
UCC STANDARD FOR DIGITAL VIDEO BROADCAST (DVB) RECEIVERS

**Digital Video Broadcasting -
Terrestrial (DVB-T2, DVB-T2
Lite, DVB-H, DVB-NGH)**

**Digital Video Broadcasting -
Satellite (DVB-S2, DVB-S2X,
DVB-SH)**

**Digital Video Broadcasting -
Cable (DVB-C, DVB-C2)**

**Digital Video Broadcasting -
Internet Protocol TV (DVB-IPTV)**

**Digital Video Broadcasting -
Common Interface Plus (DVB-
CI+)**

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SYMBOLS AND ACRONYMS

AAC	Advanced Audio Coding
AFD	Active Format Description
CI	Common Interface
CI+	Common Interface Plus
CISPR	Special International Committee on Radio Interference
CVBS	Composite Video Broadcast Signal
dB	decibel
dBm	decibel-milliwatt
DTT	Digital Terrestrial Television
DVB-T2	Digital Video Broadcasting - Second Generation Terrestrial
DVB-S2	Digital Video Broadcasting - Second Generation Satellite
DVB-S2X	Digital Video Broadcasting - Second Generation Satellite Extension
DVB-C	Digital Video Broadcasting - Cable
DVB-C2	Digital Video Broadcasting - Second Generation Cable
DVB-IPTV	Digital Video Broadcasting - Internet Protocol Television
EPG	Electronic Programme Guide
ETSI	European Telecommunication Standards Institute
FTA	Free-To-Air
HbbTV	Hybrid Broadcast Broadband TV
HDCP	High-bandwidth Digital Content Protection
HDMI	High Definition Multimedia Interface
HDTV	High Definition Television
HE AAC	High Efficiency AAC
IEC	International Electrotechnical Commission
ISO	International Organisation for Standardisation
ITU	International Telecommunication Union
LCN	Logical Channel Number
MHz	Megahertz
MPEG	Motion Picture Experts Group
NIT	Network Information Table
OSD	On Screen Display
PID	Packet Identifier
PSI	Programme Specific Information
RIT	Real Time Clock
RCU	Remote Control Unit
RF	Radio Frequency
SDTV	Standard Definition Television
SFN	Single Frequency Network
SI	Service Information
S/PDIF	Sony/Philips Digital Interface
UCC	Uganda Communications Commission
UHF	Ultra High Frequency
USB	Universal Serial Bus
VHF	Very High Frequency
WLAN	Wireless Local Area Network

1. INTRODUCTION

The Uganda Communications Commission (UCC) standard for DVB – Receivers is established to enable equipment manufacturers and/or suppliers of DVB Receivers for the Ugandan market, to provide receivers that are compatible to the available broadcast standards and provide the desired fixed and mobile reception of DVB transmissions.

In this document the phrases below may be used to define particular requirements, where a particular requirement is not provided for in this document, the manufacturer may provide the same at their discretion.

PHRASE	INTERPRETATION
“SHALL”	MANDATORY REQUIREMENT
“CAN”	HIGHLY RECOMMENDED REQUIREMENT
“MAY”	OPTIONAL REQUIREMENT

1.1. Document History

Release - Version	Revision / Version	Date	Comments
UCC Standard for Digital Video Broadcast (DVB) Receivers	Ver. 01	Pending Approval	
Minimum Requirements for DVB-T2 STBs for the Ugandan market	Rev. 03	June 2015	UCC made the following TEMPORARY REVISIONS to the Minimum Requirements for DVB-T2 STBs; <ul style="list-style-type: none"> Relaxing the requirement for Volume Buttons from MANDATORY to HIGHLY RECOMMENDED
Minimum requirements for DVB-T2 STBs for the Ugandan market	Rev. 02	June. 2014	UCC made the following REVISIONS to the Minimum Requirements for PAY TV DVB-T2 STBs; <ul style="list-style-type: none"> CI+ requirement relaxed from MANDATORY to HIGHLY RECOMMENDED.
Minimum requirements for IDTVs for the Ugandan market	Rev. 01	August 2014	UCC made the following REVISIONS to the Minimum Requirements for IDTVs; <ul style="list-style-type: none"> Amended “Certification Mark” to “Type Approval Mark” RF and HDMI cables excluded from the IDTV support package. Provision of an electronic manual relaxed from MANDATORY to RECOMMENDED. PSI/SI and PID update time increased from 1000ms to 10s. Mandatory factory default for Multiple Subtitling Language amended from MULTIPLE to ENGLISH Languages and Fonts requirement left to the discretion of the manufacturer, as long as Alpha Numeric Characters are used. Over specification details for PARENTAL RATING were EXCLUDED. ACTIVE POWER specification at First-time Power Up was EXCLUDED. RF Connector reference standard changed from IEC 60169-2 to IEC 61169-2 HDMI slot from HDMI Output to HDMI Input. HDCP requirement EXCLUDED. USB data interface required as a MANDATORY requirement.
Minimum requirements for DVB-T2 STBs for the Ugandan market	Rev. 01	February 2014	The Uganda Communications Commission REVISED the minimum specification requirements for DVB-T2 STBs for the Ugandan Market, as follows: <ul style="list-style-type: none"> Power supply requirement amended to allow DC-powered STBs.

