

REQUIREMENTS FOR

MOBILE CELLULAR SYSTEMS AND

INTERNATIONAL MOBILE

TELECOMMUNICATIONS (IMT) SYSTEMS

OPERATING IN THE FREQUENCY BANDS

1710 MHz TO 1785 MHz PAIRED WITH

1805 MHz TO 1880 MHz



TABLE OF CONTENTS	PAGE
1.0 GLOSSARY.....	3
2.0 INTENT	4
3.0 GENERAL.....	4
4.0 CHANNELLING PLAN	5
5.0 REQUIREMENTS FOR USAGE OF SPECTRUM	6
6.0 PRINCIPLES OF ASSIGNMENT	7
7.0 IMPLEMENTATION	8
8.0 COORDINATION REQUIREMENT	9
9.0 REVOCATION	9
10.0 REFERENCES.....	10
APPENDIX A: EXTRACT OF MALAYSIAN SPECTRUM PLAN.....	11
APPENDIX B: CHANNELING PLAN OF GSM SYSTEM	13
APPENDIX C: CHANNELING PLAN OF IMT SYSTEMS	19
APPENDIX D: COEXISTENCE REQUIREMENT BETWEEN DIFFERENT SYSTEMS.....	20
APPENDIX E: INTERFERENCE RESOLUTION PROCESS	23

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.mcmc.gov.my/skmmgovmy/files/attachments/SRSPGlossary.pdf>)

**REQUIREMENTS FOR MOBILE CELLULAR SYSTEMS AND INTERNATIONAL
MOBILE TELECOMMUNICATIONS (IMT) SYSTEMS OPERATING IN THE
FREQUENCY BANDS 1710 MHz TO 1785 MHz
PAIRED WITH 1805 MHz TO 1880 MHz**

2.0 INTENT

- 2.1 This Standard Radio System Plan (SRSP) states the requirements for the utilisation of the frequency bands between 1710 MHz to 1785 MHz paired with 1805 MHz to 1880 MHz ('said band') 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 operators.
- 2.3 The term IMT in this document is referred to IMT-2000 and IMT-Advanced systems 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 networks.
- 2.6 The usage of the said band is intended for providing wireless telecommunication connectivity to subscribers and can include applications such as voice, internet, video, images, interactive multimedia, high-speed data and mobile TV.
- 2.7 In general, this SRSP is 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 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.

- 3.4 The current mobile system being deployed in the said band is based on Global System for Mobile communication ('GSM') technology and IMT systems.
- 3.5 The new developments of usage of mobile phones on board vessels as well as mobile communication services on aircraft have been introduced over the past few years in the said band. These usage has also made huge developments and improvements in order for it to be deployed ubiquitously.
- 3.6 The said band 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 SRSP.

4.0 CHANNELLING PLAN

- 4.1 This SRSP defines the frequency bands from 1710 MHz to 1785 MHz paired with 1805 MHz to 1880 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 95 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 systems where each RF channel may require 5 MHz or multiples of 5 MHz of bandwidth, and a 95 MHz duplex spacing, the channelling plan for the IMT systems may be based on the band plan as in **Appendix C**.
- 4.6 In the event of co-existence between GSM with 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 D**.
- 4.7 The band plan in **Appendix C** is to be referred as a guide for full deployment of IMT systems. Assignment holders shall be allowed the flexibility to implement GSM system and/or IMT system and bandwidth usage within its allocated band subject to implementation methods defined in **Appendix D**, and other policies 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.

5.0 REQUIREMENTS FOR USAGE OF SPECTRUM

- 5.1 This SRSP covers the minimum key characteristics considered necessary in order to optimise the use of the available frequencies.
- 5.2 The use of the said band is only allowed for deployment of up to IMT-Advanced system.
- 5.3 The said band is not limited in its use for direct radio connection between a radio base station and subscribers in a point-to-multipoint configuration. It should be further noted that the operation of the IMT system in the said band 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.
- 5.4 Maximum radiated power and unwanted emission for GSM system:
 - 5.4.1 GSM base station in-block transmissions should not exceed 61dBm 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 GSM mobile station transmission should not exceed 31dBm EIRP.
- 5.5 Maximum radiated power and unwanted emission for IMT system:
 - 5.5.1 IMT Base Station in-block transmissions should not exceed 61dBm/5MHz EIRP;
 - 5.5.2 On a case to case basis, higher EIRP value may be permitted if acceptable technical justification is provided; and
 - 5.5.3 IMT mobile station transmissions should not exceed 31dBm/5MHz total radiated power for mobile/nomadic terminal stations and not exceed 35dBm/5MHz EIRP for fixed terminal stations.
- 5.6 In some cases, a radio system conforming to the requirements of this SRSP may require modifications if harmful interference is caused to other radio communication stations or systems.
- 5.7 The allocation of spectrum and shared services within the said band are found in the Spectrum Plan and an extract of it is shown in **Appendix A**.
- 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 band are as follows:

6.1.1 Until 30 June 2017;

By way of Apparatus Assignment ('AA') for mobile cellular base station apparatus and IMT base station apparatus and by way of Class Assignment ('CA') for mobile station; and

6.1.2 Effective from 1 July 2017 onwards;

By way of Spectrum Assignment ('SA') under the Ministerial Determination No. 5 of 2016.

6.2 Eligible persons for assignments mentioned in paragraph 6.1 are as follows:

Apparatus Assignment

6.2.1 The Network Facilities Provider Individual ('NFP(I)') licence holders who provides radiocommunications transmitters and links.

