Suruhanjaya Komunikasi dan Multimedia Malaysia
Malaysian Communications and Multimedia Commission

A REPORT ON A PUBLIC INQUIRY THE MANDATORY STANDARD ON THE DIGITAL TERRESTRIAL TELEVISION BROADCASTING (DTTB) FOR "FREE TO AIR" SERVICE IN MALAYSIA

October 20, 2006

GLOSSARY

Act / CMA	The Communications and Multimedia Act 1998
CA	Conditional Access
CI	Common Interface
Commission	The Malaysian Communications and Multimedia Commission
DTTB WG	Digital Terrestrial Television Broadcasting Work Group, under MTSFB
DVB-T	Digital Video Broadcasting - Terrestrial
ETSI	European Telecommunications Standards Institute
Free to air	Television Programmes Broadcast to everyone and can be viewed for Free
ITU	International Telecommunication Union
MPEG	Moving Picture Experts Group
MTSFB / Forum	Malaysian Technical Standards Forum Berhad
Pay TV	Television Programmes and broadcast services which requires subscription
STB	Set-Top-Box

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SECTION ONE: INTRODUCTION

1. On June 1, 2006, the Minister directed the Commission to determine the mandatory standard for the free to air transmission of digital terrestrial television service (Direction No. 2 of 2006, Ministerial Direction on the Standard for Free to Air Transmission of Digital Terrestrial Television Service).

2. According to the Minister's direction, the mandatory standard for the free to air transmission of digital terrestrial television service may comply with any of the requirement of internationally recognized standards for the digital terrestrial television service.

Public Inquiry

3. The Commission embarked on a public inquiry on 11 August 2006 and released a Public Inquiry Paper on the Proposal for the Determination of Mandatory Standards for DTTB for "Free to Air" service as part of the inquiry process. The paper contained:

    a. A preface
    b. The proposed DTTB "Free to Air" Framework
    c. Basis of Recommendation and
    d. Technical Standards on DTTB

4. The deadline for submissions was 12noon, 25 September 2006. At the close of inquiry the Commission had received eight submissions. Please refer to Appendix 1 of this report, which carries the detailed comments. A summary of the comments /suggestions are contained in Section 7 of this Report, entitled "Findings".

5. This Report captures the conclusions above and makes reference to the Commission's proposed DTTB Free to Air standard in the following manner:

    SECTION TWO sets out the legal context for a determination by the Commission the standards on DTTB under the Communications and Multimedia Act 1998.

    SECTION THREE provides the background to this Consultation Paper.

    SECTION FOUR sets out the DTTB system and standards available.

    SECTION FIVE sets out MTSFB DTTB WG and proposal

    SECTION SIX sets out the public inquiry process for the report

    SECTION SEVEN sets out the findings

SECTION EIGHT sets for the way forward

SECTION TWO: LEGAL CONTEXT FOR A DETERMINATION BY THE COMMISSION THE STANDARDS ON DTTB UNDER THE COMMUNICATIONS AND MULTIMEDIA ACT 1998

6. On 1 June, 2006, the Minister of Energy, Water and Communications had, under Sections 7 of the Act, directed the Commission to determine the standards on Digital Terrestrial Television Broadcasting. Section 7(1) of the Act states that:

> *"The Minister may, from time to time, issue directions to the Commission on the exercise of the Commission's powers and the performance of the Commission's functions and duties under this Act, whether of a general character or otherwise."*

7. With regard to determining a standard, the Commission is acting under the Direction specified above, to carry out its duties to determine such standard under Section 104(2) of the Act, which states that:

> *"The Commission shall determine a mandatory standard if it is subject to a direction from the Minister to determine a mandatory standard in place of a voluntary industry code".*

8. As such, the matter of mandating the standard for Digital Terrestrial Television Broadcasting falls under the Commission's power to determine, as provided for in Section 55(1). Section 55(1) states that "[t] he Commission may, from time to time, determine any matter specified in this Act as being subject to the Commission's determination."

9. In carrying out its powers to determine, Section 55(3) further states that, "[n] ot withstanding subsection (1), the Commission shall not conduct an inquiry unless it is satisfied that the matter is of significant interest to either the public or to current or prospective licensees under this Act."

