DECISION ISSUED BY
THE MEDIA DEVELOPMENT AUTHORITY
AND
THE INFO-COMMUNICATIONS DEVELOPMENT AUTHORITY OF SINGAPORE

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

19 November 2012

TECHNICAL SPECIFICATION FOR INTEGRATED RECEIVER DECODER ("IRD") FOR USE WITH THE SECOND GENERATION DIGITAL TERRESTRIAL TELEVISION BROADCASTING SYSTEM ("DVB-T2")

INTRODUCTION

1. On 1 August 2012, MDA and IDA jointly issued a public consultation document on the Technical Specification for Integrated Receiver Decoder for use with the second generation Digital Terrestrial Television broadcasting system (hereafter referred to as "TS DVB-T2 IRD").

2. The consultation closed on 28 August 2012, and comments were received from a total of 16 respondents:

    - Digital TV Labs;
    - Dolby Laboratories Singapore;
    - Fraunhofer IIS;
    - High Tech TV/SindiTV;
    - Media Broadcast GmbH;
    - MediaCorp Technologies;
    - Panasonic R&D Center Singapore;
    - Public - Mr Cheng Kim Wai;
    - Public – Mr Klaven Siow Wei Woon;
    - SkyCom Satellite System Pte Ltd;
    - Sony EMCS (Malaysia) Sdn. Bhd.;
    - StarHub Cable Vision Ltd;
    - STMicroelectronics (Thailand) Ltd;
    - Toshiba Singapore Pte Ltd Engineering Centre;
    - Verimatrix; and
    - VS Marketing and Engineering Pte Ltd

3. MDA and IDA wish to thank the respondents for their feedback. MDA and IDA have reviewed the comments received, and this document discusses the key issues raised during the consultation and sets out the decisions. This document also summarises the amendments that have been carried out to the TS DVB-T2 IRD to provide clarifications of requirements as requested by the respondents.

MDA AND IDA'S RESPONSES TO COMMENTS RECEIVED

<u>Multi-channel Audio</u>

4. Two respondents proposed that the support for multi-channel audio feature be made optional for the following reasons:

    a. Since the vast majority of consumers will use built-in speakers of the television set or the stereo audio system, it is justified to define a stereo only receiver (or IRD) without the necessary additional cost in licensing and testing required for the multi-channel audio support.

    b. Mandating the MPEG4 High Efficiency Advanced Audio Coding (HE-AAC 5.1 v2) and the Dolby Digital Plus (E-AC3) will incur licensing cost on the receivers (or IRD). Due to the competitive pricing of receivers, this cost will be passed down to end users. One of respondent further commented that less than 10% of the population may actually have a surround system at home. Singapore terrestrial broadcast is mainly used as the second delivery source to complement Cable and IPTV, thus the terrestrial receivers are seldom connected to surround systems. Hence, making this a mandatory feature will add significant cost to what may well be used by a small minority of users. Multi-channel audio feature should be made optional for receiver (or IRD) manufacturers to decide based on their targeted market segment(s).

5. A third respondent commented that the mandatory requirement for support of both HE-AAC and E-AC3 formats as the multi-channel audio requirement would serve only to increase the cost of the receiver (or IRD) if there was no immediate implementation by the broadcaster. This will also limit the ability of manufacturers to sell the receivers to other countries as multi-channel audio is not a required feature. Thus the receiver cost will increase further.

6. A fourth respondent opined that consumers would welcome the ability to have multi-channel audio feature but he raised 2 questions concerning the two advanced audio formats.

    a. The respondent questioned the necessity to have two audio formats for consumers as they had always been reluctant to spend and invest on Free-To-Air broadcasting channels. Majority of US and European broadcasters have implemented HE-AAC audio to achieve the benefits of bit rate efficiency or savings. While E-AC3 may have the same benefit, the implementation rate is low probably due to the need to have new licence agreement. The respondent advised that study should be carried out on the implementation rate of E-AC3 and its usage by consumers to consider if two audio formats were a need or an excess for consumers.

    b. The respondent questioned the expectation of consumers on the level of multi-channel audio. The respondent viewed that the purpose for multi-channel audio was to allow sound surround rather than bit rate efficiency as DVB-T2 transmission was already more robust in handling higher bit

rate. Most people know about or experience before 5.1 multi-channel audio (HE AAC format) in the cinema or at home, and 5.1 channel audio is enough to enjoy home entertainment. To cater for 7.1 channel audio (E-AC3 format), may be overkill. To have an affordable and not compromising IRD, it is recommended to follow what majority broadcasters have implemented in their transmission using HE AAC.

