

# TECHNICAL CODE

## SPECIFICATION FOR DIRECT-TO-HOME (DTH) BROADCAST RECEIVER FOR SET TOP BOX (STB) (SECOND REVISION)

Developed by



Registered by



Registered date:

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## **MCMC MTSFB TC TXXX:2022**

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The Communications and Multimedia Act 1998 ('the Act') provides for Technical Standards Forum designated under section 184 of the Act or the Malaysian Communications and Multimedia Commission ('the Commission') to prepare a technical code. The technical code prepared pursuant to section 185 of the Act shall consist of at least, the requirement for network interoperability and the promotion of safety of network facilities.

Section 96 of the Act also provides for the Commission to determine a technical code in accordance with section 55 of the Act if the technical code is not developed under an applicable provision of the Act and it is unlikely to be developed by the Technical Standards Forum within a reasonable time.

In exercise of the power conferred by section 184 of the Act, the Commission has designated the Malaysian Technical Standards Forum Bhd (MTSFB) as a Technical Standards Forum which is obligated, among others, to prepare the technical code under section 185 of the Act.

A technical code prepared in accordance with section 185 shall not be effective until it is registered by the Commission pursuant to section 95 of the Act.

For further information on the technical code, please contact:

#### **Malaysian Communications and Multimedia Commission (MCMC)**

MCMC Tower 1  
Jalan Impact  
Cyber 6  
63000 Cyberjaya  
Selangor Darul Ehsan  
MALAYSIA

Tel: +60 3 8688 8000  
Fax: +60 3 8688 1000  
<http://www.mcmc.gov.my>

OR

#### **Malaysian Technical Standards Forum Bhd (MTSFB)**

MCMC Centre of Excellence (CoE)  
Off Persiaran Multimedia  
Jalan Impact  
63000 Cyberjaya  
Selangor Darul Ehsan  
MALAYSIA

Tel: +60 3 8320 0300  
Fax: +60 3 8322 0115  
<http://www.mtsfb.org.my>

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### **Committee representation**

This technical code was developed by the Multimedia Broadcast Receiver Sub Working Group under the Broadcast Technology Working Group of the Malaysian Technical Standards Forum Bhd (MTSFB) which consists of representatives from the following organisations:

Sony EMCS Malaysia Sdn Bhd  
Fraunhofer IIS  
LG Electronics (M) Sdn Bhd  
Maxis Broadband Sdn Bhd  
Measat Broadcast Network System Sdn Bhd  
Media Prima Berhad  
Multimedia University (MMU)  
MYTV Broadcasting Sdn Bhd  
Samsung Malaysia Electronics (SME) Sdn Bhd  
Sharp Electronics (M) Sdn Bhd  
SIRIM Berhad  
SmarDTV Global S.A.S  
Sony EMCS Malaysia Sdn Bhd  
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## **Foreword**

This technical code for Specification for Direct-To-Home (DTH) Broadcast Receiver for Set Top Box (STB) ('this Technical Code') was developed pursuant to Section 95 and Section 185 of the Act 588 by the Malaysian Technical Standards Forum Bhd ('MTSFB') via its Broadcast Technology Working Group.

This Technical Code was developed for the purpose of certifying communications equipment under the Communications and Multimedia (Technical Standards) Regulations 2000.

Major modifications in this revision are as follows:

- a) Inclusion of new standard for Electromagnetic Compatibility (EMC), MS CISPR 32.
- b) Update the DDRAM and Flash processor and Memory.
- c) Inclusion of HEVC Video H.265: According to Part 2 - ISO/IEC 23008-2 for video codec.
- d) Inclusion of the specification of USB compliance with ETSI TS 103 605 under conditional access.
- e) Update the EPG clause.
- f) Inclusion of the Network Download (NWDL) as one of the updates mechanisms besides OAD.

This Technical Code cancels and replaces the SKMM MTSFB TC T006: 2013, Specification for Digital Terrestrial Television Broadcast Service Receiver.

This Technical Code shall continue to be valid and effective from the date of its registration until it is replaced or revoked.

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## SPECIFICATION FOR DIRECT-TO-HOME (DTH) BROADCAST RECEIVER FOR SET TOP BOX (STB)

### 1. Scope

This Technical Code specifies the requirements for the Direct-to-Home (DTH) Broadcast Receiver for Set Top Box (STB) to be used for Ku Band signals reception. The inputs to the Set Top Box are L- Band composite carriers in the frequency range of 950 to 2150 MHz coming from the satellite receiving antenna systems downlink.