10. Under the powers and functions provided for by the Act, the Commission is hereby holding a public inquiry to determine a mandatory standard for Digital Terrestrial Television Broadcasting in Malaysia.

SECTION THREE: BACKGROUND ON TELEVISION BROADCASTING IN MALAYSIA

11. Over forty years after its introduction, television broadcasting has grown to cover almost every household in Malaysia. During the forty over years of its existence, television broadcasting has evolved from black and white to color, from limited coverage to nationwide coverage and from terrestrial to satellite. Terrestrial television broadcasting also has grown from only one government-owned channel to the existing two government-owned and four commercial channels.

12. While these are "free to air terrestrial" channels, the Malaysian population are also able to receive pay satellite channels for the last 10 years. In addition to this, they are also "pay terrestrial" television services.

13. It is worth noting that while "free to air terrestrial" television broadcasting in Malaysia has seen significant changes and improvements, the programs are still transmitted over analogue means. Spectrum management in analogue transmission is challenging as there are overspill signals and the need to reduce interference between channels. This partly explains the limited number of free to air nationwide television stations available in Malaysia at the moment.

TELEVISION BROADCASTING UNDER CMA

14. One of the main principles of the licensing framework under the CMA is technology neutrality, and the requirement for licensing depends on the type of activity that is being undertaken. Generally, the provision of television broadcasting services, through whatever medium whether analogue or digital, require three types of licences which are follows:

    (a) Content Applications Service Provider Individual Licence - for the ***provision of content applications*** e.g. programme channels
    (b) Network Service Provider Individual Licence - for ***broadcasting distribution*** services
    (c) Network Facilities Provider Individual Licence - for ***ownership of the physical infrastructure*** required for the transmission of broadcast signals

15. Analogue television transmission is inefficient in that it requires heavy use of scarce resources, i.e. spectrum. As such, it is pertinent for the Commission to provide and manage the demand and challenges arising from the changing business environment. This, in part, prompts the Commission to facilitate the transition from analogue to digital transmission.

16. In carrying out its role to facilitate a smooth transition from analogue to digital transmission, the Commission is guided by the Ten National Policy Objectives as set out in Section 3 of the CMA. In particular, the following

objectives are what the Commission considers to be the relevant main drivers in implementing Digital Terrestrial Television Broadcast in Malaysia:

(a) Upgrading network capabilities;
(b) Improving service quality and choice of services;
(c) Building capacity; and
(d) Managing resources efficiently.

SECTION FOUR: THE DIGITAL TERRESTRIAL TELEVISION BROADCASTING STANDARDS AVAILABLE

17. As with analogue television transmission, there are also three (3) competing transmission standards being promoted worldwide for DTTB services:

(a) *Advanced Television System Committee (ATSC)*: adopted in North America;
(b) *Digital Video Broadcasting – Terrestrial (DVB-T)*: adopted in Europe; and
(c) *Integrated Services Digital Broadcasting - Terrestrial (ISDB-T)*: adopted in Japan

18. It is also worth noting that with the differences aside, the three digital terrestrial television systems are closer to compatibility than their analogue counterparts, i.e. the PAL, NTSC and SECAM[1], where compression technology used is MPEG-2. However, a later version of compression technology is being introduced which is the MPEG-4.

SDTV and HDTV

19. Standard Definition Television (SDTV) is similar to the existing television picture format. The PAL system adopted by Malaysia is 625 lines/50 Hz and picture format of 4:3. Standard Definition Television (SDTV) utilizes the same format and resolution as existing analogue system. There are, however, a number of television set manufacturers that produce "wide - screen" television sets with picture format of 16:9. Irrespective of the picture format for SDTV, viewers can still receive digital television transmission provided that they install a set-top box or purchase a digital-

[1] **NTSC – National Television Standards Committee**. This is the oldest existing standard, and was developed in the United States.
SECAM (Système Électronique pour Couleur avec Mémoire), as its name suggests, was developed in France.
PAL (Phase Alternating Line), on the other hand, was developed in the United Kingdom and Germany.

ready television set. In most cases analogue transmission will still co-exist with new digital transmission, hence requirement for set-top-box is not necessary until the day whereby analogue cease to exist which is expected around the year 2015. The decision to transmit only digital, earlier than 2015, lies with the multiplexer operator with approval in writing from the Commission.