7.   A fifth respondent commented on the requirement to support both Dolby Digital Plus (E-AC3) and HE-AAC as a multi-channel requirement. Whilst the proposed mandatory requirement would result in better audio quality and bandwidth efficiency, the cost of incorporating this specification into decoders would be substantial. Given that Dolby Digital Plus (E-AC3) is a relatively new specification with limited deployment in the region, the requirement should be implemented in phrases, initially as an optional basis and to be reviewed triennially. Market conditions in the region, technology advancement and deployment rate should be monitored before proceeding to mandate this requirement.

8.   MDA and IDA are of the view that it is important to incorporate multi-channel audio requirements in DVB-T2 receivers as multi-channel audio is an integral part of HD programmes. The inclusion of multi-channel audio requirement is consistent with the DVB-T HD specifications where Dolby Digital (AC3) is mandatory and pay TV platforms are able to support multi-channel audio. Consumers who buy home theatre systems should not need to replace their DVB-T2 receivers in order to receive multi-channel audio. The future trend for most High Definition (HD) content will also be to include multi-channel audio.

9.   However, MDA and IDA note the concerns regarding the cost of implementing multi-channel audio in the DVB-T2 receivers (or IRDs), and agree that consumers should be given the widest choice of DVB-T2 IRD equipment that meets the required standard; is cost effective; and could accommodate different consumers' usage profile. Therefore, a two tier approach to setting out the technical requirements for conformance by the DVB-T2 IRD equipment will be adopted. The TS DVB-T2 IRD will comprise two parts: Part A on minimum conformity requirements for entry level DVB-T2 IRDs; and Part B on additional requirements for supporting the multi-channel audio feature. Manufacturers are free to select their target market segment(s). They may market Basic DVB-T2 receivers that comply with Part A only and/or Basic DVB-T2 receivers with multi-channel audio that comply with Parts A and B for consumers with home theatre systems.

10.   MDA and IDA are of the view that both multi-channel audio formats should be included in Part B of the TS DVB-T2 IRD so as to make provisions for more options in digital terrestrial transmission. On the concern of specifying Dolby Digital Plus (up to 7.1 channels), MDA and IDA clarify that Dolby Digital Plus (E-AC3) is included as it offers greater data rate efficiency and increases channel support compared to the existing Dolby Digital (AC3). Dolby Digital Plus is also compatible with all existing Dolby Digital equipped consumer electronics.

Electromagnetic Compatibility (EMC)

11.   A respondent proposed a 2-year implementation grace period for the requirement to comply with CISPR 13. The respondent shared that currently there are no approved test labs in the Asia region to support CISPR 13 testing along with DVB-T2 compliant requirement. Another respondent requested for more information on conformance testing requirement for CISPR 13 as EMC testing takes time to be performed in-house or by 3rd party test lab to expedite the production. Both respondents commented that the EMC requirement should be imposed at a broader level and not be confined to digital terrestrial receivers.

12.   MDA and IDA are of the view that electromagnetic compatibility of any type of electrical/electronic products should not require a grace period for implementation. EMC is not a new requirement but is already adopted as a safety regulation for ensuring that equipment has tolerance to and for preventing equipment from causing intolerable electromagnetic disturbances to radio reception. EMC standards have been harmonised by the International Special Committee on Radio Interference (CISPR) and adopted worldwide.

13.   Where applicable, IDA requires telecommunication equipment to comply with the CISPR 22 standard for EMC since 2000 to avoid causing electromagnetic interference. Taking guidance from CISPR 22 for multi-functional equipment, MDA and IDA are prepared to accept EMC testing performed to CISPR 22 for the DVB-T2 IRD because measurements of conducted, power and radiated disturbances according to CISPR 13 may be excluded if the equipment has been tested to comply with the relevant limits of CISPR 22.

14.   Respondents need not be concerned that there are no approved test labs in the Asia region capable of testing to CISPR 13 for TV receivers (or IRDs). There are already 3 local test labs, 2 Australian labs and 3 Taiwanese labs recognised by IDA for testing to CISPR 22. MDA and IDA may also recognise EMC test reports from foreign labs that have been accredited by their own national bodies.

15.   Section 2.3 has been amended to reduce EMC requirements for the DVB-T2 IRD to CISPR 13 Section 5.3, 5.6 & 5.7 or equivalent based on CISPR 22.

