

Standard Radio System Plan

**REQUIREMENTS FOR MOBILE CELLULAR  
SYSTEMS AND INTERNATIONAL MOBILE  
TELECOMMUNICATIONS (IMT) SYSTEMS  
OPERATING IN THE FREQUENCY BANDS  
824 MHz TO 834 MHz PAIRED WITH  
869 MHz TO 879 MHz AND  
880 MHz TO 915 MHz PAIRED WITH  
925 MHz TO 960 MHz**



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## **1.0 GLOSSARY**

- 1.1 The terms used in this document may be found in the document SRSP Glossary which can be downloaded from the Commission's website.  
(<http://www.skmm.gov.my/skmmgovmy/files/attachments/SRSPGlossary.pdf>)

**REQUIREMENTS FOR MOBILE CELLULAR SYSTEMS AND INTERNATIONAL  
MOBILE TELECOMMUNICATIONS (IMT) SYSTEMS OPERATING IN 824 MHz  
TO 834 MHz PAIRED WITH 869 MHz TO 879 MHz AND 880 MHz TO 915 MHz  
PAIRED WITH 925 MHz TO 960 MHz**

## **2.0 INTENT**

- 2.1 This Standard Radio System Plan (SRSP) states the requirements for the utilization of the frequency bands between 824 MHz to 834 MHz paired with 869 MHz to 879 MHz and 880 MHz to 915 MHz paired with 925 MHz to 960 MHz ('the said bands') for mobile cellular systems and International Mobile Telecommunications (IMT) systems in Malaysia.
- 2.2 This plan is intended to ensure efficient provision of mobile services in Malaysia with minimal service disruption and radio frequency interference among service providers.
- 2.3 The term IMT is the root name which encompasses both IMT-2000 and IMT-Advanced collectively.
- 2.4 IMT-2000 systems are third generation mobile systems which provide access to a wide range of telecommunication services, supported by the fixed telecommunication networks (e.g. PSTN / ISDN / IP), and other services which are specific to mobile users.
- 2.5 IMT-Advanced systems are mobile systems that include capabilities of IMT-2000 and go beyond those of IMT-2000. Such systems provide access to a wide range of telecommunications services including advanced mobile services supported by mobile and fixed network.
- 2.6 The usage of the said bands are intended for providing wireless broadband connectivity to subscribers and may include applications such as voice, video, images, interactive multimedia, high-speed data and mobile TV.
- 2.7 In general, a SRSP is a document designed to provide information on the minimum requirements in the use of a frequency band as described in the Spectrum Plan (see **Appendix A**). It provides information on technical characteristics of radio systems, frequency channelling, coordination initiatives in order to maximise the utilisation of the band and minimise interference. It is also intended to regulate the usage of spectrum and does not attempt to establish any detailed equipment standards.

## **3.0 GENERAL**

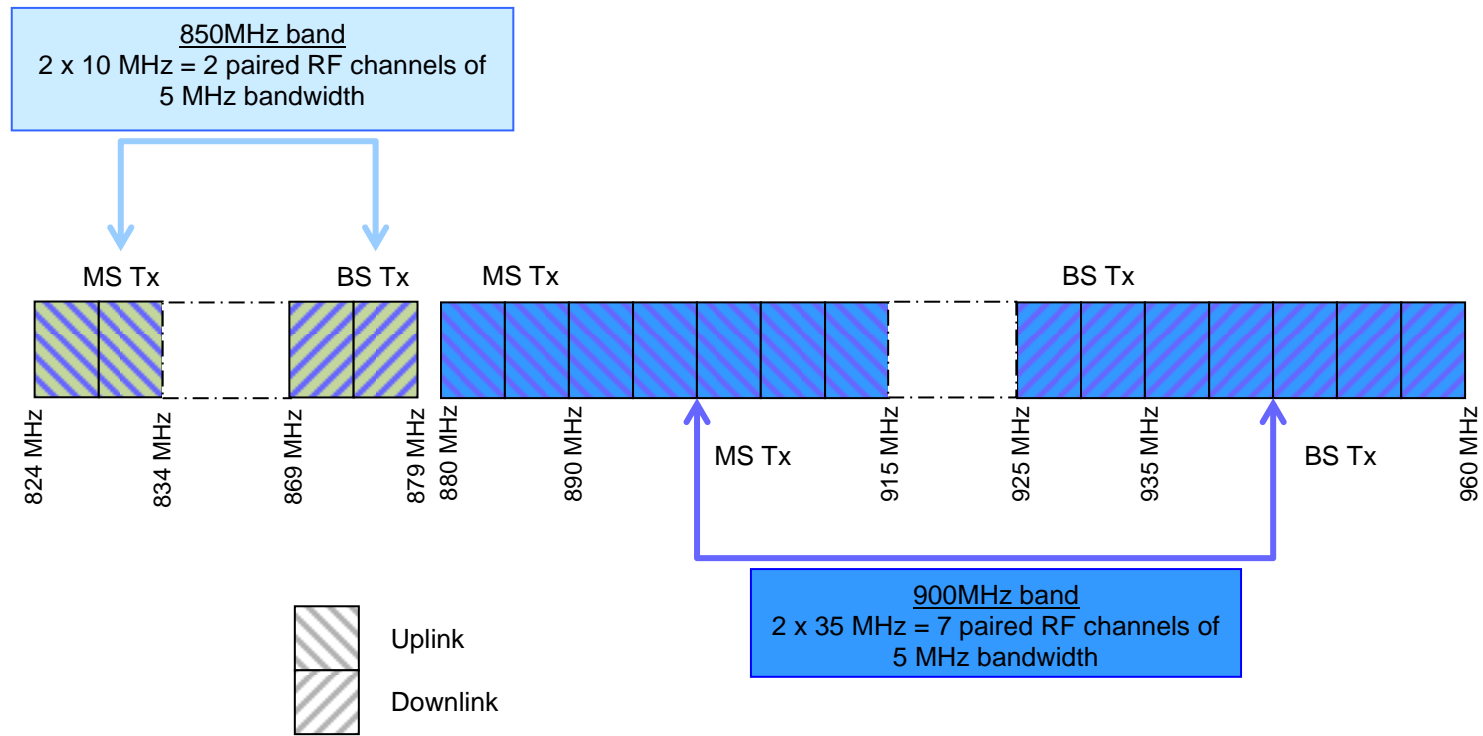
- 3.1 Technical characteristics of equipment used in mobile cellular systems and IMT systems shall conform to all applicable Malaysian standards, international standards, International Telecommunications Union (ITU) and its radio regulations as agreed and adopted by Malaysia.
- 3.2 The installation of all mobile cellular systems and IMT systems shall comply with safety rules as specified in the applicable standards.

- 3.3 The allocation of this frequency 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.
- 3.4 The current usage of the frequency band 824 MHz to 834 MHz paired with 869 MHz to 879 MHz band is for IMT systems using Long Term Evolution (LTE) technology.
- 3.5 The current mobile cellular system being deployed in the 880 MHz to 915 MHz paired with 925 MHz to 960 MHz is based on Global System for Mobile communication (GSM) technology and IMT systems.
- 3.6 The said bands may be used in a manner whereby different technologies can co-exist within the same band thus allowing maximum utilization of the spectrum subject to the requirements set in this document.

## **4.0 CHANNELLING PLAN**

- 4.1 This SRSP defines the frequency band 824 MHz to 834 MHz paired with 869 MHz to 879 MHz and 880 MHz to 915 MHz paired with 925 MHz to 960 MHz for mobile cellular systems and IMT systems in Malaysia.
- 4.2 The spectrum allocation identified for mobile cellular systems and IMT systems as described in the Spectrum Plan can be referred to in **Appendix A**.
- 4.3 The channelling plan for IMT systems is based on the radio frequency arrangement of ITU-R Recommendation M.1036.
- 4.4 For the deployment of mobile cellular system utilizing GSM technology where each RF channel may require 200 kHz or multiples of 200 kHz of bandwidth and 45 MHz duplex spacing, the channelling plan for the cellular mobile radio system are based on the band plan in **Appendix B**.
- 4.5 For the deployment of IMT system where each RF channel may require 5 MHz or multiples of 5 MHz of bandwidth, and a 45 MHz duplex spacing, the channelling plan for the IMT system may be based on the band plan as in **Figure 1**.
- 4.6 In the event of co-existence between GSM and IMT systems, assignment holders who intend to deploy IMT systems shall have the flexibility in deciding the centre frequency and the channel bandwidth of the IMT systems subject to implementation methods defined in **Appendix C** and **Appendix D**.
- 4.7 The band plan in **Figure 1** is to be referred as a guide for full deployment of IMT systems. Assignment holders shall be allowed the flexibility to implement the existing GSM system and/or IMT system and bandwidth usage within its allocated band subject to implementation methods defined in **Appendix C**, **Appendix D** and other policies which determined by the Commission.
- 4.8 Assignment holders having contiguous blocks of 5 MHz shall have the flexibility of combining the carriers to support higher channel bandwidth for IMT technologies that support larger bandwidth. The implementation methods are subject to future mitigation techniques deployed.

