

1. SCOPE

This document recommends the method of usage and application of descriptors within the Event Information Table (EIT) schedule *actual* sections to convey program guide information, for digital terrestrial television broadcasting in Australia.

Australian television broadcasters indicate their scheduled programs by the transmission of EITpresent/following_{actual} and EITschedule_{actual} information in accordance with Clause 5.2.4 of ETSI EN 300 468. EITpresent/following_{other} and EITschedule_{other} are not currently transmitted by Australian television broadcasters.

Australian television broadcasters provide guidance for the use of EITpresent/following_{actual} in a receiver's DVB EIT Schedule Information as described in Free TV OP 44 and for the use of EITschedule_{actual} in Free TV OP 58. It is intended that all transmissions will follow the specifications in both Free TV OP 44 and OP 58.

For detailed information regarding the use of descriptors in the Australian DTTB context, in tables containing the EITp/f_{actual} (EIT present/following) information, please refer to Free TV Operational Practice OP-44 [4].

In the EITschedule_{actual} tables, there are typically five descriptors commonly in use:

- short_event_descriptor (tag value 0x4D),
- extended_event_descriptor (tag value 0x4E),
- parental_rating_descriptor (tag value 0x55), and
- content_descriptor (tag value 0x54) (aka Genre)
- content_identifier_descriptor (tag value 0x76) (CRID)

Accommodation should be made for other descriptors which may also be present such as the component_descriptor and carried by broadcasters.

The use of these descriptors shall adhere to the same specification as described in Free TV Operational Practice OP-44 [4]. Within the EIT table sections, the use of these descriptors comply with the Australian digital terrestrial television transmission standard, AS 4599 [1] and references Clauses 6.2.37 and 6.2.15 of ETSI standard EN 300 468 [2] and Clause 4.1.4.2 of ETSI TR 101 211 [3].

EITschedule_{other} tables are NOT transmitted at this time.

Guidance on implementation of Content Reference IDs by Australian Television Broadcasters can be found in Free TV *OP72 Implementation of Content Reference IDs by Australian Television Broadcasters* [6].

2. APPLICATION

2.1 DVB and Usage Recommendations

While, transmission of the EIT is not mandatory in ETSI standard EN 300 468 [2] for the actual delivery system, this Operational Practice recommends transmission of EITschedule_{actual}. When transmitted, this table shall be in PID 0x0012 with a table_id value starting at 0x50 and depending upon the number of events included in the schedule may extend chronologically up to a table_id of 0x5F.

The following rules apply to the structure of the EITschedule:

- 1) the EITschedule is distributed over a number of sub tables, each with its own table_id
- 2) as shown in Figure 1, the 256 sections under each sub table are divided into 32 segments of 8 sections each. Segment #0, thus, comprises sections 0 to 7, segment #1 section 8 to 15, etc.;
- 3) each segment contains information about events that start anywhere within a three hour period. The information about separate events is ordered chronologically within segments;
- 4) if only $n < 8$ sections of a segment are used, the information shall be placed in the first n sections of the segment. To signal that the last sections of the segment are not used, the value $s_0 + n - 1$, where s_0 is the first section number of the segment, shall be encoded in the field segment_last_section_number of the EIT header. As an example, if segment 2 contains only 2 sections, the field segment_last_section_number shall contain the value $8 + 2 - 1 = 9$ in those two sections;
- 5) segments that contain all their sections shall have the value $s_0 + 7$ encoded in the field segment_last_section_number;
- 6) entirely empty segments shall be represented by an empty section (see Figure 2 Section 200), (i.e. a section which does not contain any loop over events) with the value $s_0 + 0$ encoded in the field segment_last_section_number;
- 7) the placing of events in segments is done referring to a time t_0 . t_0 is "last midnight" in Universal Time Coordinated (UTC) time. Suppose, for instance, that it is 2.00 AM in Brisbane (UTC +10). It is then 4.00 PM in the time zone UTC+0, which makes it 16 hours since "last midnight". Therefore, t_0 is 10.00 AM the previous day (refer the time scales in Figure 3);
- 8) segment #0 of table_id 0x50 shall contain information about events that start between midnight (UTC Time) and 02:59:59 (UTC Time) of "today" (see Figure 2 Section 0), Segment #1 shall contain events that start between 03:00:00 and 05:59:59 UTC time, and so on. Hence the first sub table (table_id 0x50 contains information about the first four days of schedule, starting today at midnight UTC time;

- 9) the field last_section_number is used to indicate the end of the sub table. Empty segments that fall outside the section range indicated by last_section_number shall not be represented by empty sections;
- 10) for all sections used in the delivery of EITschedule information for a particular service the field last_table_id is used to indicate the last table_id used in the delivery of EIT schedule information for that service. Empty segments that fall outside the table_id range indicated by last_table_id shall not be represented by empty sections;
- 11) segments that correspond to events in the past may be replaced by empty segments (see rule 6);
- 12) the running_status field of event definitions contained in the EITschedule shall be set to either undefined (0x00) or service off air (0x05). The use of service off-air (0x05) indicates the event represents a period when the service is off-air.