			<ul style="list-style-type: none"> • CI+ requirement relaxed to OPTIONAL for FTA STBs. • Audio and Video Interfaces; <ul style="list-style-type: none"> ✓ SCART interfaces relaxed from MANDATORY to OPTIONAL. ✓ RCA Audio Output changed to a MANDATORY requirement.
Minimum requirements for IDTVs for the Ugandan market	Ver. 01	Nov. 2013	The Uganda Communications Commission RELEASED detailed minimum specification requirements for Integrated Digital Television Sets (IDTVs) for the Ugandan Market.
Minimum requirements for DVB-T2 STBs for the Ugandan market	Ver. 01	May 2013	The Uganda Communications Commission RELEASED detailed minimum specification requirements for DVB-T2 STBs for the Ugandan Market.
Basic specification requirements for STBs	Rev. 01	Sept. 2012	UCC REVIEWED the basic specification requirements for STBs, introducing the Common Interface (CI+) as a MANDATORY requirement.
Basic specification requirements for STBs	Ver. 01	June. 2012	UCC RELEASED basic specification requirements for STBs to be used on the Ugandan market.

1.2. Definitions

For the purpose of this document, the following definitions apply:

- a) **Digital Video Broadcasting (DVB):** is a suite of internationally accepted open standards for digital television;
- b) **Free-to-Air:** A Service which is broadcast and capable of being received without payment of subscription fees;
- c) **Multiplex:** A group of Digital Video/Audio Channels that are combined together into one output signal for broadcast;
- d) **Set Top Box:** A stand-alone device that converts a Digital Video Broadcast signal to analogue video and audio signals for presentation on a television receiver or other suitable display device;
- e) **Integrated Digital Television (IDTV):** This is a television with an in-built tuner for receiving and displaying digital TV transmissions, and;
- f) **Dongle:** is a small piece of hardware that connects to another device to enable reception of Digital Video Broadcasts.
- g) **Basic TV:** corresponds to requirements for reception of basic (*video and service information*) DVB services that do not depend on enhancements by applications or interaction.
- h) **Hybrid TV:** corresponds to requirements for reception of Enhanced (*basic services with data and interaction capabilities*) DVB services, that depend on a standardised Application Programme Interface according to Hybrid Broadcast Broadband Television (HbbTV) Specification Version 1.5 (ETSI TS 102 796).
- i) **Terrestrial Receiver.** A receiver meant for the reception of Terrestrial Signals (DVB-T2) according to the ETSI EN 3302 755¹ standard.
- j) **Satellite Receiver.** A receiver meant for the reception of Satellite Signals (DVB-S2) according to the ETSI EN 302 307-1² standard.
- k) **Cable Receiver.** A receiver meant for the reception of Cable Signals (DVB-C/ DVB-C2) according to the EN 300 429³ and (or) ETSI EN 302 769⁴ standard.
- l) **IP Receiver.** A receiver meant for the reception of IP based services (DVB-IPTV) to the ETSI TS 102 034⁵ standard.
- m) **Combo Receiver.** A receiver equipped with at least two tuners, for reception of DVB services on different platforms (i.e. either; Terrestrial, Satellite, Cable or IP).