The STB shall ensure technical compatibility and effective interoperability amongst different DTH service providers in the Malaysia. All the requirements defined in this document shall be supported as a minimum except the requirements that are defined as optional.

### 2. Normative references

The following normative references are indispensable for the application of this Technical Code. For dated references, only the edition cited applies. For undated references, the latest edition of the normative references (including any amendments) applies.

See Annex A.

### 3. Abbreviations

For the purposes of this Technical Code, the following abbreviations apply.

See Annex B.

### 4. Requirements

#### 4.1 General requirements

The STB shall comply to all the requirements stated in this section.

In addition, if the DTH STB supports other communication module, the STB shall fulfill the additional requirements made by Malaysian Communications and Multimedia Commission (MCMC) (if any).

The STB is illustrated in Annex C.

#### 4.1.1 Power supply

The receiver may be AC or DC powered. For AC powered equipment, the operating voltage shall be 240 V +5 %, -10 % and frequency 50 Hz  $\pm$  1 % as according to MS 406 or 230 V  $\pm$  10 % and frequency 50 Hz  $\pm$  1 % as according to MS IEC 60038 whichever is current.

Where external power supply is used, e.g. AC adaptor, it shall not affect the capability of the receiver to meet this specification. Adaptor must be pre-approved by the relevant regulatory body before it can be used with the receiver. Adapter shall be subjected to test under tropical condition as specified in the related standard.

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### **4.1.2 Power supply cord and mains plug**

If the STB is fitted with power supply cord and mains plug, the power supply cord and mains plug shall be pre-approved by the relevant regulatory body with the following requirements before being used with the equipment:

- a) The power supply cord shall be certified according to:
  - i) MS 2112-5 or BS EN 50525-2-11 or IEC 60227-5 (for Polyvinyl Chloride (PVC) insulated – flexible cables/cords); or
  - ii) MS 2127-4 or IEC 60245-1 (for rubber insulated - flexible cables/cords).
- b) The mains plug shall be certified according to:
  - i) MS 589-1 or BS 1363 (for 13 A, fused plug); or
  - ii) MS 1577 (for 15 A, fused plugs); or
  - iii) MS 1578 or BS EN 50075 (for 2.5 A, 250 V, flat non-rewireable two-pole plugs with cord for the connection of class II equipment).

### **4.1.3 Electromagnetic Compatibility**

The STB shall comply with the Electromagnetic Compatibility (EMC) emissions requirements as defined in the MS CISPR 32 or equivalent international standards. The requirements shall cover radiated and conducted emission.

### **4.1.4 Electrical Safety**

The STB shall comply with the safety requirements as defined in IEC 62368-1. The supplier shall submit a full type test report of MS IEC 62368-1 or equivalent international standards.

### **4.1.5 Marking**

The STB and/or its component shall be marked with the following information:

- a) service provider identification;
- b) supplier/manufacturer's name or identification mark;
- c) equipment's brand name/trademark and model.
- d) other markings as required by the relevant standards; and
- e) MCMC certification mark (shall be affixed once the STB is certified by certification body).

The markings shall be legible, indelible and readily visible. All information on the marking shall be either in Bahasa Malaysia or English Language.

All equipment must have been designed with the ability to be serviced. Ease of maintenance must be a feature of the equipment.

The STB shall be supplied with an operation and installation manual in English or Bahasa Malaysia.



**4.1.6 Reliability**

The STB shall meet the performance requirements as defined in this standard for a life span which shall be at least five years.

**4.2 Technical requirements**

**4.2.1 Processor and Memory**

The processing power and memory configuration of the STB must be suitable for the routine operation of FTA or paid subscription digital satellite reception, (DVB-S2), together with the embedded operation of the interactive application and the provision of the routine replacement of all software via “Over-Air Download (OAD)” or (Network Direct Download) NDD update mechanism. The related parameter limits specified in Table 1 shall be complied.

**Table 1. Processor and memory requirement specifications**

Parameter	Minimum requirements
Double Data Random Access Memory (DDRAM)	At least 256 MBytes, Minimum baseline functionality
Flash	At least 256 MBytes, Minimum baseline functionality
Central Processing Unit (CPU) processor Speed	1000 DMIPS, Minimum baseline functionality

**4.2.2 Spectrum**

DTH services in Malaysia will be provided on Ku-band as in Table 2 below.

