The 28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand – Malaysia Common Border Meeting (JTC-28)

16th – 18th December 2015

Chiang Rai, Thailand

Agreed Minutes
of the 28th Joint Technical Committee
on Coordination and Assignment of Frequencies
along Thailand – Malaysia Common Border Meeting

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1 Introduction

1.1 The 28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand – Malaysia Common Border Meeting (JTC-28) was held in Chiang Rai, Thailand from 16th to 18th December 2015.

1.2 The Thai Delegation was led by Air Vice Marshal Thanapant Raicharoen, Ph.D., Deputy Secretary General, Office of the National Broadcasting and Telecommunications Commission (NBTC) and the Malaysian Delegation was led by YBhg Dato' Sri Dr. Halim Shafie, Chairman of Malaysian Communications and Multimedia Commission (MCMC). The list of delegates appears in Doc.JTC-28/T-02.

2 Opening Remarks

2.1 In the opening session, Air Vice Marshal Thanapant Raicharoen, Ph.D., Head of the Thai Delegation, welcomed the Malaysian Delegation to the JTC-28 Meeting in Chiang Rai.

2.1.1 He informed the Meeting that since the last JTC meeting, NBTC has achieved many accomplishments such as the cooperation with ITU of the workshop on 'Cross-Border Frequency Coordination' in Bangkok during 29th June – 1st July 2015 to provide an opportunity to participants from Thailand's neighboring countries to further study on frequency coordination at border area under the same perspective of international standardization of ITU.

2.1.2 He also mentioned that, following the Agreed Minutes of JTC-27, the relevant work items on coordination parameters and registration procedure of the agreed band plans were discussed at the Special Meeting between NBTC and MCMC during 20th – 22th October 2015 in Chonburi, Thailand.

2.1.3 The full text of the Welcome Address appears in Doc.JTC-28/T-03.

2.2 In response, YBhg Dato' Sri Dr. Halim Shafie expressed his heartfelt appreciation to NBTC for hosting the 28th JTC meeting. He assured that the 28th meeting shows the strong spirit of friendship and trust between the two regulatory agencies.

2.2.1 He then informed the meeting that he was very fortunate to have observed NBTC's 900 MHz spectrum auction in Bangkok and also very happy to have met with H.E. Air Chief Marshal Thares Punsri as well as Secretary General, Mr. Takorn Tantasith. There is much that MCMC can learn from NBTC on the auction process.

2.2.2 Furthermore, he has been briefed by his team on the efforts and successes that JTC has achieved specifically in harmonizing spectrum resources, including the 700 MHz band as well as the progress made in other areas such as:

i) the re-allocation of spectrum and roll out of Digital Terrestrial TV;
ii) the implementation of International Mobile Telecommunications (IMT) services;
iii) improving cellular and mobile broadband services; and
iv) resolving interference at the common border areas.

2.2.3 He also mentioned that he recently attended the World Radiocommunication Conference 2015 (WRC-15) which was very meaningful for Malaysia with the agreement reached on the allocation of spectrum for the Global Flight Tracking.

2.2.4 He also indicated that due to other commitment, he will not be able to participate for the rest of JTC-28 meeting. He then delegated the task to Ms. Faizah Zainal Abidin to lead the Malaysian delegation.

2.2.5 The full text of the Reciprocal Address appears in Doc.JTC-28/T-04.

3 Adoption of Agenda and Working Arrangement

3.1 The Meeting adopted the Agenda of Plenary and Working Arrangement as appear in Doc.JTC-28/T-05 (1) and Doc.JTC-28/T-06, respectively.

3.2 The Meeting appointed the Co-Chairmen of the Working Groups as follows:

3.2.1 Ms. Parita Wongchutinat (Thailand) and Mr. Abd Mubin Mohd Zain (Malaysia) for Working Group on Broadcasting Service (WG1).

3.2.2 Mr. Saneh Saiwong (Thailand) and Ms. Yushida Mohd Yunus (Malaysia) for Working Group on Mobile and Non-Broadcasting Services (WG2).

4 Exchange of Information

4.1 Thailand presented a paper on 'Thailand Information Update' as appears in Doc.JTC-28/T-07 which can be summarized as follows:

4.1.1 Broadcasting Update

i) The roadmap for digital television transition in Thailand has been initiated since 2012. DVB-T2 had been selected as a national standard. The technical specifications for digital terrestrial television broadcasting transmission/receiver and the frequency plan were adopted in the same year. In April 2013, the trial on digital television service was started. The licenses of broadcasting service were granted in December 2014. Thailand is recently moving toward digital switchover by starting Analogue Switch-Off (ASO) in December 2015.

ii) In order to facilitate the digital television transition, NBTC had provided the Digital TV Coupon via postal service since October 2014. The coupons will be distributed to every household with a host named in the house registration. The value of coupon is 690 baht and it can be used for either redemption of DVB-T2 set-top box or discount of iDTV or

Hybrid set-top box (DVB-T2 and DVB-S2). As of December 2015, 13.5 Million of Digital TV Coupons were distributed and 8.4 Million coupons were redeemed.

iii) The revision of NBTC Notification on the Frequency Plan for Digital Terrestrial Television Broadcasting (DTTB) was officially published in the Royal Gazette in August 2015. This frequency plan consists of the technical characteristic of 39 main sites and 132 additional sites, which are able to provide 95 percent of household coverage.

iv) Analogue Switch-off (ASO) plan was started in 2015. Thai PBS was the first analogue television station to start switching off its analogue transmissions at Koh Samui on 1st December 2015. The ASO is expected to be completed in 2023 or sooner.

4.1.2 Non-broadcasting Information Update

i) There are three types of telecom market services in Thailand including mobile, fixed line and fixed broadband. The penetration rate of mobile was at 139 percent, while fixed line penetration rate was at 27.75 per cent (5.59 million subscribers) and 5.85 millions of active subscribers with actual 39.58 million internet users.

ii) NBTC informed the meeting on spectrum auctions for LTE in Thailand in 1800 MHz and 900 MHz respectively. For 1800 MHz auction, it was completed at the total value of 80.778 billion baht with two winners,True Move H Universal Communication Co.,ltd (TUC) and Advanced Wireless Network Co.,Ltd (AWN) The license term for 1800 MHz is 18 years with population coverage 40 per cent within 4 years and 50 per cent within 5 years. The price of service needs to be lower than the service of 2.1 GHz at least 15 per cent. For 900 MHz auction, the process is still ongoing as at 18th December 2015.

iii) In order to serve the government's national security policy, NBTC launched 2-shot registration project for pre-paid mobile phone simcard. The project had started on 27th June 2014 and completed in September 2015 with 87 per cent of number registrations. However, in order for the simcard that have not been registered to continue using the service, NBTC provides them two options:
- The first option is to convert to new simcard by informing the operator to refund the remaining money; and
- The second option is for people who want to use the old simcard, they need to identify themselves for simcard reactivation at the operator counter service.

iv) There is Maximum Call Rate Notification to enforce the operator who is the significant market power or SMP for 2G. The SMP classified as having market share between 25 to 40 percent. For 3G in 2.1 GHz, license condition stipulated that the price needs to be lower than 2G service at least 15 per cent. For 4G in 900/1800 MHz, license condition also stipulated that the price of service needs to be lower than price of 3G service in 2.1 GHz at least 15 percent.

4.1.3 International Relation Update

i) NBTC hosted the workshop on Cross-Border Frequency Coordination during 29th June to 1st July 2015 which was comprised of 60 participants

from Cambodia, Lao PDR, Malaysia, Myanmar and Thailand including Mongolia as observer.

ii) NBTC organized the NBTC EXPO THAILAND 2015 (NET 2015) under the concept of "Collaborating toward Global Digital Economy: Opportunities and Challenges" during 6th – 8th August 2015.

iii) NBTC also organized the ASEAN Symposium on Shaping the Digital Community, Leveraging the Internet Economy on 7th August 2015 which was comprised of 200 Participants from 6 ASEAN Member Countries such as Cambodia, Indonesia, Malaysia, Singapore, Thailand and Vietnam.

iv) NBTC Commissioner and Secretary General had the meeting with MCMC Chairman during WRC-15 Conference.

4.1.4 WRC-15 Update

i) Thailand added its name in No. 5.313A of Radio Regulations in order to identify the frequency band 698 - 790 MHz for International Mobile Telecommunication (IMT).

ii) Thailand added its name in No. 6.167A of Radio Regulations in order to allow the additional allocation of the frequency band 50 - 54 MHz to fixed, mobile and broadcasting services on a primary basis, in addition to amateur service.

4.2 Malaysia presented a paper on 'Malaysian Regulatory Updates' as appears in Doc.JTC-28/T-10, which can be summarized as follows:

4.2.1 Institutional Changes

H.E. Senator Dr. Mohd Salleh Tun Said Keruak was appointed on 29th July 2015 as the Minister of Communications and Multimedia of Malaysia.

4.2.2 Review of the Communications and Multimedia Act (CMA) 1998 and the Communications and Multimedia Action Plan 2020.

i) The Malaysian Communications and Multimedia Act (CMA) 1998 is being reviewed taking into account five areas which included the safe digital space, enhanced consumer protection, function and power of MCMC and robust and vibrant ecosystem.

ii) The targets set out under the 11th Malaysia Plan 2016-2020 in creating the smart digital nation. The six key thrusts according to digital nation initiatives are broadband coverage households, broadband access, broadband affordability, improving competitiveness and smart cities.

iii) The Communications and Multimedia action plan 2020 focuses on five main areas namely content, smart city, infrastructure, enabling platform and network security

4.2.3 Smart Community Initiative.

The Malaysian Government has defined seven principles and eight components for the Smart Community Initiative. Kemaman district is chosen

as the nation's first smart community programme which is developed through various Kemaman Smart Community (KSC) flagship projects.

4.2.4 Mobile e-Waste

MCMC has initiated an industry joint recycling programme known as "Mobile e-Waste: Old Phone, New Life". This programme was launched on 18 August 2015 with 72 participating outlets nationwide in setting Mobile e-Waste Collection Box. The target is to achieve 1 Million units for Mobile e-Waste by August 2016.

4.2.5 Mandatory standard on the provisioning of services through a mobile virtual network (MVN).

MCMC is developing the mandatory standard on the provisioning of services through mobile virtual network. The requirements under the Mandatory Standard are structured into 4 stages i.e stage 1: Commencement of service, stage 2: Service termination, stage 3: Refund to subscribers and stage 4: Continuity of service.

5 Frequency Registration and Notification

5.1 Thailand presented a paper on 'Frequency Registration and Notification by Thailand' as appears in Doc.JTC-28/T-09. Thailand updated on the status of frequency registration submitted since the JTC-27 Meeting as appears in the table below:

Date of Submission	Submission Type	Type of Service	No. of Records	Approved	Reject
9 Jun 2015	online	Broadcasting	15	14	1
Total			**15**	**14**	**1**

5.2 Thailand also updated on the status of frequency notification submitted since the JTC-27 Meeting as appears in the table below:

Date of Submission	Submission Type	Type of Service	No. of Records	Acknowledged by MCMC
28 May 2015	online	Mobile (3G Cellular)	9	28 May 2015
26 Jun 2015	online	Mobile (3G Cellular)	25	29 Jun 2015
14 Aug 2015	online	Mobile (3G Cellular)	10	17 Aug 2015
2 Sep 2015	online	Mobile (3G Cellular)	15	8 Sept 2015
17 Sep 2015	online	Mobile (3G Cellular)	6	18 Sept 2015
8 Oct 2015	online	Mobile (3G Cellular)	60	13 Oct 2015
27 Nov 2015	online	Mobile (3G Cellular)	27	1 Dec 2015
Total			**152**	

5.3 Malaysia presented a paper on 'Frequency Registration and Notification updates by Malaysia' as appears in Doc.JTC-28/T-10. Malaysia updated on the status of frequency registration submitted since the JTC-27 Meeting as appears in the table below:

Date of Submission	Type of Service	No. of Application	Approved	Deferred
13 June 2015	Fixed	26	26	0
	Broadcasting	6	6	0
10 July 2015	Land Mobile	6	6	0
	Fixed	42	42	0
30 July 2015	Fixed	2	2	0
	Land Mobile	17	17	0
	Maritime Mobile	1	1	0
1 September 2015	Fixed	8	8	0
	Land Mobile	3	3	0
3 November 2015	Fixed	10	10	0
1 December 2015	Fixed	4	4	0
	Land Mobile	2	2	0
8 December 2015	Land Mobile	2	2	0
15 December 2015	Broadcasting	6	Pending analysis by NBTC	
Total		**135**	**129**	**0**

5.4 Malaysia also updated on the status of frequency notification submitted since the JTC-27 Meeting as appears in the table below:

Date of Submission	Type of Service	No. of Application	Remarks
13 June 2015	Aeronautical Radionavigation	7	Acknowledged by NBTC on 26 June 2015
	Aeronautical Fixed	3	
	Maritime Mobile	1	
	Mobile	1	
30 July 2015	Aeronautical Radionavigation	2	Acknowledged by NBTC on 18 August 2015
	Mobile	30	
15 October 2015	Mobile	3	Acknowledged by NBTC on 22 October 2015
1 December 2015	Aeronautical Radionavigation	3	Acknowledged by NBTC on 9 December 2015
Total		**50**	

5.5 The Meeting took note of the status of frequency registration and notification from both sides.

6 Update of Compilation of Agreed Band Plans, Coordination Parameters, and Registration Procedure

6.1 Thailand presented a paper on 'Update of Compilation of Agreed Band Plans, Coordination Parameters, and Registration Procedure' as appears in Doc.JTC-28/T-12.

6.2 The Meeting agreed to include the agreement reached at JTC-27 Meeting into section 2.2.8 of the Compilation of Agreed Band Plans, Coordination Parameters, and Registration Procedure document (JTC Compilation Handbook) as proposed

by Thailand. The finalized JTC Compilation Handbook (December 2015) appears in Annex to Doc.JTC-28/T-12.

6.3 The Meeting also agreed to add a list of all JTC Meetings in the introduction section of the document.

7 Report of Special Meeting on Revision of Coordination Parameters and Registration Procedures of the Agreed Band Plans

7.1 Thailand and Malaysia presented a paper on 'Report of the 2nd Special Meeting on Revision of Coordination Parameters and Registration Procedures' as appears in Doc.JTC-28/T-13.

7.2 The Special Meeting reported that the discussion had taken on the following issues:

7.2.1 Unlicensed spectrum

The Special Meeting had discussed the coordination scheme for unlicensed and mixed-use bands, then categorized the frequency bands into two groups:

i) Unlicensed bands: The list of these harmonized unlicensed bands is to be included in the JTC Compilation Handbook; and

ii) Mixed-use bands: licensed assignments are protected and interference is to be resolved on a case-by-case basis.

7.2.2 Review of coordination parameters

The Special Meeting had reviewed the coordination parameters for High and Medium priority bands, which are:

i) High priority bands:
   a. 450-470 MHz (completed); and
   b. 806-824/851-869 MHz (to be discussed in JTC-28).

ii) Medium priority bands are further classified into Higher Medium and Lower Medium priorities:
   a. Higher Medium priority (to be completed by JTC-29); and
   b. Lower Medium priority (to be completed by JTC-31).

The Special Meeting had also agreed to share existing usage and to develop a band plan for fixed links. Moreover, bands which coordination parameters have not been completed are to be further discussed.

7.2.3 Review of coordination type

The Special Meeting had reviewed and revised coordination type and had proposed the revised coordination type to be included in the JTC Compilation Handbook. Frequency bands which coordination type has not been agreed are to be further discussed.

7.2.4 Revision of frequency coordination guideline

The Special Meeting had developed a new JTC Frequency Coordination Guideline. The newly developed guideline is proposed to be adopted at JTC-28 Meeting. Once adopted, the existing guideline shall be suppressed.

7.2.5 Database on Existing Frequency Usage for TV and FM Radio Services

The Special Meeting had agreed on procedure and timeline to review and update the JTC database on TV and FM Radio Services. The Special Meeting had also appointed representatives from NBTC and MCMC to be contact person for data exchange. The time frame is as shown below:

Items	Nov 15	Dec 15	Jan 16	Feb 16	Mar 16	Apr 16	May 16
a. NBTC and MCMC to review its own database b. To submit the progress report at JTC-28							
c. NBTC and MCMC to exchange the information in the new frequency registration format with the remarks on the records, which needs attention. d. NBTC and MCMC to verify the information							
e. NBTC and MCMC to adopt the existing JTC database							
f. To submit for approval at JTC-29							

7.2.6 Other Matter

The Special Meeting had considered coordination process for broadcasting service. The Special Meeting had agreed in principle on items to be taken into account in the technical analysis, as well as the timeframe for coordination.

The Special Meeting had taken note that the notification format and the interpretation of term "relocation of transmitting station" in the JTC Frequency Coordination Guideline are to be discussed at the JTC-28 Meeting.

7.3 The Special Meeting proposed the following for consideration by this Meeting:

7.3.1 To adopt the new JTC Frequency Coordination Guideline;

7.3.2 To endorse the items below to be included in the JTC Compilation Handbook:
i) List of harmonized unlicensed band; and
ii) Table of coordination type.

7.3.3 To agree on the possible course of action for the bands which have not been completed and to further discuss the items at future Special Meetings or as new work items at JTC where required;

7.3.4 To adopt the procedure and timeline for the revision of JTC database on TV and FM Radio Services; and

7.3.5 To adopt the new procedure for frequency coordination for broadcasting service.

7.4 The Meeting considered and adopted the report of the 2nd Special Meeting.

7.5 The Meeting agreed to the proposals made by the Special Meeting as indicated in 7.3.

7.6 It was noted that, as indicated in 7.5 of the Report of Special Meeting, there was a need to further clarify the term "relocation of transmitting station". The Meeting assigned WG1 to take on this task.

7.7 The Meeting agreed that the Special Meeting will continue discussion on coordination parameters of frequency bands which are not yet completed and report at the next JTC Meeting.

8 New Interference Cases along Malaysia and Thailand Common Border Areas

8.1 MCMC informed the Meeting that it had received interference report from NBTC in July 2015 informing that DTAC Trinet Company Limited had experienced interference to its network in the 2100 MHz band. After monitoring and investigation work, MCMC confirmed that the interference came from a DECT phone located near the border area. However, this interference issue was resolved in November 2015.

8.2 The Meeting took note of the interference report.

9 New work items

9.1 New work items proposed to the Meeting were as follows:
- 9.1.1 Band Plan and Coordination Type in the 1800 MHz Band;
- 9.1.2 Band Plan, Coordination Parameters and Coordination Type to accommodate LTE technology in 2100 MHz Band;
- 9.1.3 Harmonization of Spectrum Arrangements and Full Band Sharing for Fixed Links;
- 9.1.4 Information Update on Usage in 2300 MHz Band; and
- 9.1.5 Digital Sound Broadcasting

9.2 The Meeting took note of the proposals and assigned items 9.1.1, 9.1.2, 9.1.3 and 9.1.4 to be presented and discussed during the WG2 Meeting session, and item 9.1.5 to be presented and discussed during the WG1 Meeting session.

10 Report on Working Group on Broadcasting Service (WG 1)

10.1 The Meeting agreed to adopt the Report for the WG1 Meeting as appears in Doc.JTC-28/T-31.

10.2 The Meeting also instructed that the amendment to the "JTC Frequency Coordination Guideline" as indicated in item 3.5.4 of Report for the WG1 Meeting would be carried out by the Special Meeting on Revision of Coordination Parameters and Registration Procedure of the Agreed Band Plans, and would be submitted to the next JTC Meeting for approval.

11 Report of Working Group on Mobile and Non-Broadcasting Services (WG2)

11.1 The Meeting agreed to adopt the Report for the WG2 Meeting as appears in Doc.JTC-28/T-32.

11.2 The Meeting also agreed with WG2 proposal to have an Ad-Hoc Meeting, as indicated in item 3.3.6 of Report for the WG2 Meeting. The Ad-Hoc Meeting will discuss band plans, coordination parameters, coordination distance and coordination type of frequency bands 900 MHz, 1800 MHz and 2100 MHz. The Ad-Hoc Meeting is planned to be held back-to-back with Special Meeting in Q1 of 2016 in Malaysia.

12 Other Matter

12.1 Malaysia presented a paper on 'Outcome of CPM19-1 Meeting' as appears in Doc.JTC-28/T-33, and informed the Meeting on the outcome of the First Session of the Conference Preparatory Meeting for WRC-19 (CPM19-1) which was held in Geneva, Switzerland during 30th November –1st December 2015. The draft structure of the CPM report to WRC-19 is as follows:

CHAPTER 1:	Land mobile and fixed services
CHAPTER 2:	Broadband applications in the mobile service
CHAPTER 3:	Satellite services
CHAPTER 4:	Science services
CHAPTER 5:	Maritime, aeronautical and amateur services
CHAPTER 6:	General issues

12.2 The Meeting took note of the outcome of the CPM19-1 Meeting.

13 Date and Venue of the Next JTC Meeting

The Meeting agreed that the next JTC Meeting will be held in Malaysia. The actual date and venue are to be confirmed by Malaysia through correspondence.

14 Consideration and Adoption Minutes of the Agreed Minutes

The Meeting considered and adopted the Minutes of the 28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand – Malaysia Common Border Meeting held in Chiang Rai, Thailand from 16th to 18th December 2015.

AVM. Thanapant Raicharoen, Ph.D.	Ms. Faizah Zainal Abidin
Deputy Secretary General Office of the National Broadcasting and Telecommunications Commission	Head of Spectrum Planning Division Malaysian Communications and Multimedia Commission
THAILAND	MALAYSIA

Date : 18th December 2015
Venue : Chiang Rai, Thailand

Doc. JTC-28 / T – 01

List of Documents

Paper reference : JTC-28 / T – 01
Contribution by : Secretariat
Subject : List of Documents

Document No.	Source	Title	Reference to Agenda item	
Doc.JTC-28/T-01	Secretariat	List of Documents	-	-
Doc.JTC-28/T-02	Secretariat	List of Delegates	-	-
Doc.JTC-28/T-03	Thailand	Welcome Address	P	1
Doc.JTC-28/T-04	Malaysia	Reciprocal Address	P	2
Doc.JTC-28/T-05 (1)	Secretariat	Agenda of Plenary	P	3
Doc.JTC-28/T-05 (2)	Secretariat	Agenda of Working Group 1 Meeting	P	3
Doc.JTC-28/T-05 (3)	Secretariat	Agenda of Working Group 2 Meeting	P	3
Doc.JTC-28/T-06	Secretariat	Working Arrangement	P	3
Doc.JTC-28/T-07	NBTC Thailand	Thailand Information Update	P	4
Doc.JTC-28/T-08	MCMC Malaysia	Malaysian Regulatory Updates	P	4
Doc.JTC-28/T-09	NBTC Thailand	Frequency Registration and Notification by Thailand	P	5
Doc.JTC-28/T-10	MCMC Malaysia	Frequency Registration and Notification Updates by Malaysia	P	5
Doc.JTC-28/T-11	NBTC Thailand	Frequency Registration and Notification for Broadcasting Service	P	9.5
Doc.JTC-28/T-12	NBTC Thailand	Update of Compilation of Agreed Band Plans, Coordination Parameters and Registration Procedure	P	6
Doc.JTC-28/T-13	NBTC & MCMC	Report of the 2nd Special Meeting on Revision of Coordination Parameters and Registration Procedures	P	7
Doc.JTC-28/T-14	NBTC Thailand	Band Plan, Coordination Parameters and Coordination Type for 1800 MHz	P	9.1
Doc.JTC-28/T-15	MCMC Malaysia	1800MHz Band Plan & Coordination Type	p	9.1

Document No.	Source	Title	Reference to Agenda item	
Doc.JTC-28/T-16	NBTC Thailand	Band Plan, Coordination Parameters and Notification Format to accommodate LTE Technology in 2100 MHz Band	P	9.2
Doc.JTC-28/T-17	MCMC Malaysia	2100MHz Band Plan, Coordination Parameters & Coordination Type	P	9.2
Doc.JTC-28/T-18	NBTC Thailand	Frequency Usage of Microwave Fixed Link in Thailand	P	9.3
Doc.JTC-28/T-19	MCMC Malaysia	Frequency Band for Microwave Link Application in Malaysia	P	9.3
Doc.JTC-28/T-20	MCMC Malaysia	Digital Sound Broadcasting Service in Band III	P	9.5
Doc.JTC-28/T-21	TOT Thailand	TD-LTE on 2300 MHz Band	P	10
Doc.JTC-28/T-22	NBTC Thailand	Digital Terrestrial Television (Thailand)	WG1	2.1
Doc.JTC-28/T-23	NBTC Thailand	TV White Space	WG1	2.2
Doc.JTC-28/T-24	NBTC Thailand	Database on Existing Frequency Usage for TV and FM Radio Services	WG1	2.3
Doc.JTC-28/T-25	BB & TV Thailand	Usage of Frequency Channel 51 at Satun	WG1	2.1.3
Doc.JTC-28/T-26	NBTC Thailand	Band Plan, Coordination Parameters, and Coordination Types for 800/900 MHz Spectrum	WG2	2.1
Doc.JTC-28/T-27	MCMC Malaysia	Harmonization of Spectrum Arrangements in the 800MHz and 900MHz Bands for Implementation of IMT Systems	WG2	2.1
Doc.JTC-28/T-28	MCMC Malaysia	Harmonization of Spectrum Arrangements in the 800MHz and 900MHz Bands for Implementation of IMT Systems - 850MHz	WG2	2.1
Doc.JTC-28/T-29	NBTC Thailand	Update on regulatory and operational procedures and frequency plans for unmanned aircraft systems (UAS)	WG2	2.2

Document No.	Source	Title	Reference to Agenda item	
Doc.JTC-28/T-30	MCMC Malaysia	Unmanned Aircraft Systems (UAS)	WG2	2.2
Doc.JTC-28/T-31	Secretariat	Report of Working on Broadcasting Service (WG1)	P	10
Doc.JTC-28/T-32	Secretariat	Report of Working on Mobile and Non- Broadcasting Services (WG2)	P	11
Doc.JTC-28/T-33	MCMC Malaysia	Outcome of CPM19-1 Meeting	P	12

Remarks:

P : Plenary Meeting
WG1 : Working Group 1 Meeting
WG2 : Working Group 2 Meeting

Doc. JTC-28 / T – 02

List of Delegates

Paper reference : JTC-28 / T – 02
Contribution by : Secretariat
Subject : List of Delegates

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Doc.JTC-28 / T – 03

Welcome Address

Welcome Address

by

Air Vice Marshal Thanapant Raicharoen Ph.D.

Deputy Secretary General

The National Broadcasting and Telecommunications Commission

at

the 28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand – Malaysia Common Border Meeting (JTC-28)

16 December 2015

Chiang Rai, Thailand

YBhg. Dato' Sri Dr. Halim Shafie,

Chairman of Malaysia Communications and Multimedia Commission

Norizan Baharin,

Chief Communications, Spectrum Management and Economic Regulation Officer

Nur Sulyna Lim Abdullah,

Chief Corporate Strategy Officer

Ms. Faizah Zainal Abidin, Head of Malaysian Delegation

Distinguished Guests and Delegates,

Ladies and Gentlemen,

It is with great honor for me to extend, on behalf of the Thai delegation, a hearty welcome to all of you specially for honorary guests Dr. Halim Shafie Chairman of MCMC to join all of us on the 28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand – Malaysia Common Border Meeting during 16 – 18 December 2015 in Chiang Rai, the northernmost province of Thailand which sits amid mountains and hills, and is a highly recommended place for visitors with natural and cultural beauty.

Since our last JTC meeting, NBTC has achieved many accomplishments such as the cooperation with ITU of the workshop on 'Cross-Border Frequency Coordination' in Bangkok during 29 June – 1 July 2015 to provide an opportunity to participants from Thailand's neighboring countries namely Cambodia, Lao PDR, Malaysia and Myanmar to further study on frequency coordination in broader area under the same perspective of international standardization of ITU, 'the ASEAN Symposium on Shaping the Digital Community, Leveraging the Internet Economy' on 7 August 2015 and 'NBTC Expo Thailand' during 6 – 8 August 2015 in Bangkok, which were organized for promoting the Thai Government's policy on Digital Economy Initiative, have been a huge success and undoubtedly achieved its objectives as well.

Furthermore, following the Agreed Minutes of JTC-27 on Revision of Coordination Parameters and Registration Procedure of the Agreed Band Plans, NBTC and MCMC therefore discussed on these work items which involved WG1 and WG2 at the Special Meeting during 20 – 22 October 2015 in Chonburi, the meeting was accomplished and its report will be submitted to this JTC Meeting.

Ladies and Gentlemen

May I express my appreciation for your kind assistance and collaboration of this meeting and hope that in spite of your tight schedules, you will have some time to relax and enjoy your stay in Chiang Rai.

Thank you.

Doc. JTC-28 / T – 04

Reciprocal Address

RECIPROCAL REMARKS

Y.BHG. DATO' SRI DR. HALIM SHAFIE

CHAIRMAN

MALAYSIAN COMMUNICATIONS AND MULTIMEDIA COMMISSION

THE 28TH JOINT TECHNICAL COMMITTEE ON COORDINATION ALONG THAILAND-MALAYSIA COMMON BORDER MEETING (JTC-28)

LE MÉRIDIEN CHIANG RAI RESORT THAILAND

16 DECEMBER 2015

Air Vice Marshal Mr. Thanaphan Raicharoen, *Deputy Secretary General of NBTC,*

Friends from NBTC,

My Colleagues from MCMC,

Ladies and gentlemen,

1. My delegation and I would like to express our heartfelt appreciation to Khun Thanapan and the team from NBTC for hosting the 28th JTC meeting in beautiful Chiang Rai. It is such a pleasure to be in Thailand's northernmost largest city and also one of the oldest city.

I am very happy to be with the JTC family again after being away for six years.

2. I would like to acknowledge all of you for your continuous commitment and support to JTC. Managing and coordinating spectrum is like doing a backstage job and not being the actor under the spotlight. But without the backstage crew, there would be no show, which is why I can really appreciate the meaningful contributions that you all make to ensure that communications services work at our common border areas. This being the 28th meeting shows the strong spirit of friendship and trust between our two regulatory agencies.

————————————————

3. Yesterday, I was very fortunate to have observed NBTC's 900Mhz spectrum auction in Bangkok. I was also very happy to have met ***H.E. Air Chief Marshal Thares Punsri*** as well as ***Secretary General, Khun Takorn Tantasith***. Both Chairman Thares and Khun Takorn took us on a tour of the auction facilities including the dual purpose tents for the press. Dual purpose because in the

evenings, the press will use them for resting. But during the day, they can used as saunas!

4. It was these detailed preparations that the NBTC team had put in place which I was very impressed with. There is much that MCMC can learn from NBTC on the auction process.

5. Some of you may not be aware that I used to attend JTC meetings when I was Chairman of MCMC from 2006-2009. This is my first JTC Meeting following my reappointment earlier this year. My team has briefed me on the efforts and successes that JTC has achieved specifically in harmonizing our spectrum resources, including the 700 MHz band.

6. I am also pleased to hear about the progress made in other areas such as:

(i) the re-allocation of spectrum and the rolling out of Digital Terrestrial TV;
(ii) the implementation of International Mobile Telecommunications (IMT) services;

(iii) improving cellular and mobile broadband services; and

(iv) resolving interference at our common border areas.

————————————

7. As you are all aware, we are literally just home from the recently concluded WRC 2015. I know that many of you were in Geneva for the whole month, some even longer with the RA and CPM. This WRC was especially meaningful for Malaysia with the agreement reached on the allocation of spectrum for the Global Flight Tracking effort.

8. For that, we owe our thanks to all our friends in the APT and APG, in particular, including Thailand. Apparently, this is a record for the ITU, in getting consensus on an issue within 18 months from the time it was first mooted at the WTDC 2014 till the WRC 2015. I would like to take this opportunity to thank you for your support, particularly in the APG and PACP process.

9. Finally, before I hand over the floor to Khun Thanapan, I would like to convey my appreciation once

again to NBTC for your generous hospitality. I am very sure that with your careful preparations, this will be another successful JTC meeting.

Thank you, *khop khun khap.*

Doc. JTC-28 / T – 05

Agenda

Paper reference : JTC-28 / T – 05 (1)
Contribution by : Secretariat
Subject : Agenda of Plenary

1. Opening Remarks
2. Reciprocal Remarks
3. Adoption of Agenda and Working Arrangement
4. Exchange of Information
5. Frequency Registration and Notification
6. Update of Compilation of Agreed Band Plans, Coordination Parameters, and Registration Procedure
7. Report of Special Meeting on Revision of Coordination Parameters and Registration Procedures
8. New Interference Cases along Thailand and Malaysia Common Border Areas (if any)
9. New Work Items
   - 9.1 Band Plan and Coordination Type in the 1800 MHz Band
   - 9.2 Band Plan, Coordination Parameters and Notification Format to accommodate LTE technology in 2100 MHz Band
   - 9.3 Harmonization of Spectrum Arrangements and Full Band Sharing for Fixed Links
   - 9.4 Information Update on Usage in 2300 MHz Band
   - 9.5 Digital Sound Broadcasting
10. Report of Working Group on Broadcasting Service (WG 1)
11. Report of Working Group on Mobile and Non-broadcasting Services (WG 2)
12. Any Other Matter
13. Date and Venue of the Next JTC meeting
14. Consideration and Adoption of Agreed Minutes of the Meeting
15. Signing of Agreed Minutes of the 28th JTC Meeting
16. Closing of the 28th JTC Meeting

Paper reference : JTC-28 / T – 05 (2)
Contribution by : Secretariat
Subject : Agenda of Working Group 1 Meeting

1 Opening of Working Group on Broadcasting Service (WG1) Meeting

2 Discussion on:

- 2.1 Digital Terrestrial Television
  - 2.1.1 Rollout Plan at Common Border Areas
  - 2.1.2 Frequency Re-farming Process (Channels 21 - 25)
  - 2.1.3 Usage of Frequency Channel 51 at Satun
- 2.2 TV White space
- 2.3 Database on Existing Frequency Usage for TV and FM Radio Services
- 2.4 Technical Analysis of the Broadcasting Service
- 2.5 Interpretation of “Relocation of Transmitting Station” Terms

3 Any Other Matter

- 3.1. Digital Sound Broadcasting

4 Signing of Report of WG1 Meeting

5 Closing of WG1 Meeting

Paper reference : JTC-28 / T – 05 (3)
Contribution by : Secretariat
Subject : Agenda of Working Group 2 Meeting

1 Opening of Working Group on Mobile and Non-broadcasting Services (WG2) Meeting

2 Discussion on:

2.1 Harmonization of Spectrum Arrangements in the 800 and 900 MHz Bands for Implementation of IMT Systems

2.2 Regulatory and Operational Aspects of Unmanned Aerial Systems (UAS)

3 Any Other Matter

3 Signing of Report of WG2 Meeting

4 Closing of WG2 Meeting

Doc. JTC-28 / T – 06

Working Arrangement

Paper reference : JTC-28 / T - 06
Contribution by : Secretariat
Subject : Working Arrangement

Date	Time	Activities
Day 1 16th December 2015 (Wed)	09.00 – 09.30	Registration
	09.30 – 10.00	**Opening Session** ➢ Welcome Address by the Head of Thai Delegation ➢ Reciprocal Address by the Head of Malaysia Delegation ➢ Adoption of Agenda ➢ Adoption of Working Arrangements ➢ Appointment of Co-chairman
	10.00 – 10.30	Photography Session / Coffee break
	10.30 – 12.30	**Plenary Session** ➢ Exchange of Information ➢ Frequency Registration and Notification ➢ Update of Compilation of Agreed Band Plans, Coordination Parameters, and Registration Procedure ➢ Report of Special Meeting on Revision of Coordination Parameters and Registration Procedures ➢ New Interference Cases along Thailand and Malaysia Common Border Areas (If any) ➢ New Work Items (if any)
	12.30 – 14.00	Lunch
	14.00 – 15.30	**Parallel Working Group Session 1** ➢ Working Group 1 – Broadcasting Service ➢ Working Group 2 – Mobile and Non-broadcasting Services
	15.30 – 15.45	Coffee Break
	15.45 - 17.00	**Parallel Working Group Session 2** ➢ Working Group 1 – Broadcasting Service ➢ Working Group 2 – Mobile and Non-broadcasting Services

Date	Time	Activities
Day 2 17th December 2015 (Thu)	09.00 – 10.30	**Parallel Working Group Session 3** ➢ Working Group 1 – Broadcasting Service ➢ Working Group 2 – Mobile and Non-broadcasting Services
	10.30 – 10.45	Coffee Break
	10.45 – 12.30	Preparation of Report of Working Groups
	12.30 – 14.00	Lunch
	14.00 – 15.30	**Plenary Session** ➢ Report by Co-chairman of Working Groups ➢ Any Other Matters ➢ Date and Venue for the next JTC Meeting
	15.30 – 15.45	Coffee Break
	15.45 – 17.00	Preparation of Agreed Minutes of the Meeting
Day 3 18th December 2015 (Fri)	09.00 – 10.30	**Plenary Session** ➢ Consideration and adoption of Agreed Minutes of the Meeting
	10.30 – 10.45	Coffee Break
	10.45 – 12.00	➢ Signing of Agreed Minutes of the Meeting ➢ Closing of the 28th JTC Meeting
	14.00 – 17.00	Excursion

