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Malaysian Technical Standards Forum Bhd

TECHNICAL STANDARD FOR FREE TO AIR DIGITAL TERRESTRIAL RECEIVER (SET-TOP-BOX)

MTSFB 001 : 2008

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Committee representation

The Working Group on Multimedia Terminal under whose authority this MTSFB technical standard was developed, comprises representatives from the following organizations:

Celcom Berhad
DiGi Telecommunications Sdn. Bhd.
Maxis Communications Berhad
Measat Broadcast Network Sdn Bhd (ASTRO)
Media Prima Bhd
Nat Seven Sdn Bhd
Radio Television Malaysia (RTM)
Rohde & Schwarz Malaysia Sdn. Bhd.
SIRIM Berhad
Suria FM
Telekom Malaysia
TIME dotCom Berhad
U-Mobile Sdn Bhd
Universiti Putra Malaysia

Foreword

MTSFB (Malaysian Technical Standard Forum Bhd) is a technical standard forum mandated by SKMM (Suruhanjaya Komunikasi dan Multimedia Malaysia) under section 184 of the Communications and Multimedia Act 1998.

This document was developed by the Multimedia Terminal working group under the supervision and authority of the MTSFB and is intended to define and serve as a guideline for manufacturers, consulting engineers, licensees, conformance assessment bodies and others who are responsible for designing, installing, operating, certifying or maintaining set top box devices.

This technical standard will be reviewed and revised by the Multimedia Terminal working group as necessary to ensure the growth and development of digital terrestrial television broadcasting and to meet the requirements of end users.

1   Introduction

1.1   Proposition

This baseline profile is for a High Definition (HD) as mandatory requirement while Standard Definition (SD) as backward compatible for Digital Terrestrial receiver for reception of 'Free To Air', or unencrypted services.

Items in this specification are divided into 'Required' and 'Optional' categories. Where a feature is stated as 'Required', its inclusion is necessary for the achievement of a minimum compliance with transmission requirements. Additional Optional functions may be added by the vendor to enhance the consumer proposition and these will be welcomed. In order to be compliant, where a feature is 'Optional' and is included in an offered receiver design, the optional feature must be implemented in accordance with the associated referenced standards.

This specification is not a comprehensive list of all relevant standards relating to consumer equipment that can provide digital terrestrial reception but rather a list of those standards considered relevant to requirements.

The profile is based upon open standards predominantly Digital Video Broadcasting (DVB) standards and the UK DTG D-Book or includes open implementations which are in use on the UK DTT platform. Changes and additions have been made in this document to suit the required digital terrestrial platform. This most notably, includes requirements for H.264 AVC decoding (not MPEG-2) and high definition video resolution output.

1.2   Purpose

The purpose of this document is to describe the requirements for a certified Free to Air Terrestrial receiver for Malaysia and to refer to detailed specifications that are required for conformant implementation. The profile is in the form of a hardware specification outline, together with an overview of software requirements. The software is to be routinely capable of being upgraded via 'through-the-air-download'.

1.3   Scope

The document sets out to identify the baseline functional specification of a H.264 AVC HD digital terrestrial receiver only. It does not specify the requirements of a SD receiver, which will not be certified for use on the DVB-T network. Integrated Digital Televisions (iDTV) [see separate specification] and Personal Video Recorders (PVRs) are outside the scope of this document. It is intended that a terrestrial receiver conforming to this profile should comprise part of a domestic installation, in conjunction with an external, fixed wideband terrestrial UHF antenna input. The receiver output(s) will connect to the television display (and possibly other domestic equipment).

It is the aim of the specification to ensure that the approved receiver in Malaysia satisfies the minimum requirements of each broadcaster.

