Suruhanjaya Komunikasi dan Multimedia Malaysia
Malaysian Communications and Multimedia Commission

COMMUNICATIONS AND MULTIMEDIA ACT 1998
COMMISSION DETERMINATION ON THE MANDATORY STANDARD FOR FREE TO AIR TRANSMISSION
OF DIGITAL TERRESTRIAL TELEVISION SERVICE
DETERMINATION NO. 1 OF 2011

Pursuant to the Ministerial Direction on Free To Air Transmission Of Digital Terrestrial Television Service, Direction No. 2 of 2006 and in exercise of the powers conferred by sections 55 and 104(2) of the Communications and Multimedia Act 1998 [*Act 588*], the Commission hereby determines as follows:

Citation and commencement

1. This Determination may be cited as the **Commission Determination on the Mandatory Standard for Free to Air Transmission of Digital Terrestrial Television Service, Determination No. 1 of 2011.**

2. This Determination shall come into operation on 1 January 2012.

Interpretation

3. Any terms used in this Determination shall, unless the context otherwise requires, have the same meaning as in the Act or the Regulations made under it.

4. Unless the context otherwise requires, words in the singular include the plural and vice versa.

Licensees subject to this mandatory standard

5. All holders of network facilities provider licenses and network service provider licenses shall be subject to this mandatory standard.

Standard for Free to Air Transmission of Digital Terrestrial Television Service

Background

6. Malaysia is currently using PAL B and PAL G which operates on 7 MHz (VHF) and 8 MHz (UHF) bandwidth respectively for the analog broadcasting of free to air television services. As such, standards have to be based on existing conditions within the Malaysian broadcasting context.

7. For the implementation of Digital Terrestrial Television Broadcast (DTTB), the existing Mandatory Standard is based on Digital Video Broadcasting for Terrestrial (DVB-T) which was determined by the Commission Determination on the Mandatory Standard for Free to Air Transmission of Digital Terrestrial Television Service, Determination No. 2 of 2006.

8. This Determination intends to provide a revision to the aforesaid Determination.

Scope of Standard

9. The scope of the standard covers the following:

   (a) Baseband and Compression

   (b) Transmission

   (c) Multiplexing

   (d) Subtitling

   (e) Interactivity and Hybrid Applications

   (f) Test and Measurement

Baseband and Compression

10. The use of MPEG-4 audio-visual coding for both Standard Definition (SD) and High Definition (HD) video shall be in accordance with ISO/IEC 14496-10.

11. Stereo (dual channel) Audio shall be encoded using HE-AAC according to ISO/IEC 14496-3. Multichannel audio may also be simulcast using either/both HE-AAC (according to ISO/IEC 14496-3) or E-AC3 (according to TS 102 366).

Transmission

A. Frame Structure, Channel Coding and Modulation

12. The use of the Second Generation Digital Video Broadcasting for Terrestrial (DVB-T2) framing structure, channel coding and modulation for DTTB applications shall be in accordance with ETSI EN 302 755.

B. Implementation Guidelines

13. The implementation guidelines for DVB-T2 services with respect to the terrestrial transmission aspects shall be in reference to DVB Bluebook A133.

14. The document gives the guidelines for implementation of DVB-T2 transmitting networks. Its primary intention is to be a guide to the transmission aspects, while receiver aspects have not been dealt with. The document describes the main features of the system and gives guidelines for setting up of DVB-T2 transmitting networks. This includes a general description of network topologies for Single Frequency Networks (SFN) and Multi-Frequency Networks (MFN), the possibilities and constraints when sharing transmitting sites with analogue TV and a summary of planning parameters.

C. DVB Mega-Frame for Single Frequency Network (SFN) Synchronization

15. The use of DVB mega-frame for SFN synchronization shall be in reference to ETSI TS 101 191.

16. The document specifies a mega-frame, including a mega-frame initialization packet (MIP), which may be used for synchronization of the Single Frequency Networks (SFN) as well as for the optional control of other important parameters in an SFN.

Multiplexing

A. DVB-SI Coding

17. The definition of multiplexing and the specification for Service Information (SI) shall be in accordance with ETSI EN 300 468. The document specifies the Service Information (SI) data which forms a part of DVB bitstreams.

18. The information to assist in selection of services and/or events within the DVB bitstream shall be in accordance with ISO/IEC 13818-1. The document specifies additional data which complements the Program Specific Information (PSI) by providing data to aid automatic tuning of IRDs, and additional information intended for display to the user.

19. The guidelines on the implementation and usage of Service Information (SI) including DVB SI Syntax shall be in accordance with ETSI TR 101 211. It facilitates the efficient and reliable implementation of basic user-interaction functions in the ETR 162 DVB Standard Information (SI).