6.2.2 Applicants are required to:

- i. Submit AA application for the apparatus on the prescribed AA forms in accordance with the Communications and Multimedia Act 1998 ('Act'), the Communications and Multimedia (Spectrum) Regulations 2000 ('the Regulations') and any relevant instrument issued by the Commission from time to time; and
- ii. Submit any other documents and/or information that may be requested by the Commission.

6.2.3 In facilitating the planning and efficiency in spectrum management, upon successful AA 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.

Spectrum Assignment

6.2.4 As specified in the Ministerial Determination No. 7 of 2016.

6.3 The validity period of SA is defined in the Determination No. 5 of 2016 while the validity period of an AA for all systems in the said band is until 30 June 2017.

6.4 The use of the said band is subject to successful co-ordination with Malaysia's neighbouring country(ies) for stations that are to be located along the border areas.

6.5 The conditions that may be imposed by the Commission are the standard conditions for an assignment as specified in the Regulations and any additional conditions as may be imposed 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 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 assignments 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 8.0 in order to minimize interference.
- 7.4 On board vessels systems in the said band must ensure that the mobile phones do not attempt to register with ground base stations while the system is operating at a distance from shore that prevents a reliable connection and therefore could cause interference in terrestrial networks. The said system shall not operate when the vessel is less than 2 nautical miles from the baseline (refer to **Appendix D**).
- 7.5 During the operation of mobile communication services that is authorised on an aircraft in the said band, mobile terminals must be prevented from registering with mobile networks on the ground. Mobile communication services on aircraft is only allowed to operate at the minimum height of 3000 m above the ground (refer to Section 3 of **Appendix D**).

8.0 COORDINATION REQUIREMENT

- 8.1 Technical analysis will be carried out by the Commission before an assignment is issued. Operator-to-operator coordination may be required to avoid interference.
- 8.2 In the event of any interference, the Commission will require affected users to carry out an operator-to-operator coordination. In the event that the interference remained unresolved after 24 hours by the operators, the affected parties may escalate the matter to the Commission for a resolution. The Commission will decide the necessary modifications and schedule of modifications to resolve the dispute. The Commission will be guided by the interference resolution process as shown in **Appendix E**.
- 8.3 Assignment holders are expected to take full advantage of interference mitigation techniques such as antenna discrimination, tilt, polarization, frequency discrimination, shielding/blocking (introduce diffraction loss), site selection, power control and/or filter installation to facilitate the coordination of systems.
- 8.4 The use of the said band shall also require coordination with the neighbouring countries within the coordination zones. The coordination zones are based on agreement reached at border committees namely FACSMAB, JTC and JCC¹.
- 8.5 When there is no agreed coordination zone, zone within 50 km from our neighbouring countries will be used.
- 8.6 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.
- 8.7 For communication on board vessels in the said band, there is a need for a harmonized approach to the free circulation and use of the system and mobile phones to ensure the provision of an uninterrupted service whilst the vessel crosses the borders of various countries and to reduce the regulatory requirements placed on administrations, mobile telephone network operators and vessel operators.

9.0 REVOCATION

- 9.1 MCMC SRSP 508, dated 21 June 2017 is hereby revoked.

¹ 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

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] 3GPP Technical Specification 25.104 Base Station (BS) radio transmission and reception (FDD)
- [6] 3GPP Technical Specification 36.104 Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception
- [7] ECC Report 82 Compatibility Study for UMTS Operating Within the GSM 900 and GSM 1800 Frequency Bands
- [8] 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)
- [9] CEPT Report 28 Mobile Communication Services on Vessels (MCV)
- [10] CEPT Report 16 Mobile Communication Services on board aircraft (MCA)
- [11] Spectrum Plan
(<https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/Spectrum-Plan-2017i.pdf>)

Issued by:



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	
1 710 – 1 930	FIXED MOBILE 5.384A 5.388A 5.388B 5.149 5.341 5.385 5.386 5.387 5.388			FIXED MOBILE 5.384A 5.388A MLA53 MLA89 MLA91 MLA92 MLA99 5.149 5.341 5.385 5.388 MLA3 MLA90

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

13 360-13 410 kHz,	4 950-4 990 MHz,	102-109.5 GHz,
25 550-25 670 kHz,	4 990-5 000 MHz,	111.8-114.25 GHz,
37.5-38.25 MHz,	6 650-6 675.2 MHz,	128.33-128.59 GHz,
73-74.6 MHz in Regions 1 and 3,	10.6-10.68 GHz,	129.23-129.49 GHz,
150.05-153 MHz in Region 1,	14.47-14.5 GHz,	130-134 GHz,
322-328.6 MHz,	22.01-22.21 GHz,	136-148.5 GHz,
406.1-410 MHz,	22.21-22.5 GHz,	151.5-158.5 GHz,
608-614 MHz in Regions 1 and 3,	22.81-22.86 GHz,	168.59-168.93 GHz,
1 330-1 400 MHz,	23.07-23.12 GHz,	171.11-171.45 GHz,
1 610.6-1 613.8 MHz,	31.2-31.3 GHz,	172.31-172.65 GHz,
1 660-1 670 MHz,	31.5-31.8 GHz in Regions 1 and 3,	173.52-173.85 GHz,
1 718.8-1 722.2 MHz,	36.43-36.5 GHz,	195.75-196.15 GHz,
2 655-2 690 MHz,	42.5-43.5 GHz,	209-226 GHz,
3 260-3 267 MHz,	48.94-49.04 GHz,	241-250 GHz,
3 332-3 339 MHz,	76-86 GHz,	252-275 GHz
3 345.8-3 352.5 MHz,	92-94 GHz,	
4 825-4 835 MHz,	94.1-100 GHz,	

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)

5.341 In the bands 1 400-1 727 MHz, 101-120 GHz and 197-220 GHz, passive research is being conducted by some countries in a programme for the search for intentional emissions of extraterrestrial origin.

