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**Standard Radio System Plan**

**REQUIREMENTS FOR  
INTERNATIONAL MOBILE  
TELECOMMUNICATIONS SYSTEMS  
OPERATING IN THE FREQUENCY BAND OF  
3400 MHz TO 3600 MHz**

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## **1 FOREWORD**

- 1.1 This Standard Radio System Plan ("**SRSP**") is prepared by the Malaysian Communications and Multimedia Commission ("**MCMC**") pursuant to the Communications and Multimedia Act 1998 ("**Act**") and the Spectrum Plan to provide information on the minimum technical and regulatory requirements for efficient use of the **3400 MHz to 3600 MHz** frequency band.
- 1.2 This SRSP does not attempt to establish any detailed equipment standards.
- 1.3 In the event there are any inconsistencies between this SRSP and the Act or any subsidiary legislations made under the Act, the Act or the subsidiary legislations shall prevail.

## **2     ABBREVIATIONS**

<b>AA</b>	Apparatus Assignment
<b>AAS</b>	Advanced Antenna System
<b>CA</b>	Class Assignment
<b>CEPT</b>	European Conference of Postal and Telecommunications Administrations
<b>EIRP</b>	Effective Isotropic Radiated Power
<b>FACSMAB</b>	Frequency Assignment Committee Singapore, Malaysia and Brunei Darussalam
<b>FSS</b>	Fixed-Satellite Service
<b>IMT</b>	International Mobile Telecommunications
<b>ITU</b>	International Telecommunication Union
<b>ITU-R</b>	ITU Radiocommunication Sector
<b>JCC</b>	Joint Committee on Communications between Indonesia and Malaysia
<b>JTC</b>	Joint Technical Committee on Coordination and Assignment of Frequencies along Malaysia-Thailand Common Border
<b>SA</b>	Spectrum Assignment
<b>SCS</b>	Subcarrier Spacing
<b>SRSP</b>	Standard Radio System Plan
<b>TDD</b>	Time Division Duplex
<b>TRP</b>	Total Radiated Power

### **3 INTENT**

- 3.1 This SRSP is intended to ensure efficient provision of mobile service in Malaysia with minimal service disruption and radio frequency interference among the service providers.
- 3.2 This SRSP states the requirements for the utilisation of IMT systems in Malaysia in **3400 MHz to 3600 MHz** frequency band. This frequency band shall be referred to as the “**said band**”.
- 3.3 The usage of the said band is intended for the purpose of providing wireless telecommunication connectivity and including but not limited to applications such as voice, internet, video, images, interactive multimedia, high-speed data, low latency applications and mobile television.
- 3.4 The term ‘IMT’ referred to herein, is the root name which encompasses IMT-2020 and the upgrade for the next generation of this technology as well as any other new technology that is made available in the future.

### **4 GENERAL**

- 4.1 Technical characteristics of the equipment used in IMT systems shall conform to all applicable Malaysian standards, international standards, ITU and its radio regulations as agreed and adopted by Malaysia.
- 4.2 All equipment installations shall comply with safety rules as specified in the applicable standards.
- 4.3 The equipment used shall be certified under the Communications and Multimedia (Technical Standards) Regulations 2000.
- 4.4 The assignment of the said band and the information in this SRSP are subject to review from time to time to reflect new developments in the communications and multimedia industry.

## 5 CHANNEL ARRANGEMENT

- 5.1 The allocation of services within the said band is described in the Spectrum Plan.
- 5.2 The channel arrangement in the said band is based on the TDD arrangement with a total bandwidth of 200 MHz.
- 5.3 For the deployment of IMT systems in the said band, the channeling plan may be based on the arrangement as shown in **Appendix A** of this SRSP.