**Figure 1:** Radio frequency band plan for IMT systems operating in frequency band of 824 MHz to 834 MHz paired with 869 MHz to 879 MHz and 880 MHz to 915 MHz paired with 925 MHz to 960 MHz.



## 5.0 REQUIREMENTS FOR USAGE OF SPECTRUM

- 5.1 This SRSP covers the minimum key characteristics considered necessary in order to make the best use of the available frequencies.
- 5.2 The said bands are not limited in its use for direct radio connection between a radio base station and subscribers in a point-to-point or point-to-multipoint configuration.
- 5.3 Maximum radiated power and unwanted emission for GSM system:
  - 5.3.1 GSM base station in-block transmissions should not exceed +61 dBm EIRP; and
  - 5.3.2 GSM mobile station transmission should not exceed +31 dBm EIRP.
- 5.4 Maximum radiated power and unwanted emission for IMT system:
  - 5.4.1 IMT base station in-block transmissions should not exceed +61 dBm/5MHz EIRP;
  - 5.4.2 On a case to case basis, higher EIRP value may be permitted if acceptable technical justification is provided; and
  - 5.4.3 IMT mobile station transmissions should not exceed +31dBm/5MHz total radiated power for mobile/nomadic terminal station and not exceed +35 dBm/5MHz EIRP for fixed terminal stations.
- 5.5 In some cases, a radio system conforming to the requirements of this SRSP may require modifications if harmful interference is caused to other radio stations or systems.
- 5.6 The allocation of spectrum and shared services within the said bands are found in the Spectrum Plan and an extract of it is shown in **Appendix A**.
- 5.7 It should be further noted that the operation of the IMT system in the said bands is allowed without causing any interference to other adjacent services and its coexistence and the mitigation of interference may require adopting a number of engineering solutions based on industry best practise guidelines and recommendations described in this document.
- 5.8 For IMT mobile stations, the unwanted emissions in out-of-band and spurious domain outside an assignment holder's assigned frequency blocks shall comply with ITU-R Recommendation M.1581.
- 5.9 When an unwanted emission outside of an assigned frequency block causes major interference, the Commission may, at its discretion, impose greater attenuation than specified in this section.

## **6.0 PRINCIPLES OF ASSIGNMENT**

- 6.1 Authorisations to use the said bands for the mobile cellular base station apparatus, IMT base station apparatus and the mobile stations are as follows:
  - 6.1.1 Apparatus Assignment ('AA') for mobile cellular base station apparatus and IMT base station apparatus; and
  - 6.1.2 Class Assignment ('CA') for mobile station. The applicants are required to comply with any notification of CA issued pursuant to Section 169 of the Communications and Multimedia Act 1998 ('the Act') which confers rights on any person to use any frequency band for the specified devices.
- 6.2 Eligible persons who may apply for the AA are the holders of the Network Facilities Provider Individual ('NFP(I)') licence which provides radiocommunication transmitters and links.
- 6.3 Applicants are required to:
  - 6.3.1 Submit AA application for the apparatus on the prescribed AA forms in accordance with the Act, the Communications and Multimedia (Spectrum) Regulations 2000 ('the Regulations') and any relevant instrument issued by the Commission from time to time; and
  - 6.3.2 Submit any other documents and/or information that may be requested by the Commission.
- 6.4 In facilitating the planning and efficiency in spectrum management, upon successful application, the applicants may be allocated with specific spectrum block/s. Such arrangements are only for administrative or spectrum management purposes in order to facilitate the applicants in their rollout planning. Spectrum in any areas not utilised or underutilised, may be opened to other NFP(I) licensees.
- 6.5 The maximum validity period of an AA for all systems in the said bands is five (5) years and the AA holder may make fresh application for the AA not less than 60 days before expiry.
- 6.6 Issuance of AA is subject to successful coordination with Malaysia's neighbouring country(ies) for stations that are to be located along the border areas.
- 6.7 The conditions that may be imposed by the Commission are the standard conditions for an AA as specified in the Regulations and any additional conditions as may be imposed by the Commission for the allocation and assignment in the said bands.
- 6.8 The use of frequency range 869-870MHz under CA for short range device (SRD), radio frequency device (RFID) and security device will no longer be permitted effective from 1<sup>st</sup> January 2018. Noting that IMT systems and the said devices under CA may co-exist within the said frequency range from the issuance date of this SRSP until 31<sup>st</sup> December 2017 ('Coexistence Period'), the operation of IMT systems in the frequency range of 869-870MHz may be allowed during the Coexistence Period, subject to the following:



- 6.8.1 The use of the said frequency range for the operation of IMT systems by the AA holder shall not be afforded protection from interference caused by the SRD, RFID and security device; and
- 6.8.2 The AA holder shall take all necessary steps to ensure that no interference is caused to the SRD, RFID and security device. The AA holder shall cease operation if it causes interference to the SRD, RFID and security device.
- 6.9 AA Applications for trials shall comply with the applicable trial guidelines, the new channelling plan as in **Figure 1** and any conditions as may be specified by the Commission.

## **7.0 IMPLEMENTATION**

- 7.1 This SRSP shall be effective on the date of issuance of this document.
- 7.2 It has been proven from various reports that coexistence among the different technologies is viable. In order to mitigate the interference issues, the implementation of each of the technologies shall be in accordance with the specifications in the accompanied appendices of this SRSP.
- 7.3 IMT based technologies can be introduced in the said bands after the effective date of the SRSP subject to implementation methods defined in **Appendix C**.
- 7.4 IMT technologies shall be allowed to operate without causing any interference to all existing sites and subject to any other conditions specified by the Commission. The existing sites shall be defined as sites having valid AAs and already operating within the approved bands and technologies. Noting that the deployment of new mobile cellular base station sites is an on-going process such as annual capacity enhancement sites and new coverage deployment sites, those sites under development are taken into consideration in the coordination process. Coordination among operators may be required as recommended in Section 8 in order to minimize interference.
- 7.5 The coexistence requirements between various radio access technologies are specified in **Appendix C**.
- 7.6 The coexistence scenarios among the various technology deployments are described in **Appendix D**.

## **8.0 COORDINATION REQUIREMENT**

- 8.1 The use of the said bands shall require coordination with Malaysia's neighbouring countries within coordination zones. The coordination zones are based on agreement reached at border committees namely FACSMAB, JTC and JCC<sup>1</sup>.
- 8.2 To date, coordination with Thailand in the JTC for the frequency band of 880 MHz to 894MHz has been carried out. The agreed band plan between Malaysia and Thailand

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<sup>1</sup> FACSMAB - Frequency Assignment Committee Singapore, Malaysia and Brunei Darussalam  
JTC - Joint Technical Committee on Coordination and Assignment of Frequencies along Malaysia - Thailand Common Border  
JCC - Joint Committee on Communications between Indonesia and Malaysia

is stipulated in **Appendix E** and subject to further review if deemed necessary. The agreed band plan only applies for operation of the system within 30km from the Malaysia-Thailand common border area. For the frequency band of 894 MHz to 915MHz paired with 939 MHz to 960MHz, JTC has defined a coordination zone of 10 km for this band.

- 8.3 When there is no agreed coordination zone, a zone of within 50 km from our neighbouring countries will be applicable.
- 8.4 It is to be noted that the coordination between Malaysia and other neighbouring countries is currently on-going and hence, the coordination distances may be updated from time to time. Agreement on the band plan from one neighbouring country to another may differ subject to the requirement of the respective country. The coordination parameters and band plans are continuously being reviewed with the regulatory authorities of the neighbouring countries. As such, the Commission reserves the right to reassign the affected frequency channels at border coordination areas.
- 8.5 Technical analysis will be carried out by the Commission before an AA is issued. Operator-to-operator coordination may be required to avoid interference.
- 8.6 In the event of any interference, the Commission will require affected users to carry out an operator-to-operator coordination including operators in the neighbouring countries. In the event that the interference remained unresolved by the operators after 24 hours, the affected parties may escalate the matter to the Commission for a resolution. The Commission will decide the necessary modifications to the system and schedule of modifications to resolve the interference dispute. The Commission will be guided by the interference resolution process as shown in **Appendix F**.
- 8.7 Assignment holders shall adopt interference mitigation techniques such as antenna discrimination, tilt, polarization, frequency discrimination, shielding/blocking (introduce diffraction loss), site selection, and/or power control to facilitate the coordination of systems.