Doc. JTC-28 / T – 07

Thailand Information Update

สำนักงานคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ

The National Broadcasting and Telecommunications Commission

Thailand Information Update

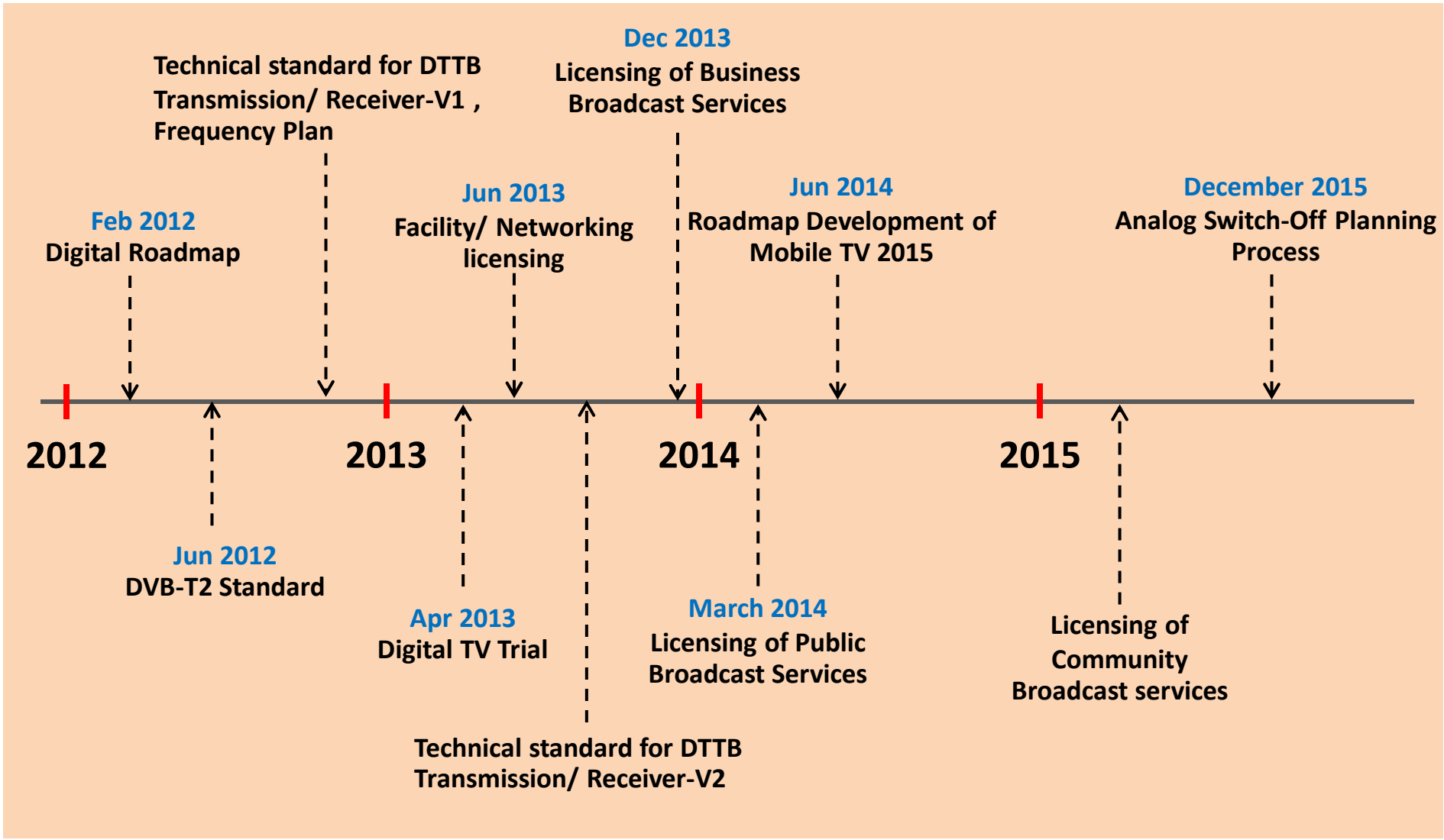
Agenda

- Broadcasting Update
- Non-broadcasting Update
- International Relation Update
- WRC–15 Update

Agenda

Broadcasting Update

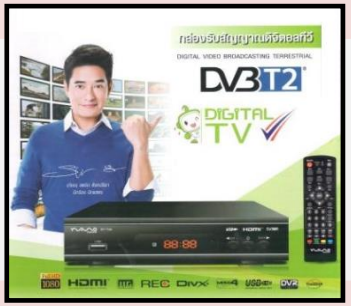
Digital television transition in Thailand



Subsidy Program for Digital TV

Digital TV Coupons

"Started in October 2014"



Coupon can be used as discount for

(1) DVB-T2 Set-top box

(2) iDTV or Hybrid Set-top box (DVB-T2 and DVB-S2)

" 1 Household 1 Coupon"

Coupons were distributed to households by picking-up at nearest post office

Criterion of distribution

Household with host/owner	Household without host	Household without host but having resident
1 Distribute	2 Not Distribute	3 Not Distribute

Subsidy Program for Digital TV

Redeem Process

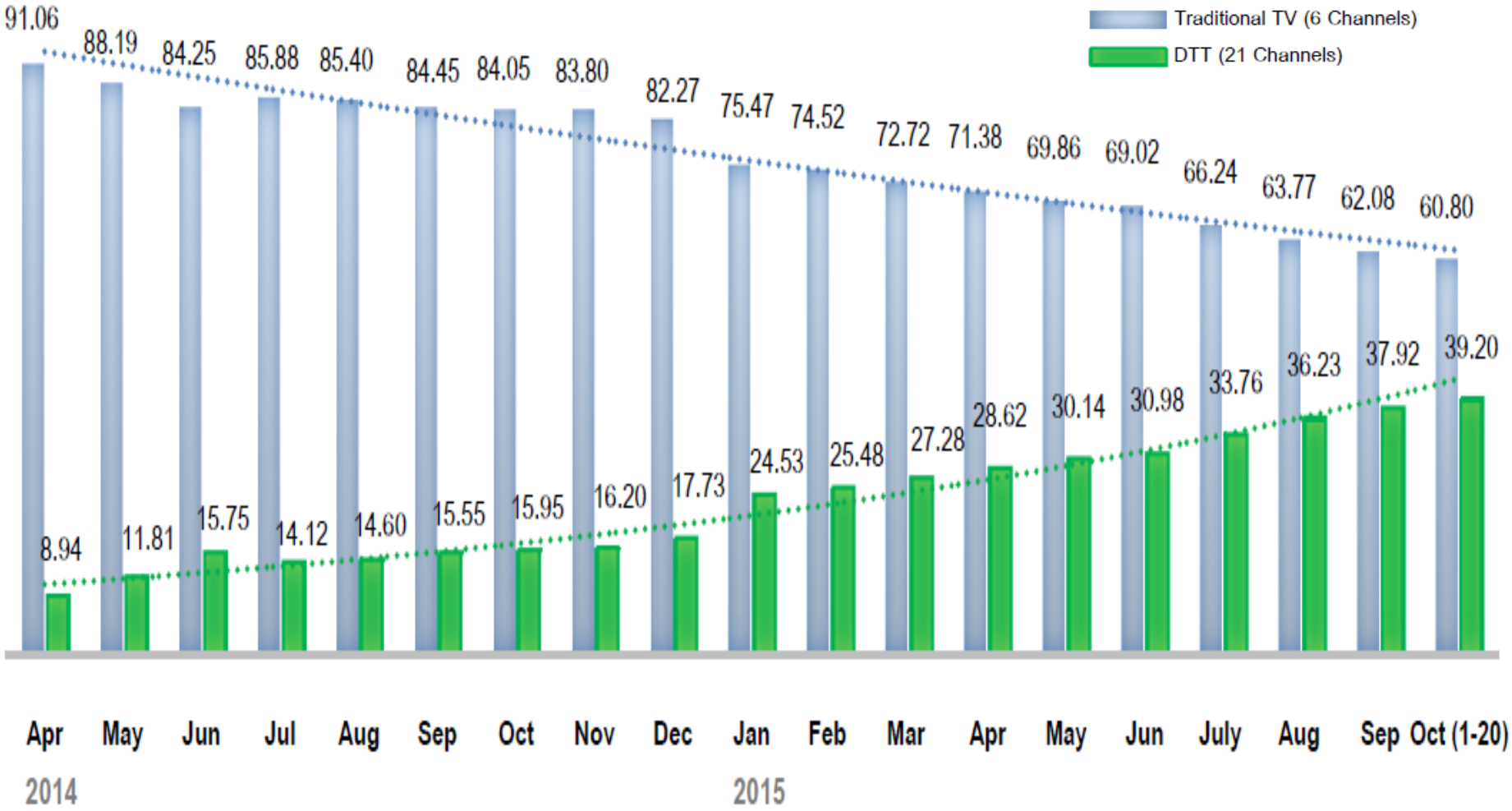
Prepare documents for redeem
1. ID Card
2. Census Registration

Go to shops & Look for Campaign Sticker with documents
(There are 42 companies jointing the program)

Keep original coupon's stub

- **13.5 Million coupons** were distributed and **8.4 Million coupons** were redeemed (Updated on December 2015)
- The last lot of coupons had been distributed on May 2015 which will expired by January 2016.

% Shared viewers on Terrestrial Channels



Source : Nielson
Last update : October 2015

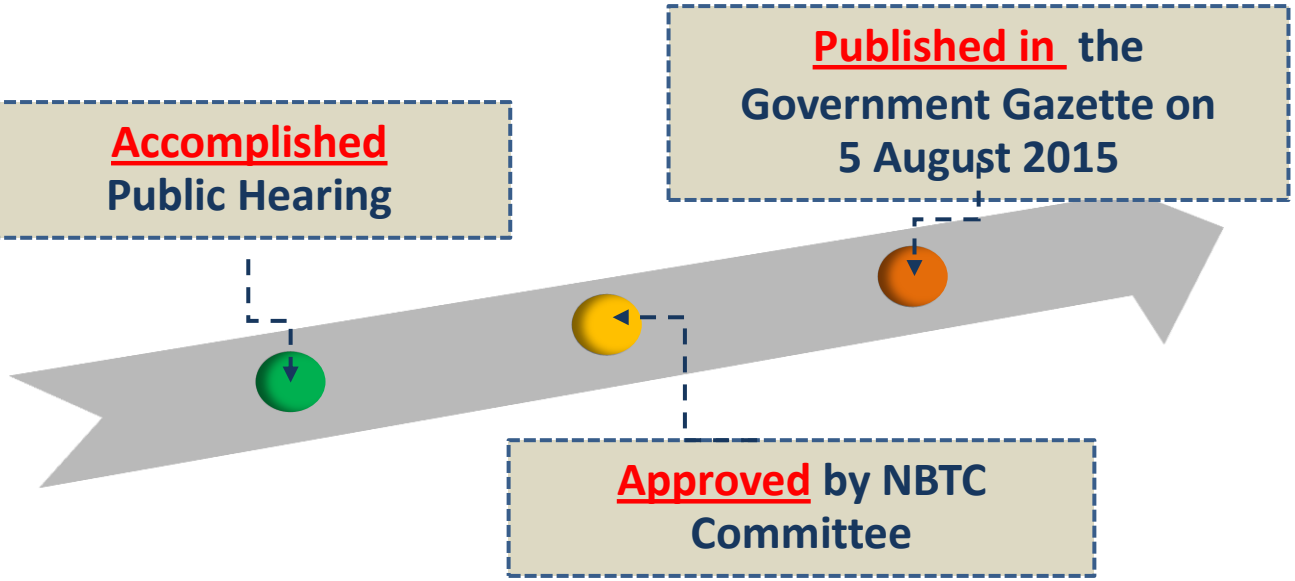
Frequency Planning of DTTB

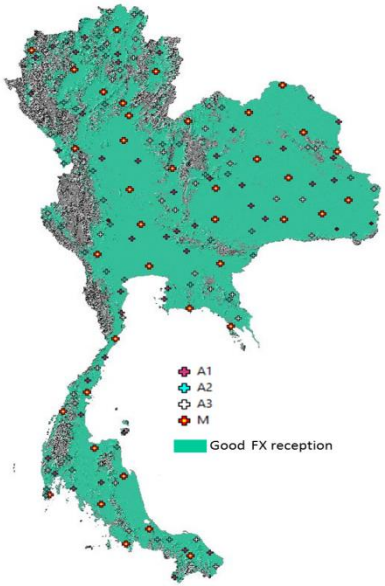
(i) Collaboration Project with ITU

- Completed the detailed planning for 39 main sites in February 2014
- Completed the detailed planning for 132 additional sites in February 2015

(ii) New Radio Frequency Plan for DTTB

- Officially published in the Government Gazette
- 39 main sites and 132 additional sites
- Target coverage is 95% of households





Analogue Switch-Off (ASO) Plan

- Thailand has started ASO in 2015. Two TPBS Analogue TV Stations had been switched off on December 1, 2015.
- TPBS, PRD, RTA, and MCOT will complete their ASO by 2018.

2015

- **TPBS ASO:** **2** Stations

2016

- **TPBS ASO:** **26** Stations

2017

- **TPBS ASO:** 21 Stations
- **RTA ASO:** 4 Stations
- **PRD ASO:** Nationwide

2018

- **TPBS ASO:** 3 Stations
- **RTA ASO:** 37 Stations
- **MCOT ASO:** Nationwide

Concession of Channel 3 and Channel 7 will be ended in 2020 and 2023, respectively.
ASO might be completed before 2023 depending on the proposal from Channel 3 and Channel 7.

Analogue Switch-Off (ASO) Plan

Thai PBS

First ASO at Ko Samui (Surat Thani)

ASO

Ko Samui
Area: 228.7 sq.km.
Population: 65,500

Agenda

Non-broadcasting Update

Telecom Outlook 2015

Mobile

Penetration rate : 139.01 %

Active Subscriptions : 93.46 Millionp.

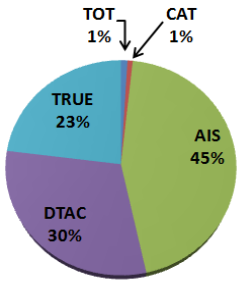
(86% Pre-paid and 14% Post-paid)

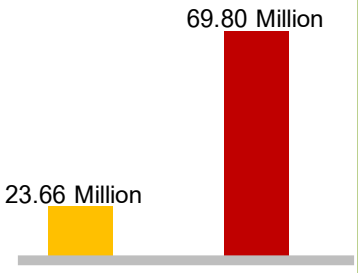
Mobile Coverage : 97%

Average Revenue per user :

(a) Pre-paid 138 THB/Month

(b) Post-Paid 554 THB/Month





Fixed Line

Household Penetration :

27.75 % (5.59 Million)

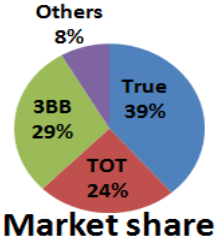
BKK & Metro penetration :

2.95 Million

Average Revenue per user : 266 THB/month

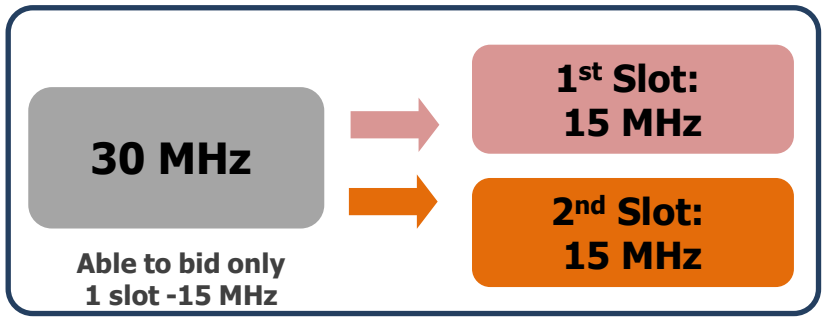
Fixed Broadband

Broadband Household penetration :
29% active subscription (5.85 Million)
Internet Users :
38.29 Million
Average Revenue per user:
664 THB/Month

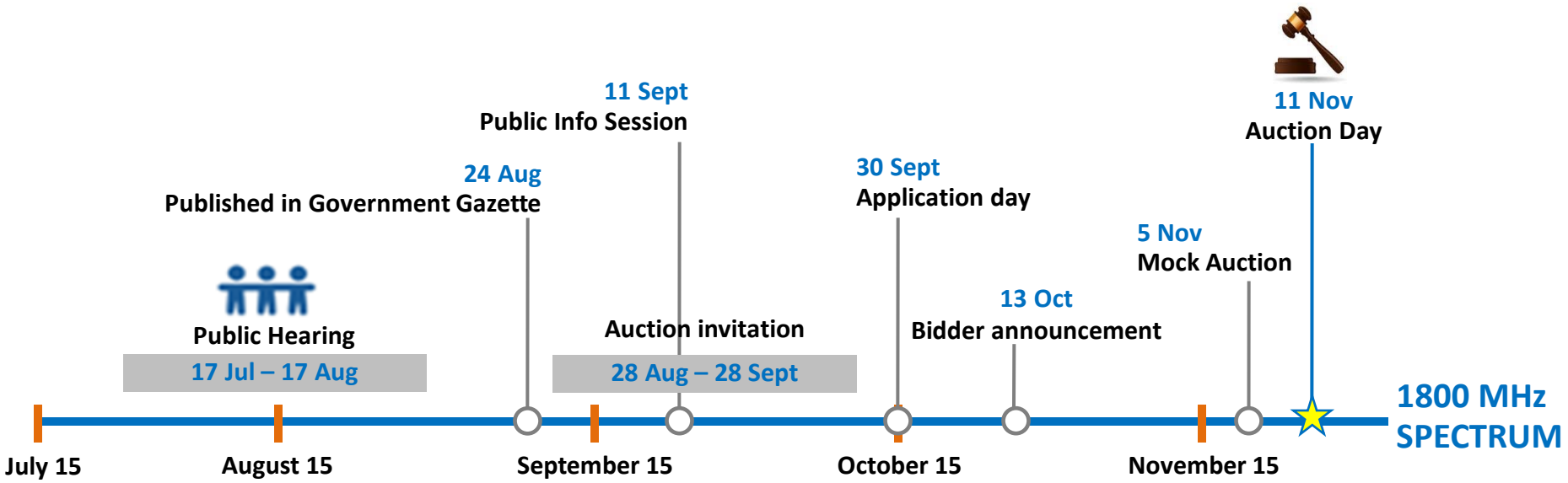


1800 MHz Spectrum Licensing

Spectrum to be auction



Framework



1800 MHz Spectrum Licensing

Auction Information

- 4 Bidders;
  1) Advanced Wireless Network Co.,Ltd(AWN)
  2) DTAC TriNet Co.,Ltd(DTN)
  3) True Move H Universal Communication Co., Ltd (TMH)
  4) JAS Mobile Broadband Co.,Ltd (JAS)

- 86 Auction Rounds (More than 30 hours with Total bidding time is 28 hours)

Auction Result

2 Winners

Total value 80.778 Billion(THB)

truemove H	AWN
39.79 Billion	40.98 Billion

1800 MHz Spectrum Licensing

License Condition

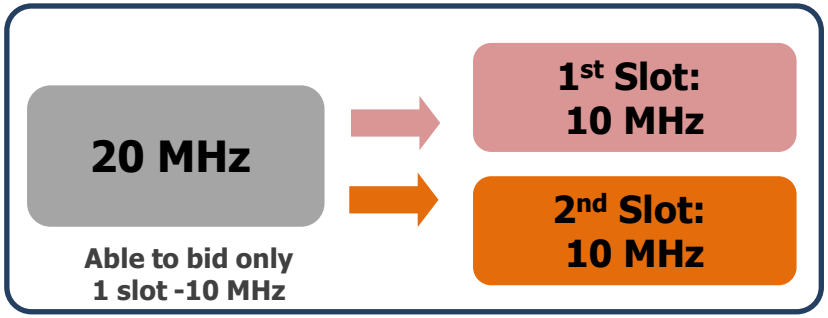
- 18-Year License term

- 4G Rollout Obligation
  1) 40% of population within 4 years
  2) 50% of population within 8 years

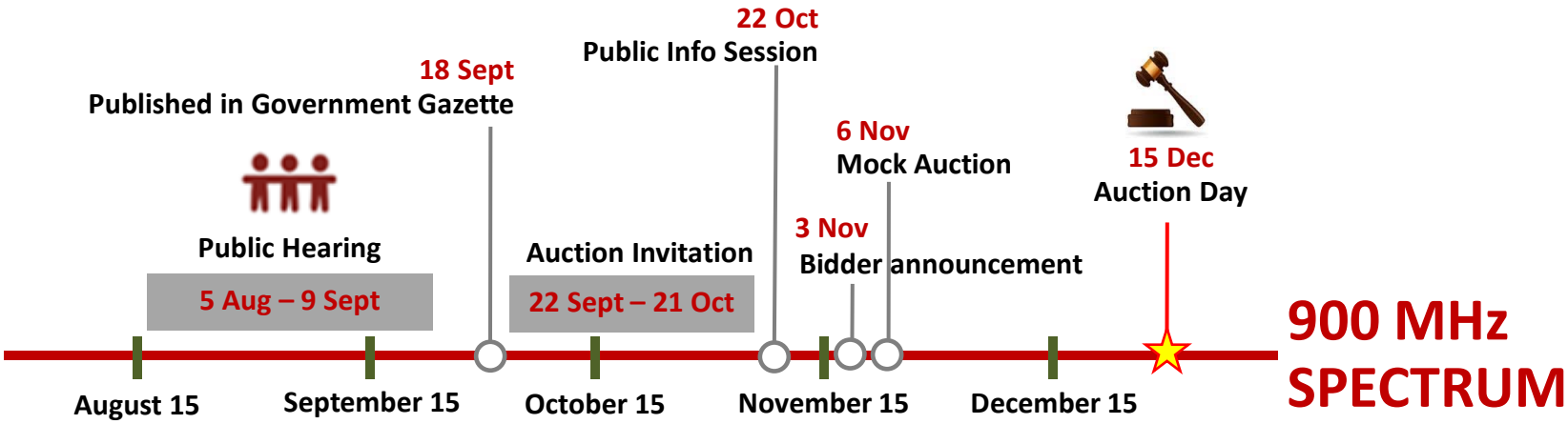
- Prices so that on average they are reduced by at least 15%, in comparison to average prices of voice and non-voice services provided by those operating on 2.1GHz

900 MHz Spectrum Licensing

Spectrum to be auction



Framework



2 Shots Registration
Prepaid SIM Card registration

START

Since 27 June 2014

- **50,000 Registration station**
- **All new SIMs must be registered**
- **Updated on September 2015 74.7 Million numbers registered (87%)**
- **Tesco Lotus, 7-11, Krungthai bank and operators counter service**
- **13 % who have not registered .**
  - Option 1: New SIM Card (Refund)
  - Option 2 : Expired SIM Card (Register with document and identified person with ID card to reopen simcard)

Finish Within 2015

Price Regulation

Maximum call rates notification enforced only for SMP

AIS and DTAC are SMP (SMP classified as having 25% to 40% of Market share)

0.99 THB/Minute

(3 Cent/Minute)

License Condition

Licensee must set the prices so that on average they are <u>reduced by at least 15%, in comparison to average prices of voice and non-voice services available in the market</u> on the date the license is awarded

Average prices on 7 December 2012

voice 0.97 baht/min.

SMS 1.56 baht/message

MMS 3.90 baht/message

Data 0.33 baht/MB

1800 MHz & 900 MHz

License Condition

Licensee must set the prices so that on average they are <u>reduced by at least 15%, in comparison to average prices of voice and non-voice services provided by those operating on 2.1GHz</u>

Agenda

International Relation Update

International Relation Update (1)

NBTC-ITU Workshop on Cross-Border Frequency Coordination
29 June - 1 July 2015, Bangkok, Thailand

1) 60 Participants
2) 4 ASEAN Member Countries;
   Cambodia, Laos PDR, Malaysia and Myanmar
3) 1 Additional Country ; Mongolia

International Relation Update (2)

NBTC EXPO THAILAND 2015 (NET 2015)
6 – 8 August 2015
“Collaborating toward Global Digital Economy: Opportunities and Challenges”

1) NBTC Symposium
2) Exhibitions
3) Business Networking Forum

International Relation Update (3)

ASEAN Symposium on Shaping the Digital Community, Leveraging the Internet Economy
7 August 2015

1) 200 Participants
2) 6 ASEAN Member Countries;
   Cambodia, Laos, Indonesia, Malaysia, Singapore , Thailand and Vietnam

International Relation Update (4)

The Meeting between MCMC Chairman with NBTC Commissioner and Secretary General during WRC-15 Conference

Agenda

WRC–15 Conference Update

Frequency band 678-790 MHz

Footnote for 678-790 MHz

MOD

5.313A The frequency band, or portions of the frequency band 698-790 MHz, in Australia, Bangladesh, Brunei Darussalam, Cambodia, China, Korea (Rep. of), Fiji, India, Indonesia, Japan, Kiribati, Lao P.D.R., Malaysia, Myanmar (Union of), New Zealand, Pakistan, Papua New Guinea, Philippines, Solomon Islands, Samoa, Singapore, Thailand, Tonga, Tuvalu, Vanuatu and Viet Nam, are identified for use by these administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. In China, the use of IMT in this frequency band will not start until 2015. (WRC-15)

Frequency band 50-54 MHz

Footnote for 50-54 MHz

MOD

5.167A *Additional allocation:* in Indonesia and Thailand, the frequency band 50-54 MHz is also allocated to the fixed, mobile and broadcasting services on a primary basis. (WRC-15)

Thank you

International Affairs Bureau

87 Phaholyothin Rd., Phayathai Bangkok 10400, Thailand

Tel: +66 2 271 0151 ext. 3511

Fax: +66 2 278 1736

Doc. JTC-28 / T – 08

Malaysian Regulatory Updates

MALAYSIAN REGULATORY UPDATES

28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand – Malaysia Common Border Meeting

16 – 18 December 2015
Chiang Rai, Thailand

Malaysian Communications & Multimedia Commission

Malaysia's Communications and Multimedia Outlook

BASIC INDICATORS

30.49 million
Population *(Q2 2015)*

10,933
GDP per capita (current US$)

7,435,000
Households *(Q2 2015)*

10,760
GNI per capita, Atlas method (current US$)

DEMAND

72.2%
Household Broadband Penetration *(Q2 2015)*

20,1 million
Internet Users Nationwide

27,9 million
Total Broadband Subscriptions (Q2 2015)

USER REACH

44.2 million
Cellular Subscriptions (Q2, 2015)

144.8%
Cellular Penetration Rate (Q2, 2015)

25.2 million
3G Cellular Subscription (Q2, 2015)

96.8%
Cellular Coverage (Q1, 2015)

Source: MCMC Statistic & World Bank

Regulatory Updates

1	Institutional Changes
2	Review of the Communications and Multimedia Act (CMA) 1998 and The Communications and Multimedia Action Plan 2020
3	Smart Community Initiative
4	Mobile e-Waste
5	Mandatory Standard on the provisioning of services through a mobile virtual network

Regulatory Updates

1	**Institutional Changes**

Institutional Changes

H.E. Senator Dr. Mohd Salleh Tun Said Keruak

Minister of Communications and Multimedia

Appointed on 29 July 2015

2	**Review of the Communications and Multimedia Act (CMA) 1998 and The Communications and Multimedia Action Plan 2020**

Roadmap of the review of the law governing the Communications and Multimedia industry – Communications and Multimedia Act (CMA) 1998

Safe Digital Space

- Ensure sufficient safeguards against harmful and offensive practice within the digital space

Functions and Powers of MCMC

- Strengthen and improve investigation and enforcement powers
- Expanding use of instruments provided in the Act

Enhanced consumer protection

- Higher penalties for breaches of relevant provisions
- Inclusion of civil penalties to allow quick action to be taken

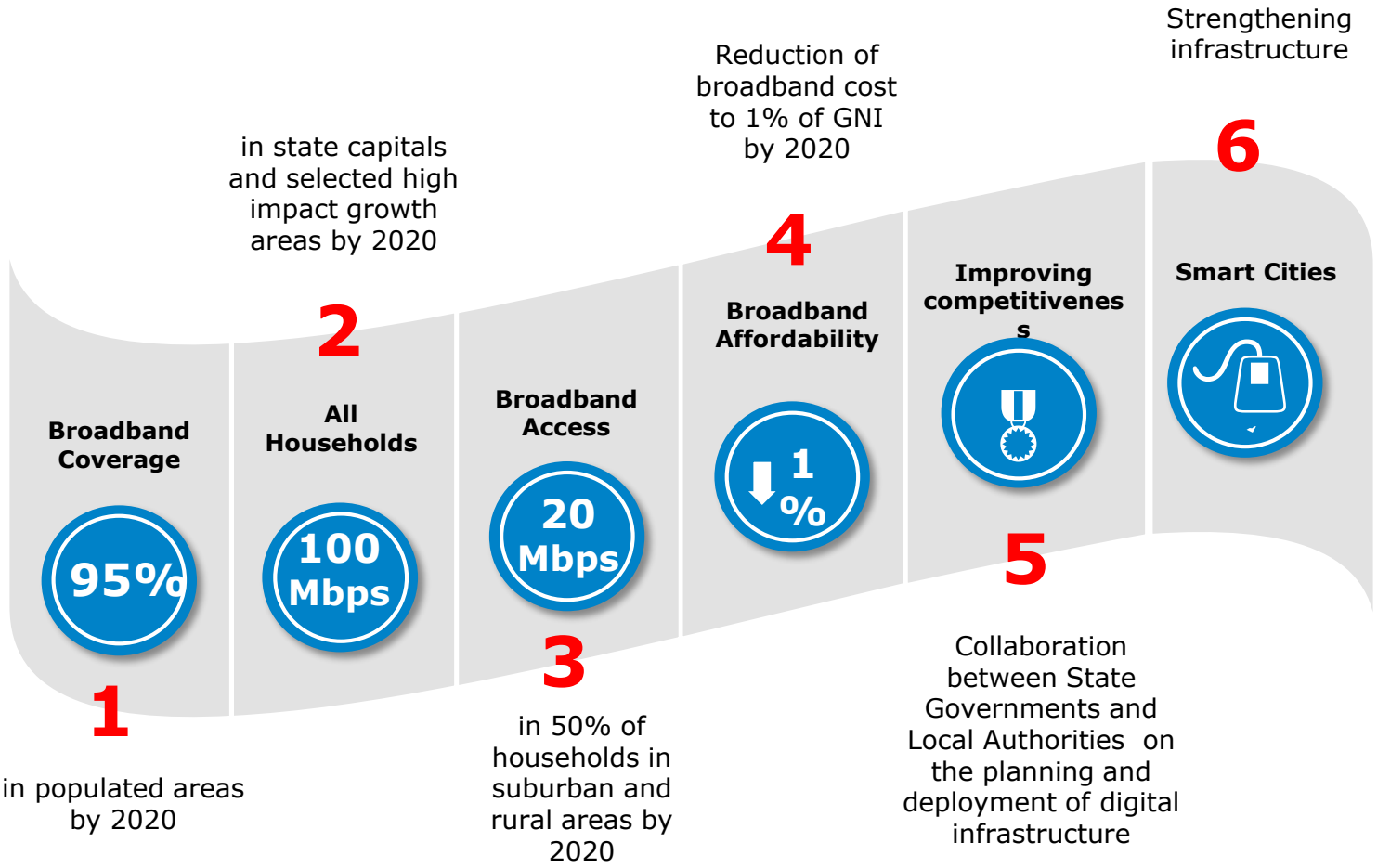
SMART NATION

Robust and Vibrant Ecosystem

- Securing communication infrastructure – new network security chapter
- Updating competition provisions
- Facilitating future infrastructure demand and business models
- Expansion of USP framework

Review started in April 2015 and is ongoing.

Targets set out in 11th Malaysia Plan has bearing on the smart digital nation agenda



"Digital inclusion (is) vital and that was why the 11th Malaysia Plan was people-centric… We believe that our nation will prosper through innovation and ICT to create a smart digital nation"

- YAB Prime Minister's Acceptance Speech to the United Nations' ICT in Sustainable Development Award, September 2015

7

The Communications and Multimedia Action Plan 2020

INFRASTRUCTURE

- Facilitate future infrastructure needs — COVERAGE
- Improve QOS and speed — QUALITY
- Ensuring affordable broadband services — AFFORDABILITY

CONTENT

- Effective approaches in managing content issues
- Protection of vulnerable groups
- Level playing field for industry players

ENABLING PLATFORMS

- Digital ID
- Mobile payment
- Open data

SMART CITY

- Improved coordination
- Streamlining technical standards
- Success criteria from pilots

SOCIAL
BUILDINGS
ENERGY
WATER & WASTE
TRANSPORT

NETWORK SECURITY

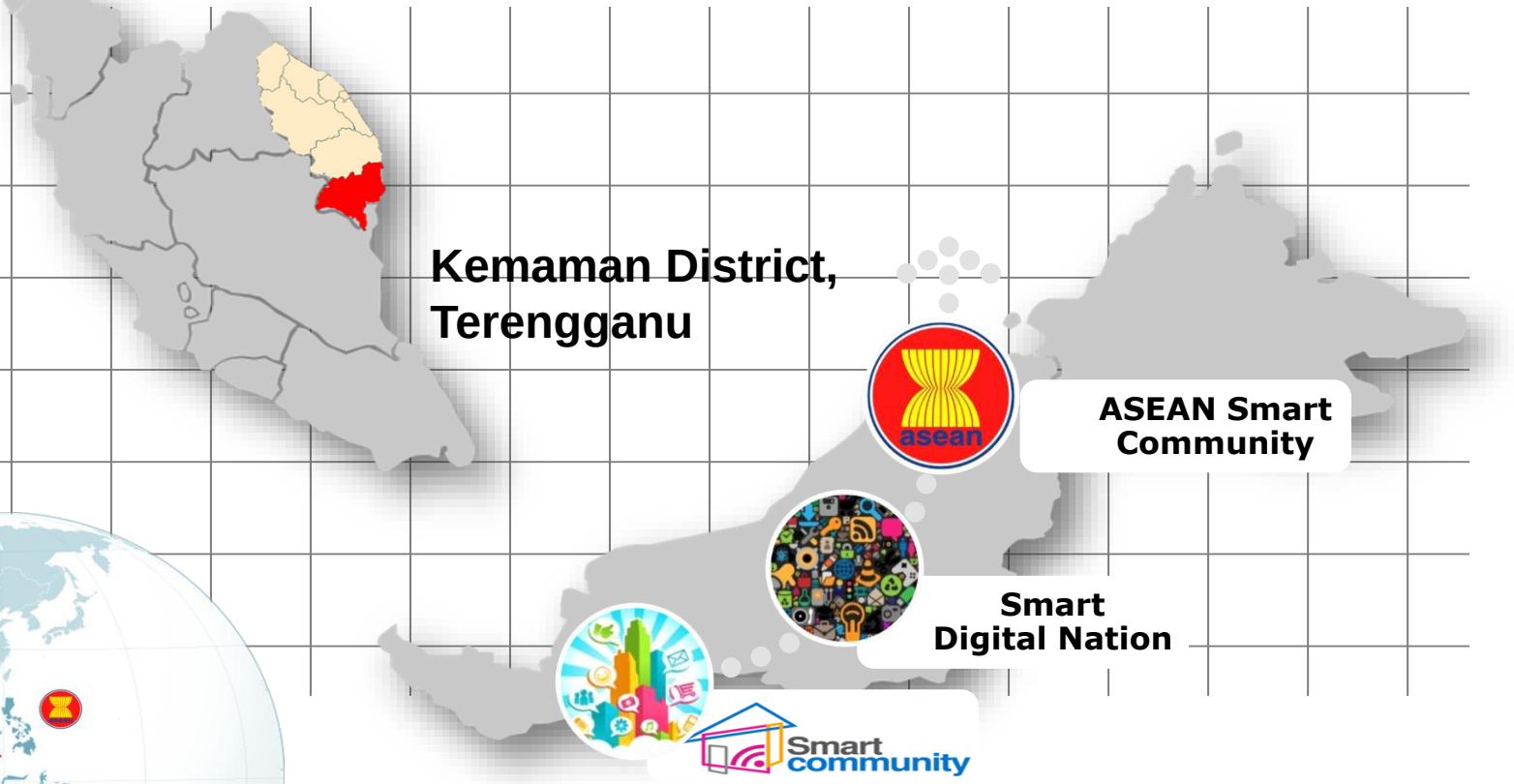
- Enhancement of consumer confidence
- Ensuring security for infrastructure and networks
- Setting minimum security measures through development of industry codes

Regulatory Updates

3	**Smart Community Initiative**

Smart Community Initiative: The Fundamental Of National And ASEAN Development

In Line With The Theme:"transforming ASEAN: Moving Towards Smart Communities"



- **SMART GOVERNANCE**
- **SMART LIVING**
- **SMART PEOPLE**
- **SMART ECONOMY**

Smart Community Principles and Component

Principles applied

Smart Community Principles and Component

Development

Kemaman Smart Community (KSC) Flagship Projects

Flood Management System

The Flood Management System is introduced with the aim to leverage on ICT platform in managing flood disaster. The system is a working outline and tactical flood management system that covers pre-flood, during the flood and post flood management.

Kemaman Innovation Centre (KIC)

Establishment of an innovation center in Kemaman as an accelerator programme with two main objectives. Firstly, to internally drive innovation, creativity and entrepreneurship. Secondly, to maximize and explore other opportunities in the market that can be capitalised.

Pusat Internet 1Malaysia

Pusat Internet 1 Malaysia (PI1M) is an initiative which will provide collective broadband access in rural and sub-urban areas. The centre is aimed as a local transformation platform for the community to learn ICT.

Documentary 'Malaysia's Flood Warrior'

A 45-minute documentary on the devastation brought by floods in Kemaman. Despite the devastation and challenges, the close-knit community of Kemaman persevered as it becomes national role model in managing floods.

Hackathon

First hackathon event held outside Klang Valley where the participants pitch, programme and present a functioning Android mobile application within 24 hours.

Lifelong Learning

Life Long Learning is an initiative of leveraging ICT platform to enhance knowledge of community which consist of 4 main modules:

a) Community of Interest
b) uPustaka
c) ICT Module
d) Information Literacy

Regulatory Updates

4	**Mobile e-Waste**

Mobile e-Waste: Old Phone, New Life

- A Green Initiative by the Malaysian Communications Industry to Promote;

i. Environmentally safe disposal and recycling of end-of-life (EOL) mobile devices;

ii. Awareness on the hazardous effects on health and environment due to improper disposal of mobile devices; and

iii. Education on the steps that you can take to recycle and refurbish your old mobile devices.