## 6 REQUIREMENTS FOR USAGE OF SPECTRUM

- 6.1 This SRSP covers the minimum key characteristics considered necessary in order to make the best use of the said band.
- 6.2 It should be further noted that the operation of the IMT systems in the said bands should not cause any interference at all times, to other services in the adjacent frequency bands. The coexistence and mitigation of interference may require adopting a number of engineering solutions based on industry best practice, guidelines and recommendations as described in this SRSP.
- 6.3 Maximum radiated power and unwanted emission for IMT systems are as follows:
  - 6.3.1 Base station
    - 6.3.1.1 base station in-block transmissions should not exceed
      - i. **65 dBm/5 MHz EIRP** for Non-AAS base station; and
      - ii. **44 dBm/5 MHz TRP** for AAS base station;
    - 6.3.1.2 the unwanted emissions (i.e. out of band and spurious emissions) should comply with the limit as below:
      - i. Out-of-band Power Limits: A limit of **-15 dBm/MHz** applies for base stations; and
      - ii. Spurious Emission Power Limits: A limit of **-30 dBm/MHz** applies for base stations.

### 6.3.2 User terminal station

6.3.2.1 IMT user terminal station transmissions should not exceed **28 dBm TRP** for mobile/nomadic terminal station and **35 dBm/5 MHz EIRP** for fixed terminal station; and

6.3.2.2 the unwanted emissions (i.e. out-of-band and spurious emissions) should comply with the limits as below:

i. Out-of-Band Power Limits: A limit of **-13 dBm/MHz** applies for user terminal stations; and

ii. Spurious emission power limits: A limit of **-30 dBm/MHz**.

6.4 A radio system conforming to the requirements of this SRSP may require modifications if major interference is caused to other radiocommunication stations or systems.

6.5 For avoidance of doubt, MCMC shall not be responsible for any costs incurred as a result of the system modification. The cost of modification shall be fully borne by the assignment holder.

## 7 PRINCIPLES OF ASSIGNMENT

7.1 Authorisation to use the said band for IMT base station apparatus and user terminal station shall be subject to the followings :

7.1.1 by way of AA for IMT base station apparatus; and

7.1.2 by way of CA for IMT user terminal station and is required to comply with the latest provisions of the CA issued by MCMC pursuant to section 169 of the Act, which confers rights on any person to use any frequency band or bands for a specified purpose.

7.2 The assignment shall be subject to all conditions as specified in regulations 9, 10 and 22 of the Communications and Multimedia (Spectrum) Regulations 2000 ("**Spectrum Regulations**"), and any additional conditions as may be imposed by MCMC from time to time.

- 7.3 Issuance of AA within the said band shall be subject to successful coordination with Malaysia's neighbouring countries for stations that are to be located along the common border areas.

## **8 COORDINATION REQUIREMENT**

### **8.1 Operator-to-Operator Coordination in the said band and Adjacent Bands Coordination**

- 8.1.1 Issuance of AA is subject to the technical analysis to be carried out by MCMC. If necessary, coordination between IMT base station and FSS station operating in the adjacent bands of the said band may be required to mitigate the interference.
- 8.1.2 The assignment holder operating in the said band shall ensure that its system only operate within the assigned frequency band.
- 8.1.3 In the event of any interference, MCMC will be guided by the interference resolution process as shown in **Appendix B** of this SRSP.

### **8.2 Common Border Area Coordination**

- 8.2.1 The use of the said band shall also require coordination at common border area(s) with the neighbouring countries within the coordination zones. The coordination zones are based on agreement reached by border committees namely FACSMAB, JTC and JCC. Agreement on the said band plan may differ from one neighbouring country to another subject to the requirement of the respective country.
- 8.2.2 In the event there is no agreement on coordination zone, a zone within 50 km from the border of the neighbouring countries will be used.
- 8.2.3 It shall be noted that the coordination between Malaysia and the neighbouring countries is currently on-going. Hence, the coordination distances and parameters may be updated from time to time.
- 8.2.4 The deployment of IMT systems within the said band at the border areas shall consider the following:
- 8.2.4.1 there is a potential interference with operators that



operate in the said band's channel blocks; and

8.2.4.2 the potential interference could be mitigated with synchronisation between the TDD operators or by geographical separation.

8.3 Assignment holders shall take full advantage of interference mitigation techniques such as antenna discrimination, tilt, polarisation, frequency discrimination, shielding/blocking (introduction of diffraction loss), site selection, power control, isolation distance and/or filter installation to facilitate the coordination of systems.