## **9.0 REVOCATION**

- 9.1 SKMM SRSP-504 dated 31 January 2013 is hereby revoked.

## 10.0 REFERENCES

- [1] Recommendation ITU-R M.1036 – Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications (IMT) in the bands identified for IMT in the Radio Regulations (RR)
- [2] Recommendation ITU-R M.1457 - Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2000 (IMT-2000)
- [3] Recommendation ITU-R M.1580 – Generic unwanted emission characteristics of base stations using the terrestrial radio interfaces of IMT 2000
- [4] Recommendation ITU-R M.1581 – Generic unwanted emission characteristics of mobile stations using the terrestrial radio interfaces of IMT 2000
- [5] ECC Report 82 Compatibility Study for UMTS Operating Within the GSM 900 and GSM 1800 Frequency Bands
- [6] ECC Report 96 Compatibility between UMTS 900/1800 and Systems Operating in Adjacent Bands CEPT Report 40 Compatibility study for LTE and WiMAX operating within the bands 880-915 MHz / 925-960 MHz and 1710-1785 MHz / 1805-1880 MHz (900/1800 MHz bands)
- [7] 3GPP Technical Specification 25.104, Base Station (BS) radio transmission and reception (FDD)
- [8] 3GPP Technical Specification 25.816, UMTS 900 MHz Work Item Technical Report
- [9] 3GPP Technical Specification 45.005
- [10] 3GPP2 Specification C.S0057, Band Class Specification for cdma2000 Spread Spectrum Systems
- [11] The Spectrum Plan  
(<http://www.skmm.gov.my/skmmgovmy/media/General/pdf/Spectrum-Plan2014.pdf>)

Issued by:



**Suruhanjaya Komunikasi dan Multimedia Malaysia**  
Malaysian Communications and Multimedia Commission

**APPENDIX A: EXTRACT OF MALAYSIAN SPECTRUM PLAN**  
**(This Appendix forms an integral part of the SRSP document)**

Frequency Band (MHz)	ITU Allocations			Malaysian Allocations
	Region 1	Region 2	Region 3	
698 – 790	BROADCASTING  5.149 5.291A 5.294 5.296 5.300 5.304 5.306 5.311A 5.312 5.312A	BROADCASTING  MOBILE 5.313B 5.317A  Fixed  5.293 5.309 5.311A	698-862  FIXED  MOBILE 5.313A 5.317A  BROADCASTING	FIXED  MOBILE 5.317A MLA89  BROADCASTING MLA29 MLA86 MLA95
790 – 806	790 – 862  FIXED  BROADCASTING  MOBILE except aeronautical mobile 5.316B 5.317A	BROADCASTING  MOBILE 5.313B 5.317A  Fixed  5.293 5.309 5.311A		
806 – 862	5.312 5.314 5.315 5.316 5.316A 5.319	806-890  FIXED  MOBILE 5.317A  BROADCASTING  5.317 5.318	5.149 5.305 5.306 5.307 5.311A 5.320	5.149 5.306 5.311A 5.320 MLA3 MLA14 MLA44 MLA79 MLA80 MLA84 MLA94 MLA98 MLA102
862 - 890	FIXED  MOBILE except aeronautical mobile 5.317A  BROADCASTING 5.322  5.319 5.323	FIXED  MOBILE 5.317A  BROADCASTING  5.317 5.318	FIXED  MOBILE 5.313A 5.317A  BROADCASTING  5.149 5.305 5.306 5.307 5.311A 5.320	FIXED  MOBILE MLA79 MLA80 MLA89 MLA91  BROADCASTING  MLA3 MLA 44 MLA84 MLA93 MLA98 MLA102
890-902	890-942  FIXED  MOBILE except aeronautical mobile 5.317A  BROADCASTING 5.322	FIXED  MOBILE except aeronautical mobile 5.317A  Radiolocation  5.318 5.325	890-942  FIXED  MOBILE 5.317A  BROADCASTING  Radiolocation	FIXED  MOBILE MLA91  BROADCASTING 5.317A  Radiolocation
902-928	Radiolocation  5.323	FIXED  Amateur  Mobile except aeronautical mobile 5.325A  Radiolocation  5.150 5.325 5.326	5.327	MLA3 MLA43 MLA94 MLA98 MLA102

928-942		FIXED MOBILE except aeronautical obile 5.317A Radiolocation 5.325		
942-960	FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 5.323	FIXED MOBILE 5.317A	FIXED MOBILE 5.317A BROADCASTING 5.320	FIXED MOBILE 5.317A MLA91 BROADCASTING 5.320 MLA3 MLA98 MLA102

**5.149** In making assignments to stations of other services to which the bands:

13 360-13 410 kHz, 25 550-25 670 kHz, 37.5-38.25 MHz, 73-74.6 MHz in Regions 1 and 3, 150.05-153 MHz in Region 1, 322-328.6 MHz, 406.1-410 MHz, 608-614 MHz in Regions 1 and 3, 1 330-1 400 MHz, 1 610.6-1 613.8 MHz, 1 660-1 670 MHz, 1 718.8-1 722.2 MHz, 2 655-2 690 MHz, 3 260-3 267 MHz, 3 332-3 339 MHz, 3 345.8-3 352.5 MHz, 4 825-4 835 MHz, 4 950-4 990 MHz,	13 360-13 410 kHz, 25 550-25 670 kHz, 37.5-38.25 MHz, 73-74.6 MHz in Regions 1 and 3, 150.05-153 MHz in Region 1, 322-328.6 MHz, 406.1-410 MHz, 608-614 MHz in Regions 1 and 3, 1 330-1 400 MHz, 1 610.6-1 613.8 MHz, 1 660-1 670 MHz, 1 718.8-1 722.2 MHz, 2 655-2 690 MHz, 3 260-3 267 MHz, 3 332-3 339 MHz, 3 345.8-3 352.5 MHz, 4 825-4 835 MHz, 4 950-4 990 MHz,	13 360-13 410 kHz, 25 550-25 670 kHz, 37.5-38.25 MHz, 73-74.6 MHz in Regions 1 and 3, 150.05-153 MHz in Region 1, 322-328.6 MHz, 406.1-410 MHz, 608-614 MHz in Regions 1 and 3, 1 330-1 400 MHz, 1 610.6-1 613.8 MHz, 1 660-1 670 MHz, 1 718.8-1 722.2 MHz, 2 655-2 690 MHz, 3 260-3 267 MHz, 3 332-3 339 MHz, 3 345.8-3 352.5 MHz, 4 825-4 835 MHz, 4 950-4 990 MHz,
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are allocated, administrations are urged to take all practicable steps to protect the radio astronomy service from harmful interference. Emissions from spaceborne or airborne stations can be particularly serious sources of interference to the radio astronomy service (see Nos. 4.5 and 4.6 and Article 29). (WRC-07)

**5.150** The following bands:

13 553-13 567 kHz (centre frequency 13 560 kHz),  
26 957-27 283 kHz (centre frequency 27 120 kHz),  
40.66-40.70 MHz (centre frequency 40.68 MHz),  
902-928 MHz in Region 2 (centre frequency 915 MHz),  
2 400-2 500 MHz (centre frequency 2 450 MHz),  
5 725-5 875 MHz (centre frequency 5 800 MHz), and  
24-24.25 GHz (centre frequency 24.125 GHz)

are also designated for industrial, scientific and medical (ISM) applications. Radiocommunication services operating within these bands must accept harmful interference which may be caused by these applications. ISM equipment operating in these bands is subject to the provisions of No. **15.13**.