Figure 1: EITschedule Structure

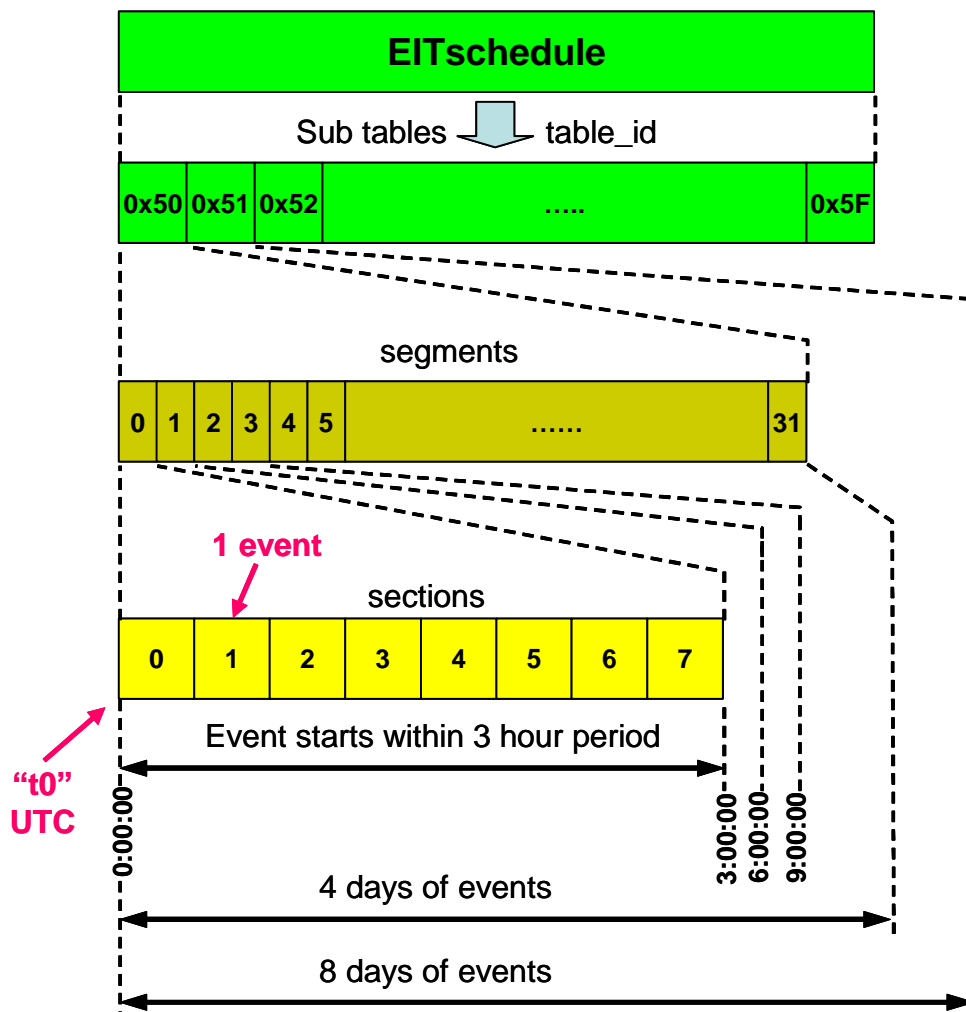
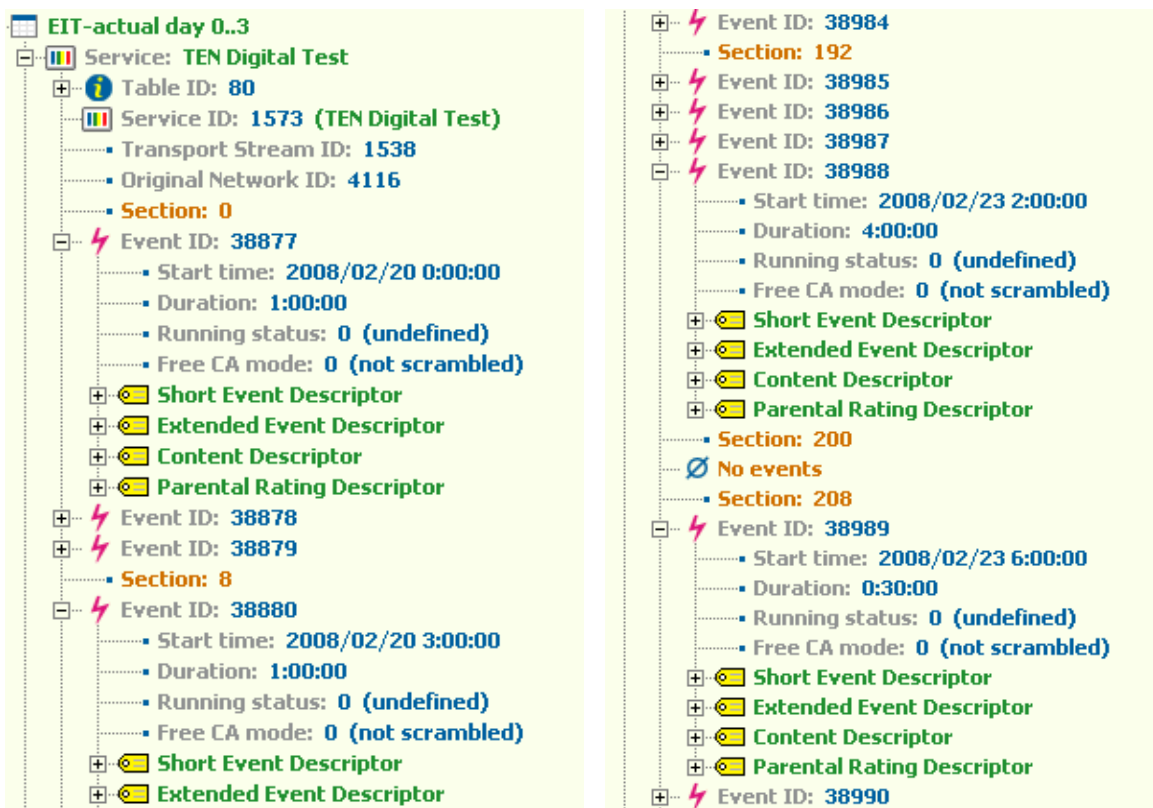


