



Secretaría de Estado de Telecomunicaciones
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Foro Técnico de la televisión digital

**Especificación de receptores de televisión digital terrestre para
recepción de alta definición**

Versión 1.0.2

Elaborado por

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1 Introducción

En el marco del Grupo de Trabajo 7 del Foro Técnico de la Televisión Digital se ha detectado la necesidad de elaborar una serie de documentos que recojan las especificaciones mínimas que deben cumplir los receptores de televisión digital terrestre que se comercialicen en el mercado español. Para ello se ha dividido la tarea en varios subgrupos:

- Subgrupo 1: Especificación básica de receptores de televisión digital terrestre.
- Subgrupo 2: Especificación de receptores de televisión digital para alta definición.
- Subgrupo 3: Especificación de receptores de televisión digital para acceso condicional.
- Subgrupo 4: Especificación de receptores de televisión digital para aplicaciones interactivas.

Los cuatro documentos se complementan entre sí, conteniendo el primero de ellos la especificación básica que debe cumplir cualquier receptor de televisión digital terrestre que se ponga en el mercado español para garantizar plena compatibilidad con las emisiones de televisión digital terrestre y que puede complementarse con uno o varios de los documentos elaborados por los subgrupos 2, 3 y 4, dependiendo de las funcionalidades que disponga el mismo.

Este documento, elaborado por el Subgrupo 2, “Especificación de receptores de televisión digital terrestre para alta definición”, define los requisitos mínimos que deben cumplir los receptores para permitir la sintonización de los contenidos en alta definición que se difundan a través de las emisiones de televisión digital terrestre.

2 Terminology:

The following terms are used in this document:

SHALL (mandatory): Denotes that the item is mandatory.

SHOULD (recommended): Denotes that the item is not mandatory, but highly recommended.

3 References

- ETSI EN 300 468 "Specification for Service Information Systems Digital Video Broadcasting (DVB).
- ETSI TR 101 211 "Guidelines for the implementation and use of the Information Service".
- ISO 639 Code for the submission of names of languages
- AENOR UNE 153 030 IN "Accessibility Digital Television".
- E-Book (Draft Version 2.0.2), 62216-1 IEC:2001
- ETSI EN 202 432 "Human Factors (FH): Access symbols for use with video content and devices of Information and Communications Technology (ICT).
- IEC 60603-14 Connectors for frequencies below 3 MHz for use with printed boards – Part 14: Detail specification for circular connectors for low-frequency audio and video applications such as audio, video and audio-visual equipment.
- EN 50049-1 Domestic and similar electronic equipment interconnection requirements: Peritelevision connector.
- ISO/IEC 13818-1 : Information Technology – Generic coding of Moving pictures and associated Audio Information – Part I : Systems – International Standard (IS)
- ETSI EN 300 472 v1.3.1 Conveying ITU-R System B Teletext in DVB bitstreams.
- ETSI EN 300 743 V1.2.1 Subtitling Systems
- ISO/IEC 14496-10 : Coding of audio-visual objects -- Part 10: Advanced Video Coding
- ATSC A/52: Digital Audio Compression Standard (AC-3, E-AC-3)
- ISO/IEC 13818-2: Generic coding of moving pictures and associated audio information -- Part 2: Video.
- ISO/IEC 13818-3: Generic coding of moving pictures and associated audio information -- Part 3: Audio
- ISO/IEC 13818-7: Generic coding of moving pictures and associated audio information -- Part 7: Advanced Audio Coding (AAC) »
- ISO/IEC 14496-3:2001/Amd.1 Coding of audio-visual objects -- Part 3: Audio
- ISO/IEC 14496-3:2005/Amd.2 Coding of audio-visual objects -- Part 3: Audio
- ITU-T Recommendation H.264: Advanced video coding for generic audiovisual services.
- ETSI TS 102 006: Digital Video Broadcasting (DVB): Specification for System Software Update in DVB Systems.

- ETSI EN 300 744 V1.6.1 (2008-09): European Standard (Telecommunications series) Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for digital terrestrial television.
- ETSI TS 101 154 V1.8.1 (2007-07): Specification for the use of Video and Audio Coding in Broadcasting Applications based upon the MPEG-2 Transport stream.
- IEC 62216-1 First edition (2001 – 10): Digital terrestrial television receivers for the DVB-T system Part1: Baseline receiver specification.
- ISO/IEC 7816 -1, -2, -3: Identification Cards – Integrated circuit cards.
- ISO/IEC 6937: Coded graphic character set for text communication – Latin alphabet.
- ETSI TS 102 114 V1.2.1 (2002-12) : DTS Coherent Acoustics.
- ETSI TS 102 366 V1.2.1 (2008-08) : Digital Audio Compression (AC-3, Enhanced AC-3) Standard.
- ISO/IEC 61169-2 Radio Frequency connectors Part 2: Coaxial unmatched connector

Note: although revision numbers may be stated the latest revisions of the above references shall be used at all times.