¹ **ETSI EN 3302 755:** Digital Video Broadcasting (DVB); Frame Structure channel coding and modulation for a second generation digital terrestrial broadcasting system (DVB-T2)

² **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

³ **EN 300 429:** Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for cable systems

⁴ **ETSI EN 302 769:** Digital Video Broadcasting (DVB); Frame structure channel coding and modulation for a second generation digital transmission system for cable systems (DVB-C2)

⁵ **ETSI TS 102 034:** Digital Video Broadcasting (DVB); Transport of MPEG-2 TS Based DVB Services over IP Based Networks

1.3. Referenced Standards

All standards referenced in this document are subject to revision. Therefore, Parties to agreements based on such standards are encouraged to take steps to ensure the use of the most recent editions of the standards referenced in this document.

2. SCOPE

This document specifies a standard for equipment that receive DVB related services (Free-to-Air and subscription services) from Terrestrial, Cable and Satellite digital broadcast networks.

The types of receivers include Set Top Boxes, Integrated Digital TVs, Mobile Receivers and Dongles.

2.1. Receiver Classification/ Categorisation

2.1.1. Receiver Profiles

For the purpose of this document, the following Receiver Profiles apply:

- a) **Basic TV.**
- b) **Hybrid TV.**

2.1.2. Receiver Categories

For the purpose of this document, the following DVB Receiver categories apply:

- **Terrestrial Receiver.**
- **Satellite Receiver.**
- **Cable Receiver.**
- **IP Receiver.**
- **Combo Receiver.**

§X.X	REQUIREMENT DESCRIPTION	SET TOP BOXES		INTEGRATED DIGITAL TVs		MOBILE RECEIVERS	DONGLES
		Basic	Hybrid	Basic TV	Smart TV		

3. GENERAL REQUIREMENTS

3.1. Equipment Identification	3.1.1. Brand Name and Model The receiver shall be marked with the supplier or manufacturer's Brand name and Model Markings shall preferably be on the Receiver front panel and shall be Legible, Indelible and Readily Visible	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
	3.1.2. UCC Type Approval Mark All DVB receivers shall upon Type Approval, be marked with: ➤ The UCC Serialised Type Approval Mark ⁶ . The mark shall be legible, Indelible and Readily visible.	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
3.2. EMC, and Equipment Immunity	The Receivers shall comply with the relevant Electromagnetic Compatibility (EMC) and Equipment Immunity Standards.	➤ CISPR(CISPR 13 ⁷ , CISPR-20 ⁸ , CISPR-22 ⁹), ➤ IEC (IEC 6100-3-2 ¹⁰), ➤ EN (EN 55013 ¹¹ , EN 55020 ¹² , EN 55022 ¹³ , EN 55024 ¹⁴) or ➤ Any other equivalent international Electromagnetic Compatibility (EMC), and Equipment Immunity standards					
3.3. Safety Requirements	The Receivers shall comply with the relevant International Safety Standards	➤ IEC 60065:2014 Any other internationally acceptable standards					
3.4. Power Supply	All DVB receivers shall either be AC powered or DC powered	➤ AC {Mains: 230V±10% /50 Hz ±2%} OR ➤ DC {Source: 12V} Incorporated protection against over/under-voltage and reversed polarity. NOTE: Dongles may or may not be powered by the host device/ equipment.					
3.5. Power Supply Cord and Mains Plug	The power supply cord shall conform to the relevant International standards. The power supply cord may or may not be applicable for Dongles.	➤ BS 6500 , ➤ IEC 60227-6, IEC 60245-7, IEC 60446 The AC main plug shall be fitted with a 3 pin, 13A fused plug or equivalent as per BS 1363/MS 589- Part 1 standard.					
	Power Supply (AC/DC) Cord/ Adapter.	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory if Applicable.	

⁶ The UCC Type Approval Mark shall be provided by the commission to the applicant upon completions of the type approval process and issuing of the UCC Type Approval Certificate.

⁷ CISPR-13: Sound and television broadcast receivers and associated equipment - Radio disturbance characteristics - Limits and methods of measurement

⁸ CISPR-20: Sound and television broadcast receivers and associated equipment - Immunity characteristics Limits and methods of measurement

⁹ CISPR-22: Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement

¹⁰ Electromagnetic compatibility (EMC) - Part 3-2 - Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

¹¹ European limits and methods of measurement of radio disturbance characteristics of broadcast receivers

