THE UNITED REPUBLIC OF TANZANIA TANZANIA COMMUNICATIONS REGULATORY AUTHORITY ISO 9001:2008 CERTIFIED



PUBLIC NOTICE

Minimum Technical Requirements and Specifications for Satellite (DVB-S2), Cable (DVB-C, DVB-C2), Terrestrial (DVB-T, DVB-T2), Internet Protocol Television (IPTV) Set Top Boxes (STBs) and Integrated Digital Television Receivers

The Tanzania Communications Regulatory Authority (TCRA), established under the Tanzania Communications Regulatory Authority Act No.12 of 2003, is mandated among other duties, to license communications and broadcasting operators and type approve communication equipment for use in the United Republic of Tanzania pursuant to Section 82 of the Electronic and Postal Communications Act, No.3 of 2010 hereby stipulating as follows:-

- 1. The Authority shall be responsible for the establishment and publication of technical standards relating to all regulated services in the United Republic of Tanzania.
- 2. In establishing such standards, the Authority shall-

(a) Where appropriate, seek submissions from other interested parties, in particular those persons likely to be most affected by the publication of such standards; and

(b) Participate in standardization activities and take due account of any

relevant standards prescribed by international organizations to which the

United Republic belongs, such as the International Telecommunications

Union and other sub-regional groupings."

Furthermore, pursuant to Section 4(1) (a) of the Electronic and Postal Communications (Digital and Other Broadcasting networks) Regulation 2011 which empowers the Authority to determine standards for broadcasting networks in the country and Section 10 (2) of the Electronic and Postal Communications (Digital and Other Broadcasting Networks)

Regulation 2011 which empowers the Authority, from time to time review standards as provided under the Regulations.

The Authority therefore wishes to notify all importers of Digital Terrestrial (DTT), Satellite (DTH), Cable Television receivers, Multiplex Operators, Content Services Providers and the general public that, the minimum technical requirements and specifications for Terrestrial (DVB-T, DVB-T2), Satellite (DVB-S2), Cable (DVB-C, DVB-C2) digital set top boxes (STBs), Internet Protocol Set Top Boxes (IPTV) and integrated digital television receivers have been revised on grounds of technology advancement and obsoleteness of old standards for use with DTT, DTH and Cable networks.

Standards are guidelines for equipment manufacturers and/or suppliers aimed at adhering to quality product in the Tanzania.

The composed minimum technical requirements and specifications for DVB-S2, DVB-C (*To be valid until when DVB-C2 is matured in the market*), DVB-C2, DVB-T (*To be valid until when DVB-T2 is matured in the market*), DVB-T2, IPTV Set-Top-Boxes and Integrated Digital Television Receivers shall be as presented in the Tables herein below:

A: SE	A: SET TOP BOX (STB) MINIMUM TECHNICAL SPECIFICATIONS			
S/N	A. STB BASIC FEATURES	OPERATIONAL EFFECT(S)		
1.0	Auto and manual search modes	Basic features for broadcasting channel searching		
2.0	Signal Quality Level indicator	Basic feature for signal level indication(green or yellow) for acceptable signal quality		
3.0	Parental Control/Lock	Basic feature for controlling viewers		
4.0	Electronic Program guide (EPG)	On screen electron guide		
5.0	Full function standard IR remote control, using AA or AAA size battery.	Small size battery, hence an easier to handle (small in size) remote control		
6.0	Languages: English and Swahili	Availability language selection feature: Swahili is the national language spoken by majority Tanzanians		
7.0	PAL I/B/G auto conversion	PAL I is the VIDEO System for Tanzania		

1.0 DVB-S2 MINIMUM TECHNICAL REQUIREMENTS AND SPECIFICATIONS

8.0	Minimum 1000 channels receivable and storable	The software programming for channel storage caters for 00-99 or 000 to 999 hence channel storage is the best choice
9.0	Favourite channel list editing	Provision for editing channels for user preference (basic feature)
10.0	Warranty: 1 year	To avoid substandard equipment in the market
11.0	Owner's Manual	User manual for Understanding the operation of the equipment as well as troubleshooting simple problems (English and Swahili languages)
12.0	 Marking: Each STB shall be legibly and indelibly marked with at least the following information: a) Manufacturer's name or trade-mark (if any); b) Mode designation and serial No.' c) Country of manufacture; d) Input supply voltage and frequency; e) Power consumption; f) Satellite input and output terminals; and g) Sockets for audio and video output. 	Basic marks to enable the subscriber to have first-hand information

B: DVB-S2 SHALL HAVE THE FOLLOWING MINIMUM TECHNICAL SPECIFICATIONS

		Input impedance	75Ω
		Modulation	Single Carrier QPSK with multiple streams
		Modulation	QPSK, 8PSK, 16APSK,32APSK
		schemes	
		Frequency	950-2150 MHz
		Input signal level	-25 dBm to -65 dBm
		FEC coding	LDPC + BCH 1/4, 1/3, 2/5, 1/2, 3/5, 2/3,
			3/4, 4/5, 5/6, 8/9, 9/10
		C/N range	-2.0 dB (QPSK) to +16 dB (32APSK)
		Signal Bandwidth	Depends on the transponder
		Interleaving	Bit-Interleaving
		Symbol rate	2~45Msps
10	RF tuner	Rotated	2 bit/s/Hz to 5 bit/s/Hz, optimized for
1.0	& DVB-S2	constellations	operation over non-linear transponders.
	Channel		
		Transport stream	MPEG-2 and MPEG-4 ISO/IEC13818-1

		Video decoding	MPEG-2/MPEG4 AVC(H.264)	
		Aspect Ratio	4:3,16:9	
		(image rate)		
2.0	MPEG	Frame frequency	25Hz (PAL)	
	Transport	Video Resolution	720X576 (PAL) - standard definition,	
	stream video		1920X1080 (High definition)	
	and Audio	Audio decoding	MPEG-2, MPEG-4	
	Decoding	Audio mode	stereo	
		The STB should in	clude a frequency scanning function to	
		Be capable of programme memory in case of cut off		
2.0	Coopeing	Be capable of programme memory in case of cut off		
3.0	Scanning	It should be able t	o display the number of channel currently	
	runction	being scanned	a diantau numbeu af asu isan la satad	
		It should be able t	o display number of services located	
		The decoder shall	display details of its name, network 1D,	
		FDG: current and	next programme information 24x7 days	
		schedule	next programme mormation, 24x7 days	
			a	
		24-bourclock		
		OTA: STB software's EPG CA features must be upgradable		
		over the air		
		Support receive m	ail	
4.0	Software	Provides the instant and personalized message prompt		
		including the following:-		
		Display and withdrawal of subtitles		
		Support multi-language info		
		Able to disp	lay current software and hardware version	
		stored in th	e decoders	
		Able to indi	cate whether an updates are available or	
		not		
		Able to indi	cate the unique serial number and state of	
		the STB dec	coder (error code)	
		Able to indi	cate type of middleware and other resident	
		applications version numbers		
FO	Tutorfococ			
5.0	Interfaces	KF input connector: remaie connector, input impedance 75		
		UIIIIS One DCA (CINCH) female connector for video output and two		
		PCA (CINCH) female connectors for stored output and two		
		REA (CINCIT) Territe	connector	
		INB control· STR c	hall have provisions to provide proper	
		power supply and	switching signal for oscillator selection and	
		nolarization selection for LNR		
6.0	Interfaces for	STB must include at least one embedded smartcard reader or		

	Conditional Access	a DVB-CI (Common Interface) slot to allow any type of conditional access module to be plugged in to the set top box. The CI should be upgradable to newer version	
7.0	Physical	Power supply	
	attributes	AC 220±10%, 50±1Hz	
8.0	Environmental	Operating Temperature	
	attributes	0~45°C	
		Operating humidity	
		Up to 90%	
9.0	Reliability	MTBF	
	-	>80,000Hrs	

2.0 DVB-C MINIMUM TECHNICAL SPECIFICATIONS

A: SE	ET TOP BOX (STB) MINIMUM TECHNICAL SPECIFICATIONS			
S/N	A. STB BASIC FEATURES	OPERATIONAL EFFECT(S)		
1.0	Auto and manual search modes	Basic features for broadcasting channel searching		
2.0	Signal Quality Level indicator	Basic feature for signal level indication(green or yellow) for acceptable signal quality		
3.0	Parental Control/Lock	Basic feature for controlling viewers		
4.0	Electronic Program guide (EPG)	On screen electron guide		
5.0	Full function standard IR remote control, using AA or AAA size battery.	Small size battery, hence an easier to handle (small in size) remote control		
6.0	Languages: English and Swahili	Availability language selection feature: Swahili is the national language spoken by majority Tanzanians		
7.0	PAL I/B/G auto conversion	PAL I is the VIDEO System for Tanzania		
8.0	Minimum 1000 channels receivable and storable	The software programming for channel storage caters for 00-99 or 000 to 999 hence channel storage is the best choice		
9.0	Favourite channel list editing	Provision for editing channels for user preference (basic feature)		
10.0	Warranty: 1 year	To avoid substandard equipment in the market		
11.0	Owner's Manual.	User manual for understanding the operation of the equipment as well as troubleshooting simple		

		problems (English and Swahili languages)
12.0	Marking: Each STB shall be legibly and indelibly marked with at least the following information:	Basic marks to enable the subscriber to have first-hand information
	 a) Manufacturer's name or trade-mark (if any); b) Mode designation and serial No.' c) Country of manufacture; d) Input supply voltage and frequency; e) Power consumption; f) Cable input and output terminals; and g) Sockets for audio and video output. 	

B: DVB-C SHALL HAVE THE FOLLOWING MINIMUM TECHNICAL SPECIFICATIONS

		Input impedance	75Ω
		Modulation	Single Carrier QAM
		Modes	Constant Coding & Modulation
		Modulation	16- to 256-QAM
		schemes	
1.0	RF tuner	Frequency	6 and 8 MHz
	& DVB-C	Input signal level	-40 to -60 dBm
	Channel	FEC coding	Reed Solomon (RS)
		C/N range	31 dB Min. for 64 QAM
		Signal Bandwidth	47 MHz – 862 MHz
		Interleaving	Bit Interleaving
		Channel raster	6 or 8 MHz
		Constellations	16 QAM, 64 QAM and 256 QAM
		Max Bit Rates	83.1 Mbit/s
		(8MHz)	
		Transport stream	MPEG-2/ISO/IEC13818-1
		Video decoding	MPEG-2
		Aspect Ratio	4:3,16:9
		(image rate)	
2.0	MPEG	Frame frequency	25Hz (PAL)
	Transport	Video Resolution	720X576 (PAL) - standard definition
	stream and	Audio decoding	MPEG-2
	video and	Audio mode	stereo
	Audio Decoding		
		The STB should include a frequency scanning function to	
		detect the availability of DVB-C signals	
		Be capable of programme memory in case of cut off	