Languages and Fonts

16. Five respondents requested for the support for Tamil font display of EPG to be made optional. The feedback was that almost all consumer electronics devices do not support Tamil fonts/On Screen Display (OSD) due to the fact that other languages have sufficiently covered the Tamil demographics and it is not a strongly requested feature. Tamil EPG is not a common feature and manufacturers will need time and cost to re-work the software and conduct tests. The respondents further commented that longer lead time is required for the Tamil font development and this will cause delay in their product launch date. In addition, if the broadcaster does not broadcast Tamil EPG, the mandatory requirement will unnecessarily increase the cost of the DVB-T2 IRD. This will also limit the manufacturer's ability to sell such DVB-T2 IRDs to other countries as Tamil font is not a required feature in these countries.

17. MDA and IDA note that Tamil EPG is not commonly implemented and there is a lack of readily available equipment. MDA and IDA also note the high cost of mandating Tamil font and the lead time required to implement. We have amended the specifications to include Tamil font as an optional feature. MDA and IDA will review the requirement when Tamil font support is more readily available.

Advanced Features

18. One respondent requested for reference specifications for advanced features such as Personal Video Recorder (PVR) and interactive services. Two other respondents recommended the addition of ancillary interface for hybrid operation and interactive services.

19. MDA and IDA clarify that the TS DVB-T2 IRD is intended for setting out the minimum requirements for use with DVB-T2 networks. However, manufacturers may add on ancillary interfaces to their DVB-T2 IRDs for Internet access. Development of standards for the DVB-T2 IRD interactive functionality and the PVR feature with network specific requirements may be driven by the IDA standards working group (TSAC WG3) for interactive TV services based on market readiness.

Amendments to the TS DVB-T2 IRD

20. In response to feedback received during the public consultation, amendments made to the TS DVB-T2 IRD are summarised below.

TS DVB-T2 IRD Clause (§)	Comments received from the Public Consultation	Amendments & Clarifications to the TS DVB-T2 IRD
Part A Scope 1.2 b) Audio Decoding Part B § 6	Audio Description (AD) in Broadcast-mix mode To specify the receiver-mix mode in combination of the use of MPEG-4 HE AAC or E-AC3 as transmission codec. Respondents commented that receiver-mix mode allows lower data transmission rate and significant saving on bandwidth, especially in case of multi-channel audio transmissions. There is no additional cost or delay in implementation. To include Audio Description (AD) as part of the requirements in the specification.	Noted the advantage of receiver-mix mode for broadcasters as well as providing users more control on the volume of the AD track. Added Part B § 6 to include receiver-mix mode (in combination with MPEG-4 HE AAC and E-AC3 where applicable) to support AD function with reference to ETSI TS 101 154 Annex E.
Part A § 2.3	General Requirements To address concerns of requiring compliance with CISPR13 on EMC of sound and TV broadcast receivers and associated equipment.	Have amended § 2.3 to reduce EMC requirements for DVB-T2 IRD to CISPR 13, § 5.3, 5.6 & 5.7 or equivalent based on CISPR 22.
Part A § 4	Latest Revision of ETSI TS 101 154 Specification To update reference to the upcoming version of the ETSI TS 101 154 (v1.11.1) for use of video and audio coding in broadcasting applications based on MPEG-2 transport stream. This latest version provides further clarity on the use of metadata in the multi-channel audio.	Will track the ETSI JTC-DVB work programme closely for the publication of this version on the ETSI website and update reference, where applicable, as soon as it is published as an ETSI standard.
Part A § 4.2.4	Active Format Description (AFD) To include illustrations for display requirement on TV as there are various display options.	Have added the illustrations in Annex A of TS DVB-T2 IRD.
Part A § 4.3.3 Part B § 5 Table 9	Decoding and Presentation Options for 2 channels of Decoder Output and Multi-Channel Decoder To include a clause in Part A § 4.3.3 Table 4 and Part B § 5 Table 9 to state S/PDIF output as optional to align with the Digital Audio Data Stream Output option given in § 8.9.	Have included a footnote in Part A § 4.3.3 Table 4 and Part B § 5 Table 9 to clarify that the S/PDIF requirement is applicable only when the S/PDIF output is available.