5.384A The frequency bands, 1 710-1 885 MHz, 2 300-2 400 MHz and 2 500-2 690 MHz, or portion thereof, are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC-15). 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-15)

5.385 *Additional allocation:* the band 1 718.8-1 722.2 MHz is also allocated to the radio astronomy service on a secondary basis for spectral line observations. (WRC-2000)

5.386 *Additional allocation:* the frequency band 1 750-1 850 MHz is also allocated to the space operation (Earth-to-space) and space research (Earth-to-space) services in Region 2 (except in Mexico), in Australia, Guam, India, Indonesia and Japan on a primary basis, subject to agreement obtained under No. 9.21, having particular regard to troposcatter systems. (WRC-15)

5.387 *Additional allocation:* in Belarus, Georgia, Kazakhstan, Kyrgyzstan, Romania, Tajikistan and Turkmenistan, the band 1 770-1 790 MHz is also allocated to the meteorological-satellite service on a primary basis, subject to agreement obtained under No. 9.21. (WRC-12)

5.388 The frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement International Mobile Telecommunications (IMT). Such use does not preclude the use of these frequency bands by other services to which they are allocated. The frequency bands should be made available for IMT in accordance with Resolution 212 (Rev.WRC-15)*. (See also Resolution 223 (WRC-15)*) (WRC-15)

5.388A In Regions 1 and 3, the bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz and, in Region 2, the bands 1 885-1 980 MHz and 2 110-2 160 MHz may be used by high altitude platform stations as base stations to provide International Mobile Telecommunications (IMT), in accordance with Resolution 221 (Rev.WRC-07)*. Their use by IMT applications using high altitude platform stations as base stations does not preclude the use of these bands by any station in the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-12)

5.388B In Algeria, Saudi Arabia, Bahrain, Benin, Burkina Faso, Cameroon, Comoros, Côte d'Ivoire, China, Cuba, Djibouti, Egypt, United Arab Emirates, Eritrea, Ethiopia, Gabon, Ghana, India, Iran (Islamic Republic of), Israel, Jordan, Kenya, Kuwait, Libya, Mali, Morocco, Mauritania, Nigeria, Oman, Uganda, Pakistan, Qatar, the Syrian Arab Republic, Senegal, Singapore, Sudan, South Sudan, Tanzania, Chad, Togo, Tunisia, Yemen, Zambia and Zimbabwe, for the purpose of protecting fixed and mobile services, including IMT mobile stations, in their territories from co-channel interference, a high altitude platform station (HAPS) operating as an IMT base station in neighbouring countries, in the bands referred to in **No. 5.388A**, shall not exceed a co-channel power flux-density of $-127 \text{ dB(W/(m}^2 \cdot \text{MHz))}$ at the Earth's surface outside a country's borders unless explicit agreement of the affected administration is provided at the time of the notification of HAPS. (WRC-12)

MLA3 Class Assignment.

MLA53 Standard Radio System Plan 524M: Requirements for International Mobile Telecommunications (IMT) Systems Operating in the Frequency Bands from 1885 MHz to 2025 MHz and 2110 MHz to 2200 MHz.

MLA89 Technical Specification for Broadband Wireless Access (SKMM WTS BWA)

MLA90 Technical Specification for Cordless Telephone Systems (SKMM WTS CTS)

MLA91 Technical Specification for GSM Mobile Terminals (SKMM WTS GSM-MT)

MLA92 Technical Specification for IMT-2000 Third-Generation (3G) Cellular Mobile Terminals (SKMM WTS IMT-MT)

MLA99 Standard Radio System Plan 508: Requirements for Mobile Cellular Systems and International Mobile Telecommunications (IMT) Systems Operating in the Frequency Bands from 1710 MHz to 1785 MHz and 1805 MHz to 1880 MHz.

APPENDIX B: CHANNELING PLAN OF GSM SYSTEM

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

- B.1 Within the frequency band between 1710 MHz to 1785 MHz paired with 1805 MHz to 1880 MHz, the channelling plan are developed based on a 200 kHz channel raster corresponding to the GSM channel bandwidth, and provides for up to 375 FDD channels. The mobile station's transmit frequency is always 95 MHz lower than the base station's transmit frequency (95 MHz duplex spacing):

Figure B.1: Channel arrangement for GSM systems operating in frequency band 1710 MHz to 1785 MHz and 1805 MHz to 1880 MHz



GSM:

Frequency range: 1710 MHz to 1785 MHz paired with 1805 MHz to 1880 MHz

Start frequency for uplink carrier: $F_u = 1710.2 \text{ MHz} + (\text{ARFCN} - 512) * 0.2 \text{ MHz}$