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3.0	Scanning function	It should be able to display the number of channel currently being scanned	
		It should be able to display number of services located	
		The decoder shall display details of its name network ID	
		signal strength and quality	
		EDC: current and next programme information 24x7days	
		erd: current and next programme information, 24x7uays	
		Auto/monual tuning	
		Auto/manual tuning	
		24-nourclock	
		OTA: STB software's, EPG, CA features must be upgradable	
		over the air	
		Support Receive mail	
4.0	Software	Provides the instant and personalized message prompt	
		including the following:-	
		Display and withdrawal of subtitles	
		Support multi-language info	
		Able to display current software and hardware version	
		stored in the decoders	
		Able to indicate whether an updates are available or	
		not	
		Able to indicate the unique serial number and state of	
		the STB decoder (error code)	
		Able to indicate type of middleware and other resident	
		applications version numbers	
50	Interfaces	Input interfaces: Multiple Transport Stream and Ceneric	
5.0	Interfaces	Stream Encapsulation (CSE)	
		DE input/output 75 obms impodance, female connector	
		RF Input/output 75 onins impedance, female connector	
		Output video 1 x RCA(cinch) type; Output audio (L and R) 2 x	
		RCA (cinch) type	
6.0	Interfaces for	STB must include at least one embedded smartcard reader or	
	Conditional	a DVB-CI (Common Interface) slot to allow any type of	
	Access	conditional access module to be plugged in to the set top	
		box. The CI should be upgradable to newer version	
7.0	Physical	Power supply	
	attributes	AC 220±10%, 50±1Hz	
8.0	Environmental	Operating Temperature	
	attributes	0~45°C	
		Operating humidity	
		Up to 90%	
9.0	Reliability	MTBF	
		>80.000Hrs	
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NB: THE ABOVE DVB-C SPECIFICATIONS WILL BE VALID UNTIL WHEN DVB-C2 IS MATURED IN THE MARKET

3.0 DVB-C2 MINIMUM TECHNICAL REQUIREMENTS AND SPECIFICATIONS

A: SE	A: SET TOP BOX (STB) MINIMUM TECHNICAL SPECIFICATIONS			
S/N	A. STB BASIC FEATURES	OPERATIONAL EFFECT(S)		
1.0	Auto and manual search modes	Basic features for broadcasting channel searching		
2.0	Signal Quality Level indicator	Basic feature for signal level indication(green or yellow) for acceptable signal quality		
3.0	Parental Control/Lock	Basic feature for controlling viewers		
4.0	Electronic Program guide (EPG)	On screen electron guide		
5.0	Full function standard IR remote control, using AA or AAA size battery.	Small size battery, hence an easier to handle (small in size) remote control		
6.0	Languages: English and Swahili	Availability language selection feature: Swahili is the national language spoken by majority Tanzanians		
7.0	PAL I/B/G auto conversion	PAL I is the VIDEO System for Tanzania		
8.0	Minimum 1000 channels receivable and storable	The software programming for channel storage caters for 00-99 or 000 to 999 hence channel storage is the best choice		
9.0	Favourite channel list editing	Provision for editing channels for user preference (basic feature)		
10.0	Warranty: 1 year	To avoid substandard equipment in the market		
11.0	Owner's Manual.	User manual for understanding the operation of the equipment as well as troubleshooting simple problems (English and Swahili languages)		
12.0	 Marking: Each STB shall be legibly and indelibly marked with at least the following information: a) Manufacturer's name or trade-mark (if any); b) Mode designation and serial No.' c) Country of manufacture; d) Input supply voltage and frequency; e) Power consumption; f) Cable input and output terminals; and g) Sockets for audio and video output. 	Basic marks to enable the subscriber to have first-hand information		

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B: D SPEC	/B-C2 SHALL HAVI IFICATIONS	E THE FOLLOWING	G MINIMUM TECHNICAL
		Input impedance	75Ω
		Modulation	OFDM
		Modes	Variable Coding & Modulation and
			Adaptive Coding & Modulation
		Modulation	16- to 4096-QAM
1.0		schemes	
1.0	RF tuner	Frequency	Flexible, 8 MHz or several hundred MHz
	& DVB-C2	Service specific	Single and multiple PLP (physical layer
	Channel	robustness	pipes)
		Input signal level	-31 to -65 dBm
		FEC coding	LDPC + BCH 1/2, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
		C/N range	-2.0 dB (QPSK) to +16 dB (32APSK)
		Inverse Fast	4k
		Fourier transform	
		(IFFT) size	
		Signal Bandwidth	47 MHz – 862 MHz
		Guard Intervals	1/64 or 1/128
		Interleaving	Bit, Time and Frequency Interleaving
		Channel raster	6 or 8 MHz
		Constellations	5 constellations, ranging in spectrum
			efficiency from 1 to 10.8 bit/s/Hz,
			optimized for operation in cable networks
		Pilots Pattern	Scattered and Continual Pilots
		Max Bit Rates	83.1 Mbit/s
		(8MHz)	
		I ransport stream	MPEG-2 and MPEG-4 ISO/IEC13818-1
		Video decoding	MPEG-2/MPEG4 AVC (H.264)
		Aspect Ratio	4:3,16:9
2.0	MDEO	(image rate)	
2.0	MPEG	Frame frequency	25Hz (PAL)
	I ransport	Video Resolution	720X576 (PAL) -standard definition,
	video and		
	Audio Docoding	Audio decoding	MPEG-2, MPEG-4
	Addio Decodilig	Audio mode	stereo
		The CTD should in	
		detect the availability of DVB-C2 signals	
		Be canable of prog	ramme memory in case of cut off
		3.0 Scanning It should be able to display the number of shannel curre	
3.0	Scanning	It should be able to	o display the number of channel currently

		It should be able to display number of services located	
		The decoder shall display details of its name, network ID,	
		signal strength and quality	
		EPG: current and next programme information, 24x7days	
		schedule	
		Auto/manual tuning	
		24-hourclock	
		OTA: STB software's, EPG, CA features must be upgradable	
		over the air	
		Support Receive mail	
4.0	Software	Provides the instant and personalized message prompt	
		including the following:-	
		Display and withdrawal of subtitles	
		Support multi-language info	
		Able to display current software and hardware version	
		stored in the decoders	
		Able to indicate whether an undates are available or	
		• Able to indicate whether all updates are available of	
		 Able to indicate the unique corial number and state of 	
		• Able to indicate the unique senai number and state of the STB deceder (error code)	
		Able to indicate type of middleware and other resident	
		 Able to indicate type of middleware and other resident applications version numbers 	
F 0	Tutofacoa	Insut interference Multiple Transport Chapter and Consule	
5.0	Interraces	Input interfaces: Multiple Transport Stream and Generic	
		Stream Encapsulation (GSE)	
		Output video 1 x PCA(cinch) type: Output audio (L and D) 2 x	
		Dulput video 1 x KCA(cinch) type; Output audio (L and R) 2 x	
		RCA (cinch) type	
6.0	Interfaces for	STB must include at least one embedded smartcard reader or	
	Conditional	a DVB-CI (Common Interface) slot to allow any type of	
	Access	conditional access module to be plugged in to the set top	
		box. The CI should be upgradable to newer version	
7.0	Physical	Power supply	
	attributes	AC 220±10%, 50±1Hz	
8.0	Environmental	Operating Temperature	
	attributes	0~45°C	
		Operating humidity	
		Up to 90%	
9.0	Reliability	MTBF	
	-	>80,000Hrs	

4.0 DVB-T MINIMUM TECHNICAL SPECIFICATIONS

A: SE	A: SET TOP BOX (STB) MINIMUM TECHNICAL SPECIFICATIONS				
S/N	A. STB BASIC FEATURES	OPERATIONAL EFFECT(S)			
1.0	Auto and manual search modes	Basic features for broadcasting channel searching			
2.0	Signal Quality Level indicator	Basic feature for signal level indication(green or yellow) for acceptable signal quality			
3.0	Parental Control/Lock	Basic feature for controlling viewers			
4.0	Electronic Program guide (EPG)	On screen electron guide			
5.0	Full function standard IR remote control, using AA or AAA size battery.	Small size battery, hence an easier to handle (small in size) remote control			
6.0	Languages: English and Swahili	Availability language selection feature: Swahili is the national language spoken by majority Tanzanians			
7.0	PAL I/B/G auto conversion	PAL I is the VIDEO System for Tanzania			
8.0	Minimum 1000 channels receivable and storable	The software programming for channel storage caters for 00-99 or 000 to 999 hence channel storage is the best choice			
9.0	Favourite channel list editing	Provision for editing channels for user preference (basic feature)			
10.0	Warranty: 1 year	To avoid substandard equipment in the market			
11.0	Owner's Manual.	User manual for Understanding the operation of the equipment as well as troubleshooting simple problems (English and Swahili languages)			
12.0	 Marking: Each STB shall be legibly and indelibly marked with at least the following information: a) Manufacturer's name or trade-mark (if any); b) Mode designation and serial No.' c) Country of manufacture; d) Input supply voltage and frequency; e) Power consumption; f) RF input and output terminals; and g) Sockets for audio and video output. 	Basic marks to enable the subscriber to have first-hand information			

B:DVI	B:DVB-T SHALL HAVE FOLLOWING MINIMUM TECHNICAL SPECIFICATIONS			
		Input impedance	75Ω	
		Modulation	COFDM: OPSK, 160AM, 640AM	
		Frequency	VHF (174-230MHz) - optional, UHF (470-	
			862 MHz)	
		Input signal level	-33dBm to -81dBm	
		FEC coding	Convolutional Coding + Reed Solomon	
			1/2, 2/3, 3/4, 5/6, 7/8	
		FTT Size	2k, 8k	
		C/N range	3dB (QPSK) to 7dB (64QAM)	
		Guard intervals	1/4, 1/8, 1/16, 1/32	
	RF tuner	Channel raster (width)	7MHz (VHF), 8MHz (UHF)	
1.0	& DVB-1	Signal Bandwidth	7.61 MHz in the 8 MHz channel; 6.66	
	Channel		MHz in the 7 MHz channel	
		Interleaving	Bit+ Frequency	
		Max Bit Rates (8MHz)	32 Mbit/s	
		Used Bit Rates	5 to 32 Mbit/s	
		(8MHz)		
		Transport stream	MPEG-2 ISO/IEC13818	
	MPEG Transport stream video and Audio	Video decodina	MPEG-2/MPEG4AVC	
		Aspect Ratio	4:3.16:9	
		(image rate)		
2.0		Frame frequency	25Hz (PAL)	
		Video Resolution	720X576 (PAL) - standard definition,	
			1920X1080 (High definition)	
		Audio decoding	MPEG-2 MUSICAM Layer I&II/HEAAC	
	Decoding	Audio mode	Single track/dual track/stereo	
		Audio sampling	32KHz, 44.1KHz, 48KHz., 96KHz	
		rate	(optional)	
		The STB should include a frequency scanning function to detect the availability of DVB-T signals		
	Scanning	It should also automatically list the content of the terrestrial		
3.0		bouquet by reading the PSI/SI streams and		
	function	Be capable of programme memory in case of cut off		
		It should be able to display the number of channel currently		
		being scanned	being scanned	
		It should be able to	o display number of services located	
		Where the multiplex is seized, the decoder shall display		
			, network 1D, signal strength and quality	