- Target e-Waste

- Participating Stakeholders

MCMC

Malaysian Technical Standards Forum Bhd

ALTEL converging communities

celcom an axiata company

digi

maxis

TM

mobile

The Initiative

Launched on 18 Aug 2015

72 Outlets Nationwide

Target 1M unit of Mobile e-Waste by August 2016

How it works

Collect your old mobile devices & accessories

Drop them into the collection boxes at selected outlets

The recyclers collect & transport your devices to the facility

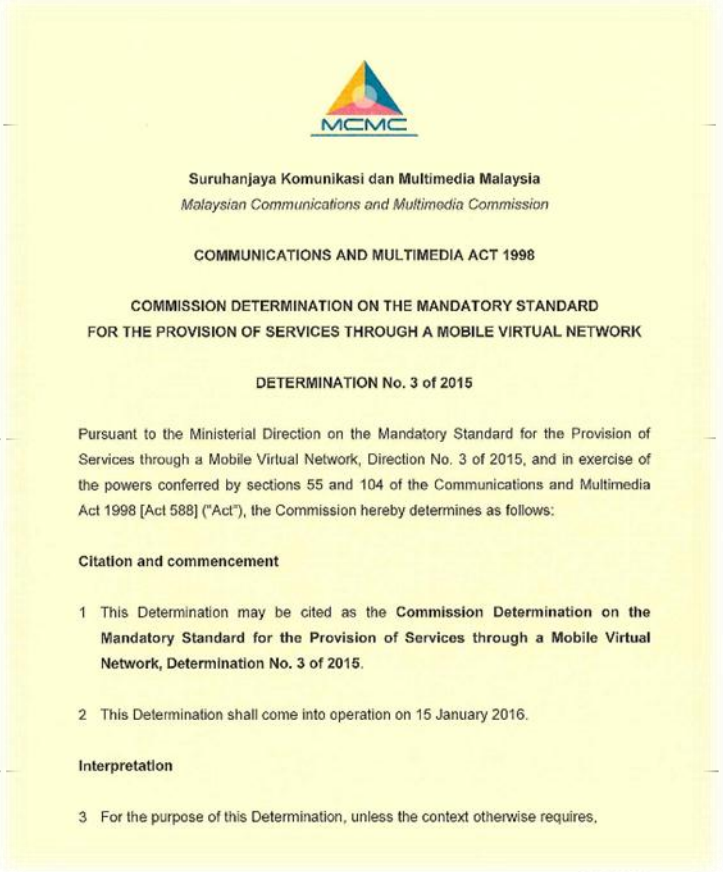
Proper disposal & urban mining will take place at the facility

Recovered materials will be used to manufacture new products

5	**Mandatory Standard on the Provisioning of Services Through a Mobile Virtual Network**

Mandatory Standard on the provisioning of services through a mobile virtual network

Output	Status / Requirements
Ministerial Direction	• Registered on 10 July 2015.
Public Inquiry Process	• PI conducted from 13 July 2015 – 1 September 2015 (50 days); and • PI Report published on 30 September 2015.
Mandatory Standard Requirements	• Registered the Commission Determination by 13 October 2015; and • Operationalization of MS by 15 January 2016.
Requirements for MVN Service Providers	• Submission of Stage 1 Notice to the Commission - 15 April 2016 (For existing MVN SPs).



Suruhanjaya Komunikasi dan Multimedia Malaysia
Malaysian Communications and Multimedia Commission

COMMUNICATIONS AND MULTIMEDIA ACT 1998

COMMISSION DETERMINATION ON THE MANDATORY STANDARD FOR THE PROVISION OF SERVICES THROUGH A MOBILE VIRTUAL NETWORK

DETERMINATION No. 3 of 2015

Pursuant to the Ministerial Direction on the Mandatory Standard for the Provision of Services through a Mobile Virtual Network, Direction No. 3 of 2015, and in exercise of the powers conferred by sections 55 and 104 of the Communications and Multimedia Act 1998 [Act 588] ("Act"), the Commission hereby determines as follows:

Citation and commencement

1 This Determination may be cited as the **Commission Determination on the Mandatory Standard for the Provision of Services through a Mobile Virtual Network, Determination No. 3 of 2015**.

2 This Determination shall come into operation on 15 January 2016.

Interpretation

3 For the purpose of this Determination, unless the context otherwise requires,

http://www.mcmc.gov.my/skmmgovmy/media/General/pdf/Commission-Determination-No-3-2015.pdf

The requirements under the Mandatory Standard

STAGE 1
COMMENCEMENT OF SERVICE

STAGE 2
MOBILE VIRTUAL NETWORK (MVN) SERVICE TERMINATION

STAGE 3
REFUND TO SUBSCRIBERS

STAGE 4
CONTINUITY OF SERVICE

THANK YOU

Annex:
The requirements under the Mandatory Standard

Stage 1 Commencement of Service	Stage 2 MVN Service Termination	Stage 3 Refund to subscribers	Stage 4 Continuity of Service
Submission of Stage 1 Notice : i. at least three (3) months before the commencement of service (for new MVN SP); or ii. no later than 15 April (for existing MVN SP). Submission of a revised Stage 1 Notice: i. at least three (3) month prior to change of HO; or ii. seven (7) working days for any material changes to the info in Stage 1 Notice.	Submission of Stage 2 Notice at least three (3) months before the service termination date to: i. the Commission; ii. HO; and iii. subscribers (via announcements). MVN SPs are to : i. provide and facilitate service continuity options to subscribers (i.e.: to terminate or port); ii. handover remaining subscribers to HO (if subscribers don't terminate or port); and iii. develop standard procedures for refund.	MVN SPs' obligations : i. refund to subscribers who have chosen to terminate their services; ii. refund to be completed within three (3) months from the date of issuance of the Stage 2 Notice; and iii. submit weekly report to the Commission for the entire refund period.	MVN SPs' obligations: i. handover its remaining subscribers' database and the Home Location Register ("HLR") to the HO within three (3) months from the date of the issuance of the Stage 2 Notice; and ii. publish own standard procedures to migrate subscribers. HO's obligations : i. accept the remaining subscribers; ii. provide information to subscribers (i.e.: terms and condition, service info, minimum credit obligation; and iii. publish own standard procedures to migrate subscribers.

Note :
HO = Host Operator
MVN SP = Mobile Virtual Network Service Provider

Doc.JTC-28/T-09

Frequency Registration and Notification by Thailand

สำนักงานคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ
The National Broadcasting and Telecommunications Commission

Frequency Registration and Notification by Thailand

Update on Frequency Registration

Date of Submission	Submission Type	Type of Service	No. of Records	Approved	Reject
9 Jun 2015	online	Broadcasting	15	14	1*
Total			**15**	**14**	**1**

* Technical analysis is required before re-submission.

.

Update on Frequency Notification

Date of Submission	Submission Type	Type of Service	No. of Records	Acknowledged by MCMC
28 May 2015	online	Mobile (3G Cellular)	9	28 May 2015
26 Jun 2015	online	Mobile (3G Cellular)	25	29 Jun 2015
14 Aug 2015	online	Mobile (3G Cellular)	10	17 Aug 2015
2 Sep 2015	online	Mobile (3G Cellular)	15	8 Sept 2015
17 Sep 2015	online	Mobile (3G Cellular)	6	18 Sept 2015
8 Oct 2015	online	Mobile (3G Cellular)	60	13 Oct 2015
27 Nov 2015	online	Mobile (3G Cellular)	27	1 Dec 2015
Total			**152**	

The Meeting is invited to take note on the status of frequency registration and notification submitted by Thailand since JTC-27.

Thank you

Spectrum Management Bureau
The Office of the National Broadcasting and Telecommunications Commission (NBTC)
Email: spectrum@nbtc.go.th

Doc.JTC-28/T-10

Frequency Registration and Notification Updates by Malaysia

FREQUENCY REGISTRATION AND NOTIFICATION UPDATES BY MALAYSIA

28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand – Malaysia Common Border Meeting

16 -18 December 2015
Chiang Rai, Thailand

Malaysian Communications & Multimedia Commission

OBJECTIVE

To update members on status of Frequency Registrations and Notifications submitted by Malaysia since the last 27th JTC Meeting in Penang, Malaysia.

STATUS OF FREQUENCY REGISTRATIONS FROM MALAYSIA BY SERVICE (May 2015 – December 2015)

DATE OF SUBMISSION	TYPE OF SERVICE	NO. OF APPLICATION	APPROVED	DEFERRED	REMARKS
13 June 2015	FIXED	26	26	0	APPROVED
	BROADCASTING	6	6	0	APPROVED
10 July 2015	LAND MOBILE	6	6	0	APPROVED
	FIXED	42	42	0	APPROVED
30 July 2015	FIXED	2	2	0	APPROVED
	LAND MOBILE	17	17	0	APPROVED
	MARITIME MOBILE	1	1	0	APPROVED
	Sub-total	**100**	**100**	**0**	

STATUS OF FREQUENCY REGISTRATIONS FROM MALAYSIA BY SERVICE (May 2015 – December 2015)

DATE OF SUBMISSION	TYPE OF SERVICE	NO. OF APPLICATION	APPROVED	DEFERRED	REMARKS
1 September 2015	FIXED	8	8	0	APPROVED
	LAND MOBILE	3	3	0	APPROVED
3 November 2015	FIXED	10	10	0	APPROVED
1 December 2015	FIXED	4	4	0	APPROVED
	LAND MOBILE	2	2	0	APPROVED
TOTAL		**127**	**127**	**0**	

STATUS OF FREQUENCY NOTIFICATIONS (TEMPORARY ACCEPTANCE) FROM MALAYSIA BY SERVICE (May 2015 – December 2015)

DATE OF SUBMISSION	TYPE OF SERVICE	NO. OF APPLICATION	REMARKS
13 June 2015	AERONAUTICAL RADIONAVIGATION	7	Acknowledged by NBTC on 26th June 2015
	AERONAUTICAL FIXED	3	
	MARITIME MOBILE	1	
	MOBILE	1	
30 July 2015	AERONAUTICAL RADIONAVIGATION	2	Acknowledged by NBTC on 18th August 2015
	MOBILE	30	
15 October 2015	MOBILE	3	Acknowledged by NBTC on 22nd October 2015
1 December 2015	AERONAUTICAL RADIONAVIGATION	3	Acknowledged by NBTC on 9th December 2015
TOTAL		**50**	

CONCLUSION

Members are invited to take note on the status of registrations and notifications submitted by Malaysia since the 27th JTC meeting held in Penang, Malaysia.

THANK YOU

Doc.JTC-28/T-11

Frequency Registration and Notification for Broadcasting Service

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Frequency Registration and Notification for Broadcasting Service

The 28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand-Malaysia Common Border (JTC) Meeting

16 – 18 December 2015

Broadcasting Technology and Engineering Bureau

Background

- At the Special Meeting between NBTC and MCMC during 20 – 22 October 2015, there are 2 issues for considering further at JTC-28:

  1) Description of “Relocation of transmitting station”
  2) Parameters for Technical Analysis (Television Broadcasting)

1. Description of "Relocation of transmitting station" (1/2)

- **Proposal** : For broadcasting service, the relocation of transmitting station is required to submit as a new application for coordination, when

$FS_{(after\ relocation)} > FS_{(before\ relocation)}$ at all agreed test points in another country ,where FS is a simulated field strength

other case of the relocation, it is required to submit the frequency notification and to be recorded in the JTC Database.

- The Meeting is invited to consider and agree on the proposal as mentioned above.
- The agreed description will be added into the Compilation Handbook.

Office of the National Broadcasting and Telecommunications Commission (NBTC)

1. Description of "Relocation of transmitting station" (2/2)

- The test points for broadcasting service in Band III, IV and V are as shown in the table below (JTC-14):

	No.	Location	Longitude	Latitude
Malaysia	1	Tanjung Rhu	099 E 49' 24"	06 N 27' 20"
	2	Kangar	100 E 11' 25"	06 N 25' 59"
	3	Alor Setar	100 E 23' 20"	06 N 06' 35"
	4	Baling	100 E 55' 10"	05 N 40' 01"
	5	Gerik	101 E 08' 15"	05 N 23' 20"
	6	Jeli	101 E 50' 05"	05 N 40' 00"
	7	Kota Bharu	102 E 15' 30"	06 N 06' 40"
Thailand	1	Satun (Pak Bara)	099 E 47' 10"	06 N 50' 34"
	2	Sadao	100 E 25' 12"	06 N 37' 52"
	3	Chana	100 E 43' 35"	06 N 54' 10"
	4	Betong	101 E 03' 50"	05 N 46' 37"
	5	Wang	101 E 53' 08"	05 N 55' 57"
	6	Tak Bai	102 E 03' 20"	06 N 15' 03"
	7	Thepa	100 E 56' 38"	06 N 43' 13"

- The Meeting is invited to agree further that the list of test points above is applied to broadcasting service in Band II, III, IV, and V.

Broadcasting Technology and Engineering Bureau Broadcasting@NBTC | broadcast.nbtc.go.th

2. Parameters for Technical Analysis (TV)

- The Meeting is invited to consider and agree on the following parameters to be used when one country conducts the technical analysis for co-channel situation before ASO:

No.	Parameters	
1	Propagation model	ITU-R P.1546 - Wanted signal : 50% location, 50% time - Interfering signal : 50% location, 10% time
2	System Variants	Actual system variants of each country **Thailand:** DVB-T2 with 16K ext, 64QAM, code rate 3/5, PP2, GI 266 µs **Malaysia:** DVB-T2 with ….
3	Planning and Protection Criteria	**Analogue TV:** ITU-R BT.655 (protection ratio), ITU-R BT.417 (minimum field strength), ITU-R BT.419 (antenna discrimination) **Digital TV:** ITU-R BT.2033 (planning criteria incl. protection ratio for fixed reception mode), ITU-R BT.419 (antenna discrimination), Signal summation method : Log normal method, coverage probability 90%
4	Field strength limit	No field strength limit, however, the service area shall not be interfered for more than 5% of covered population.
5	Terrain and Clutter data	At least 200x200 m resolution

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Thank you

Doc.JTC-28/T-12

Update of Compilation of Agreed Band Plans, Coordination Parameters and Registration Procedure

สำนักงานคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ
The National Broadcasting and Telecommunications Commission

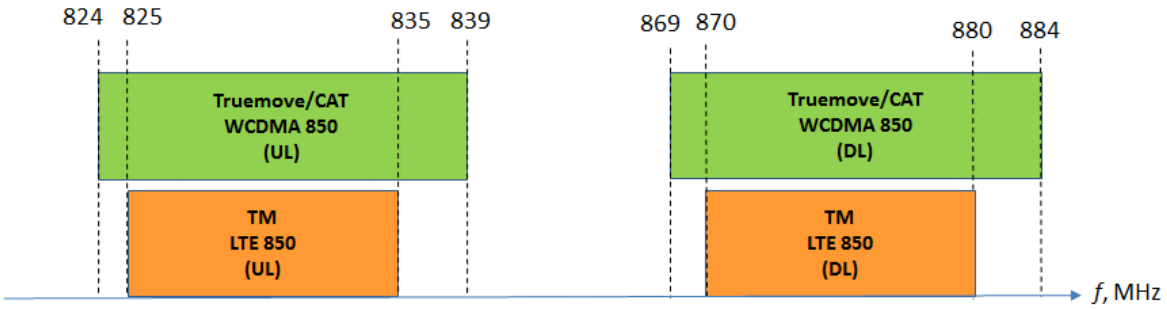
Update of Compilation of Agreed Band Plans, Coordination Parameters and Registration Procedure

Dec 2015

Spectrum Management Bureau, Office of NBTC

Background

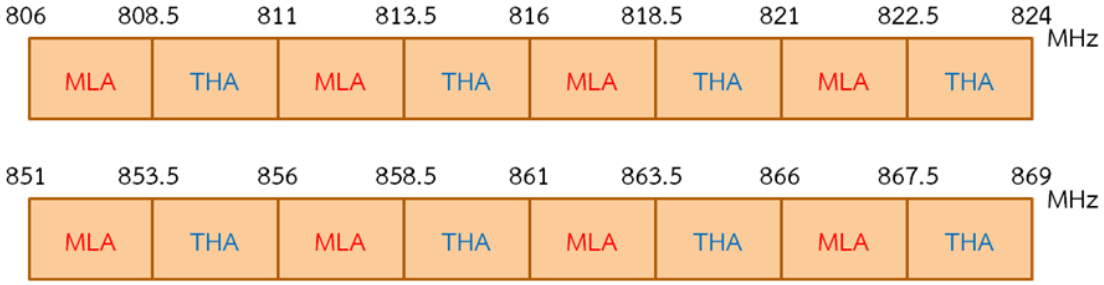
- At JTC-26, the Meeting agreed to adopt the Compilation of Agreed Band Plans, Coordination Parameters and Registration Procedure (updated until JTC-25).
- The JTC-27 Meeting agreed on spectrum arrangement of the bands 824 - 835/869 - 880 MHz to be full band sharing until August 2025 and coordination distance to be 10 km from border.



Section 2.2.8 Band 800 MHz

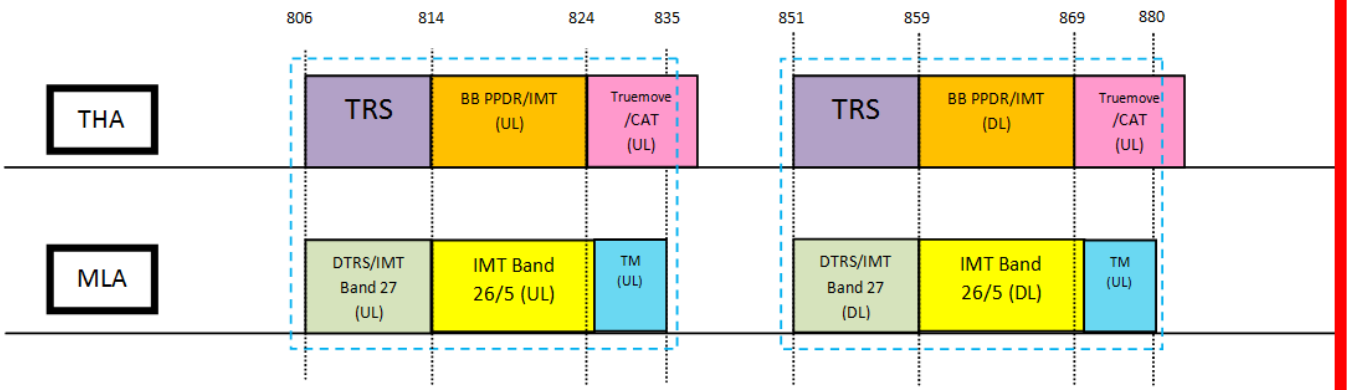
2.2.8 Band 800 MHz

Spectrum arrangement for 800 MHz as agreed at JTC-13



Revise

Band Plans for 800 MHz as agreed at JTC-26 and JTC-27



Proposal

The Meeting is invited to agree on the inclusion of those update information in the Compilation Agreed Band Plans, Coordination Parameters and Registration Procedure (updated until JTC-27).

Thank you

Spectrum Management Bureau
The Office of the National Broadcasting and Telecommunications Commission (NBTC)
Email: spectrum@nbtc.go.th

Doc.JTC-28/T-13

Report of the 2nd Special Meeting on Revision of Coordination Parameters and Registration Procedures

สำนักงานคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ
The National Broadcasting and Telecommunications Commission

Report of the 2nd Special Meeting on Revision of Coordination Parameters and Registration Procedures

Dec 2015

Spectrum Management Bureau, Office of NBTC

Introduction

- The 2nd Special Meeting was held from 20th to 22nd October 2015 in Chonburi, Thailand. The Meeting was a continuation from the previous Special Meeting held in April 2015 in Kuala Lumpur, Malaysia.
- The Meeting was attended by 10 representatives from NBTC and 4 representatives from MCMC.

Overview

- The Meeting discussed the following:
  - Unlicensed spectrum
  - Review of coordination parameters
  - Review of coordination type
  - Revision of frequency coordination guideline
  - Database on Existing Frequency Usage for TV and FM Radio Services
  - Other Matter

Unlicensed Spectrum

- The Meeting discussed the coordination scheme for unlicensed and mixed-use bands. Then categorized frequency bands into 2 groups:
  - Unlicensed bands
    - The list of these harmonized unlicensed bands is to be included in the JTC Compilation Handbook.
  - Mixed-use bands
    - Protect licensed assignments and solve interference on a case-by-case basis.

Review of Coordination Parameters

- The Meeting reviewed the coordination parameters for High and Medium priority bands:
  - High priority bands
    - 450-470 MHz (completed)
    - 806-824/851-869 MHz (to be discussed in JTC-28)
  - Medium priority bands are further classified into Higher Medium and Lower Medium priority
    - Higher Medium priority (to be completed by JTC-29)
    - Lower Medium priority (to be completed by JTC-31)
- The Meeting also agreed to share existing usage and to develop a band plan for fixed links.
- Bands which coordination parameters have not been completed are to be further discussed.

Review of the Coordination Type

- The Meeting reviewed and revised coordination type and propose the revised coordination type to be included in the JTC Compilation Handbook.
- Bands which coordination type has not already been agreed is to be further discussed.

Revision of Frequency Coordination Guideline

- The Meeting developed a new JTC Frequency Coordination Guideline.
- The newly developed guideline is proposed to be adopted at JTC-28 Meeting. Once adopted, the existing guideline shall be suppressed.

Database on Existing Frequency Usage for TV and FM Radio Services

- The Meeting agreed on procedure and timeline to review and update the JTC database on TV and FM Radio Services. The Meeting also appointed representatives from NBTC and MCMC to be contact person for data exchange.

Items	Nov 15	Dec 15	Jan 16	Feb 16	Mar 16	Apr 16	May 16
a. NBTC and MCMC to review its own database b. To submit the progress report at JTC-28							
c. NBTC and MCMC to exchange the information in the new frequency registration format with the remarks on the records, which needs attention. d. NBTC and MCMC to verify the information							
e. NBTC and MCMC to adopt the existing JTC database							
f. To submit for approval at JTC-29							

Other Matter

- The Meeting considered coordination process for broadcasting service. The Meeting agreed in principle on items to be taken into account in the technical analysis, as well as timeframe for coordination.
- The Meeting noted that the notification format and the interpretation of term “relocation of transmitting station” in the Guideline to be discussed at the JTC-28 Meeting.

Other Matter

FM Radio	Analogue TV	Digital TV		
		Scenario 1 After both sides complete their ASO plan.	**Scenario 2** Before both sides complete their ASO plan.	
- No technical analysis is required once it is in compliance with the agreed minimum frequency separation	- No new assignment, except the frequency channel to replace the frequency channel at Satun	- No technical analysis is required.	**Scenario 2A** Non Co-channel frequency usage - No technical analysis is required.	**Scenario 2B** Co-channel frequency usage - Technical analysis is required.
High and medium power: Registration < 4 weeks Low power: Notification				High and medium power: Registration > 4 weeks Low power: Notification

Proposal

- The JTC-28 Meeting is invited to consider and adopt the report of this Special Meeting.
- The Meeting would like to propose to the JTC the followings:
  I. To adopt the new JTC Frequency Coordination Guideline;
  II. To endorse the items below to be included in the JTC Compilation Handbook:
    - List of harmonized unlicensed band; and
    - Table of coordination type.

Proposal

III. To agree to the possible course of action for the bands which have not been completed to be further discussed at future Special Meetings, and to be the new work items at JTC where required;

IV. To adopt the procedure and timeline for the revision of JTC database on TV and FM Radio Services; and

V. To adopt the new procedure for frequency coordination for broadcasting service.

Thank you

Spectrum Management Bureau
The Office of the National Broadcasting and Telecommunications Commission (NBTC)
Email: spectrum@nbtc.go.th

Report of the 2nd Special Meeting

on Revision of Coordination Parameters and Registration Procedures

20th – 22nd October 2015 Chonburi, Thailand

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1 INTRODUCTION

1.1 The 2nd Special Meeting on Revision of Coordination Parameters and Registration Procedures was successfully held from 20th to 22nd October 2015 in Chonburi, Thailand. The Meeting was a continuation from the previous Special Meeting held in April 2015 in Kuala Lumpur, Malaysia. The objectives of this Meeting are as follows:

a. to harmonize the unlicensed spectrum usage at the common border areas;
b. to review the coordination parameters which have been identified as "High" and " Medium" priority;
c. to review the coordination type for all the agreed band plans;
d. to revise the JTC Frequency Coordination Guideline; and
e. to review and update the broadcasting database.

1.2 The Thai Delegation was led by Mr. Saneh Saiwong, Executive Director of Spectrum Management Bureau, Office of the National Broadcasting and Telecommunications Commission (NBTC) and the Malaysian Delegation was led by Mr. Abd Mubin Mohd Zain, Head of Spectrum Planning Department (Fixed and Broadcasting Services), Malaysian Communications and Multimedia Commission (MCMC). The Meeting was attended by 10 representatives from NBTC and 4 representatives from MCMC.

2 UNLICENSED SPECTRUM

2.1 The Meeting discussed the coordination scheme for unlicensed and mixed-use bands. The coordination schemes for mixed-use band will be able to cater for the use of unlicensed and licensed users across the border between Thailand and Malaysia. The coordination scheme for unlicensed band will provide harmonization for unlicensed devices for both sides.

2.2 The Meeting exchanged information of the frequency bands used by low power unlicensed equipment in Thailand and Malaysia. MCMC then presented a comparison chart of unlicensed frequency usage in both countries and highlighted the bands that are commonly used for unlicensed devices. According to the data, frequency bands can be categorized into 2 different groups as follows:

a. Frequency bands used for unlicensed equipment by both countries:
The Meeting suggested that these frequency bands are to be harmonized. The list of harmonized frequency bands are presented in Table 1 below and proposed to be included in the JTC Compilation Handbook.

Table 1: List of harmonized frequency bands used by unlicensed equipment.

Applications	**Common Frequency Band**
Security/ SRD/ RFID	3 to 135 kHz
SRD/ ISM/ RFID	13.553 to 13.567 MHz
Remote controlled/ Wireless mic/SRD/ ISM/ Pocket unit/ Paging	26.9650 to 27.28272 MHz
Personal radio/ Pocket unit/ Paging	26.965 to 27.405 MHz
Remote controlled/ Wireless mic/ SRD/ ISM/ Pocket unit/ Paging	40 to 40.925 MHz
Remote controlled/ Pocket unit/ Paging/ SRD	47 MHz
Cordless phone/ Pocket unit/ Paging/ SRD	46.610 to 46.970 MHz
Remote controlled/ Pocket unit/ Paging/ SRD	49 MHz
Cordless phone/ Pocket unit/ Paging/ SRD	49.610 to 49.970 MHz
SRD / Wireless mic/ Pocket unit/ Paging	87.5 to 108 MHz
Wireless mic/ Pocket unit/ Paging	182.025 to 182.975 MHz
Wireless mic/ Pocket unit/ Paging	183.025 to 183.475 MHz
Wireless mic/ Pocket unit/ Paging	217.025 to 217.975 MHz
Wireless mic/ Pocket unit/ Paging	218.025 to 218.475 MHz
Security/ Pocket unit/ Paging	228.0063 to 228.9937 MHz
Remote controlled/ Security/ Pocket unit/ Paging/ SRD	303 to 320 MHz
Security/ Pocket unit/ Paging/ SRD	400 to 402 MHz
Medical/ Pocket unit/ Paging/ SRD	401 to 406 MHz
SRD/RFID/ Remote/ security/ Pocket unit/ Paging/ SRD	433 to 435 MHz
Personal radio/ Pocket unit/ Paging/ SRD	446 to 447 MHz
Personal radio/ SRD	477 to 478 MHz
Wireless mic/ Video transmission	510 to 790 MHz
Wireless mic	794 to 798 MHz
SRD/ RFID	920 to 923 MHz
SRD/ RFID/ ISM/ Cordless phone/ Wireless mic/ CCTV/ Aero mobile telemetry/ RLAN	2400 to 2500 MHz
SRD/ CCTV/ Aero mobile telemetry/ RFID/ RLAN	5150 to 5350 MHz

Applications	Common Frequency Band
SRD/ RLAN/ RFID/ Radar	5470 to 5650 MHz
Aero mobile telemetry/ SRD/ RLAN/ RFID/ Radar	5470 to 5725 MHz
SRD/CCTV/ Aero mobile telemetry/ RLAN/ RFID/ Radar	5725 to 5875 MHz
SRD/ ISM/ Radar/ Vehicle radar	24.05 to 24.25 GHz
SRD/ WLAN	57 to 64 GHz
ISM/ WLAN	61 to 61.5 GHz
SRD/ Security/ Automotive radar	76 to 77 GHz
Automotive radar/ Radar	77 to 81 GHz

b. Frequency bands with mixed-use between licensed frequency assignment and unlicensed equipment:
Frequency bands identified as mixed-use must not cause interference to, and cannot claim protection from, the frequency assignments duly licensed by both countries. The interference resolution will be resolved on a case-by-case basis once an interference case is reported.

3 REVIEW OF COORDINATION PARAMETERS OF AGREED BAND PLANS

3.1 The Meeting reviewed the coordination parameters for all the bands identified as “High” and “Medium” priorities.

3.2 For the “High” priority bands the summary of the discussion is as follows:
a. 450-470 MHz: Completed (As agreed at JTC-27).
b. 806-824/851-869 MHz: To be further discussed in JTC-28 meeting for the possible scenarios as shown in Table 2 below:

Table 2: High priority work item for JTC-28 Meeting

Technology	Possible course of action
TRS vs TRS	To retain the agreed coordination parameters
IMT vs IMT	To propose ECC Recommendation 11(04) at JTC 28
TRS vs IMT	TBD: To be reviewed after re-planning process complete.

3.3 Details for the “High” priority bands is shown in Annex 1.

3.4 As for “Medium” priority bands, The Meeting identified the possible course of actions and classified 2 frequency bands to be completed by JTC-29 (Higher Medium priority) and 9 frequency bands to be completed by JTC-31 (Lower Medium priority). Details of the bands is as shown in Annex 2.

3.5 The Meeting also agreed to share existing usage and to develop a band plan for fixed links for possible full band sharing at the JTC-28 meeting.

3.6 The Meeting agreed to propose to the JTC that the possible course of action for the bands which have not been completed to be further discussed at future Special Meetings, and to be proposed at JTC as new work items where required.

4 REVIEW OF THE COORDINATION TYPE OF THE AGREED BAND PLANS

4.1 The Meeting reviewed and revised the coordination type based on the bands and services in the JTC Compilation Handbook. The revised coordination type can be referred to in Annex 3 and proposed to be included in the JTC Compilation Handbook.

4.2 The Meeting noted that coordination distances for several bands have already been agreed, but the coordination types are not specified. Therefore, the coordination types of these frequency bands should be further discussed at future Special Meetings, and to be proposed at JTC as new work items where required.

5 REVISION OF FREQUENCY COORDINATION GUIDELINE

5.1 The Meeting developed a new JTC Frequency Coordination Guideline in line with the agreed principles at the last Special Meeting and JTC-27 Meeting. The finalized guideline is as shown in Annex 4.

5.2 The finalized guideline comprises of the following:

a. Coordination scheme;
b. Coordination type;
c. Submission of frequency assignment;
d. Modification to a recorded assignment;
e. Deletion of a recorded assignment;
f. Temporary usage of frequency;
g. Special conditions for frequency coordination;
h. Notification of frequency assignment to be included in ITU MIFR
i. Application format; and
j. Review of JTC database.

5.3 The newly developed guideline is proposed to be adopted at JTC-28 Meeting. Once adopted, the existing guideline shall be suppressed.

6 DATABASE ON EXISTING FREQUENCY USAGE FOR TV AND FM RADIO SERVICES

6.1 NBTC presented a paper on 'Database on Existing Frequency Usage for TV and FM Radio Services'. NBTC informed the Meeting of the following issues:

a. Related issues on the JTC database;
b. Summary of JTC database on TV and FM Radio Services; and
c. Comparison between the existing JTC database and NBTC database.

6.2 NBTC further proposed the procedure and timeline for the review of JTC database on TV and FM Radio Services.

6.3 The Meeting agreed on the procedure and timeline as shown below:

Items	Nov 15	Dec 15	Jan 16	Feb 16	Mar 16	Apr 16	May 16
a. NBTC and MCMC to review its own database b. To submit the progress report at JTC-28							
c. NBTC and MCMC to exchange the information in the new frequency registration format with the remarks on the records, which needs attention. d. NBTC and MCMC to verify the information							
e. NBTC and MCMC to adopt the existing JTC database							
f. To submit for approval at JTC-29							

6.4 The Meeting appointed the contact persons for the data exchange as follows:

Organization	Name	E-mail address
NBTC	Mr. Supatrasit Suansook	supatrasit.s@nbtc.go.th
MCMC	Ms. Siti Hajar binti Mohd Yakop	siti.hajar@cmc.gov.my

7 ANY OTHER MATTER

7.1 NBTC brought the issue on the technical analysis and the timeframe for the frequency coordination process (broadcasting service) to the Meeting for consideration.

7.2 The Meeting agreed in principle on the following procedure:

Table 3: Technical analysis and timeframe for frequency coordination process

<table>
<tr><th rowspan="2">FM Radio</th><th rowspan="2">Analogue TV</th><th colspan="3">Digital TV</th></tr>
<tr><td>Scenario 1
After both sides complete their ASO plan.</td><td colspan="2">Scenario 2
Before both sides complete their ASO plan.</td></tr>
<tr><td>- No technical analysis is required once it is in compliance with the agreed minimum frequency separation</td><td>- No new assignment, except the frequency channel to replace the frequency channel at Satun</td><td>- No technical analysis is required.</td><td>Scenario 2A
Non Co-channel frequency usage

- No technical analysis is required.</td><td>Scenario 2B
Co-channel frequency usage

- Technical analysis is required.</td></tr>
<tr><td colspan="3">High and medium power:
Registration
< 4 weeks

Low power:
Notification</td><td>High and medium power:
Registration
> 4 weeks

Low power:
Notification</td></tr>
</table>

7.3 The Meeting agreed to propose the above procedure to JTC-28 for adoption.

7.4 The Meeting agreed that the following items will be taken into account in the technical analysis and the details will be further discussed at JTC-28:

a. propagation model;
b. system variants;
c. planning and protection criteria;
d. field strength limit;
e. terrain and clutter data; and
f. other coordination parameters or technical parameters.

7.5 In addition, the Meeting also noted that for broadcasting service, the notification format and the interpretation of term “relocation of transmitting station” in the Guideline will be further discussed at JTC-28 Meeting.

8 PROPOSALS

8.1 The JTC-28 Meeting is invited to consider and adopt the report of this Special Meeting.

8.2 The Meeting would like to propose to the JTC on the following:

i. To adopt the new JTC Frequency Coordination Guideline;

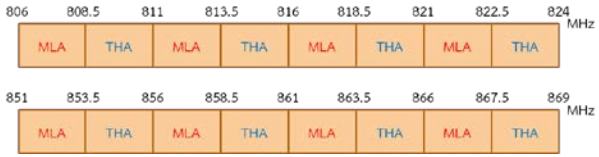
ii. To endorse the items below to be included in the JTC Compilation Handbook:
   a. List of harmonized unlicensed band; and
   b. Table of coordination type.

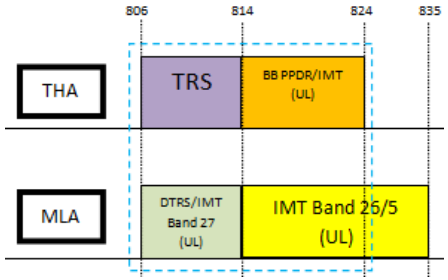
iii. To agree to the possible course of action for the bands which have not been completed to be further discussed at future Special Meetings, and to be the new work items at JTC where required;

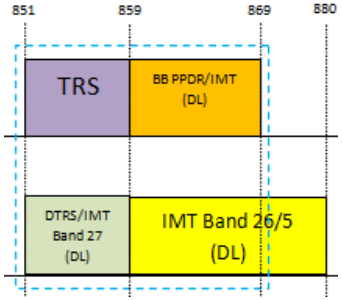
iv. To adopt the procedure and timeline for the revision of JTC database on TV and FM Radio Services; and

v. To adopt the new procedure for frequency coordination for broadcasting service.