**5.291A** *Additional allocation:* in Germany, Austria, Denmark, Estonia, Finland, Liechtenstein, Norway, Netherlands, the Czech Rep. and Switzerland, the band 470-494 MHz is also allocated to the radiolocation service on a secondary basis. This use is limited to the operation of wind profiler radars in accordance with Resolution 217 (WRC-97). (WRC-97)

**5.293** *Different category of service:* in Canada, Chile, Cuba, the United States, Guyana, Honduras, Jamaica, Mexico, Panama and Peru, the allocation of the bands 470-512 MHz and 614-806 MHz to the fixed service is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**. In Canada, Chile,

Cuba, the United States, Guyana, Honduras, Jamaica, Mexico, Panama and Peru, the allocation of the bands 470-512 MHz and 614-698 MHz to the mobile service is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. In Argentina and Ecuador, the allocation of the band 470-512 MHz to the fixed and mobile services is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. (WRC-12)

**5.294** *Additional allocation:* in Saudi Arabia, Cameroon, Côte d'Ivoire, Egypt, Ethiopia, Israel, Kenya, Libya, the Syrian Arab Republic, South Sudan, Chad and Yemen, the band 470-582 MHz is also allocated to the fixed service on a secondary basis. (WRC-12)

**5.296** *Additional allocation:* in Albania, Germany, Saudi Arabia, Austria, Bahrain, Belgium, Benin, Bosnia and Herzegovina, Burkina Faso, Cameroon, Congo (Rep. of the), Côte d'Ivoire, Croatia, Denmark, Djibouti, Egypt, United Arab Emirates, Spain, Estonia, Finland, France, Gabon, Ghana, Iraq, Ireland, Iceland, Israel, Italy, Jordan, Kuwait, Latvia, The Former Yugoslav Republic of Macedonia, Libya, Liechtenstein, Lithuania, Luxembourg, Mali, Malta, Morocco, Moldova, Monaco, Niger, Norway, Oman, the Netherlands, Poland, Portugal, Qatar, the Syrian Arab Republic, Slovakia, the Czech Republic, the United Kingdom, Sudan, Sweden, Switzerland, Swaziland, Chad, Togo, Tunisia and Turkey, the band 470-790 MHz, and in Angola, Botswana, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Nigeria, South Africa, Tanzania, Zambia and Zimbabwe, the band 470-698 MHz are also allocated on a secondary basis to the land mobile service, intended for applications ancillary to broadcasting. Stations of the land mobile service in the countries listed in this footnote shall not cause harmful interference to existing or planned stations operating in accordance with the Table in countries other than those listed in this footnote. (WRC-12)

**5.300** *Additional allocation:* in Saudi Arabia, Cameroon, Egypt, United Arab Emirates, Israel, Jordan, Libya, Oman, Qatar, the Syrian Arab Republic, Sudan and South Sudan, the band 582-790 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis. (WRC-12)

**5.304** *Additional allocation:* in the African Broadcasting Area (see Nos. 5.10 to 5.13), the band 606-614 MHz is also allocated to the radio astronomy service on a primary basis.

**5.305** *Additional allocation:* in China, the band 606-614 MHz is also allocated to the radio astronomy service on a primary basis.

**5.306** *Additional allocation:* in Region 1, except in the African Broadcasting Area (see Nos. 5.10 to 5.13), and in Region 3, the band 608-614 MHz is also allocated to the radio astronomy service on a secondary basis.

**5.307** *Additional allocation:* in India, the band 608-614 MHz is also allocated to the radio astronomy service on a primary basis.

**5.309** *Different category of service:* in Costa Rica, El Salvador and Honduras, the allocation of the band 614-806 MHz to the fixed service is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21.

**5.311A** For the frequency band 620-790 MHz, see also Resolution 549 (WRC-07). (WRC-07)

**5.313A** The band, or portions of the band 698-790 MHz, in Bangladesh, China, Korea (Rep. of), India, Japan, New Zealand, Pakistan, Papua New Guinea, Philippines and Singapore are identified for use by these administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of these 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 band will not start until 2015. (WRC-12)

**5.313B** *Different category of service:* in Brazil, the allocation of the band 698-806 MHz to the mobile service is on a secondary basis (see No. 5.32). (WRC-07)

**5.314** *Additional allocation:* in Austria, Italy, Moldova, Uzbekistan, Kyrgyzstan and the United Kingdom, the band 790-862 MHz is also allocated to the land mobile service on a secondary basis. (WRC-12)

**5.315** *Alternative allocation:* in Greece, the band 790-838 MHz is allocated to the broadcasting service on a primary basis. (WRC-12)

**5.316** *Additional allocation:* in Germany, Saudi Arabia, Bosnia and Herzegovina, Burkina Faso, Cameroon, Côte d'Ivoire, Croatia, Denmark, Egypt, Finland, Greece, Israel, the Libyan Arab Jamahiriya, Jordan, Kenya, The Former Yugoslav Republic of Macedonia, Liechtenstein, Mali, Monaco, Montenegro, Norway, the Netherlands, Portugal, the United Kingdom, the Syrian Arab Republic, Serbia, Sweden and Switzerland, the

band 790-830 MHz, and in these same countries and in Spain, France, Gabon and Malta, the band 830-862 MHz, are also allocated to the mobile, except aeronautical mobile, service on a primary basis. However, stations of the mobile service in the countries mentioned in connection with each band referred to in this footnote shall not cause harmful interference to, or claim protection from, stations of services operating in accordance with the Table in countries other than those mentioned in connection with the band. This allocation is effective until 16 June 2015. (WRC-07)

**5.316A** *Additional allocation:* in Spain, France, Gabon and Malta, the band 790-830 MHz, in Albania, Angola, Bahrain, Benin, Botswana, Burundi, Congo (Rep. of the), Egypt, United Arab Emirates, Estonia, Gambia, Ghana, Guinea, Guinea-Bissau, Hungary, Iraq, Kuwait, Lesotho, Latvia, Lebanon, Lithuania, Luxembourg, Malawi, Morocco, Mauritania, Mozambique, Namibia, Niger, Nigeria, Oman, Uganda, Poland, Qatar, Slovakia, Czech Rep., Romania, Rwanda, Senegal, Sudan, South Sudan, South Africa, Swaziland, Tanzania, Chad, Togo, Yemen, Zambia, Zimbabwe and French overseas departments and communities of Region 1, the band 790-862 MHz and in Georgia, the band 806-862 MHz, are also allocated to the mobile, except aeronautical mobile, service on a primary basis subject to the agreement by the administrations concerned obtained under No. **9.21** and under the GE06 Agreement, as appropriate, including those administrations mentioned in No. **5.312**, where appropriate. See Resolutions **224 (Rev.WRC-12)** and **749 (Rev.WRC-12)**. This allocation is effective until 16 June 2015. (WRC-12)

**5.316B** In Region 1, the allocation to the mobile, except aeronautical mobile, service on a primary basis in the frequency band 790-862 MHz shall come into effect from 17 June 2015 and shall be subject to agreement obtained under No. **9.21** with respect to the aeronautical radionavigation service in countries mentioned in No. **5.312**. For countries party to the GE06 Agreement, the use of stations of the mobile service is also subject to the successful application of the procedures of that Agreement. Resolutions **224 (Rev.WRC-12)** and **749 (Rev.WRC-12)** shall apply, as appropriate. (WRC-12).

**5.317** *Additional allocation:* in Region 2 (except Brazil and the United States), the band 806-890 MHz is also allocated to the mobile-satellite service on a primary basis, subject to agreement obtained under No. 9.21. The use of this service is intended for operation within national boundaries.

**5.317A** Those parts of the band 698-960 MHz in Region 2 and the band 790-960 MHz in Regions 1 and 3 which are allocated to the mobile service on a primary basis are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) – see Resolutions **224 (Rev.WRC-12)** and **749 (Rev.WRC-12)**, as appropriate. This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-12)

**5.318** *Additional allocation:* in Canada, the United States and Mexico, the bands 849-851 MHz and 894-896 MHz are also allocated to the aeronautical mobile service on a primary basis, for public correspondence with aircraft. The use of the band 849-851 MHz is limited to transmissions from aeronautical stations and the use of the band 894-896 MHz is limited to transmissions from aircraft stations.

**5.319** *Additional allocation:* in Belarus, the Russian Federation and Ukraine, the bands 806-840 MHz (Earth-to-space) and 856-890 MHz (space-to-Earth) are also allocated to the mobile-satellite, except aeronautical mobile-satellite (R), service. The use of these bands by this service shall not cause harmful interference to, or claim protection from, services in other countries operating in accordance with the Table of Frequency Allocations and is subject to special agreements between the administrations concerned.

**5.320** *Additional allocation:* in Region 3, the bands 806-890 MHz and 942-960 MHz are also allocated to the mobile-satellite, except aeronautical mobile-satellite (R), service on a primary basis, subject to agreement obtained under No. 9.21. The use of this service is limited to operation within national boundaries. In seeking such agreement, appropriate protection shall be afforded to services operating in accordance with the Table, to ensure that no harmful interference is caused to such services.

