

PUBLIC NOTICE

Minimum Technical Specifications of Set Top Box (STB) and Network Infrastructure for Digital Terrestrial Television (DTT) in Rwanda

In preparation for migration from analogue to digital television, Rwanda Utilities Regulatory Agency (RURA) like other sister regulators in East African Community (EAC) has adopted DVB-T2 as transmission standard for digital terrestrial television (DTT). Therefore, any rollout of digital broadcasting infrastructure in Rwanda after 2012 shall be in DVB-T2 Standard. Existing broadcasting infrastructure in DVB-T platform are required to be upgraded into DVB-T2.

While awaiting this upgrade, DVB-T and DVB-T2 platforms will run concurrently in Rwanda especially during the entire duration of the simulcast period (migration period).

It is well understood that DVB-T compliant set top box is limited to only receiving DVB-T digital signal and is NOT capable of correctly receiving and displaying digital TV signals transmitted on a DVB-T2 digital platform.

Consequently, in order to receive TV programmes, Consumers and vendors of equipment are requested to acquire **DVB-T2 / MPEG-4 compliant Set Top Boxes or integrated digital TVs (iDTVs) fitted with a DVBT2 tuner** that are capable of receiving and correctly displaying digital TV signals transmitted on both DVB-T and DVB-T2 digital platforms.

In addition to that, STB suppliers are further advised to obtain Type Approval to import Set Top Boxes from Rwanda Utilities Regulatory Agency as required by the law governing telecommunication.

The minimum technical specifications of DVB-T2 / MPEG-4 for the Rwandan market are summarized as follows:

Basic features	Full function standard IR remote control,	
	Minimum channels receivable and storable	200
	Warranty	1 year
	User Manual	Use friendly documentation which should be in English or French
System resources	Flash Memory	>8MB
	RAM	>128MB
RF tuner & DVB-T2 Channel	Frequency	- UHF (470 – 862 MHz) - Optional, VHF (174-230 MHz)
	Input signal level	36 – 85 dB μ V

FEC coding

LDPC Code + BCH Code,
Code rates: 1/2, 3/5, 2/3, 3/4, 4/5,

		5/6
Transmission mode (Fast Fourier Transform, FFT Size)		1K, 2K, 4K, 8K, 16K, 32K.
C/N range (Rice channel)		3dB (QPSK 1/2) to 24dB (256QAM 5/6)
Pilot Pattern		PP1 to PP8
Guard intervals		1/128, 1/32, 1/16, 19/256, 1/8, 19/128, 1/4.
Channel raster		7 MHz (VHF), 8 MHz (UHF)
Signal Bandwidth		7.61 MHz (Normal mode), 6.80, 7.77 MHz (Extended mode) 1.54 (optional) 6.66, 1.57, (optional),
Service specific robustness		Physical Layer Pipes (PLP)
Interleaving		Bit + Cell + Time + Frequency
Diversity		SIS, MISO, (SIMO, MIMI if diversity receiver)
Rotated constellations		Significant robustness gain in channels with severe degradations (multipath, SFN operation, narrow band interference...)
Mode of Extensions		Future Extension Frame (FEF)
Max Bit Rates (8MHz)		50.3 Mbit/s, (32Ke, 256QAM, CR=5/6, GI=1/128, PP7)
Used Bit Rates (8MHz)		Portable SFN: 25.0 Mbit/s, Fixed SFN: 37.0 Mbit/s, Fixed MFN: 40.2 Mbit/s
C/(N+I) Performance in SFNs		EN 300744 compliant

	GE06 compatible	Signal is under the mask of DVB-T (power level measured in a 4 KHz bandwidth)
Maximum Frequency Offset	The STB shall be able to receive signals with an offset of up to 125 kHz from the nominal centre frequency	
MPEG Transmission stream and	Transmission stream	MPEG-4 ISO/IEC 14496
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video and Audio Decoding		
	Video decoding	MPEG 4 AVC (H.264), (ISO/IEC 14496-10)
	Aspect Ratio (image rate)	4:3, 16:9
	Frame frequency	25Hz (PAL)
	Video Resolution	720X576 (PAL)-standard definition, HD 1080,1080i
	Audio decoding	MPEG/MusiCam Layer I & II / HE AAC
	Audio mode	Single track/dual track/stereo
	Audio sampling rate	32KHz, 44.1KHz, 48KHz, 96 KHz(optional)
	Quality reception thresholds	All STBs should have an onscreen visual signal level indicator which would aid in directing the antenna and troubleshooting reception problems.

Scanning function (5mins max)	<ul style="list-style-type: none"> - The STB should include a frequency scanning function to detect the availability of DVB-T signals. - It should also automatically list the content of the terrestrial bouquet by reading the PSI/SI streams and - Be capable of program memory in case of cut off
Software	<ul style="list-style-type: none"> - EPG: current and next program information. 24x7 days schedule. - Capable of the Identity control, watch rating and parental lock - Auto/manual tuning - 24-hour clock (optional) - OTA: STB software's, EPG, CA features must be upgradable over the air (USB Upgrade-optional) - Support Receive mail - Provides the instant and personalized message prompt - Display and withdrawal of subtitles
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- Support multi-language info		
software for interpretation and handling of the active service information	PSI/SI(program Specific Information/Service Information	NIT, CAT, PAT, PMT, SDT, EIT, TDT, TOT EN 300 468 [10] and ETSI TR 101 211 [11] compliant
Additional Hardware	PVR (optional)	
Teletext & Teletext subtitle	<ul style="list-style-type: none"> - It is able to display Teletext using the OSD and/or by the insertion of the Teletext data in the VBI of the analogue CVBS video output. - It is able to display Teletext subtitling, meeting the requirements for level 1.5 in ref. [ETS 300 706, "Enhanced Teletext Specification"] 	

Interfaces	<ul style="list-style-type: none"> - RF input connector: IEC 169-2 female, input impedance 75 ohms - One RCA (CINCH) female connector for video output and Two RCA (CINCH) female connectors for stereo sound output - RF by pass (loop) IEC 169-2 male - RF input via a PAL-B/G modulator - SCART interface (optional) - HDMI interface - USB Port (optional) - Data port1 (RS232, 9 pin D -Sub type(optional) - Should include at least one RF cable to connect the unit with its associated analogue television receiver - For pay TV, at least 1 CI (Common Interface) slot to allow any type of conditional access module to be plugged into the set top box (EN 50221-1997 V1.2/97) 	
Mechanical interfaces(LED Indicators)	Green	normal operation
	flashing green	system boot in progress
	flashing red	software download in progress
	Controls to be provided on the front panel	Menu, P+, P-, V+, V-
Physical attributes	Power supply	AC 230 ± 10%, 50Hz
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Environmental attributes	Power consumption	Max 15W
	Operating Temperature	0~45°C
	Operating humidity	Up to 90%
	Over and under voltage protection	
	Overheating protection	
Reliability	MTBF (Mean time between failures)	80,000Hrs

	Standby functionality (sleep mode)	
Service Acquisition	Typically 500ms, and a maximum of 750ms	When required service is carried in the same Transport Stream as the Current service
	Typically 750ms and a maximum of 1000ms	When the required service is in a different Transport Stream.