		EPG: current and next programme information. 24x7days	
		schedule.	
		Auto/manual tuning	
		24-hourclock	
		OTA: STB software's, EPG, CA features must be upgradable	
		over the air. (USB Upgrade-optional)	
		Support receive mail	
4.0	Software	Provides the instant and personalized message prompt	
		including the following:-	
		 Display and withdrawal of subtitles 	
		Support multi-language info	
		Able to display current software and hardware version	
		stored in the decoders	
		 Able to indicate whether an updates are available or not 	
		Able to indicate the unique serial number and state of	
		the STB decoder (error code)	
		Able to indicate the received multiplex with indications	
		of signal strength and bit errors rates based on the	
		received PLP	
		Able to indicate type of middleware and other resident	
		applications version numbers	
5.0	Additional Hardware	PVR (optional)	
5.0	Additional Hardware	PVR (optional)	
5.0 6.0	Additional Hardware Teletext	PVR (optional) It is able to display Teletext using the OSD and/or by the insertion of the Teletext data in the V/BL of the analogue CV/BS	
5.0 6.0	Additional Hardware Teletext &Teletext subtitle	PVR (optional) 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	
5.0 6.0	Additional Hardware Teletext &Teletext subtitle	PVR (optional) 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	
5.0 6.0 7.0	Additional Hardware Teletext &Teletext subtitle	PVR (optional) 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 RE input connector: IEC169-2 female, input impedance 75	
5.0 6.0 7.0	Additional Hardware Teletext &Teletext subtitle Interfaces	PVR (optional) 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 RF input connector: IEC169-2 female, input impedance 75 ohms	
5.0 6.0 7.0	Additional Hardware Teletext &Teletext subtitle Interfaces	PVR (optional) 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 RF input connector: IEC169-2 female, input impedance 75 ohms One RCA (CINCH) female connector for video output and two	
5.0 6.0 7.0	Additional Hardware Teletext &Teletext subtitle Interfaces	PVR (optional) 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 RF input connector: IEC169-2 female, input impedance 75 ohms One RCA (CINCH) female connector for video output and two RCA (CINCH) female connectors for stereo sound output	
5.0 6.0 7.0	Additional Hardware Teletext &Teletext subtitle Interfaces	PVR (optional) 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 RF input connector: IEC169-2 female, input impedance 75 ohms One RCA (CINCH) female connector for video output and two RCA (CINCH) female connectors for stereo sound output RF bypass (loop) IEC169-2 male	
5.0 6.0 7.0	Additional Hardware Teletext &Teletext subtitle Interfaces	PVR (optional) 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 RF input connector: IEC169-2 female, input impedance 75 ohms One RCA (CINCH) female connector for video output and two RCA (CINCH) female connectors for stereo sound output RF bypass (loop) IEC169-2 male RF output via a PAL-G modulator	
5.0 6.0 7.0	Additional Hardware Teletext &Teletext subtitle Interfaces	PVR (optional) 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 RF input connector: IEC169-2 female, input impedance 75 ohms One RCA (CINCH) female connector for video output and two RCA (CINCH) female connectors for stereo sound output RF bypass (loop) IEC169-2 male RF output via a PAL-G modulator SCART interface (optional)	
5.0 6.0 7.0	Additional Hardware Teletext &Teletext subtitle Interfaces	PVR (optional) 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 RF input connector: IEC169-2 female, input impedance 75 ohms One RCA (CINCH) female connector for video output and two RCA (CINCH) female connectors for stereo sound output RF bypass (loop) IEC169-2 male RF output via a PAL-G modulator SCART interface (optional) HDMI interface (optional)	
5.0 6.0 7.0	Additional Hardware Teletext &Teletext subtitle Interfaces	PVR (optional) 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 RF input connector: IEC169-2 female, input impedance 75 ohms One RCA (CINCH) female connector for video output and two RCA (CINCH) female connectors for stereo sound output RF bypass (loop) IEC169-2 male RF output via a PAL-G modulator SCART interface (optional) HDMI interface (optional) Should include at least one RF cable to connect the unit with	
5.0 6.0 7.0	Additional Hardware Teletext &Teletext subtitle Interfaces	PVR (optional) 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 RF input connector: IEC169-2 female, input impedance 75 ohms One RCA (CINCH) female connector for video output and two RCA (CINCH) female connectors for stereo sound output RF bypass (loop) IEC169-2 male RF output via a PAL-G modulator SCART interface (optional) HDMI interface (optional) Should include at least one RF cable to connect the unit with its associated analogue television receiver	
5.0 6.0 7.0	Additional Hardware Teletext &Teletext subtitle Interfaces	PVR (optional) 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 RF input connector: IEC169-2 female, input impedance 75 ohms One RCA (CINCH) female connector for video output and two RCA (CINCH) female connectors for stereo sound output RF bypass (loop) IEC169-2 male RF output via a PAL-G modulator SCART interface (optional) HDMI include at least one RF cable to connect the unit with its associated analogue television receiver	
5.0 6.0 7.0 8.0	Additional Hardware Teletext &Teletext subtitle Interfaces	PVR (optional) 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 RF input connector: IEC169-2 female, input impedance 75 ohms One RCA (CINCH) female connector for video output and two RCA (CINCH) female connectors for stereo sound output RF bypass (loop) IEC169-2 male RF output via a PAL-G modulator SCART interface (optional) HDMI interface (optional) Should include at least one RF cable to connect the unit with its associated analogue television receiver STB must include at least one embedded smartcard reader or	
5.0 6.0 7.0 8.0	Additional Hardware Teletext &Teletext subtitle Interfaces	PVR (optional) 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 RF input connector: IEC169-2 female, input impedance 75 ohms One RCA (CINCH) female connector for video output and two RCA (CINCH) female connectors for stereo sound output RF bypass (loop) IEC169-2 male RF output via a PAL-G modulator SCART interface (optional) HDMI interface (optional) Should include at least one RF cable to connect the unit with its associated analogue television receiver STB must include at least one embedded smartcard reader or a DVB-CI (Common Interface) slot to allow any type of	
5.0 6.0 7.0 8.0	Additional Hardware Teletext &Teletext subtitle Interfaces	PVR (optional) 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 RF input connector: IEC169-2 female, input impedance 75 ohms One RCA (CINCH) female connector for video output and two RCA (CINCH) female connectors for stereo sound output RF bypass (loop) IEC169-2 male RF output via a PAL-G modulator SCART interface (optional) HDMI interface (optional) Should include at least one RF cable to connect the unit with its associated analogue television receiver STB must include at least one embedded smartcard reader or a DVB-CI (Common Interface) slot to allow any type of conditional access module to be plugged in to the set top	
5.0 6.0 7.0 8.0	Additional Hardware Teletext &Teletext subtitle Interfaces	PVR (optional) 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 RF input connector: IEC169-2 female, input impedance 75 ohms One RCA (CINCH) female connector for video output and two RCA (CINCH) female connectors for stereo sound output RF bypass (loop) IEC169-2 male RF output via a PAL-G modulator SCART interface (optional) HDMI interface (optional) Should include at least one RF cable to connect the unit with its associated analogue television receiver STB must include at least one embedded smartcard reader or a DVB-CI (Common Interface) slot to allow any type of conditional access module to be plugged in to the set top box. The CI should be upgradable to newer version	
5.0 6.0 7.0 8.0	Additional Hardware Teletext &Teletext subtitle Interfaces Interfaces for Conditional Access	PVR (optional) 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 RF input connector: IEC169-2 female, input impedance 75 ohms One RCA (CINCH) female connector for video output and two RCA (CINCH) female connectors for stereo sound output RF bypass (loop) IEC169-2 male RF output via a PAL-G modulator SCART interface (optional) HDMI interface (optional) Should include at least one RF cable to connect the unit with its associated analogue television receiver STB must include at least one embedded smartcard reader or a DVB-CI (Common Interface) slot to allow any type of conditional access module to be plugged in to the set top box. The CI should be upgradable to newer version	

9.0	Physical	Power supply: AC 220±10%, 50±1Hz	
	attributes	Power: Energy star(option)	
10.0	Environmental	Operating Temperature: 0~45°C	
	attributes	Operating humidity: Up to 90%	
11.0	Reliability	MTBF: >80,000Hrs	

NB: THE ABOVE DVB-T SPECIFICATIONS WILL BE VALID UNTIL WHEN DVB-T2 IS MATURED IN THE MARKET

5.0 DVB-T2 MINIMUM TECHNICAL SPECIFICATIONS

A: SET TOP BOX (STB) MINIMUM TECHNICAL SPECIFICATIONS			
S/N	A. STB BASIC FEATURES	OPERATIONAL EFFECT(S)	
1.0	Auto and manual search modes	Basic features for broadcasting channel searching	
2.0	Signal Quality Level indicator	Basic feature for signal level indication(green or yellow) for acceptable signal quality	
3.0	Parental Control/Lock	Basic feature for controlling viewers	
4.0	Electronic Program guide (EPG)	On screen electron guide	
5.0	Full function standard IR remote control, using AA or AAA size battery.	Small size battery, hence an easier to handle (small in size) remote control	
6.0	Languages: English and Swahili	Availability language selection feature: Swahili is the national language spoken by majority Tanzanians	
7.0	PAL I/B/G auto conversion	PAL I is the VIDEO System for Tanzania	
8.0	Minimum 1000 channels receivable and storable	The software programming for channel storage caters for 00-99 or 000 to 999 hence channel storage is the best choice	
9.0	Favourite channel list editing	Provision for editing channels for user preference (basic feature)	
10.0	Warranty: 1 year	To avoid substandard equipment in the market	
11.0	Owner's Manual.	User manual for Understanding the operation of the equipment as well as troubleshooting simple problems (English and Swahili languages)	
12.0	Marking: Each STB shall be legibly and indelibly marked with at least the following information:	Basic marks to enable the subscriber to have first-hand information	

a) Manufacturer's name or trade-mark (if
any);
b) Mode designation and serial No.'
c) Country of manufacture;
d) Input supply voltage and frequency;
e) Power consumption;
f) RF input and output terminals; and
g) Sockets for audio and video output.

