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Australian Standard™

Digital television—Requirements for receivers

Part 1: VHF/UHF DVB-T television broadcasts

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Digital television—Requirements for receivers

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PREFACE

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee CT 002, Broadcasting and Related Services. After consultation with stakeholders in both countries, Standards Australian and Standards New Zealand decided to develop this Standard as an Australian, rather than Australian/New Zealand Standard.

The objective of this Standard is to provide television receiver manufacturers with the technical specifications and requirements of digital television receivers in order to achieve successful reception from free-to-air DTTB transmissions that comply with the Australian DTTB transmission Standard AS 4599.1-2005, *Digital television—Terrestrial broadcasting—Characteristics of digital terrestrial television transmissions.*

Interoperability issues for DVB-S, DVB-C and Datacasting are not addressed in this part of the Standard.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the Appendix to which they apply.

A 'normative' Appendix is an integral part of a Standard, whereas an 'informative' Appendix is only for information and guidance. Informative sections are included also in the main body of this standard.

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FOREWORD

Digital terrestrial television broadcasting (DTTB) in Australia officially commenced on 1 January 2001. The transmissions are based on the DVB-T[1] system, however, it should be noted that the international DVB Standards and related ETSI, IEC/ISO and ITU-R documents provide a range of operational choices.

Many other implementations of digital television systems around the world operate on pay satellite and cable systems where compatibility between transmission and reception equipment of each system is generally under the control of a single system operator. These are known as 'vertical' markets.

In contrast, no single operator is in control of the Australian implementation of the digital terrestrial television broadcasting system. There are multiple free-to-air services and multiple receiver/decoder manufacturers, as well as subscription television services and datacasting services delivered in the digital television broadcasting environment. Domestic digital television receivers are expected to be available from a wide range of manufacturers through many retail suppliers; this is known as a 'retail' or 'horizontal' market.

Consumers expect a choice of receiving equipment from many manufacturers, ranging from fully integrated receivers with inbuilt displays to modular set-top-box receivers intended for connection to a separate display and sound reproduction system, (see Appendix B). This equipment will be expected to satisfactorily receive digital terrestrial television broadcasts from a choice of multiple broadcasters (each probably using a different brand of encoding and transmission equipment).

A separate Australian Standard, AS 4599.1, details information specific to the transmission aspects of the Australian adaptation of the relevant ETSI DVB-T Standards. For an overview on DVB documents the reader is referred to the technical report from DVB: TR 101 200; 'Digital Video Broadcasting (DVB); A guideline for the use of DVB specifications and Standards'.

This Standard aims to provide the necessary information so that any digital terrestrial television receiving equipment made for the Australian system will operate satisfactorily on Australian digital terrestrial television broadcast transmissions.

While some receiver requirements are nominated to be essential, in general, it will be a marketing choice by the manufacturer as to how the various receiver models operate with a variety of conditions.

Conformance testing related to this standard is the responsibility of the manufacturer.

See below for a summary of important DTTB receiver requirements to operate in the Australian environment.

Manufacturers should note that DTTB is a rapidly evolving technological environment and, consequently, this Standard may require revisions and additions. Readers are urged to contact any Standards Australia office or broadcasters regarding such changes.

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1 DVB-T: Digital Video Broadcasting (project) – Terrestrial. The DVB Project Office is co-located at the headquarters of the European Broadcasting Union in Geneva, Switzerland. Their web site is http://www.dvb.org/

Summary of minimum DTTB receiver requirements and recommendations for Australia

The minimum DTTB receiver requirements and recommendations for Australia are as follows:

(a) The receiver shall operate in a 7 MHz VHF/UHF channel allocation with possibly higher powered analog PAL signals present in adjacent channels—digital channel allocations range from 174 MHz to 820 MHz, some with 125 kHz offsets.

(b) All COFDM modes, except hierarchical modulation which is optional shall be receivable by both SD-only receivers and receivers that also have HD capabilities. (See Items 4.1 and 4.3 of Section 3, Table 1).

(c) Receivers shall be able to demodulate and decode the Transmission Parameter Signalling (TPS) data to determine or confirm transmission parameters when an RF transmission is first accessed or when a service on a different RF transmission is selected. As COFDM transmission parameters may change from time-to-time, TPS data should also be accessed if a signal is lost.

(d) Single Frequency Network (SFNs) are in use and all receivers are expected to operate in environments, that include pre and post echoes.

(e) Receivers should use the broadcast Logical Channel Numbering of services to simplify channel selection. (This is an Australian adaptation from the UK DTG and EACEM definition of Logical Channel Numbering and is found in the NIT 2nd loop with tag of 0×83 – See Appendix H, Paragraph H1).