**Table 2. Frequency spectrum for DTH services in Malaysia**

Frequency Range	Band	Polarization
10.70 – 11.70 GHz	Lower Band	Vertical/Horizontal
11.70 – 12.75 GHz	Upper Band	Vertical/Horizontal

**DTH Tuning**

Upon boot up, the STB shall tune to the default entry point tuning parameter and acquire the required Program Specific Information (PSI) tables. From this tables, the STB shall build a channel list and electronic program guide information. The STB also shall support capability for manual entry tuning parameters.

**4.2.3 Video**

**4.2.3.1 Video Codec**

The STB shall be supported with the following video codec:

- a) MPEG-2: MPEG-2 MP@ML
- b) MPEG-4 video: H.264 AVC Encoding, as ISO/IEC 14496-10 2005 as constrained by ETSI TS 101 154.

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The profiles that shall be supported are as follows:

- a) MPEG-4 AVC MP@L3 SD Video stream; and
- b) MPEG-4 AVC HP@L4 HD Video stream

4K video codec is an optional feature. But manufacturers who opt to offer 4K, HEVC Video H.265: According to Part 2 - ISO/IEC 23008–2, ITU-T H.265 is mandatory.

### 4.2.3.2 Video Decoding

The following resolutions as describe in Table 3 shall be supported where applicable according to video codecs above.

**Table 3. Codec specifications**

Resolution	Frame Rate	Scanning	Aspect Ratio	Profile
720 x 576	25	Interlaced	4:3 or 16:9	MPEG-4 AVC HP @ L3 H.264
1280 x 720	50	Progressive	16:9	MPEG-4 AVC HP @ L4 H.264
1440 x 1080	25	Interlaced	16:9	MPEG-4 AVC HP @ L4 H.264
1920 x 1080	25	Interlaced	16:9	MPEG-4 AVC HP @ L4 H.264
1920 x 1080	25	Progressive	16:9	MPEG-4 AVC HP @ L4 H.264
1920 x 1080	50	Progressive	16:9	H.264

The following resolutions as describe in Table 4 shall be supported in addition by a compliant of UHD STB.

**Table 4. Codec specifications for UHD STB**

Resolution	Frame Rate	Scanning	Aspect Ratio	Profile
960x540	25/50	Progressive	16:9	H.265
960x720	25/50	Progressive	16:9	H.265
1280x720	25/50	Progressive	16:9	H.265
1440x1080	25	Interlaced	16:9	H.265
1920x1080	25	Interlaced	16:9	H.265
1440x1080	25/50	Progressive	16:9	H.265

Table 4. Codec specifications for UHD STB (continued)

Resolution	Frame Rate	Scanning	Aspect Ratio	Profile
1920x1080	25/50	Progressive	16:9	H.265
3840 x 2160	25/50	Progressive	16:9	H.264/ H.265

The STB shall support both 16:9 (widescreen) and 4:3 picture format changes, including support for the correct aspect ratio and use of the active format descriptor (AFD) as defined in ETSI TS 101 154.

For HD and UHD outputs, the STB should be able to use the EDID information provided by the sink device to automatically determine the STB output.

The STB shall provide an "Original Format" option, i.e., to output the same format as received if supported by the display, as indicated by the EDID information. If the received format is not supported; the STB should select the display mode providing the best possible video quality. This is to avoid the STB output to go black, if there is a mismatch between received format and display capabilities. It shall also be possible to manually set the default output format from the STB to a fixed format.

**4.2.4 Audio**

**4.2.4.1 Audio codec**

MPEG-1 Layer II or MPEG-2 Layer II (MP 2) audio for services will be encoded according to ISO/ IEC 11172-3. The sampling rate is 32, 44.1 and 48 kHz while the bit rates are 32, 48, 56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320 and 384 kbps.

MPEG-4 HE AAC audio for services will be encoded according to ISO/IEC 14496-3 and signalled/constrained by ETSI TS 101 154, section 6.4 and Annex C.5.

AC-3 Dolby Digital shall support both Dolby Digital (AC3) decoder and pass-through mode. Dolby Digital (AC3) shall be supported via S/PDIF interface in pass through mode only for a connection to home theatre systems as depicted in Figure 1 below.