B:DV	B-T2 SHALL HAV	/E FOLLOWING MIN	IMUM TECHNICAL SPECIFICATIONS
		Input	75Ω
		impedance	
		Modulation	COFDM:OPSK, 160AM, 640AM, 2560AM
		Frequency	VHF(174-230MHz)-optional, UHF(470-
			700MHz)
		Input signal	-35dBm to -85dBm
		level	
		FEC coding	LDPC Code+ BCH Code, Code rates :1/2,
			3/5, 2/3, 3/4, 4/5, 5/6
		FTT Size	1K, 2K, 4K, 8K, 16K, 32K
		C/N range	3dB (QPSK1/2) to 24dB (256QAM5/6)
		(Rice	
	KF tuner	channel)	
1.0	& DVB-12	Pilot Pattern	PP1 to PP8
	Channel	Guard intervals	1/4, 1/8, 1/16, 1/32, 1/128, 19/128,
			19/256
		Channel raster	7MHz (VHF),8MHz(UHF), 1.7MHz (VHF)-
			optional
		Signal	8MHz corresponds to 7.61 MHz in the
		Bandwidth	normal carrier mode, /./1 MHz for 8k,
		Comiles and if	While /./// MHZ for 16K and 32K
		Service specific	Physical Layer Pipes (PLP)
		Topustness	Bit Coll + Time + Frequency
		Divorcity	DIL+ CEII + TITTE + FREQUENCY
		Diversity	
		Rotated	Significant robustness gain in channels
		constellations	with severe degradations (multinath SEN
		CONSCENDENTS	operation parrow band interference
		Mode of	Future Extension Frame(FFF)
		Extensions	
		Max Bit Rates	50.3Mbit/s.(32Ke.256OAM.CR=5/6.GI=1/
		(8MHz)	28,PP7)
		Used Bit Rates	Portable SFN:25.0Mbit/s, Fixed
		(8MHz)	SFN:37.0Mbit/s, Fixed MFN:40.2Mbit/s
		GE06	Signal is under the mask of DVB-T2

		compatible	(power level measured in a 4KHz	
			bandwidth)	
		Transport	MPEG-2ISO/IEC13818	
		stream		
		Video decoding	MPEG-2/MPEG4AVC (H.264)	
2.0		Aspect Ratio	4:3,16:9	
2.0	MPEG Transport	(image rate)		
	and Audio	Frame	ZSHZ (PAL)	
	Decoding	Video Resolution	720VE76 (DAL) standard definition	
	Decouning		1920X1080 (High definition)	
		Audio decodina	MPEG-2 MUSICAM Laver I&II/HEAAC	
		Audio mode	Single track/dual track/stereo	
		Audio sampling	32KHz, 44,1KHz, 48KHz, 96KHz (ontional)	
		rate		
		The STB should ir	nclude a frequency scanning function to	
		detect the availab	ility of DVB-T signals	
		It should also automatically list the content of the terrestrial		
3.0	Scanning	bouquet by reading the PSI/SI streams and		
	function	Be capable of programme memory in case of cut off		
It should		It should be able	to display the number of channel currently	
		being scanned		
		It should be able	to display number of services located	
		Where the multip	lex is seized, the decoder shall display	
		details of its name	e, network ID, signal strength and quality	
		FPC : current and	next programme information 24x7days	
		schedule	next programme information, 24x7 days	
		Auto/manual tuni	na	
		24-hourclock		
		OTA: STB software's, EPG, CA features must be upgradable		
		over the air. (USB Upgrade-optional)		
		Support receive mail		
4.0	Software	Provides the insta	nt and personalized message prompt	
		including the follo	wing:-	
		Display and	d withdrawal of subtitles	
		Support m	ulti-language info	
		Able to dis	play current software and hardware	
		version sto	red in the decoders	
		Able to Ind not	icate whether an updates are available or	
		110L	icate the unique carial number and state of	
			icale une unique sendi number dhu state of	
			icate the received multipley with	
		indications	of signal strength and hit errors rates	
		 Able to indicate the unique serial number and state of the STB decoder (error code) Able to indicate the received multiplex with indications of signal strength and bit errors rates 		

		based on the received PLP	
		Able to indicate type of middleware and other	
		resident applications version numbers	
5.0	Additional Hardware	PVR (optional)	
6.0	Tolotoxt	It is able to display Teletayt using the OSD and/or by the	
0.0	8 Tolotoxt	insortion of the Teletext data in the VRI of the appleque	
		CVBS Video Output	
	Sublice		
7.0	Interfaces	RF input connector: IEC169-2 female, input impedance 75 ohms	
		One RCA (CINCH) female connector for video output and	
		two RCA (CINCH) female connectors for stereo sound	
		output	
		RF bypass (loop) IEC169-2 male	
		RF output via a PAL-G modulator	
		SCART interface (optional)	
		HDMI interface (optional)	
		Should include at least one RF cable to connect the unit with	
		its associated analogue television receiver	
8.0	Interfaces for	STB must include at least one embedded smartcard reader	
	Conditional	or a DVB-CI (Common Interface) slot to allow any type of	
	Access	conditional access module to be plugged in to the set top	
		box. The CI should be upgradable to newer version	
0.0	Dhusical		
9.0	Physical	Power supply: AC $220\pm10\%$, $50\pm1HZ$	
10.0		Power: Energy star(option)	
10.0	Environmental	Operating Temperature: U~45°C	
		Operating numidity: Up to 90%	
11.0	Reliability	MIBE: >80,000Hrs	

6.0 MINIMUM TECHNICAL SPECIFICATIONS FOR INTEGRATED DIGITAL TERRESTRIAL, SATELLITE AND CABLE TELEVISION (IDTV)

1. SCOPE

This specification describes a baseline profile, based on open specifications for Standard (SD) and High Definition (HD) integrated Digital Television (IDTV) receivers for the reception of digital terrestrial, satellite and cable television signals. This profile is based predominantly on Digital Video Broadcasting (DVB) specifications.

2. REFERENCES

The Standards listed in Annex I contains provisions which, through reference in this text, constitute provisions of this specifications. All specifications are subject to revision.

3. REQUIREMENTS

The IDTV shall comply to the following:-

- i. Terrestrial, satellite and cable services. IDTV receivers shall fully comply with detailed specifications in Table I.
- ii. The manufacturer shall ensure compatibility/interfacing with Consumer Electronic equipment such as Audio and Video systems in the country.

TABLE I

A: INTEGRATED DIGITAL TELEVISION – SATELLITE (DVB-S2) MINIMUM TECHNICAL SPECIFICATIONS				
S/N	I. BASIC FEATURES	OPERATIONAL EFFECT(S)		
1.0	Auto and manual search modes	Basic features for broadcasting channel searching		
2.0	Signal Quality Level indicator	Basic feature for signal level indication(green or yellow) for acceptable signal quality		
3.0	Parental Control/Lock	Basic feature for controlling viewers		
4.0	Electronic Program guide (EPG)	On screen electron guide		
5.0	Full function standard IR remote control , using AA or AAA size battery.	Small size battery, hence an easier to handle (small in size) remote control		
6.0	Languages: English and Swahili	Availability language selection feature: Swahili is the national language spoken by majority Tanzanians		
7.0	PAL I/B/G auto conversion	PAL I is the VIDEO System for Tanzania		
8.0	Minimum 1000 channels receivable and storable	The software programming for channel storage caters for 00-99 or 000 to 999 hence channel storage is the best choice		
9.0	Favourite channel list editing	Provision for editing channels for user preference (basic feature)		
10.0	Warranty: 1 year	To avoid substandard equipment in the market		
11.0	Owner's Manual	User manual for Understanding the operation of the equipment as well as troubleshooting simple problems (English and Swahili languages)		
12.0	Marking: Each iDTV shall be legibly and indelibly marked with at least the following information:	Basic marks to enable the subscriber to have first-hand information		

II: MINIMUM TECHNICAL SPECIFICATIONS

		Input	75Ω
		impedance	
		Modulation	Single Carrier QPSK with multiple streams
		Modulation	QPSK, 8PSK, 16APSK,32APSK
		schemes	
		Frequency	950-2150 MHz
		Input signal	-25 dBm to -65 dBm
		level	
		FEC coding	LDPC + BCH 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4,
			4/5, 5/6, 8/9, 9/10
		C/N range	-2.0 dB (QPSK) to +16 dB (32APSK)
		Signal	Depends on the transponder
	RF tuner	Bandwidth	
1.0	& DVB-S2	Interleaving	Bit-Interleaving
	Channel	Symbol rate	2~45Msps
		Rotated	2 bit/s/Hz to 5 bit/s/Hz, optimized for operation
		constellations	over non-linear transponders.
		Transport	MPEG-2 and MPEG-4 ISO/IEC13818-1
		stream	
		Video	MPEG-2/MPEG4 AVC(H.264)
		decoding	
2.0	MPEG	Aspect Ratio	4:3,16:9
	Transport stream video	(image rate)	
		Frame	25Hz (PAL)
	and Audio	frequency	
	Decoding	Video	720X576 (PAL) - standard definition, 1920X1080
		Resolution	(High definition)
		Audio	MPEG-2, MPEG-4
		decoding	
		Audio mode	stereo
		The IDTV shou	Ild include a frequency scanning function to detect
		the availability	of DVB-S2 signals

		Be capable of programme memory in case of cut off	
3.0	Scanning	It should be able to display the number of channel currently	
	function	being scanned	
		It should be able to display number of services located	
		The receiver shall display details of its name, network ID, signal	
		strength and quality	
		EPG: current and next programme information, 24x7 days	
		schedule	
		Auto/manual tuning	
		24-hourclock	
		OTA: IDTV software's, EPG, CA features must be upgradable	
		over the air	
		Support receives mail.	
4.0	Software	Provides the instant and personalized message prompt including	
		the following:-	
		 Display and withdrawal of subtitles 	
		Support multi-language info	
		 Able to display current software and hardware version 	
		stored in the receivers	
		 Able to indicate whether an updates are available or not 	
		Able to indicate the unique serial number and state of the	
		IDTV receiver (error code)	
		 Able to indicate type of middleware and other resident 	
		applications version numbers	
5.0	Interfaces	RF input connector: remaie connector, input impedance 75 onms	
		One RCA (CINCH) female connector for video output and two	
		RCA (CINCH) female connectors for stereo sound output	
		RF output: remaie connector	
		LINB control: IDIV shall have provisions to provide proper power	
		supply and switching signal for oscillator selection and	
6.0	Interfaces for	IDTV must include at least one embedded smartcard reader or a	
0.0	Conditional	DVB-CI (Common Interface) slot to allow any type of conditional	
	Access	access module to be plugged in to the set top box. The CI	
	ACCOD	should be upgradable to newer version	
7.0	Physical	Power supply	
	attributes	AC $220\pm10\%$, $50\pm1Hz$	
8.0	Environmental	Operating Temperature	
	attributes	0~45°C	
		Operating humidity	
		Up to 90%	
9.0	Reliability	MTBF	
		>80,000Hrs	
B: IN	TEGRATED DIGI	TAL TELEVISION – CABLE (DVB-C) MINIMUM TECHNICAL	

SPEC	IFICATIONS		
S/N	I. BASIC FEATU	IRES	OPERATIONAL EFFECT(S)
1.0	Auto and manual	search modes	Basic features for broadcasting channel searching
2.0	Signal Quality Lev	vel indicator	Basic feature for signal level indication(green or yellow) for acceptable signal quality
3.0	Parental Contro	l/Lock	Basic feature for controlling viewers
4.0	Electronic Progra	m quide (EPG)	On screen electron guide
5.0	Full function stan control , using A/ battery.	dard IR remote A or AAA size	Small size battery, hence an easier to handle (small in size) remote control
6.0	Languages: Engli	sh and Swahili	Availability language selection feature: Swahili is the national language spoken by majority Tanzanians
7.0	PAL I/B/G auto	conversion	PAL I is the VIDEO System for Tanzania
8.0	Minimum 1000 ch and storable	nannels receivable	 The software programming for channel storage caters for 00-99 or 000 to 999 hence channel storage is the best choice
9.0	Favourite channe	l list editing	Provision for editing channels for user preference (basic feature)
10.0	Warranty: 1 year		To avoid substandard equipment in the market
11.0	Owner's Manual.		User manual for understanding the operation of the equipment as well as troubleshooting simple problems (English and Swahili languages)
12.0	Marking: Each ID and indelibly mar the following info a) Manufacturer's mark (if any); b) Mode designat c) Country of mar d) Input supply v frequency; e) Power consum f) Cable input and terminals; and g) Sockets for au output.	TV shall be legibl ked with at least rmation: a name or trade- tion and serial No nufacture; oltage and ption; d output dio and video	y Basic marks to enable the subscriber to have first-hand information
11: N		NICAL SPECIFI(
		Input impedance	/5\2
		Modulation	Single Carrier QAM