§X.	REQUIREMENT DESCRIPTION	SET TOP BOXES		INTEGRATED DIGITAL TVs		MOBILE RECEIVERS	DONGLES
		Basic	Hybrid	Basic TV	Smart TV		
3.6. Support Package	CVBS-RCA ¹⁵ Cable of 1 metre minimum length.	Mandatory	Recommended	Optional	Optional	Recommended	Recommended
	An HDMI Cable of 1 meter minimum length.	Recommended	Recommended	Optional	Optional	Optional	Optional
	All Receivers shall be equipped with a Remote control unit (RCU) and ‘AA’ or ‘AAA’ sized batteries.	The Remote Control Unit shall have necessary functionality of Power, Volume , Programme/Channel and Numeric numbers 0-9.					
	An illustrative User Manual in English language.	Mandatory ➤ Printed	Mandatory ➤ Printed	Mandatory ➤ Printed.	Mandatory ➤ Printed	Mandatory ➤ Printed	Mandatory ➤ Printed
		Optional ➤ Electronic	Recommended ➤ Electronic	Recommended ➤ Electronic	Mandatory ➤ Electronic	Optional ➤ Electronic	Optional ➤ Electronic
Ethernet Cable.	Optional	Recommended	Optional	Recommended	Optional	Optional	
3.7. Processor and Memory	<p>The DVB receiver must be equipped with a powerful Processor and sufficient Memory suitable for the reception of DVB services and where applicable, operation of the Interactive Application.</p> <p>The embedded Processor and Memory shall be suitable for the provision of the routine software and (or) firmware upgrades.</p> <p>The installed Processor and Memory capacity shall be clearly visible in the System Information Menu, And all Processor and Memory configurations shall cater for DDRAM , Flash Memory, Storage Memory and the Processor for applicable receiver functions.</p>						
3.8. Maintenance & Upgrade	3.8.1. Over The Air Software Upgrade. OAD software and (or) Firmware Upgrade.	Recommended					
	3.8.2. USB Software Upgrade. Software and (or) Firmware upgrade through USB.	Recommended					
	3.8.3. Ethernet (IP) Software Upgrade. Software and (or) Firmware upgrade through Ethernet using Internet Protocol.	Optional	Recommended	Optional	Recommended	Optional	Optional
3.9 Navigation Features	Power , Volume , Program/Channel & Menu features	The DVB receivers shall have access to the navigation features.					

¹² European, immunity from radio interference of broadcast receivers

¹³ European limits and methods of measurement of radio disturbance characteristics of information technology equipment

¹⁴ European immunity requirements for information technology equipment

¹⁵ A Composite (CVBS) and Stereo Audio RCA cable.

§X.	REQUIREMENT DESCRIPTION	SET TOP BOXES		INTEGRATED DIGITAL TVs		MOBILE RECEIVERS	DONGLES
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4. FRONT END CHARACTERISTICS / REQUIREMENTS

4.1. Radio Frequencies and Bandwidths

The DVB receiver shall contain at least one Tuner/Demodulator for reception of Cable, Satellite or Terrestrial signals, or an interface for reception of signals from IP networks.

4.1.1. Terrestrial Tuner and Demodulator

All receivers meant for Terrestrial Reception shall include a DVB-T2 tuner/demodulator unit for reception of signals from terrestrial broadcasting transmissions in accordance with EN 302 755, DVB-T2 standard. The receiver shall be able to receive in all frequency bands allocated to digital terrestrial broadcasting in Uganda.

§X.	REQUIREMENT DESCRIPTION	SET TOP BOXES		INTEGRATED DIGITAL TVs		MOBILE RECEIVERS	DONGLES
		Basic	Hybrid	Basic TV	Smart TV		

	<p>4.1.2. Satellite Tuner and Demodulator All receivers meant for satellite reception shall include a DVB-S2 tuner/demodulator unit for reception of signals from satellite broadcasting transmissions in accordance with EN 302 307-1 standard. Support for DVB-S2X (EN 302 307-2) standard is optional. The receiver shall be able to receive on all frequency bands allocated to digital satellite broadcasting in ITU Region 1.</p> <p>4.1.3. Cable Tuner and Demodulator All Receivers meant for Cable Reception shall include a DVB-C tuner/demodulator unit for reception of signals from terrestrial broadcasting transmissions in accordance with EN 300 429 standard. Support for DVB-C2 (EN 302 769) standard is optional.</p> <p>4.1.4. DVB- IPTV Based Front-End All Receivers meant for Reception using Internet Protocol (IP) shall include capability to receive DVB-IPTV signals in accordance with the TS 102 034 standard.</p>
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5. SERVICE INFORMATION

NOTE: The DVB Receiver shall be able to process the necessary SI transmitted within individual transport data streams so that its proper function is secured and the end user is able to make full use of the services provided. The processing of the SI shall be according to the EN 300 468¹⁶ specification for Service Information (SI) in DVB Systems.