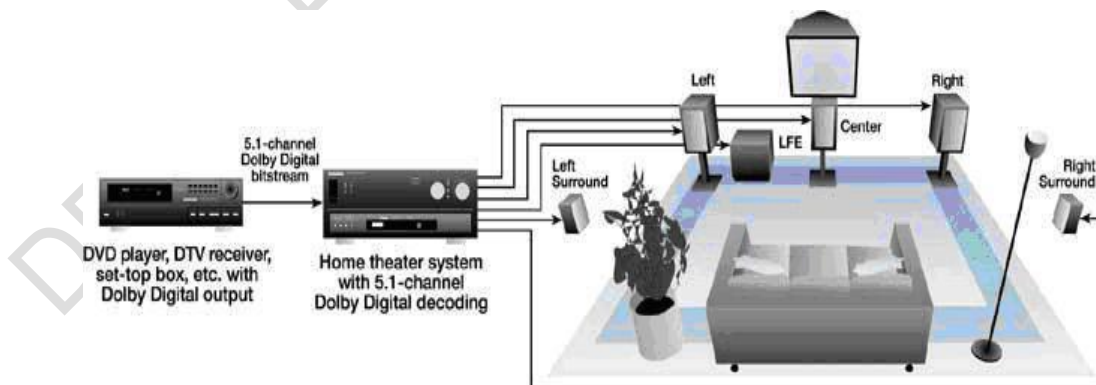


Figure 1. Dolby Digital (AC3) connection for home-theatre system

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Enhanced Dolby Digital (E-AC3) is based on ETSI TS 102 366 and signalled by TS 101 154, Annex C and constrained by clause 6.2. Sampling rates should be restricted to 32, 44.1 & 48kHz.

Only pass through of AC-3 audio to the Digital Audio Connector shall be required when E-AC3 is supported.

Dolby Digital Plus (E-AC3) shall also be supported to work with H.264/MPEG-4/ HEVC video content supporting data rates from 30kbps to 640 kbps. It shall support only up to 7.1 full-range channels.

### 4.2.4.2 Audio Decoding

Stereo only receivers shall support audio codecs above decoding including optional downmix and support of metadata as defined in ETSI TS 101 154 section 6.4.3 and Annex C.5.

Multichannel capable receivers shall support audio codecs above decoding including optional transcoding into either AC-3 or Digital Theatre System (DTS) and support of metadata as defined in ETSI TS 101 154 section 6.4.3 and Annex C.5.

The STB shall support decoding of audio bit streams. Receivers should support conversion of HE-AAC v2 Level 4 streams to either an AC-3 or DTS bit stream for output via S/PDIF or HDMI ARC. Pass through of the HE-AAC v2 Level 4-bit stream over S/PDIF or HDMI ARC may be supported.

The STB should support decoding of E-AC-3 elementary streams. Receivers should also support conversion of E-AC-3 elementary streams to an AC-3 bitstream for output via HDMI and S/PDIF. If this option is supported, the decoding and conversion of an E-AC-3 elementary stream shall conform to the requirements defined in ETSI TS 102 366 including Annex E.

### 4.2.5 Subtitle

A compliant STB shall be able to decode DVB subtitles according to the specification outlined in EN 300 743. DVB subtitles shall be invoked from a suitable labelled remote-control key which is always under the control of the STB and not controlled by the middleware application.

#### 4.2.5.1 Display of subtitles during enhanced programming

Subtitles shall be displayed on a separate logical graphics plane separate from that used for the interactive application.

### 4.2.6 Multi-Language Support

The user shall be provided with Primary and secondary language options for both subtitles and audio selection. The list of languages provided shall as a minimum contain all the languages outlined in the Table 5 below.

**Table 5. Multi- Language Support**

Language	ISO 639-3
English	ENG
Bahasa Malaysia	MSA
Chinese	ZHO
Tamil	TAM
Original Audio	QAA*

NOTE: Original audio is only applicable for Audio.

#### 4.2.6.1 Subtitle selection

The order of priority for subtitle selection shall be as follows:

- a) primary language;
- b) secondary language (optional); and
- c) receivers' own selection criteria (optional).

The STB may implement its own selection criteria after (1) & (2) fail to provide a language match.

The STB shall automatically choose the primary audio language if available and if not, choose the secondary if available. The user shall be able to select the primary and secondary language via the menu and select the preferred audio language while watching a given service.

#### 4.2.6.2 Audio selection

The order of priority for audio selection shall be as follows:

- a) primary language;
- b) secondary language (optional); and
- c) receivers' own selection criteria (optional).

The STB may implement its own selection criteria after (1) & (2) fail to provide a language match.

The STB shall automatically choose the primary audio language if available and if not, choose the secondary if available. The user shall be able to select the primary and secondary language via the menu and select the preferred audio language while watching a given service.

#### 4.2.7 Receiver Character Set

The text strings shall be coded using the character code table 00 – Latin Alphabet as specified in ISO 6937 and EN 300 468 of Annex A. It is required that the STB embedded character set is character code table 00 – Latin Alphabet. It is not required for receivers to support any other character sets within native SI.

