz ± 2 percent	—	No separate test is required. DTV receiver is compliant to this requirement if it complies with IS 616 or IS/IEC 62368-1
ii)	RF characteristics to be supported by the DTV receiver	As per DVB-S and DVB-S2 standard for Satellite signal	—	DTV receiver is said to be compliant with this requirement if it is complying with all other mandatory requirements of Table 1 and Table 2.
iii)	Satellite DTV: DVB-S tuner performance characteristics a) Input level per carrier b) Input frequency range c) RF input impedance	a) Required C/N for QEF (BER = 10^{-10} to 10^{-11}) **Mode Pilots C/N (dB)** QPSK 1/2 No 3.8 QPSK 2/3 No 5.6 QPSK 3/4 No 6.7 QPSK 5/6 No 7.7 QPSK 7/8 No 8.4 b) 950 to 2150 MHz c) 75 Ω		DTV receiver shall be able to demodulate and decode L-band signal of the specified Carrier/Noise (C/N) ratio mentioned against the respective modulation mode and the specified Input frequency range. DTV receiver complying to the requirement of Input level per carrier and Input Frequency range shall be said to be compliant with the requirement of RF input impedance. Testing method: L-band modulated DVB S signal, using DVB S/S2 compliant modulator shall be fed to DTV receiver. Power and Frequency of this signal shall be varied to check the compliance.

iv)	Satellite DTV: DVB-S2 tuner performance Characteristics a) Input level per carrier b) Input frequency range c) RF input impedance	a) Required C/N for QEF (PER = 10^{-10} to 10^{-11}) **Mode Pilots C/N (dB)** QPSK 1/2 No 2.0 QPSK 3/5 No 3.2 QPSK 2/3 No 4.1 QPSK 3/4 No 5.0 QPSK 4/5 No 5.7 QPSK 5/6 No 6.2 QPSK 8/9 No 7.2 QPSK 9/10 No 7.4 8PSK 3/5 Yes 6.5 8PSK 2/3 Yes 7.6 8PSK 3/4 Yes 8.9 8PSK 5/6 Yes 10.4 8PSK 8/9 Yes 11.7 8PSK 9/10 Yes 12.0 b) 950 to 2150 MHz c) 75 Ω	—	DTV receiver shall be able to demodulate and decode L-band signal of the specified Carrier/Noise (C/N) ratio mentioned against the respective modulation mode and the specified Input frequency range. DTV receiver complying to the requirement of Input level per carrier and Input Frequency range shall be said to be compliant with the requirement of RF input impedance. L-band modulated DVB S signal, using DVB S/S2 compliant modulator shall be fed to DTV receiver. Power and Frequency of this signal shall be varied to check the compliance.
v)	Symbol rate	2 to 45 Msps		DTV receiver shall be able to demodulate and decode L-band signal of the specified Symbol rate.

				Testing Method: L-band modulated DVB S signal, using DVB S/S2 compliant modulator shall be fed to DTV receiver. Symbol rate of this signal shall be varied to check the compliance.
vi)	RF input return loss	8dB Minimum		DTV receiver is said to be compliant with this requirement if it complies with requirement (iii) and (iv) of Table 2
vii)	DisEqC		DisEqC 1.2	Manufacturer shall give declaration to this effect and shall provide associated documents to demonstrate this capability. Compliance is checked based on the manufacturer's declaration and documents.
viii)	Operating ambient temperature range	5 °C to 45 °C	—	No separate test is required. DTV receiver is compliant to this requirement if it complies with IS 616 or IS/IEC 62368-1
ix)	Operating humidity range	Up to 90 percent (non-condensing)	—	No separate test is required. DTV receiver is compliant to this requirement if it complies with IS 616 or IS/IEC 62368-1
x)	Power consumption	TV shall comply with Power consumption requirements as per prevailing Bureau of Energy Efficiency (BEE) regulations or notifications issued for TV.		Compliance is checked by documents of BEE or as per Test methods prescribed by BEE.

ANNEX A
(*Clause* 2)

LIST OF REFFERED INDIAN STANDARDS

Sl No.	*IS No.*	*Title*
1.	IS 616: 2017	Audio, video and similar electronic apparatus — Safety requirements (*fifth revision*)
2.	IS/CISPR 32:2015	Electromagnetic compatibility of multimedia equipment — Emission requirements
3.	IS/ISO/IEC 14496-15 : 2019	Information Technology — Coding of Audio — Visual Objects: Part 15 Carriage of network abstraction layer (NAL) unit structured video in the ISO base media file format (*first revision*)
4.	IS/IEC 62368-1:2023	Audio/video, information and communication technology equipment - Part 1: Safety requirements (*Second revision*)

ANNEX B
(*Clause* 2)

LIST OF REFFERED INTERNATIONAL STANDARDS

Sl No.	*International Standards/ Publications.*	*Title*
1.	a) ETSI EN 300421 Ver 1.1.2	First generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications (DVB-S)
	b) ETSI EN 302 307 Ver 1.4.1	Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications (DVB-S2)
2.	ISO/IEC 13818-1 :2007	Information technology — Generic coding of moving pictures and associated audio information" Part 1: Systems (MPEG 2)
3.	ISO/ IEC 13818-2 :2000	Information technology – Generic coding of moving pictures and associated audio information Part 2 Video Coding
4.	ISO/IEC 14496-10:2020	Information technology – Coding of Audio-Visual objects: Part 10 Advance Video Coding (MPEG-4 Part 10 AVC).
5.	ISO/ IEC 11172-3 : 1993	Information technology — Coding of moving pictures and associated audio for digital storage media at up to about 1.5 Mbit/s : Part 3 Audio: MPEG-1 Audio Layer II
6.	ETSI TS 101 154 Ver 2.7.1	Digital Video Broadcasting (DVB); Specification for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream.
7.	ETSI EN 301 192 Ver 1.7.1	Digital Video Broadcasting (DVB); DVB specification for data broadcasting
8.	ETSI TR 101 202 Ver 1.9.1	Digital Video Broadcasting (DVB); Implementation guidelines for Data Broadcasting
9.	ETSI TS 102 006 Ver 1.4.1	Specification for System Software Update in DVB Systems
10.	ETSI EN 300 468 Ver 1.16.1	Specifications for Service Information (SI) in DVB systems
11.	ETSI TS 101 211 Ver 1.12.1	Guidelines on implementation and usage of Service Information (SI) in DVB systems
12.	ETSI EN 300 743 Ver 1.6.1	Subtitling Systems
13.	ETSI EN 300 706 Ver 1.2.1	Enhanced Teletext specification
14.	IEC 61169-24	Radio-frequency connectors — Part 24: Sectional specification Radio frequency coaxial connectors with screw coupling, typically for use in 75 ohm cable networks (type F)
15.	ISO/IEC 6937	Information technology — Coded graphic character set for text communication — Latin alphabet