1.4   Glossary

AFD	Active Format Descriptor
AC-3	Dolby Digital (5.1 Channel)
CVBS	Composite Video Blanking and Synchronization
D-Book	See technical standards listed elsewhere in this document
BER	Bit Error Rate
C/N	Carrier to Noise Ration
CLUT	(DVB) Colour Look Up Table
CVBS	Composite Video Baseband Signal

DTT	Digital Terrestrial Television
DVB	Digital Video Broadcast organization
DVB-CI	DVB-Common Interface
DVB-T	DVB-Terrestrial
DTG	Digital Television Group – a UK digital television industry organisation
EBU	European Broadcasting Union
EPG	Electronic Programme Guide
EIT	Event Information Table
FEC	Forward Error Correction
FFT	Fast Fourier Transform
FTA	Free to Air
HDCP	High-Bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
HDTV	High Definition Television
IRD	Integrated Receiver Decoder
iDTVs	Integrated Digital Televisions
MHEG-5	A standard devised for the middleware for interactive services.
MHEG	stands for "Multimedia and Hypermedia information coding Expert Group"
May	Indicates an event or provision which is permitted, but not mandatory
MP@HL	Main Profile at High Level
MP@ML	Main Profile at Main Level
MPEG	Moving Pictures Expert Group
Must	Indicates that a third party must comply to ensure correct operation (present tense) Indicates an existing provision
NIT	Network Information Table
OSD	Onscreen Display
(Opt)	Optional
PAL	Phase Alternating Line
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
(Req)	Requirement
RF	Radio Frequency
RS	Reed-Solomon
SD	Standard Definition
SDT	(DVB) Service Description Table
SDTV	Standard Definition Television
SFN	Single Frequency Network
SI	Service Information
S/PDIF	Sony/Philips Digital Interface
SSU	System Software Update
STB	Set-Top-Box, which is equivalent to a digital Terrestrial receiver
Shall	Indicates a mandatory provision
Should	Indicates a desirable, but not mandatory, provision
(TS)	Transport Stream: A data structure defined in ISO/IEC 13818-1
UHF	Ultra-High Frequency
Y/C	S-Video Signal
YCbCr/YPbPr	Component Video Signal
Will	Indicates an assumption about existing states or future events

1.5   References

[D-BOOK]   "Digital Television Group: Digital Terrestrial Television, Requirements for Interoperability, Issue 4.0"

HDMI "High-Definition Multimedia Interface; specification Version 1.3a"

HDCP "High-Definition Digital Content Protection System Revision 1.1"

EN 300 468 V1.7.1 Digital Video Broadcasting (DVB) Digital Broadcasting Systems for Television, Sound, and Data Services. Specification for service information (SI) in Digital Video Broadcasting (DVB) European Telecommunication Standards Institute ETSI

TR 101 211 V1.7.1 Digital Video Broadcasting (DVB); guidelines on implementation and usage of Service information(SI)

EN 300 472 v1.2.2 Digital Video Broadcasting (DVB) Digital Broadcasting Systems for Television, Sound, and Data Services. Specification for conveying ITU-R system B Teletext in Digital Video Broadcasting (DVB) Bitstreams. European Telecommunication Standards Institute ETSI.

EN 300 744 v.1.5.1 Digital Video Broadcasting (DVB); DVB Framing structure, Channel coding and modulation for digital terrestrial television. European Telecommunications Standards Institute. ETSI.

TR 101 190 v.1.2.1 Digital Video Broadcasting (DVB); Implementation guidelines for DVB terrestrial Transmission aspects.

ETR 101 154 v1.7.1 Digital Video Broadcasting (DVB); Implementation Guidelines for the use of video and audio coding in Broadcasting Applications based on the MPEG-2 transport stream

ETSI 162 Digital Broadcasting Systems for Television, sound and data services, allocation of service information (SI) codes for digital Video Broadcasting (DVB) systems. European Telecommunication Standards Institute. ETSI.

ETSI 300 743 Digital Video Broadcasting (DVB); DVB Subtitling Systems. European Telecommunication Standards Institute. ETSI.

ISO/IEC 14496-10 2005 Information Technology – Coding of audio visual objects – part 10 – Advanced Coding

[ETSI-MHEG] MHEG Broadcast Profile ETSI ES 202 184 v1.1.1" Logical Channel Numbering The logical channel numbering specification used is the Australian variation to the UK specification.

NorDig Unified ver 1.0.2 NorDig Unified Requirements for Integrated Receiver Decoders for use in cable, satellite, terrestrial and IP-based networks.

2   Overview

This specification uses the UK DTG D-BOOK (V4) as its primary reference, in particular Chapter 22, Receiver Requirements, and Chapters 23-27 relating to receiver behaviour and diagnostics with changes/modifications to suit digital Terrestrial broadcasting in Malaysia.