		Modes	Constant Coding & Modulation
		Modulation	16- to 256-QAM
1.0	RF tuner	schemes	
	& DVB-C	Frequency	6 and 8 MHz
	Channel	Input signal	-40 to -60 dBm
		level	
		FEC coding	Reed Solomon (RS)
		C/N range	31 dB Min. for 64 QAM
		Signal	47 MHz – 862 MHz
		Bandwidth	
		Interleaving	Bit Interleaving
		Channel	6 or 8 MHz
		raster	
		Constellations	16 QAM, 64 QAM and 256 QAM
		Max Bit Rates	83.1 Mbit/s
		(8MHz)	
		Transport	MPEG-2/ISO/IEC13818-1
		stream	
		Video	MPEG-2
		decoding	
2.0	MPEG	Aspect Ratio	4:3,16:9
	Iransport	(image rate)	
	stream and	Frame	25Hz (PAL)
		frequency	
	Audio	Video	/20X5/6 (PAL) - standard definition
	Decouning	Resolution	
		Audio	MPEG-2
		Audio modo	storeo
			Stereo
		The IDTV shou	l include a frequency scanning function to detect
		the availability of DVB-C signals	
		Be canable of programme memory in case of cut off	
3.0	Scanning	It should be at	ble to display the number of channel currently
	function	being scanned	
		It should be able to display number of services located	
		The receiver s	nall display details of its name, network ID, signal
		strength and guality	
		EPG: current a	and next programme information, 24x7days
		schedule	
		Auto/manual to	uning
		24-hourclock	
		OTA: IDTV sof	tware's, EPG, CA features must be upgradable
		over the air	
		Support Receiv	ve mail
4.0	Software	Provides the in	stant and personalized message prompt including

		the following:-	
		Display and	l withdrawal of subtitles
		 Support mu 	ulti-language info
		Able to disp	play current software and hardware version
		stored in tr	ie receivers
		Able to ind	icate whether an updates are available or not
		Able to indi IDTV receiv	icate the unique serial number and state of the ver (error code)
		Able to ind	icate type of middleware and other resident
		application	s version numbers
5.0	Interfaces	Input interfaces: I Encapsulation (GS	Multiple Transport Stream and Generic Stream
		RF input/output 7	5 ohms impedance, female connector
		Output video 1 x l	RCA(cinch) type: Output audio (L and R) 2 x
		RCA (cinch) type	
6.0	Interfaces for	IDTV must include	e at least one embedded smartcard reader or a
	Conditional	DVB-CI (Common	Interface) slot to allow any type of conditional
	Access	access module to	be plugged in to the set top box. The CI
		should be upgrade	able to newer version
7.0	Physical	Power supply	
	attributes	AC 220±10%, 50±1Hz	
8.0	Environmental	Operating Temper	rature
	allibules	0~45 C	
		Up to 90%	-Y
0.0	Poliability		
9.0	Reliability	$\mathbb{N} = \mathbb{D} = \mathbb{D}$	
C: TN			
TECH	NICAL SPECIFIC	ATIONS	- CABLE (DVB-C2) MINIMON
S/N	I. BASIC FEATU	IRES	OPERATIONAL EFFECT(S)
1.0	Auto and manual	search modes	Basic features for broadcasting channel
			searching
2.0	Signal Quality Lev	el indicator	Basic feature for signal level indication(green
			or yellow) for acceptable signal quality
3.0	Parental Control	/Lock	Basic feature for controlling viewers
4.0	Electronic Progra	m guide (EPG)	On screen electron guide
5.0	Full function stan	dard IR remote	Small size battery, hence an easier to handle
	control, using A	A or AAA size	(small in size) remote control
	battery.		
6.0	Languages: Englis	sh and Swahili	Availability language selection feature:
			Swahili is the national language spoken by
			majority Tanzanians

7.0	PAL I/B/G auto	conversion	PAL I is the VIDEO System for Tanzania
8.0	Minimum 1000 cł	nannels receivable	e The software programming for channel
	and storable		storage caters for 00-99 or 000 to 999
			hence channel storage is the best choice
9.0	Favourite channe	l list editing	Provision for editing channels for user
			preference (basic feature)
10.0	Warranty: 1 year		To avoid substandard equipment in the market
11.0	Owner's Manual.		User manual for understanding the operation of the equipment as well as troubleshooting simple problems (English and Swahili languages)
12.0 II: M	Marking: Each ID and indelibly mar the following info a) Manufacturer's mark (if any); b) Mode designat c) Country of mar d) Input supply v frequency; e) Power consum f) Cable input and terminals; and g) Sockets for au output.	TV shall be legibl ked with at least rmation: name or trade- ion and serial No nufacture; oltage and ption; d output dio and video	Iv Basic marks to enable the subscriber to have first-hand information o.' .'
		Input	75Ω
		impedance	
		Modulation	OFDM
		Modes	Variable Coding & Modulation and Adaptive
			Coding & Modulation
10	RF tunor	Modulation	16- to 4096-QAM
1.0	& DVB-C2	Froquency	Elevible 8 MHz or coveral hundred MHz
	Channel	Sonvico	Single and multiple PLP (physical layer pipes)
		specific	
		robustness	
		Input signal	-31 to -65 dBm
		level	
		FEC coding	LDPC + BCH 1/2, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
		C/N range	-2.0 dB (QPSK) to +16 dB (32APSK)
		Inverse Fast	4k
		Fourier	
1			
		transform	

		Signal	47 MHz – 862 MHz	
		Bandwidth		
		Guard	1/64 or 1/128	
		Intervals	-, • · • · -,•	
		Interleaving	Bit, Time and Frequency Interleaving	
		Channel	6 or 8 MHz	
		raster		
		Constellations	5 constellations, ranging in spectrum efficiency	
			from 1 to 10.8 bit/s/Hz, optimized for operation	
			in cable networks	
		Pilots Pattern	Scattered and Continual Pilots	
		Max Bit Rates	83.1 Mbit/s	
		(8MHz)		
	1			
		Transport	MPEG-2 and MPEG-4 ISO/IEC13818-1	
		stream		
		Video	MPEG-2/MPEG4 AVC (H.264)	
		decoding		
2.0	MPEG	Aspect Ratio	4:3,16:9	
	Transport	(image rate)		
	stream and	Frame	25Hz (PAL)	
	video and	frequency		
	Audio	Video	720X576 (PAL) -standard definition, 1920X1080	
	Decoding	Resolution	(High definition)	
		Audio	MPEG-2, MPEG-4	
		decoding		
		Audio mode	stereo	
		the availability	and include a frequency scanning function to detect	
			OI DVD-C2 Signals	
30	Scanning	It should be able to display the number of channel surrently		
5.0	function	hoing scannod		
	runction	It should be at	ale to display number of services located	
		The receiver st	all display details of its name network ID signal	
		strength and quality		
		FPG: current and next programme information 24x7days		
		schedule		
		Auto/manual tuning		
		24-hourclock OTA: IDTV software's EPG CA features must be upgradable		
		over the air Support Receive mail		
4.0	Software	Provides the in	stant and personalized message prompt including	
		the following:-	, , , , , , , , , , , , , , , , , , , ,	
		Display	and withdrawal of subtitles	
		Support multi-language info		

		 Able to disp stored in th 	play current software and hardware version
			cate whether an undates are available or not
		Able to indi Able to indi	cate the unique serial number and state of the
		IDTV receiv	ver (error code)
		Able to indi	cate type of middleware and other resident
		applications	s version numbers
5.0	Interfaces	Input interfaces: N Encapsulation (GS	Multiple Transport Stream and Generic Stream E)
		RF input/output 7	5 ohms impedance, female connector
		Output video 1 x F	RCA(cinch) type; Output audio (L and R) 2 x
		RCA (cinch) type	
6.0	Interfaces for	DVP CI (Common	e at least one embedded smartcard reader or a
		access module to	be plugged in to the set top box. The CI
	ALLESS	should be upgrada	able to newer version
7.0	Physical	Power supply	
	attributes	AC 220±10%, 50=	±1Hz
8.0	Environmental	Operating Temper	ature
	attributes	0~45°C	
		Operating humidit	у
		Up to 90%	
9.0	Reliability		
	TECOATED DICI		- TEDESTRIAL (DVR-T) MINIMUM
TECH	NICAL SPECIFIC	ATIONS	- TERESTRIAL (DVD-T) MINIMOM
S/N	I. BASIC FEATU	RES	OPERATIONAL EFFECT(S)
1.0			Desis factures for burndessting showned
1.0	Auto and manual	search modes	Basic features for broadcasting channel
2.0	Signal Quality Lev	vel indicator	Basic feature for signal level indication (green
2.0			or vellow) for acceptable signal quality
3.0	Parental Control	/Lock	Basic feature for controlling viewers
4.0	Electronic Program guide (EPG)		On screen electron guide
5.0	Full function standard IR remote		Small size battery, hence an easier to handle
	control, using AA	A or AAA size	(small in size) remote control
	battery.		
6.0	Languages: Englis	sh and Swahili	Availability language selection feature:
			Swahili is the national language spoken by
70		convorcion	majority Lanzanians
1.0	Minimum 1000 ch		The software programming for channel
0.0	and storable		storage caters for 00-99 or 000 to 999
			hence channel storage is the best choice
8.0	Minimum 1000 ch and storable	annels receivable	The software programming for channel storage caters for 00-99 or 000 to 999
			nence charmer storage is the best choice