Start frequency for downlink carrier: $F_d = F_u(\text{ARFCN}) + 95 \text{ MHz}$

FREQUENCY AND CHANNELLING PLAN FOR THE FREQUENCY BAND 1710 MHz TO 1785 MHz PAIRED WITH 1805 MHz TO 1880 MHz

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

Channel No.	Base Station Receive Frequency (MHz)	Base Station Transmit Frequency (MHz)	Channel No	Base Station Receive Frequency (MHz)	Base Station Transmit Frequency (MHz)	Channel No	Base Station Receive Frequency (MHz)	Base Station Transmit Frequency (MHz)
512	1710.20	1805.20	543	1716.40	1811.40	574	1722.60	1817.60
513	1710.40	1805.40	544	1716.60	1811.60	575	1722.80	1817.80
514	1710.60	1805.60	545	1716.80	1811.80	576	1723.00	1818.00
515	1710.80	1805.80	546	1717.00	1812.00	577	1723.20	1818.20
516	1711.00	1806.00	547	1717.20	1812.20	578	1723.40	1818.40
517	1711.20	1806.20	548	1717.40	1812.40	579	1723.60	1818.60
518	1711.40	1806.40	549	1717.60	1812.60	580	1723.80	1818.80
519	1711.60	1806.60	550	1717.80	1812.80	581	1724.00	1819.00
520	1711.80	1806.80	551	1718.00	1813.00	582	1724.20	1819.20
521	1712.00	1807.00	552	1718.20	1813.20	583	1724.40	1819.40
522	1712.20	1807.20	553	1718.40	1813.40	584	1724.60	1819.60
523	1712.40	1807.40	554	1718.60	1813.60	585	1724.80	1819.80
524	1712.60	1807.60	555	1718.80	1813.80	586	1725.00	1820.00
525	1712.80	1807.80	556	1719.00	1814.00	587	1725.20	1820.20
526	1713.00	1808.00	557	1719.20	1814.20	588	1725.40	1820.40
527	1713.20	1808.20	558	1719.40	1814.40	589	1725.60	1820.60
528	1713.40	1808.40	559	1719.60	1814.60	590	1725.80	1820.80
529	1713.60	1808.60	560	1719.80	1814.80	591	1726.00	1821.00
530	1713.80	1808.80	561	1720.00	1815.00	592	1726.20	1821.20
531	1714.00	1809.00	562	1720.20	1815.20	593	1726.40	1821.40
532	1714.20	1809.20	563	1720.40	1815.40	594	1726.60	1821.60
533	1714.40	1809.40	564	1720.60	1815.60	595	1726.80	1821.80
534	1714.60	1809.60	565	1720.80	1815.80	596	1727.00	1822.00
535	1714.80	1809.80	566	1721.00	1816.00	597	1727.20	1822.20
536	1715.00	1810.00	567	1721.20	1816.20	598	1727.40	1822.40

537	1715.20	1810.20	568	1721.40	1816.40	599	1727.60	1822.60
538	1715.40	1810.40	569	1721.60	1816.60	600	1727.80	1822.80
539	1715.60	1810.60	570	1721.80	1816.80	601	1728.00	1823.00
540	1715.80	1810.80	571	1722.00	1817.00	602	1728.20	1823.20
541	1716.00	1811.00	572	1722.20	1817.20	603	1728.40	1823.40
542	1716.20	1811.20	573	1722.40	1817.40	604	1728.60	1823.60

Channel No	Base Station Receive Frequency (MHz)	Base Station Transmit Frequency (MHz)	Channel No	Base Station Receive Frequency (MHz)	Base Station Transmit Frequency (MHz)	Channel No	Base Station Receive Frequency (MHz)	Base Station Transmit Frequency (MHz)
605	1728.80	1823.80	636	1735.00	1830.00	667	1741.20	1836.20
606	1729.00	1824.00	637	1735.20	1830.20	668	1741.40	1836.40
607	1729.20	1824.20	638	1735.40	1830.40	669	1741.60	1836.60
608	1729.40	1824.40	639	1735.60	1830.60	670	1741.80	1836.80
609	1729.60	1824.60	640	1735.80	1830.80	671	1742.00	1837.00
610	1729.80	1824.80	641	1736.00	1831.00	672	1742.20	1837.20
611	1730.00	1825.00	642	1736.20	1831.20	673	1742.40	1837.40
612	1730.20	1825.20	643	1736.40	1831.40	674	1742.60	1837.60
613	1730.40	1825.40	644	1736.60	1831.60	675	1742.80	1837.80
614	1730.60	1825.60	645	1736.80	1831.80	676	1743.00	1838.00
615	1730.80	1825.80	646	1737.00	1832.00	677	1743.20	1838.20
616	1731.00	1826.00	647	1737.20	1832.20	678	1743.40	1838.40
617	1731.20	1826.20	648	1737.40	1832.40	679	1743.60	1838.60
618	1731.40	1826.40	649	1737.60	1832.60	680	1743.80	1838.80
619	1731.60	1826.60	650	1737.80	1832.80	681	1744.00	1839.00
620	1731.80	1826.80	651	1738.00	1833.00	682	1744.20	1839.20
621	1732.00	1827.00	652	1738.20	1833.20	683	1744.40	1839.40
622	1732.20	1827.20	653	1738.40	1833.40	684	1744.60	1839.60
623	1732.40	1827.40	654	1738.60	1833.60	685	1744.80	1839.80
624	1732.60	1827.60	655	1738.80	1833.80	686	1745.00	1840.00