8.4 Any costs incurred as a result of the coordination process shall be fully borne by the assignment holder.

## **9 EFFECTIVE DATE**

9.1 This SRSP shall be effective on the date of issuance of this document.

## 10 REFERENCES

- i. **Spectrum Plan**
- ii. **Recommendation ITU-R M.1036** - Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications in the bands identified for IMT in the Radio Regulations
- iii. **Report ITU-R M.2411** - Requirements, evaluation criteria and submission templates for the development of IMT-2020
- iv. **3GPP TS 38.101-1** - Technical Specification Group Radio Access Network; NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone
- v. **3GPP TS 38.104** - Technical Specification Group Radio Access Network; NR; Base Station (BS) radio transmission and reception
- vi. **3GPP TS 38.141-2** - Technical Specification Group Radio Access Network; NR; Base Station (BS) conformance testing Part 2: Radiated conformance testing
- vii. **3GPP TS 38.521** - Technical Specification Group Radio Access Network; NR; User Equipment (UE) conformance specification; Radio transmission and reception
- viii. **CEPT Report 49** - Technical conditions regarding spectrum harmonisation for terrestrial wireless systems in the 3400-3800 MHz frequency band
- ix. **CEPT Report 67** - Review of the harmonised technical conditions applicable to the 3.4-3.8 GHz (3.6 GHz) frequency band
- x. **ECC Report 203** - Least Restrictive Technical Conditions suitable for Mobile/Fixed Communication Networks (MFCN), including IMT, in the frequency bands 3400-3600 MHz and 3600-3800 MHz
- xi. **ECC Report 281** - Analysis of the suitability of the regulatory technical conditions for 5G MFCN operation in the 3400-3800 MHz band

- xii. **ECC/DEC(11)06** - Harmonised frequency arrangements and least restrictive technical conditions (LRTC) for mobile/fixed communications networks (MFCN) operating in the band 3400-3800 MHz

## APPENDIX A: CHANNEL ARRANGEMENT

### A.1 CHANNEL BANDWIDTH WITHIN FREQUENCY BAND OF 3400 MHz TO 3600 MHz

Frequency band	SCS kHz	10 MHz	15 MHz	20 MHz	25 MHz	30 MHz	40 MHz	50 MHz	60 MHz	70 MHz	80 MHz	90 MHz	100 MHz
3400 MHz to 3600 MHz	15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
	30	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	60	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