20. Event Information Table (EIT) data may be compressed utilizing Huffman coding as outlined in MTSFB 006:2011.

B. Transport Stream Media on MPEG-2

21. The DVB System is a means of delivering MPEG-2 Transport Streams (TS) via a variety of transmission media. The specification for transport stream media on MPEG-2 application shall be in reference to ETSI EN 301 192 which is developed in conjunction with ETSI EN 300 468 and ETSI TR 101 211.

C. Specification for Data Broadcasting

22. The specification for data broadcasting shall be in reference to ETSI EN 301 192 and ETSI TR 101 202.

D. Specification for System Software Update (SSU)

23. The specification for System Software Update (SSU) shall be in reference to ETSI TS 102 006. The document specifies a standard mechanism to transport the data to trigger a service software update. The document does not define the mandatory character of this protocol in a specific context and it does not exclude the use of proprietary mechanisms for doing a software update.

Subtitling

24. The specification for subtitling system shall be in reference to ETSI EN 300 743. The document refers to the delivery of both SD subtitles as well as enhancements which allow the broadcasting of HD subtitles using Display Definition Segment (DDS).

25. The document also specifies the method by which subtitles, logos and other graphical elements may be coded and carried in DVB bitstreams. The system applies Colour Look-Up Tables (CLUTs) to define the colors of the graphical elements. The transport of the coded graphical elements is based on the MPEG-2 system described in ISO/IEC 13818-1.

26. For Home Network Reference model, DVB Bluebook Document A109 shall be referred to.

Interactivity and Hybrid Applications

27. The specification for interactivity and hybrid applications including the return channel shall be in accordance to ETSI TS 102 809.

Test and Measurement

28. The Digital Video Broadcasting (DVB) set of digital TV standards specify baseline systems for various transmission media: satellite, cable, terrestrial, etc. Each baseline system standard defined the channel coding and modulation schemes for that transmission medium. The source coding was adapted from the MPEG-2 standard. The design of these new systems has created a demand for a common understanding of measurement techniques and the interpretation of measurement results.

29. The measurement guidelines for DVB systems shall be in accordance with ETSI TR 101 290. The document provides recommendations by defining a number of measurement techniques in such details that the results are actually comparable as long as the measurement is carried out in compliance with the given definition.

30. The inclusion of each parameter in the document is based on requirements from those who envisage having to work alongside the defined procedures. This includes network operators

and providers of equipment for network installation, as well as manufacturers of Integrated Receiver Decoders (IRD) or test and measurement equipment.

31. The recommendations of the document can be used:

    (a) to set-up test beds or laboratory equipment for testing hardware for DTTB and other related services;

    (b) to set these instruments to the appropriate parameters;

    (c) to obtain unambiguous results that can be directly compared with results from other test set-ups; and

    (d) to form a potential basis for communicating results in an efficient way by using the definitions in the present document as references.

32. Due to the highly complex nature of DTTB as a terrestrial transmission path, the requirements for testing and conformance are much greater in DVB-T2 connected devices as compared to previous transmission DVB-T unconnected devices. DVB-T2 is much more complex due to the technicalities of DVB-T2 modulator and analogue I-Q modulator, and the various additional features such as Multiple Physical Layer Pipe (PLP) modes that enable new use cases.

33. Furthermore, connected DTTB receivers that include hybrid connectivity via IP also include a complex software footprint for components such as hybrid middleware, conditional access, digital rights management, configuration and tuning, software upgrade mechanisms, resident and downloadable applications.

DVB Defined Interfaces

34. The specifications and use of DVB possible interfaces shall be in reference to existing relevant European standards.

35. The specifications for user and market requirement for in-home digital networks interface shall be in reference to DVB A029.

36. The specification for Common Interface (CI) for Conditional Access (CA) and other DVB decoder applications and extensions to the common interface shall be in reference to EN 50221, R206 001 and ETSI TS 101 699. The documents have two main purposes:

    (a) To explain why the CI specification is designed the way it is and is elaborated in the 'Rationale' sections throughout the document.

    (b) To give guidance on how to implement and use the CI. This will include recommendations for various design options where specific limits were not set in the specification.

37. The documents contain recommendations for implementation in various places which extend the CI specification to ensure that modules and hosts are fully interoperable. Designers are free to accept or ignore them. However if a recommendation is ignored the

designer should be confident that he fully understands the implications of doing this and the effect this may have on the interoperability of his product.

38. Any standards agreed by ETSI, EBU or ITU which is adopted by the DVB hereafter will automatically supersede any earlier interface standards.