Annex 1: New Coordination Parameter Table (High Priority)

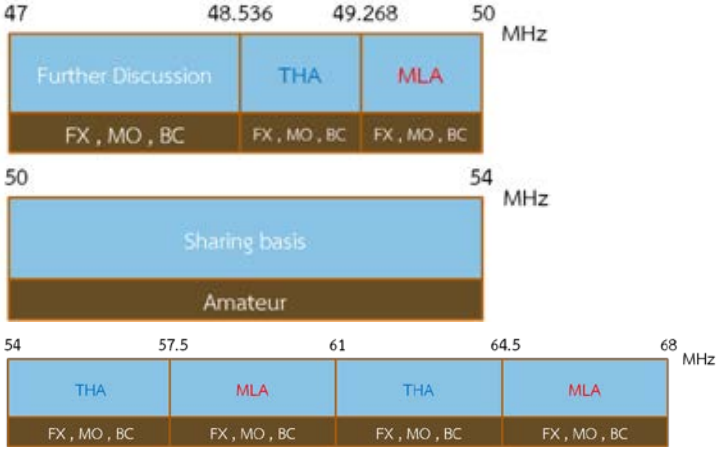
Frequency Band	Existing Technologies		Coordination Parameters		Priority
	Thailand	Malaysia	Existing agreements	Possible course of action	
UHF (450-470 MHz)	Land mobile	CDMA 450	1. Full band sharing 2. Coordination parameters: -85 dBm at 5km from the border with C/I of 18 dB. 3. Coordination distance: 30km 4. Coordination type: registration	Maintain existing agreement	Completed
	Fixed				
806-824/ 851-869 MHz	Trunked Radio	Trunked Radio	1. Band plan for 800 MHz as agreed at JTC-13:  2. Coordination parameters: -85 dBm at 5km from the border with C/I of 18 dB. 3. Coordination distance: 30km 4. Coordination type: Registration	Maintain existing agreement until migration of TRS is completed.	High (By JTC-28)

<table>
<tr><th rowspan="2">Frequency Band</th><th colspan="2">Existing Technologies</th><th colspan="2">Coordination Parameters</th><th rowspan="2">Priority</th></tr>
<tr><th>Thailand</th><th>Malaysia</th><th>Existing agreements</th><th>Possible course of action</th></tr>
<tr><td></td><td>Trunked Radio</td><td rowspan="2">IMT</td><td rowspan="2">1. Band plan as agreed at JTC-26:
 



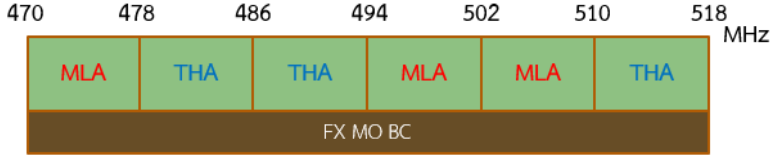
2. No agreed coordination type, distance and parameters.</td><td rowspan="2">1. IMT vs. IMT: To propose ECC/REC/(11)04 at JTC-28.
2. TRS vs. IMT: To consider ECC/REC/(11)04 as possible coordination parameters.
3. To propose coordination type and distance at JTC-28.</td><td rowspan="2"></td></tr>
<tr><td>IMT</td></tr>
</table>

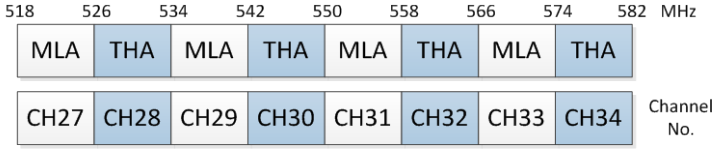
Annex 2: New Coordination Parameter Table (Medium Priority)

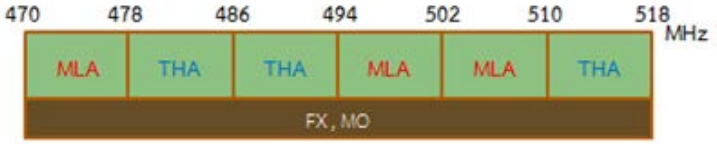
<table>
<tr><th rowspan="2">Frequency Band</th><th colspan="2">Existing Technologies</th><th colspan="2">Coordination Parameters</th><th rowspan="2">Priority</th></tr>
<tr><th>Thailand</th><th>Malaysia</th><th>Existing agreements</th><th>Possible course of action</th></tr>
<tr><td rowspan="3">47-68 MHz
(Band I)</td><td>Broadcasting</td><td>Broadcasting</td><td rowspan="3">1. Band plan as agreed at JTC-18:
 

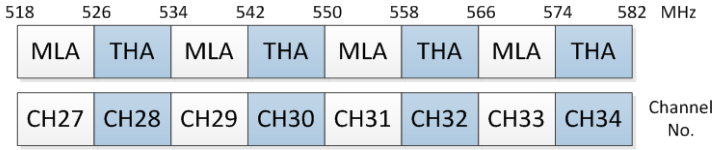
2. No agreed coordination parameters.</td><td rowspan="3">1. Maintain existing agreements for broadcasting services.
2. For other services, develop coordination types, parameters, and distances.</td><td rowspan="3">Medium
(By JTC-31)</td></tr>
<tr><td>Fixed/
Mobile</td><td>Fixed/
Mobile</td></tr>
<tr><td>Amateur</td><td>Amateur</td></tr>
</table>

<table>
<tr><th rowspan="2">Frequency Band</th><th colspan="2">Existing Technologies</th><th colspan="2">Coordination Parameters</th><th rowspan="2">Priority</th></tr>
<tr><th>Thailand</th><th>Malaysia</th><th>Existing agreements</th><th>Possible course of action</th></tr>
<tr><td rowspan="4">470-790 MHz
(Band IV/V)

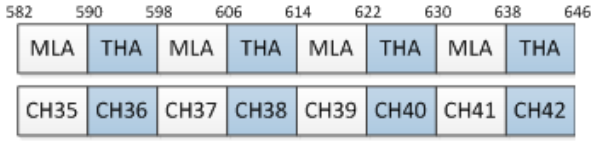
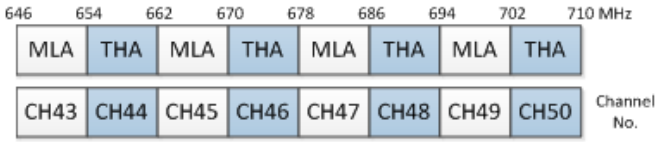
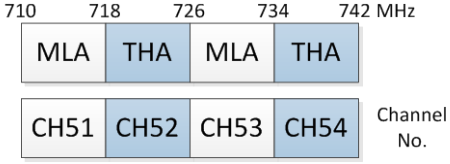
470-790 MHz
(Band IV/V)</td><td>Fixed</td><td rowspan="3">Broadcasting</td><td rowspan="4">1. Band plan for 470-518 MHz as agreed at JTC-18:
 

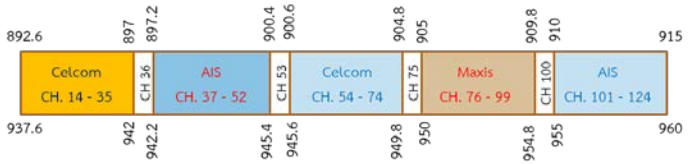
2. Band plan for 518-582 MHz as agreed at JTC-14:
 

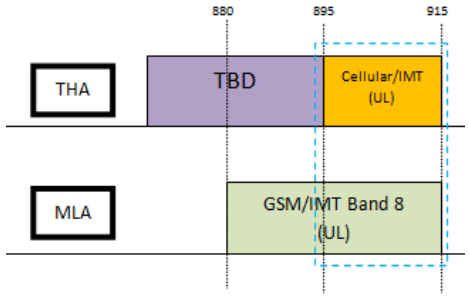
3. Band plan for 470-518 MHz as agreed at JTC-18:
 

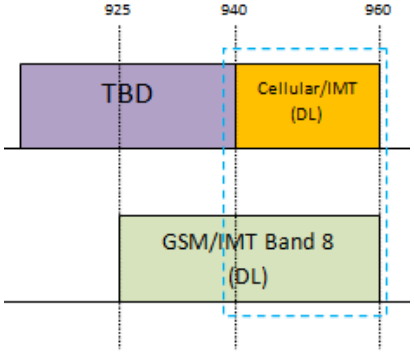
4. Band plan for 518-582 MHz as agreed at JTC-14:
 

5. Band plan for 582-710 MHz as agreed at JTC-14:</td><td rowspan="4">1. Maintain existing agreements for broadcasting services.
2. Develop a new band plan for the 470-694/698 MHz band and 698-803MHz band.
3. Develop coordination types, parameters, and distances as required.</td><td rowspan="4">Medium
(By JTC-31)</td></tr>
<tr><td>Land mobile</td></tr>
<tr><td>Broadcasting</td></tr>
<tr><td>IMT</td><td>IMT</td></tr>
</table>

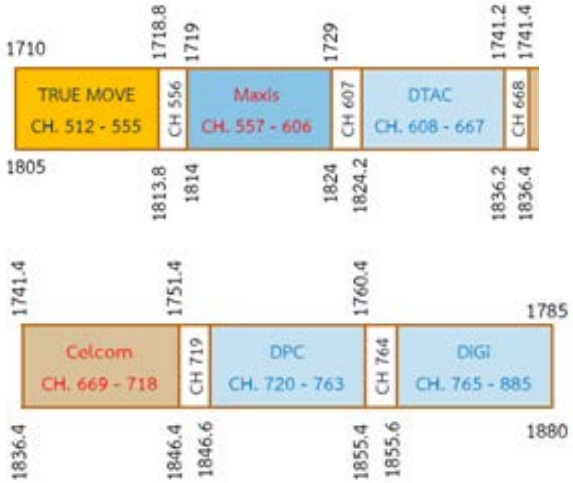
Frequency Band	Existing Technologies		Coordination Parameters		Priority
	Thailand	Malaysia	Existing agreements	Possible course of action	
			  6. Band plan for 710-742 MHz as agreed at JTC-19:  7. No agreed band plan for 742-790 MHz. 8. See Section 3.1 and 3.2 of the compilation of agreed band plans, coordination parameters, and registration procedure.		

Frequency Band	Existing Technologies		Coordination Parameters		Priority
	Thailand	Malaysia	Existing agreements	Possible course of action	
790-806 MHz	IMT	Fixed	1. No agreed band plan and coordination parameters.	1. Develop a new band plan for the 470-694/698 MHz band and 698-803 MHz band 2. Develop coordination types, parameters, and distances as required. 3. This band is considered together with 470-790 MHz band.	Medium (By JTC-31)
		IMT			
895-915/ 940-960 MHz	GSM 900	GSM 900	1. Spectrum arrangement for 900 MHz as agreed at JTC-9:  2. Coordination parameters: -85 dBm measured at 5km from border and 1.5 meter above ground level with C/I of 12 dB.	Maintain existing agreement.	Completed

<table>
<tr><th rowspan="2">Frequency Band</th><th colspan="2">Existing Technologies</th><th colspan="2">Coordination Parameters</th><th rowspan="2">Priority</th></tr>
<tr><th>Thailand</th><th>Malaysia</th><th>Existing agreements</th><th>Possible course of action</th></tr>
<tr><td rowspan="8"></td><td></td><td></td><td>3. Coordination distance: 10 km
4. Coordination type: Special condition (Operator to operator)</td><td></td><td></td></tr>
<tr><td>GSM 900</td><td>UMTS</td><td rowspan="7">1. Band plan as agreed at JTC-26:
 



5. Coordination parameters: ECC Rec. (08)02 as agreed at JTC-26.</td><td rowspan="7">Develop coordination types and distances.</td><td rowspan="7">Medium
(By JTC-31)</td></tr>
<tr><td>GSM 900</td><td>LTE</td></tr>
<tr><td>UMTS</td><td>UMTS</td></tr>
<tr><td>UMTS</td><td>LTE</td></tr>
<tr><td>LTE</td><td>LTE</td></tr>
</table>

Frequency Band	Existing Technologies		Coordination Parameters		Priority
	Thailand	Malaysia	Existing agreements	Possible course of action	
1800 MHz	GSM 1800	GSM 1800	1. Spectrum arrangement for 1800 MHz as agreed at JTC-11:  2. Coordination parameters: -85 dBm measured at 5km from the border and 1.5m above ground level with C/I of 9 dB. 3. Coordination distance: 8km from the border	Maintain existing agreement.	Completed

<table>
<tr><th rowspan="2">Frequency Band</th><th colspan="2">Existing Technologies</th><th colspan="2">Coordination Parameters</th><th rowspan="2">Priority</th></tr>
<tr><th>Thailand</th><th>Malaysia</th><th>Existing agreements</th><th>Possible course of action</th></tr>
<tr><td rowspan="6"></td><td></td><td></td><td>4. Coordination type: Special condition (Operator to operator)</td><td></td><td></td></tr>
<tr><td>GSM 1800</td><td>UMTS</td><td rowspan="5">1. Coordination Parameters:
ECC Rec. (08)02 as agreed at JTC-26.
2. Coordination distance: 8 km from the border</td><td rowspan="5">1. Review band plan to reflect full band sharing.
2. To develop coordination types.</td><td rowspan="5">Medium
(By JTC-29)</td></tr>
<tr><td>GSM 1800</td><td>LTE</td></tr>
<tr><td>UMTS</td><td>UMTS</td></tr>
<tr><td>UMTS</td><td>LTE</td></tr>
<tr><td>LTE</td><td>LTE</td></tr>
<tr><td rowspan="2">1920-1980/
2110-2170 MHz</td><td>WCDMA</td><td rowspan="2">WCDMA</td><td rowspan="2">1. Spectrum arrangement for 2100 MHz as agreed at JTC-23:
<table><tr><td>Thailand</td><td>DTN</td><td>REAL FUTURE</td><td>AWN</td><td>TOT</td></tr><tr><td>Uplink</td><td>1920-1935</td><td>1935-1950</td><td>1950-1965</td><td>1965-1980</td></tr><tr><td>Downlink</td><td>2110-2125</td><td>2125-2140</td><td>2140-2155</td><td>2155-2170</td></tr><tr><td>Malaysia</td><td>UMOBILE</td><td>MAXIS</td><td>CELCOM</td><td>DIGI</td></tr></table>2. Coordination parameters: -105 dBm measured at 3km from the border and 1.5m above ground level.
3. Coordination distance: 6 km from the border
4. Coordination type: Notification</td><td rowspan="2">1. Review coordination parameters and notification format to accommodate LTE.
2. Review band plan to reflect full band sharing.</td><td rowspan="2">Medium
(By JTC-29)</td></tr>
<tr><td>LTE</td></tr>
<tr><td rowspan="3">2300-2400 MHz</td><td>Fixed</td><td rowspan="2">WiMAX</td><td rowspan="3">1. No agreed band plan.
2. See Section 3.3 of the compilation of agreed band plans, coordination parameters, and registration procedure.</td><td rowspan="3">Develop band plans, coordination types, and distances as required.</td><td rowspan="3">Medium
(JTC-31)</td></tr>
<tr><td>Mobile</td></tr>
<tr><td>TDD LTE</td><td>TDD LTE</td></tr>
<tr><td>2500-2690 MHz</td><td>BWA/IMT</td><td>LTE</td><td>1. No agreed band plan.
2. See Section 3.3 of the compilation of agreed band plans, coordination parameters, and registration procedure.</td><td>Develop band plans, coordination types, and distances as required.</td><td>Medium
(JTC-31)</td></tr>
</table>

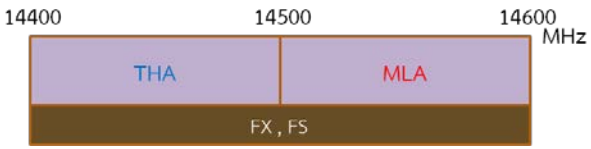
Frequency Band	Existing Technologies		Coordination Parameters		Priority
	Thailand	Malaysia	Existing agreements	Possible course of action	
<10 GHz	Fixed	Fixed	1. No agreed band plan. 2. Coordination distance: 35 km from the border 3. Coordination type: Registration	1. To share existing usage 2. Develop a band plan for fixed links for possible full band sharing.	Medium (JTC-31)
10 GHz to 17 GHz	Fixed	Fixed	1. Band plan for 14.4-14.6 GHz as agreed at JTC-10:  2. No agreed band plan for other bands. 3. Coordination distance: 15 km from the border 4. Coordination type: Registration		
>17 GHz	Fixed	Fixed	1. No agreed band plan. 2. Coordination distance: 5 km from the border 3. Coordination type: Registration		

Table of Frequency Coordination Distances and Types

Frequency Band	Technologies		Coordination Types
	Thailand	Malaysia	
47-68 MHz (Band I)	Broadcasting	Broadcasting	For existing assignments, registration has been completed. No new frequency assignment for TV Broadcast.
	Fixed/Mobile	Fixed/Mobile	**Registration**:within distance XX km from border
	Amateur	Amateur	TBD
87.5-108 MHz (Band II)	FM Radio	FM Radio	**Registration**: High power (ERP > 2 kW) within coordination zone **Notification**: Low power (ERP ≤ 2 kW) within coordination zone *MLA and THA have unlicensed equipment (microphones) in this band.
VHF (137-174 MHz)	Fixed	Fixed	**Registration**: within distance XX km from border
	Land Mobile	Land Mobile	**Registration**: within distance 60 km from border
	Amateur	Amateur	TBD
	Maritime Mobile	Maritime Mobile	**Registration**: within distance XX km from border (coast stations and port operation stations only)
VHF (174-230 MHz) (Band III)	Broadcasting	Broadcasting	**Analogue TV** **Registration**: within coordination zone **Digital Broadcast** **Registration**: High & Medium power (ERP ≥ 50 W) within coordination zone **Notification**: Low power (ERP < 50 W) within coordination zone *MLA and THA have unlicensed equipment (microphones and security devices) in this band.
UHF (380-470 MHz)	Fixed	Fixed	**Registration**: within distance XX km from border
	Land Mobile	Land Mobile	**Registration**: within distance 30 km from border
		CDMA 450	*MLA and THA have unlicensed equipment in this band.

<table>
<tr><th rowspan="2">Frequency Band</th><th colspan="2">Technologies</th><th rowspan="2">Coordination Types</th></tr>
<tr><th>Thailand</th><th>Malaysia</th></tr>
<tr><td rowspan="3">UHF
470-510 MHz
(Band IV)</td><td>Fixed</td><td rowspan="3">Broadcasting</td><td rowspan="3">Analogue TV
<u>Registration</u>: within coordination zone

Digital Broadcast
<u>Registration</u>: High & Medium power (ERP ≥ 250 W) within coordination zone
<u>Notification</u> : Low power (ERP < 250 W) within coordination zone

Land Mobile
<u>Registration</u>: within distance 30 km from border

Fixed
<u>Registration</u>: within distance XX km from border

*MLA and THA have unlicensed equipment in this band.</td></tr>
<tr><td>Land mobile</td></tr>
<tr><td>Broadcasting</td></tr>
<tr><td rowspan="2">510-790 MHz
(Band IV/V)</td><td>Broadcasting</td><td>Broadcasting</td><td>Analogue TV
<u>Registration</u>: all stations except lower power stations in Band V within coordination zone
<u>Notification</u>: Low power stations in Band V within coordination zone
(ERP ≤ 3 kW)

Digital Broadcast
<u>Registration</u>: High & Medium power (ERP ≥ 250 W) within coordination zone
<u>Notification</u> : Low power (ERP < 250 W) within coordination zone

*MLA and THA have unlicensed equipment in this band.</td></tr>
<tr><td>IMT</td><td>IMT</td><td>TBD</td></tr>
<tr><td rowspan="2">790-806 MHz</td><td rowspan="2">IMT</td><td>Fixed</td><td rowspan="2">TBD

*MLA and THA have unlicensed equipment in this band.</td></tr>
<tr><td>IMT</td></tr>
<tr><td rowspan="2">806-824/851-869 MHz</td><td>Land Mobile</td><td>Land Mobile</td><td><u>Registration</u>: within distance 30 km from border</td></tr>
<tr><td>IMT</td><td>IMT</td><td>TBD</td></tr>
<tr><td>824-835/869-880 MHz</td><td>IMT</td><td>IMT</td><td><u>XXX</u>: within distance 10 km from border

* THA have unlicensed based stations (femtocells) in this band.</td></tr>
</table>

Frequency Band	Technologies		Coordination Types
	Thailand	Malaysia	
880-894 MHz	WCDMA850	GSM900	* Operator-to-operator coordination * THA have unlicensed based stations (femtocells) in this band.
895-915/940-960 MHz	GSM 900	GSM 900	**XXX**: within distance 10 km from border * THA have unlicensed based stations (femtocells) in this band.
	UMTS	UMTS	TBD
	LTE	LTE	TBD
L Band 1452-1492 MHz	Broadcasting	Broadcasting	TBD
	Fixed		
	IMT	IMT	
1710-1785/ 1805-1880 MHz	GSM 1800	GSM 1800	**XXX**: within distance 8 km from border * THA have unlicensed based stations (femtocells) in this band.
	LTE	LTE	
1920-1980/ 2110-2170 MHz	WCDMA	WCDMA	**Notification**: within distance 6 km from border * Modification to notification format may be required. * THA have unlicensed based stations (femtocells) in this band.
	LTE		
2300-2400 MHz	Fixed	WiMAX	**WiMAX** **Registration**: within distance 7 km from border **Fixed** **Registration**: within distance 35 km from border (Microwave link) **Mobile** TBD
	Mobile		
	TDD LTE	TDD LTE	TBD
2500-2690 MHz	BWA/IMT	LTE	**XXX**: within distance 7 km from border
<10 GHz	Fixed	Fixed	**Registration**: within distance 35 km from border (Microwave link)
10 GHz to < 17 GHz	Fixed	Fixed	**Registration**: within distance 15 km from border (Microwave link)
>17 GHz	Fixed	Fixed	**Registration**: within distance 5 km from border (Microwave link except E-Band)
E-Band 71-76/81-86 GHz	Fixed	Fixed	**Notification**: within distance 5 km from border

JTC FREQUENCY COORDINATION GUIDELINE

1 Introduction

JTC Frequency Coordination is to ensure efficient use and effective coordination of frequency spectrum along Thailand-Malaysia border. Registration and Notification of frequency assignments are required prior to use so that in the event of interference, the station causing interference and the owner of the station could be identified to resolve the interference.

2 Coordination Scheme

2.1 **Licensed Band**

a. Shared band
   - Both sides can use the band with coordination parameters within the agreed coordination distance/zone.

b. Band segmentation
   - Both sides can use the band without restriction within its allocated block within the agreed coordination distance/zone. However, coordination parameters may be used.

2.2 **Unlicensed Band**

a. The use of this band shall be on shared basis;
b. Usage shall not exceed the allowed technical conditions/parameters; and
c. User shall not cause interference and cannot claim protection from licensed and other unlicensed applications.
d. List of harmonized frequency bands for unlicensed devices can be found in the JTC Compilation Handbook (Compilation of Agreed Band Plans, Coordination Parameters and Coordination Procedure).

2.3 **Mixed-use Band**

a. Usage by licensed and unlicensed applications within the same band;
b. Usage of the unlicensed devices shall not cause interference to, and cannot claim protection from, the frequency assignments duly licensed by both countries; and
c. Coordination and interference resolution will be addressed on case by case basis.

3 Coordination Type

3.1 There are 4 types of frequency coordination namely:

a. Registration;
b. Notification;
c. Temporary acceptance of an assignment; and
d. Exemption of coordination.

3.2 **Registration**

3.2.1 This type of coordination applies to usage of any frequency along the common border area that may cause interference which both sides agreed to register.

3.2.2 All frequency assignments submitted for registration will be either approved or rejected. In case of rejection, there shall be an accompanying reason.

3.2.3 Submission of frequency assignment outside the agreed coordination zone/distance should be avoided**.** In case of that happen, each side should inform each other and return the submission.

3.2.4 All frequency assignments submitted for registration will be recorded in the JTC Database upon approval and are to be protected. The priority of the registered frequency assignment is based on "first comes, first served" basis.

3.2.5 Imposition of Non-Interference Basis (NIB)

3.2.5.1 Assignment imposed with NIB shall not cause interference to and claim protection from:

a. earlier recorded assignment; and
b. assignments within other country's allocated block.

3.2.5.2 NIB shall be imposed only when there exists a high probability that interference to an existing frequency assignment will occur. As a general principle, NIB should be applied when there are overlapping of:

a. coverage area;
b. necessary RF bandwidth;
c. radiation directions; and/or
d. hours of transmission of the existing and proposed frequency assignments.

3.2.5.3 Should interference between the two assignments occur, the assignment with NIB should take necessary actions to eliminate the interference.

3.3 **Notification**

3.3.1 This type of coordination applies to usage of any frequency along the common border area that may cause interference which both sides agreed to notify.

3.3.2 All frequency assignments submitted for notification will be acknowledged by the responsible person of each party.

3.3.3 Submission of frequency assignment outside the agreed coordination zone/distance should be avoided. In such case, each side should inform each other and return the submission.

3.3.4 The notified frequency assignment does not establish priority for interference protection; however, interference resolution is to be handled on case by case basis.

3.4 **Temporary acceptance of an assignment**

3.4.1 This type of coordination applies to usage of any frequency along the common border area where no agreement is reached for the frequency band, that may cause interference and are to be recorded on a separate list attached to the JTC Database. Assignments are to be registered in JTC Database once agreement is reached.

3.4.2 The interference resolution is based on case by case basis.

3.5 **Exemption of coordination**

3.5.1 This type of coordination applies to usage of any frequency along the common border which both sides agree to be exempted from coordination prior to use.

3.5.2 List of frequency usage exempted from frequency coordination is as follows:

3.5.2.1 Common Frequency for World-wide Use

a. Frequencies prescribed by the Radio Regulations for common use by stations of a given service need not be registered (see Section V of the preface to the International Frequency List (IFL) and mobile parts of the Radio Regulations).
b. ITU Radio Regulation Appendix 15 on Frequencies for distress and safety communications for the Global Maritime Distress and Safety System (GMDSS).
c. Frequencies of ship station operating in the band allocated to the maritime mobile service need not be registered. Each party must conform to the instructions pertaining to the spot frequencies, channel spacing and mode of operation as specified in the relevant Appendices (Appendices 17, 18 and 25) of the Radio Regulations where appropriate.
d. Frequencies used by radio-location and radio-navigation systems installed on board ships in the Radiolocation and Radio-navigation bands need not be registered.

3.5.2.2 Allocated Frequency based on ITU Allotment Plan

a. Appendix 25 (Allotment Plan for HF Maritime Mobile Band) in conjunction with Appendix 17 (HF Maritime Mobile Channeling Plan)
b. Appendix 26 (Allotment Plan for HF Aeronautical Mobile Band (OR))

3.5.2.3 VHF Aeronautical Mobile in the band 108-137 MHz which have been registered with ICAO.

3.5.2.4 HF Frequencies

a. HF Broadcasting frequencies in the band allocated exclusively for the Broadcasting Service between 5900 – 26100 kHz intended for seasonal broadcasting.
b. Amateur stations in HF Bands.

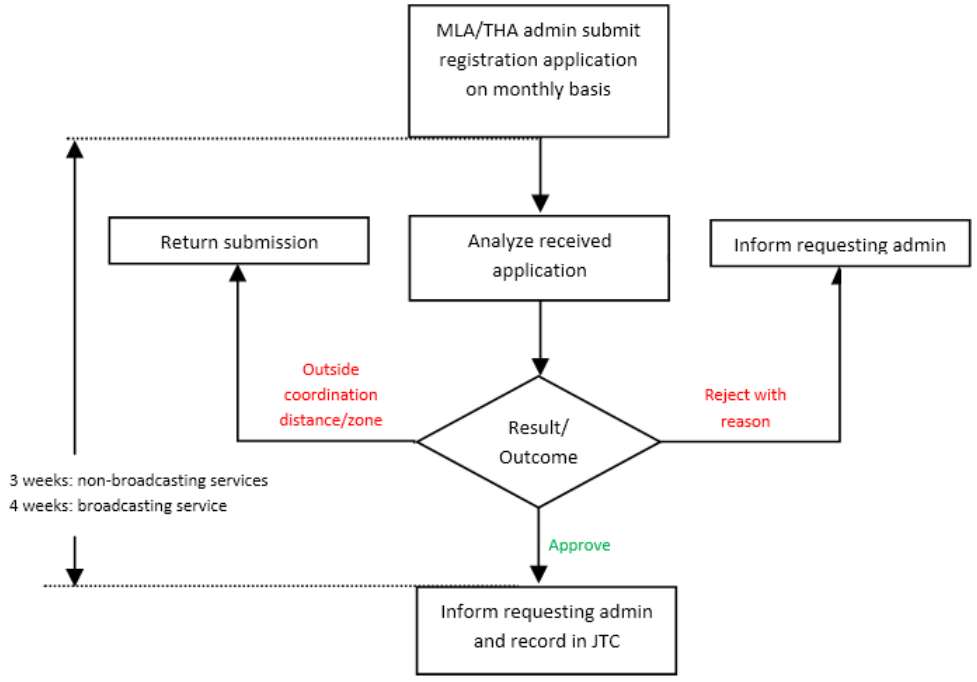
3.5.2.5 All stations in satellite services which will be coordinated in the satellite coordination meeting.

3.5.2.6 Frequency bands used for unlicensed device.

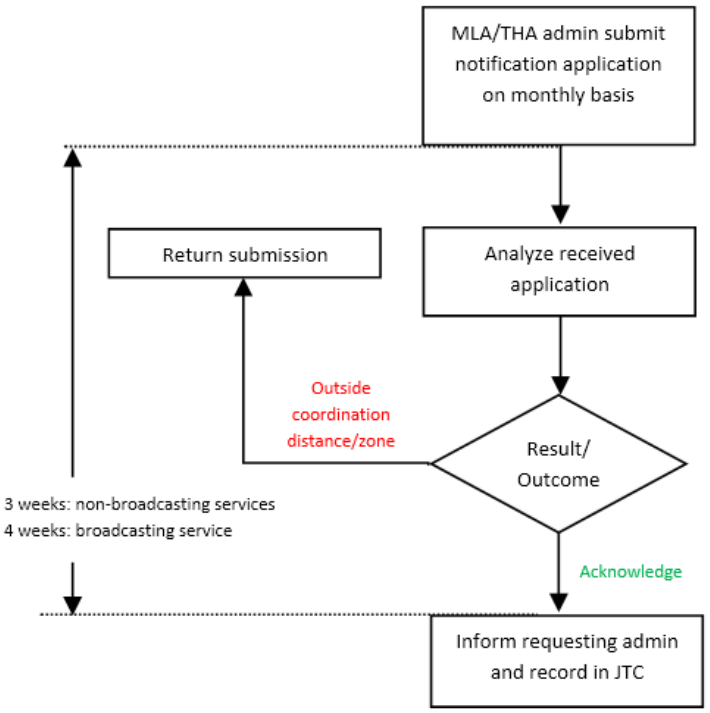
3.5.2.7 Any other frequency usage as agreed by both Administrations.

4 Submission of frequency assignment

4.1 Submission of frequency assignment should be exchanged via E-mail, and the received date would be based on electronic delivery of the information. The procedures for submission are as shown below:



Frequency Registration Procedure



Frequency Notification Procedure

4.2 Before both sides complete their Analogue Switch-Off (ASO), the technical analysis for co-channel usage is required before approval of the frequency registration (high power and medium power transmitter for television broadcasting), therefore, the above timeline can be more than 4 weeks for this specific case.

4.3 For a frequency assignment with more than one emission, the power for each type of emission shall be submitted as a different application.

4.4 All coordinated assignments will be recorded in the JTC Database which is to be maintained in Microsoft Access/Microsoft Excel format. There may be separate databases or different formats for registered assignments and notified assignments.

5 Modification to a recorded assignment

5.1 Resubmission of a recorded assignment

5.1.1 A recorded assignment requiring a change in any one of the following characteristics which may increase the probability of interference to existing assignments, shall be resubmitted as a new application for coordination:

a. Change of assigned frequency;
b. Relocation of transmitting station;
c. Increase of radiated power;
d. Increase of transmitter height (above mean sea level);
e. Increase of bandwidth; and/or

f. Other necessary transmission characteristics (e.g. class of emission, transmitting antenna characteristics, etc.).

5.1.2 Any NIBs previously imposed on other frequency assignments by the recorded assignment shall be treated on a case by case basis.

5.1.3 The recorded assignment shall be deleted from the database upon approval or acknowledgment of the new assignment.

5.2 Amendment of a recorded assignment

5.2.1 A recorded assignment requiring a change in its parameter(s), which will not increase the probability of interference to other existing assignments, other than those parameters indicated in para 5.1.1 shall be considered as amendment.

5.2.2 An amendment to a recorded assignment shall not lose the priority in case of registration.

6 Deletion of a recorded assignment

6.1 The recorded assignments which are no longer required or in use shall be deleted from the JTC Database.

7 Temporary Usage of Frequency

7.1 Frequency assignment used for specified periods which includes (but not limited to) special events, military exercise, trials and demonstrations do not require coordination.

7.2 Usage of the frequency shall be communicated to the responsible person, including all necessary information prior to its transmission.

8 Special Conditions for Frequency Coordination

8.1 Frequency assignment for certain usage, which agreed by both sides, may not be required to be registered or notified. However, certain condition may be imposed such as operator to operator coordination or maintaining an updated database for interference resolution.

9 Notification of Frequency Assignment to be included in ITU MIFR

9.1 Frequency assignment intended for the following services need to be coordinated and approved at JTC prior to its submission to be included in ITU Master International Frequency Register (MIFR):

a. HF Aeronautical Mobile Service; and
b. Coast Stations in Maritime Mobile Service.

10 Application Format

10.1 Formats for Registration, Notification and Temporary Acceptance can be referred to in Appendix 1. Abbreviations and codes for the respective data fields can be referred to in Appendix 2.

11 Review of JTC Database

11.1 Information exchange of JTC database will be done between both sides on a yearly basis.

11.2 Both sides shall review the JTC Database in every 3 years timeframe to ensure that the recorded frequency assignments are still in use and to keep the JTC Database updated. All frequency assignments that are no longer in use shall be deleted from the database.

APPENDIX 1 : FORMATS FOR REGISTRATION, NOTIFICATION AND TEMPORARY ACCEPTANCE

Registration and Temporary Acceptance Format

No.	Field name		No.	Field name	
1	ID		24	A7_MODEL	
2	SUB_TYPE		25	S7_RADIUS	
3	MTG_NO		26	F1_TXRX	
4	APPDATE		27	F2_POLCODE	
5	OAC		28	F3_TXASFRE	
6	CLIENT		29	F4_TXCRFRE	
7	S1		30	F5_RXASFRE	
8	S2		31	F6_RXCRFRE	
9	S3		32	F7_SVCCODE	
10	S4		33	F8_ITUCODE	
11	S_5 LAT		34	F9_STCODE	
12	S_5 LONG		35	F10_HOUR	
13	S_6 LATLINK		36	T1_BW	
14	S_6 LONG LINK		37	T2_EMCLASS	
15	S6LINK_LOC		38	T3_RFOPPOW	
16	S8_AMSL_M		39	T5_TOTALLO	
17	A1_AGL_M		40	T6_RAD_PWR	
18	A1_AMSL_M		41	T8_MODTYPE	
19	A2_GAIN_DB		42	T9_MODSCHE	
20	A3_AZIMUTH		43	T10_MODFACT	
21	A4_3DB		44	T12_BITRATE	
22	A8_ELEVATI		45	R1_PMIN	
23	A6_MFR		46	REMARKS	

Notification Format

3G 2100 MHz (as agreed at JTC-23)

No.	Field name		No.	Field name	
1	ADMIN		7	TX FREQ	
2	CLIENT		8	RX FREQ	
3	STATION NAME		9	BANDWIDTH	
4	LOCATION		10	TX POWER	
5	LATITUDE		11	EFF RADIATED POWER	
6	LONGITUDE				

E-Band (71-76/81-86 GHz) (as agreed at JTC-24)

No.	Field name		No.	Field name	
1	ADMIN		10	RX FREQ	
2	CLIENT		11	BANDWIDTH	
3	STATION NAME		12	TX POWER	
4	LOCATION		13	EFF RADIATED POWER	
5	LATITUDE		14	ANTENNA HEIGHT	
6	LONGITUDE		15	ANTENNA AZIMUTH/ELEVATION	
7	LINK LATITUDE		16	ANTENNA GAIN	
8	LINK LONGITUDE		17	ANTENNA PATTERN	
9	TX FREQ		18	ANTENNA POLARIZATION	

Broadcasting Service (As agreed at JTC-28)

Same format as registration.