625	1732.80	1827.80	656	1739.00	1834.00	687	1745.20	1840.20
626	1733.00	1828.00	657	1739.20	1834.20	688	1745.40	1840.40
627	1733.20	1828.20	658	1739.40	1834.40	689	1745.60	1840.60
628	1733.40	1828.40	659	1739.60	1834.60	690	1745.80	1840.80
629	1733.60	1828.60	660	1739.80	1834.80	691	1746.00	1841.00
630	1733.80	1828.80	661	1740.00	1835.00	692	1746.20	1841.20
631	1734.00	1829.00	662	1740.20	1835.20	693	1746.40	1841.40
632	1734.20	1829.20	663	1740.40	1835.40	694	1746.60	1841.60
633	1734.40	1829.40	664	1740.60	1835.60	695	1746.80	1841.80
634	1734.60	1829.60	665	1740.80	1835.80	696	1747.00	1842.00
635	1734.80	1829.80	666	1741.00	1836.00	697	1747.20	1842.20

Channel No	Base Station Receive Frequency (MHz)	Base Station Transmit Frequency (MHz)	Channel No	Base Station Receive Frequency (MHz)	Base Station Transmit Frequency (MHz)	Channel No	Base Station Receive Frequency (MHz)	Base Station Transmit Frequency (MHz)
698	1747.40	1842.40	729	1753.60	1848.60	760	1759.80	1854.80
699	1747.60	1842.60	730	1753.80	1848.80	761	1760.00	1855.00
700	1747.80	1842.80	731	1754.00	1849.00	762	1760.20	1855.20
701	1748.00	1843.00	732	1754.20	1849.20	763	1760.40	1855.40
702	1748.20	1843.20	733	1754.40	1849.40	764	1760.60	1855.60
703	1748.40	1843.40	734	1754.60	1849.60	765	1760.80	1855.80
704	1748.60	1843.60	735	1754.80	1849.80	766	1761.00	1856.00
705	1748.80	1843.80	736	1755.00	1850.00	767	1761.20	1856.20
706	1749.00	1844.00	737	1755.20	1850.20	768	1761.40	1856.40
707	1749.20	1844.20	738	1755.40	1850.40	769	1761.60	1856.60
708	1749.40	1844.40	739	1755.60	1850.60	770	1761.80	1856.80
709	1749.60	1844.60	740	1755.80	1850.80	771	1762.00	1857.00
710	1749.80	1844.80	741	1756.00	1851.00	772	1762.20	1857.20
711	1750.00	1845.00	742	1756.20	1851.20	773	1762.40	1857.40
712	1750.20	1845.20	743	1756.40	1851.40	774	1762.60	1857.60

713	1750.40	1845.40	744	1756.60	1851.60	775	1762.80	1857.80
714	1750.60	1845.60	745	1756.80	1851.80	776	1763.00	1858.00
715	1750.80	1845.80	746	1757.00	1852.00	777	1763.20	1858.20
716	1751.00	1846.00	747	1757.20	1852.20	778	1763.40	1858.40
717	1751.20	1846.20	748	1757.40	1852.40	779	1763.60	1858.60
718	1751.40	1846.40	749	1757.60	1852.60	780	1763.80	1858.80
719	1751.60	1846.60	750	1757.80	1852.80	781	1764.00	1859.00
720	1751.80	1846.80	751	1758.00	1853.00	782	1764.20	1859.20
721	1752.00	1847.00	752	1758.20	1853.20	783	1764.40	1859.40
722	1752.20	1847.20	753	1758.40	1853.40	784	1764.60	1859.60
723	1752.40	1847.40	754	1758.60	1853.60	785	1764.80	1859.80
724	1752.60	1847.60	755	1758.80	1853.80	786	1765.00	1860.00
725	1752.80	1847.80	756	1759.00	1854.00	787	1765.20	1860.20
726	1753.00	1848.00	757	1759.20	1854.20	788	1765.40	1860.40
727	1753.20	1848.20	758	1759.40	1854.40	789	1765.60	1860.60
728	1753.40	1848.40	759	1759.60	1854.60	790	1765.80	1860.80