20. High Definition Television (HDTV), on the other hand offers a higher resolution picture (up to 1080 lines by 1920 pixels; with picture format of 16:9). HDTV could also be define with a lower resolution of 720p/50. Similarly, viewers can receive digital television transmission on their HDTV sets or existing analogue TV sets equipped with the appropriate high definition transmission decoder.

21. In DTTB, one digital channel is capable to multiplex several SDTV services together (up to 6 programme channels) OR 1 HDTV and 1 or more SDTV services combined together using the MPEG-2 compression technique.

22. In moving into digital terrestrial television, there have been opposing views on how best a "user experience" could be leveraged to allow higher take up of digital television. SDTV would allow a proliferation of television programs by six for each channel, while a HDTV program will occupy the whole single channel if MPEG-2 is used.

SECTION FIVE: MTSFB DTTB WG

23. MTSFB was established under the Act to develop technical standards for the telecommunication and multimedia industry in Malaysia. The MTSFB DTTB WG is given the task to develop technical standard for Digital Terrestrial Television Broadcasting. The members are represented by telecommunication, broadcast operators, suppliers and the Commission as below:

CELCOM (M) BERHAD

DIGI TELECOMMUNICATIONS SDN. BHD.

DIMENSITEK SDN. BHD.

MALAYSIAN COMMUNICATIONS AND MULTIMEDIA COMMISSION

MEASAT BROADCAST NETWORK SYSTEMS SDN. BHD.

MITV CORPORATION SDN. BHD.

NTL BROADCAST SDN. BHD.

PTT UNITTRUNK SDN. BHD.

RADIO TELEVISYEN MALAYSIA

ROHDE & SCHWARZ MALAYSIA SDN. BHD.

TELEKOM MALAYSIA BHD.

24. The standard developed by the MTSFB DTTB WG is based on ETSI's DVB Specifications and Standards incorporated in the DTTB WG's document proposal to MCMC.

25. The document specifies the standards to be used for the transmission of DTTB in Malaysia. This standard will dictate the specifications for the manufacture and construction of all electronic devices/equipments, which relates to the transmission of all free to air Terrestrial TV in this country.

26. After thorough study and consideration, MTSFB DTTB WG has proposed to the Commission to adopt **Digital Video Broadcasting – Terrestrial (DVB-T)** to be the standard for free to air Digital Terrestrial Television Broadcasting service.

27. The submission of MTSFB DTTB WG was used as the basis for the Public Inquiry.

SECTION SIX: THE PUBLIC INQUIRY PROCESS

28. Section 60 of the CMA provides that public inquiry is to be conducted as and when the CMC thinks fits. The CMA also acknowledges that a public inquiry may be conducted in private or public.

29. The Commission carried out the public inquiry through the publication of a consultation paper.

30. The consultation paper was subjected for public inquiry for a period of 45 days, within which the members of the public were invited to make submissions to the Commissions about the matter.

31. Pursuant to Section 65, the CMC is thereafter obliged to publish a report of its findings as a result of the public inquiry within 30 days of the conclusion of the public inquiry. The report will then be registered and made available to the public.

32. Within 45 days from the conclusion of the public inquiry, the Commission shall determine the standards based on report published.

Time Frame for the Process

33. The time frame for the process is as follows:

Action Date

No.	Action	Date
1	Ministerial Direction on Mandatory Standard	June 1 , 2006
2	Publication of public inquiry via Consultation Paper	August 11, 2006
3	Close of feedback on public inquiry (45 days) at 1200 hrs	September 25, 2006
4	Report on public inquiry (report to be published within 30 days of the conclusion of the PI)	October 20, 2006
5	Determination of Standard by the Commission	(within 45 days of the conclusion of PI) 15 days after Publish of Report on public inquiry

SECTION SEVEN: FINDINGS

34. The following paragraphs in this section deal with the input/ comments received from the public, how it was assessed and dealt with. The summary of the comment is as in the Findings Table in Appendix 1.

35. The submissions received involved a wide range of comments including policy, resource assignments and other proposals. For the purpose of this report, these comments are not discussed, however, to be noted by the Commission. It will be consolidated and discussed in a separate paper for consideration.

