



INFORMATION MEMORANDUM

CLARIFICATIONS ISSUED BY

THE MEDIA DEVELOPMENT AUTHORITY
AND
THE INFO-COMMUNICATIONS DEVELOPMENT AUTHORITY OF SINGAPORE

TO THE

TECHNICAL SPECIFICATION FOR THE INTEGRATED RECEIVER DECODER
FOR USE WITH THE SECOND GENERATION DIGITAL TERRESTRIAL
TELEVISION BROADCASTING SYSTEM

(IDA/MDA TS DVB-T2 IRD Issue 1, November 2012)

15 March 2013

BACKGROUND

1. Following MDA and IDA's decision on 19 November 2012 to issue the Technical Specification for the Integrated Receiver Decoder for use with the second generation Digital Terrestrial Television Broadcasting System ("TS DVB-T2 IRD"), and for the purpose of equipment registration with effect from 1 April 2013, further comments were received suggesting editorial clarifications to be carried out to the published TS DVB-T2 IRD.
2. The published TS DVB-T2 IRD comprises 2 parts:
 - a. Part A sets out the minimum requirements for DVB-T2 IRD for use with the second generation Digital Terrestrial Television Broadcasting System (DVB-T2), including safety and EMC requirements; and
 - b. Part B sets out the additional requirements for DVB-T2 IRDs which are capable of supporting the multi-channel audio feature.
3. This document outlines the editorial clarifications that will be made to the TS DVB-T2 IRD to provide greater clarity to the requirements.

EDITORIAL CLARIFICATIONS TO TS DVB-T2 IRD

Scope of Part A: Basic DVB-T2 IRD Requirements

4. A comment was received recommending that the upcoming version of the DVB standard for use of video and audio coding in broadcasting applications be adopted to provide clarity to the metadata used in multi-channel audio. The reference cited in § 10 [1] of Part A of the TS DVB-T2 IRD was proposed to be updated to "*ETSI TS 101 154 v1.11.1 (2012-11)*". MDA and IDA noted that this latest version has been approved by the European Telecommunications Standards Institute ("ETSI"). As revisions of the ETSI TS 101 154 have been developed largely in a backward compatible manner, updating of this reference will not bring about any change to the mandatory requirements defined in the TS DVB-T2 IRD. Hence, MDA and IDA will update the reference as suggested.
5. The text "*E-AC3*" is deleted from § 1.1(e) of Part A of the TS DVB-T2 IRD as E-AC3 audio decoding is a Part B requirement for supporting the multi-channel audio feature.

Video Decoding

6. To align with Table 1 in Part A of the TS DVB-T2 IRD, the text "and § 5.2" is deleted from § 4.2.1 of Part A of the TS DVB-T2 IRD. Support for the 25 Hz MPEG2 HDTV video format as defined in § 5.2 of the ETSI TS 101 154 is not required.

Operating Modes

7. § 5 of Part A of the TS DVB-T2 IRD specifies that the frontend/tuner shall comply with the Layer 1 (“L1”) signalling requirements of the DVB-T2 baseline system defined in the ETSI EN 302 755 V1.3.1, which includes a feature for scrambling of the L1 data¹. Some manufacturers have raised concerns on the implementation timeline for supporting this version of the DVB-T2 L1 signalling which has only been released by ETSI in April 2012, citing that more lead time is needed for the development and testing of new chipsets made for the DVB-T2 V1.3.1 L1 signalling.
8. Specifying the DVB-T2 V1.3.1 L1 signalling in the TS DVB-T2 IRD will give flexibility to broadcasters in using transmission modes and offering services. Scrambling of the L1 data will bring about power efficiency (reducing the PAPR²) to take advantage of the M-PLP³ (Multiple Physical Layer Pipes) mode for different reception scenarios and applications with the same signal, and providing for future services using DVB-T2 Lite⁴.
9. To give clarity to the adoption of the DVB-T2 V1.3.1 L1 signalling with the L1 data scrambling feature, signalling formats for PAPR reduction given in Table 6, § 5.3.2 of Part A of the TS DVB-T2 IRD are replaced as shown below, and support for scrambling of L1 post signalling is indicated as required. Also, the text “*support for time frequency slicing (TFS) is not required for the DVB-T2 IRD with single frontend/tuner*” is inserted in § 5.3.2 of Part A of the TS DVB-T2 IRD.

DVB-T2 Parameter/Mode	Requirement
<i>Signalling format for Peak Average Power Ratio (PAPR) reduction</i>	<i>L1-ACE is used and TR is used on P2 symbols only; L1-ACE and ACE only are used; L1-ACE and TR only are used; or L1-ACE, ACE and TR are used.</i>
<i>Scrambling of L1 post signalling (L1_POST_SCRAMBLED)</i>	<i>Feature shall be supported by the DVB-T2 IRD.</i>

¹ Scrambling of L1 data is included in the ETSI EN 302 755 version 1.3.1 as an error protection mechanism for transmission in the multiple physical layer pipe (M-PLP) mode, which allows transmission of a group of services with different modulation and code rate over one frequency.

² Peak to average power ratio (PAPR) is a related measure derived from square of the peak amplitude (giving the peak power) divided by square of the RMS value (giving the average power). High PAPR will result in inter-carrier interference, high out-of-band radiation and bit error rate performance degradation, mainly due to the nonlinearity of the high power amplifier.

³ M-PLP enables the broadcaster to use different transmission modes to transmit different services, e.g. the broadcaster can choose to use a different mode to transmit services to outdoor locations such as bus-stops compared to the mode required for indoor fixed reception.

⁴ The additional profile on DVB-T2 Lite for mobile reception is an optional requirement in the Singapore TS DVB-T2 IRD as there is no mobile receiver yet to be available readily.

Service Identification and Logical Channel Number (LCN)

10. The text “*The assigned private data specifier is “0x00000019”* in § 6.6 of Part A of the TS DVB-T2 IRD is replaced as shown below, adding the “*Original Network ID value*” to the list of DVB identification values that has been uniquely assigned for and used by the broadcaster in Singapore. This provides further information of the network identification values that have been allocated to Singapore for broadcasting applications.

“The DVB identification values given in the following table shall be used for digital terrestrial transmission.”

Identifier	Value
<i>Private Data Specifier</i>	<i>0x00000019</i>
<i>Original Network ID</i>	<i>0x22BE</i>

Digital Audio Data Stream Output (Optional)

11. The text “*section 4*” in § 8.9 of Part A of the TS DVB-T2 IRD is replaced by “*§ 4.3.3 of Part A and § 5 of Part B*”.

System Software Update

12. References to “*ISO/IEC 13818-1 [5], ETSI TS 101 154 [1]*” are deleted from § 9.11 of Part A of the TS DVB-T2 IRD as reference to “*ETSI TS 102 006 [21]*” should suffice for specifying requirements for system software update in DVB systems.

EFFECTIVE DATE OF EQUIPMENT CONFORMANCE WITH TS DVB-T2 IRD

13. The revised TS DVB-T2 IRD reflecting the above amendments is issued together with this Information Memorandum.
14. To address manufacturers’ concern on the implementation timeline for equipment conformity to the TS DVB-T2 IRD, IDA will defer the effective date for enforcement from 1 April 13 to **1 November 13** while equipment registration of DVB-T2 IRDs/receivers with IDA may proceed after 1 April 2013.

CLARIFICATIONS

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