3   Receiver Profile

3.1   Processor and Memory

The processing power and memory configuration of the receiver must be suitable for the routine operation of FTA digital Terrestrial reception, (DVB-T), together with the embedded operation of MHEG-5, and the provision of the routine replacement of all software via "over-air download". The related parameter limits specified in this section are believed to be the minimum necessary to achieve these requirements.

3.1.1 DDRAM   : 128 Mbytes, Minimum baseline functionality
3.1.2 Flash   : 8 Mbytes, Minimum baseline functionality
3.1.3 CPU Processor Speed : 300MHz, Minimum baseline functionality

3.2. Services Summary

The receiver must give access to all Malaysia free-to-view broadcast digital Terrestrial television, radio and enhanced/interactive television services. This must include the capability to efficiently present radio channels, DVB subtitles, Digital Text and Enhanced Broadcast elements of all services. It must present DVB subtitles when broadcast and if requested by the viewer; manage the output video in both widescreen 16:9 and 4:3 picture formats to suit the connected display. Where possible receivers should be able to present both subtitles and interactive graphics simultaneously. However, not all receivers may be able to do this, the result being that interactive content will not always be available to viewers that wish subtitles to be presented.

3.2.1 Time-exclusive Services

The receiver shall handle the transition between the active and inactive states of a time exclusive service in an orderly fashion, presenting clean transitions into and out of video, audio and inter-active content streams without presentation of any content or application not intended for the selected service.

3.3 Functions

3.3.1 MPEG4 video: H.264 AVC Encoding, as ISO/IEC 14496-10 2005 (Information Technology – Coding of audio visual objects – part 10 –Advanced Coding) - (Req)

3.3.2 MPEG2 Video: MPEG 2 MP@ML, video resolution, 720x576 (PAL) Opt ISO/IEC 13818 (Opt)

3.3.3 HDTV Formats:

Resolution / Frame Rate/ Scanning / Aspect Ratio

1080p50: 1920x1080 / 50 / Progressive / 16:9 (Opt)
1080p25: 1920x1080 / 25 / Progressive / 16:9 (Opt)
1080i25: 1920x1080 / 25 / Interlaced / 16:9 (Req)
720p50 1280 x720 / 50 / Progressive / 16:9 (Req)
720p25 1280x720 / 25 / Progressive / 16:9 (Req)

3.3.4 SDTV Formats:

Resolution / Frame Rate / Scanning / Aspect Ratio

576p25:720x576 / 25 / Progressive / 16:9 and 4:3 (Opt)
576i25 : 720x576 / 25 / Interlaced / 16:9 and 4:3 (Req)

Within the Menu System and/or Remote control of the receiver an option is provided to change the output video format as required by the user. The receiver is not to output a HD format on any analogue video outputs. The receiver is to perform a down-conversion or up-conversion from any valid input resolution to a user selected video resolution output. If the Video Output format option is in the menu structure of the receiver for the user to manually select then a pop-up message will appear to confirm the selection or reset automatically to the default selection after a time-out period (similar to changing the output format change display in windows operating system).

3.3.5   Audio Decoding

Dolby Digital (AC-3) 32, 44.1 & 48KHz – Pass Through Only,[ISO/IEC 14496-3] and signalled by TS 101 154, Annex C. Only Pass through of DD audio to the Digital Audio Connector is required (Req).

Dolby Digital (AC-3) 32, 44.1 & 48KHz – Downmix to stereo Pair . ISO/IEC 14496-3 and signalled by TS 101 154, Annex C – Downmix to the Stereo Pair (Opt)

MPEG-4 HE AAC (mono and stereo level 2 bitstreams only), [ISO/IEC 14496-3]. HE AAC audio for services will be encoded for the stereo pair. It is optional for the receiver to decode multi-channel level 4 bitstreams (Req)

3.3.6   Subtitles:

DVB Subtitles. [ETSI EN 300 743 V1.3]
DVB subtitles shall be invoked from a suitable labelled remote control key which is always under the control of the receiver. i.e. not under control of receiver group 3 of MHEG. (Req)

The subtitle language shall support Roman based (Bahasa Malaysia, English), Simplified Chinese and Tamil. (Req)

3.3.7   Display of Subtitles During Enhanced Programming

Where both are components of a service, ability to simultaneously present both Subtitles and interactive application graphics if required by viewer preferences. (D-Book sections 17.4 and 15.2).Receivers that are capable of simultaneously presenting both subtitles and interactive application graphics must observe the rules enabling applications to suspend presentation of Subtitles where editorially required (Opt).