4 HD AVC DVB-T Receiver

4.1 Introduction

This section sets out the ADDITIONAL receiver requirements specifically for the Spanish HD DTT services. This specifically related to the decoding of MPEG-4 AVC, it should be noted that the modulation scheme remains the same as SD services, that is DVB-T.

HD receivers shall comply with the SD requirements as well as the additional requirements listed in this chapter.

4.2 Video decoding

4.2.1 Video Formats

The video program elementary stream shall fulfil all the requirements of the H.264/MPEG4 part 10 according to ISO/IEC 14496-10 available in the following profiles:

High definition, format 16:9 :

- H.264 HP@L4.0.
- Variable Bit Rate with maximum of 15Mbps
- Resolution 1920x1080i 25Hz, 1440x1080i 25Hz and 1280x720p 50Hz

Note: - In the future there is a possibility that the DTT network and technologies supporting H.264 may expand to support H.264 HP@L4.2 in this case receivers that exist in the market that are not capable of supporting this format should not fail / crash upon reception of such signal.

Standard definition, format 16:9 and 4:3:

- H.264 MP@L3
- Variable Bit Rate with maximum of 10Mbps
- Resolution 720x576 and 544x576 25Hz

Note: - In the future there is a possibility that the DTT network and technologies supporting H.264 may expand to support SVC (Scalable Video Coding), in this case receivers that exist in the market that are not capable of supporting this format should not fail / crash upon reception of such signal.

4.3 Audio decoding

4.3.1 Audio Formats

The program audio elementary stream is distributed in mono, stereo or multi-channel (5.1). In presence of audio 5.1 elementary streams the receiver shall make the down-mix from 5.1 to stereo, if no 5.1 output is active.

All audio streams shall correspond to one of the following profiles:

- Mono or stereo, in MPEG 1 Layer II, according to:
 - Minimum bandwidth of 64Kbps and a maximum of 128Kbps in mono;
 - Minimum bandwidth of 128Kbps and a maximum of 256Kbps in stereo;
 - Mono, Stereo or multichannel 5.1 using Dolby Digital AC-3 and E-AC3, according to Digital Audio Compression Standard TS 102 366.
 - Support for data rates from 64kbps to 640kbps for AC-3.
 - Support for data rates from 32kbps to 3024 for Enhanced AC-3.
- Note:** - All sample rates required to be supported are listed in TS 102 366;
- Mono, Stereo or multichannel in AAC-LC (ISO/IEC 13818-7), AAC-HE V1 (ISO/IEC 14496-3:2001) or AAC-HE V2 (ISO/IEC 14496-3:2005)
 - Minimum bandwidth of 16Kbps and maximum of 32Kbps in mono.
 - Minimum bandwidth of 32Kbps and maximum of 128Kbps in Stereo.
 - Minimum bandwidth of 128Kbps and maximum of 256Kbps in 5.1.

4.4 Switching from SD to HD

Switching from SD to HD should follow EN 62216-1 2008 update (section 9.2.7.1.4 Linkage descriptor).

4.5 Still Images

The receiver shall support AVC still image decoding follow EN 62216-1 2008 update (section 5.3.3.2.3).

NOTE: - The still picture shall consist by only the intra slices, and each picture shall start by AU delimiter and includes SPS(sequence parameter set) and PPS(picture parameter set) in it.

4.6 Simulcast

Currently the Logical Channel Number (LCN) mechanism is not used within the Spanish broadcast system for regulatory reasons. However at the time of writing the use of LCN is to be discussed by the regulator, broadcasters, industry and other parties involved and may be adopted in the future. If this is the case then the Spanish broadcast system will also consider the use of the HD_Simulcast_LCN according to IEC 62216 2008 update, (sections 9.2.11.2.5 HD Simulcast descriptor).

Note: If the LCN mechanism is adopted then the specification will be updated accordingly.