#### 4.2.8 Conditional Access (CA)

The receiver must have at least one common interface slot, example USB complying with ETSI TS 103 605 v1.1.1 Alternatively, a smartcard or mini-sim card reader can be fitted in complying to the ISO/IEC 7810:2003, ID-000 and ISO/IEC 7810:2003, ID-1 standards accordingly.

#### 4.2.9 Modulation and Radio Frequency (RF)

The STB shall support the requirements of reception signalling as outline in Table 6 below.

Table 6. Reception of signals

<b>RF/IF Frequency Range</b>	950 MHz – 2150 MHz
<b>Input Signal Level/ Receiver Sensitivity</b>	-65 dBm to -25 dBm
<b>Supply LNB current</b>	Up to a maximum of 500 mA with overload protection; with a minimum capability of 150 mA
<b>Supply LNB Volts</b>	Vertical polarisation: 13 V dc Horizontal polarisation: 18 V dc
<b>Signalling</b>	13/ 18 V and 22 kHz tone switching
<b>DiSEqC (Digital Satellite Equipment Control)</b>	Support for 1.x or 2.x
<b>Demodulation</b>	QPSK 8PSK 16APSK 32APSK
<b>Input Symbol Rates</b>	15 – 30 MS/s
<b>Forward Error Correction (FEC) Codes</b>	LDPC + BCH 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 6/7, 8/9, 9/10
<b>LNB Local Oscillator (L.O) frequency</b>	Lower band: 10.7 GHz – 11.7 GHz Upper band: 11.7 GHz – 12.75 GHz
NOTE: Reception of signals is according to ETSI EN 302 307	

The STB shall recover from changes in modulation parameters and output an error free TS. This shall take less than one second for any change.

#### 4.2.10 Service List

After a receiver is installed, it must offer the viewer all services that may be received in that geographic region compliant with the regional services requirement. The services being broadcast may change over time. To ensure that the viewer will always be able to access all services being broadcast to the selected region, the receiver shall detect and reflect to the viewer any such changes with minimal viewer involvement.

All services have an associated Logical Channel Number (LCN). Use of the LCN ensures that the viewer becomes familiar with a specific remote control unit button number for each channel. Access to, and use of, accurate service information is essential if the viewer is to enjoy all of the content being broadcast.

#### 4.2.11 Electronic Program Guide (EPG)

Receiver middleware shall receive an EPG broadcast in DVB EIT schedule tables. The middleware application shall render the EPG on screen according to the UI specification. Through the UI, the user shall be able to browse TV listings and perform associated functions such as setting reminders (optional) and recordings (optional).

The STB shall be able to capture and display at least 7 days of EPG based on broadcasted EIT schedule information. EIT information capture shall be done in the background continuously (optional). This will enable the STB to display the Full EPG as soon as the EPG button is pressed.

#### 4.2.12 Software Upgrade

The STB shall support the following requirements as stated below:

- a) The STB shall be capable of supporting over the air download from satellite;
- b) All devices with Network capability are required to support download from Internet (optional);
- c) All devices are required to support USB upgrade (optional).

#### 4.2.13 Input and Output

The STB shall have the following ports as below.

- a) Fast Ethernet RJ45 IEEE802.3 or WiFi IEEE802.11n as minimum;
- b) Universal Serial Bus – USB 2.0 as minimum; and
- c) HDMI – shall have HDCP on for all HD and UHD broadcasts where applicable.

##### 4.2.13.1 High-Definition Multimedia Interface (HDMI)

The STB shall support High-Definition Multimedia Interface (HDMI) female output connector or an intermediate connector that provides the capable connectivity. All the features available under HDMI v1.3a specification with the HDMI Compliance Test Specification (CTS) v1.3c shall be supported.

The STB should also support the Video Electronics Standards Association- Extended display identification data (VESA-EDID) standard.

##### 4.2.13.2 HDCP Protection

The STB HDMI output shall be protected with HDCP version 1.4 for all HD video content and HDCP version 2.2 for all UHD content digital content protections for content licenses requiring HDCP protection.

HDCP copy protection shall be enabled at all times but under the control of CA/Middleware. The HDMI output shall be constrained or muted under the CA/Middleware control if an HDCP connection cannot be established. The HDCP management shall be enabled by default.

HDCP copy protection shall be enabled and disabled under the control of CA/Middleware. If not required by the content provider, HDCP is not applicable.

##### 4.2.13.3 CVBS RCA

If the manufacturer wishes to include RCA into the STB, the STB shall have a standard CVBS RCA output capable of PAL 576i output to compatible TV or video sink.