9.0	Favourite channe	l list editing	Provision for editing channels for user
10.0			preterence (basic feature)
10.0			no avoid substandard equipment in the market
11.0	Owner's Manual.		User manual for Understanding the operation
			of the equipment as well as troubleshooting
			simple problems (English and Swahili
			languages)
12.0	Marking: Each ID	TV shall be legib	ly Basic marks to enable the subscriber to have
	and indelibly mar	ked with at least	first-hand information
	a) Manufacturer's	name or trade-	
	mark (if any);		
	b) Mode designat	ion and serial No	o.'
	c) Country of mai	nufacture;	
	d) Input supply v	oltage and	
	frequency;		
	e) Power consum	ption;	
	and	utput terminais;	
	a) Sockets for au	dio and video	
	output.		
II: M	INIMUM TECHN	CAL SPECIFIC	ATIONS
	Γ	1	
		Input	75Ω
		impedance Madulation	COEDM: OPCK 1COAM CAOAM
		impedance Modulation	COFDM: QPSK, 16QAM, 64QAM
		impedance Modulation Frequency	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz)
		impedance Modulation Frequency Input signal	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm
		Impedance Modulation Frequency Input signal level	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm
		impedanceModulationFrequencyInput signallevelFEC coding	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm Convolutional Coding + Reed Solomon 1/2, 2/3,
		impedance Modulation Frequency Input signal level FEC coding	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm Convolutional Coding + Reed Solomon 1/2, 2/3, 3/4, 5/6, 7/8
		impedance Modulation Frequency Input signal level FEC coding FTT Size	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm Convolutional Coding + Reed Solomon 1/2, 2/3, 3/4, 5/6, 7/8 2k, 8k
		impedanceModulationFrequencyInput signallevelFEC codingFTT SizeC/N range	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm Convolutional Coding + Reed Solomon 1/2, 2/3, 3/4, 5/6, 7/8 2k, 8k 3dB (QPSK) to 7dB (64QAM)
	RF tuner	impedance Modulation Frequency Input signal level FEC coding FTT Size C/N range Guard	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm Convolutional Coding + Reed Solomon 1/2, 2/3, 3/4, 5/6, 7/8 2k, 8k 3dB (QPSK) to 7dB (64QAM) 1/4, 1/8, 1/16, 1/32
1.0	RF tuner & DVB-T	impedance Modulation Frequency Input signal level FEC coding FTT Size C/N range Guard intervals	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm Convolutional Coding + Reed Solomon 1/2, 2/3, 3/4, 5/6, 7/8 2k, 8k 3dB (QPSK) to 7dB (64QAM) 1/4, 1/8, 1/16, 1/32
1.0	RF tuner & DVB-T Channel	impedanceModulationFrequencyInput signallevelFEC codingFTT SizeC/N rangeGuardintervalsChannel	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm Convolutional Coding + Reed Solomon 1/2, 2/3, 3/4, 5/6, 7/8 2k, 8k 3dB (QPSK) to 7dB (64QAM) 1/4, 1/8, 1/16, 1/32 7MHz (VHF), 8MHz (UHF)
1.0	RF tuner & DVB-T Channel	impedance Modulation Frequency Input signal level FEC coding FTT Size C/N range Guard intervals Channel raster (width)	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm Convolutional Coding + Reed Solomon 1/2, 2/3, 3/4, 5/6, 7/8 2k, 8k 3dB (QPSK) to 7dB (64QAM) 1/4, 1/8, 1/16, 1/32 7MHz (VHF), 8MHz (UHF)
1.0	RF tuner & DVB-T Channel	impedance Modulation Frequency Input signal level FEC coding FTT Size C/N range Guard intervals Channel raster (width) Signal	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm Convolutional Coding + Reed Solomon 1/2, 2/3, 3/4, 5/6, 7/8 2k, 8k 3dB (QPSK) to 7dB (64QAM) 1/4, 1/8, 1/16, 1/32 7MHz (VHF), 8MHz (UHF) 7.61 MHz in the 8 MHz channel; 6.66 MHz in the
1.0	RF tuner & DVB-T Channel	impedance Modulation Frequency Input signal level FEC coding FTT Size C/N range Guard intervals Channel raster (width) Signal Bandwidth	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm Convolutional Coding + Reed Solomon 1/2, 2/3, 3/4, 5/6, 7/8 2k, 8k 3dB (QPSK) to 7dB (64QAM) 1/4, 1/8, 1/16, 1/32 7MHz (VHF), 8MHz (UHF) 7.61 MHz in the 8 MHz channel; 6.66 MHz in the 7 MHz channel
1.0	RF tuner & DVB-T Channel	impedance Modulation Frequency Input signal level FEC coding FTT Size C/N range Guard intervals Channel raster (width) Signal Bandwidth Interleaving	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm Convolutional Coding + Reed Solomon 1/2, 2/3, 3/4, 5/6, 7/8 2k, 8k 3dB (QPSK) to 7dB (64QAM) 1/4, 1/8, 1/16, 1/32 7MHz (VHF), 8MHz (UHF) 7.61 MHz in the 8 MHz channel; 6.66 MHz in the 7 MHz channel Bit+ Frequency
1.0	RF tuner & DVB-T Channel	impedance Modulation Frequency Input signal level FEC coding FTT Size C/N range Guard intervals Channel raster (width) Signal Bandwidth Interleaving Max Bit Rates (8MHz)	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm Convolutional Coding + Reed Solomon 1/2, 2/3, 3/4, 5/6, 7/8 2k, 8k 3dB (QPSK) to 7dB (64QAM) 1/4, 1/8, 1/16, 1/32 7MHz (VHF), 8MHz (UHF) 7.61 MHz in the 8 MHz channel; 6.66 MHz in the 7 MHz channel Bit+ Frequency 32 Mbit/s
1.0	RF tuner & DVB-T Channel	impedance Modulation Frequency Input signal level FEC coding FTT Size C/N range Guard intervals Channel raster (width) Signal Bandwidth Interleaving Max Bit Rates (8MHz) Used Bit	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm Convolutional Coding + Reed Solomon 1/2, 2/3, 3/4, 5/6, 7/8 2k, 8k 3dB (QPSK) to 7dB (64QAM) 1/4, 1/8, 1/16, 1/32 7MHz (VHF), 8MHz (UHF) 7.61 MHz in the 8 MHz channel; 6.66 MHz in the 7 MHz channel Bit+ Frequency 32 Mbit/s
1.0	RF tuner & DVB-T Channel	impedance Modulation Frequency Input signal level FEC coding FTT Size C/N range Guard intervals Channel raster (width) Signal Bandwidth Interleaving Max Bit Rates (8MHz) Used Bit Rates (8MHz)	COFDM: QPSK, 16QAM, 64QAM VHF (174-230MHz) - optional, UHF (470– 862 MHz) -33dBm to -81dBm Convolutional Coding + Reed Solomon 1/2, 2/3, 3/4, 5/6, 7/8 2k, 8k 3dB (QPSK) to 7dB (64QAM) 1/4, 1/8, 1/16, 1/32 7MHz (VHF), 8MHz (UHF) 7.61 MHz in the 8 MHz channel; 6.66 MHz in the 7 MHz channel Bit+ Frequency 32 Mbit/s 5 to 32 Mbit/s

		Transport	MPEG-2 ISO/IEC13818		
		stream			
		Video	MPEG-2/MPEG4AVC		
		decoding			
2.0	MPEG	Aspect Ratio	4:3,16:9		
	Transport	(image rate)	,		
	stream video	Frame	25Hz (PAL)		
	and Audio	frequency			
	Decoding	Video	720X576 (PAL) - standard definition, 1920X1080		
		Resolution	(High definition)		
		Audio	MPEG-2 MUSICAM Layer I&II/HEAAC		
		decoding			
		Audio mode	Single track/dual track/stereo		
		Audio	32KHz, 44.1KHz, 48KHz., 96KHz (optional)		
		sampling rate			
		The IDTV shou	ald include a frequency scanning function to detect		
		the availability	of DVB-T signals		
		It should also	automatically list the content of the terrestrial		
3.0	Scanning	bouquet by rea	ading the PSI/SI streams and		
	function	Be capable of	programme memory in case of cut off		
		It should be at	ble to display the number of channel currently		
		being scanned			
		It should be able to display number of services located			
		Where the mu	where the multiplex is seized, the receiver shall display details of its name, network ID, signal strength and quality		
		of its name, network ID, signal strength and quality			
		EDC: ourrent of	and next programme information 24x7days		
		schedule			
		Auto/manual tuning			
		24-HOULCIOCK			
		over the air (I	ISB Lingrade-ontional)		
		Support receiv	e mail		
4.0	Software	Provides the in	e mail		
		the following:-			
		Display	and withdrawal of subtitles		
		Support multi-language info			
		Able to display current software and hardware version			
		stored i	n the receivers		
		Able to	indicate whether an updates are available or not		
		Able to	indicate the unique serial number and state of the		
		IDTV re	ceiver (error code)		
		Able to	indicate the received multiplex with indications of		
		signal s	trength and bit errors rates based on the received		
		PLP			
		Able to	indicate type of middleware and other resident		

		applications	s version numbers
5.0	Additional Hardware	PVR (optional)	
6.0	Teletext	It is able to displa	v Teletext using the OSD and/or by the
	&Teletext	insertion of the Te	eletext data in the VBI of the analogue CVBS
	subtitle	Video Output	J
		•	
7.0	Interfaces	RF input connecto	r: IEC169-2 female, input impedance 75 ohms
		One RCA (CINCH)	female connector for video output and two
		RCA (CINCH) fema	ale connectors for stereo sound output
		RF bypass (loop)	IEC169-2 male
		RF output via a PA	AL-G modulator
		SCART interface (optional)
		HDMI interface (o	ptional)
		Should include at	least one RF cable to connect the unit with its
		associated analog	ue television receiver
8.0	Interfaces for	IDTV must include	e at least one embedded smartcard reader or a
	Conditional	DVB-CI (Common	Interface) slot to allow any type of conditional
	Access	access module to	be plugged in to the set top box. The CI
		should be upgrada	able to newer version
0.0	Bhysical	$Power cupply AC 220 \pm 100\% = E0 \pm 1 Hz$	
9.0	Pllysical	For the suppression of the second se	
10.0	Environmental	Operating Temper	rature: 0.45°C
10.0	attributes	Operating humidity $\ln t_{0} = 0.00\%$	
11.0	Reliability		
F. TN	TEGRATED DIGT	TAL TELEVISION – TERESTRIAL (DVB-T2) MINIMUM	
TECH	NICAL SPECIFIC	ATIONS	
S/N	I. BASIC FEATU	RES	OPERATIONAL EFFECT(S)
1.0			
1.0	Auto and manual	search modes	Basic features for broadcasting channel
2.0	Circul Quality Law	val indiantau	searching
2.0		er indicator	Basic redure for signal level indication(green
2.0	Darantal Control	/Lock	Provide the second seco
3.0	Floctropic Program	/LUCK	On screen electron quide
4.0 5.0	Full function stan	dard IP remote	Small size battery, hence an easier to handle
5.0		A or AAA size	(small in size) remote control
	hattery		
6-0	Languages: Englig	sh and Swahili	Availability language selection feature:
			Swahili is the national language spoken by
			majority Tanzanjans
7.0	PAL I/B/G auto	conversion	PAL I is the VIDEO System for Tanzania

8.0	Minimum 1000 ch	annels receivab	le The software programming for channel
	and storable		storage caters for 00-99 or 000 to 999
			hence channel storage is the best choice
9.0	Favourite channe	l list editing	Provision for editing channels for user
			preference (basic feature)
10.0	Warranty: 1 year		To avoid substandard equipment in the
			market
11.0	Owner's Manual.		User manual for Understanding the operation of the equipment as well as troubleshooting
			simple problems (English and Swahili
			languages)
12.0	Marking: Each IDTV shall be legibly		Basic marks to enable the subscriber to have
	and indelibly mar	ked with at least	first-hand information
	the following info	rmation:	
	a) Manufacturor's	nomo or trado	
	a) Manufacturer S		
	b) Mode designat	ion and serial No	D.'
	c) Country of mar	nufacture;	
	d) Input supply v	oltage and	
	frequency;	-	
	e) Power consum	ption;	
	f) RF input and or	utput terminals;	
	and		
	g) Sockets for audio and video		
TT	output.		
11: M		ICAL SPECIFIC	LATIONS
		Input	750
		impedance	, 51E
		Modulation	COFDM:OPSK, 160AM, 640AM, 2560AM
		Frequency	VHF(174-230MHz)-optional, UHF(470– 700MHz)
		Input signal	-35dBm to -85dBm
		level	
		FEC coding	LDPC Code+ BCH Code, Code rates :1/2, 3/5,
			2/3, 3/4, 4/5, 5/6
		FTT Size	1K, 2K, 4K, 8K, 16K, 32K
		C/N range	3dB (QPSK1/2) to 24dB (256QAM5/6)
		(RICE	
	RF tuner	Dilot Dattorn	DD1 to DD8
1.0	& DVB-T2	Guard	1/4 1/8 1/16 1/32 1/128 10/128 10/256
	Channel	intervals	1/4, 1/0, 1/10, 1/32, 1/120, 19/120, 19/230
		Channel	7MHz (VHE).8MHz(UHE). 1.7MHz (VHE)-optional
		raster	
1			
		Signal	8MHz corresponds to 7.61 MHz in the normal
		Signal Bandwidth	8MHz corresponds to 7.61 MHz in the normal carrier mode, 7.71 MHz for 8k, while 7.777 MHz
		Signal Bandwidth	8MHz corresponds to 7.61 MHz in the normal carrier mode, 7.71 MHz for 8k, while 7.777 MHz for 16k and 32k