4.7 Accessibility Services

4.7.1 Teletext

Mandatory (Teletext-Subtitle EN 300472, internal decoder), and the STB shall render the graphics (ITU-R System B Teletext).

Note: There is no teletext via HDMI.

4.7.2 Subtitles

The receiver shall be capable of decoding and presenting DVD Subtitles according to ETSI EN 300 743 including DDS (Display Definition Segment).

Note: - DDS shall only be used for High Definition Broadcast content

4.8 Service information (PSI/SI)

4.8.1 SDT and NIT

The receiver shall support the following service types in SDT and NIT:

- Advanced codec SD digital television service (H.264): 0x16
- Advanced codec HD digital television service (H.264): 0x19
- Advanced codec digital radio sound service (AAC/5.1): 0x0A

4.8.2 PMT

The following descriptors shall be supported:

AC-3_descriptor: 0x6A

- Only present if Dolby AC-3 is present within the Stream;

Enhanced_AC-3_descriptor: 0x7A

- Only present if Enhanced_AC-3 is present within the Stream;

AAC descriptor: 0x7C

- Only present if AAC audio is available;

4.8.3 NIT

HD_simulcast_logical_channel_descriptor: 0x88

Note: this will be the descriptor value if the LCN mechanism is adopted by the Spanish broadcast system in the future

4.9 External connections

Connectors for iDTV:

- Mandatory: HDMI input, Common Interface, SCART input (RGB/CVBS)/Output (CVBS)

- Optional: headphone audio output (i.e. audio description), additional SCART inputs (RGB/CVBS/Y-C), SCART output, Ethernet port, S/PDIF (either optical or electrical) although optional is **strongly recommended**.

Connectors for STB:

- Mandatory: HDMI output, SCART output (RGB/CVBS).
- Optional: Y Pb Pr, RF loop-through for DVB-T, headphone audio output (i.e. audio description), Ethernet port, SCART input-output for VCR and loop-through to the SCART output. S/PDIF (either optical or electrical) although optional is **strongly recommended**.

4.9.1 HDMI:

Any HDMI connection (input and/or output) provided by receivers shall follow the latest version of the HDMI specification as provided by HDMI Licensing.

4.10 Content management

4.10.1 Analogue HDTV/SDTV component output

Any analogue output shall only be provided in an SD quality format. Y Pb Pr outputs in HD quality shall not be available. Additionally the receiver shall support the DVB FTA_Content_Management_Descriptor information as specified in EN 300 468 V1.10.1.

4.10.2 HDCP on HDMI

Shall be controlled by the DVB FTA_Content_Management_Descriptor information as specified in EN 300 468 V1.10.1.

4.10.3 HDCP switchable (via menu in STB)

When the HDCP control is not signalled in the broadcast it shall be possible for the user to set the default status for the receiver (enabled or disabled) through a user set-up menu.

4.10.4 FTA content management according to signalling by FTA content management descriptor

For SDTV broadcasts no restrictions shall apply.

Note: This section follows the principles of ETSI EN 300 468 V1.10.1; however further definitions are made for the management of HD content.

The FTA content management descriptor provides a means of defining the content management policy for an item of content delivered as part of a free-to-air (FTA) DVB Service.

4.10.5 Semantics for the FTA content management descriptor

The content management descriptor is defined in EN 300 468 V1.10.1 Section 6.2.18.

5 Acronyms and Abbreviations

AAL	ATM adaptation Layer	CPE	Customer Premise Equipment
	Analogue to Digital		Continuous Phase Shift
ADC	Conversion	CPFSK	Keying
ADSL	Asymmetric Digital	CRC	Cyclic Redundancy Check
	Subscriber Line	CRT	Cathode Ray Tube
AEIT	Aggregate Event Information	CVCT	Cable Virtual Channel Mode
	Table	CVDT	Code Version Download Table
	Aggregate Extended Text	CVDT	Code Version Download Table
AETT	Table	CVT	Code Version Table
AIT	Application Information Table	DACS	Digital Addressable Control
API	Application Programming		System
	Interface	DASE	Digital TV Application
ASI	Asynchronous Serial Interface		Software Environment
ASK	Amplitude Shift Keying	DAVIC	Digital Audio Visual Council
ATM	Asynchronous Tranter Mode		Digital Broadband Delivery
ATSC	Advanced Television Systems	DBDS	System
	Committee	DCC	Dynamic Channel Change
BAT	Bouquet Association Table		Downstream Channel
BBB	Bipolar baseband	DCD	Descriptor
BFS	Broadcast File System	DDB	Download Data Block
BIOP	Broadcast Inter ORB Protocol	DIBEG	Digital Broadcasting Experts
BML	Broadcast Mark-up Language		Group
BPSK	Binary Shift Keying	DII	Download Info Indication
bslbf	Bit string, left bit first		Digital Multimedia
BT	Broadcast Tunnel	DMB	Broadcasting
CA	Conditional Access		Digital Network Control
CAT	Conditional Access Table	DNCS	Server
CBR	Constant Bit Rate	DOCSIS	Data Over Cable Service
CDM	Code Division Multiplexing		Interface Specification
CM	Cable Modem	DSG	DOCSIS Set-top Gateway
	Cable Modem Termination	DSI	Download Server Initiate
CMTS	System	DSM-CC	Digital Storage Media
COFDM	Co-orthogonal Frequency		Command & Control
	Division Multiplexing	DSP	Digital Signal processing