**5.322** In Region 1, in the band 862-960 MHz, stations of the broadcasting service shall be operated only in the African Broadcasting Area (see Nos. 5.10 to 5.13) excluding Algeria, Burundi, Egypt, Spain, Lesotho, Libya, Morocco, Malawi, Namibia, Nigeria, South Africa, Tanzania, Zimbabwe and Zambia, subject to agreement obtained under No. 9.21. (WRC-12)

**5.323** *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 862-960 MHz, in Bulgaria the bands 862-890.2 MHz and 900-935.2 MHz, in Poland the band 862-876 MHz until 31 December 2017, and in Romania the bands 862-880 MHz and 915-925 MHz, are also allocated to the aeronautical radionavigation service on a primary basis. Such use is subject to agreement obtained under No. 9.21 with administrations

concerned and limited to ground-based radiobeacons in operation on 27 October 1997 until the end of their lifetime. (WRC-12)

**5.325** *Different category of service:* in the United States, the allocation of the band 890-942 MHz to the radiolocation service is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**.

**5.325A** *Different category of service:* in Cuba, the allocation of the band 902-915 MHz to the land mobile service is on a primary basis. (WRC-2000)

**5.326** *Different category of service:* in Chile, the band 903-905 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis, subject to agreement obtained under No. **9.21**.

**5.327** *Different category of service:* in Australia, the allocation of the band 915-928 MHz to the radiolocation service is on a primary basis (see No. **5.33**).

**MLA3** Class Assignment.

**MLA14** The following frequency bands are exclusively use by the Government of Malaysia:

30 kHz to 70 kHz;	70 kHz to 90 kHz;
110 kHz to 160 kHz;	1985 kHz to 3000 kHz;
3025 kHz to 3155 kHz;	4700 kHz to 4750 kHz;
5680 kHz to 5730 kHz;	6685 kHz to 6765 kHz;
8965 kHz to 9040 kHz;	11175 kHz to 11275 kHz;
13200 kHz to 13260 kHz;	13360 kHz to 13410 kHz;
14500 kHz to 14900 kHz;	15010 kHz to 15100 kHz;
17970 kHz to 18030 kHz;	23200 kHz to 23350 kHz;
25550 kHz to 25670 kHz;	30.010 MHz to 37.500 MHz;
41.015 MHz to 44.000 MHz;	44.000 MHz to 47.000 MHz;
47.000 MHz to 50.000 MHz;	54.000 MHz to 68.000 MHz;
72.800 MHz to 74.800 MHz;	75.200 MHz to 75.400 MHz;
75.400 MHz to 87.000 MHz;	165.000 MHz to 167.000 MHz
170.000 MHz to 172.000 MHz;	230.000 MHz to 235.000 MHz;
235.000 MHz to 267.000 MHz;	267.000 MHz to 272.000 MHz;
272.000 MHz to 273.000 MHz;	273.000 MHz to 312.000 MHz;
312.000 MHz to 315.000 MHz;	315.000 MHz to 322.000 MHz;
322.000 MHz to 328.600 MHz;	335.400 MHz to 380.000 MHz;
380.000 MHz to 399.900 MHz;	444.000 MHz to 445.000 MHz
449.000 MHz to 450.000 MHz;	457.000 MHz to 458.000 MHz;
458.000 MHz to 459.000 MHz;	467.000 MHz to 468.000 MHz;
468.000 MHz to 469.000 MHz;	798.000 MHz to 806.000 MHz;
960.000 MHz to 1215.000 MHz;	1400.000 MHz to 1427.000 MHz;
2040.000 MHz to 2096.000 MHz	2035.000 MHz to 2036.000 MHz
2232.000 MHz to 2233.000 MHz;	2700.000 MHz to 2900.000 MHz;
2900.000 MHz to 3100.000 MHz;	3100.000 MHz to 3300.000 MHz;
3300.000 MHz to 3400.000 MHz;	4940.000 MHz to 4990.000 MHz;
5460.000 MHz to 5470.000 MHz;	5470.000 MHz to 5650.000 MHz;
8146.000 MHz to 8275.000 MHz;	9500.000 MHz to 9800.000 MHz;
9800.000 MHz to 10000.000 MHz.	

**MLA29** Standard Radio System Plan 521: Requirements for Digital Terrestrial Television (including digital terrestrial sound) (DTT) Service Operating in the Frequency Bands 174 MHz to 230 MHz AND 470 MHz to 742 MHz.

**MLA43** Standard Radio System Plan 530: Requirements for Radio Frequency Identification Device-RFID-Operating in the Frequency Band 919 MHz to 923 MHz.

**MLA44** The following bands are planned for the use of International MobileTelecommunications (IMT) Systems:

from 450 MHz to 470 MHz;  
806 MHz to 869 MHz; and  
2 300 MHz to 2 400 MHz.

**MLA79** Standard Radio System Plan 502: Requirements for Trunk Radio Systems (TRS) Operating in the Frequency Band 806 MHz to 821 MHz and 851 MHz to 866 MHz.



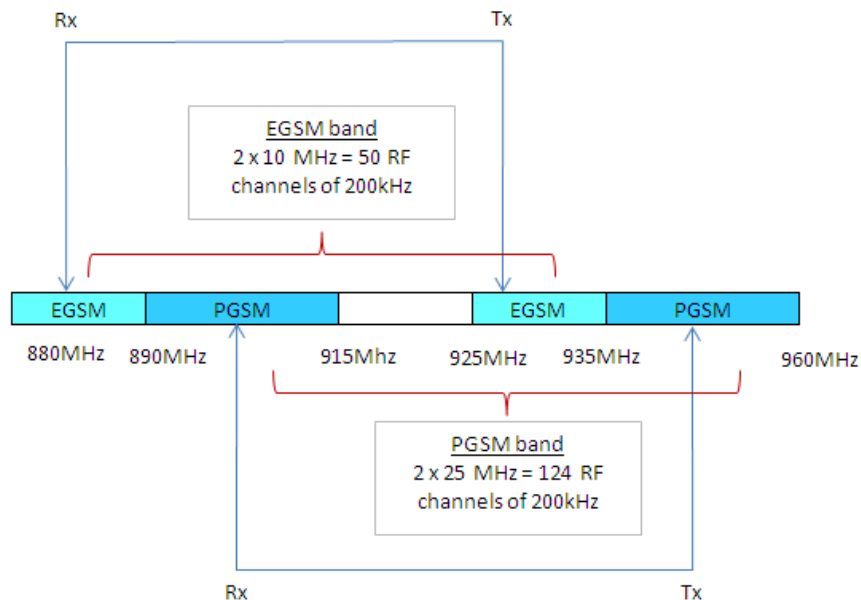
- MLA80** Standard Radio System Plan 531: Requirements for Broadband Wireless Access (BWA) Systems Operating in the frequency band from 821 MHz to 824 MHz and 866 MHz to 869MHz.
- MLA84** The following bands have been identified for Public Protection and Disaster Relief (PPDR) use in Malaysia:  
380 MHz to 400 MHz;  
816 MHz to 821 MHz / 861 MHz to 866 MHz;  
4940 MHz to 4990 MHz
- MLA86** The analogue TV broadcasting stations are allowed to operate in the bands from 174 MHz to 230 MHz and from 470 MHz to 798 MHz until Analogue Switch-Off (ASO) which is targeted to be in 2015. The analogue TV broadcasting stations shall cease operation after ASO.
- MLA87** Use of frequency band from 223 MHz to 230 MHz for Airport Tower operation in the Aeronautical Radionavigation Service is allowed until 31st December 2020.
- MLA89** Technical Specification for Broadband Wireless Access (SKMM WTS BWA)
- MLA91** Technical Specification for GSM Mobile Terminals (SKMM WTS GSM-MT)
- MLA93** Technical Specification for Land Mobile Radio Equipment (SKMM WTS LMR)
- MLA94** Technical Specification for Short Range Devices (SKMM WTS SRD)
- MLA95** Specification for Digital Terrestrial Television Broadcast Receiver (SKMM MTSFB TC T004).
- MLA98** Standard Radio System Plan 504 : Requirements for Mobile Cellular Systems and International Mobile Telecommunications (IMT) Systems Operating in the Frequency Bands from 825 MHz to 835 MHz Paired With 870 MHz to 880 MHz and 880 MHz to 915 MHz Paired With 925 MHz to 960 MHz
- MLA102** Standard Radio System Plan 549 : Requirements for Devices using Ultra-Wideband (UWB) Technology Operating in the Frequency Bands from 30 MHz to 960 MHz, 2.17 GHz to 10.6 GHz, 21.65 GHz to 29.5 GHz and 77 GHz to 81GHz