36. It is no doubt that all respondents supported and agreed to mandate DVB-T as the standard for Digital Terrestrial Television Broadcasting for "Free-to-Air" in Malaysia (as of column **Comment on the proposed standard** in table Appendix 1). However, the issues spur in how and to what extend does the mandating covers. Thus the following issues were raised in adopting the standard.

37. In looking at all the issues, it should be noted that the Ministerial Direction for this Public Inquiry is for the Commission to determine a mandatory standard for the free to air transmission of Digital terrestrial television service. The issues below should be anchored towards this direction.

1) Issue: Whether to include DVB-H in the mandating

38. The DTTB proposal by MTSFB did mentioned on DVB-H but not extensively. DVB-H is part of the DVB family to cater on the mobile TV segment of television broadcasting.

39. From the 8 respondents, 5 has directly mentioned on Mobile TV standard which is the DVB-H. Nokia and Maxis have proposed to include DVB-H as part of mandating where Nokia has also suggested a number of DVB-H standards to be included in the determination. Maxis is of the opinion that the use of a common technology standard for different delivery media can accelerate the take up of DTTB service in Malaysia and offer new business opportunities for different companies across the value chain. Maxis also requests that the technical specifications for DTTB standards in the PI be reviewed and amended to take into consideration the latest updates on DVB-H specifications.

40. On the other hand, Astro, Nera and Media Prima have reservation on DVB-H. Astro proposed a separate standard to address the unique requirements of mobile devices in terms of power consumption, mobility and screen size. Astro further proposed that the transmission standard for Mobile TV services must be determined prior to any award of spectrum. Nera proposed that DVB-H to be excluded due to the different frequency range and service allocation it claimed for exp. for mobile fixed service, broadcasting etc. Nera add up that DVB-H standards and engineering scope are more relevant to mobile operators, despite the similarities in the transmission technology to DTTB.

41. Media Prima proposed an independent study be conducted to determine the merit of the various other mobile TV standards available rather than DVB-H based merely on the ground that DVB-H is a common family of DVB standards.

Decision

42. The Commission is of the opinion not to include DVB-H in the mandating of DTTB for "Free to Air" for the reasons:
    a. as stated by the Ministerial Direction that the Commission is to determine a mandatory standard for the transmission of digital terrestrial television broadcasting (DTTB) where else DVB-H is a

technology for mobile broadcasting. Thus the technology does not fall under the direction; and

b. DVB-H is of the technology where practises are usually if not always, subscription or Pay TV. Thus it is not in line with the exercise where the objective is to mandate a standard for "Free to Air". It also proves that the standard caters for a premium level of the market where as such, should be study thoroughly if it needs to be mandated.

2) Issue: Should there be inclusive of Pay TV in the mandate

43. A few respondents have argued and proposed that DVB-T should also be mandated for Pay TV other than "Free to Air". Astro, MiTV and RTM have suggested that DVB-T should also be mandated for Pay TV. Astro comment is to create a single common standard for spectrum efficiency and to encourage commonality in the manufacture of STBs and equipment. Not doing so, will lead to adoption of different standards, use of different STBs and broadcast equipment which could unduly impede the promotion of DTTB service in Malaysia. MiTV propose that the mandating should be for all terrestrial digital TV broadcast service. RTM on the other hand, suggested that by doing so, Malaysian public would only need to purchase a single STB with a common digital standard which is able to receive both FTA and Pay TV services.

Decision

44. In addressing the issue, the Commission is of the opinion that the mandating should

a. adhere to the Ministerial Direction which is for the Commission to determine a mandatory standard for "free to air" transmission of digital terrestrial television service;
b. nevertheless with the willingness of Pay TV licensees, they are strongly encouraged to adopt to the standard mandated in this determination; and
c. this is also in looking to existing Pay TV licensees already in operation. Currently, the Commission has no plan to mandate any standard for DTTB Pay TV.

3) Issue: The minimum requirement for STB.

45. All respondents have touched on the customers' premises equipment or the STB. Each of respondents has different opinion on what should be the minimum requirement for the STB. Responses are contradicting to each other and a few feedbacks also propose for further study to be taken in setting out the minimum requirement of STB.