TS DVB-T2 IRD Clause (§)	Comments received from the Public Consultation	Amendments & Clarifications to the TS DVB-T2 IRD
Part A § 4.3.2	MPEG-4 HE AAC V2 Audio (up to Level 3) To specify the use of MPEG-4 HE AAC v2 level 4 (instead of level 3, which offers only stereo decoding capabilities) to enable efficient use of the spectrum by transmitting one multichannel MPEG-4 HE-AAC audio bit stream to both stereo and multichannel receivers instead of a simulcast of a stereo and a multichannel bit stream. Level 4 offers multichannel decoding capabilities. In combination with a mandatory down-mix to stereo, the license fee for the use of MPEG-4 HE AAC v2 level 4 is identical to the license fee for level 3 or level 2. This combination allows a more efficient use of the spectrum.	Have specified level 4 for the basic stereo receiver in combination with a mandatory down-mix to stereo PCM.
Part A § 4.3.2	Sampling Rate for MPEG-4 HE AAC V2 Audio To allow sampling rate of up to 48 KHz instead of limiting it to exactly 48 kHz for MPEG-4 HE AAC v2 Audio. Lower sampling rate is used for transmitting radio programs or mobile applications alongside the TV signal over the DVB-T2 network. Implementation is already supported by the chipsets.	Noted that lower sampling rate is of interest for other services such as radio programs or mobile applications transmitted alongside of the TV signal over the DVB-T2 network, and requirement has been amended accordingly.
Part A § 4.3.3 Table 4	Pass through for Stereo Receiver To include the pass through of HE AAC bit stream for optical/coaxial (S/PDIF) output as well as for the HDMI output to provide for use of a multichannel signal with an external decoder e.g. an AV Receiver.	Have amended Part A § 4.3.3 Table 4 to include pass through of HE AAC bit stream for S/PDIF and HDMI output.
Part A § 4.3.3 Table 4	To include E-AC3 for stereo decoding output in the DVB-T2 IRD as the E-AC3 bit-stream can also be transmitted and decoded in stereo outputs (S/PDIF, HDMI), and that pass-through of E-AC3 is included in the stereo E-AC3 royalty. With inclusion of E-AC3 for both stereo and multichannel decoding output on the DVB-T2 IRD, the benefits of a mono-cast/single audio bit-stream on-air can be enjoyed by the broadcaster as the IRD can decode this single on-air bit-stream for either stereo or multi-channel output. This will translate to cost savings and band-width savings for the broadcaster for their various HD channels on-air when they used a single E-AC3 audio stream.	E-AC3 for stereo decoding output will not be included as it is unlikely that the broadcaster is able to do a single cast / mono cast on E-AC3 as the stereo (HE-AAC) will still be the primary audio tracks for the reception on receiver that does not have the multi-channel audio feature.

TS DVB-T2 IRD Clause (§)	Comments received from the Public Consultation	Amendments & Clarifications to the TS DVB-T2 IRD
Part B § 2	Metadata To clear ambiguity as to which of the 3 references cited should be used for the IRD to perform a down-mix; and whether the Dynamic Range Control (DRC) defined in the ETSI TS 101 154 in the future should follow the ETSI TS 101 154 or the ISO/IEC 14496-3.	Have amended Part B § 2 to give clarity that the IRD shall apply bit-stream metadata parameters and down mix multichannel input configurations to stereo PCM for Enhanced AC-3 in accordance with guidelines given in ETSI TS 102 366 [10] and MPEG-4 HE AAC as specified in ISO/IEC14496-3 [9] and ETSI TS 101 154 [1].
Part B § 3	Pass through To clear ambiguity whether only DVB-T2 IRD with ARC capability need to support pass through or that ARC should be supported by all DVB-T2 IRD; and whether the native bit stream was referring to the native audio elementary bit stream as it could imply the complete transport stream.	Have amended Part B § 3 to give clarity that the DVB-T2 IRD (standalone module) shall pass through the native input audio elementary bit-stream over the HDMI output and ARC output for DVB-T2 IRD (where applicable).
Part B § 4	Trans-coding To add the trans-coding of MPEG-4 HE AAC multichannel audio to DTS as an alternative to the trans-coding of AC-3. To clarify whether only DVB-T2 IRD with ARC capability needs to support trans-coding or that ARC is to be supported by all DVB-T2 IRD.	Have included the trans-coding to DTS to support legacy devices so as to allow manufacturers to adopt either one of the trans-coding technologies. Also have amended Part B § 4 to give clarity on the requirement for Audio Return Channel (ARC) output.
Part B § 5	Pass through for Multi-channel Receiver To include bit stream pass through capabilities for MPEG-4 HE-AAC and E-AC3 for the optical/coaxial (S/PDIF) output. To note that pass through of E-AC3 on S/PDIF is not achievable.	Have amended Part B § 5 Table 9 to include pass through of MPEG-4 HE-AAC for S/PDIF output.