3.3.8   Teletext

A receiver shall have the facility to acquire teletext as defined in EN 300 472 (DVB: Specification conveying ITU-R System B Teletext in DVB Bitstreams) and reinsert it in the vertical blanking interval (VBI) of the composite video output according to specification ITU-R BT.653-2, Teletext Systems and / or b/ include a Teletext decoder as defined by ETSI standard 300 706 Enhanced Teletext Specification including up to Teletext V1.5 and display Teletext pages on the attached TV or video monitor via an onscreen-display (OSD) that can be viewed via all available video output interface signals. A suitable remote control button other than the 'TEXT' button must be provided to launch the Teletext OSD display. Receivers must support Teletext either via OSD or VBI pass-through mechanisms. Providing the alternative mechanism as well is optional (Req).

3.3.9   Digitext

A Digitext service may be provided via an MHEG-5 Application. This will be accessed by the "TEXT" Button on the RCU. Via an MHEG-5 Application (Req).

3.3.10   Multi-Language Support

The receiver is to at least support a primary and secondary audio language based on the ISO 639 language descriptors associated with the audiostreams in the ISO/IEC 13818 MPEG2 transport stream. If the secondary audio language is not present then the receiver shall automatically choose the primary audio language (Req).

3.3.11   Widescreen

For SD video resolution output format D-Book V4 Section 3.4 and Section 24.2 (Req).

3.3.12 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. Receiver shall not support WSS insertion on any analogue outputs (Req).

3.3.13 Processing of 14x9

Receiver may offer the option of a 14:9 (letter box) format when working with SD outputs on 4:3 displays (D-Book section 24.) (Opt)

3.3.14 OSD

Support for 3 graphics layer model (Req)

- Image Layer (a full colour layer to display IFrame stills captured from the video decoder) Layer to support: Y=8 bit, Cb=8 bit, Cr=8 bit Chroma to be sub-sampled to either 4:2:0 or 4:2:2 Alpha blending need not be supported, but the layer may be shown or hidden. Background Image shall be I-Frame only.
- Video Layer (a full colour layer displaying the output of the MPEG video decoder) Layer to support: Y=8 bit, Cb=8 bit, Cr=8 bit Chroma to be sub-sampled to either 4:2:0 or 4:2:2 Alpha blending need not be supported, but the layer may be shown or hidden.
- OSD/Graphics Layer (an 8-bit palletised layer which can display region-based graphics) Each CLUT palette entry to support: Y=6 bit, Cb=4 bit, Cr=4 bit. Chroma to be sub-sampled to either 4:2:0 or 4:2:2. Alpha blending to be support both 6 bit across the entire layer, and 2 bit per pixel, but need not at the same time.

3.3.15 Receiver Character Set

The Character set of the receiver shall be the Character code table 00 – Latin Alphabet as specified in IS0 6937 (Req).

3.3.16 Common Interface

The receiver is to incorporate the DVB-CI Interface standard otherwise known as the Common Interface which is a part of the DVB extended specifications for an open platform. The receiver with Common Interface must also comply with the EN 50221-1997 standard. (Opt)

3.4 Tuner / Decoder

In accordance to EN300 744 Rev R1.4.1 (Req).

3.4.1 RF Input Connector

In accordance to IEC 60169-2 (Req).

3.4.2 RF Loop-through Connector

In accordance to IEC 60169-2 (Opt)

3.4.3 Loop-through

Gain 0 dB typical. If RF loop through connector supplied (Opt).

3.4.4   Input Impedance

75 ohm nominal (Req)

3.4.5   Modulation

COFDM (Req)

3.4.6   UHF Frequency Range

470MHz to 860MHz UHF bands IV and V (Req)

3.4.7   Channel Bandwidth

8MHz (Signal Bandwidth 7.61MHz). The receiver shall be able to receive carriers within an offset of upto 50KHz from the nominal centre frequency (Req)

3.4.8   Input Signal Level / Receiver Sensitivity

Required signal power (dBµV) for 2x10-4 post Viterbi. Guassian transmission channel assumed. QPSK, 16-QAM, 64-QAM (Req)

3.4.9   Receiver Noise Performance

Better than 7dB noise figure in the UHF Band IV and V (Req)

3.4.10   Receiver Implementation Margin

Better than 1.5dB, With reference to C/N values given in the D-Book, section 9.12, for all modulation and code rates listed (Req).