APPENDIX 2: EXPLANATORY NOTES TO THE REGISTRATION AND NOTIFICATION FORMATS

EXPLANATORY NOTES TO THE INFORMATION TO BE FURNISHED FOR THE RESPECTIVE DATA FIELDS:

DATA ITEM	DATA NAME	FIELD NAME	DATA TYPE	CODE	DESCRIPTION
1	Identification Number	ID	Char(10)	-	Unique ID for each submission record: TXXX for Thailand Submission MXXX for Malaysia Submission e.g. T25, M150
2	Submission Type	SUB_TYPE	Char(7)	Meeting Online	Submission at JTC meeting Submission Online
3	JTC Meeting Number	MTG_NO	Char(7)	-	Number of JTC Meeting that approves frequency registration records e.g. JTC-24
4	Approval Date	APPDATE	Char(9)	-	Date of the frequency registration records approval e.g. DDMMMYYYY
5	Operating Administration	OAC	Char(4)	PTD NTC NBTC MCMC	Post and Telegraph Department (2001 – 2004) National Telecommunications Commission (2005 – 2011) National Broadcasting and Telecommunications Commission (2012 – present) Malaysian Communications and Multimedia Commission (Malaysia)
6	Client Name	CLIENT	Char(40)	-	Full name of applicant
7	Station Type	S1	Char(2)	10 11 12 20	Land/Fixed Station (Non-Microwave) Microwave Earth Station Microwave Fixed Station Land Mobile Station (Non-Microwave)

DATA ITEM	DATA NAME	FIELD NAME	DATA TYPE	CODE	DESCRIPTION
8	Station Name	S2	Char(40)	-	Name of the locality of the station
9	Location of Operation	S3	Char(40)	-	Country/State/Province/District or Town in which the station is located
10	Intended Use	S4	Char(2)	01	Paging
				02	Leased Channel
				03	Trunked Radio System
				04	Personal Communication Network
				05	Rural Call Service
				06	Cellular Mobile Radio System
				07	Telepoint (e.g. CT2)
				08	Carphone
				09	Country Set
				10	Wireless LAN
				11	Multi-Channel Analogue-Main
				12	Multi-Channel Analogue-Spur
				13	Multi-Channel Digital-Main
				14	Multi-Channel Digital-Spur
				15	Multi-Access Radio System (MARS)
				16	Service Channel
				17	Telemetry
				18	Private Business
				19	Broadcasting (including Auxiliary to Broadcasting)
				20	Press
				21	Localized Network is a radiocommunication network in which the handheld equipment are intended to be operated in a small specific geographical area e.g. factories, warehoused, campus, hospitals, shops and office complexes for security and/or operational communication
				22	Official Network is radiocommunication network operated by statutory and government bodies
				23	Radar Station
				24	Radio Mobile Data
				25	Equipment operating in the ISM Bands
				26	LPD use for remote-control (alarm & etc.)
				27	Satellite systems (Including earth station and VSAT)

DATA ITEM	DATA NAME	FIELD NAME	DATA TYPE	CODE	DESCRIPTION
				28 29 30 31 32	Receiving systems operating in the band approved by agreements Amateur Station (Tx and Rx) Radionavigation, DF & Sat-GPS Aeronautical Communications Point-to-multipoint system (e.g. FWA)
11	Station Coordinates Latitude	S_5 LAT	Char(7)	-	Latitude and Longitude of the station Mobiles-to-mobiles communication: Latitude and Longitude of the centre of coverage is to be given Mobiles–to-base stations communication: Latitude and Longitude of the base station is to be given <u>Lat(N/S) Long(E/W)</u> deg (00-90) deg (000-180) min (00-59) min (00-59) sec (00-59) sec (00-59) e.g. 065439N, 1004523E
12	Station Coordinates Longitude	S_5 LONG	Char(8)	-	
13	Link Coordinates Latitude	S_6 LATLINK	Char(7)	-	Microwave Link: Latitude and Longitude of the target of the main beam link (the receiving station's coordinates or a geographic point) <u>Lat(N/S)Long(E/W)</u> deg (00-90) deg (000-180) min (00-59) min (00-59) sec (00-59) sec (00-59) e.g. 065439N, 1004523E
14	Link Coordinates Longitude	S_6 LONG LINK	Char(8)	-	
15	Link Location	S6LINK_LOC	Char(40)		Name of the geographic location where the radio link terminates
16	Elevation (m)	S8_AMSL_M	Number (6,2)	-	Elevation above mean sea level of the ground at the site of the station e.g. 0.00
17	Height Above Ground (m)	A1_AGL_M	Number (6,2)	-	Height of the antenna above ground level at the location e.g. 0.00

DATA ITEM	DATA NAME	FIELD NAME	DATA TYPE	CODE	DESCRIPTION
18	Antenna Height AMSL (m)	A1_AMSL_M	Number (6,2)		Height of the antenna above mean sea level (= A1_AGL_M + S8_AMSL_M) e.g. 0.00
19	Gain (dB)	A2_GAIN_DB	Number (4,2)	-	Maximum radiation to that of a reference antenna for equal power (Ratio of radiation) e.g. 0.00
20	Azimuth (deg)	A3_AZIMUTH	Number (3,2)	-	a) Direction to which the antenna point, measured at an angle clockwise from true North in degrees b) Non-directional antenna/Omni: 0.0 is to be indicated e.g. 0.00
21	3 dB Beamwidth (deg)	A4_3DB	Number (3,2)	-	Angle between two half-power points (3 dB below maximum radiated power) of the main lobe Non-directional antenna/Omni: 360.00 is to be indicated e.g. 0.00
22	Elevation Angle (deg)	A8_ELEVATI	Number (2,2)	-	Microwave Earth Stations and Microwave Fixed Stations: from the horizontal plane, the angle of the antenna which provide maximum radiation to the target (endpoint) e.g. 0.00
23	Manufacturer	A6_MFR	Char(10)	-	Name of the manufacturer of the antenna
24	Model Code	A7_MODEL	Char(25)	-	Model number of the antenna provided by the manufacturer
25	Radius (km)	S7_RADIUS	Number (4,2)	-	Nominal radius of the circular transmitting area e.g. 0.00

DATA ITEM	DATA NAME	FIELD NAME	DATA TYPE	CODE	DESCRIPTION
26	Tx/Rx Indicator	F1_TXRX	Char(2)	1 2 3	Transmits only Receives only Transmits and Receives
27	Polarization	F2_POLCODE	Char(2)	C CL CR D E H HV L M O R SL SR V	Circular Circular Left Polarized Circular Right Polarized Dual Polarized Elliptical Polarized Horizontal Polarized Horizontal/ Vertical Linear Polarized Mixed Other (unspecified polarization) Rotating Slant Left Polarized Slant Right Polarized Vertical Polarized
28	Tx Assigned Frequency (MHz)	F3_TXASFRE	Number (6,4)	-	Frequency assigned to the transmitting station e.g. 0.0000
29	Tx Carrier Frequency (MHz)	F4_TXCRFRE	Number (6,4)	-	a) Frequency on which the signal is modulated to facilitate transmission b) To be provided only if it is different from the assigned frequency e.g. 0.0000
30	Rx Assigned Frequency (MHz)	F5_RXASFRE	Number (6,4)	-	Frequency assigned to the receiving station e.g. 0.0000
31	Rx Carrier Frequency (MHz)	F6_RXCRFRE	Number (6,4)	-	Frequency on which the signal is modulated to facilitate reception of the transmission e.g. 0.0000

DATA ITEM	DATA NAME	FIELD NAME	DATA TYPE	CODE	DESCRIPTION
32	Nature of Service	F7_SVCCODE	Char(2)	AS	Station using a frequency adaptive system
				AX	Fixed station used for provision of services related to aircraft flight safety
				CO	Station open to official correspondence exclusively
				CP	Station open to public correspondence
				CR	Station open to limited public correspondence
				CV	Station open exclusively to correspondence of a private agency
				FS	Land station established solely for the safety of life
				HP	Fixed station using high altitude platform
				MX	Fixed station used for transmission of meteorological information
				OT	Station open exclusively to operational traffic of the service concerned
				PX	Fixed station used for press transmission
				RC	Non-directional radiobeacon
				RD	Directional radiobeacon
				RG	Radio direction-finding station
				RT	Revolving radiobeacon
				ST	Fixed station using tropospheric scatter
33	ITU Service Code	F8_ITUCODE	Char(3)	AFX	Aeronautical Fixed
				AMR	Aeronautical Mobile-Satellite(R)
				AMS	Aeronautical Mobile-Satellite
				AMX	Aeronautical Mobile
				ARS	Aeronautical Radionavigation-Satellite
				ARX	Aeronautical Radionavigation
				ATX	Amateur
				ATS	Amateur-Satellite
				BCS	Broadcasting-Satellite
				BCX	Broadcasting
				EES	Earth Exploration-Satellite
				FXS	Fixed-Satellite
				FXX	Fixed
				ISM	Industrial, Scientific and Medical Application
				ITS	Intersatellite Service
				LMS	Land Mobile-Satellite

DATA ITEM	DATA NAME	FIELD NAME	DATA TYPE	CODE	DESCRIPTION
				LMX	Land Mobile
				MAX	MeteorologicalAids
				MES	Meteorological-Satellite
				MMX	Maritime Mobile
				MMS	Maritime Mobile-Satellite
				MOS	Mobile-Satellite
				MOX	Mobile
				MRS	Maritime Radionavigation-Satellite
				MRX	Maritime Radionavigation
				POX	Port Operations
				RAX	Radio Astronomy
				RCX	Radiocommunication
				RDS	Radiodetermination-Satellite
				RDX	Radiodetermination
				RLX	Radiolocation
				RNS	Radionavigation-Satellite
				RNX	Radionavigation
				SFS	Standard Frequency and Time Signal-Satellite
				SFT	Standard Frequency and Time Signal
				SMX	Ship Movement
				SOX	Space Operations
				SRX	Space Research
				SSX	Safety Services
				SVX	Special Services
34	Class of Station Code	F9_STCODE	Char(2)	AL	Aeronautical radionavigation land station (transmitting station in the service)
				AM	Aeronautical radionavigation mobile station(receiving station in the service)
				AT	Amateur station
				AX	Aeronautical fixed
				BC	Broadcasting station, sound
				BT	Broadcasting station, television
				EA	Space station in the amateur-satellite service
				EB	Space station in the broadcasting-satellite service (sound broadcasting)
				EC	Space station in the fixed-satellite service Space telecommand space station
				ED	Space station in the standard frequency-
				EE	satellite service Space station in the radiodetermination-

DATA ITEM	DATA NAME	FIELD NAME	DATA TYPE	CODE	DESCRIPTION
				EF	satellite service
				EG	Space station in the maritime mobile-satellite service
				EH	Space research space station
				EI	Space station in the mobile-satellite service
				EJ	Space station in the aeronautical mobile-satellite service
				EK	Space tracking space station
				EM	Space station in the meteorological-satellite service
				EN	Space station in the radionavigation-satellite service
				EO	Space station in the aeronautical radionavigation-satellite service
				EQ	Space station in the maritime radionavigation-satellite service
				ER	Space telemetering space station
				ES	Station in the inter-satellite service
				ET	Space station in the space operation service
				EU	Space station in the land mobile-satellite service
				EV	Space station in the broadcasting-satellite service (television)
				EW	Space station in the earth exploration-satellite service
				EX	Experimental Station
				EY	Space station in the time signal-satellite service
				FA	Aeronautical station
				FB	Base station
				FC	Coast station
				FD	Aeronautical station in the aeronautical mobile (R) service
				FG	Aeronautical station in the aeronautical mobile (OR) service
				FL	Land station
				FP	Port station
				FR	Receive only station
				FX	Fixed station
				LR	Radiolocation land station
					Aircraft station

DATA ITEM	DATA NAME	FIELD NAME	DATA TYPE	CODE	DESCRIPTION
				MA	Land mobile station
				ML	Mobile station
				MO	Radiolocation mobile station
				MR	Ship station
				MS	Maritime radionavigation land station
				NL	Radionavigation mobile station
				NR	Oceanographic data station (RX)
				OD	Oceanographic data interrogation station
				OE	(TX)
				PL	Combination of two or more classes of station (limited to collective entries made under the terms of RR2184)
				RA	Radio astronomy station Maritime radionavigation mobile station
				RM	Radionavigation land station
				RN	Meterological aids mobile station (Rx)
				SA	Meteorological aids station (Tx)
				SM	Standard frequency and time signal
				SS	station
				TA	Amateur Earth Station (Space operation earth station in the amateur-satellite service)
				TB	Aeronautical earth station Earth station in the fixed-satellite service
				TC	Space telecommand earth station
				TD	Satellite EPIRB in the mobile-satellite
				TE	service
				TF	Fixed earth station in the radiodetermination-satellite service
				TG	Ship earth station Earth station in the space research service
				TH	Coast earth station
				TI	Aircraft earth station
				TJ	Space tracking earth station
				TK	Mobile earth station in the
				TL	radiodetermination-satellite service
				TM	Earth station in the meteorological-satellite service
				TN	Fixed earth station in the radionavigation-satellite service
				TO	Mobile earth station in the aeronautical radionavigation-satellite service
					Receiving earth station

DATA ITEM	DATA NAME	FIELD NAME	DATA TYPE	CODE	DESCRIPTION
				TP	Mobile earth station in the maritime
				TQ	radionavigation-satellite service
					Space telemetering earth station
				TR	Television, sound channel (audio)
				TS	Earth station in the space operation
				TT	service
					Earth station in the land mobile service
				TU	Television, vision channel (visual)
				TV	Earth station in the earth exploration-
				TW	satellite service
					Fixed earth station in the maritime
				TX	radionavigation-satellite service
					Base earth station
				TY	Fixed earth station in the aeronautical
				TZ	radionavigation-satellite service
					Mobile earth station
				UA	Earth station in the broadcasting-satellite
				UB	service (sound broadcasting)
					Space telecommand mobile earth station
				UD	Mobile earth station in the space research
				UH	service
					Space tracking mobile earth station
				UK	Mobile earth station in the
				UM	meteorological-satellite service
					Mobile earth station in the
				UN	radionavigation-satellite service
					Space telemetering mobile earth station
				UR	Mobile earth station in the space
				UT	operation service
					Earth station in the broadcasting-satellite
				UV	service (television)
					Mobile earth station in the earth
				UW	exploration-satellite service
					Land earth station
				VA	Repeater
				YY	
35	Usage Period	F10_HOUR	Char(3)	H	Scheduled
				H8	8 hours service provided by a ship station
					of the third category
				H16	16 hours service provided by a ship
					station of the second category
				H24	24 hours operation
				HJ	Day use

DATA ITEM	DATA NAME	FIELD NAME	DATA TYPE	CODE	DESCRIPTION
				HN HT HX	Night use Transit period operation Intermittent use during 24 hours operation
36	Bandwidth (kHz)	T1_BW	Number (6,2)	-	Size of bandwidth e.g. 0.00
37	Class of Emission	T2_EMCLASS	Char(9)	-	According to the RR Appendix 1, class of emission comprises of : Char(4): Necessary bandwidth Char(5): Emission characteristics (the first three characters are mandatory and the last two characters are optional) e.g. 28M0G7WET
38	TX Output Power (Watt)	T3_RFOPPOW	Number (6,2)	-	Radiated power of the transmitter e.g. 0.00
39	Total System Loss (dB)	T5_TOTALLO	Number (6,2)	-	Total reduction in the signal strength through the signal path including insertion and line loss e.g. 0.00
40	Effective Radiated Power (dBW)	T6_RAD_PWR	Number (6,2)	-	Effective radiated power e.g. 0.00
41	Modulation Type	T8_MODTYPE	Char(1)	A D	Analog Digital
42	Modulation Scheme	T9_MODSCHE	Char(9)	 AM-SSB-TV AM VIDEO ASK DAV DIV DUV FDM-FM FM VIDEO	How the information carried by the signal is encoded onto the carrier frequency Amplitude Modulation SSB-TV Amplitude Modulation Video (Audio Sub-Carrier) Amplitude Shift Keying Data Above Voice Data In Voice Data Under Voice Frequency Division Multiplex-Frequency Modulation Frequency Modulation Video

DATA ITEM	DATA NAME	FIELD NAME	DATA TYPE	CODE	DESCRIPTION
				FSK MSK OQPSK PSK QAM QPR QPRS QPSK TCM	Frequency Shift Keying Minimum Shift Keying Offset Quadrature Phase Shift Keying Phase Shift Keying Quadrature Amplitude Modulation Quadrature Partial Response Quadrature Partial Response Signaling Quadrature Phase Shift Keying Trellis Coded Modulation
43	Modulation Factor	T10_MODFACT	Number (4)	-	Modulation factor of the digital modulation type e.g. PSK 8 Phase: the code to be furnished is 8
44	Bit Rate (Mbits/s)	T12_BITRATE	Number (6,2)	-	Rate of transmission at which a digital system can send binary signal e.g. 0.00
45	Minimum Rx Signal (dBW)	R1_PMIN	Number (6,2)	-	Minimum received signal level required at the receiving site e.g. 0.00
46	Remarks	REMARKS	Char(40)	-	Any comments or special consideration to be noted.

Note: Hyphen (-) indicates that no info provided in the submission

Doc.JTC-28/T-14

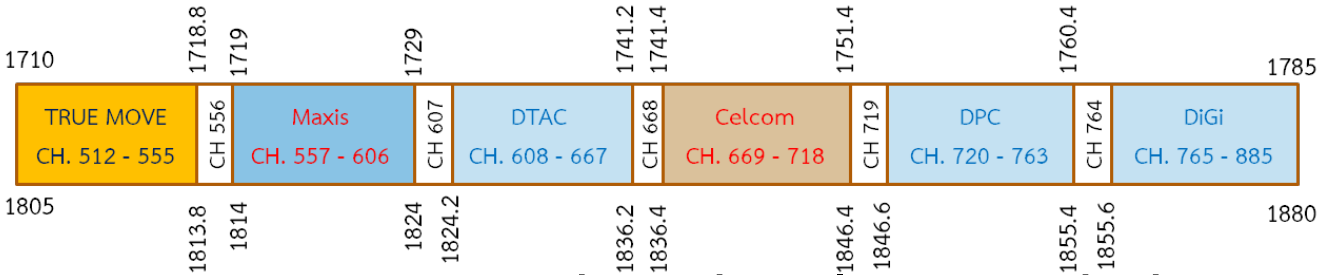
Band Plan, Coordination Parameters and Coordination Type for 1800 MHz

สำนักงานคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ
The National Broadcasting and Telecommunications Commission

Band Plan, Coordination Parameters and Coordination Type for 1800 MHz

Existing Agreement

- Band plan: frequency partitioning



- For GSM 1800 MHz, the signal strength is -85 dBm measured at 5 km from border and 1.5 m above ground level. C/I is 9 dB.
- Coordination distance is 8 km from border.

Proposal (1)

- Since the existing agreement has not covered LTE Technology, the Meeting is invited to consider the followings:
  - To revise existing coordination distance: 9 km from border

    Refer to JTC-26, coordination parameters for GSM/LTE and LTE/LTE: ECC Rec. 08(02).

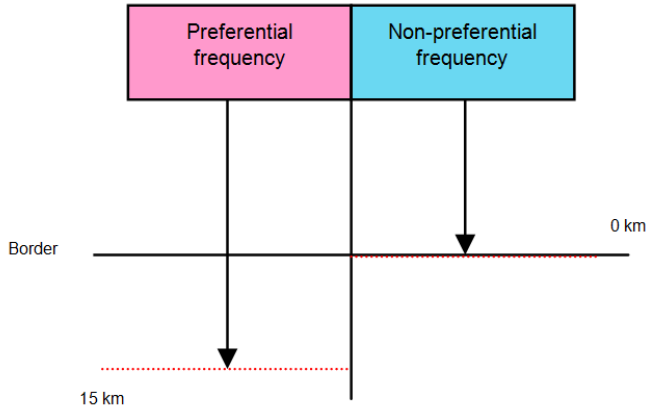
Field Strength (dBuV/m/5MHz)	Field Strength at 3 m height
65 @ 0 km	-77.4 dBm
41 @ 9 km	-101.4 dBm

  - To adopt coordination type: Notification (same format with 3G2100)

Proposal (2)

- To revise existing coordination parameters for GSM/GSM.
  - Option A: band partitioning (review the existing partitioning) and use agreed parameter, which is - 85 dBm measured at 5 km from border and 1.5 m above ground level. C/I is 9 dB.
  - Option B: band partitioning and use ECC Rec. 05(08)

    For preferential frequencies, field strength cannot exceed 25 dBuV/m measured at 15 km from border and 3 m above ground level. For non-preferential frequencies, field strength cannot exceed 25 dBuV/m measured at 0 km from border and 3 m above ground level.



Proposal (3)

- To review existing coordination parameters for GSM/GSM. (continue)
  - Option C: full-band sharing and field strength cannot exceed 25 dBuV/m measured at 0 km from border and 3 m above ground level.

    Examples of dBuV/m to dBm conversion are as shown in the table below:

Field Strength (dBuV/m)	F = 1805 MHz	F = 1880 MHz
25	-117.33 dBm	-117.68 dBm

Thank you

Spectrum Management Bureau
The Office of the National Broadcasting and Telecommunications Commission (NBTC)
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Doc.JTC-28/T-15

1800MHz Band Plan & Coordination Type

1800MHz BAND PLAN & COORDINATION TYPE

28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand – Malaysia Common Border Meeting

16 – 18 December 2015

Chiang Rai, Thailand

Malaysian Communications & Multimedia Commission

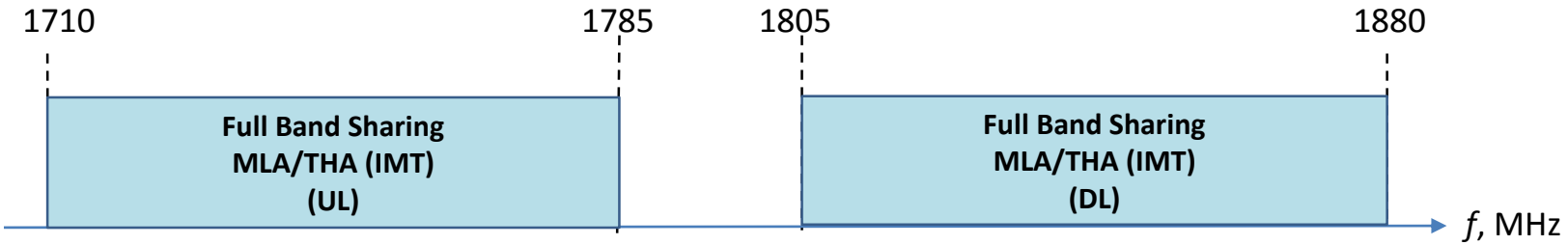
BACKGROUND

From 2nd Special Meeting (20-22 Oct 2015):

- MLA and THA have deployed or plan to deploy new systems within the 1800MHz band
- At JTC-23, coordination distance has been agreed at 8km
- At JTC-26, coordination parameters has been agreed based on ECC Rec. 08(02)
- No band plan has been agreed
  - Current band plan is only applicable to GSM vs GSM
- No coordination type has been agreed
  - Coordination type for GSM vs GSM is “Special Condition” (operator-to-operator coordination)

PROPOSAL

- To adopt full band sharing for the 1800MHz frequency band (1710-1785MHz/ 1805-1880MHz) for all systems as shown below:



- Justifications for full band sharing:
  - Able to cater for multiple systems both narrow band and wideband systems
  - Faster network roll-out

- To consider coordination type of “Special Condition” (operator-to-operator coordination)

RECOMMENDATION

The Meeting is invited to consider the proposals

THANK YOU

Doc.JTC-28/T-16

Band Plan, Coordination Parameters and Notification Format to accommodate LTE Technology in 2100 MHz Band

สำนักงานคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ
The National Broadcasting and Telecommunications Commission

Band Plan, Coordination Parameters and Notification Format to accommodate LTE Technology in 2100 MHz Band

Dec 2015

Spectrum Management Bureau, Office of NBTC

Existing Agreement

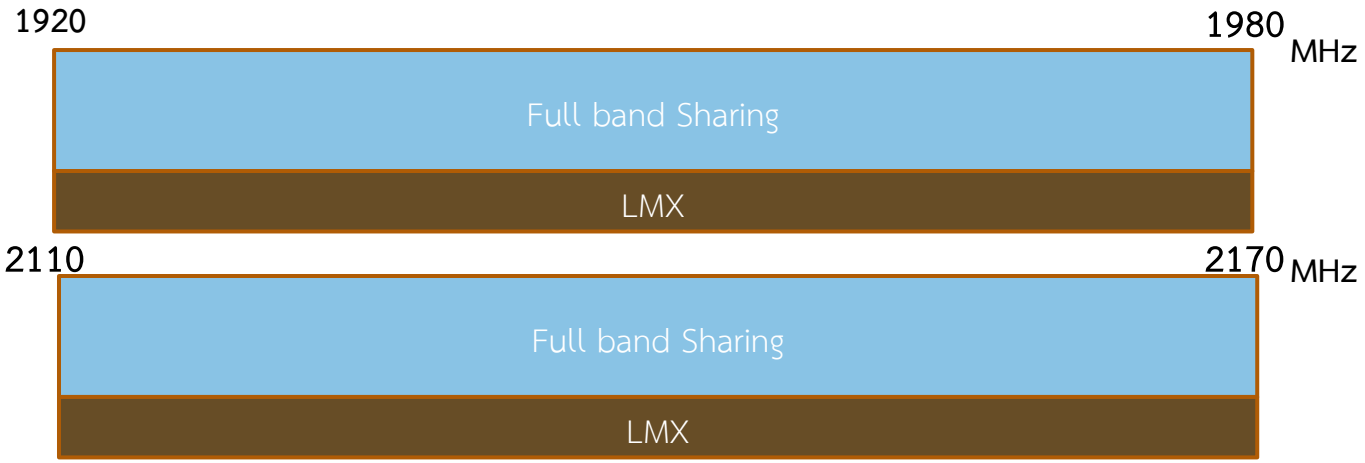
- At JTC-23, 2100 MHz band has spectrum arrangement as shown in the table below:

Thailand	DTN	REAL FUTURE	AWN	TOT
Uplink	1920-1935	1935-1950	1950-1965	1965-1980
Downlink	2110-2125	2125-2140	2140-2155	2155-2170
Malaysia	UMOBILE	MAXIS	CELCOM	DIGI

- For WCDMA (3G) 2100 MHz, the signal strength is -105 dBm measured at 3 km from border and 1.5 m above ground level.
- Coordination distance is 6 km from border.
- Coordination type is Notification.

Proposal (1)

- Since the existing agreement has not covered LTE Technology, the Meeting is invited to consider the followings:
  - To adopt full band sharing for FDD system:



  - To adopt coordination distance for LTE: 6 km from border
  - To adopt coordination type for LTE: Notification (same format as 3G2100)

Proposal (2)

- To replace all existing coordination parameters in 2100 MHz band by using ERC Rec. 01-01

  Examples of dBuV/m to dBm conversion are as shown in the table below:

Field Strength (dBuV/m/5MHz)	F = 2110 MHz	F = 2170 MHz
65 @ 0 km	-78.69 dBm	-78.93 dBm
37 @ 6 km	-106.69 dBm	-106.93 dBm

*measured at 3 m above ground level.

Thank you

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The Office of the National Broadcasting and Telecommunications Commission (NBTC)
Email: spectrum@nbtc.go.th

Doc.JTC-28/T-17

2100MHz Band Plan, Coordination Parameters & Coordination Type

2100MHz BAND PLAN, COORDINATION PARAMETERS & COORDINATION TYPE

28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand – Malaysia Common Border Meeting

16 – 18 December 2015

Chiang Rai, Thailand

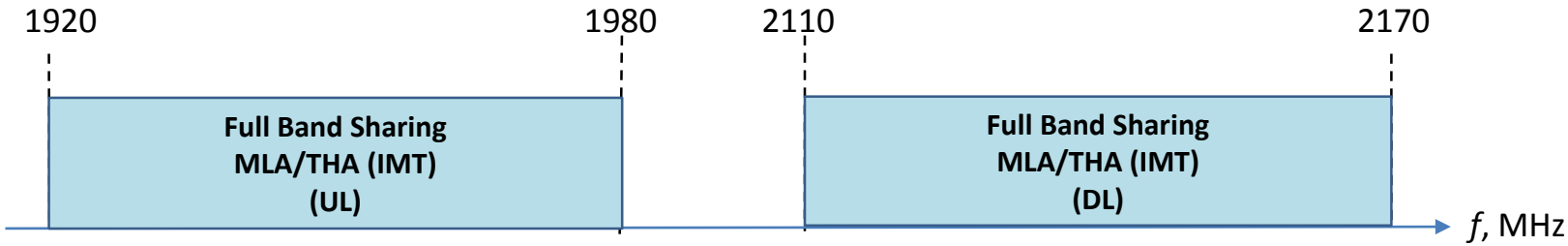
BACKGROUND

From 2nd Special Meeting (20-22 Oct 2015):

- There is a requirement to review the band plan, coordination parameters and coordination type to accommodate new system, ie. LTE
- Current coordination parameters only applicable for WCDMA/UMTS systems
  - -105 dBm at 3 km from border
- Current coordination type is through notification
- At JTC-23, it was agreed on 6km coordination distance

PROPOSAL

- To adopt full band sharing for the 2100MHz frequency band (1920-1980MHz/ 2110-2170MHz) for all FDD systems



- To maintain coordination type which is “Notification” with the same notification format used for 3G 2100MHz that was agreed at JTC-23
- To adopt ECC Rec. 01-01 for the coordination parameters:

	ECC Rec. 01-01	
Systems	UMTS vs UMTS (FDD)	Non-UMTS broadband (FDD)
Mean Field Strength at 3 m above ground	**65 dBµV/m/5MHz @ borderline**	
	37 dBµV/m/5MHz @ 6 km from border	

PROPOSAL

- By using the conversion formula agreed at JTC-25:

dBm = dBμV/m – 20 log f (MHz) + G (dBi) – L (dB) – 77.2

With total system gain of 0 dBi and 0 dB loss since its receiver is mobile terminal and frequency chosen to be 2110MHz (lowest downlink frequency)

	ECC Rec. 01-01	
Systems	UMTS vs UMTS (FDD)	Non-UMTS broadband (FDD)
Mean Field Strength at 3 m above ground	**-79 dBm/5MHz @ borderline**	
	-107 dBm/5MHz @ 6 km from border	

RECOMMENDATION

The Meeting is invited to consider the proposals

THANK YOU

Doc.JTC-28/T-18

Frequency Usage of Microwave Fixed Link in Thailand

สำนักงานคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ
The National Broadcasting and Telecommunications Commission

Frequency Usage of Microwave Fixed Link in Thailand

Dec 2015

Spectrum Management Bureau, Office of NBTC

Background

- The 2nd Special Meeting agreed that both sides share existing usage and to develop a band plan for fixed links for possible full band sharing at the JTC-28 Meeting.

List of Frequency Bands for Microwave Fixed Links in Thailand

- Thailand uses 10 frequency bands for microwave fixed links as follows:
  - 5 GHz band:
    - 4400 – 5000 MHz ITU-R F.746-8 annex 2
    - Channel spacing 28 MHz
  - 6.7 GHz band:
    - 6430 – 7110 MHz ITU-R F.384-9
    - Channel spacing 20 and 40 MHz
  - 7.2 GHz band:
    - 7110 – 7425 MHz ITU-R F.385-8
    - Channel spacing 7, 14 and 28 MHz

List of Frequency Bands for Microwave Fixed Links in Thailand (2)

- 7.5 GHz band:
  - 7425 – 7725 MHz ITU-R F.385-8
  - Channel spacing 7, 14 and 28 MHz
- 8 GHz band:
  - 7725 – 8285 MHz ITU-R F.386-7 annex 6
  - Channel spacing 29.65 MHz
- 11GHz band:
  - 10700 – 11700 MHz ITU-R F.387-10
  - Channel spacing 20 and 40 MHz
- 15 GHz band:
  - 14400 – 15350 MHz ITU-R F.636-3
  - Channel spacing 3.5 7 14 and 28 MHz

List of Frequency Bands for Microwave Fixed Links in Thailand (3)

- 18 GHz band:
  - 17700 – 19700 MHz ITU-R F.595-9
  - Channel spacing 13.75 and 27.5 MHz
- 23 GHz band:
  - 21200– 23600 MHz ITU-R F.637-3
  - Channel spacing 3.5 7 14 28 and 112 MHz
- 71-76 GHz / 81 – 86 GHz band (E-Band) :
  - 71 – 76 GHz / 81 – 86 GHz

Future Plan for Microwave Fixed Links in Thailand

- 2.2 GHz band:
  - 2025 – 2285 MHz
- 8 GHz band (TV pick up) :
  - 8290 – 8250 MHz
- 57 – 66 GHz band (V-Band):
  - 57 – 66 GHz

Proposal

- The Meeting is invited to take note on frequency usage of microwave fixed links in Thailand and consider possible full band sharing for microwave fixed links between Thailand and Malaysia.

Thank you

Spectrum Management Bureau
The Office of the National Broadcasting and Telecommunications Commission (NBTC)
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Doc.JTC-28/T-19

Frequency Band for Microwave Link Application in Malaysia

FREQUENCY BAND FOR MICROWAVE LINK APPLICATION IN MALAYSIA

28th Joint Technical Committee on Coordination and Assignment of Frequencies along Malaysia – Thailand Common Border Meeting

16 -18 December 2015
Chiang Rai, Thailand

Malaysian Communications & Multimedia Commission

OBJECTIVE

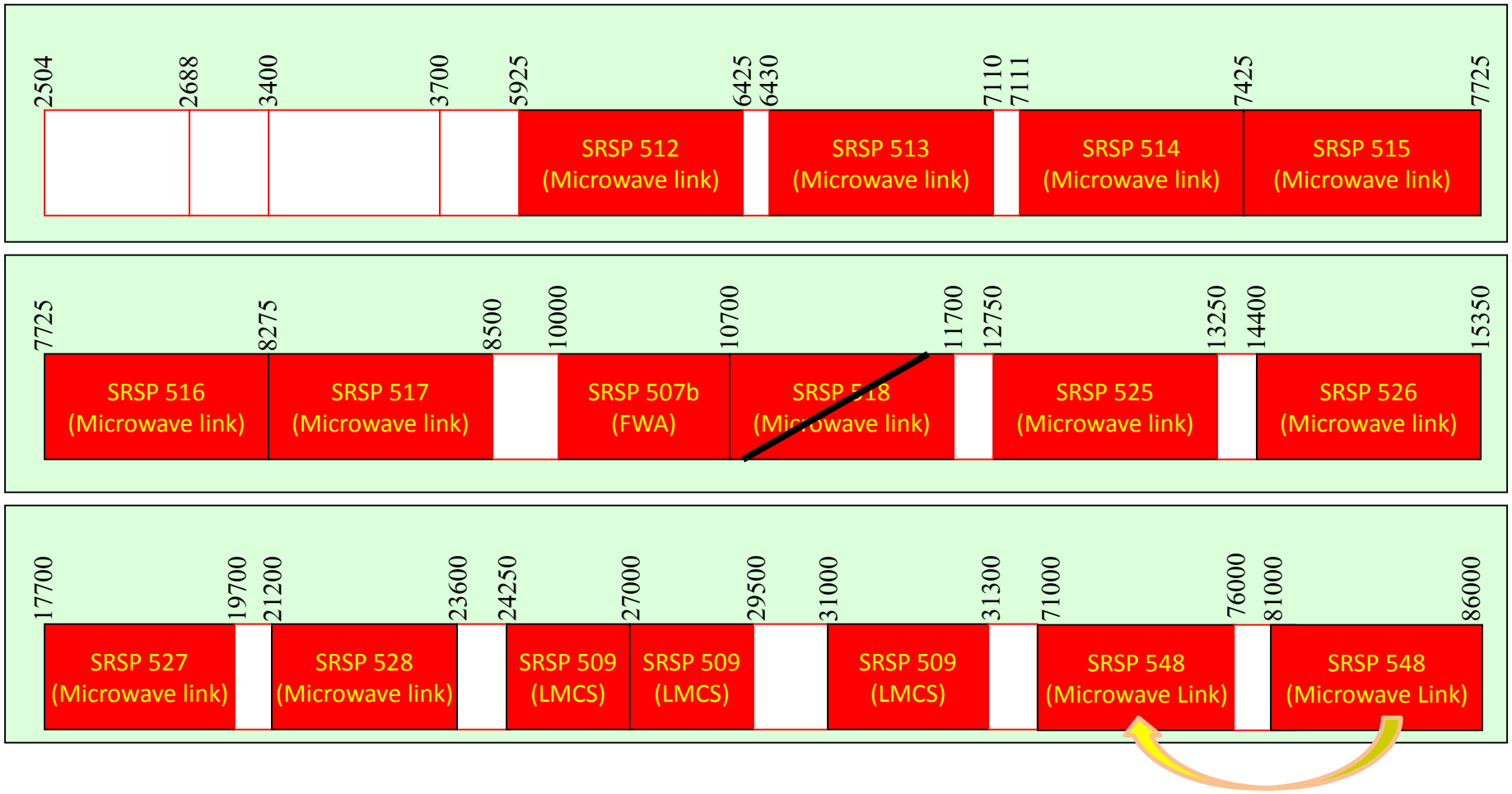
To share information on frequency bands allocated and assigned to microwave link applications (Fixed Service) in Malaysia

BACKGROUND

- MCMC has published a total of 13 Standard Radio System Plan (SRSP) document for microwave link application in frequency range from 5GHz to 86GHz

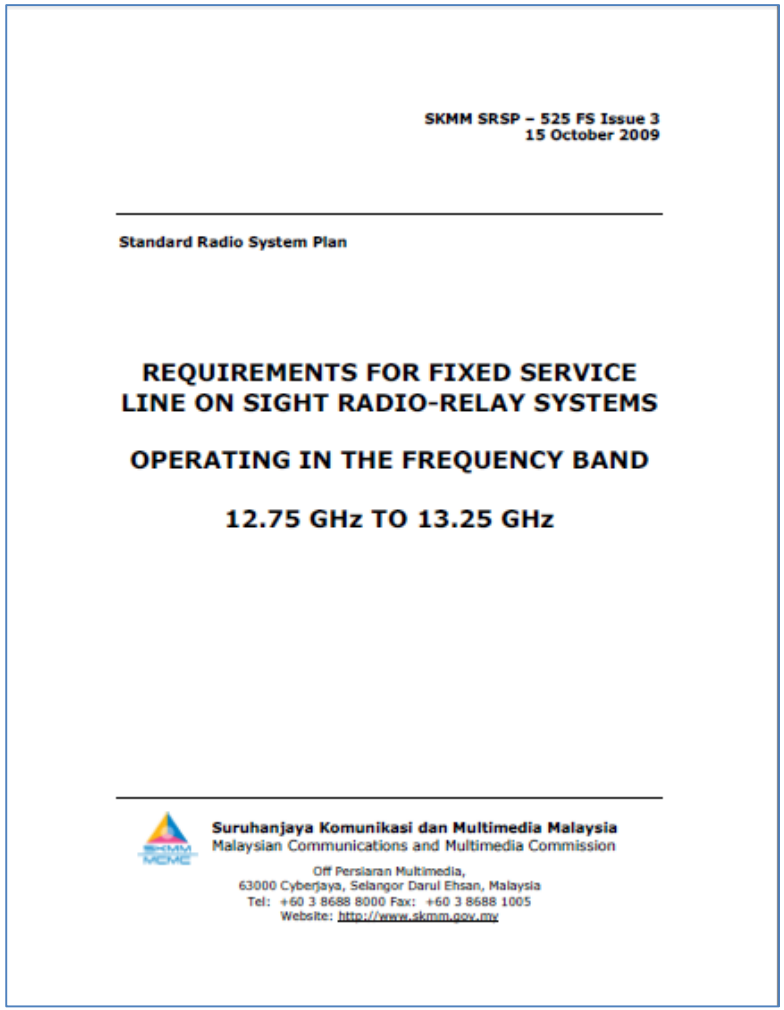
- These SRSP documents provide information on the use of spectrum such as:
  - Minimum technical requirements:
    - examples: trunk/mini link usage, sharing conditions, etc.
  - Frequency channelling plan:
    - example: frequency Tx/Rx separation and channel bandwidth.
  - Assignment of radio spectrum:
    - example: licensing requirement, type of assignment, etc.
  - Coordination requirement
    - example: coordination distances/zones at common border areas.