## APPENDIX B: CHANNELING PLAN OF CURRENT 900 MHz GSM SYSTEM

(This Appendix forms an integral part of the SRSP document)

B.1 Within 880 – 915 MHz and 925 - 960 MHz band, the channelling plan are developed based on a 200 kHz channel raster corresponding to the GSM channel bandwidth, and provides for up to 174 FDD channels. The mobile station's transmit frequency is always 45 MHz lower than the base station's transmit frequency (45 MHz duplex spacing):

**Figure B.1:** Channel arrangement for GSM systems operating in frequency band 880 MHz to 915 MHz and 925 to 960 MHz



**E-GSM:** (ARFCN 975-1023):

Frequency range: 880-890MHz / 925-935MHz

Centre frequency for uplink carrier:  $F_u = 890\text{MHz} + (\text{ARFCN} - 1024) \times 0.2\text{MHz}$

Centre frequency for downlink carrier:  $F_d = F_u(\text{ARFCN}) + 45\text{MHz}$

**P-GSM:** (ARFCN 0-124):

Frequency range: 890-915MHz / 935-960MHz

Centre frequency for uplink carrier:  $F_u = 890\text{MHz} + (\text{ARFCN}) \times 0.2\text{MHz}$

Centre frequency for downlink carrier frequency:  $F_d = F_u(\text{ARFCN}) + 45\text{MHz}$

**FREQUENCY AND CHANNELLING PLAN FOR THE BAND 880 - 915 MHz AND 925 - 960 MHz**

**TABLE B.1: FREQUENCY AND CHANNELLING PLAN FOR EGSM AND GSM (MHz)**

	A1	B1	C1	D1	A2	B2	C2	D2	A3	B3	C3	D3
<b>CHANNEL No.</b>							<b>975</b>	<b>976</b>	<b>977</b>	<b>978</b>	<b>979</b>	<b>980</b>
RX							880.2	880.4	880.6	880.8	881.0	881.2
TX							925.2	925.4	925.6	925.8	926.0	926.2
<b>CHANNEL No.</b>	<b>981</b>	<b>982</b>	<b>983</b>	<b>984</b>	<b>985</b>	<b>986</b>	<b>987</b>	<b>988</b>	<b>989</b>	<b>990</b>	<b>991</b>	<b>992</b>
RX	881.4	881.6	881.8	882.0	882.2	882.4	882.6	882.8	883.0	883.2	883.4	883.6
TX	926.4	926.6	926.8	927.0	927.2	927.4	927.6	927.8	928.0	928.2	928.4	928.6
<b>CHANNEL No.</b>	<b>993</b>	<b>994</b>	<b>995</b>	<b>996</b>	<b>997</b>	<b>998</b>	<b>999</b>	<b>1000</b>	<b>1001</b>	<b>1002</b>	<b>1003</b>	<b>1004</b>
RX	883.8	884.0	884.2	884.4	884.6	884.8	885.0	885.2	885.4	885.6	885.8	886.0
TX	928.8	929.0	929.2	929.4	929.6	929.8	930.0	930.2	930.4	930.6	930.8	931.0
<b>CHANNEL No.</b>	<b>1005</b>	<b>1006</b>	<b>1007</b>	<b>1008</b>	<b>1009</b>	<b>1010</b>	<b>1011</b>	<b>1012</b>	<b>1013</b>	<b>1014</b>	<b>1015</b>	<b>1016</b>
RX	886.2	886.4	886.6	886.8	887.0	887.2	887.4	887.6	887.8	888.0	888.2	888.4
TX	931.2	931.4	931.6	931.8	932.0	932.2	932.4	932.6	932.8	933.0	933.2	933.4
<b>CHANNEL No.</b>	<b>1017</b>	<b>1018</b>	<b>1019</b>	<b>1020</b>	<b>1021</b>	<b>1022</b>	<b>1023</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
RX	888.6	888.8	889.0	889.2	889.4	889.6	889.8	890.0	890.2	890.4	890.6	890.8
TX	933.6	933.8	934.0	934.2	934.4	934.6	934.8	935.0	935.2	935.4	935.6	935.8
<b>CHANNEL No.</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>
RX	891.0	891.2	891.4	891.6	891.8	892.0	892.2	892.4	892.6	892.8	893.0	893.2
TX	936.0	936.2	936.4	936.6	936.8	937.0	937.2	937.4	937.6	937.8	938.0	938.2
<b>CHANNEL No.</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>
RX	893.4	893.6	893.8	894.0	894.2	894.4	894.6	894.8	895.0	895.2	895.4	895.6
TX	938.4	938.6	938.8	939.0	939.2	939.4	939.6	939.8	940.0	940.2	940.4	940.6
<b>CHANNEL No.</b>	<b>29</b>	<b>30</b>	<b>31</b>	<b>32</b>	<b>33</b>	<b>34</b>	<b>35</b>	<b>36</b>	<b>37</b>	<b>38</b>	<b>39</b>	<b>40</b>

RX	895.8	896.0	896.2	896.4	896.6	896.8	897.0	897.2	897.4	897.6	897.8	898.0
TX	940.8	941.0	941.2	941.4	941.6	941.8	942.0	942.2	942.4	942.6	942.8	943.0
<b>CHANNEL No.</b>	<b>41</b>	<b>42</b>	<b>43</b>	<b>44</b>	<b>45</b>	<b>46</b>	<b>47</b>	<b>48</b>	<b>49</b>	<b>50</b>	<b>51</b>	<b>52</b>
RX	898.2	898.4	898.6	898.8	899.0	899.2	899.4	899.6	899.8	900.0	900.2	900.4
TX	943.2	943.4	943.6	943.8	944.0	944.2	944.4	944.6	944.8	945.0	945.2	945.4
<b>CHANNEL No.</b>	<b>53</b>	<b>54</b>	<b>55</b>	<b>56</b>	<b>57</b>	<b>58</b>	<b>59</b>	<b>60</b>	<b>61</b>	<b>62</b>	<b>63</b>	<b>64</b>
RX	900.6	900.8	901.0	901.2	901.4	901.6	901.8	902.0	902.2	902.4	902.6	902.8
TX	945.6	945.8	946.0	946.2	946.4	946.6	946.8	947.0	947.2	947.4	947.6	947.8
<b>CHANNEL No.</b>	<b>65</b>	<b>66</b>	<b>67</b>	<b>68</b>	<b>69</b>	<b>70</b>	<b>71</b>	<b>72</b>	<b>73</b>	<b>74</b>	<b>75</b>	<b>76</b>
RX	903.0	903.2	903.4	903.6	903.8	904.0	904.2	904.4	904.6	904.8	905.0	905.2
TX	948.0	948.2	948.4	948.6	948.8	949.0	949.2	949.4	949.6	949.8	950.0	950.2
<b>CHANNEL No.</b>	<b>77</b>	<b>78</b>	<b>79</b>	<b>80</b>	<b>81</b>	<b>82</b>	<b>83</b>	<b>84</b>	<b>85</b>	<b>86</b>	<b>87</b>	<b>88</b>
RX	905.4	905.6	905.8	906.0	906.2	906.4	906.6	906.8	907.0	907.2	907.4	907.6
TX	950.4	950.6	950.8	951.0	951.2	951.4	951.6	951.8	952.0	952.2	952.4	952.6
<b>CHANNEL No.</b>	<b>89</b>	<b>90</b>	<b>91</b>	<b>92</b>	<b>93</b>	<b>94</b>	<b>95</b>	<b>96</b>	<b>97</b>	<b>98</b>	<b>99</b>	<b>100</b>
RX	907.8	908.0	908.2	908.4	908.6	908.8	909.0	909.2	909.4	909.6	909.8	910.0
TX	952.8	953.0	953.2	953.4	953.6	953.8	954.0	954.2	954.4	954.6	954.8	955.0
<b>CHANNEL No.</b>	<b>101</b>	<b>102</b>	<b>103</b>	<b>104</b>	<b>105</b>	<b>106</b>	<b>107</b>	<b>108</b>	<b>109</b>	<b>110</b>	<b>111</b>	<b>112</b>
RX	910.2	910.4	910.6	910.8	911.0	911.2	911.4	911.6	911.8	912.0	912.2	912.4
TX	955.2	955.4	955.6	955.8	956.0	956.2	956.4	956.6	956.8	957.0	957.2	957.4
<b>CHANNEL No.</b>	<b>113</b>	<b>114</b>	<b>115</b>	<b>116</b>	<b>117</b>	<b>118</b>	<b>119</b>	<b>120</b>	<b>121</b>	<b>122</b>	<b>123</b>	<b>124</b>
RX	912.6	912.8	913.0	913.2	913.4	913.6	913.8	914.0	914.2	914.4	914.6	914.8
TX	957.6	957.8	958.0	958.2	958.4	958.6	958.8	959.0	959.2	959.4	959.6	959.8