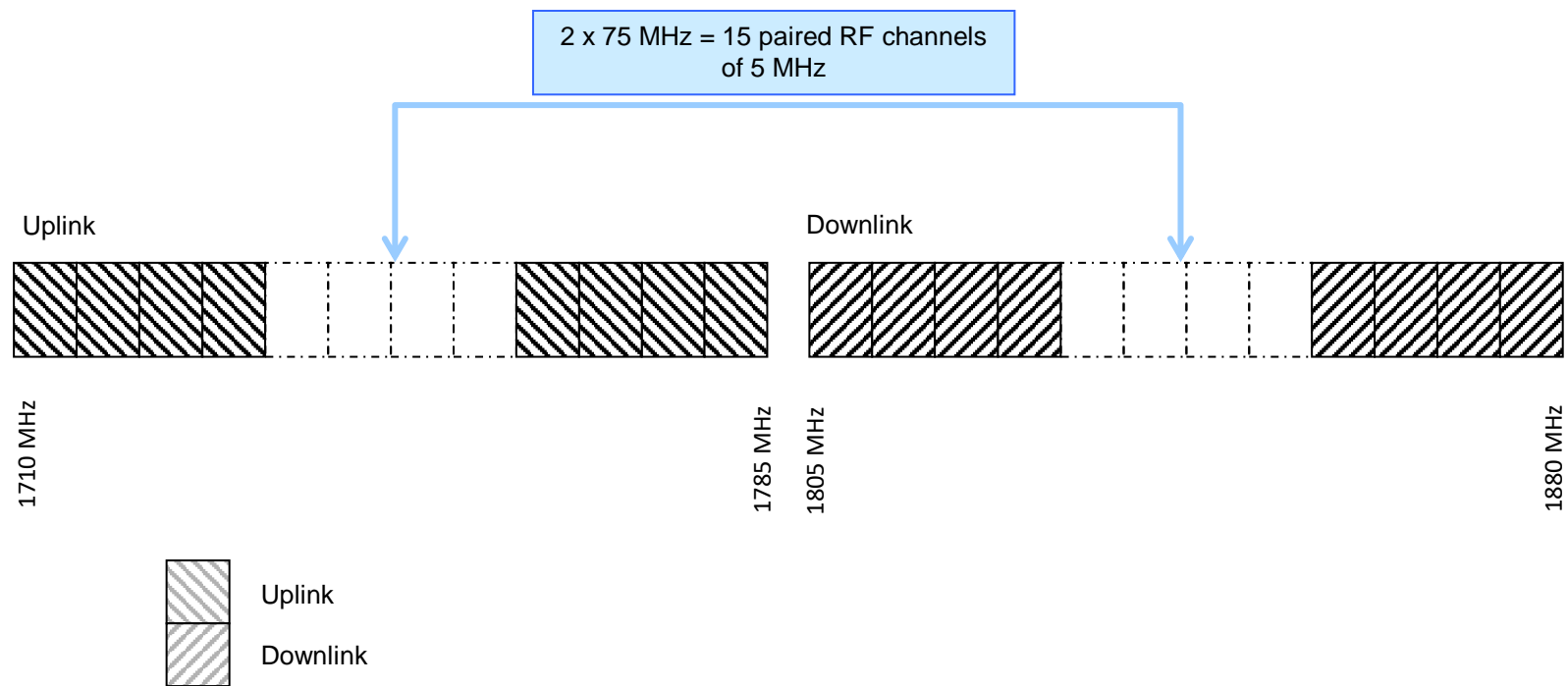
Channel No	Base Station Receive Frequency (MHz)	Base Station Transmit Frequency (MHz)	Channel No	Base Station Receive Frequency (MHz)	Base Station Transmit Frequency (MHz)	Channel No	Base Station Receive Frequency (MHz)	Base Station Transmit Frequency (MHz)
791	1766.00	1861.00	822	1772.20	1867.20	853	1778.40	1873.40
792	1766.20	1861.20	823	1772.40	1867.40	854	1778.60	1873.60
793	1766.40	1861.40	824	1772.60	1867.60	855	1778.80	1873.80
794	1766.60	1861.60	825	1772.80	1867.80	856	1779.00	1874.00
795	1766.80	1861.80	826	1773.00	1868.00	857	1779.20	1874.20
796	1767.00	1862.00	827	1773.20	1868.20	858	1779.40	1874.40
797	1767.20	1862.20	828	1773.40	1868.40	859	1779.60	1874.60
798	1767.40	1862.40	829	1773.60	1868.60	860	1779.80	1874.80
799	1767.60	1862.60	830	1773.80	1868.80	861	1780.00	1875.00
800	1767.80	1862.80	831	1774.00	1869.00	862	1780.20	1875.20

801	1768.00	1863.00	832	1774.20	1869.20	863	1780.40	1875.40
802	1768.20	1863.20	833	1774.40	1869.40	864	1780.60	1875.60
803	1768.40	1863.40	834	1774.60	1869.60	865	1780.80	1875.80
804	1768.60	1863.60	835	1774.80	1869.80	866	1781.00	1876.00
805	1768.80	1863.80	836	1775.00	1870.00	867	1781.20	1876.20
806	1769.00	1864.00	837	1775.20	1870.20	868	1781.40	1876.40
807	1769.20	1864.20	838	1775.40	1870.40	869	1781.60	1876.60
808	1769.40	1864.40	839	1775.60	1870.60	870	1781.80	1876.80
809	1769.60	1864.60	840	1775.80	1870.80	871	1782.00	1877.00
810	1769.80	1864.80	841	1776.00	1871.00	872	1782.20	1877.20
811	1770.00	1865.00	842	1776.20	1871.20	873	1782.40	1877.40
812	1770.20	1865.20	843	1776.40	1871.40	874	1782.60	1877.60
813	1770.40	1865.40	844	1776.60	1871.60	875	1782.80	1877.80
814	1770.60	1865.60	845	1776.80	1871.80	876	1783.00	1878.00
815	1770.80	1865.80	846	1777.00	1872.00	877	1783.20	1878.20
816	1771.00	1866.00	847	1777.20	1872.20	878	1783.40	1878.40
817	1771.20	1866.20	848	1777.40	1872.40	879	1783.60	1878.60
818	1771.40	1866.40	849	1777.60	1872.60	880	1783.80	1878.80
819	1771.60	1866.60	850	1777.80	1872.80	881	1784.00	1879.00
820	1771.80	1866.80	851	1778.00	1873.00	882	1784.20	1879.20
821	1772.00	1867.00	852	1778.20	1873.20	883	1784.40	1879.40
884	1784.60	1879.60	885	1784.80	1879.80			

APPENDIX C: CHANNELING PLAN OF IMT SYSTEMS

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

Figure C.1: Radio frequency band plan of cellular mobile radio systems operating in frequency band 1710 MHz to 1785 MHz paired with 1805 MHz to 1880 MHz for IMT systems.



APPENDIX D: COEXISTENCE REQUIREMENT BETWEEN DIFFERENT SYSTEMS

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

Section 1: Coexistence Requirements between Different Systems

D.1 Table D.1 below defines the parameters for coexistence requirement between various technologies within the bands 1710 MHz to 1785 MHz and 1805 MHz to 1880 MHz.