##### 4.2.13.4 S/PDIF connector

The Dolby Digital 5.1 audio should be output via S/PDIF connector as described in Table 7 below. Only Coaxial or Optical TOS Link connector shall be supported.

Table 7. S/PDIF Connector

<b>Cabling</b>	75 ohm coaxial
<b>Connector</b>	RCA (orange colour) or TOSLink
<b>Signal level</b>	0.5-1V
<b>Modulation</b>	Biphase-mark-code
<b>Sub code information</b>	SCMS copy protection info
<b>Max. resolution</b>	20 bits(24 bit optional)

It shall be possible to mute the analog and digital audio outputs simultaneously under application control.

The Dolby approved logo shall be printed on the STB subject to service providers approval.

#### 4.2.13.5 USB Port

The STB should have a minimum of 1 USB port. The universal serial bus interface shall be a USB type A and compliant with Universal Serial Bus Revision 2.0 Specification at a minimum.

#### 4.2.14 Remote control Interface

A Remote Control shall be simple and easy to use. Basic functionality such as power, volume control shall be placed on prominent locations on the remote control. Colour-coded multifunctional buttons can be included to enhance user experience and ease the navigation on the STB.

#### 4.2.15 Renewable Security

The STB design should not preclude the ability to revise or replace the conditional access algorithm for control word generation, if the system becomes compromised.

#### 4.2.16 Middleware

The STB shall support middleware system with Electronic Program Guide (EPG) application as specified by the operators.

#### 4.2.17 Transport

The transport shall be compatible with a minimum of ISO IS13818-1, MPEG-2-systems layer standard. The STB shall be able to decode an MPEG-2 system layer bitstream.



**4.2.18 Environmental Conditions**

The unit must operate with an ambient temperature range of 5 - 60°C without forced air cooling. The STB shall meet all of the performance requirements of this standard when operated intermittently or continuously under the following conditions as stated in Table 8 below.

**Table 8. Environmental conditions**

<b>Ambient temperature</b>	5°C to 60°C (Operating) 0°C to 60°C (Non-operating)
<b>Relative humidity</b>	65% noncondensing

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**Annex A**  
(normative)

**Normative references**

MS 406, *Specification for voltages and frequency for alternating current transmission and distribution systems*

MS 589-1, *13 A plugs, socket-outlets, adaptors and connection units - Part 1: Specification for rewirable and non-rewirable 13 A fused plugs*

MS 1577, *Specification for 15 A plugs and socket-outlets for domestic and similar purposes*

MS 1578, *Specification for flat non-rewirable two-pole plugs, 2.5 A, 250 V with cord, for the connection of class II - Equipment for household and similar purposes*

MS 2112-5, *Electric cable and wire - Polyvinyl Chloride (PVC) insulated cables of rated voltages up to and including 450/750 V - Part 5: Flexible cables*

MS 2127-4, *Rubber insulated cables of rated voltages up to and including 450/750 V - Part 4: Cords and flexible cables*

MS CISPR 13, *Sound and television broadcast receivers and associated equipment - Radio disturbance characteristics - Limits and methods of measurement*

MS IEC 60038, *IEC Standard Voltages*

IEC 1114-2, *Methods of measurement on receiving antennas for satellite broadcast transmissions in the 11/12 GHz band - Part 2: Mechanical and environmental tests on individual and collective receiving antennas*

IEC 60227-5, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 5: Flexible cables (cords)*

IEC 60245-1, *Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 1: General requirements*

IEC 60245-4, *Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 4: Cords and flexible cables*

IEC 62368-1, *Audio/video, information and communication technology equipment - Part 1: Safety requirements*

ISO 639 (all parts), *Codes for the Representation of Names of Languages*

ISO/IEC 7816-1, *Identification cards - Integrated circuit cards - Part 1: Cards with contacts - Physical characteristics*

ISO/IEC 7816-2, *Identification cards - Integrated circuit cards - Part 2: Cards with contacts - Dimensions and location of the contacts*

ISO/IEC 7816-3, *Identification cards - Integrated circuit cards - Part 3: Cards with contacts - Electrical interface and transmission protocols*

ISO/IEC 11172-3, *Information technology - Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s - Part 3: Audio*

ISO/IEC 14496-10, *Information technology - Coding of audio-visual objects - Part 10: Advanced video coding*

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

EN 300 421, *Digital Video Broadcasting (DVB); Framing Structure, Channel Coding and Modulation for 11/12 GHz Satellite Service*

BS 1363-1, *13 A plugs, socket-outlets, adaptors and connection units. Specification for rewirable and non-rewirable 13 A fused plugs*