SRSP for Fixed Service



Operating frequency bands for each SRSP – Fixed Service (FS)

SRSP for Fixed Service



SKMM SRSP – 525 FS Issue 3
15 October 2009

Standard Radio System Plan

REQUIREMENTS FOR FIXED SERVICE
LINE ON SIGHT RADIO-RELAY SYSTEMS

OPERATING IN THE FREQUENCY BAND

12.75 GHz TO 13.25 GHz

Suruhanjaya Komunikasi dan Multimedia Malaysia
Malaysian Communications and Multimedia Commission

Off Persiaran Multimedia,
63000 Cyberjaya, Selangor Darul Ehsan, Malaysia
Tel: +60 3 8688 8000 Fax: +60 3 8688 1005
Website: http://www.skmm.gov.my

SRSP documents can be accessed at MCMC's website: http://skmm.gov.my/Spectrum/Standard-Radio-System-Plan-Resources/Standard-Radio-System-Plan/List-of-current-SRSPs.aspx

RECOMMENDATION

JTC members are invited to take note on the information regarding SRSPs

THANK YOU

Doc.JTC-28/T-20

Digital Sound Broadcasting Service in Band III

DIGITAL SOUND BROADCASTING SERVICE IN BAND III

28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand – Malaysia Common Border Meeting

16 – 18 December 2015
Chiang Rai, Thailand

Malaysian Communications & Multimedia Commission

OUTLINE OF PRESENTATION

- Objective
- Background
- Audio Broadcasting Technologies
- DSB Development - Europe
- Policy Status – Digital Switch Over
- Advantages of DSB
- Summary
- Proposal
- Way Forward

OBJECTIVE

To study on possible deployment of Digital Sound Broadcasting (DSB) Service in Band III

BACKGROUND

Analogue TV (ATV)

- Utilizing :
  - Band III (174MHz - 230MHz)
  - Bands IV & V (470MHz – 790MHz)

Digital TV (DTV)

- Operates in Bands IV and V;
- Rollout started in Q2 2015; and
- Simulcast (ATV & DTV) until Analogue Switch Off (ASO) – Q2 2018

Post ASO

- Band III will be vacant – potential candidate band for Digital Sound Broadcasting (DSB)

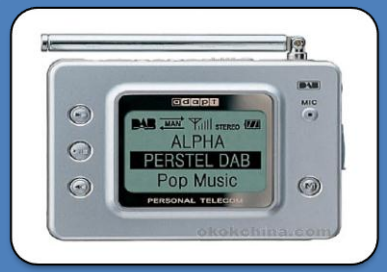
AUDIO BROADCASTING TECHNOLOGIES

Frequency Modulation (FM)

- Analogue
- 87.5 – 108.0MHz (Band II)
- RF Channeling plan : 200kHz/channel

Digital Radio Mondiale (DRM)

- Digital
- HF/Band II/Band III
- RF Channeling plan: 100kHz/channel (Band III)



Terrestrial Digital Audio Broadcast (DAB)

- Digital
- Band III
- RF Channeling plan: 1.75MHz/carrier

DSB DEVELOPMENT - EUROPE

Network Coverage

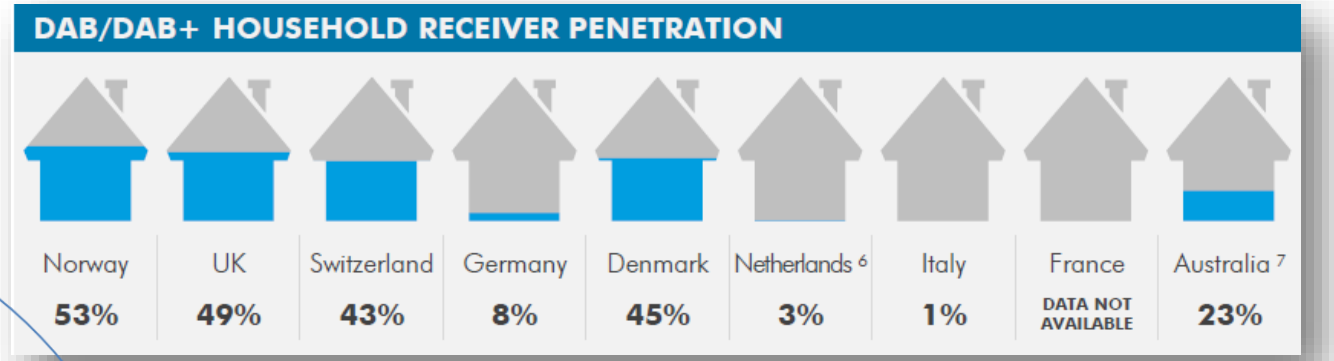
- 90 % of population in UK, Switzerland, Norway, Denmark Germany and Netherlands; and
- 65% of population in Italy

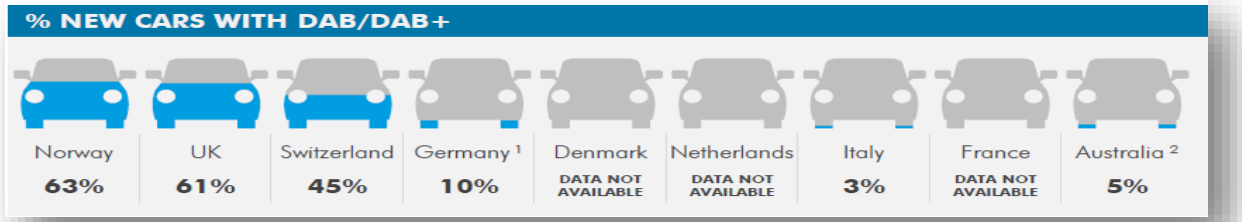
Developing Markets

- Network coverage are being extended in France, Italy and Poland; and
- DAB+ trial is expected in Austria this year

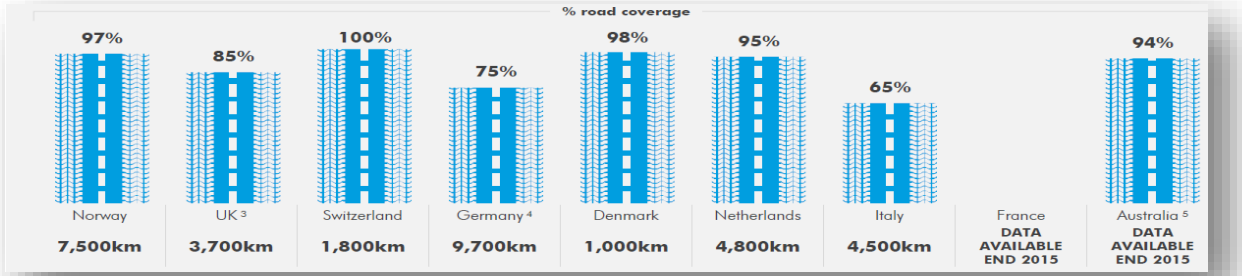
New Cars with DAB/DAB+ receiver

- 63% in Norway
- 61% in UK
- 45% in Switzerland
- 10% Germany





Percentage of new cars with DAB/DAB+



DAB/DAB+ First Level Road Coverage

Source: World DMB 2015

POLICY STATUS - DIGITAL SWITCH-OVER (DSO)

Australia

- DAB+ launched in 5 metropolitan areas
- 64% population coverage

United Kingdom

- Switchover Criteria likely to be ready in 2017

Denmark

- Government target for DSO 2019

Norway

- Criteria met for DSO 2017 or 2019

Switzerland

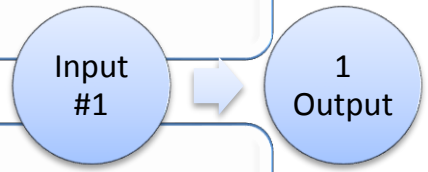
- Broadcast industry has proposed DSO 2020-2024

ADVANTAGES OF DSB……(1/3)

1. Efficient use of Spectrum

FM Radio

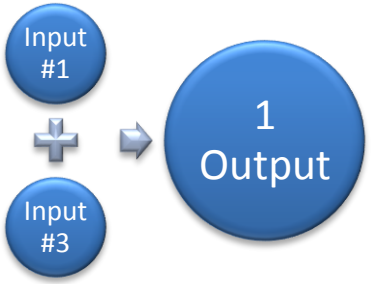
- One complete network per program



- Each transmitter needs another frequency

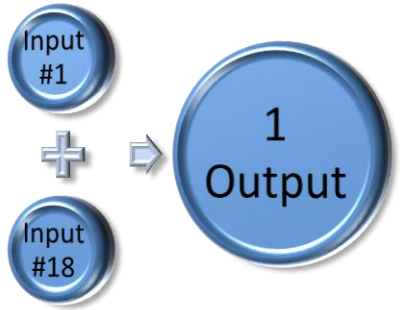
DRM

- One network/one frequency for up to 3 Radio programs



DAB+

- One network/one frequency for up to 18 Radio programs



ADVANTAGES OF DSB……(2/3)

2. Reduction of Capital and Operational Expenditure (CAPEX & OPEX)

Transmitter	FM	DRM+	DAB+
Power	10 kW peak	1 kW rms	2,5 kW rms
Price per Transmitter	50.000 USD	45.000 USD	80.000 USD
Transmitter	18	6	1
Price all Transmitter	900.000 USD	270.000 USD	80.000 USD

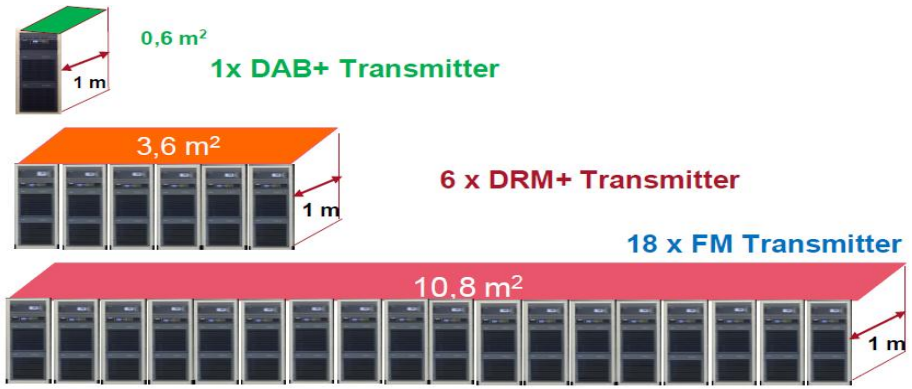
Transmitter investment cost

Transmitter	FM	DRM+	DAB+
Power	10 kW	1 kW rms	2,5 kW rms
Efficiency	72%	40 %	40%
Energy consumption per Transmitter	13,9 kW	2,5 kW	6,25 kW
Transmitters	18	6	1
Energy all Transmitters	250 kW	15 kW	6,25 kW
Annual cost of energy	328.500 USD	20.000 USD	8.000 USD

Cost-energy consumption

Transmitter	FM	DRM+	DAB+
Power	10 kW	1 kW rms	2,5 kW rms
Power consumption (rms)	13,9 kW	2,5 kW	6,25 kW
Dissipated Power	3,9 kW	1,5 kW	3,75 kW
Transmitter for 18 Radio programs	18	6	1
Dissipated power for 18 programs	70,2 kW	9 kW	3,75 kW
Cost per annum	92.250 USD	11.800 USD	5.000 USD

Cost-Room Cooling



Space utilization at transmission site

Source: Gatesair

ADVANTAGES OF DSB……(3/3)

3. Reduces risk of interference

Analogue FM Radio

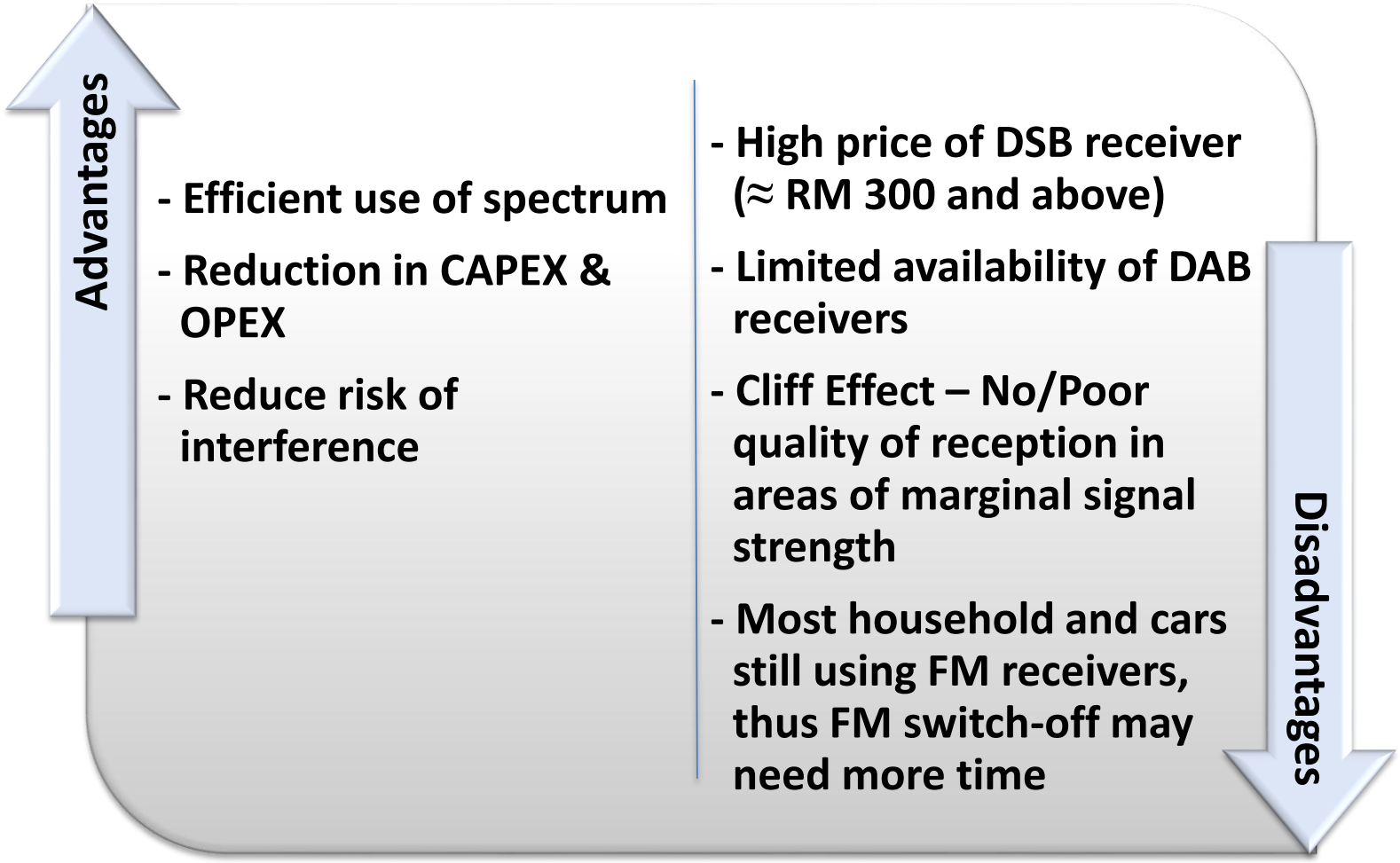
- Multiple Frequency Network (MFN)
  - Multiple frequencies are required to provide required coverage
  - Stringent requirement of frequency separation limits the number of services/operators

DAB+

- Single Frequency Network (SFN)
  - Single frequency is sufficient to provide the required coverage

SUMMARY

Advantages and disadvantages of DSB can be summarized as below:



PROPOSALS

Members are invited to:

i. Take note on the development of DSB;

ii. Study the following items:
- Feasibility of band III as a potential candidate band for deployment of DSB;
- Appropriate timeline for DSO; and
- Viability of simulcast (e.g. FM radio and DAB+).

WAY FORWARD

Members are invited to consider the proposals

THANK YOU

Malaysian Communications and Multimedia Commission

Doc.JTC-28/T-21

TD-LTE on 2300 MHz Band

TD-LTE on 2300 MHz Band

The 28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand - Malaysia Common Border Meeting (JTC-28)

16-18 December 2015

Chiang Rai, Thailand

Backgroud: A Chronology of 2300 MHz Spectrum

- Rural Telephone Services, including public telephony services and transmission links, has been implemented in Thailand using TDMA technology on 2300 MHz spectrum

- NBTC's Spectrum Management Master Plan (No. 2) (B.E. 2558) (2015) mandates that the band of 2300-2400 MHz be targeted for spectrum redeployment for International Mobile telecommunications (IMT) / Broadband Wireless Access (BWA), to be completed within 2018

- NBTC has recently granted TOT rights to develop 4G LTE services in the spectrum band of 2300MHz-2400 MHz for the next ten years

Key Characteristics

- Specified as Time-division Long-Term Evolution (TD-LTE) by 3GPP Band 40 (2300-2400 MHz)
- 60MHz (2310-2370 MHz) of bandwidth permitted for commercial 4G services nationwide
- TD-LTE can adapt to Downlink/Uplink traffic ratio, which is typical of Internet traffic

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

- Physical Cell Identifier (PCI) coordination will be necessary to avoid unnecessary signaling load and handover failures

Proposal

- The meeting is invited to take note of the updated information on the following topics:
  - Development plan for 4G LTE services using the spectrum band of 2300-2400 MHz with initial implementation targeted at Q3 2016
- The meeting is also invited to study the possibility of new source of interference from the spectrum used along Thailand-Malaysia border.

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Bangkok 10210 Thailand

Doc.JTC-28/T-22

Digital Terrestrial Television (Thailand)

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Digital Terrestrial Television (Thailand)

The 28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand-Malaysia Common Border (JTC) Meeting

16-18 December 2015

Broadcasting Technology and Engineering Bureau

Agenda

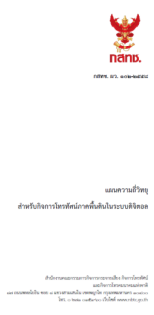
- Rollout Plan at Common Border Areas
- Frequency Re-farming Process (Channels 21 – 25)
- Usage of Frequency Channel 51 at Satun

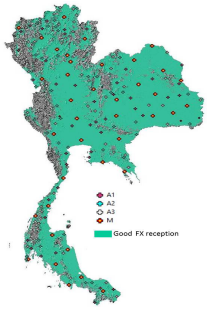
Rollout Plan at Common Border Areas

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Introduction

- NBTC has a collaboration project with ITU:
  - Completed the detailed planning for 39 main sites in February 2014
  - Completed the detailed planning for 132 additional sites in February 2015
- NBTC Notification have been developed “New Radio Frequency Plan for DTTB “
  - Officially posted in the Royal Gazette on August 5, 2015
  - Consist of the frequency plan for 39 main sites and 132 additional sites
    - No change to the technical characteristic of main sites
    - Target coverage is 95% of households





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DTT Rollout Obligation

Phase	Period	Target Households	Deployment of DTT sites
1	April 2014 – June 2014	50%	11 main sites + 1 additional sites (A1)
2	July 2014 – June 2015	80%	28 main sites + 7 additional sites (A1)
3	July 2015 – June 2016	90%	37 additional sites (A1)
4	July 2016 – June 2017	95%	additional sites (A2+A3)

Current Status of DTT Rollout
(As of 4 December 2015)

82.13% of coverage HH
by 39 main sites and 16 A1 sites

Office of the National Broadcasting and Telecommunications Commission (NBTC)

DTTB Sites located in the coordination area

DTTB Sites located in the coordination area

Type	No. of sites	Site Name	Date of Bringing into operation
Main sites (M)	3	▪ Song Khla ▪ Satun ▪ Yala	▪ 1 April 2014 ▪ 1 June 2015 ▪ 1 June 2015
Additional sites (A1)	3	▪ Su-ngai Padi (Narathiwat) ▪ Betong (Yala) ▪ Narathiwat	▪ 1 December 2015 ▪ 1 February 2016 ▪ 1 June 2016
Additional sites (A2)	2	▪ Thepha (Song Khla) ▪ Na-Thawi (Song Khla)	▪ TBD ▪ TBD
Additional sites (A3)	2	▪ _AddSite_074 ▪ _AddSite_119	▪ TBD ▪ TBD
Total	**10**		

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Analogue Switch-Off (ASO) Plan

- Thailand has started ASO in 2015. Two TPBS Analogue TV Stations had been switched off on December 1, 2015.
- TPBS, PRD, RTA, and MCOT will complete their ASO by 2018.

2015
- **TPBS ASO:** 2 Stations

2016
- **TPBS ASO:** 26 Stations

2017
- **TPBS ASO:** 21 Stations
- **RTA ASO:** 4 Stations
- **PRD ASO:** Nationwide

2018
- **TPBS ASO:** 3 Stations
- **RTA ASO:** 37 Stations
- **MCOT ASO:** Nationwide

Concession of Channel 3 and Channel 7 will be ended in 2020 and 2023, respectively.
ASO might be completed before 2023 depending on the proposal from Channel 3 and Channel 7.

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Analogue Switch-Off (ASO) Plan

First ASO at Ko Samui (Surat Thani)

ASO

Ko Samui
Area: 228.7 sq.km.
Population: 65,500

Office of the National Broadcasting and Telecommunications Commission (NBTC)

ASO Plan

TPBS has started their ASO on December 1, 2015. Two TPBS sites at Samui (Surat Thani) and Chai Prakan (Chiang Mai) had been switched off. The following table provides the ASO Plan along the common border between Thailand and Malaysia.

Date of ASO	Site Name	Frequency Channel	Broadcaster
16 June 2017 31 Dec. 2016 31 Dec. 2017	▪ Song Khla ▪ Satun ▪ Yala	10 31 12	TPBS
16 June 2018	▪ Song Khla ▪ Satun ▪ Muang (Yala) ▪ Su-ngai Padi (Narathiwat) ▪ Betong (Yala) ▪ Bannang Star(Yala)	8 7 3 4 52 41	ARMY
31 Dec. 2017	▪ Song Khla ▪ Yala ▪ Satun	10 12 31	PRD
16 July 2018	▪ Satun ▪ Song Khla ▪ Yala	9 4 5	MCOT

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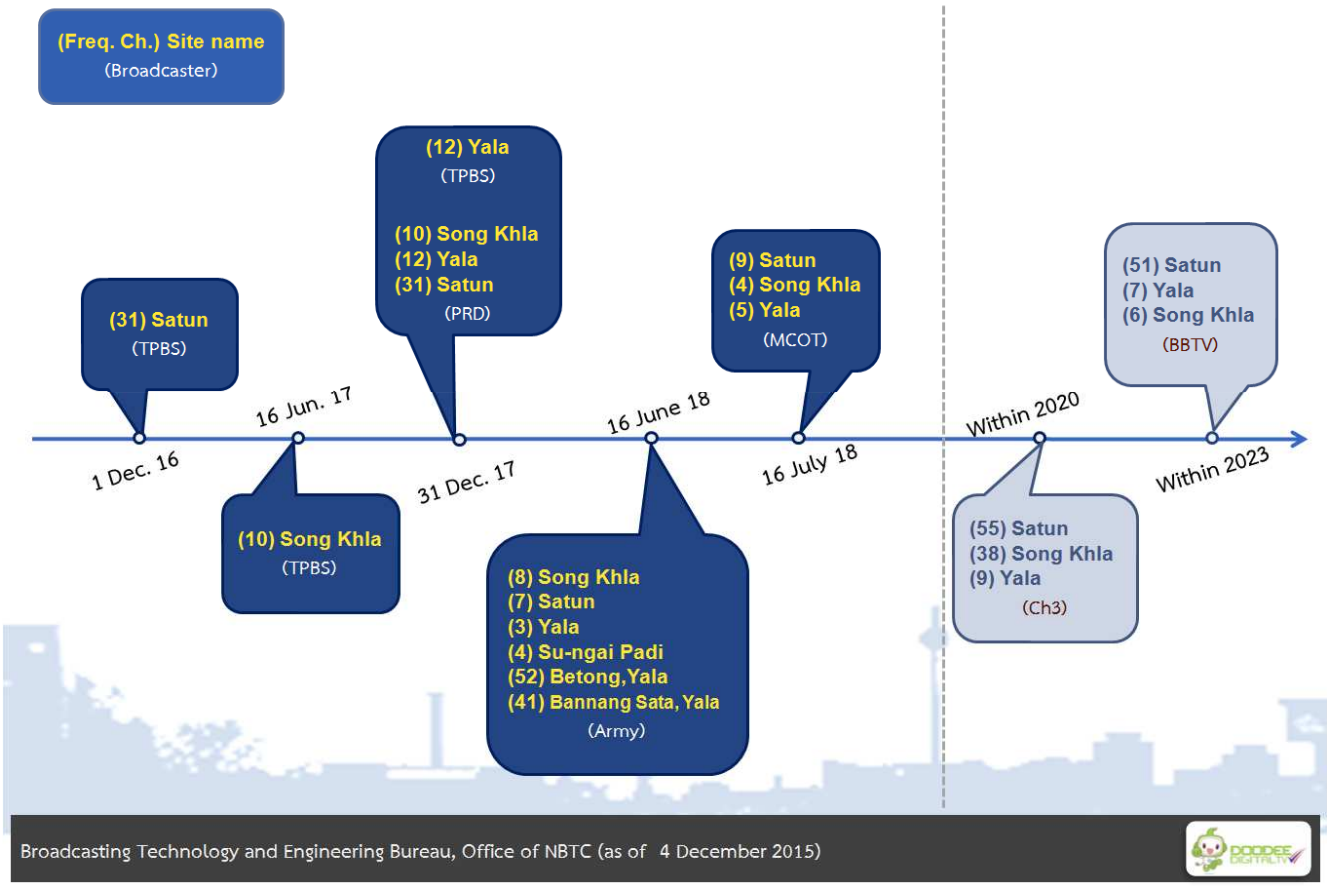
Analogue Switch-off Plan of Thailand (at the common border)



Broadcasting Technology and Engineering Bureau, Office of NBTC (as of 4 December 2015)

Proposal

- The Meeting is invited to take note of the presentation.
- Thailand will update the information at the next JTC Meeting.

Frequency Re-farming Process (Channels 21 – 25)

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Progress

- There are 2 parallel processes:
  (1) Revision on the National Table of Frequency Allocations
  (2) Re-farming process

National Table of Frequency Allocation

- Officially posted in the Royal Gazette (7 September 2015)
- The 470-510 MHz shall be co-primary allocations (FIXED, MOBILE, and BROADCASTING)

Re-farming Process

- Officially posted in the Royal Gazette (25 June 2015)
- It is hi-lighted that the existing services in the band 470-510 MHz (FIXED and MOBILE) shall be relocated to other bands by 2020.

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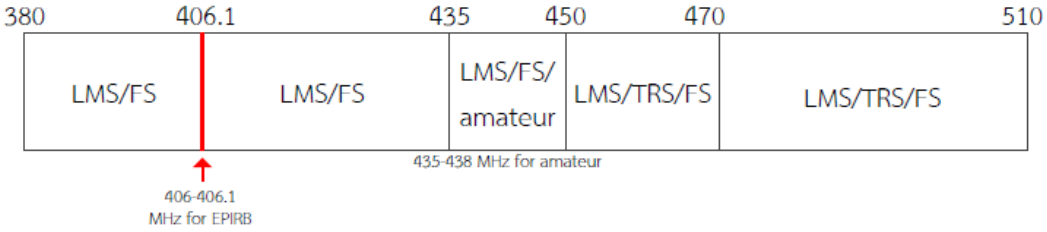
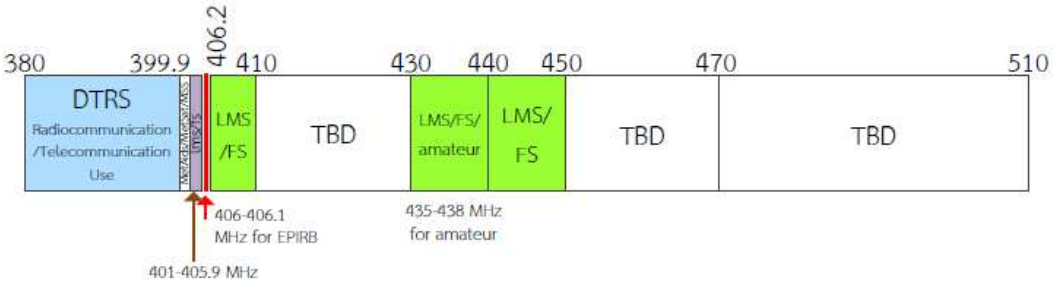
Status of 470-510 MHz

Existing



Future



Office of the National Broadcasting and Telecommunications Commission (NBTC)

Proposal

- The Meeting is invited to take note of the presentation on Frequency Re-farming Process (Channels 21-25).
- Thailand proposes to close this item.

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Usage of Frequency Channel 51 at Satun

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Background

- **JTC-27**
  - Thailand proposed to replace Channel 51 with Channel 58 at Satun for analogue TV service.
  - Malaysia responded that Channel 58 is within the digital dividend spectrum and expressed their concern on the use of this channel at Satun, as it may affect future Mobile service implementation at Malaysia – Thailand common border areas after analogue switch-off process in Malaysia.

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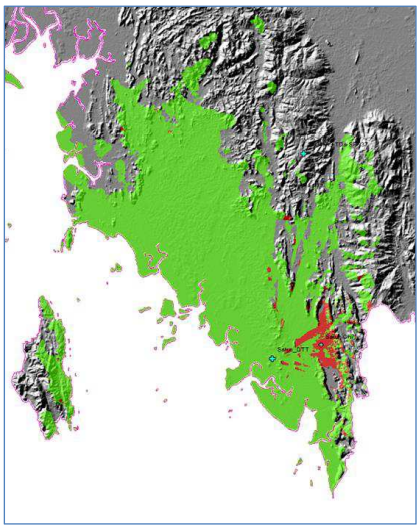
Progress

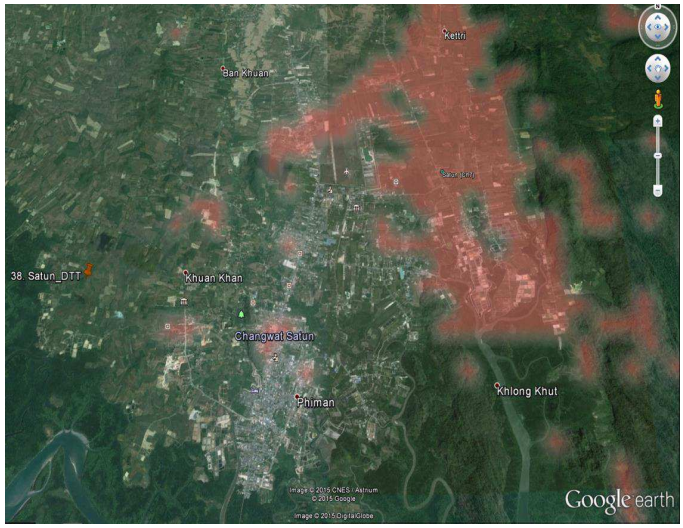
- **After JTC-27**
  - MCMC sent an official letter to Office of the NBTC.
  - MCMC proposed to consider the frequency channel 41 (odd channel) for replacing the frequency channel 51 being used for analogue TV at Satun.
  - NBTC conducted a detailed planning and compatibility check. The result shows the incompatibility between analogue and digital stations.
  - NBTC submitted the result to BBTV Channel 7 for consideration.
  - BBTV Channel 7 confirmed to operate the analogue tv station using frequency channel 58 due to the incompatibility of frequency channel 41.
  - Office of the NBTC sent an official letter back to MCMC and confirmed the usage of the frequency channel 58 to replace the frequency channel 51 (being used by BBTV Channel 7), based on the detailed compatibility study.

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Compatibility Analysis

- The compatibility analysis shows that the adjacent channel interference from Satun ATV (Ch.41) into DTTB site at Satun (Mux#2 Ch.42) is unacceptable.





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Proposal

- The Meeting is invited to agree on the following way forwards:
  - BBTV Channel 7 procures the transmitter and the antenna system for frequency channel 58. This analogue TV station at Satun will be brought into operation before June 2016.
  - The frequency channel 51 at Satun will be switched off before June 2016.
  - BBTV Channel 7 will continue operating the analogue TV station at Satun until 2023 (end of the concession) or it will be switched off sooner depending on the ASO plan.
  - After the implementation of IMT in 700 MHz band in Malaysia, the interference case between IMT and ATV (if any) will be resolved on case-by-case basis. The mitigation techniques might be introduced if required.

- Thailand proposes to close this item. However, this item would be revisited in the future, when necessary.

Note: Due to the internal procurement process, BBTV Channel 7 emphasizes that if they cannot get confirmed by JTC-28 on the frequency channel to replace the frequency channel 51, they will not be able to switch off the frequency channel 51 at Satun before June 2016 as agreed at JTC-26.

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Thank you

Doc.JTC-28/T-23

TV White Space

Office of the National Broadcasting and Telecommunications Commission (NBTC)

TV White Space

The 28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand-Malaysia Common Border (JTC) Meeting

16 – 18 December 2015

Broadcasting Technology and Engineering Bureau

OBJECTIVE

- To share the information from the workshop on Spectrum Regulatory Approach for TV White Space Devices in Vietnam.
- To share the status update on TV White Space in Thailand

ASEAN Workshop

- Host : Authority of Radio Frequency Management (ARFM).
- Spectrum Regulatory Approach for TV White Space Devices.
  - On 19th October 2015 in Ho Chi Minh, Vietnam.
  - ASEAN members (attended): Cambodia, Indonesia, Lao PDR, Philippines, Singapore, Thailand and Vietnam.
- The framework of the ASEAN countries :
  - Most ASEAN countries are in the simulcast period, therefore, the spectrum usage in VHF/UHF band is very congested.
  - In some countries, the policy on TVWS technology will be more clear after Analogue Switch off. (after the completion of digital transition)
  - Encourage ASEAN countries to promote TVWS in VHF/UHF band.

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Status Update of TV White Space in Thailand

- Office of NBTC initiates a project to conduct a study on utilization of TVWS technology in Thailand.
- Objective and Scope of Project :
  - To conduct a study on utilization of the available spectrum in each area within the frequency band allocated to the television broadcasting service
  - To design and develop a communication system for TVWS in Thailand
- This project has been proposed to Executive Committee of “Broadcasting and Telecommunications Research and Development Fund for the Public Interest”.
- The project is pending approval by NBTC.

Broadcasting@NBTC | broadcast.nbtc.go.th

Proposal

- The Meeting is invited to take note of the presentation.
- Thailand proposes to close this item.

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Thank you

Doc.JTC-28/T-24

Database on Existing Frequency Usage for TV and FM Radio Services

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Database on Existing Frequency Usage for TV and FM Radio Services

The 28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand-Malaysia Common Border (JTC) Meeting

16 – 18 December 2015

Broadcasting Technology and Engineering Bureau

Background

- At the Special Meeting between NBTC and MCMC during 20 – 22 October 2015:
  - The Meeting agreed on the procedure and timeline
  - The Meeting appointed the contact persons for the data exchange as follows:

Organization	Name	E-mail address
NBTC	Mr. Supatrasit Suansook	supatrasit.s@nbtc.go.th
MCMC	Ms. Siti Hajar binti Mohd Yakop	siti.hajar@cmc.gov.my

Procedure and Timeline for the Review of JTC database on TV and Radio Services

Items	Nov 15	Dec 15	Jan 16	Feb 16	Mar 16	Apr 16	May 16
a. NBTC and MCMC to review its own database b. To submit the progress report at JTC-28							
a. NBTC and MCMC to exchange the information in the new frequency registration format with the remarks on the records, which needs attention. b. NBTC and MCMC to verify the information							
a. NBTC and MCMC to adopt the existing JTC database							
a. To submit for approval at JTC-29							

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Frequency Registration and Notification (Broadcasting Service)

- Frequency Registration and Notification (Broadcasting Service)
  - Only for the stations which are located in the coordination zones
  - Condition for frequency registration and notification :

Band	Service	Registration	Notification
I	Analogue TV	No new frequency assignment for TV Broadcast (Both Thailand and Malaysia)	
II	FM Radio	High power (ERP > 2 kW)	Low power (ERP ≤ 2 kW)
III	Analogue TV	All powers	-
	Digital TV and Radio	High&Medium power (ERP ≥ 50 W)	Low power (ERP < 50 W)
IV	Analogue TV	All powers	-
	Digital TV	High&Medium power (ERP ≥ 250 W)	Low power (ERP < 250 W)
V	Analogue TV	High power (ERP > 3 kW)	Low power (ERP ≤ 3 kW)
	Digital TV	High&Medium power (ERP ≥ 250 W)	Low power (ERP < 250 W)

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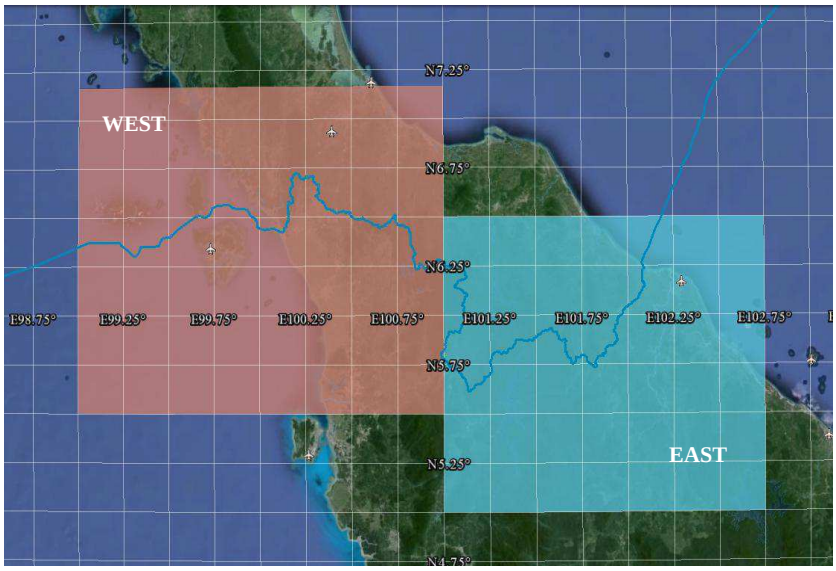
Coordination Zones for Broadcasting Service in VHF Band II/III and UHF Band IV/V



Area / Zone	Longitude (between)	Latitude (between)
WEST	E99° 00' to E101° 00'	N5° 30' to N7° 10'
EAST	E101° 00' to E102° 45'	N5° 00’ to N6° 30’

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Summary of Existing JTC Database (Thailand)

	Number of Records	
Broadcasting Service	**THA**	**MLA**
VHF Band I	8	0
VHF Band II	28	112
VHF Band III	18	48
VHF Band IV/V	18	90

FM stations (Thailand)

	Existing JTC database	Existing NBTC database
Current #stations	28	-
Current #stations located in the new coordination zone	24	28
Operator name	Need to verify	
Frequency	JTC and NBTC databases are aligned	
ERP	Differences are in the range 0.4 – 5.7 dB	
Coordinates	Differences are in the range 0.27 – 100.45 km	
#low power (notification)	-	8
#high power (registration)	28	20
#stations to exclude from the database due to the new coordination zone	4 (incorrect coordinates)	0
#stations to include into the database due to the new coordination zone	N/A	0

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Analogue TV stations in Band I (Thailand)

	Existing JTC database	Existing NBTC database
Current #stations	4 (8 records)	3
Current #stations located in the new coordination zone	4	3
Operator name	Need to verify	
Frequency	JTC and NBTC databases are aligned (3 stations)	
ERP	Differences are in the range 0.63 dB – no info in NBTC DB	
Coordinates	Differences are in the range 0 – 0.52 km	
#low power (notification)	-	-
#high power (registration)	4	3
#stations to exclude from the database due to the new coordination zone	0	0
#stations to include into the database due to the new coordination zone	N/A	0

Analogue TV stations in Band III (Thailand)

	Existing JTC database	Existing NBTC database
Current #stations	9 (18 records)	9
Current #stations located in the new coordination zone	6	9
Operator name	Need to verify	
Frequency	1 station is not aligned	
ERP	Differences are in the range 2-9.65 dB	
Coordinates	Differences are in the range 0.36 – 67 km	
#low power (notification)	-	-
#high power (registration)	6	9
#stations to exclude from the database due to the new coordination zone	3 (incorrect coordinates)	0
#stations to include into the database due to the new coordination zone	N/A	0

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Analogue TV stations in Band IV/V (Thailand)

	Existing JTC database	Existing NBTC database
Current #stations	9 (18 records) [1 station is duplicate]	9
Current #stations located in the new coordination zone	9	9
Operator name	Need to verify	
Frequency	6 stations are matched	
ERP	Differences are in the range 0.69-14.14 dB	
Coordinates	Differences are in the range 0– 6.64 km	
#low power (notification)	0	0
#high power (registration)	9 (incl 1 dup.)	9
#stations to exclude from the database due to the new coordination zone	[3]	0
#stations to include into the database due to the new coordination zone	N/A	[3]

Progress

- NBTC had reviewed its own JTC Database (FM/TV).
- The information is now aligned with the new frequency registration format.
- After JTC-28, NBTC and MCMC will exchange the information in the new frequency registration format with the remarks on the records for which they need further verification.
- The verification process will take place before submitting to JTC-29 for approval.

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Proposal

- The Meeting is invited to take note of the presentation and progress report.
- NBTC will update the information at the next JTC Meeting.

Broadcasting Technology and Engineering Bureau Broadcasting@NBTC | broadcast.nbtc.go.th

Office of the National Broadcasting and Telecommunications Commission (NBTC)

Thank you

Doc.JTC-28/T-25

Usage of Frequency Channel 51 at Satun

Bangkok Broadcasting & TV

Bangkok Broadcasting & TV

Usage of Frequency Channel 51 at Satun

Bangkok Broadcasting & TV

JTC-26

- If the interference case in Malaysia, Thailand will be resolved into operation before June 2016.