		specific		
		robustness		
		Interleaving	Bit+ Cell + Time + Frequency	
		Diversity	SISI, MISO, (SIMO, MIMI if diversity receiver)	
		Rotated	Significant robustness gain in channels with	
		constellations	severe degradations (multipath, SFN operation,	
			narrow band interference)	
		Mode of	Future Extension Frame(FEF)	
		Extensions		
		Max Bit Rates	50.3Mbit/s,(32Ke,256QAM,CR=5/6,GI=1/28,PP7)	
		Used Bit	Portable SEN:25 (Mbit/c Eived SEN:37 (Mbit/c	
		Discu Dic Rates (8MHz)	Fixed MEN:40 2Mbit/s	
		GE06	Signal is under the mask of DVR-T2 (nower level	
		compatible	measured in a 4KHz bandwidth)	
		Transport	MPEG-2ISO/IEC13818	
2.0		stream		
		Video	MPEG-2/MPEG4AVC (H.264)	
		decoding		
	MPEG Transport stream video and Audio Decoding	Aspect Ratio	4:3,16:9	
		(image rate)		
		Frame	25Hz (PAL)	
		frequency		
		Video	720X576 (PAL) - standard definition, 1920X1080	
		Resolution	(High definition)	
		AUGIO	MPEG-2 MUSICAM Layer 1&11/HEAAC	
		decoding	Single track/dual track/stores	
		Audio mode	Single track/dual track/stereo	
		Audio		
		The IDTV shou	ld include a frequency scanning function to detect	
		the availability	of DVB-T signals	
		It should also a	automatically list the content of the terrestrial	
3.0	Scanning	bouquet by rea	ading the PSI/SI streams and	
	function	Be capable of p	programme memory in case of cut off	
		It should be ab	le to display the number of channel currently	
		being scanned		
		It should be ab	ble to display number of services located	
		Where the multiplex is seized, the receiver shall display details		
		of its name, ne	etwork ID, signal strength and quality	
		EPG: current a	and next programme information, 24x7days	
		schedule		
		Auto/manual tu	uning	
		24-hourclock		
		UTA: IDIV sof	OTA: IDTV software's, EPG, CA features must be upgradable	

		over the air. (USB Upgrade-optional)	
		Support receive mail	
4.0	Software	Provides the instant and personalized message prompt including	
		the following:-	
		 Display and withdrawal of subtitles 	
		Support multi-language info	
		 Able to display current software and hardware version 	
		stored in the receivers	
		 Able to indicate whether an updates are available or not 	
		 Able to indicate the unique serial number and state of the IDTV receiver (error code) 	
		 Able to indicate the received multiplex with indications of signal strength and bit errors rates based on the received property 	
		Able to indicate type of middleware and other resident applications version numbers	
5.0	Additional	PVR (optional)	
	Hardware		
<u> </u>	Talataut		
6.0	l eletext	It is able to display Teletext using the OSD and/or by the	
		Video Output	
	Sublice		
7.0	Interfaces	RE input connector: IEC169-2 female_input impedance 75 ohms	
710		One RCA (CINCH) female connector for video output and two	
		RCA (CINCH) female connectors for stereo sound output	
		RF bypass (loop) IEC169-2 male	
		RF output via a PAL-G modulator	
		SCART interface (optional)	
		HDMI interface (optional)	
		Should include at least one RF cable to connect the unit with its	
		associated analogue television receiver	
8.0	Interfaces for	IDTV must include at least one embedded smartcard reader or a	
	Conditional	DVB-CI (Common Interface) slot to allow any type of conditional	
	Access	access module to be plugged in to the set top box. The CI	
		snould be upgradable to newer version	
90	Physical	Power supply: $AC 220 \pm 10\%$ 50 ± 1 H_7	
9.0	attributes	Power Suppry. At $220\pm10\%$, $30\pm1\pi2$ Power: Energy star(ontion)	
10.0	Environmental	Operating Temperature: 0~45°C	
10.0	attributes	Operating humidity: Up to 90%	
11.0	Reliability	MTBF: >80,000Hrs	

ANNEX I: LIST OF REFFERED INTERNATIONAL STANDARDS

S/No	Reference No.	Title
1.	TR 101 190 Ver 1.3.2	Implementation Guidelines for DVB Terrestrial Services: Transmission aspects
2.	EN 302 755 Ver 1.3.1	Framing structure channel coding and modulation for a second generation digital terrestrial broadcasting system (DVB-T2)
3.	EN 300 429 Ver 1.2.1	Framing structure, channel coding and modulation for cable systems (DVB-C)
4.	EN 300 421 Ver 1.1.2	Framing structure, channel coding and modulation for 11/12 GHz satellite services (DVB-S)
5.	EN 302 307 Ver 1.2.1	Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications (DVB-S2)
6.	TS 102 773 Ver 1.3.1	Modulation Interface for a second generation digital terrestrial television broadcasting system
7.	ISO/IEC 13818-1: 2007/Amd. 6 : 2011	Information technology – Generic coding of moving pictures and associated audio information" Part 1:Systems (MPEG 2)
8.	ISO/ IEC 13818-2: 2000/Amd. 3 : 2010	Information technology – Generic coding of moving pictures and associated audio information Part 2 Video Coding
9.	ISO/IEC 14496-3 : 2009	Information technology - Coding of audio-visual objects : Part 3 Audio
10.	ISO/IEC 14496-15 : 2010	Information technology - Coding of audio-visual objects : Part 15 Advanced Video Coding (MPEG-4 Part 10 AVC) (AVC File Format)
11.	ETSI TS 101 154 Ver 1.10.1	Digital Video Broadcasting (DVB); Specification for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream.
12.	ETSI EN 301 192 Ver 1.5.1	Digital Video Broadcasting (DVB); DVB specification for data broadcasting
13.	EN 50221 Ver 1	Common Interface Specification for Conditional Access and other Digital Video Broadcasting Receiver Applications and ETR 289 Ver 1 Support for use of scrambling and Conditional Access (CA) within digital broadcasting systems
14.	TS 101 699 Ver 1.1.1	Extensions to the Common Interface Specification
15.	TS 102 006 Ver 1.3.2	Specification for System Software Update in DVB Systems
16.	ETSI EN 300 468 Ver 1.13.1	Specifications for Service Information (SI) in DVB systems
17.		
18.	TS 101 211 Ver 1.10.1	Guidelines on implementation and usage of Service Information (SI) in DVB systems
19.	ETSI EN 300 743 Ver	Subtitling Systems

	1.4.1	
20.	ETSI TS 102 831 Ver 1.1.1	Digital Video Broadcasting (DVB); Implementation guidelines for a second generation digital terrestrial television broadcasting system (DVB- T2)
21.	ETSI TS 102 201 Ver	Digital Video Broadcasting (DVB); Interfaces for
	1.2.1	DVB Integrated Receiver (DVB-IRD)
22.	ETSI EN 300 706	Enhanced Teletext specification

7.0 MINIMUM TECHNICAL SPECIFICATIONS FOR INTERNET PROTOCOL TELEVISION (IPTV) SET TOP BOXES (STBs)

1. SCOPE

This minimum technical specification specifies the requirements of a digital Set Top Box (STB), for use by the subscribers to receive IPTV services delivered to the viewers' homes using fiber cable as last mile access network. In the home, the IPTV STB is to be connected to the Cable Modem using a 10/100 Base T Ethernet connector.

Alternately the STB could also be used for receiving IPTV services delivered using high speed Digital Subscriber Line (DSL) based access technologies (ADSL2, ADSL2+, VDSL etc.) or for receiving services delivered via a broadband modem connected to a 4G network. In this case STB is to be connected to the DSL Modem or the Broadband Modem using the Ethernet connector.

2. REFERENCES

The Standards listed in Annex I contains provisions which, through reference in this text, constitute provisions of this specifications. All specifications are subject to revision.

3. REQUIREMENTS

The IPTV STB shall be based on open (non-proprietary) architecture and shall ensure technical compatibility and effective interoperability amongst different IPTV services in the country. The interoperability shall be achieved by complying with the following ETSI standards:-

- i. TS 102 034 V1.5.1 (2014-05): Digital Video Broadcasting (DVB); Transport of MPEG-2 TS Based DVB Services
- ii. over IP Based Networks TS 102 542 V1.2.1: Guidelines for the implementation of DVB IP Phase 1 Specifications
- iii. TS 102 539 V1.3.1 (2010-04): Carriage of broadband guide content information over IP
- iv. TS 102 824 V1.2.1 : "Digital Video Broadcasting (DVB); Remote Management and Firmware Update System For DVB IP Services"
- v. TS 102 366 V1.2.1: "Digital Audio Compression (AC-3, Enhanced AC-3) Standard

4. SOFTWARE SPECIFICATIONS

4.1 The STB shall have the capability to receive the following three types of services delivered using Real Time Streaming Protocol (RTSP) as defined in S/NO. 1 of Annex I.

- i. Live Media Broadcast (LMB): Delivery in Unicast or Multicast
- ii. Media Broadcast with Trick Modes (MBwTM): Delivery in Unicast only
- iii. Content on Demand (CoD) Delivery in Unicast. User initiates a presentation

4.2 The complete protocol stack used for the delivery of the services mentioned in Clause 4.1 above, is described in clause 4 of S/NO. 1 of Annex I. The detailed description of the process of encapsulation of the MPEG-2 transport stream packets carrying Audio/video streams and service information (DVB SI), into RTP packets and their transport over the IP network is given in Clause 7 of S/NO. 1 of Annex I. The IPTV STB should conform to this complete protocol stack.

The carriage of DVB-SI in transport streams is described in Clause 7.1.2 of S/NO. 1 of Annex I .As per this the following are applicable:

- i. Carriage of PAT & PMT is mandatory on all transport streams.
- ii. Option 1: Carriage of all DVB SI tables except NIT (TS-Full SI)
- iii. Option 2: Carriage of tables other than PMT & PAT is optional (TS-Optional SI)

4.3 The STB should have the capability to decode MPEG -2 MP@ML SDTV and optionally MPEG-4 Part 10 AVC HP@L4 HDTV signals.

4.4 The STB should have the capability to decode MPEG -2 MP@ML SDTV and optionally MPEG-4 Part 10 AVC HP@L4 HDTV signals.

4.5 The STB should have the capability to decode one or more of the following formats: MPEG-1 Layer2, E-AC3 Stereo, MPEG-4 HE AAC Stereo, MPEG-1 Layer3. If any multichannel audio is available, it should be transcoded and passed through to an S/PDIF if available.

4.6 On connection to the network, the IPTV STB should send a broadcast query requesting info from the DHCP server. On receiving this request, the DHCP server will assign an IP address to the STB. This process is defined in detail in Clause 8 of S/NO. 1 of Annex I.

4.7 DVB has defined a Service Discovery / Selection (SD&S) process in Clause 5 of S/NO. 1 of Annex I. SD&S protocol for multicast services is transported in IP packets in accordance with the DVB STP protocol whereas for Unicast services SD&S info is transported in HTTP. Using this information the IPTV STB should build a list of service providers and the different services available from each service provider.