## APPENDIX C: COEXISTENCE REQUIREMENTS BETWEEN DIFFERENT SYSTEMS

(This Appendix forms an integral part of the SRSP document)

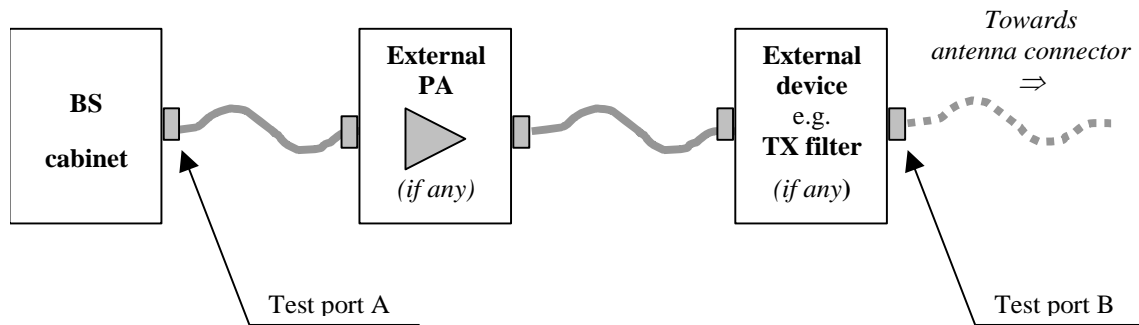
C.1 Table C.1 below defines the parameters for coexistence requirement between various technologies.

Table C.1: Technical requirements for coexistence between different systems

System A	System B	Technical Requirements
LTE DL (850 MHz)	GSM UL (900 MHz)	<p>When System A and System B co-exist in the same geographical area, System A shall ensure that the unwanted emission (spurious emission and out-of-band emission) to be equal to or less than -61dBm/100kHz starting at the lowest edge of the operating frequency band of System B and beyond, measured at System A.</p> <p>When System A and System B are co-located in the same structure (e.g. tower, mast, etc.), System A shall ensure that the unwanted emission (spurious emission and out-of band emission) to be equal to or less than -98dBm/100kHz starting at the nearest edge of the operating frequency band of System B and beyond, measured at System A. The receive signal allowed from System A shall be equal to or less than -128dBm/100kHz measured at the receiver of System B. [Note: 30dB coupling loss between transmitter of System A and receiver of System B is required.]</p>
LTE DL (850 MHz)	WCDMA UL (900 MHz)	<p>When System A and System B co-exist in the same geographical area, System A shall ensure that the unwanted emission (spurious emission and out-of-band emission) to be equal to or less than -49dBm/1MHz starting at the lowest edge of the operating frequency band of System B and beyond, measured at System A.</p> <p>When System A and System B are co-located in the same structure (e.g. tower, mast, etc.), System A shall ensure that the unwanted emission (spurious emission and out-of-band emission) to be equal to or less than -96dBm/100kHz starting at the lowest edge of the operating frequency band of System B and beyond, measured at System A. The receive signal allowed from System A shall be equal to or less than -126dBm/100kHz measured at the receiver of System B. [Note: 30dB coupling loss between transmitter of System A and receiver of System B is required.]</p> <p>For co-existence and/or co-location scenario, System A shall ensure that its transmit power within the allowed operating range of System B's receiver is equal to or less than -40dBm/3.84MHz measured at System B receiver.</p>
LTE DL (850 MHz)	LTE DL (850 MHz)	No frequency separation is required between System A's channel edge and the System B's channel edge.
WCDMA DL (900 MHz)	GSM DL (900 MHz)	System A shall provide a minimum separation of 200 kHz between its channel edge and the nearest System B's channel edge. The separation may be reduced if both systems are coordinated.
WCDMA DL (900 MHz)	WCDMA DL (900 MHz)	No frequency separation is required between System A's channel edge and the System B's channel edge.

C.3 The specification defines the measurement points to be at the BS antenna connector (test port A). If any external apparatus such as a TX amplifier, a filter or the combination of such devices is used, measurement points shall be at the far end antenna connector (test port B). These ports' location are shown in Figure 6.1 of 3GPP TS25.104 and extracted into Figure C.1 below.

Figure C.1: Reference Points for Measurements of Unwanted Emissions from System A



## APPENDIX D: DESCRIPTION OF COEXISTENCE METHODOLOGIES

(This Appendix is an informative reference)

- D.1 There are various types of studies which had been carried out to evaluate on major incidents of mutual interference between mobile stations and base stations working in adjacent frequency ranges in an environment where different radio access technologies exist.
- D.2 Current technologies for coexistence in the 850 MHz/ 900 MHz may consist of one of the followings: GSM, 3GPP2 CDMA and 3GPP (WCDMA and beyond).
- D.3 Two site scenarios are possible in deploying different access technologies within the same bands:
- Coordinated – Both systems are located at the same physical site.
  - Un-coordinated – No site sharing. The two systems are located on different physical sites.
- D.4 Each scenario will generate different system interference results and coordinated scenario is always preferred whenever possible to give minimum interference to each other.
- D.5 Carriers of different technologies can co-exist in 850 MHz/ 900 MHz spectrum but extra measures must be taken to prevent interference.
- D.6 There exist two types of frequency placing of 3GPP (WCDMA and beyond) 850 MHz/ 900 MHz in existing GSM 900 MHz system or 3GPP2 CDMA 850 MHz system. The coexistence can be achieved by using one of these two arrangements:
- 'Sandwich-type' frequency arrangement

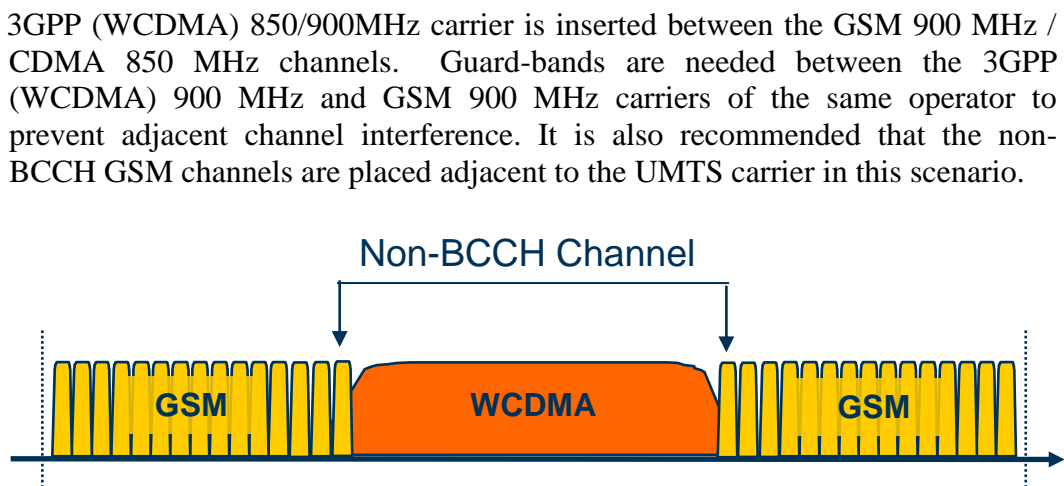


Figure D.1: Example of Sandwich-type for GSM and 3GPP (WCDMA)

- 'Carrier Edge' frequency arrangement

3GPP (WCDMA) 900 MHz carrier is placed at the edge of the GSM 900 MHz/ CDMA 850 MHz channels.