- The frequency channel 51 at Satun will be switched off after June 2016.

After JTC-26

- BBTV procures the transmitter and the antenna system for frequency channel 58, will be brought into operation before June 2016.

JTC-27

- Thailand proposed to replace channel 51 with channel 58 at Satun for analogue TV service.

- Malaysia responded that channel 58, as it may affect future Mobile service implementation after analogue switch off process in Malaysia.

After JTC-27

- MCMC proposed to consider the frequency channel 41 (odd channel) for replacing the frequency channel 51 being used for analogue TV at Satun.

- NBTC conducted a detailed planning and compatibility check. The result shows the incompatibility between analogue and digital stations, and submitted the result to BBTV for consideration.

- BBTV confirmed to operate the analogue TV station using frequency channel 58 due to the incompatibility of frequency channel 41.

JTC-28

- BBTV will continue operating the analogue TV station at Satun channel 58 until 2023 (end of the concession), if the interference case will be resolved on case-by-case basic.

Bangkok Broadcasting & TV

Remarks

- BBTV would like get confirmed by JTC-28 on the frequency channel 58 until 2023 to replace from the frequency channel 51, if not confirmed will not be able to switch off the frequency channel 51 at Satun before June 2016 as agreed at JTC-26.

Bangkok Broadcasting & TV

Thank you

Doc.JTC-28/T-26

Band Plan, Coordination Parameters, and Coordination Types for 800/900 MHz Spectrum

สำนักงานคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ
The National Broadcasting and Telecommunications Commission

Band Plan, Coordination Parameters, and Coordination Types for 800/900 MHz Spectrum

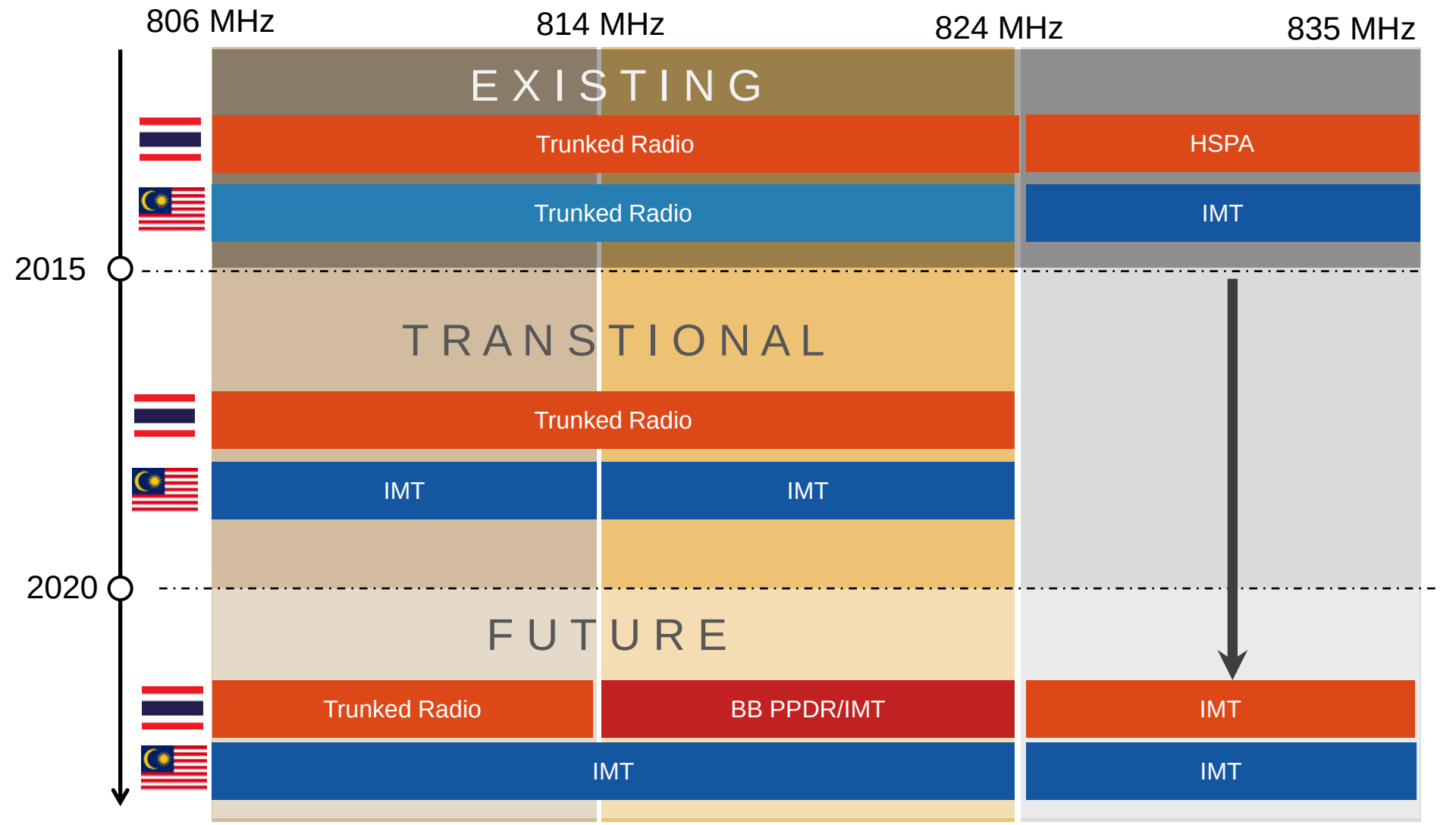
December 2015

Spectrum Management Bureau, Office of NBTC

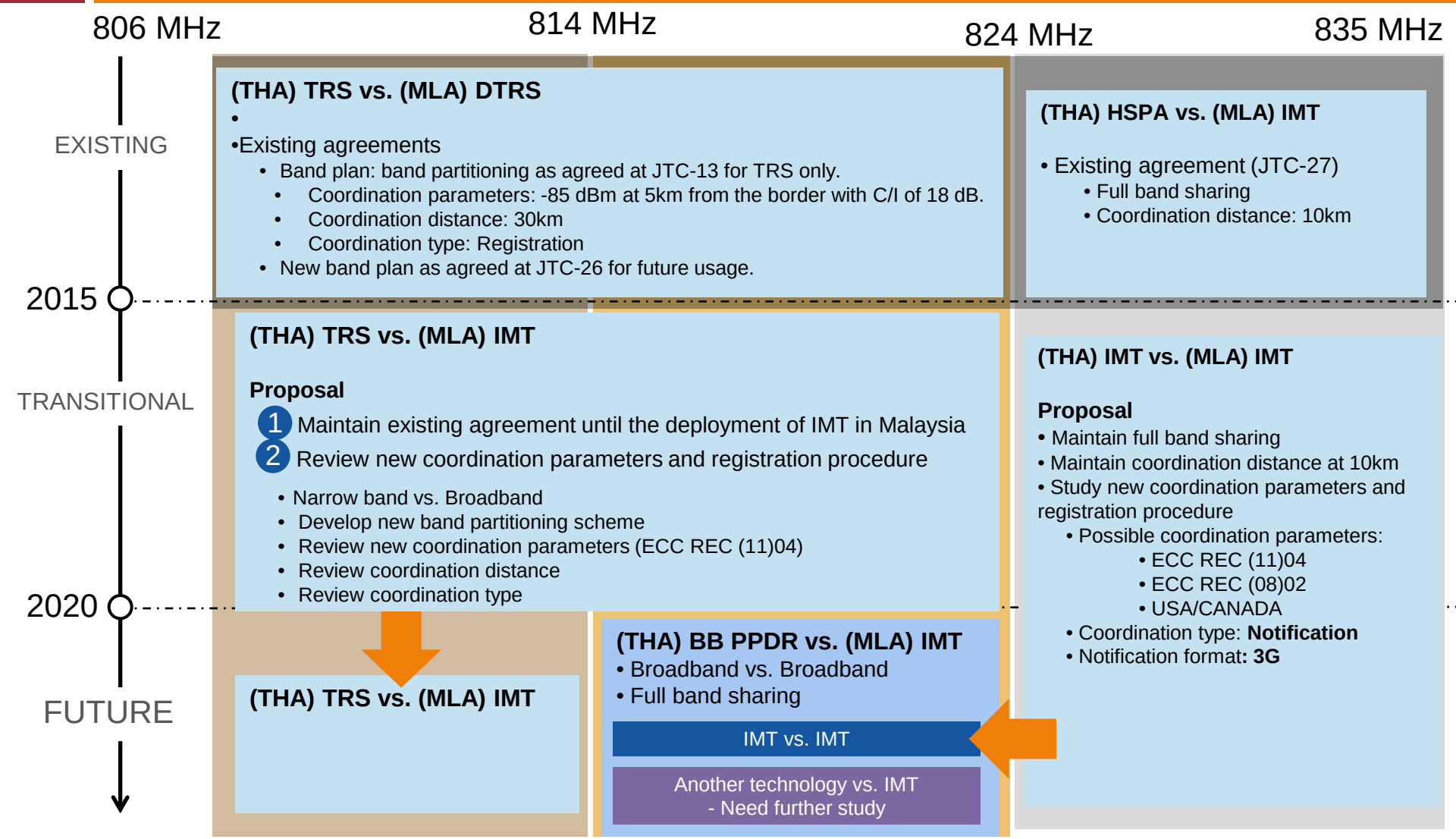
Background

- 806-835/851-880 MHz is defined as a band with “High” priority for revision.
- The 2nd Special Meeting agreed to maintain existing agreement for this band until the migration of TRS is completed.
- The Meeting seeks for possible future agreements used during transitional phases of technology upgrades.

Phases and transition



Transitional phases and possible agreements



Proposal

- The Meeting is invited to take note of the updated information on expected transitional phases of technology upgrades in the band 806-835/851-880 MHz along the border between Thailand and Malaysia.
- The Meeting is invited to consider the proposed possible agreements on band plan, coordination parameters, and coordination types for the band 806-835/851-880 MHz

Thank you

Spectrum Management Bureau
The Office of the National Broadcasting and Telecommunications Commission (NBTC)
Email: spectrum@nbtc.go.th

Doc.JTC-28/T-27

Harmonization of Spectrum Arrangements in the 800MHz and 900MHz Bands for Implementation of IMT Systems

HARMONIZATION OF SPECTRUM ARRANGEMENTS IN THE 800MHz AND 900MHz BANDS FOR IMPLEMENTATION OF IMT SYSTEMS

28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand – Malaysia Common Border Meeting

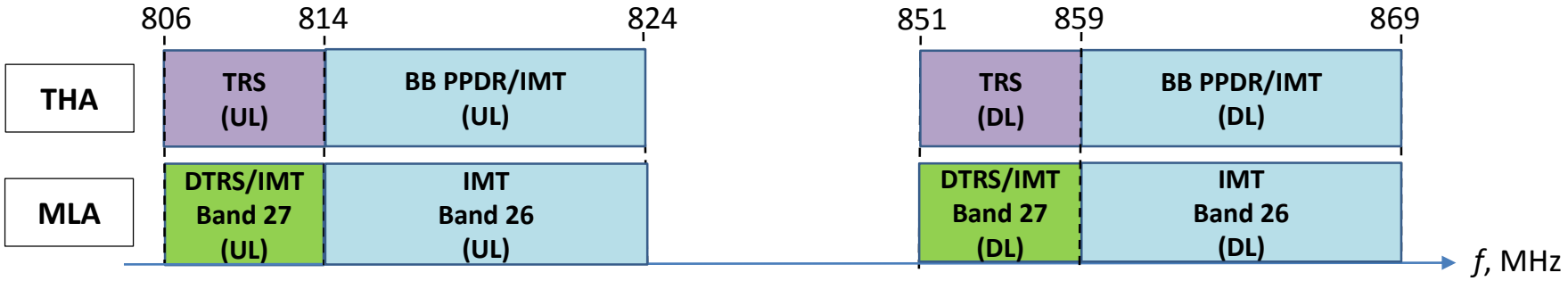
16 – 18 December 2015

Chiang Rai, Thailand

BACKGROUND

From 2nd Special Meeting (20-22 Oct 2015):

- New frequency coordination is required and it was discussed that ECC Rec. 11(04) is suitable to be adopted for frequency coordination in frequency band 806-824MHz/ 851-869MHz



	ECC Rec. 11(04)	
Frequency range	790 – 862 MHz	
Systems	MFCN (FDD)	LTE vs LTE (FDD)
Mean Field Strength at 3 m above ground	**55 dBuV/m/5MHz @ 0 km from border**	**59 dBuV/m/5MHz @ 0 km from border**
	29 dBuV/m/5MHz @ 9 km from border	**41 dBuV/m/5MHz @ 6 km from border**

PROPOSAL

- To adopt the coordination parameters based on ECC Rec. 11(04) and to use the conversion formula which was agreed at JTC-25 for the conversion from field strength to receive signal power as below:

$$\mathbf{dBm = dB\mu V/m - 20 \log f\,(MHz) + G\,(dBi) - L\,(dB) - 77.2}$$

With total system gain of 0 dBi and 0 dB loss since its receiver is mobile terminal and frequency chosen to be 851MHz (lowest downlink frequency)

- The coordination parameters after conversion:

	ECC Rec. 11(04)			
	MFCN systems		LTE vs LTE	
	Field strength	Receive power	Field strength	Receive power
Mean Field Strength at 3m above ground	55 dBµV/m/ 5MHz @ 0km	**-81 dBm/ 5MHz @ 0km**	59 dBµV/m/ 5MHz @ 0km	**-77 dBm/ 5MHz @ 0km**
	29 dBµV/m/ 5MHz @ 9km	**-107 dBm/ 5MHz @ 9km**	41 dBµV/m/ 5MHz @ 6km	**-95 dBm/ 5MHz @ 6km**

PROPOSAL

For TRS vs TRS:

- To retain existing coordination agreement

For other systems:

- To consider the proposed coordination parameters according to ECC Rec. 11(04)
- To consider the frequency band for full band sharing
- To consider the coordination distance of 10km
  - The same coordination distance as frequency band 824-835MHz / 869-880MHz
- To consider coordination type of “Special Condition” (operator-to-operator coordination)

RECOMMENDATION

The Meeting is invited to consider the proposals

THANK YOU

Doc.JTC-28/T-28

Harmonization of Spectrum Arrangements in the 800MHz and 900MHz Bands for Implementation of IMT Systems - 850MHz

HARMONIZATION OF SPECTRUM ARRANGEMENTS IN THE 800MHz AND 900MHz BAND FOR IMPLEMENTATION OF IMT SYSTEMS – 850MHz

28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand – Malaysia Common Border Meeting

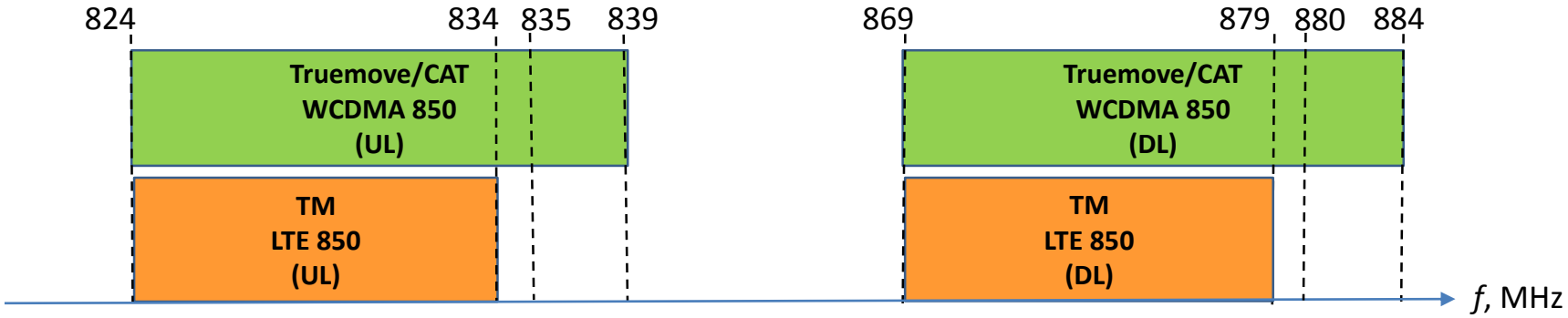
16 - 18 December 2015

Chiang Rai, Thailand

BACKGROUND

From 27th JTC Meeting (13-15 May 2015):

- MLA proposed to adopt ECC recommendations (2 options) for frequency coordination in frequency band 824-835MHz/ 869-880MHz:



	ECC Rec. 11(04)	ECC Rec. 08(02)
Frequency covered (MHz)	790 - 862	925 - 960
Systems	MFCN (FDD)	LTE vs WCDMA (FDD)
Mean Field Strength at borderline at 3m above ground	**55 dBµV/m/5MHz**	**59 dBµV/m/5MHz**
Mean Field Strength at 9km from border at 3m above ground	**29 dBµV/m/5MHz**	**35 dBµV/m/5MHz**

PROPOSAL

- To use the conversion formula which was agreed at JTC-25 to convert field strength to receive signal power as below:

dBm = dBμV/m – 20 log f (MHz) + G (dBi) – L (dB) – 77.2

With total system gain of 0 dBi and 0 dB loss since its receiver is mobile terminal and frequency chosen to be 869MHz (lowest downlink frequency)

- The coordination parameters after conversion:

	ECC Rec. 11(04)		ECC Rec. 08(02)	
	Field strength	Receive power	Field strength	Receive power
At 0km from border at 3m	55 dBμV/m/ 5MHz	**-81 dBm/ 5MHz**	59 dBμV/m/ 5MHz	**-77 dBm/ 5MHz**
At 9km from border at 3m	29 dBμV/m/ 5MHz	**-107 dBm/ 5MHz**	35 dBμV/m/ 5MHz	**-101 dBm/ 5MHz**

- The coordination type is proposed to be “Special Condition” (operator-to-operator coordination)

RECOMMENDATION

The Meeting is invited to consider the proposals

THANK YOU

Doc.JTC-28/T-29

Update on regulatory and operational procedures and frequency plans for unmanned aircraft systems (UAS)

สำนักงานคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ

The National Broadcasting and Telecommunications Commission

Update on regulatory and operational procedures and frequency plans for unmanned aircraft systems (UAS)

December 2015

Spectrum Management Bureau, Office of NBTC

Background

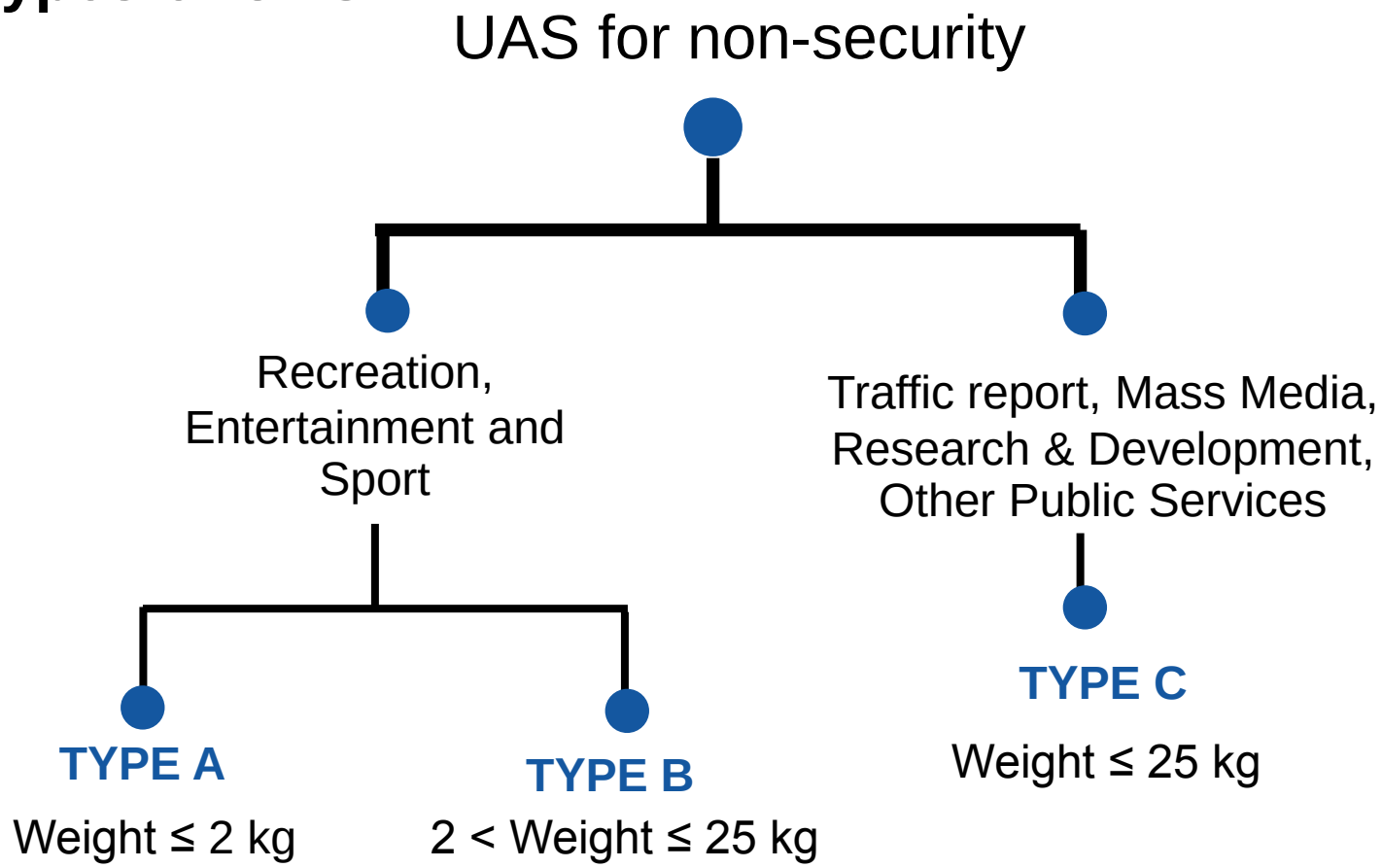
- Previous JTC meetings exchanged information about the regulatory and operational procedures for unmanned aircraft system (UAS).
- The meeting discussed a framework to harmonize the spectrum allocation to UAS for both control link and payload systems at Malaysia and Thailand common border area.

Progress Update

- Update on regulatory and operational procedures for UAS in non-security applications, announced by Ministry of Transport effective from Aug 2015.
- Update on upcoming regulation on spectrum allocation for UAS, being prepared by NBTC

Regulation

Types of UAS



Regulation

Requirements	Type A	Type B	Type C
Basic qualifications	• Age ≥ 18 years unless under supervision by adults	• Age ≥ 20 years • No records in drug abuse and custom law violation	• Only juristic person • Plan and objectives: media, traffic reports, R&D
Registration	• Registration is not required.	• Registration is required • Application Documents: - ID Card - Device Specifications - Insurance, etc.	• Registration is required • Application Documents: - ID Card of major share holders - Device Specifications - Insurance, etc.
Before Flight	• Hardware Checking • Permission from land owners /local administrations • Area survey • Preparation for Emergency	• Complied with Type A's requirements • Registration certificate	• Complied with Type B's requirements • Registration certificate

Regulation

Requirements	Type A	Type B	Type C
During Flight	• Do not enter to no-fly zone • Line-of-sight flight • Daytime flight • At least 9 km away from airport/airfields • Maximum altitude of 90 m • No privacy violation • Minimum horizontal distance of 30m •Flight in a clear space	• Complied with Type A's requirements • Minimum horizontal distance of 50 m	• Complied with Type B's requirements

Frequency bands to be used by non-security UAS

Frequency Band	License	Max Power	Primary Applications
5.725-5.850 GHz	No	1W e.i.r.p.	FS, MS, RLS, FSS ISM/SRD Applications
2.4-2.5 GHz	No	100mW e.i.r.p.	FS, MS, RLS, FSS ISM/SRD Applications
433.05-434.79 MHz	No	10 mW e.i.r.p.	FS, MS, RLS
	Yes	TBD	FS, MS, RLS

Note: ARN: Aeronautical Radio Navigation
AM(R)S: Aeronautical Mobile Satellite
FS: Fixed Services
FSS: Fixed Satellite Services
MS: Mobile Services
RLS: Radio Location Services

Proposal

- The Meeting is invited to take note of the updated information from Thailand on the following topics:

  - Regulatory and operational procedures for unmanned aircraft systems (UAS).
  - Frequency bands for use by non-security UAS

Thank you

Spectrum Management Bureau
The Office of the National Broadcasting and Telecommunications Commission (NBTC)
Email: spectrum@nbtc.go.th

Doc.JTC-28/T-30

Unmanned Aircraft Systems (UAS)

UNMANNED AIRCRAFT SYSTEMS (UAS)

28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand – Malaysia Common Border Meeting

16 - 18 December 2015

Chiang Rai, Thailand

OBJECTIVE

To update the latest development on regulatory framework for Unmanned Aircraft Systems (UAS) in Malaysia

BACKGROUND

At JTC-27, the meeting agreed on the following:

i. Acknowledge on the usage of UAS by Malaysia and Thailand on unlicensed basis as shown in table below:

Frequency Bands (MHz)	Power Limit (EIRP)	
	Malaysia	Thailand
433 - 435	100 mW	10 mW
2400 - 2500	500 mW	100 mW
5725 - 5850	1 W	1 W

ii. To share and update on further development of regulatory framework; and

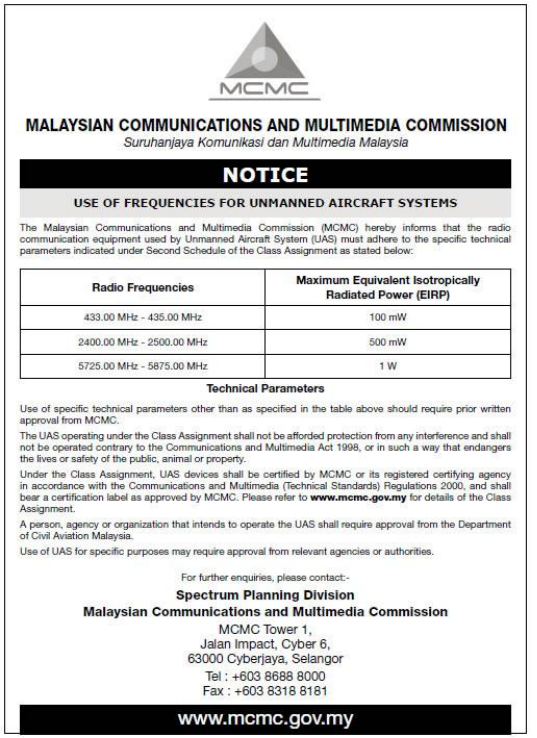
iii. To study possibility to harmonize the spectrum allocation for licensed UAS operation along Malaysia and Thailand common border area.

PUBLIC NOTICE ON USE OF FREQUENCIES FOR UAS

- Published in local newspapers on 30 November 2015 and in MCMC's website on 2 December 2015;
- The identified frequency bands for UAS are based on SRD technical parameters in the Class Assignment as shown in the table below:

Radio Frequencies (MHz)	Power Limit (EIRP)
433.00 – 435.00	100 mW
2400.00 – 2500.00	500 mW
5725.00 – 5850.00	1 W

- Use of technical parameters other than as specified in the table above should require prior written approval from MCMC;
- Radio communication devices shall be certified by MCMC;
- Require approval from the Department of Civil Aviation (DCA) Malaysia; and
- UAS for specific purposes may require approval from relevant agencies or authorities.



MCMC

MALAYSIAN COMMUNICATIONS AND MULTIMEDIA COMMISSION

Suruhanjaya Komunikasi dan Multimedia Malaysia

NOTICE

USE OF FREQUENCIES FOR UNMANNED AIRCRAFT SYSTEMS

The Malaysian Communications and Multimedia Commission (MCMC) hereby informs that the radio communication equipment used by Unmanned Aircraft System (UAS) must adhere to the specific technical parameters indicated under Second Schedule of the Class Assignment as stated below:

Radio Frequencies	Maximum Equivalent Isotropically Radiated Power (EIRP)
433.00 MHz - 435.00 MHz	100 mW
2400.00 MHz - 2500.00 MHz	500 mW
5725.00 MHz - 5875.00 MHz	1 W

Technical Parameters

Use of specific technical parameters other than as specified in the table above should require prior written approval from MCMC.

The UAS operating under the Class Assignment shall not be afforded protection from any interference and shall not be operated contrary to the Communications and Multimedia Act 1998, or in such a way that endangers the lives or safety of the public, animal or property.

Under the Class Assignment, UAS devices shall be certified by MCMC or its registered certifying agency in accordance with the Communications and Multimedia (Technical Standards) Regulations 2000, and shall bear a certification label as approved by MCMC. Please refer to **www.mcmc.gov.my** for details of the Class Assignment.

A person, agency or organization that intends to operate the UAS shall require approval from the Department of Civil Aviation Malaysia.

Use of UAS for specific purposes may require approval from relevant agencies or authorities.

For further enquiries, please contact:-

Spectrum Planning Division
Malaysian Communications and Multimedia Commission
MCMC Tower 1,
Jalan Impact, Cyber 6,
63000 Cyberjaya, Selangor
Tel : +603 8688 8000
Fax : +603 8318 8181

www.mcmc.gov.my

Blogger: Dr M playing to the gallery

Cops to take statement from Charles Morais's lawyer

All-in-the-family drug ring busted

OTHER FREQUENCY BANDS FOR UAS

- Frequency band of 5030 – 5091MHz requires Apparatus Assignment (AA); and

- MCMC may consider other potential/suitable frequency bands based on development at ICAO/ITU and global market.

RECOMMENDATION

JTC members are invited to take note on the update

THANK YOU

Malaysian Communications and Multimedia Commission

Doc.JTC-28/T-31

Report of Working on Broadcasting Service (WG1)

Paper reference : **JTC-28 / T - 31**
Contribution by : **Secretariat**
Subject : **Report of Working Group on Broadcasting Service (WG1)**

1 Introduction

The Working Group on Broadcasting Service (WG1) of the 28th JTC Meeting was co-chaired by Ms. Parita Wongchutinat from Office of the National Broadcasting and Telecommunications Commission (NBTC), Thailand and Mr. Abd. Mubin Mohd Zain from Malaysian Communications and Multimedia Commission (MCMC), Malaysia and comprised of 16 delegates from Thailand and 3 delegates from Malaysia. The list of delegates for WG1 is shown in Annex to Doc. JTC-28/T–31.

The following documents were presented and discussed during the WG1 Meeting session:

a) Doc.JTC-28/T-11 : Frequency Registration and Notification for Broadcasting Service;
b) Doc.JTC-28/T-20 : Digital Sound Broadcasting Service in Band III;
c) Doc.JTC-28/T-22 : Digital Terrestrial Television (Thailand);
d) Doc.JTC-28/T-23 : TV White Space;
e) Doc.JTC-28/T-24 : Database on Existing Frequency Usage for TV and FM Radio Services; and
f) Doc.JTC-28/T-25 : Usage of Frequency Channel 51 at Satun.

2 Adoption of Agenda

The Meeting adopted the revised Agenda of Working Group 1 Meeting as appears in Doc.JTC-28/T-05(2).

3 Discussion

The WG1 Meeting discussed the following issues:

ITEM	ISSUES	ACTION
3.1	**Digital Terrestrial Television**	
3.1.1	**<u>i. Rollout Plan at Common Border Areas</u>** Thailand presented a paper on 'Digital Terrestrial Television (Thailand)' as appears in Doc.JTC-28/T-22. The Meeting was informed on the following items: • NBTC Notification on Radio Frequency Plan for Digital Terrestrial Television Broadcasting, which was officially published on August 5, 2015; • DTT Rollout Schedule for Main and Additional Sites; • Current Status of DTT Rollout (82.13% of Households); • Timeline of Analogue Switch-Off (ASO) in Thailand, including the 1st ASO Station at Ko Samui (Surat Thani); and • ASO Plan at the Common Border as shown in the table below.	Info Info

<table>
<tr><th>ITEM</th><th>ISSUES</th><th>ACTION</th></tr>
<tr><td></td><td>
<table>
<tr><th>ASO Date</th><th>Site Name</th><th>Frequency Channel</th><th>Broadcaster</th></tr>
<tr><td>16 Jun. 2017
31 Dec. 2016
31 Dec. 2017</td><td>▪ Song Khla
▪ Satun
▪ Yala</td><td>34
27
37</td><td>TPBS</td></tr>
<tr><td>16 Jun. 2018</td><td>▪ Song Khla
▪ Satun
▪ Muang (Yala)
▪ Su-Ngaipadi (Narathiwat)
▪ Betong (Yala)
▪ Bannang-Star(Yala)</td><td>8
7
3
4
52
41</td><td>RTA</td></tr>
<tr><td>31 Dec. 2017</td><td>▪ Song Khla
▪ Yala
▪ Satun</td><td>10
12
31</td><td>PRD</td></tr>
<tr><td>16 Jul. 2018</td><td>▪ Satun
▪ Song Khla
▪ Yala</td><td>9
4
5</td><td>MCOT</td></tr>
</table>
Concession of BEC Channel 3 and BBTV Channel 7 will be ended in year 2020 and 2023, respectively. ASO might be completed before the end of concession depending on the proposal from BEC Channel 3 and BBTV Channel 7.</td><td>Info</td></tr>
<tr><td>3.1.2</td><td>Thailand will further update information on DTT at the next JTC Meeting.</td><td>Thailand</td></tr>
<tr><td>3.1.3</td><td>Malaysia took note of the presentation from Thailand.</td><td>Info</td></tr>
<tr><td>3.1.4</td><td>Malaysia informed the Meeting that the DTT rollout in Malaysia is ongoing; however, there is a proposal from the Common Integrated Infrastructure Provider (CIIP) to increase the ERP of DTT stations along the common border. The increment of 2 dB ERP will be applied at the stations in Gunung Jerai and Bukit Bakar in order to improve the portable indoor coverage.

MCMC will resubmit a new frequency registration for the two sites mentioned above (Gunung Jerai and Bukit Bakar) with new power transmission to NBTC, for consideration and approval.</td><td>Info

Malaysia</td></tr>
<tr><td>3.1.5</td><td>Thailand took note of the progress on DTT rollout in Malaysia. In addition, Thailand was of the view that any increment in ERP will be considered through regular frequency registration process.</td><td>Info</td></tr>
<tr><td>3.1.6</td><td><u>ii. Frequency Re-farming Process (Channels 21 - 25)</u>

In Doc.JTC-28/T-22, Thailand also updated on the progress of revision of the National Table of Frequency Allocations as well as NBTC Notification on Re-farming Process for Channels 21-25, which was officially published on June 25, 2015.</td><td>Info</td></tr>
</table>

ITEM	ISSUES	ACTION
	Thailand highlighted that the existing services (fixed and mobile services) in the band 470-510 MHz shall be re-relocated to other bands by year 2020.	Info
3.1.7	The Meeting took note of the presentation from Thailand and agreed to close this agenda item.	Thailand and Malaysia
3.1.8	**iii. Usage of Frequency Channel 51 at Satun** In Doc.JTC-28/T-22, NBTC briefly reported on the background and progress usage of frequency channel 51 at Satun. Thailand shared the result of compatibility analysis on the usage of frequency channel 41 which will be replacing the frequency channel 51 for analogue television (ATV) station at Satun. The result showed that the adjacent channel interference from Satun ATV (Ch.41) into DTTB site at Satun (Mux#2 Ch.42) is unacceptable.	Info Info
3.1.9	Thailand further proposed the following, as the way forward: (i) BBTV Channel 7 procures the transmitter and the antenna system for frequency channel 58. This analogue TV station at Satun will be brought into operation before June 2016; (ii) The frequency channel 51 at Satun will be switched off before June 2016; (iii) BBTV Channel 7 will continue operating the analogue TV station at Satun by using the frequency channel 58 until year 2023 (end of the concession) or it will be switched off sooner depending on the ASO plan. (iv) After the implementation of IMT in 700 MHz band in Malaysia, the interference case between IMT and ATV (if any) will be resolved on case-by-case basis.	Thailand
3.1.10	BBTV Channel 7 presented a paper on 'Usage of Frequency Channel 51 at Satun' as appears in Doc.JTC-28/T-25. Due to the internal procurement process, BBTV Channel 7 emphasized that, if JTC-28 could not confirm on the replacement frequency channel, they will not be able to switch off the frequency channel 51 at Satun before June 2016 as agreed at JTC-26.	Info Info
3.1.11	The Meeting agreed on the proposal from Thailand as mentioned in item 3.1.9 and further agreed that, if there is a requirement from Malaysia to deploy IMT System, which involves the use of frequency channel 58 at Satun before BBTV Channel 7 switch-off (year 2023), that requirement will be allowed on Non-Interference Basis (NIB). [Note: NIB - not to cause interference and cannot claim protection]	Thailand and Malaysia
3.1.12	The Meeting agreed to close this agenda item.	Thailand and Malaysia

ITEM	ISSUES	ACTION
3.2	**TV White Space**	
3.2.1	Thailand presented a paper on 'TV White Space' as appears in Doc.JTC-28/T-23. Thailand shared on information from the Workshop on Spectrum Regulatory Approach for TV White Space (TVWS) Devices, which was held on October 19, 2015 in Vietnam. This workshop mainly focused on ASEAN framework on TVWS.	Info Info
3.2.2	Furthermore, the Meeting was informed that NBTC has initiated the project to conduct a study on utilization of TVWS technology in Thailand. The objectives of this project are as follows: (i) to conduct a study on utilization of the available spectrum in each area within the frequency band allocated to the television broadcasting service; and (ii) to develop a communication system for TVWS in Thailand. This project is currently pending approval by NBTC.	Info
3.2.3	Thailand proposed to close this agenda item.	Info
3.2.4	The Meeting further elaborated that the TV UHF band is also used for SAB/SAP including wireless microphone, therefore, it is very difficult to implement TVWS in this band due to the congestion of spectrum, especially in the small countries.	Info
3.2.5	The Meeting took note of the presentation from Thailand and agreed to close this agenda item.	Thailand and Malaysia
3.3	**Database on Existing Frequency Usage for TV and FM Radio Services**	
3.3.1	NBTC presented a paper on 'Database on Existing Frequency Usage for TV and FM Radio Services' as appears in Doc.JTC-28/T-24. NBTC informed the Meeting on the progress of database review process for existing frequency usage in broadcasting service, which consisted the following issues: (i) NBTC had reviewed its own JTC Database (FM/TV); (ii) the information is now aligned with the new frequency registration format; (iii) after JTC-28, NBTC and MCMC will exchange the information in the new frequency registration format with the remarks on the records for which they need further verification; and (iv) the verification process will take place before submitting to JTC-29 for approval.	Info Info

<table>
<tr><th>ITEM</th><th>ISSUES</th><th>ACTION</th></tr>
<tr><td>3.3.2</td><td>NBTC will update the information at the next JTC Meeting.</td><td>Thailand</td></tr>
<tr><td>3.3.3</td><td>The Meeting took note of the presentation from NBTC.</td><td>Info</td></tr>
<tr><td>3.3.4</td><td>MCMC informed the Meeting that they had completed the review of its own JTC Database (FM/TV). The database is ready to be shared with NBTC after JTC-28.</td><td>Malaysia</td></tr>
<tr><td>3.3.5</td><td>The Meeting took note of the information from MCMC.</td><td>Info</td></tr>
<tr><td>3.4</td><td colspan="2">Technical Analysis of the Broadcasting Service</td></tr>
<tr><td>3.4.1</td><td>Thailand presented a paper on ‘Frequency Registration and Notification for Broadcasting Service’ as appears in Doc.JTC-28/T-11.