TS DVB-T2 IRD Clause (§)	Comments received from the Public Consultation	Amendments & Clarifications to the TS DVB-T2 IRD
Part A § 4.3.7	Loudness Matching There should be more clarity to the standards required for implementing loudness matching, and this feature should be made optional as the standards are still in the early stage of development.	Changed requirement to optional.
Part A § 5	Front End Characteristics To revert support for ETSI EN 302 755 back to v1.2.1 instead of v1.3.1, to exclude the DVB-T2 Lite requirements for transmission to handheld receivers (e.g. tablets and smart phones). As such receivers are not yet available, mandating T2-lite would limit the benefits that a growing base of suppliers of T2 modulators or combo solutions would bring.	Reference to ETSI EN 302 755 v1.3.1 will be maintained but with an indication in § 5.1 that support for DVB-T2 Lite is optional.
Part A § 5.3.2	DVB-T2 Operating Mode To remove § 5.3.2 as the DVB-T2 modes in Singapore are outlined in § 5.3.3.	Deleted but updated Table 7 in the Part A § 5.3.2 with a note to indicate that Pilot Pattern 8 (PP8) is not supported as we understand from manufacturers that modulators today do not support PP8 due to the need to implement expensive and untested algorithms.
Part A § 5.4 [Further comment received after closing date]	DVB-T2 Performance Requirements To change the C/N value for synchronisation for varying echo power levels in SFN to 28.1 dB for SG1 (Fixed Outdoor) to follow the Nordig definition.	The initial performance figure for Singapore was calculated based on the NorDig Unified_ver_2.2.1's formula in section 3.4.10.3. For Variable C, the C/N loss for PP2 is higher than PP4 (different by 0.5dB). Taking into consideration that Nordig uses the C/N values from PP2 in the rest of their performance figures, Annex E has been amended to follow the Nordig recommendation.
Part A § 5.5.1.1	Performance in Time-Varying Channels To remove § 5.5.1.1 as it is not a testable requirement.	Part A § 5.5.1.1 has been removed.
Part A § 6.3	Optional and unrecognised SI SIT (Selection Information Table), BAT (Bouquet Association Table) and DIT (Data Information Table) should be removed from terrestrial platform.	Will be kept as an optional requirement for future services, where applicable.

TS DVB-T2 IRD Clause (§)	Comments received from the Public Consultation	Amendments & Clarifications to the TS DVB-T2 IRD
Part A § 6.6	Service Identification and Logical Channel Numbering (LCN) To clarify intent of clause, whether the receiver needs to store the tuning data internally or in a user visible manner.	Have clarified in Part A § 6.6 that it is intended that the tuning data be stored in the receiver for quick tune in to selected transport stream in normal reception scenario.
Part A § 6.6.1	Logical Channel Numbering (LCN) To align the LCN range for consistency in Part A § 6.6.	Amended Part A § 6.6.1 on the LCN range to start from 1 to 999 to align with § 6.6.
Part A § 7.1.1	Subtitling To recommend the default setting for subtitling to be "ON" and include "MUL" signalling for multi-language subtitling. This is to facilitate the introduction of close caption subtitling upon digital switch on. The close caption approach allows the user to enable/disable the subtitles display.	The default setting for subtitling is recommended to be "ON" to maintain the same viewing experience from analogue to digital since subtitles have always been available and should stay the same moving on to digital switch on. MDA and IDA recommend that the preferred language for the subtitles to be set as "MUL" for IRD's factory default settings. This ensures consistent subtitling experience for users with different IRDs. By selecting 'MUL', the user will be able to view the multi-language subtitling service that would be transmitted by the broadcasters.
Part A § 7.2.2	EPG Presentation To support the display of elapsed duration on EPG. Information on elapse time can be presented differently by manufacturers in the design layout.	Have amended Part A § 7.2.2 to include elapsed duration as an optional requirement as it is suffice to have the program duration for the basic digital receiver and also give flexibility to manufacturers in their implementation.
Part A § 7.2.3	Languages and Fonts To clarify whether § 7.2.3 specifies for the support of Latin, Chinese and Tamil fonts but the font to be used for each language may be defined by the manufacturer.	Have amended Part A § 7.2.3 to require that the DVB-T2 IRD shall support the defined character code sets, and indicate that the support for Tamil font is optional.
Part A § 7.2.4	Parental Lock Feature To align the matrix mapping table closer to DVB's definition to allow IRDs that implement DVB definition to function with minimum deviation from the Singapore classification rating code.	Have amended Part A § 7.2.4 to align closely to DVB's definition to facilitate ease of implementation. In addition, PG13 is moved to 0x0A to give possibility for user to block PG13 and above (NC16, M18 and R21) if the IRD supports the locking mechanism based on age definition.