3.4.11   Interference Immunity

Values as stated in Tables 14, 15, 16, 17, 18, 19, 22 and 23 ITU-R BT. 1368-6 document (Req).

3.4.12   FFT Size

Receiver shall be capable of detecting and presenting services transmitted using 2K and 8K carriers (Req).

3.4.13   Demodulation

QPSK, 16 QAM and 64 QAM, as specified by EN 300 744 (Req).

3.4.14   Forward Error Correction

Codes : ½, 2/3, ¾, 5/6, 7/8, Auto, as specified by EN 300 744 (Req)

3.4.15   Guard Interval

Tu/4, Tu/8, Tu/16, Tu/32, as specified by EN 300 744 (Req)

3.4.16   SFN Operation

There shall be regions mainly in metropolitan areas where SFN will be in use. TS 101 191

V1.4.1 (06/04) Mega-frame for Single Frequency Network (SFN) synchronization (Req)

3.4.16a Tolerance to Equal Amplitude SFN Signals

The receiver shall continue to correctly demodulate and decode the DVB-T signal in an SFN environment when there are two or more signals of equal amplitude present at the receiver input, provided the maximum time difference between the signals is less than 90% of the guard interval. It is assumed the amplitude of each signal is greater than that specified in 4.8 (Req)

3.4.16b FFT Window Positioning Strategy

Manufacturers are requested to advise of which of the 5 generic strategies described in [EBU SFN Receiver Paper] is used to synchronise the start of the FFT time window when there are several SFN signals present at the receiver input. This information is requested to assist in modelling SFN coverage only (Req).

3.4.17   Scanning for Multiplexers

The STB will perform an automatic scan based on the NIT information. It shall find all DTT multiplexers within its cell and shall tune in to the correct DVB structure, channel coding, modulation and shall display all services. Before an automatic search the receiver shall delete all services currently held in the service list. It addition to an automatic search it shall be possible to perform a manual search where the channel number (id) or frequency is entered. New channels shall be added to the service list. No duplicated channels shall be displayed in the service list. The existing list should be overwritten with the new one and if the process failed, the last stored list shall be restored. (Req)

3.5   Over-Air Software Download

The receiver shall support DVB System Software Update (SSU) to at least the simple profile. ETSI TS 102 006 refers (Req)

3.6   Service Information & Selection: Summary

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 is always able to access all services being broadcast to the selected region, the receiver must detect and reflect to the viewer any such changes with minimal viewer involvement. All services have an associated (Logical) Channel Number. Use of the logical channel number 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. Receivers must offer a complete list of available unencrypted services and information as carried in *'DVB S.I. EIT present/following'* about the current and following programmes. A comprehensive multi-day programme schedule will be broadcast as an EPG service to an MHEG-5 to the receiver.

3.6.1   Scanning for Services

The receiver shall be capable of automatically detecting changes in the services configuration of each broadcast transport stream provided that such changes are implemented by the broadcaster in accordance to the 'transmission rules' and are compliant with the DVB-SI

standards, [ETSI EN 300 468], [TR 101 211]. The intent of this requirement is to allow the broadcaster to vary the services offering within the relevant broadcast transport stream(s) without the viewer needing to rescan the receiver (Req).

3.6.2   Logical Channel Numbers

Ability to locate, store and handle services with Logical Channel Numbers (LCNs) within the ranges of 1 to 999 (Req).

3.6.3   Identification of Service Changes

Automatic identification / storage of services or service changes, without the need for user intervention, by reference to the SDT and/or NIT within 24 hours in the presence of correct SDT signaling (Req)

3.6.4   Selection via Service List

The initial displayed service list following a full automatic scan must present services in ascending order of LCN (Req)

3.6.5   Selection via Numeric Entry

Service selection via numeric entry shall always select a service with a corresponding LCN regardless of any viewer favourites (Req)

3.6.6   Hidden Services

Services identified as "hidden" in the LCN descriptor shall not appear in the service list presented to the viewer. In addition such services may also be identified as not selectable by numeric entry (Req)

3.6.7   EPG "Now/Next"

'Now / Next' screen guide shall be derived using information from DVB SI EITp/f tables as per EN 300 468. The presentation of the now/next banner is as per manufactures chosen user interface but it is desirable for the following information to be displayed in the bottom third of the screen.