BS EN 50075, *Specification for flat non-wirable two-pole plugs 2.5 A 250 V, with cord, for the connection of class II-equipment for household and similar purposes*

BS EN 50525-2-11, *Electric cables. Low voltage energy cables of rated voltages up to and including 450/750V (U0/U) - Cables for general applications. Flexible cables with thermoplastic PVC insulation*

ETSI 300 743, *Digital Video Broadcasting (DVB); DVB subtitling systems*

ETSI EN 302 307-1, *Digital Video Broadcasting (DVB); Second Generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications; Part 1: DVB-S2*

ETSI TR 102 154, *Digital Video Broadcasting (DVB); Implementation guidelines for the use of MPEG-2 Systems, Video and Audio in Contribution and Primary Distribution Applications*

ETSI TS 101 154, *Digital Video Broadcasting (DVB); Specification for the use of Video and Audio Coding in Broadcast and Broadband Applications*

ETSI TS 102 366, *Digital Audio Compression (AC-3, Enhanced AC-3) Standard*

ETSI TS 103 605, *Digital Video Broadcasting (DVB); Second Generation Common Interface (CI); Implementation Using the Universal Serial Bus (USB)*

**Annex B**  
(informative)

**Abbreviations**

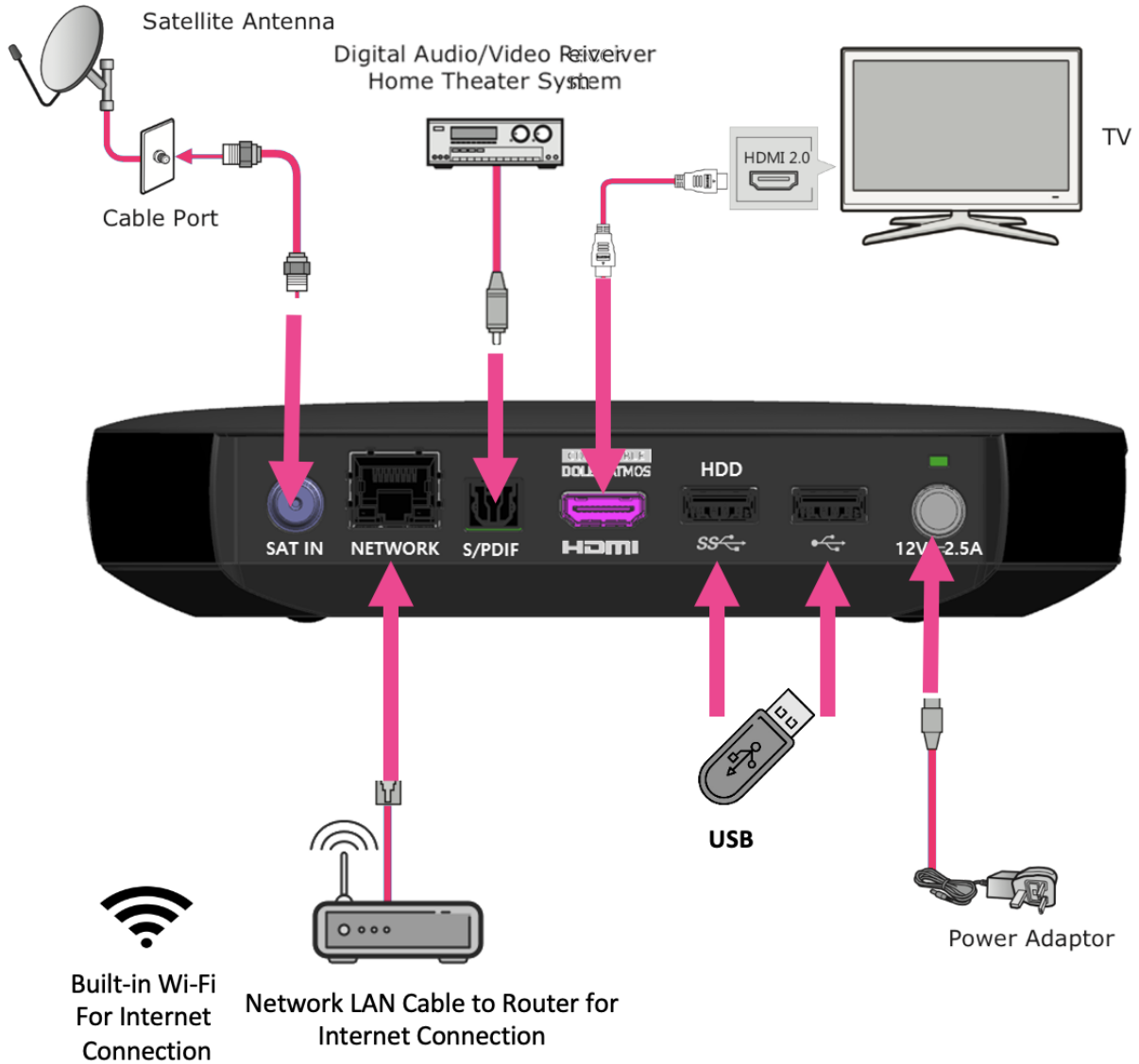
DTH	Direct to Home
DVB	Digital Video Broadcasting
EMC	Electromagnetic Compatibility
IEC	International Electrotechnical Commission
LNB	Low Noise Block Downconverter
MPEG	Motion Picture Expert Group
MS	Malaysian Standard
SRA	Satellite Receiving Antenna
STB	Set-Top Box