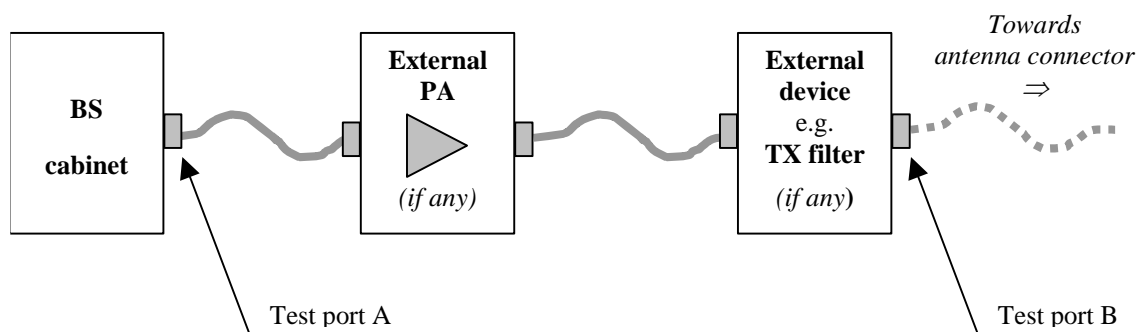
Table D.1: Technical Requirements for Coexistence between Different Systems

System A	System B	Technical Requirements
LTE	GSM	Separation of 200 kHz is recommended between the channel edge of both systems whereby 100 kHz is to be contributed by each systems. The separation may be reduced if both systems are coordinated*.
LTE	LTE	No frequency separation is required between System A's channel edge and the System B's channel edge.

*Coordinated is referred as the agreed coordination between network operators to ensure minimal spectrum wastage as guard band and no interference between system for different network operators.

D.2 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 D.1 below.

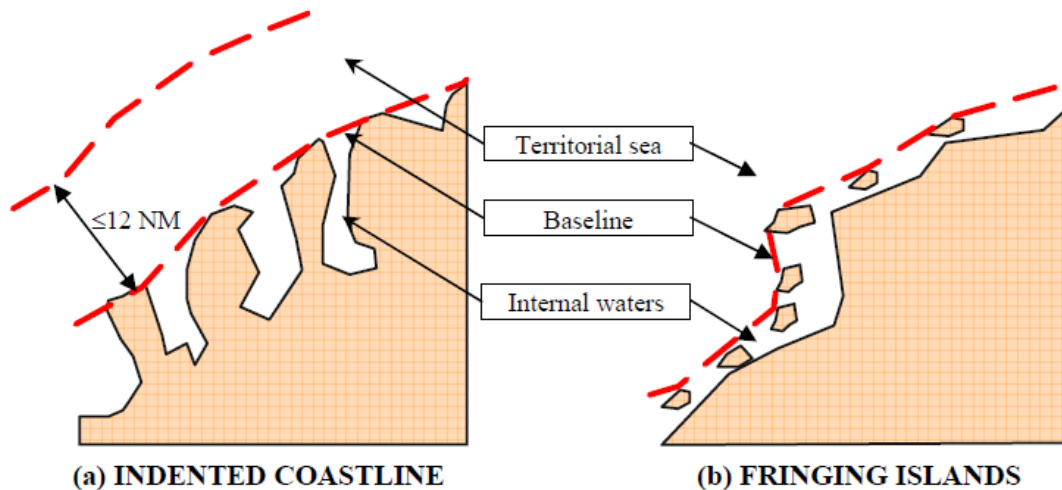
Figure D.1: Reference Points for Measurements of Unwanted Emissions from System A



Section 2: Coexistence Requirements for Mobile Onboard Vessel

D.3 The technical aspects of operation mobile communications onboard vessels in the territorial sea as defined in the UN Convention on the Law of the Sea (UNCLOS, 1982), excluding internal waters, harbours and ports. The territorial sea is understood as being on the waterway side of the geographical baseline as illustrated below in Figure D.2.

Figure D.2: Illustration of baseline between internal waters and territorial sea (NM – nautical miles)



Note: 1 nautical mile = 1.852 kilometers

- D.4 GSM access onboard a vessel is to be provided by one or more pico-cell BTS (v-BS) which operates on the 1800 MHz band. From the baseline the v-MS receiver sensitivity and the disconnection threshold has to follow the specifications as listed below.

The CEPT Report 028 establishes different interference scenarios and considers the results of minimal coupling loss (MCL) and Spectrum Engineering Advanced Monte-Carlo Analysis Tool (SEAMCAT) simulations for these various scenarios. The results show compatibility between mobile communication services on vessels (MCV) operating in territorial seas and land-based systems can be achieved provided the following conditions are met:

- 1) The System shall not be used closer than 2 NM from the baseline;
- 2) Only indoor v-BS antenna(s) shall be used;
- 3) DTX1 has to be activated on the MCV uplink;
- 4) The timing advance2 value of v-BS must be set to minimum;
- 5) All v-MS shall be controlled to use the minimum output power (5 dBm in 900 MHz and 0 dBm in 1800 MHz bands);
- 6) Within 2-3 NM from the baseline the v-MS receiver sensitivity and the disconnection threshold (ACCMIN3 & min RXLEV4 level) shall be ≥ 70 dBm/200 kHz;
- 7) Within 3-12 NM from the baseline the v-MS receiver sensitivity and the disconnection threshold (ACCMIN & min RXLEV level) shall be ≥ 75 dBm/200 kHz;
- 8) The v-BS emissions measured anywhere external to the vessel (i.e. at ship perimeter or on its open deck areas) shall not exceed -80 dBm/200 kHz (referenced to a 0 dBi measurement antenna gain);

Section 3: Coexistence Requirements for Mobile Communication Services Onboard Aircraft

- D.5 To avoid harmful interference to ground-based networks, the E.I.R.P densities given in Table D.2 should not be exceeded. These limits are defined as levels outside the aircraft in order to meet this objective, despite the variation in aircraft attenuation due to the factors described above.