- Current time
- Start time of now and next programme
- End time of now and next programme
- Logical Channel Number
- Channel Name
- Date
- Event name
- Short description
- Extended description
- Genre
- Sub-genre
- Parental ratings

The EPG "Now and next" shall be displayed when the user launched using the i (info) button on the remote control. If a descriptor is missing from the EIT table – the receiver shall not display an error message. (Req)

The EPG "Now and next" should be displayed when the user changes channels for approx 2 secs. (Opt)

3.6.8 EPG "Schedule":

An 7-day EPG will be provided as an MHEG-5 application. This application will be invoked

using the EPG button on the remote control. If a native EPG is resident in the receiver this can be invoked by the receivers' menu system. (Req)

Repeat information and Keyword searching can be added (Opt).

3.6.9 TDT / TOT:

The receiver shall have a real time clock / calendar running continuously. The clock shall be updated by the incoming TDT and TOT table in the SI. The receiver shall display the local time. (Req)

3.7.0 Copy Protection Digital Outputs

The receiver will provide HDCP digital content protection on the HDMI output. (Req)

3.8.0 Set-up and I/O

3.8.1 Easy to Use and Simple Documentation

Receivers shall be simple to set up and operate and be provided with clear easy to understand user documentation in line with that requirement. (Req)

3.8.2 Support Package

The following peripheral items should be included within a baseline receiver package:

- An RF lead/cable for connection of loop-through connector to a second receiver (500mm min length; male F-connectors each end). (Opt)
- Composite (CVBS) and stereo audio RCA cable. (1m min length). (Req)
- Component video and stereo audio RCA cable(s) (1m min length). (Opt)
- HDMI Cable. (Opt)
- Remote control and batteries. (Req)
- An easy to understand user manual in English language. (Req)
- Coaxial cable for digital audio (Opt)

3.8.3 Status

A basic status check shall be invoked by a menu driven option or a user selected key. The OSD is to present the reception quality, signal strength indicator, Channel ID and Video and Audio PIDs. (Opt)

3.9 Outputs

3.9.1 Primary Output.

HDMI (HDCP) is a requirement. Support for AC-3 via the HDMI is optional

3.9.2 Secondary Output.

- RCA (phono) providing: Component YPbPr. Shall only provide SD video resolution (max: 702x576) output. Shall meet the characteristics in ITU report 624-4 (Opt)

- RCA (phono) providing composite (CVBS) video. Shall meet the characteristics in ITU report 624-4 (Req)

- TV SCART with both composite (CVBS) and RGB or YPbPr selectable Audio output (L,R). SCART shall support widescreen switching on pin 8. Opt Shall only provide SD video resolution (max: 702x576) output. EN 50049-1 (Opt)

3.9.3 Analogue Phono Audio

RCA Audio left (Colour – white) & Right (Colour –Red) connectors. (Req)

3.9.4 Dolby Digital

SPDIF for pass through of Dolby Digital (AC-3) Either an Optical and/or Coaxial Digital Audio Output(s). Manufactures are requested to state connector type. (Req)

3.9.5 UHF Modulator

Tuneable to UHF channels 21 to 69 (Opt)
RF Connector – 75 ohm, IEC 169-2, Male/Female (Opt)

- Frequency – 470 to 860 MHz
- TV Standard PAL BG/I/DK
- Preset Channel – 22

3.9.6 RF Loop-through

RF Loop-through connector (Opt)

3.9.7 Data Interface

The receiver shall have a data interface to perform software upgrades and should comply to one of the following options. (Req)

- Universal Serial Bus (USB)
- RJ 45 (Ethernet IEE802.3)
- Appropriate Memory Card

3.9.8 Remote Control

A Remote Control is to be supplied with the receiver. The manufacture is free to design the remote control but the basic key functions and button labels should be as D Book Chapter 25 "Remote Control Key Labelling" (Req)

The EPG button will launch the MHEG- 5 EPG application.
The TEXT button will launch the MHEG-5 Digitext application.
The RED button will launch any available MHEG-5 Interactive application.

