Technical Requirements and Guidelines
For the Set Top Box
Intended for DVB-T Reception

Focus Area: Digital television signal reception
Process Area: Willemstad, Curaçao
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Scope

This document represents minimum requirements for DVB-T (Digital Video Broadcasting – Terrestrial) receivers by means of a stand-alone set top box (STB) used in Curacao and the BES islands. These specifications are developed and published by the Bureau Telecommunicatie en Post and are based on international standards as produced by the European Telecommunications Standards Institute (ETSI) and the DVB Organization.

The document is applicable for Standard Definition Television (SDTV) level receivers and High Definition Television (HDTV) level receivers.

The purpose of this document is to present specific requirements for receiving, decoding and presentation of audio-visual content distributed on the implemented DVB-T platform. The document shall present technical support for producers and providers of DVB-T receivers in order to allow a faster implementation of functionality required for the DVB-T platform used in Curacao and the BES islands.

Additional middleware functionality (MHP, MHEG), interactivity services and other applications are possible but are at the time not defined and therefore not a part of the technical requirements of this document. These will be further specified in a later stage and published if necessary.
1. **General Requirements**
   The set top box shall comply with the international standards according to the DVB-organization and the essential requirements of the CE (“European Conformity”), and the apparatus shall bear the related conformance mark.

2. **DVB-T Standard**
   The set top box shall allow reception and demodulation of the DVB-T signal transmitted in accordance with: ETSI EN 300 744 “Digital Video Broadcasting; Framing structure, channel coding and modulation for DVB-T”.

3. **Frequency Range**
   The frequency range of the set top box shall be limited in between 470 MHz and 698 MHz, in accordance to RF channel 21 up to 48, each channel with a bandwidth of 8 MHz. Otherwise bandpass filters should be implemented.

4. **Modulation and Transmission**
   The set top box shall allow reception of the DVB-T (T2) signal with at least but not limited to the following system parameters:
   
   a. Single Frequency Network (SFN);
   b. Bandwidth: 8 MHz per channel;
   c. Frequency: 470-697 MHz;
   d. Transmission mode: 8k COFDM;
   e. Modulation: 64 QAM;
   f. Code Rate: ½, (2/3);
   g. Guard Interval: ¼, (1/8);

5. **MPEG Decoding**
   The de-multiplexer of the set top box shall decode compressed data compliant to the following standards:
   
b. MPEG-4; as defined in ISO/IEC 14496, Part 1-28, “Coding of audio-visual objects”.

6. **Video Resolution**
   The decoder of receiver shall decode pictures in resolution 720x576 pixels for SDTV services, and 1920x1080, 1440x1080, 1280x1080 and 1280x720 for HDTV services, in accordance with ETSI TS 101 154 “Digital Video Broadcasting; Specification for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream”.

7. **HDTV Service**
   HDTV service is defined as a service that includes MPEG-4 High Definition video stream, the surround audio stream and data streams for subtitling (and teletext information). The HDTV level receiver shall comply with all basic SDTV level receiver requirements with some HDTV additions, i.e. HDTV level receiver shall be backward compatible with SDTV and be able to receive and decode MPEG-2 and MPEG-4 SDTV based services as well as MPEG-4 based SDTV and HDTV services.

8. **Aspect Ratio en Signaling**
   The set top box shall receive and decode all “Standard Definition” and “High Definition” video and audio channels, and deliver this information to the TV-set in the Aspect Ratio format of 16 x 9 as well as 4 x 3.

9. **Specification for Service Information (SI)**
   The set top box shall be able to tune to transmission channels by interpreting the navigational aids that are provided in the DVB bit-streams as described in ETSI EN 300 468 “Specification for Service Information (SI) in DVB systems”.

   The assigned Original Network ID is **0x2213** (Bureau Telecommunicatie en Post).

10. **Electronic Program Guide**
    The set top box shall provide a complete list of channels and an Electronic Program Guide containing all event information for all program channels on the available multiplexers.

11. **Subtitle Information**
    The set top box shall include the capability to receive and output DVB-T subtitles according with ETSI EN 300 743 “Digital Video Broadcasting; Subtitling Systems”. The user must be able to select or deselect subtitles and for this choice to be maintained across channel changes.
12. **Logical Channel Numbering**
The set top box shall support Logical Channel Numbers associated to the local television-stations and must be unique within the network.

13. **Conditional Access**
Conditional Access for pay television services shall be implemented in accordance with ETSI ETR 289 “Digital Video Broadcasting; Support for use of scrambling and Conditional Access within digital broadcasting systems”.

14. **Common Interface**
The applicable Common Interface module (for Conditional Access) should comply with the most recent standard (CI+) from the DVB organization.

15. **System Software Update**
De set top box shall support software “upgrades” according with ETSI TS 102 006 “Digital Video Broadcasting; Specification for System Software Update (SSU) in DVB systems”.

16. **Video/Audio Connectors**
The set top box shall be supported by the following output connections for delivery of audio-visual information to the TV-set:

   a. High Definition Multimedia Interface (HDMI) connector for high speed digital data connection in support of “High Definition” video information;

   b. Analogue RCA video/audio connector (“composite output”) for older TV sets without an HDMI input.

17. **Power Supply**
The set top box shall be powered on AC 110-127 Volts (50 kHz) up to 240 Volts. It is recommended that the set top box has a physical power on/off switch.

18. **Active Antenna Power Supply**
If the set top box has a built in (inline-DC) power supply for an active antenna connection over the RF input;

   a. It should be possible to switch this power on- and off using the installation menu of the user interface;

   b. The power supply (±5V) shall provide at least 30 mA current to feed the antenna’s amplifier;
c. The DC power supply shall be protected against short circuit.

19. RF Connectors

The set top box should support the following features:

a. The receiver shall have at least one F-Port (Female Indoor) input connector in accordance with IEC 60169-24 “Radio-frequency coaxial connectors with screw coupling, typically for use in 75 Ω cable distribution systems (Type F)”, and shall allow the connection to external antenna with F-type male connector. The RF input impedance shall be 75 Ohm [Ω].

b. The viewer should be able to receive independently from the status of the DVB-T transmission all “free-to-air” analogue and digital television channels on the connected antenna installation;

c. Reception of “free-to-air” analogue and digital are delivered to the TV-set by means of a “loop through” RF connection in accordance with IEC 60169-24;

d. The RF signals shall be bypassed from RF antenna input (RF/ANT-in) to RF antenna output (RF/ANT-out) independently from the status of the receiver, so that connected equipment (e.g. TV set) can operate even if the set top box is in standby mode.
Reference documents

1. ETSI EN 300 744 “Digital Video Broadcasting; Framing structure, channel coding and modulation for DVB-T”

2. ETSI EN 300 468 “Specification for Service Information (SI) in DVB systems”

3. ETSI EN 300 743 “Digital Video Broadcasting; Subtitling Systems”

4. ETSI ETR 289 “Digital Video Broadcasting; Support for use of scrambling and Conditional Access within digital broadcasting systems”

5. ETSI ETR 154 “Digital Video Broadcasting; Implementation guidelines for the use of MPEG-2 Systems, Video and Audio in satellite, cable and terrestrial broadcasting applications”

6. ETSI TS 102 006 “Digital Video Broadcasting; Specification for System Software Update (SSU) in DVB systems”

7. ETSI TS 101 154 “Digital Video Broadcasting; Specification for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream”


10. IEC 60169-24 “Radio-frequency coaxial connectors with screw coupling, typically for use in 75 Ω cable distribution systems (Type F)”