Decision

46. The Commission's impression by studying the feedbacks, shows that the industry does not have any consensus on the minimum specification for the STB. Therefore the Commission is of the opinion that

    a. the STB to be taken out and discussed further in a different forum namely the Technical Standard Forum, MTSFB; and
    b. by not mandating the STB standard, still does not contradict to the objective of the exercise where by the Ministerial Direction, to mandate a standard for the free to air "transmission" of digital terrestrial television service.

4) The mandating to include MPEG-4

47. The usage of MPEG-4 video coding for the distribution of DTTB has lead to comments. TM, Astro, RTM, Nera and Media Prima has given their concern on MPEG-4 coding.

48. TM support for the codec of video and audio services not restricted to MPEG-2 codec. Hence, new type of codec and compression could be applied as part of the DVB-T implementation. TM supports the usage of MPEG-4 codec. TM iterated that it is important to future proof for new services and small "now" cost may mitigate large future costs. Astro would like the "baseline" DTTB STB to have the capability to decode MPEG-2, MPEG 4 AVC (and VC1) streams.

49. RTM also supports that the compression technology not restricted to MPEG-2 and be open to newer compression technology. In fact, RTM is of the opinion to mandate a compression format in line with mandating a digital TV standard. With mandating only one standard would ensure that the cost of the STB will be reasonable and encourage digital TV take up by the public. RTM mentioned two more efficient compression technologies which are MPEG-4 (H.264 AVC and VCI). Nera suggested that MPEG-4 (H.264 part 10) encoding scheme should be employed citing the efficiency usage of the spectrum to cater more channels. MPEG-4 offers economical bandwidth utilisation for the broadcasters, as well as to the telcos in providing comlinks to transmission sites. Media Prima on the other hand suggests more study be done before strictly mandating the adoption of MPEG-2.

Decision

50. The Commission takes note of the concern on Audio and visual coding on the usage of MPEG-2 or MPEG-4 coding. It is noted that MPEG-4 is the latest coding technology which will provide efficiency usage of spectrum to cater more channels. It should be the standard employed as it is future proof and the way to adhere to. Thus the Commission is of the opinion to capitalize on the MPEG-4 Audio-Video Coding advantages by mandating MPEG-4 in the determination. Thus MPEG–2 Audio–Visual Coding item is amended as below.

MPEG–4 Audio–Visual Coding

The use of MPEG-4 audio-visual coding in contribution and primary distribution applications with the variation be decided in the setting up of the minimum standard for Set-Top-Box.

Both Standard Definition Television (SDTV) and High Definition Television (HDTV) are covered. The rules of operation for the encoders are features and constraints which the encoding system should adhere to in order to ensure that the transmissions can be correctly decoded. These constraints may be mandatory, recommended or optional.

5) DVB Define Interface

51. Media Prima has iterated in considering on the relevancy on DVB Define Interface (Section 36) of the Technical Standards proposed by MTSFB as stipulated in the Public Inquiry Paper. Media Prima claims that DVB define interface are not strictly features normally associated with DTTB and the distribution network to be utilised should perhaps be entirely the choice of Broadcasters.

Decision

52. The Commission is of the opinion to preserve the DVB Define Interfaces section as the Commission considered the section proposed by the Forum, to be relevant.

SECTION EIGHT: WAY FORWARD

53. The implementation of a mandatory DTTB "Free to Air" standard is aimed at ensuring a standardized and affordable platform for the viewers. By mandating the standard, a common STB could be achieved for all "Free to Air" service throughout the nation. Pay TV licensees are also strongly encouraged to adapt to the mandated standard. This will facilitate the widespread and pervasive use of Digital TV among the public. A mandatory standard will also enable infrastructure sharing by the content providers and also having efficient use of resources including spectrum.

54. Thus, The Commission has exercised its power in pursuant to the Ministerial Direction on the standard for free to air transmission of Digital Terrestrial Television Broadcasting Service, Direction No 2 of 2006 under Section 7 and 104(3) of the CMA to determine DVB-T as the mandatory standard for free to air transmission of Digital Terrestrial Television Service.