Reference Document

39. The reference documents used to further define the details of the technical standards are listed in Table 1.

Table 1: Reference documents

No.	Category	Description	Standard Identification Code
		Baseband and Compression	
1.	MPEG-4	MPEG Information technology -- Coding of audio-visual objects -- Part 10: Advanced Video Coding	ISO/IEC 14496-10
2.	HE-AAC	MPEG Information technology -- Coding of audio-visual objects -- Part 3: Audio	ISO/IEC 14496-3
3.	E-AC3	Digital Audio Compression (AC-3, Enhanced AC-3) Standard	ETSI TS 102 366
		Transmission	
4.	DVB-T2	Digital Video Broadcasting (DVB); Frame Structure channel coding and modulation for a second generation digital terrestrial television broadcasting system (DVB-T2)	ETSI EN 302 755
5.	DVB Bluebook A133	Implementation guidelines for a second generation digital terrestrial television broadcasting system (DVB-T2)	DVB Bluebook A133
6.	DVB-SFN	Specification of a Mega-frame for SFN Synchronisation	ETSI TS 101 191
		Multiplexing	
7.	DVB-SI	Digital broadcasting systems for television, sound and data services; Specification for Service Information (SI) in Digital Video Broadcasting (DVB) systems	ETSI EN 300 468
8.	ISO/IEC 13818-1	Information technology -- Generic coding of moving pictures and associated audio information: Systems	ISO/IEC 13818-1
9.	DVB-SI	Guidelines on implementation and usage of service information	ETSI TR 101 211
10.	DVB-SI	Digital broadcasting systems for television, sound and data services; Allocation of Service Information (SI) codes for DVB systems	ETR 162

11.	Huffman Coding	Compression of DVB SI Descriptions Using Huffman Coding for Malaysia Digital Broadcast	MTSFB 006:2011
12.	DVB-DATA	Specification for the transmission of data services in DVB bitstreams	ETSI EN 301 192
13.	DVB-DATA	Implementation guidelines for Data Broadcasting	ETSI TR 101 202
14.	DVB-SSU	Digital Video Broadcasting (DVB); Specification for System Software Update in DVB Systems	ETSI TS 102 006
	Subtitling		
15.	DVB-SUB	Digital broadcasting systems for television, sound and data services; Subtitling systems	ETSI EN 300 743
16.	DVB Bluebook A109	Digital Video Broadcasting (DVB) Home Network Reference Model, Phase 1	DVB Bluebook A109
	Interactivity and Hybrid Applications		
17.	TS 102 809	Digital Video Broadcasting (DVB); Signalling and carriage of interactive applications and services in Hybrid broadcast/broadband environments	ETSI TS 102 809
	Test and Measurement		
18.	TR 101 290	Digital Video Broadcasting (DVB); Measurement guidelines for DVB systems	ETSI TR 101 290
	DVB Defined Interfaces		
19.	DVB A029	User and Market Requirements for In-Home Digital Networks	DVB A029
20.	DVB-CI	Common Interface Specification for Conditional Access and other Digital Video Broadcasting Decoder Applications	EN 50221
21.	DVB-CI	Guidelines for Implementation and Use of the Common Interface for DVB Decoder Applications	R 206 001
22.	DVB-CI	Digital Video Broadcasting (DVB); Extensions to the Common Interface Specification	ETSI TS 101 699

Reference URLs

40. The reference documents are accessible from the URLs listed in Table 2.

Table 2: Reference URLs

No.	Organization	URL
1.	Digital Video Broadcasting (DVB)	http://www.dvb.org
2.	European Committee for Electrotechnical Standardization (CENELEC)	http://www.cenelec.eu
3.	European Telecommunications Standard Institute (ETSI)	http://www.etsi.org
4.	International Electrotechnical Commission (IEC)	http://www.iec.ch
5.	International Organization for Standardization (ISO)	http://www.iso.ch
6.	Malaysian Technical Standards Forum Bhd (MTSFB)	http://www.mtsfb.org.my

Abbreviations

41. For the purposes of this standard, the following abbreviations in Table 3 apply:

Table 3: Abbreviations

CA	Conditional Access
CI	Common Interface
DTTB	Digital Terrestrial Television Broadcast
DVB	Digital Video Broadcasting
DVB-T	Digital Video Broadcasting for Terrestrial
DVB-T2	Second Generation Digital Video Broadcasting for Terrestrial
ETSI	European Telecommunications Standards Institute
HD	High Definition
HE-AAC	High-Efficiency Advanced Audio Coding
IEC	International Electrotechnical Commission
IP	Internet Protocol
IRD	Integrated Receiver Decoder
ISO	International Standards Organisation
ITU	International Telecommunication Union
MFN	Multiple Frequency Networks
MIP	Magazine Inventory Page
MPEG	Motion Picture Expert Group
MPI	MPEG Physical Interface
PAL	Phase Alternating Line
PSI	Program Specific Information
SD	Standard Definition
SFN	Single Frequency Networks
SI	Service Information
TS	Transport Stream
TV	Television
UHF	Ultra-High Frequency (300...3000 MHz)
VHF	Very High Frequency (30...300 MHz)

Revocation and Transitional

42. With the coming into force of this Determination, the Commission Determination on the Mandatory Standard For Free to Air Transmission of Digital Terrestrial Television Service, Determination No. 2 of 2006 shall be revoked. For avoidance of doubt, all actions taken and decisions made under the revoked Determination shall continue to be valid and effective until revoked.

Made: **13** December 2011

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