Figure 2: EITschedule Section Examples



2.2 Playout Repetition Rates

The playout rates for the EITschedule actual table will be divided into two different values. The first eight days will be played out with a repetition rate of 10000ms (10 seconds), with any included remaining days being played out at a repetition rate of 30000ms (30 seconds). (refer to Section 4.4 of TR 101 211 [3])

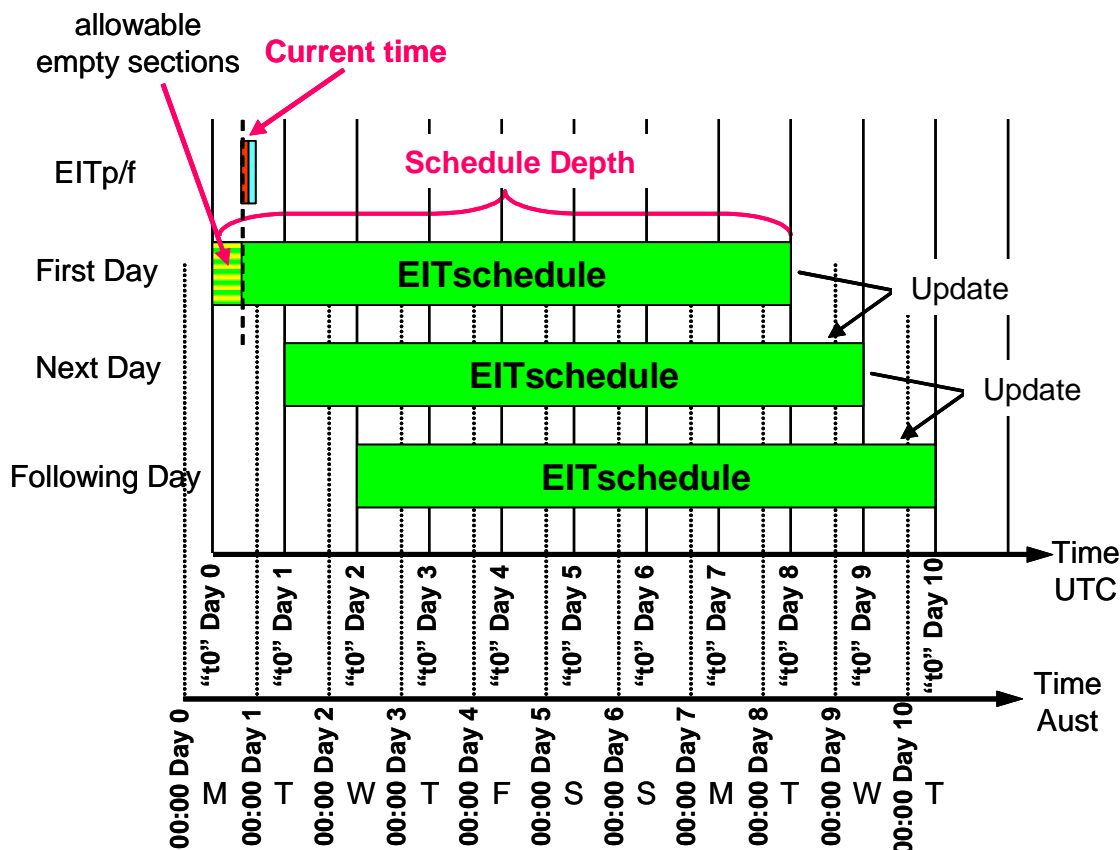
2.3 Schedule Window Update Rates

The updating of the time period of events ("schedule window") transmitted in EITschedule_{actual} shall take place at least once every 24 hours (typically at 12:00am Universal Coordinated Time), and preferably dynamically in the same manner as EITp/f.

2.4 Schedule Depth

The EITschedule_{actual} depth (i.e. the number of days transmitted) shall be at least eight days to allow the viewer to see if regular weekly events (i.e. a program series) on the current day will occur at the same time the following week.

Figure 3: Schedule Window and Depth



2.5 Schedule Accuracy

The accuracy of the timing information in the EITschedule_{actual} shall reflect the timing in the published station schedule. The timing of events may differ from timing information in the EITp/f_{actual} as this may be amended closer to the air time of the event.

2.6 Unique Identification of an Event

Every event in the event loop of an Event Information Section is assigned a unique identifier known as the event_id. This unique identifier is used to link the event information in the two EIT tables, EITschedule_{actual} and EITp/f_{actual}. The event_id broadcast in the EITschedule_{actual} for an event shall be the same event_id that is broadcast in the EITp/f_{actual} for that particular event.

3.0 RECEIVER BEHAVIOUR

3.1 Memory Implications in Receivers

The receiver would need to have sufficient memory capacity to be able to store up to eight days of schedule for the broadcast services it is able to receive. Broadcasters could typically transmit an average of eight events per three hours, with up to 1000 characters per event with three services per broadcaster, which implies that typically receivers require at least 12MBytes of memory to retain the available schedules in broadcaster overlap areas.