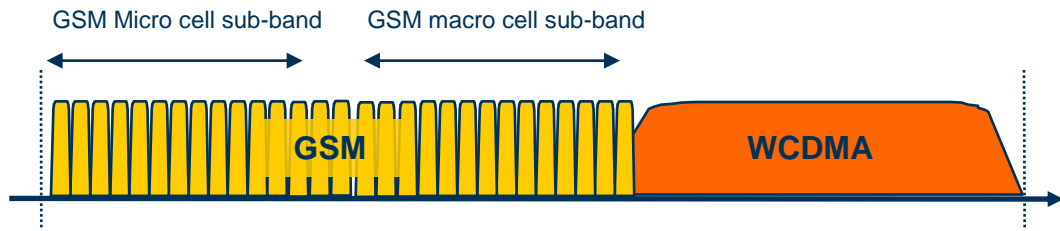


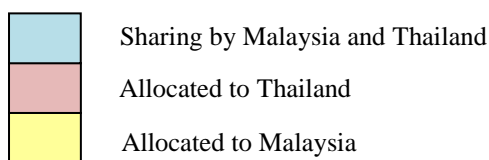
Figure D.3: Example of Carrier Edge for GSM and 3GPP (WCDMA)

- D.7 In urban areas, GSM900 is typically deployed in a Hierarchy Cell Structure (HCS), comprising of macrocells, microcells and picocells. The HCS between a 3GPP(WCDMA/TD-CDMA/TD-SCDMA) device and a GSM microcell is significantly smaller (by 30–40dB) than between a 3GPP(WCDMA/TD-CDMA/TD-SCDMA) device and a GSM macrocell. This increases adjacent channel interference in the microcell case (compared with the macrocell case). To overcome this, 3GPP recommends that the 3GPP(WCDMA/TD-CDMA/TD-SCDMA) carrier is allocated a position in the spectrum as far away as possible from the microcell or picocell sub-band, by positioning the GSM macrocell sub-band between the two.
- D.8 There are two scenarios for interference to be generated when different technologies are introduced in the 850 MHz and 900 MHz bands: In-band interference and inter-band interference.
- i) Scenario 1 - In-band interference: A guard band is required between existing technology and the expected introduction of other technologies. The size of the guard band depends on whether the technology is introduced in a coordinated or uncoordinated manner.
  - ii) Scenario 2 - Inter-band interference: Occurs in cases of base transmit of 850 MHz systems into Base receive of 900 MHz systems and Mobile transmit of 900 MHz systems into Mobile receive of 850 MHz systems.



## APPENDIX E: AGREED BAND PLAN WITH NEIGHBOURING COUNTRIES

### Agreed Band Plan with Thailand



#### E.1) 880MHz to 884 MHz band:

- i) Both Malaysia and Thailand operators to continue operator-to-operator coordination and use reference signal spillage level of -98dBm/200kHz at 3 km distance from the border measured at the height of Malaysia Base station receiver to minimize potential interference.

#### E.2) 884 MHz to 889 MHz band:

- i) The maximum receive signal level from Thailand operator is -98 dBm/200kHz at 30 km distance from the border measured at the height of Malaysia Base station receiver; and
- ii) For certain geographical condition such as islands and coastline, or other special cases, it was agreed to be solved by operator-to-operator coordination on case-by-case basis if the receive signal level exceeds -98 dBm/200kHz.

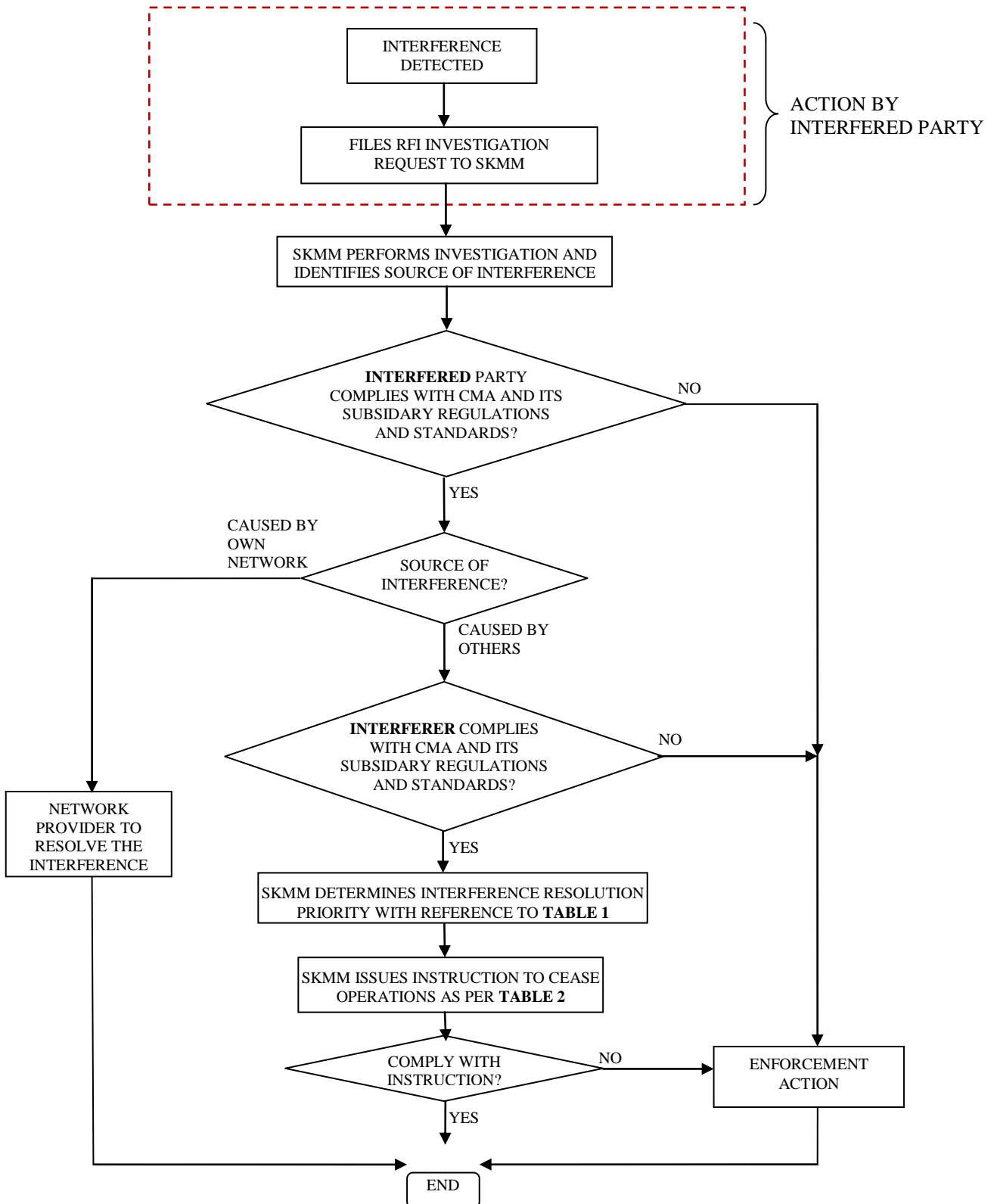
#### E.3) 889 MHz to 894 MHz band:

- i) The maximum receive signal level from Thailand operator is -98 dBm/200kHz at 3 km distance from the border measured at the height of Malaysia Base station receiver. The sites measured during the joint measurements will be used as reference; and
- ii) For certain geographical condition such as islands and coastline, or other special cases, it was agreed to be solved by operator-to-operator coordination on case-by-case basis if the receive signal level exceeds -98 dBm/200kHz.

#### E.4) 880 MHz to 894 MHz band:

- i) As and when necessary, both Thailand and Malaysia operators to perform necessary mitigation techniques to minimize interference. (e.g. antenna down tilting etc.) .

## APPENDIX F: INTERFERENCE RESOLUTION PROCESS



**TABLE 1: INTERFERENCE RESOLUTION PRIORITY**

	Resolution Type of Priority	Description
1	Service Priority	Primary has priority over secondary services. Among co- primary or co-secondary services, the stated priority is accorded as in the Spectrum Plan
2	Assignment Type Priority	Spectrum Assignment (SA) and Apparatus Assignment (AA) have equal priority but are of higher priority than Class Assignment (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): <ul style="list-style-type: none"> <li>i. Safety or Radionavigation service;</li> <li>ii. Based on the Date of Apparatus Assignment - Priority is given to the earliest/first installation</li> </ul>

**TABLE 2: INTERFERENCE RESOLUTION TIMELINE TO PARTIES**

	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 CMA (Spectrum) Regulations 2000	To cease* operation immediately within 24 hours or earlier as specified in the notice issued by the Commission
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 the Commission 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 the Commission 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 complete implementation of the mitigation plan to the satisfaction of the Commission to remove/ avoid the interference.