55. The Commission is also obligated in setting the minimum standards for the STB and recommend the Technical Forum, MTSFB and Consumer Forum to be given an avenue to assist the Commission in addressing the market and consumers needs in line with the support of the 'self regulatory framework' uphold by the CMA.

APPENDIX 1: FINDINGS TABLE

No	Source of comments	Comment on the proposed standard	Further Suggestion/ Comment
1	Telekom Malaysia Berhad (TM)	Strongly supportive to the proposed standard	**MPEG Issue** • No restriction on the video and audio codec but support the use of MPEG-4 **STB Issue** • Supportive with the minimum requirement of "HD ready" devices sold in market
2	Maxis Broadband Sdn. Bhd. (Maxis)	Fully supports to the proposed standard	**DVB-H issue** • To include DVB-H standard **STB Issue** • Common conditional access between mobile devices and STB • Propose the needs and concerns of consumers to be prioritized
3	Measat Broadcast Network Systems Sdn. Bhd. (Astro)	Fully supports to the proposed standard	**Pay TV issue** • Propose to include mandate on the Pay TV **DVB-H issue** • To have separate std for Mobile TV services **STB Issue** • STB has these tech. specs. as below ▪ DVB-S2 and DVB-T tuner ▪ Embedded CAS(Nagravision compliant and other CA kernels) and single ISO-compliant card slot ▪ Capability to decode MPEG-2, MPEG-4 AVC (and VC1) streams for video and MPI/II, MP3 and ACC audio outputs ▪ Embedded capability for over-the-air to replace or upgrade the entire software system (Optional, for retail, unsubsidised) ▪ MHP 1.0.2 capable ▪ Capability to receive IP streams via RJ45. • "HD ready" definition to include

No	Source of comments	Comment on the proposed standard	Further Suggestion/ Comment
			WXGA native resolution of 700 lines
4	MiTV Networks Sdn. Bhd. (MiTV)	Supportive to the proposed standard	**Pay TV issue** • Propose to include mandate on Pay TV **STB Issue** • in consideration to include/exclude STB in mandating
5	Nokia Malaysia Sdn. Bhd. (Nokia)	Fully supportive to the proposed standard	**DVB-H issue** • To include DVB-H in the mandating with complete list of DVB-H standards.
6	Radio Televisyen Malaysia (RTM)	Supportive to the proposed standard	**MPEG Issue** • Propose compression technology not restricted to MPEG-2 and open to newer compression technology. • Indicate a need to mandate a compression format in line with mandating a digital TV standard **Pay TV issue** • Propose to include mandate on the Pay TV **STB Issue** • Recommends closed door meeting between MCMC and all broadcasters after PI to discuss issues pertaining the STB standards.
7	Nera Infocom (M) Sdn. Bhd. (Nera)	Supportive to the proposed standard	**STB Issue** • Propose study further on use of MHP due to additional licensing cost for STB • Propose use of DVB-HTML instead of MHP middleware for cheaper STB **MPEG Issue** • Proposal of employing MPEG-4 (H.264 part 10) encoding scheme. MPEG 2 may be implemented in the contribution side and MPEG-4 on the distribution side. **DVB-H issue** • Propose DVB-H to be excluded from DTTB "Free to Air" devices in

No	Source of comments	Comment on the proposed standard	Further Suggestion/ Comment
			Malaysia
8	Media Prima Berhad (Media prima)	Agreeable in principle to the proposed standard	**STB Issue** • Suggest adoption of standards based on viewers' orientation. • Proposed STB to be at a low cost specification for affordability and at the same time introducing premium STB. • Concern on IPR in adopting of AC-3 audio coding and non-availability of the coding to support multi lingual platform. • Multiple network return channel may create confusion and unnecessary cost which may deter DTTB acceptance • A need to create standard for STB • Also concern on IPR in adopting MHP • Disagree on Common Interface (CI) of multi conditional access systems at head ends because it will incur additional cost to broadcasters. **DVB-H issue** • Propose to also study of other mobile TV technologies other than DVB-H. **MPEG Issue** • Suggest more study be done before strictly mandating the adoption of MPEG-2. • Optional for IP decoding capability for STB. **Backhaul Distribution Issue** • DVB defined interface should not be included since the distribution network should perhaps be entirely the choice of broadcasters