(f) Broadcasters may change COFDM modes and available services in the transport stream from time-to-time, requiring receivers to refresh the ‘PAT’, ‘PMT’, ‘NIT’ and ‘SDT’ data on a regular (typically 10 sec), basis. Receivers shall check in the PMT, the PID values for video, audio and other components of a service when selected, as these may change from time-to-time. Receivers shall not assume any sequenced or ordered numbering of the PID values of various components of a service.

(g) All receivers shall be capable of decoding 50 Hz based Standard Definition (SD) MPEG-2 picture formats with displayable closed captions and MPEG-1 Layer II sound, and optionally, Dolby Digital® (AC-3) sound. Receivers may also decode a number of 50 Hz based High Definition (HD) picture formats (see preferred interface and scanning details in Appendix G), with additional decoding for up to 5.1 channel Dolby Digital® (AC-3) sound (See Items 7 and 8 of Section 3, Table 1).

(h) Standard Definition receivers (SD-only), if switched to a HD (MP@HL) service, should not attempt to decode the service and either present a message to the user or a blank screen (See Appendix H Paragraph H6).

(i) Receivers should use Australian specific look-up tables for on-screen display for time-zone region setting using the transmitted Time Offset Table (TOT) and Parental-Guidance codes and Program Content (Genre) codes using the transmitted Event Information Table (EIT).

(j) If a receiver includes an optional Dolby Digital® (AC-3) sound decoder, then the receiver shall operate to a viewer’s preset preference or indicate and give a choice to the viewer if a service has other audio channels (sound tracks), which the receiver is able to decode.

(k) Some transmissions will include radio (audio-only) services in MPEG-1 Layer II format, which receivers shall be able to decode.

(l) Receivers shall be able to provide decoding of Closed Captions broadcast in Teletext. Bit-mapped format decoding may also be provided. In the case of set-top-boxes, the teletext should be added to the VBI on the analog video outputs on the same VBI lines as indicated in the transmission (see ETSI EN 300 472 Standard).

(m) Optionally provide DSM-CC support to enable capability for data broadcasting and system software upgrade (SSU) by over-the-air download, conforming to DVB/ETSI standards.

(n) Optionally provide interactivity conforming to the DVB MHP standards.

Manufacturers of DTTB receivers incorporating interactive capabilities will need to confirm aspects of the Australian Interactive Digital Television ‘Feature Set’ which is currently under development.

STANDARDS AUSTRALIA

Australian Standard
Digital television—Requirements for receivers

Part 1: VHF/UHF DVB-T television broadcasts

SECTION 1 SCOPE AND APPLICATION

1.1 SCOPE

This Standard defines both essential and optional requirements for DVB-T compliant digital broadcast television receivers for Australia with the capability of receiving Standard Definition television and optionally High Definition television via terrestrial broadcasting services. Other optional features include interactivity, datacasting services, surround sound, multi-lingual and appropriate interfaces for ancillary equipment. Specifications for subscription/pay services should be obtained from the operators of those services although specifications for the possible addition to a receiver of a Conditional Access system or other features are included.

NOTES:

1 See Appendix G for details on 50 Hz HD and SD scanning and interface parameters.

2 See Appendix H for receiver functional design issues that have attracted attention since the commencement of transmissions.

3 See Appendix I for abbreviations and a glossary of terms used in this Standard.

1.2 APPLICATION

Australian digital terrestrial transmissions will include SD pictures at 576i and HDTV pictures at 576p, 720p and 1080i. The terrestrial transmissions' sound format for SD services will be MPEG-1 Layer II, or both MPEG-1 Layer II and AC-3, whereas for HD, the sound format will be MPEG-1 Layer II or AC-3, or both.

A range of receiving equipment may be available either in modular or fully integrated forms that extend from low-cost limited-facility with a standard definition video and monophonic sound output to premium full-facility features providing high definition display with full surround sound. Modular equipment may be set-top box style integrated-receiver-decoders or plug-in PC card tuner-decoders.

NOTE: Appendix B gives an example of the components of the architecture of a typical digital terrestrial television receiver and set-top-box.

While this Standard seeks to identify minimum essential requirements for reception, demodulation and decoding of television broadcasts complying with the Australian implementation of DVB-T, additional information and recommendations are provided to clarify preferred implementation if a feature is included in the receiver's design.

As a minimum requirement, equipment must be capable of simultaneously decoding from the transport stream, a video stream, an associated audio stream and associated teletext closed captions. Also optionally, bit-mapped subtitle decoding may be provided. The decoded information shall be presented in a time-synchronized manner suitable for a display device and sound reproduction system.