5.1. Use of DVB SI	<p>The DVB Receiver shall comply with the technical implementation guidelines outlined in the ETSI TR 101 211¹⁷, for the use of DVB SI as specified in the EN 300 468 specification for Service Information (SI) in DVB Systems.</p> <p>The SI table mechanism, syntax and semantics, and minimally; the Service Description Table (SDT), the Event Information Table (EIT) and the Time and Date Table (TDT) shall be supported.</p>
5.2. System Timing	The DVB Receiver shall support Real Time Clock (RTC) setting or allow network synchronised time.
5.3. Optional and Unrecognised SI	<p>For DVB receivers with recording features, it is recommended that the Selection Information Table (SIT) be supported for partial transport stream selection and recording. Support of Bouquet Association Table (BAT), Stuffing Table (ST) and Data Information Table (DIT) is optional.</p> <p>The DVB Receiver shall ignore any incomprehensive SI or tables. The DVB Receivers shall discard any PSI/SI signals if it is unrecognised or not supported.</p>
5.4. PSI/SI and PID Update	<p>The DVB receiver shall be able to monitor and update all PSI and all SI.</p> <p>The DVB Receiver shall be able to synchronize with changes or modifications on the parameters of transmissions, networks and services.</p>
5.5. Dynamic Response to PAT, PMT, NIT and SDT Updates	<p>The DVB Receiver shall be capable of identifying changes or new services in the current channel/multiplex and respond to these changes. Changes may occur, in particular:</p> <ul style="list-style-type: none"> • when a new programme is added to the transport stream • when the transmission of a certain programme is terminated • during regular exchange of programmes within the daily or weekly cycle • when switching between the regional programme versions • when language versions are added or removed • when subtitles are added • when the transmission frequency is changed as planned (NIT table) • when other data services are added, such as SSU

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¹⁶ [EN 300 468](#) - Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems

¹⁷ [ETSI TR 101 211](#) - Digital Video Broadcasting (DVB); Guidelines on implementation and usage of Service Information (SI)

§X.	REQUIREMENT DESCRIPTION	SET TOP BOXES		INTEGRATED DIGITAL TVs		MOBILE RECEIVERS	DONGLES
		Basic	Hybrid	Basic TV	Smart TV		
5.6. Service Identification and Logical Channel Number (LCN)	<p>The DVB receiver shall be able to automatically scan through the applicable frequency range available for each of the available Tuners/Demodulators and tune in to the correct DVB framing structure, channel coding and modulation to deliver the incoming transport stream to the next units. The tuning data shall be stored to allow a quick tune in to the selected transport stream.</p> <p>Note: Frequency Scanning is not relevant for DVB receivers with IP-based front-end.</p> <p>The DVB Receiver shall support LCN by using descriptor with tag value of 0x83 (Version 1) and (or) 0x87 (Version 2). All services shall be sorted, listed and managed accordingly with assigned LCN.</p> <p>Note: When both the Logical Channel Descriptor <i>Version 1</i> and <i>Version 2</i> are broadcast within one Original network ID (ONID), the DVB Receiver supporting both descriptors shall only sort according to the <i>version 2</i> (higher priority)</p>						
5.7. Responses to Network Changes	<p>5.7.1. Addition of multiplex on a network</p> <p>When a multiplex is added to the network, it shall make reference in the second loop of the NIT actual table. The NIT (<i>actual</i>) and SDT (<i>actual and other</i>) version_number shall be changed. The DVB Receiver shall recognise the change of version_number of the NIT table and that a new transport_stream_id is present in the NIT (<i>actual</i>).</p>						
	<p>5.7.2. Addition or removal of service on a multiplex</p> <p>When a service has been added to a multiplex, there shall be an update in the SDT (<i>actual</i>) for that multiplex which references the new service. The DVB Receiver shall consider a service to be removed from a multiplex if the service is not referenced in the SDT (<i>actual</i>) of that particular service.</p> <p>A rescan of any or all the multiplexes shall not be required for the DVB Receiver to acknowledge the presence of a new service. The DVB receiver shall process the SDT (<i>actual</i>) and EIT-present/following (<i>actual</i>) when tuning to a different multiplex or every 2 seconds as recommended by ETSI TR 101 211.</p> <p>When a new service is added or removed from a multiplex, the DVB receiver may inform the user that a new service has been added or removed using an appropriate DVB Receiver specific method e.g. a short screen pop-up lasting not more than three (3) seconds.</p>						
	<p>5.7.3. DVB Operational Mode Changes.</p> <p>In the event that there is any operational mode changes, the DVB receiver shall automatically perform an update to capture these changes with minimal or no disruption to the viewer</p>						
	<p>5.7.4. Network Configuration.</p> <p>All Terrestrial DVB Receivers shall be able to operate in both Multiple Frequency Networks (MFN) and Single Frequency Network (SFN) environments.</p>						
5.8. Summary of SI transmitted and received in the DVB system	<p>The DVB Receiver shall interpret the following service information tables.</p> <ul style="list-style-type: none"> • Programme Association Table (PAT) , Programme Map Table (PMT), Conditional Access Table (CAT), Network Information Table (NIT), Service Description Table (SDT), Event Information Table (EIT) Present/Following, Event Information Table (EIT) Schedule, Time and Date Table (TDT) Time Offset Table (TOT), Running Status Table (RST) 						
6. SERVICES							