3.10 Maintenance & Upgrade:Summary

To allow for software changes in either, receivers must be upgradeable in a practical manner, i.e. over-air download. The process of upgrading should cause minimal disruption to the viewer. However, to minimize the diversity of deployed software builds and to most efficiently use the available broadcast capacity, the receiver must detect and act upon the broadcast of a relevant software download within 24 hours of its transmission commencing.

3.10.1 Auto-upgrade

Receivers shall be capable of automatic (i.e. not user initiated) software upgrade by over-air download with minimal interruption to the viewer and within 24 hours of availability of the download under normal operating conditions. (Req)

3.10.2 Download Mechanism

Support for the use of DVB SSU, to at least the simple profile as defined in ETSI TS 102 006 is required. (Req)

3.10.3 Downloads in Any Carrier Signal

Receivers shall be able to handle the presence of software downloads in any NIT referred carrier signal. (Req)

3.10.4 Middleware

A new MHEG 5 profile is required for a receiver to correctly handle interactive application. (Req)

3.10.5 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 ± 1 % as according to MS 406 or 230 V ± 10 % and frequency 50 Hz ± 1 % as according to MS IEC 60038 whichever is current. (Req)

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. (Req)

3.10.6 Power Supply Cord and Mains Plug

The receiver shall be fitted with a suitable and appropriate approved power supply cord and mains plug. Both are regulated products and must be pre-approved by the relevant regulatory body before it can be used with the receiver. (Req)

The power supply cord shall be certified as according to:

  a) MS 140; or
  b) BS 6500; or
  c) IEC 60227-5; or
  d) IEC 60245-4.

The main plug shall be certified as according to:

  a) 13 A fused plugs: MS 589: Part 1 or BS 1363: Part 1; or
  b) 15 A plugs: MS 1577 or BS 546; or
  c) 2.5 A, 250 V, flat non-rewirable two-pole plugs: MS 1578 or BS EN 50075.

3.10.7 Electromagnetic Compatibility

The receiver shall comply with the EMC emissions requirements as defined in the MS CISPR 13 or equivalent international standards. The requirements shall cover radiated and conducted emission. (Req)

3.10.8 Electrical Safety

The receiver shall comply with the safety requirements as defined in MS IEC 60950-1. The supplier shall submit full type test report of MS IEC 60950 -1 or equivalent international standards. (Req)

3.10.9 Marking

The receiver shall be marked with the following information:

      a) supplier/manufacturer's name or identification mark;
      b) supplier/manufacturer's model or type reference; and
      c) other markings as required by the relevant standards.

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

4   Key Elements of Software

A number of software elements, in addition to those required for basic services, will need to be available or developed prior to launch. They are:

4.1   EPG

An 7-day EPG service will be broadcast on all multiplexes as an MHEG-5 application. The MHEG-5 Application will enable the user to navigate through all platform services. The user experience should be consistent across all receivers.

4.2   Subtitles

According to EN 300 743 v1.3.1– Digital Video Broadcast (DVB); Subtitling Systems.

4.3   Interactive Services

These services will be developed utilising MHEG-5 V1.06 applications

4.4   Software Upgrades

A service for providing firmware updates to receivers will be available on the home transport stream using the DVB specification for SSU.

4.4.1. All conforming receivers shall be capable of a systems software update using the simple profile defined in – ETSI TS 102 006.

4.4.2. Manufacturers shall ensure that the receiver offered shall only respond to a unique OUI code, (Organisation Unique Identifier). This means that the receiver offered shall not react to any other OUI from any other manufacturer nor react to any other OUI from the same company which relates to a different model receiver.

4.4.3. The default DVB-SSU mode for receivers shall be with DVB-SSU "enabled".

4.4.4. For Conformance testing manufacturers will be required to deliver two ASI transport streams containing relevant converted binary image files, together with all relevant NIT and PMT data necessary for their receiver to properly undergo a successful DVB-SSU operation. One stream will replace the software in the receiver as demonstrated by a new version number, or some other visible indicator, the other will restore the receiver to its then current configuration.

4.4.5 Icons for components such as subtitle/multilingual/widescreen/audio type shall be considered.

Acknowledgements