Broadcasters recommend that receivers be able to retain schedule information from all broadcasters while switched to standby.

3.2 Schedule Scanning

A single tuner receiver may be able to scan available services while in active standby to update the schedule information similar to scanning for a system software update (refer to Annex A of Free TV Operational Practice OP-46 [5]).

A receiver with dual tuners could scan available services for schedule information with the alternate tuner when available.

3.3 Recording Functionality

It is recommended that a receiver use the event_id as a reference for that event (e.g. a PVR that has been set for a recording, or a TV that has the event highlighted as a favourite to be watched). As an event becomes imminent, it will be displayed as the following event in the EITp/f_{actual} table with a potentially different start time and duration from that indicated for that event in EITschedule_{actual}. It is recommended that receivers regularly check the EITp/f_{actual} table for updated event times.

4.0 REFERENCES

[1]	Australian Standard, Digital television – Terrestrial broadcasting Part 1: Characteristics of digital terrestrial television transmissions	AS4599.1-2011
[2]	Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems	ETSI EN 300 468 V1.11.1 (2010-04)
[3]	Digital Video Broadcasting (DVB); Guidelines on implementation and usage of Service Information	ETSI TR 101 211 V 1.10.1 (2009-07)
[4]	Free TV Australia Operational Practice 44 – Implementation of Electronic Service Guide Information	Issue 5 October 2012
[5]	Free TV Australia Operational Practice 46 – Implementation of System Software updates in Australian DVB-T Systems using the simple Profile.	Issue 2 August 2006
[6]	Free TV Australia Operational Practice 72 – Implementation of Content Reference IDs by Australian Television Broadcasters	Issue 1 November 2014