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6.1. Subtitling	<p>6.1.1. Specification for Subtitling</p> <p>The DVB Receiver shall support DVB subtitling and display it using the On Screen Display (OSD) capabilities while decoding the full television service (video and audio).</p>
	<p>6.1.2. Multiple Subtitling Language</p> <p>The DVB Receiver shall be able to handle multiple subtitling streams within the same service and the correspondent PSI/SI information like language descriptors. The DVB Receiver shall provide convenient user control for enabling, disabling, displaying and to select primary and secondary subtitling languages. In case of subtitling is set to “ON” and the subtitle streams do not match any of the settings of preferred languages, the DVB receiver shall select the first subtitle stream signaled in the elementary stream loop of the PMT.</p> <p>The recommended factory default settings are:</p> <ul style="list-style-type: none"> • The default setting on the DVB Receiver for subtitling set to “ON” • The primary preferred language set to “English Language” (ENG) • The secondary preferred language set to “Multiple Languages” (MUL)
	<p>6.1.3. Support for Hearing Impaired</p> <p>The DVB Receiver may be capable of displaying subtitles for the hearing impaired. The DVB Receiver shall be capable of overlaying the subtitle text on the picture. The subtitles for the hearing impaired may differ from the normal subtitles by the amount of text displayed per second, which is controlled by the broadcasted content.</p> <p>When enabled, subtitles shall automatically be displayed. When disabled, the decoder shall allow manual selection from the available list of broadcasted subtitle services.</p>
6.2. Electronic Programme Guide (EPG)	<p>6.2.1. Specification for EPG</p> <p>The DVB Receiver shall to display “<i>Present/ following</i>” (or “<i>Now/ Next</i>”) and schedule EPG information in accordance with guidelines given in ETSI TR 101 211 and requirements defined in ETSI EN 300 468.</p> <p>The DVB Receiver shall provide users with a navigation function through the OSD interface to guide them through the environment of the services provided. The data necessary for preparing and updating the guide shall be transmitted within the transport data stream.</p> <p>The DVB Receiver shall display the <i>present/following</i> information immediately after switching the programme and at any time on request (<i>after pressing the relevant Info button to ‘DO’</i>).</p>
	<p>6.2.2. EPG Presentation</p> <p>EPG presentation shall include but not limited to the following:</p> <ul style="list-style-type: none"> • Service name, Programme title, Programme duration, Elapsed duration (optional), Short description, Long description (extended text), Present/following (now/next) event, Current date/time, Parental guidance information. <p>The DVB Receiver shall provide an EPG organizer to access the <i>Next Seven-Day</i> planned programme guide with all information in above list. It shall be a practical and easy to use search function.</p>
	<p>6.2.3. Languages and Fonts</p> <p>The DVB Receiver shall support an easily visible character coding for EPG and other labeling decoding and presentation.</p>