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**Annex C**  
(informative)

**Illustration of STB and their interfaces**

Figure C1 shows the illustration of STB and their interface. The design shall not be limited to this figure since it is provided as for the purpose of the illustration only.



**Figure C1. Illustration of STB and their interfaces**

## Acknowledgements

### Members of the Multimedia Broadcast Receiver Sub Working Group

Ts Mazlan Mahdi (Chairman)	MYTV Broadcasting Sdn Bhd
Ms Syaida Syarafina Sohaimi (Vice Chairman / Draft Lead)	SIRIM Berhad
Ts Mohammad Hafiz Halal /	Malaysian Technical Standards Forum Bhd
Mr Muhaimin Mat Salleh (Secretariat)	
Mr Muhd Kamarul Hafiz Mohd Tang	Sony EMCS Malaysia Sdn Bhd
Mr Sharad Sadhu	Fraunhofer IIS
Mr Mohd Suhairi Mohd Noor	LG Electronics (M) Sdn Bhd
Dr Mun Wai Yuen	Maxis Broadband Sdn Bhd
Mr Adrian Van Win Sen /	Measat Broadcast Network System Sdn Bhd
Mr Mohamad Isa Mohd Razhali /	
Mr. Sheikh Azhar Sheikh Razak	
Dr Ahmad Zaki Mohd Salleh /	Media Prima Berhad
Mr Asri Abd Rahman /	
Mr Imaliana Muzni /	
Mr Mohd Sharil Duki	
Ir Dr Lim Heng Siong	Multimedia University (MMU)
Mr Mohd Khairul Abdul Kadir /	MYTV Broadcasting Sdn Bhd
Mr Shamsul Najib Mohtar	
Mr Navin Kumar /	Samsung Malaysia Electronics (SME) Sdn Bhd
Mr Zainuddin Mohd Zainon	
Mr Chin Ket Ming	Sharp Electronics (M) Sdn Bhd
Mr Al Hafiz Bin Abu Bakar /	SIRIM Berhad
Ms Hafizah Zainal Abiddin /	
Ms Norhanisah Mohd Basri /	
Ms Nurhafenah Abdul Jalil /	
Mr Zul Jaafar	
Mr Bertrand Pennachio /	SmarDTV Global S.A.S
Mr Erik Gazzoni	
Mr Stephen Anthony Cleary	Sony EMCS Malaysia Sdn Bhd
Mr Najib Fadil Mohd Bisri @ Bisri	Telekom Malaysia Bhd
Mr Low Wei Yap	Wideminds Pte Ltd

**By invitation:**

Ts Amirah Jaafar Mad Ariff /

Radio Televisyen Malaysia (RTM)

Mr Karim Sadiran /

Ts Khairuddin Hj Osman /

Ms Norhanim Yahya /

Mr Wan Ariffin Wan Hussin

Mr Sallehuddin Wagimen /

Smart Digital International Sdn. Bhd. (Sirius TV)

Mr Mohd Fakhruzzaman Bin Mohd Noor

Mr Mohamad Hafizal Bin Mohamed Ariffin

Al Hijrah Media Corporation (TV Alhijrah)

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## **MALAYSIAN TECHNICAL STANDARDS FORUM BHD**

MCMC Centre of Excellence (CoE),  
Off Persiaran Multimedia, Jalan Impact  
63000 Cyberjaya,  
Selangor Darul Ehsan

Tel: (+603) 8320 0300  
Fax: (+603) 8322 0115  
Website: [www.mtsfb.org.my](http://www.mtsfb.org.my)