Thailand informed the Meeting that, from the outcome of Special Meeting between NBTC and MCMC, two issues to be considered further at JTC-28 are as follows:
(i) description of relocation of transmitting station; and
(ii) parameters for technical analysis (television broadcasting).</td><td>Info

Info</td></tr>
<tr><td>3.4.2</td><td>Thailand proposed parameters for technical analysis (television broadcasting) to be used when one country conducts the technical analysis for co-channel situation before ASO. The proposed parameters are as shown in the table below:
<table>
<tr><th>Parameters</th><th>Value/Criteria</th></tr>
<tr><td>Propagation model</td><td>ITU-R P.1546
- Wanted signal : 50% location, 50% time
- Interfering signal : 50% location, 10% time</td></tr>
<tr><td>System Variants</td><td>Actual system variants of each country
Thailand: DVB-T2 with 16K ext, 64QAM, code rate 3/5, PP2, GI 266 µs
Malaysia: To be determined.</td></tr>
<tr><td>Planning and Protection Criteria</td><td>Analogue TV: ITU-R BT.655 (protection ratio), ITU-R BT.417 (minimum field strength),
ITU-R BT.419 (antenna discrimination)
Digital TV: ITU-R BT.2033 (planning criteria incl. protection ratio for fixed reception mode), ITU-R BT.419 (antenna discrimination), Signal summation method : Log normal method, coverage probability 90%</td></tr>
<tr><td>Field strength limit</td><td>No field strength limit, however, the service area shall not be interfered, for more than 5% of covered population.</td></tr>
<tr><td>Terrain and Clutter data</td><td>200x200 m resolution or better resolution</td></tr>
</table></td><td>Info</td></tr>
<tr><td>3.4.3</td><td>Malaysia took note of the presentation from Thailand. Malaysia will further study the proposal from Thailand and respond at the next JTC Meeting.</td><td>Malaysia</td></tr>
</table>

ITEM	ISSUES	ACTION
3.5	**Interpretation of "Relocation of Transmitting Station" Terms**	
3.5.1	In Doc.JTC-28/T-11, Thailand also proposed on the criteria to determine the relocation of transmitting station for broadcasting service, which is required to submit as a new application, and also proposed the parameters for technical analysis (television broadcasting).	Info
3.5.2	The Meeting agreed on the criteria as follows: (i) The resubmission of a recorded assignment is required if there is a change in the following characteristics : a. Change of assigned frequency; b. Relocation of transmitting station; c. Increase of radiated power; d. Increase of transmitter height (above mean sea level); e. Increase of bandwidth; and/or f. Other necessary transmission characteristics (e.g. class of emission, transmitting antenna characteristics, etc.). (ii) For relocation of transmitting station in broadcasting service, without any other change in the above characteristics, the following Field Strength (FS) criteria will be applied: • a new application is required to be submitted for coordination, when $FS_{(after\ relocation)} > FS_{(before\ relocation)}$ at all agreed test points in another country, where FS is a simulated field strength; • frequency notification is required to be submitted and to be recorded in the JTC Database, regardless of the antenna height above mean sea level and the antenna orientation, when $FS_{(after\ relocation)} \leq FS_{(before\ relocation)}$ at all agreed test points in another country, where FS is a simulated field strength.	Thailand and Malaysia
3.5.3	The Meeting further agreed that the list of test points as agreed at JTC-14 is also applied to broadcasting service in Band II. The "Compilation of Agreed Band Plans, Coordination Parameters, and Registration Procedure" will be updated accordingly. The Meeting noted that the number of test points can be added in the future, if necessary.	Thailand and Malaysia
3.5.4	The Meeting also recommended the Plenary of JTC-28 to amend paragraph 5.1.1 of the "JTC Frequency Coordination Guideline" as follows:	Thailand and Malaysia

ITEM	ISSUES	ACTION
	(i) to replace "d. Increase of transmitter height (above mean sea level)" with "d. Increase of antenna height (above mean sea level)"; and (ii) to add item 3.5.2 (ii) above as a new paragraph (paragraph 5.1.2).	
3.5.5	The Meeting agreed to close this agenda item.	Thailand and Malaysia
3.6	**Digital Sound Broadcasting**	
3.6.1	Malaysia presented a paper on 'Digital Sound Broadcasting Service in Band III' as appears in Doc.JTC-28/T-20. Malaysia invited the Meeting to study on possible development of Digital Sound Broadcasting (DSB) Service in Band III. Malaysia also informed the Meeting of DSB technologies and international development including Digital Switch-Over (DSO) for radio service.	Info Info
3.6.2	Thailand took note of the presentation from Malaysia. Thailand will update the information on Digital Sound Broadcasting at the next JTC Meeting.	Thailand
3.6.3	The Meeting agreed to the proposal from Malaysia to study the following items: (i) feasibility of band III as a potential candidate band for deployment of DSB; (ii) appropriate timeline for DSO; and (iii) viability of simulcast (e.g. FM radio and DAB+).	Thailand and Malaysia

4 Endorsement of Report

The Meeting agreed and endorsed the Report of the Working Group on Broadcasting Service (WG1).

Ms. Parita Wongchutinat	Mr. Abd. Mubin Mohd Zain
THAILAND	MALAYSIA

Date : 17th December 2015
Venue : Chiang Rai, Thailand

Annex

List of Delegates in Working Group on Broadcasting Service (WG1)

THAILAND

No.	Name	Organization	Email
1	Ms. Parita Wongchutinat	NBTC	paritaw@gmail.com
2	Mr. Supatrasit. Suansook	NBTC	supatrasit.s@nbtc.go.th
3	Ms. Rapeeporn Buahom	NBTC	rapeeporn.b@nbtc.go.th
4	Colonel Teerapon Reunjaimun	RTA Radio & TV	teeraponrj@gmail.com
5	Mr. Pulsawat Insuwan	RTA Radio & TV	pulsawat_i@yahoo.com
6	Mrs. Kamolthip Serasuwan	RTA Radio & TV	skamolthip@hotmail.com
7	Mr. Somrat Buadhet	PRD	somrat_b@prd.go.th
8	Mr. Anusorn Srimalaikul	PRD	anusorn_sr@prd.go.th
9	Mr. Gangkoi Sunanta	PRD	gangkoi_s@prd.go.th
10	Mr. Apichit Wongkeeratikul	BEC	apichit_w@thaitv3.com
11	Mr. Mongkol Tulyapreecha	BEC	eng254@gmail.com
12	Mr Kinupong Chomsuk	BBTV	kinupong@ch7.com
13	Mr. Tassanai Wanitrabruen	MCOT	tassanai.wa@mcot.net
14	Mr. Tanabodee Viseskul	MCOT	tanabodee.vi@gmail.com
15	Mr. Thanakorn Suksai	Thai PBS	thanakorns@thaipbs.or.th
16	Ms. Pitchaporn Kaewka	Thai PBS	pitchaporn@thaipbs.or.th

MALAYSIA

No.	Name	Organization	Email
1	Mr. Abd. Mubin Mohd Zain	MCMC	abd.mubin@cmc.gov.my
2	Mr. Sukumar Lechimanan	Astro Radio	sukumar_lechimanan @astro.com.my
3	Mr. Zulkifli Bin Ab Rahim	RTM	zulrahim@rtm.gov.my

Doc.JTC-28/T-32

Report of Working on Mobile and Non- Broadcasting Services (WG2)

Paper reference : **JTC-28 / T - 32**
Contribution by : **Secretariat**
Subject : **Report of Working Group on Mobile and Non-Broadcasting Services (WG2)**

1 Introduction

The Working Group on Mobile and Non-Broadcasting Services (WG2) of the 28th JTC Meeting was co-chaired by Mr. Saneh Saiwong from Office of the National Broadcasting and Telecommunications Commission (NBTC), Thailand and Ms. Yushida Mohd Yunus from Malaysian Communications and Multimedia Commission (MCMC), Malaysia and comprised of 23 delegates from Thailand and 15 delegates from Malaysia. The list of delegates for WG2 is shown in Annex to Doc. JTC-28/T- 32.

The following documents were presented and discussed during the WG2 Meeting session:

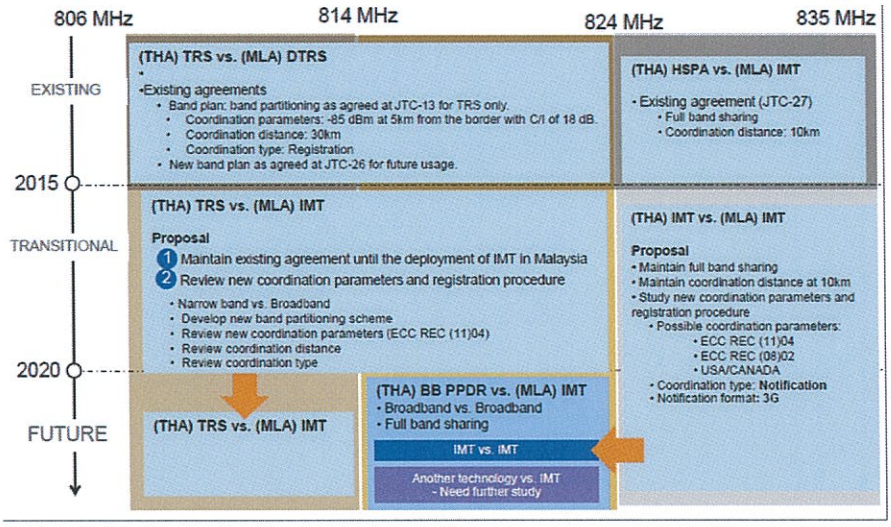
a) Doc.JTC-28/T-14 : Band Plan, Coordination Parameters and Coordination Type for 1800 MHz;
b) Doc.JTC-28/T-15 : 1800 MHz Band Plan & Coordination Type;
c) Doc.JTC-28/T-16 : Band Plan, Coordination Parameters and Notification Format to accommodate LTE Technology in 2100 MHz Band;
d) Doc.JTC-28/T-17 : 2100 MHz Band Plan, Coordination Parameters & Coordination Type;
e) Doc.JTC-28/T-18 : Frequency Usage of Microwave Fixed Link in Thailand;
f) Doc.JTC-28/T-19 : Frequency Band for Microwave Link Application in Malaysia;
g) Doc.JTC-28/T-21 : TD-LTE on 2300 MHz Band;
h) Doc.JTC-28/T-26 : Band Plan, Coordination Parameters, and Coordination Types for 800/900 MHz Spectrum;
i) Doc.JTC-28/T-27 : Harmonization of Spectrum Arrangements in the 800 MHz and 900 MHz Bands for Implementation of IMT Systems;
j) Doc.JTC-28/T-28 : Harmonization of Spectrum Arrangements in the 800 MHz and 900 MHz Bands for Implementation of IMT Systems – 850 MHz;
k) Doc.JTC-28/T-29 : Update on regulatory and operational procedures and frequency plans for unmanned aircraft systems (UAS); and
l) Doc.JTC-28/T-30 : Unmanned Aircraft Systems (UAS).

2 Adoption of Agenda

The Meeting adopted the Agenda of Working Group 2 Meeting as appears in Doc.JTC-28/T-05(3).

3 Discussion

The WG2 Meeting discussed the following issues:

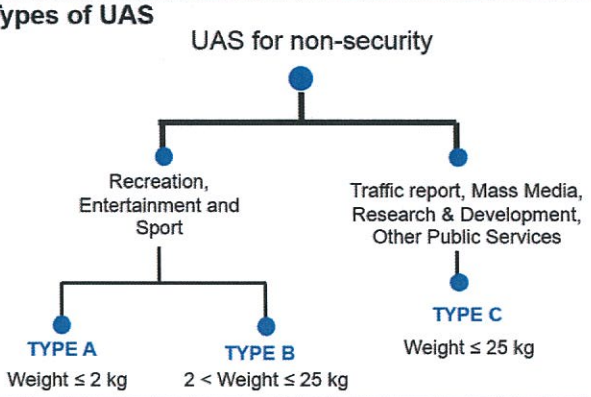
ITEM	ISSUES	ACTION
3.1	**Harmonization of Spectrum Arrangements in the 800 and 900 MHz Bands for Implementation of IMT Systems**	
3.1.1	Thailand presented a paper on 'Band Plan, Coordination Parameters, and Coordination Types for 800/900 MHz Spectrum' as appears in Doc.JTC-28/T-26.	Info
3.1.2	The frequency band 806–835/851-880 MHz is divided into three sub-bands including 806–814/851-859 MHz, 814–824/859-869 MHz, and 824–835/869-880 MHz and is presented based on the phases of technology transition in Thailand and Malaysia. The timeline is divided into existing, transitional and future phases as shown in the diagram below:  	Info
3.1.3	**<u>806–814/851-859 MHz and 814–824/859-869 MHz:</u>** Thailand and Malaysia have existing coordination agreements for trunked radio systems in the band 806–824/851-869 MHz since JTC-13. Thailand has reserved the frequency band 814–824/ 859-869 MHz for broadband PPDR application which is due to be deployed in 2020. After 2020, only the frequency band 806–814/851-859 MHz will remain to be used for trunked radio systems. Thailand proposed the Meeting to maintain the existing agreements for trunked radio systems in the transitional phase until the deployment of IMT in Malaysia. It also proposed that coordination parameters, coordination type and coordination distance between trunked radio systems and IMT are to be further studied. Once the study is completed, the results could be applicable to the frequency band 806–814/851-859 MHz in the future.	Info

ITEM	ISSUES	ACTION
3.1.4	**824-835/869-880 MHz:** Thailand and Malaysia have existing agreements on the frequency band 824–835/869-880 MHz for HSPA in Thailand and IMT in Malaysia since JTC-27 in which they agreed to use full band sharing and coordination distance at 10 km from the border. However, no coordination parameters and coordination type have yet to be agreed. Thailand proposed the Meeting to consider three options for coordination parameters between IMT (including HSPA) in Thailand and IMT in Malaysia which are ECC Rec. (08)02, ECC Rec. (11)04, and coordination agreements between US and Canada. The last option is proposed as an alternative because the European references, namely ECC Rec. (08)02 and ECC Rec. (11)04, may not be compatible with the band plans in 824-835/869-880 MHz used in Thailand and Malaysia. Thailand proposed the Meeting to maintain the existing agreements for full band sharing and 10 km coordination distance, while the coordination parameters and coordination type are to be further studied. Once the study is completed, the results could be applicable to the frequency band 824–835/869-880 MHz and also the frequency band 814-824/859-869 MHz if IMT technology is used for broadband PPDR application.	Info
3.1.5	Malaysia presented papers on 'Harmonization of Spectrum Arrangements in the 800 MHz and 900 MHz Bands for Implementation of IMT Systems' and 'Harmonization of Spectrum Arrangements in the 800 MHz and 900 MHz Bands for Implementation of IMT Systems – 850 MHz' as appear in Doc.JTC-28/T-27 and Doc.JTC-28/T-28 respectively.	Info
3.1.6	**806–814/851-859 MHz and 814–824/859-869 MHz:** Malaysia proposed the Meeting to maintain existing coordination agreement when trunked radio systems are used in both Thailand and Malaysia. For other systems, the Meeting is invited to consider the following: (i) to use ECC Rec. 11(04); (ii) to adopt full band sharing; (iii) to adopt coordination to be 10 km from border; and (iv) to adopt coordination type to be 'Special Condition', which is coordination between operators on a case-by-case basis. **824-835/869-880 MHz:** Malaysia proposed the Meeting to consider two options of ECC Recommendations, namely ECC Rec. 11(04) and ECC Rec. 08(02), for frequency coordination in frequency band 824-835/869-880 MHz.	Info

ITEM	ISSUES	ACTION
	The field strengths and computed received powers stated in the ECC Recommendations are shown in the presentation of Malaysia. Malaysia proposed the Meeting to consider 'Special Condition', coordination between operators on a case-by-case basis.	
3.1.7	The Meeting agreed as follows: **<u>For the frequency band 806-824/851-869 MHz:</u>** (i) To maintain the existing agreements for trunked radio systems in the transitional phase until the deployment of IMT in Malaysia. (ii) To study coordination parameters, coordination type and coordination distance between trunked radio systems and IMT. The Meeting noted that once the study is completed, the results could be applicable to the frequency band 806–814/851-859 MHz in the future. **<u>For the frequency band 824-835/869-880 MHz:</u>** (i) To maintain the existing agreements for full band sharing and 10 km coordination distance. (ii) To study coordination parameters and coordination type between IMT/IMT. The Meeting noted that once the study is completed, the results could be applicable to the frequency band 824–835/869-880 MHz. Moreover, the Meeting noted that such results could also be applicable to the frequency band 814-824/859-869 MHz if IMT technology is to be used for broadband PPDR application. Otherwise, additional study on coordination parameters and coordination type between IMT and non-IMT broadband PPDR applications may be required.	Thailand and Malaysia
3.2	**Regulatory and Operational Aspects of Unmanned Aerial Systems (UAS)**	
3.2.1	Thailand presented a paper on 'Update on regulatory and operational procedures and frequency plans for unmanned aircraft systems (UAS)' as appears in Doc.JTC-28/T-29.	Info
3.2.2	Thailand informed the Meeting that regulations for the operational procedures of the UAS were announced by the Ministry of Transport, effective since August 2015. The regulations classified UAS for non-security usage into three different types based on weight and usage purposes as shown in diagram below:	Info

ITEM	ISSUES	ACTION

Types of UAS



The regulations also stipulated requirements for each type of UAS, including basic requirements, registration, before-flight and during-flight requirements, which are summarized in the table below:

Requirements	Type A	Type B	Type C
Basic qualifications	• Age ≥ 18 years unless under supervision by adults	• Age ≥ 20 years • No records in drug abuse and custom law violation	• Only juristic person • Plan and objectives: media, traffic reports, R&D
Registration	• Registration is not required.	• Registration is required • Application Documents: - ID Card - Device Specifications - Insurance, etc.	• Registration is required • Application Documents: - ID Card of major share holders - Device Specifications - Insurance, etc.
Before Flight	• Hardware Checking • Permission from land owners /local administrations • Area survey • Preparation for Emergency	• Complied with Type A's requirements • Registration certificate	• Complied with Type B's requirements • Registration certificate
During Flight	• Do not enter to no-fly zone • Line-of-sight flight • Daytime flight • At least 9 km away from airport/airfields • Maximum altitude of 90 m • No privacy violation • Minimum horizontal distance of 30m • Flight in a clear space	• Complied with Type A's requirements • Minimum horizontal distance of 50 m	• Complied with Type B's requirements

Thailand further informed the Meeting that it is under the process of preparing draft regulations to allow the use of three frequency bands for non-security UAS, which are summarized in the table below:

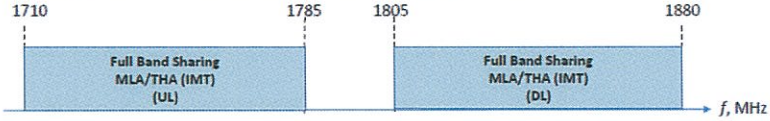
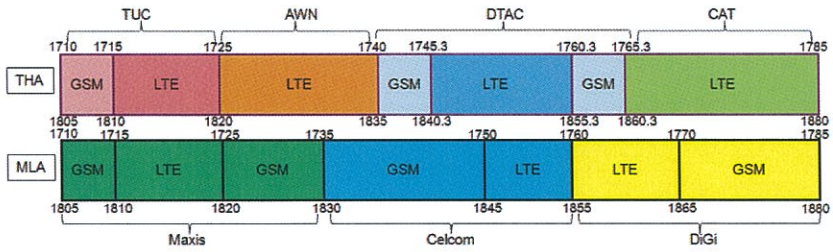
Frequency Band	License	Max Power	Primary Applications
5.725-5.850 GHz	No	1W e.i.r.p.	FS, MS, RLS, FSS ISM/SRD Applications
2.4-2.5 GHz	No	100mW e.i.r.p.	FS, MS, RLS, FSS ISM/SRD Applications
433.05-434.79 MHz	No	10 mW e.i.r.p.	FS, MS, RLS
	Yes	TBD	FS, MS, RLS

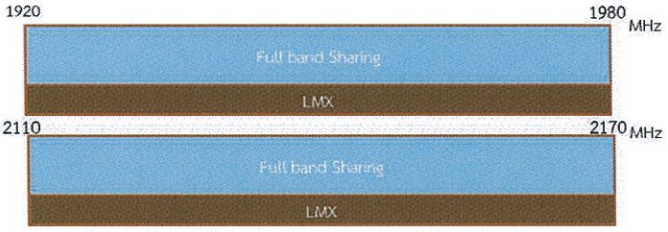
<table>
<tr><th>ITEM</th><th>ISSUES</th><th>ACTION</th></tr>
<tr><td>3.2.3</td><td>Malaysia presented a paper on 'Unmanned Aircraft Systems (UAS)' as appears in Doc.JTC-28/T-30.</td><td>Info</td></tr>
<tr><td>3.2.4</td><td>Malaysia updated the latest development on regulatory framework for Unmanned Aircraft Systems (UAS). Malaysian side acknowledged on the usage of UAS by Malaysia and Thailand on unlicensed basis agreed at JTC-27 and stated that the administration has issued the public notice on use of frequencies for UAS. The public notice was published in local newspapers and MCMC website.

The frequency bands and corresponding power limits are as shown in the table below:
<table><tr><th>Radio Frequencies (MHz)</th><th>Power Limit (EIRP)</th></tr><tr><td>433.00 – 435.00</td><td>100 mW</td></tr><tr><td>2400.00 – 2500.00</td><td>500 mW</td></tr><tr><td>5725.00 – 5850.00</td><td>1 W</td></tr></table>It is emphasized that frequency bands allocated are harmonized with the UAS bands in Thailand but the power limits allowed are different. The users of UAS in Malaysia need to comply with the technical restrictions stated above and radio communication devices shall be certified by MCMC.

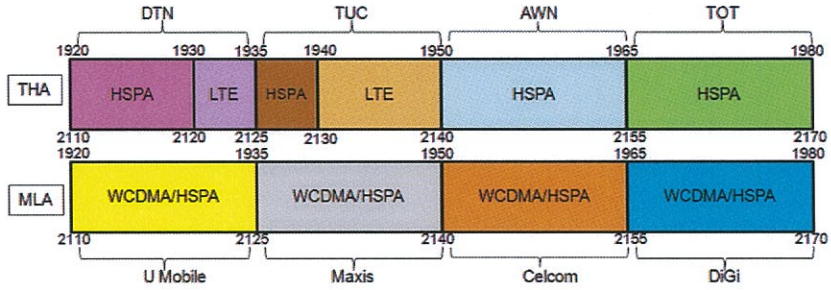
In addition, the use of UAS requires approval from the Department of Civil Aviation (DCA) of Malaysia and UAS for specific purposes may require approval from relevant agencies or authorities.

Malaysia stated that frequency band 5030–5091 MHz requires Apparatus Assignment (AA); and MCMC may consider other potential/suitable frequency bands based on development at ICAO/ITU and global market.</td><td>Info</td></tr>
<tr><td>3.2.5</td><td>The Meeting took note of the updates from both sides and agreed to close this agenda item. This issue may be revisited if necessary.</td><td>Thailand and Malaysia</td></tr>
<tr><td>3.3</td><td colspan="2">Band Plan and Coordination Type in the 1800 MHz Band</td></tr>
<tr><td>3.3.1</td><td>Thailand presented a paper on 'Band Plan, Coordination Parameters and Coordination Type for 1800 MHz' as appears in Doc.JTC-28/T-14.</td><td>Info</td></tr>
<tr><td>3.3.2</td><td>Thailand proposed the following:
(i) to revise existing coordination distance to be 9 km;
(ii) to consider coordination type to be notification (with same format used for 3G 2100 MHz); and</td><td>Info</td></tr>
</table>

ITEM	ISSUES	ACTION
	(iii) to revise existing coordination parameters for GSM/GSM with three options to be considered: • Option A: band partitioning (review the existing partitioning) and use agreed parameters, which is -85 dBm measured at 5 km from border and 1.5 m above ground level. C/I is 9 dB. • Option B: band partitioning and use ECC Rec. 05(08) • Option C: full band sharing and use ECC Rec. 05(08)	
3.3.3	Malaysia presented a paper on '1800 MHz Band Plan & Coordination Type' as appears in Doc.JTC-28/T-15.	Info
3.3.4	Malaysia proposed the following: (i) to adopt full band sharing for all systems;  (ii) to consider coordination type to be special condition (operator-to-operator coordination).	Info
3.3.5	The Meeting, after information exchange between operators, also took note of the current spectrum arrangement for 1800 MHz as shown in diagram below:  * True Move H Universal Communication Co., Ltd. (TUC) was formerly known as TrueMoveH.	Info
3.3.6	The Meeting took note of both sides' proposals. There was discussion among relevant operators of both sides; however, there were different views on this issue. Therefore, the existing agreements are to be maintained for the time being. Moreover, the Meeting agreed to recommend to the Plenary that an Adhoc Meeting, comprising regulators and mobile operators of both sides, may be required to resolve this issue.	Thailand and Malaysia

<table>
<tr><th>ITEM</th><th>ISSUES</th><th>ACTION</th></tr>
<tr><td>3.4</td><td colspan="2">Band Plan, Coordination Parameters and Coordination Type to accommodate LTE Technology in 2100 MHz Band</td></tr>
<tr><td>3.4.1</td><td>Thailand presented a paper on 'Band Plan, Coordination Parameters and Notification Format to accommodate LTE Technology in 2100 MHz Band' as appears in Doc.JTC-28/T-16.</td><td>Info</td></tr>
<tr><td>3.4.2</td><td>Malaysia presented a paper on '2100 MHz Band Plan, Coordination Parameters & Coordination Type' as appears in Doc.JTC-28/T-17.</td><td>Info</td></tr>
<tr><td>3.4.3</td><td>Both sides proposed the following:
(i) to adopt full band sharing for FDD systems;
 

(ii) to consider coordination distance to be 6 km from border;
(iii) to consider coordination type to be notification (with same format used for 3G 2100 MHz); and
(iv) to adopt ERC Rec. 01-01 for coordination parameters:
'Frequencies for UMTS FDD systems using preferential codes with centre frequencies aligned, or where centre frequencies are not aligned, or not using a IMT-2000/UMTS radio interface3, may be used without coordination with a neighbouring country if the predicted mean field strength of each carrier produced by the base station does not exceed a value of 37 dBμV/m/5MHz at a height of 3 m above ground at a distance of 6 km inside the neighbouring country and a value of 65 dBμV/m/5MHz at a height of 3 m above ground at the borderline between countries.'
o dBμV/m to dBm conversion are as shown in the table below:
<table>
<tr><th>Field Strength (dBμV/m/5MHz) Measured at 3 m above ground level</th><th>dBμV/m to dBm conversion (f = 2110 MHz)</th></tr>
<tr><td>65 @ borderline</td><td>-78.69 dBm</td></tr>
<tr><td>37 @ 6 km</td><td>-106.69 dBm</td></tr>
</table>
* dBm = dBμV/m – 20log(f) + G – L – 77.2 where G = 0 and L = 0</td><td>Info</td></tr>
<tr><td>3.4.4</td><td>The Meeting, after information exchange between operators, also took note of the current spectrum arrangement for 2100 MHz as shown in diagram below:</td><td>Info</td></tr>
</table>

ITEM	ISSUES	ACTION
	 * True Move H Universal Communication Co., Ltd. (TUC) was formerly known as TrueMoveH.	
3.4.5	The Meeting took note of both sides' proposals. There was discussion among relevant operators of both sides; however, there were different views on this issue. Therefore, the existing agreements are to be maintained for the time being. The Meeting agreed that this issue is also to be discussed in Adhoc Meeting as indicated in item 3.3.6.	Thailand and Malaysia
3.5	**Harmonization of Spectrum Arrangements and Full Band Sharing for Fixed Links**	
3.5.1	Thailand presented a paper on 'Frequency Usage of Microwave Fixed Link in Thailand' as appears in Doc.JTC-28/T-18.	Info
3.5.2	Thailand updated the current frequency usage of microwave fixed links as shown in the table below:	Info

Frequency Band (GHz)	Frequency Plan (FP)	Frequency Range (MHz)	ITU-R Reference
5	NTC FP 106-2550	4400-5000	ITU-R F.746-8 annex 2
6.7	NTC FP 107-2550	6430-7110	ITU-R F.384-9
7.2	NTC FP 108-2550	7110-7425	ITU-R F.385-8
7.5	NTC FP 109-2550	7425-7725	ITU-R F.385-8
8	NTC FP 110-2550	7725-8285	ITU-R F.386-7 annex 6
11	NTC FP 111-2550	10700-11700	ITU-R F.387-10
15	NTC FP 112-2550	14400-15350	ITU-R F.636-3
18	NTC FP 113-2550	17700-19700	ITU-R F.595-9
23	NTC FP 114-2550	21200-23600	ITU-R F.637-3
E-Band	NBTC FP 301-2558	71-76/81-86 GHz	ITU-R F.2006

<table>
<tr><th>ITEM</th><th>ISSUES</th><th>ACTION</th></tr>
<tr><td>3.5.3</td><td>Thailand indicated that it will develop additional frequency plans for microwave fixed links in 3 frequency bands as follows:
(i) 2.2 GHz band: 2025–2285 MHz
(ii) 8 GHz band (TV pick-up): 8290–8250 MHz
(iii) V-Band: 57 – 66 GHz band</td><td>Info</td></tr>
<tr><td>3.5.4</td><td>Thailand invited the Meeting to take note on frequency usage of microwave fixed links in Thailand and consider possible full band sharing for microwave fixed links between Thailand and Malaysia.</td><td>Info</td></tr>
<tr><td>3.5.5</td><td>Malaysia presented a paper on 'Frequency Band for Microwave Link Application in Malaysia' as appears in Doc.JTC-28/T-19.</td><td>Info</td></tr>
<tr><td>3.5.6</td><td>Malaysia informed the Meeting that it has published a total of 13 Standard Radio System Plan (SRSP) documents for microwave link application in frequency range from 5 GHz to 86 GHz as shown in the table below:
<table>
<tr><th>SRSP</th><th>Frequency (MHz)</th><th>Type</th></tr>
<tr><td>SRSP 512</td><td>5925-6425</td><td>Microwave link</td></tr>
<tr><td>SRSP 513</td><td>6430-7110</td><td>Microwave link</td></tr>
<tr><td>SRSP 514</td><td>7111-7425</td><td>Microwave link</td></tr>
<tr><td>SRSP 515</td><td>7425-7725</td><td>Microwave link</td></tr>
<tr><td>SRSP 516</td><td>7725-8275</td><td>Microwave link</td></tr>
<tr><td>SRSP 517</td><td>8275-8500</td><td>Microwave link</td></tr>
<tr><td>SRSP 507b</td><td>10000-10700</td><td>FWA</td></tr>
<tr><td>SRSP 525</td><td>12750-13250</td><td>Microwave link</td></tr>
<tr><td>SRSP 526</td><td>14400-15350</td><td>Microwave link</td></tr>
<tr><td>SRSP 527</td><td>17700-19700</td><td>Microwave link</td></tr>
<tr><td>SRSP 528</td><td>21200-23600</td><td>Microwave link</td></tr>
<tr><td rowspan="3">SRSP 509</td><td>24250-27000</td><td>LMCS</td></tr>
<tr><td>27000-29500</td><td>LMCS</td></tr>
<tr><td>31000-31300</td><td>LMCS</td></tr>
<tr><td rowspan="2">SRSP 548</td><td>71000-76000</td><td>Microwave link</td></tr>
<tr><td>81000-86000</td><td>Microwave link</td></tr>
</table></td><td>Info</td></tr>
<tr><td>3.5.7</td><td>Thailand proposed the Meeting to adopt full band sharing for frequency bands that are aligned and to maintain existing agreement on coordination distance and type.</td><td>Info</td></tr>
</table>

<table>
<tr><th>ITEM</th><th>ISSUES</th><th>ACTION</th></tr>
<tr><td>3.5.8</td><td>Malaysia also proposed that no coordination parameters were necessary since registration will be done on a first come, first served basis.</td><td>Info</td></tr>
<tr><td>3.5.9</td><td>The Meeting agreed to the proposals; therefore, the following frequency bands for fixed service are to be full band sharing:
<table>
<tr><th>Frequency Band (GHz)</th><th>Frequency Plan (FP)</th><th>SRSP</th><th>Frequency (MHz)</th></tr>
<tr><td>6.7</td><td>NTC FP 107-2550</td><td>SRSP 513</td><td>6430-7110</td></tr>
<tr><td>7.5</td><td>NTC FP 109-2550</td><td>SRSP 515</td><td>7425-7725</td></tr>
<tr><td>15</td><td>NTC FP 112-2550</td><td>SRSP 526</td><td>14400-15350</td></tr>
<tr><td>18</td><td>NTC FP 113-2550</td><td>SRSP 527</td><td>17700-19700</td></tr>
<tr><td>23</td><td>NTC FP 114-2550</td><td>SRSP 528</td><td>21200-23600</td></tr>
</table>
The Meeting noted that E-Band (71-76/81-86 GHz) was already agreed for full band sharing with associated coordination distance and coordination type at JTC-24. Therefore, the existing agreement is to be maintained for this frequency band.

The remaining frequency bands which are not fully aligned or are used by different services at the common border areas will be further discussed at the next Special Meeting.</td><td>Thailand and Malaysia</td></tr>
<tr><td>3.6</td><td colspan="2">Information Update on Usage in 2300 MHz Band</td></tr>
<tr><td>3.6.1</td><td>Thailand presented a paper on ‘TD-LTE on 2300 MHz Band’ as appears in Doc.JTC-28/T-21.</td><td>Info</td></tr>
<tr><td>3.6.2</td><td>Thailand informed the Meeting that frequency band 2310–2370 MHz which NBTC has just granted permission for TOT to upgrade the technology will be developed for TD-LTE service with initial implementation in Q3 of 2016.</td><td>Info</td></tr>
<tr><td>3.6.3</td><td>The Meeting took note of the updates and agreed that both sides will further study on:
(i) Coordination parameters;
(ii) Coordination type; and
(iii) Coordination distance.

The result is to be reported at the next JTC Meeting. The coordination parameters for 2300 MHz band should be concluded preferably by JTC-30 Meeting to be in time for TD-LTE deployment by TOT in Thailand.</td><td>Thailand and Malaysia</td></tr>
</table>

ITEM	ISSUES	ACTION
3.7	**Other Matter**	
3.7.1	Thailand informed the Meeting that Thailand has conducted auction in 900 MHz since 15 December 2015 and it has not completed yet. However, the licensees will begin roll out their network for LTE starting from Q1 of 2016. Therefore, there is an urgent need to review the existing agreements on 895-915/940-960 MHz after the auction is completed, on the following: (i) Coordination parameters; (ii) Coordination type; and (iii) Coordination distance.	Info
3.7.2	The Meeting agreed that this issue is also to be discussed together with other frequency bands in Adhoc Meeting as indicated in item 3.3.6.	Thailand and Malaysia

4 Endorsement of Report

The Meeting agreed and endorsed the Report of the Working Group on Mobile and Non-Broadcasting Services (WG2).

Mr. Saneh Saiwong
THAILAND

Ms. Yushida Mohd Yunus
MALAYSIA

Date : 17th December 2015
Venue : Chiang Rai, Thailand

Annex

List of Delegates in Working Group on Mobile and Non-Broadcasting Services (WG2)

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Doc.JTC-28/T-33

Outcome of CPM19-1 Meeting

OUTCOME OF CPM19-1 MEETING

28th Joint Technical Committee on Coordination and Assignment of Frequencies along Thailand – Malaysia Common Border Meeting

16 -18 December 2015
Chiang Rai, Thailand

Malaysian Communications & Multimedia Commission

OBJECTIVE

To update members on the outcome of the First Session of the Conference Preparatory Meeting for WRC-19 (CPM19-1)

BACKGROUND

Date	:	30 Nov. – 1 Dec. 2015
Venue	:	ITU, Geneva, Switzerland
No of Participants	:	286
Chairman of CPM19	:	Mr. Khalid AL-AWADI (UAE)
Reference Documents:		• **Temp document:** http://www.itu.int/md/R15-CPM19.01-151130-TD/en • **Final document:** Will be sent through circular letter

DRAFT STRUCTURE OF THE CPM REPORT TO WRC-19

CHAPTER 1: Land mobile and fixed services	CHAPTER 2: Broadband applications in the mobile service	CHAPTER 3: Satellite services
WRC-19 agenda items: 1.11, 1.12, 1.14, 1.15	WRC-19 agenda items: 1.13, 1.16, 9.1 (issues 9.1.1, 9.1.5, 9.1.8)	WRC-19 agenda items: 1.4, 1.5, 1.6, 7, 9.1 (issues 9.1.2, 9.1.3, 9.1.9)

CHAPTER 4: Science services	CHAPTER 5: Maritime, aeronautical and amateur services	CHAPTER 6: General issues
WRC-19 agenda items: 1.2, 1.3, 1.7	WRC-19 agenda items: 1.1, 1.8, 1.9, 1.10, 9.1(Issue 9.14)	WRC-19 agenda items: 2, 4, 9.1 (issues 9.1.6, 9.1.7), 10


Allocation


Final Act

CONCLUSION

Members are invited to take note on outcome of the First Session of the Conference Preparatory Meeting for WRC-19 (CPM19-1).

THANK YOU