**TABLE 1: CHANNEL BANDWIDTH**

## A.2 CHANNELING PLAN FOR THE FREQUENCY BAND OF 3400 MHz TO 3600 MHz

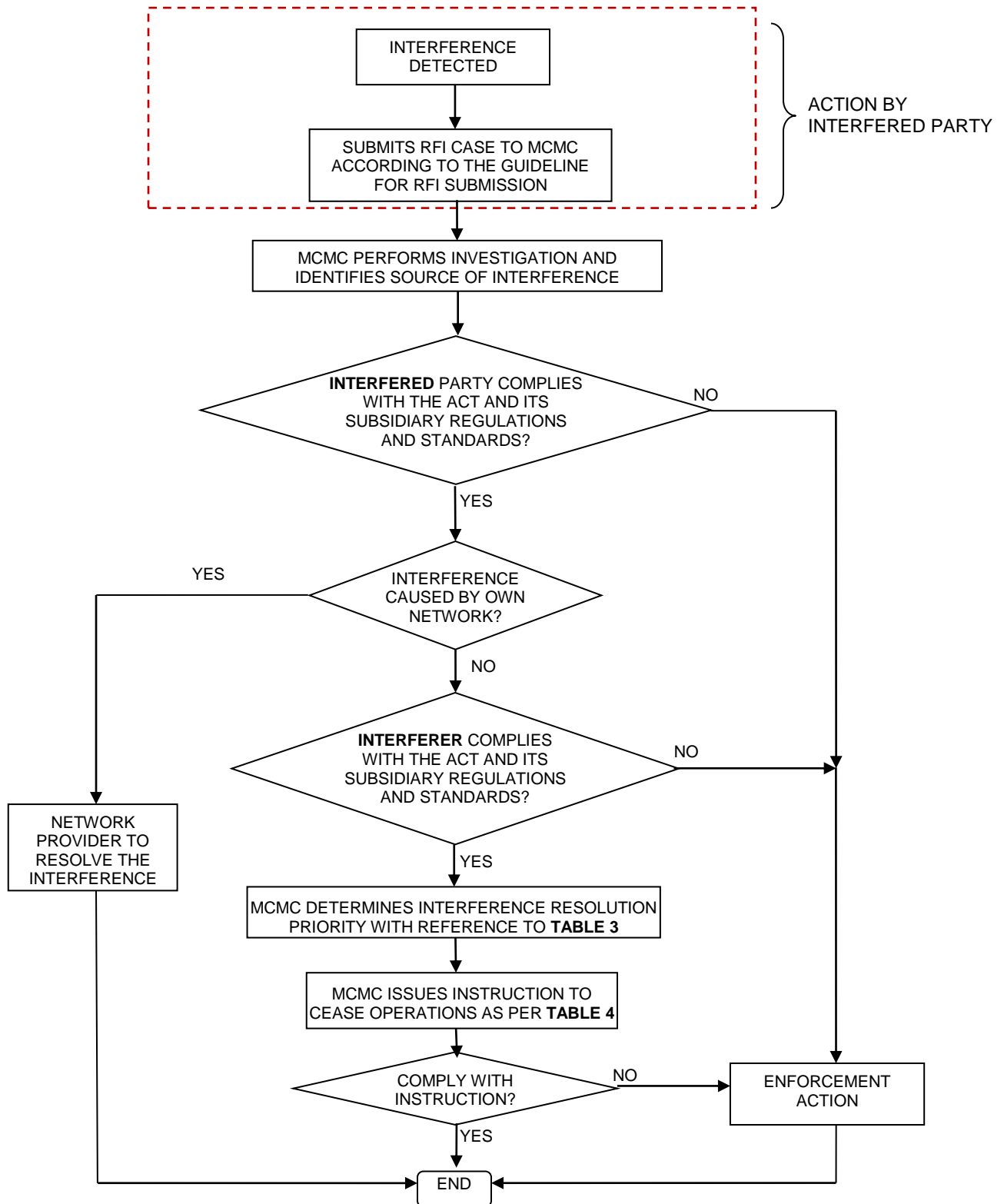
Channel Bandwidth													
10 MHz													
Channel No.	1	Channel No.	2	Channel No.	3	Channel No.	4	Channel No.	5	Channel No.	6	Channel No.	7
Tx/Rx	3405	Tx/Rx	3415	Tx/Rx	3425	Tx/Rx	3435	Tx/Rx	3445	Tx/Rx	3455	Tx/Rx	3465
Channel No.	8	Channel No.	9	Channel No.	10	Channel No.	11	Channel No.	12	Channel No.	13	Channel No.	14
Tx/Rx	3475	Tx/Rx	3485	Tx/Rx	3495	Tx/Rx	3505	Tx/Rx	3515	Tx/Rx	3525	Tx/Rx	3535
Channel No.	15	Channel No.	16	Channel No.	17	Channel No.	18	Channel No.	19	Channel No.	20		
Tx/Rx	3545	Tx/Rx	3555	Tx/Rx	3565	Tx/Rx	3575	Tx/Rx	3585	Tx/Rx	3595		
15 MHz													
Channel No.	21	Channel No.	22	Channel No.	23	Channel No.	24	Channel No.	25	Channel No.	26	Channel No.	27
Tx/Rx	3407.5	Tx/Rx	3422.5	Tx/Rx	3437.5	Tx/Rx	3452.5	Tx/Rx	3467.5	Tx/Rx	3482.5	Tx/Rx	3497.5
Channel No.	28	Channel No.	29	Channel No.	30	Channel No.	31	Channel No.	32	Channel No.	33		
Tx/Rx	3512.5	Tx/Rx	3527.5	Tx/Rx	3542.5	Tx/Rx	3557.5	Tx/Rx	3572.5	Tx/Rx	3587.5		
20 MHz													
Channel No.	34	Channel No.	35	Channel No.	36	Channel No.	37	Channel No.	38	Channel No.	39	Channel No.	40
Tx/Rx	3410	Tx/Rx	3430	Tx/Rx	3450	Tx/Rx	3470	Tx/Rx	3490	Tx/Rx	3510	Tx/Rx	3530
Channel No.	41	Channel No.	42	Channel No.	43								
Tx/Rx	3550	Tx/Rx	3570	Tx/Rx	3590								