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		Basic	Hybrid	Basic TV	Smart TV		
	<p>6.2.4. Parental Lock Feature</p> <p>The DVB Receiver shall have parental lock capabilities to block television programming with a particular Classification Code from being shown unless the correct PIN code is entered by the user.</p> <p>The DVB Receiver shall be able to identify the Classification Code that is applied to the television programme and shall allow user to set the rating that he/she wants to block. The DVB Receiver shall support standard Classification codes.</p>						
	<p>6.2.5. Parental Rating Display</p> <p>The parental rating information shall be displayed clearly as part of EPG.</p> <p>The parental rating descriptor shall be transmitted and the full parental rating information shall be appended to the front of the programme title or programme description by the broadcaster.</p> <p>Manufacturers can add additional displays of programme ratings, but they must display the full rating information.</p>						
	<p>6.2.6. Multi-Language Support</p> <p>The DVB Receiver shall provide a mechanism for the selection of primary and secondary language options for both Subtitles and Audio selection. The DVB Receiver shall as a minimum, interpret the following ISO 639-3 language codes:</p> <ul style="list-style-type: none"> English (ENG), Swahili (SWH), French (FRA), Original Audio (QAA*), Multiple Languages (MUL**) <p>* Original Audio is only applicable for Audio ** Multiple Languages is only applicable for Subtitle</p>						
	<p>6.2.7. Teletext</p> <p>The DVB Receiver shall be able to support and display teletext information.</p>						
	<p>6.2.8. Remote Control Unit (RCU)</p> <p>An RCU shall be bundled with the DVB Receiver. It shall be simple and easy to use, with all necessary functionality.</p> <p>It is recommended that manufacturers and (or) Vendors avail alternative Remote Control Units for those with impaired vision or impaired manual dexterity (e.g. over-sized keys and character fonts, shaped keys).</p>						
	<p>6.2.9. Reliability</p> <p>a. Robustness</p> <p>The RCU shall be designed to withstand frequent usage, with a robust case that is resistant to damage from being dropped onto hard surfaces or sat upon.</p> <p>b. Environmental</p> <p>The RCU shall be designed to work in the same environmental conditions (i.e. ambient temperature and humidity) as specified for the DVB Receiver.</p> <p>c. Key life</p> <p>The design of the key mechanism shall be such as to provide a minimum of three (3) years' operation under normal expected usage.</p>						
6.3. Signal Strength and Quality Bar	The DVB Receiver shall be able to display both signal strength and quality (BER) level. This will aid the user in setting up indoor antenna to ensure best reception position or identifying other reception problems.						
6.4. Service Unavailability	In the event of service unavailable, poor or no RF signal, the DVB Receiver shall display an on-screen message.						

§X.	REQUIREMENT DESCRIPTION	SET TOP BOXES		INTEGRATED DIGITAL TVs		MOBILE RECEIVERS	DONGLES
		Basic	Hybrid	Basic TV	Smart TV		
6.5. Listing of All Available Services	The DVB Receiver shall provide a listing of all available services after scanning.						
6.6. First-time Power Up	<p>Upon powering up for the first-time, the DVB Receiver shall initiate the following processes:</p> <ol style="list-style-type: none"> Set OSD language (Default – English); Prompt tuning/scanning for all available services; and Set other configurations (user data, preferences and others). 						
7. INTERFACES AND CONNECTORS							
7.1. RF Input Connector	<p>The RF Input connector must be of the IEC female type with an impedance of 75 Ω according to the IEC 61169-2¹⁸ standard and IEC 169-24 for satellite receivers. The following specifications shall apply for Satellite and Terrestrial:</p> <ol style="list-style-type: none"> Terrestrial Receiver: May provide 5V DC output for the active antenna power supply. If it is provided, the 5V DC shall be able to be turned on/off. Satellite Receiver: shall provide an LNB supply voltage (11/15V, 13/18V, 21 V or off) and a supply current (400 mA with short circuit and Surge Protection). 	Mandatory for Terrestrial, Cable and Satellite Receivers.	Mandatory for Terrestrial, Cable and Satellite Receivers.	Mandatory for Terrestrial, Cable and Satellite Receivers.	Mandatory for Terrestrial, Cable and Satellite Receivers.	Mandatory for Terrestrial Mobile Receivers.	May or May not be applicable for Terrestrial, Cable and Satellite Dongles.
7.2. RF Output Connector	The RF Output connector must be of the IEC male type IEC 61169-2 standard and IEC 169-24 for satellite receivers. Where applicable The DVB Receiver shall provide an RF connector interface with a loop-through.	Recommended	Recommended	Recommended	Recommended	Not Applicable	Not Applicable
7.3. RCA, CVBS Output	The DVB Receiver Shall provide the Audio and Video output (RCA, CVBS) interface.	Mandatory	Mandatory	Not Applicable	Not Applicable	Recommended	Optional
7.4. HDMI	The DVB Receiver shall provide HDMI interface for digital video and audio output. HDMI interface must comply with the specifications of HDMI release 2.0 releases.	Mandatory	Mandatory	HDMI In, required. HDMI Out, Not Applicable		Recommended	Optional
7.5. Copy Protection on Outputs	The DVB Receiver that has the HDMI interface as specified in § 6.4 above, shall provide High Bandwidth Digital Content Protection (HDCP) on the HDMI output for all output/ Input resolutions.	Mandatory	Mandatory	HDCP In, required. HDCP Out, Not Applicable		Recommended	Optional
7.6. Common Interface	Common Interface shall be implemented as outlined in the DVB-CI+ specification V1.4, or DVB-CI+ Specification V2.0 or later.	Recommended	Recommended	Recommended	Recommended	Optional	Optional