DTTV	Digital Terrestrial Television
DVB	Digital Video Broadcast
DVS	Digital Video Subcommittee
EBU	European Broadcasting Union
eDOCSIS	Embedded DOCSIS
	ETV Integrated Signalling Stream
EISS	Stream
EIT	Event Information Table
EITpf	EIT present/following Entitlement Management
EMM	Message
EPG	Electronic Programme Guide
ETM	Extended Text Message
ETT	Extended Text Table
ETV	Enhanced Television Forward Application
FAT	Transport
FDC	Forward Data Channel Frequency Division
FDM	Multiplexing
FEC	Forward Error Correction
GEM	Globally Executable MHP Home Audio Video
HAVi	Interoperability
HFC	Hybrid Fibber/ Coax
IB	In-band
IDTV	Integrated Digital Television International Electrotechnical Commission
IEC	Commission
IF	Intermediate Frequency
INT	IP/ MAC notification table Integrated Services Digital
ISDB-C	Broadband Cable Integrated Services Digital
ISDB-H	Broadband Handheld Integrated Services Digital
ISDB-S	Broadband Satellite Integrated Services Digital
ISDB-T	Broadband Terrestrial International Organization for Standardization
ISO	Standardization
ISO/IEC	Joint Technical Committee

ITU	International Telecommunications Union
JMF	Java Media Framework Long-form Virtual Channel Table
LVCT	Table
MCPC	Multiple Channels Per Carrier
MFN	Multi Frequency Network
MGT	Master Guide Table Multimedia & Hypermedia Expert Group
MHEG	Expert Group
MHP	Multimedia Home Platform Management Information Base
MIB	Base
MPE	Multi-Protocol Encapsulation Multiple Program Transport Stream
MPTS	Stream
MSO	Multiple System Operator
MTA	Multimedia Terminal Adaptor
MTBF	Mean Time Between Failure
NIT	Network Information Table
NPT	Normal Play Time
NTT	Network Text Table
NTT	Network Text Table
NVOD	Near Video On Demand
OBCIG	Object Carousel-content Interchange Group
OC	Object Carousel Open Cable Application Platform
OCAP	Platform
OOB	Out Of Band Organizationally Unique Identifier
OUI	Identifier
PAT	Program Allocation Table
PCF	Portable Content Format
PCR	Program Clock Reference Packetized Elementary Stream
PES	Stream
PID	Packet ID
PMT	Program Map Table
POD	Point of Deployment
PSI	Program Specific Information Quadrature Amplitude Modulation
QAM	Modulation Quadrature Phase-Shifting Key
QPSK	Key
RRT	Rating Region Table
RST	Running Status Table
SCPC	Single Channel per Carrier

SDR	Satellite Digital Radio
SDT	Service Description Table
SFN	Single Frequency Network
SG	Stream Generator
SI	Service Information
SNMB	Simple Network Management Protocol
SNS	Source Name Sub-table
SPI	Synchronous Parallel Interface (DVB)
SPTS	Single Program Transport Stream
SSU	System Software Update
STB	Set Top Box
STD	Set Top Device
STT	System Time Table
SVCT	Short-form Virtual Channel Table
TDT	Time and Date Table
TLV	Type, Length, Value encoding
TOT	Time Offset Table
TS	Transport Stream
TSDT	Transport Stream Description Table
UNT	Updated Notification table
UTC	Universal Time, Co-ordinated
VBI	Vertical Blanking Interval
VCT	Virtual Channel Table
VOD	Video on Demand
WSS	Wide Screen Signalling