25 MHz													
Channel No.	44	Channel No.	45	Channel No.	46	Channel No.	47	Channel No.	48	Channel No.	49	Channel No.	50
Tx/Rx	3412.5	Tx/Rx	3437.5	Tx/Rx	3462.5	Tx/Rx	3487.5	Tx/Rx	3512.5	Tx/Rx	3537.5	Tx/Rx	3562.5
Channel No.	51												
Tx/Rx	3587.5												
30 MHz													
Channel No.	52	Channel No.	53	Channel No.	54	Channel No.	55	Channel No.	56	Channel No.	57		
Tx/Rx	3415	Tx/Rx	3445	Tx/Rx	3475	Tx/Rx	3505	Tx/Rx	3535	Tx/Rx	3565		
40 MHz													
Channel No.	58	Channel No.	59	Channel No.	60	Channel No.	61	Channel No.	62				
Tx/Rx	3420	Tx/Rx	3460	Tx/Rx	3500	Tx/Rx	3540	Tx/Rx	3580				
50 MHz													
Channel No.	63	Channel No.	64	Channel No.	65	Channel No.	66						
Tx/Rx	3425	Tx/Rx	3475	Tx/Rx	3525	Tx/Rx	3575						
60 MHz													
Channel No.	67	Channel No.	68	Channel No.	69								
Tx/Rx	3430	Tx/Rx	3490	Tx/Rx	3550								
70 MHz													
Channel No.	70	Channel No.	71										
Tx/Rx	3435	Tx/Rx	3505										

80 MHz				
Channel No.	72	Channel No.	73	
Tx/Rx	3440	Tx/Rx	3520	
90 MHz				
Channel No.	74	Channel No.	75	
Tx/Rx	3445	Tx/Rx	3535	
100 MHz				
Channel No.	76	Channel No.	77	
Tx/Rx	3450	Tx/Rx	3550	

**TABLE 2: CHANNELING PLAN FOR 3400 MHz TO 3600 MHz BAND**

## APPENDIX B: INTERFERENCE RESOLUTION PROCESS





**TABLE 3: INTERFERENCE RESOLUTION PRIORITY**

No.	Types of Priority	Description
1	Service Priority	Primary services have priority over secondary services. Among co-primary or co-secondary services, the stated priority is accorded as provided in the Spectrum Plan.
2	Assignment Type Priority	SA and AA have equal priority but are of higher priority than CA.
3	Service Type Priority	In the event where service priority and assignment type priority are equal for affected parties, the following list will determine the priority level for the interference case (the earlier in the list is given higher priority): i. safety or radionavigation service; and ii. based on the date of AA - Priority is given to the earliest/first installation.

**TABLE 4: INTERFERENCE RESOLUTION TIMELINE TO PARTIES**

No.	Types of Interference	Description	Resolution Timeline
1	Harmful	Interference which endangers or seriously degrades, obstructs or repeatedly interrupts the functioning of a radionavigation service or one or more safety services operating in accordance with Spectrum Regulations.	To cease* operation immediately within 24 hours or earlier as specified in the notice issued by MCMC.
2	Major	Electromagnetic interference rendering any apparatus or services unsuitable for their intended purpose.  For this purpose, interference to public correspondence service is considered under this category.	To cease* operation within 3 days or earlier as specified in notice issued by MCMC if interference cannot be resolved.
3	Minor	Electromagnetic interference which does not affect the overall operation of any radiocommunications transmission.	To cease* operation within 7 days or earlier as specified in the notice issued by MCMC if interference cannot be resolved.

\*Note:

Resumption of operation of the apparatus is not allowed unless the assignment holder submit interference resolution or mitigation plan and has completed the implementation of the mitigation plan to the satisfaction of MCMC.