§X.	REQUIREMENT DESCRIPTION	SET TOP BOXES		INTEGRATED DIGITAL TVs		MOBILE RECEIVERS	DONGLES
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¹⁸ IEC 61169-2 - Specification for Radio frequency coaxial connectors

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7.7. Data Interfaces and Interactivity	<i>The DVB Receiver may be furnished with any of the interfaces for data transmission: If any data interface is used for recording the received content to an external storage medium, the protection (if any) against unauthorised access must also be maintained in the data provided at such an interface (i.e., the data at this interface must not be modified by decoding or removing this protection).</i>						
	7.7.1. Ethernet under IEEE 802.3 (at least 100Base-T)	Optional	Recommended	Optional	Mandatory	Optional	Optional
	7.7.2. WLAN (IEEE 802.11, b, g)	Optional	Recommended	Optional	Mandatory	Recommended	Recommended

8. VIDEO AND AUDIO DECODING REQUIREMENT

8.1. Video Decoding	The DVB Receiver shall be able to decode video formats as specified below for SDTV and HDTV based on the ITU-T Recommendation H.264[23] or ISO / IEC 14496-10[24].																					
	<p>a) Standard Definition SDTV</p> <ul style="list-style-type: none"> • Main Profile @ Level 3 • Frame frequency 25 Hz • Image format / Aspect Ratio 4:3, 16:9 • Definition 720, 704, 544, 480 (point) x 576 (lines). <p>b) High Definition HDTV</p> <ul style="list-style-type: none"> • High Profile @ Level 4 • Frame frequency 25 and 50Hz (see the table below) • Image format Aspect Ratio 16:9 <p>Formats supported: at least by details based on ITU-T R H.264 /or ISO / IEC 14496-10 as described in the table below:</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Vertical size</th> <th>Horizontal size</th> <th>Frame rate</th> <th>Progressive/ Interlaced</th> </tr> </thead> <tbody> <tr> <td>1080</td> <td>1920</td> <td>25</td> <td>I</td> </tr> <tr> <td>1080</td> <td>1440</td> <td>25</td> <td>I</td> </tr> <tr> <td>720</td> <td>1280</td> <td>50</td> <td>P</td> </tr> </tbody> </table>							Vertical size	Horizontal size	Frame rate	Progressive/ Interlaced	1080	1920	25	I	1080	1440	25	I	720	1280	50
Vertical size	Horizontal size	Frame rate	Progressive/ Interlaced																			
1080	1920	25	I																			
1080	1440	25	I																			
720	1280	50	P																			
8.2. Aspect Ratio	The DVB Receiver shall provide convenient user control for appropriate aspect ratio switching between 4:3 and 16:9 to adapt display in different size and aspect ratio.																					

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8.3. Active Format Description (AFD)	When AFD is used, the DVB Receiver shall present the video aspect ratio properly according to the current AFD value and response in next frame. The DVB Receiver shall support at least the Active Formats shown in the Table below;						
	Active Format	Aspect ratio of the “area of interest					
	1000	Active format is the same as the coded frame					
	1001	“Pillar box” 4:3 (center)					
	1010	“Letter box” 16:9 (center)					
8.4. Audio Decoding	The DVB Receiver shall support (decode) sounds compressed in MPEG-1 Audio Layer II and MPEG-4 HE AAC. The DVB Receiver can support sound compressed in Dolby Digital Plus.						

