**PUBLIC NOTICE**

**Minimum Technical Specifications of Set Top Box (STB) 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 DVB-T2 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 DVB-T2 / MPEG-4 Digital Set Top Box Specifications for the Rwandan market are summarized as follows:

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| **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)<br>- Optional, VHF (174-230 MHz) |
| | Input signal level | 36 – 85 dBµV |
| | FEC coding | LDPC Code + BCH Code,<br>Code rates: 1 /2, 3/5, 2/3, 3 /4, 4/5, |

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| | | 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 | SISI, 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,<br>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 on-screen visual signal level indicator which would aid in directing the antenna and troubleshooting reception problems. |
| **Scanning function (5mins max)** | - The STB should include a frequency scanning function to detect the availability of DVB-T signals.<br>- It should also automatically list the content of the terrestrial bouquet by reading the PSI/SI streams and<br>- Be capable of program memory in case of cut off | |
| **Software** | - EPG: current and next program information. 24x7 days schedule.<br>- Capable of the Identity control, watch rating and parental lock<br>- Auto/manual tuning<br>- 24-hour clock (optional)<br>- OTA: STB software's, EPG, CA features must be upgradable over the air ( USB Upgrade-optional)<br>- Support Receive mail<br>- Provides the instant and personalized message prompt<br>- 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<br>EN 300 468 [10] and ETSI TR 101 211 [11] compliant |
| **Additional Hardware** | PVR (optional) | |
| **Teletext & Teletext subtitle** | - 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.<br>- It is able to display Teletext subtitling, meeting the requirements for level 1.5 in ref. [ETS 300 706, "Enhanced Teletext Specification"] | |
| **Interfaces** | - RF input connector: IEC 169-2 female, input impedance 75 ohms<br>- One RCA (CINCH) female connector for video output and Two RCA (CINCH) female connectors for stereo sound output<br>- RF by pass (loop) IEC 169-2 male<br>- RF input via a PAL-B/G modulator<br>- SCART interface (optional)<br>- HDMI interface<br>- USB Port (optional)<br>- Data port1 (RS232, 9 pin D -Sub type(optional)<br>- Should include at least one RF cable to connect the unit with its associated analogue television receiver<br>- 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. |