4.8 Clause 9 of S/NO. 1 of Annex I specifies the File Upload System Stub (FUSS), which is mandatory and allows the system software of an IPTV STB to be updated on a power-cycle or reboot. The sending of the system software will be handled by the mechanisms specified in S/NO. 4 of Annex I. The IPTV STB should conform to this in order to get the software update.

4.9. S/NO. 3 of Annex I specifies the signalling and transport of TV – Anytime Meta data describing both Content on Demand as well as Live services delivered over an always on bi-directional IP Networks. The capability to use this information to generate Broadband Content Guide should be an optional requirement for the IPTV STB.

4.10 Clause 10 of S/NO. 1 of Annex I specifies Content Download Services (CDSs). CDSs provide the download of content items to a local storage of the IPTV STB via a broadband IP connection.

Two types of services are supported: push download services where the distribution decision is taken by the service provider (without explicit request from the user) and pull download services where the download is requested by the user. If a STB is equipped with appropriate local storage, it could use this service for content downloading.

4.11 Annex E of S/NO. 1 of Annex I defines an optional protocol for Application Layer FEC (ALFEC) protection of streaming media for DVB-IPTV services carried over RTP transport. If this option is used at the sending end, the STB should have the capability to decode this FEC.

4.12 Annex F of S/NO. 1 of Annex I defines an optional re-transmission mechanism (RET) to provide for protection against packet loss of DVB-IPTV services carried over RTP transport. It specifies the mechanism to provide immediate Feedback (FB) towards the network using RTCP and how to retransmit the missing packets.

4.13 In a scenario where the Servers at the transmitting end has so many options, there has to be a means for the Server to find out the configurations and the capabilities of the receiving devices at the consumers premises before exercising those options. This is the function of the Remote Management System (RMS) and the Firmware Update Service (FUS) described in S/NO. 4 of Annex I.

Remote Management is the ability of a server entity outside the home environment to monitor and configure the devices within the home and covers provisioning and assurance tasks. It optionally includes firmware updates to the equipment.

4.14 Conditional Access: Specific support for Conditional access or Content Protection is out of scope of this ETSI standard as given in S/NO. 1 of Annex I (Clause 1.1.2).

S/N	I. BASIC FEATURES	OPERATIONAL EFFECT(S)
1.0	Parental Control/Lock	Basic feature for controlling viewers
2.0	Electronic Program guide (EPG)	On screen electron guide
3.0	Full function standard IR remote	Small size battery, hence an easier to
	control, using AA or AAA size	handle (small in size) remote control
	battery.	
4.0	Languages: English and Swahili	Availability language selection feature:

5.0 BASIC FEATURES

		Swahili is the national language spoken by
70	PAL I/B/G auto conversion	PAL I is the VIDEO System for Tanzania
9.0	Favourite channel list editing	Provision for editing channels for user preference (basic feature)
10.0	Warranty: 1 year	To avoid substandard equipment in the market
11.0	Owner's Manual	User manual for Understanding the operation of the equipment as well as troubleshooting simple problems (English and Swahili languages)
12.0	Marking: Each IPTV shall be legibly and indelibly marked with at least the following information: a) Manufacturer's name or trade- mark (if any); b) Mode designation and serial No.' c) Country of manufacture; d) Input supply voltage and frequency; e) Power consumption; f) Ethernet input/output g) Sockets for audio and video output.	Basic marks to enable the subscriber to have first-hand information

6.0 HARDWARE SPECIFICATIONS

S/No	Parameter/Spec	Mandatory	Optional
1	Interfaces/	1. Input :10/100 BaseT	1. 1000 BaseT
	Connectors	Ethernet	Ethernet
		2. Analog Audio Output	connector RJ45
		3. Stereo RCA	2. Compressed
		4. Composite Video Out	Multichannel
		RCA (Yellow)	Audio
			output: S/PDIF
			(IEC 61937)
			3. Uncompressed
			digital AV Streams
			Output: HDMI
			Port V1.3a
			to V2.0

			4. USB 2.0 Ports
2	Graphics	Standard Definition (SD):	High Definition
	Resolution	720X576	(HD):
			1920 x 1080i
			(30fps) or higher
			(1080p @ 60fps)
			with capability to
			down-convert to
			SD (720x576)
3	Command Device	IR Remote Control	Keyboard / Mouse
4	Local Storage	-	Hard Disk

7.0 PERFORMANCE REQUIREMENTS

	Specification/Parameter	Mandatory	Optional
		Requirements	
1	Electrical Specs		
	a) Input Voltage range	AC 220±10%,	
	b) Frequency	50±1Hz	
2	Operating Ambient	0~45°C	
	Temperature.		
3	Operating humidity range	Up to 90%	
4	Front Panel Features		
	a) Connector	a) USB Host – A Type 5V	
		500ma	
	b) Controls (buttons 7)	b) Power, Menu, OK.	
		Remote Control Unit	
	c) LED Indicators	c) Power, Link, HD/SD,	
		Receiver	
5	Back Panel		
	a) Ethernet	10/100 Mbps Ethernet	1000 Mbps
		RJ45	Ethernet RJ45
	b) Audio Video Connectors	i) Component, Y, Pb, Pr	i) 5.1 Dolby
		ii) Component Video RCA	Digital Optical

		iii) Stereo L,R Audio RCT (2 sets)	Output ii) HDMI V1.3a to
	c) Miscellaneous	iv) Mic Input 3.5 mm Slot	i) External IR
	Connectors	Mini-jack	Receiver
			ii) USB 2.0 Port
6	Video Codec	i) MPEG-2	i) MPEG-4
		SMPTE	ii) HEVC
7	Audio Codec	i) MPEG-1 Layer 2	i) AC-3
		(Musician)	ii) E-AC-3
		ii) MPEG-4 AAC	
		iii) MPEG-1 Layer 3	
		iv) AC-3 Stereo	
8	Processor	32-bit Host Processor	
		400MHz	
		1000DMIPS	
9	Remote Control (IR	Battery Condition	
	Support)	Power On/Off	
	Keys/Buttons/Indicators	Mute	
		Numeric Keys (10)	
		Search	
		Previous Program	
		Home	
		TV	
		CoD	
		Video Player (Play, Stop,	
		Pause, Fast Forward,	
		Rewind, Previous Frame)	
		Favourite	
		Information	
		Menu	
		Settings	
		Guide	
		Organizer	
		Coloured Buttons (4)	

		(Blue Yellow Red &	
		Green)	
		For Designer Assigned	
		Usage	
		Reset	
10	Supported Video Output	PAL	
11	Aspect Ratio	4:3 and 16:9	

ANNEX I: LIST OF REFFERED INTERNATIONAL STANDARDS

S/No	Reference No.	Title
1.	ETSI TS 102 034 V1.5.1 (2014-05)	Digital Video Broadcasting (DVB); Transport of MPEG-2 TS Based DVB Services
		over IP Based Networks
2.	ETSI ETR 211	Digital Video Broadcasting (DVB); Guidelines on implementation and usage of Service Information (SI)
3.	ETSI TS 102 539 V1.3.1 (2010-04)	Digital Video Broadcasting (DVB); Carriage of Broadband Content Guide (BCG)
4.	ETSI TS 102 824 V1.2.1 (2008-07)	Digital Video Broadcasting (DVB); Remote Management and Firmware Update System for DVB IP Services
5.	ETSI TS 102 366 V1.2.1	Digital Audio Compression (AC-3, Enhanced AC-3) Standard
6.	ETSI TS 101 812 (V1.3.1)	Digital Video Broadcasting (DVB); Multimedia Home Platform (MHP) Specification 1.0.3
7.	ETSI TS 542 V1.2.1	Guidelines for the implementation of DVB IP Phase 1 specifications
8.	IEEE 802-1990	IEEE Standards for Local and Metropolitan Area Networks: overview and architecture
9.	IEEE 802.1Q-1998	IEEE Standards for Local and Metropolitan Area Networks: Virtual Bridged Local Area Networks
10.	IEEE 802.2-1998	IEEE Standard for Information technology- Telecommunications and information exchange between systems - Local and metropolitan area networks – Specific requirements - Part 2: Logical Link Control
11.	IEEE 802.3-2000	IEEE Standard for Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer

		Specification
12.	IETF RFC 768	User Datagram Protocol
13.	IETF RFC 791	Internet Protocol
14.	IETF RFC 826	An Ethernet Address Resolution Protocol: or
		converting Network
		Protocol Addresses to 48.bit Ethernet Address for
		Transmission
		on Ethernet Hardware
15.	IETF RFC 1042	A Standard for the Transmission of IP Datagrams over IEEE 802 Networks
16.	IETF RFC 1122	Requirements for Internet Hosts - Communication Lavers
17.	IETF RFC 1213	Management Information Base for Network
		Management of
		TCP/IP-based internets: MIB-II
18.	IETF RFC 1305	Network Time Protocol (Version 3) Specification,
_		Implementation and Analysis
19.	IETF RFC 1630	Universal Resource Identifiers in WWW
20.	IETF RFC 3550	RTP: A Transport Protocol for Real-Time
		Applications
21.	IETF RFC 1890	RTP Profile for Audio and Video Conferences with
		Minimal Control
22.	IETF RFC 2011	SNMPv2 Management Information Base for the
		Internet Protocol using SMIv2
23.	IETF RFC 2030	Simple Network Time Protocol (SNTP) Version 4
		for IPv4, IPv6
		and OSI
24.	IETF RFC 2250	RTP Payload Format for MPEG1/MPEG2 Video)
25.	IETF RFC 2326	Real Time Streaming Protocol (RTSP)
26.	ETSI TS 101 154	Digital Video Broadcasting (DVB); Implementation
	(V1.7.1)	guidelines
		for the use of Video and Audio Coding in
		Broadcasting
		Applications based on the MPEG-2 Transport
27	FTCI TC 102 222	Stream
27.	ETSI TS 102 323	Digital Video Broadcasting (DVB); Carriage and
		signalling of TV-Anytime information in DVB
20	100/100 22001 1	Information Technology MDEC Cystome
20.	150/1EC 23001-1 (MDEC P)	Information Technology - MPEG Systems
	(ויורנט־ט)	MDEG format for YMI
20	FTSI TS 102472	Digital Video Broadcasting (DVR) ID Data cast
29.		over DVBH: Content Delivery Protocols
30	SMPTE specification	Forward Error Correction for Real-time
	2022-1	Video/Audio Transport
		Over IP Networks
31.	SMPTE specification	Unidirectional transport of constant bit rate MPEG-
	2022-2	2 Transport
		4

		Streams on IP Networks
32.	ITU-T Recommendation	Full service VDSL – System architecture and
	H.610 (07/2003)	customer premises
		equipment
33.	ETSI TS 102822-3-2:	Broadcast and On-line Services: Search, select,
	(V1.3.1)	and rightful use of content on personal storage
		systems ("TV Anytime"); Part 3:
		Metadata; Sub-part 2: System aspects in a uni
		directional
		environment
34.	ETSI TS 102 366	Digital Audio Compression (AC-3, Enhanced AC-3)
	(V1.2.1)	Standard

Issued by Director General Tanzania Communications Regulatory Authority (TCRA)