TS DVB-T2 IRD Clause (§)	Comments received from the Public Consultation	Amendments & Clarifications to the TS DVB-T2 IRD
Part A § 7.3	Multi-Language Support To order the priority for subtitles listed in § 7.3 and re-word § 7.3 to give clarity on the language support for both subtitles and audio selection.	Have amended Part A § 7.3 to give clarity on the receiver requirement.
Part A § 8.4	Antenna Output Power (Optional) To require the antenna output power feature together with over current protection circuitry to protect antenna output from power surge due to short circuit.	Maintained that the antenna output power requirement should be optional to give flexibility for its implementation whereas protection circuitry should be part of the design for a functional product.
Part A § 8.5	Component Analogue Outputs To remove the requirement of component analogue outputs from the TS DVB-T2 IRD since only SD contents are allowed to be output through component analogue output which has no copy protection mechanism.	Have defined requirement as optional to give flexibility for its implementation for connecting legacy televisions without HDMI inputs.
Part A § 8.11	Copy Protection on Outputs To add § 8.11 to state that copy protection is only required for DVB-T2 IRD with HDMI outputs.	Have amended Part A § 8.11 to include protection for DVB-T2 IRD standalone module.
Part A § 8.12	Common Interface (Optional) To specify CI+ certified requirement as optional if the CI slot is available as CI+ certification cost is significant and expensive, which include the software stack and enabled chipset.	To clarify that CI is an optional requirement applicable only for pay TV services. It is necessary to incorporate effective content protection mechanism (CI+) to safe guard premium pay TV content if CI is available.
Part A § 9 [Comment received after closing date]	First time Power Up To clarify whether time zone selection is required in Part A § 9.	Have amended Part A § 6.2 and § 9 accordingly to clarify that the default GMT setting for Singapore is 8 and it is not required to have the time zone selection in the user menu.
Part A § 9.2 b)	To clarify whether clause applies only to DVB-T2 IRD that provides antenna output power.	Have amended Part A § 9.2 b) to indicate that antenna power setting is only applicable when the antenna output power connector is available.
Part A § 9.10	Channel Zapping Time To clarify whether the channel zapping time is intended for switching between multiplexes or within the same multiplex.	Have amended Part A § 9.10 to clarify that channel zapping time refers to the switching time within the same multiplex.

TS DVB-T2 IRD Clause (§)	Comments received from the Public Consultation	Amendments & Clarifications to the TS DVB-T2 IRD
–	Energy Efficiency To introduce energy efficiency compliance with reference to the European Eco Design Standard.	Respondent's views will be directed to the National Environment Agency (NEA) for consideration when NEA conducts industry consultation on energy compliance for IRDs or receivers prior to the gazette of the new regulation.
–	Digital Signal via Power Line To transmit digital signal using Multi Streaming Power-line Adaptor to encourage more users to view Free-To-Air (FTA) channels in the homes.	Will forward this proposal for feasibility study by the IDA standards working group (TSAC WG2) for home networking.

SUMMARY OF MDA AND IDA'S DECISION

21. MDA and IDA have considered all the comments received and incorporated the necessary changes to the TS DVB-T2 IRD. MDA and IDA hereby issue the finalised TS DVB-T2 IRD on 19 November 2012 which comprises 2 parts:

    a. Part A sets out the minimum requirements for DVB-T2 IRDs 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.

22. Notwithstanding the issuance of the finalised TS DVB-T2 IRD, MDA and IDA are mindful of the need for a lead time for manufacturers and suppliers to bring into the market DVB-T2 IRDs capable of complying with either Part A of the TS DVB-T2 IRD or Parts A and B of the TS DVB-T2 IRD. As such IDA's licensees (suppliers/dealers of DVB-T2 IRDs) shall only be required to ensure that DVB-T2 IRDs comply with the relevant parts of the requirements set out in the IDA/MDA TS DVB-T2 IRD for the purpose of equipment registration with effect from **1 April 2013**.

23. MDA and IDA will review the TS DVB-T2 IRD triennially or whenever there is sufficient evidence of market development or major technology change that warrants a review.