Table D.2: Technical Requirements for Mobile Communication Services Onboard Aircraft

Minimum operational height above ground (m)	Maximum e.i.r.p. defined outside the aircraft, resulting from the ac-UE (LTE) in (dBm/5 MHz)	Maximum e.i.r.p. defined outside the aircraft, resulting from the ac-MS (GSM) in (dBm/200 kHz)	Maximum permitted e.i.r.p. density produced by NCU/aircraft-BTS, defined outside the aircraft	
			Ac-BTS	NCU
			1800 MHz	
			(dBm/200 kHz)	(dBm/200 kHz)
3000	1.7	-3.3	-13.0	-13.0
4000	3.9	-1.1	-10.5	-10.5
5000	5	0.5	-8.5	-8.5
6000	5	1.8	-6.9	-6.9
7000	5	2.9	-5.6	-5.6
8000	5	3.8	-4.4	-4.4

APPENDIX E: INTERFERENCE RESOLUTION PROCESS

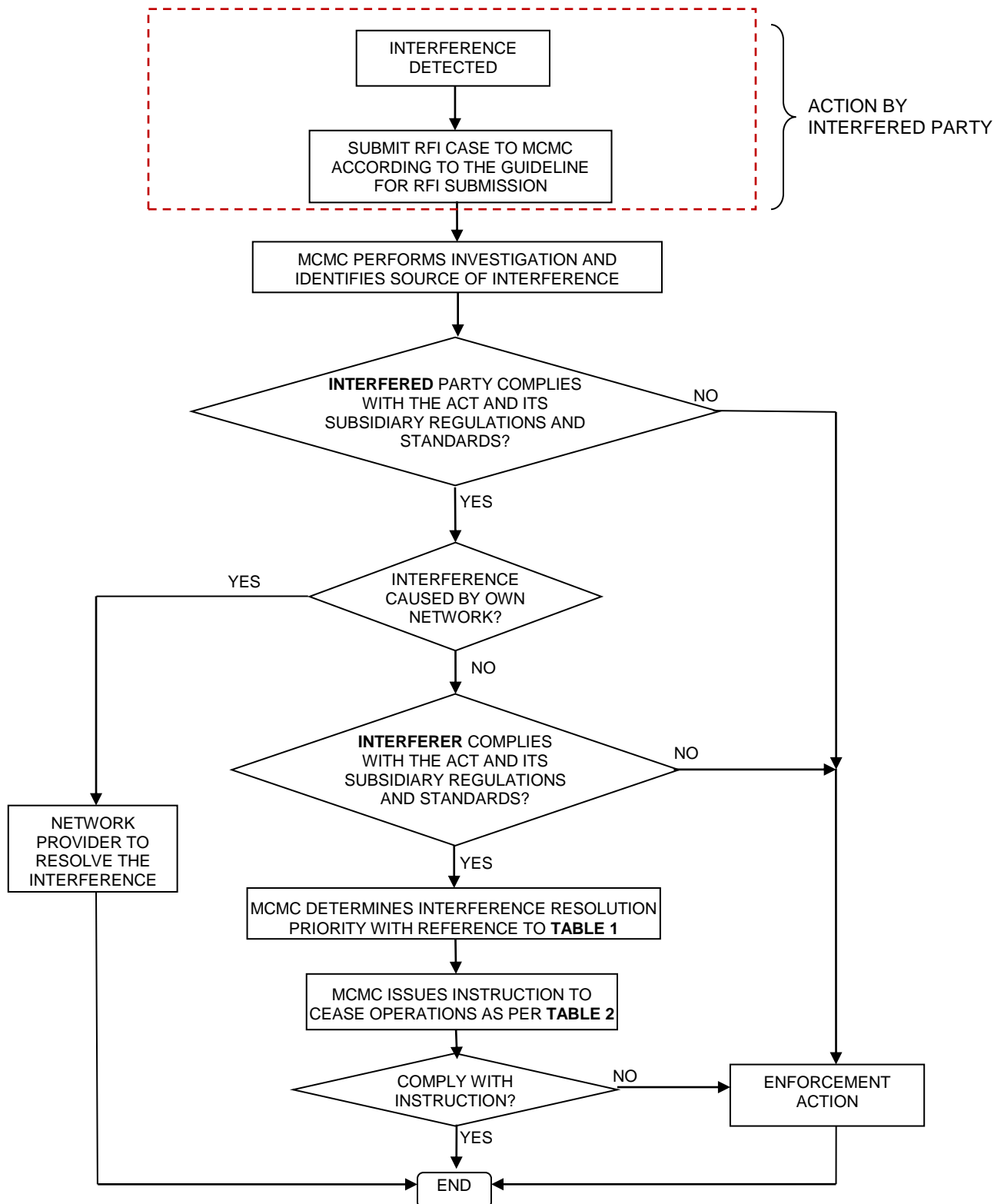


TABLE 1: INTERFERENCE RESOLUTION PRIORITY

	Resolution Type 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	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"> i. Safety or Radionavigation service; ii. Based on the Date of Apparatus Assignment - Priority is given to the earliest/first installation

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 Communications and Multimedia (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 has completed implementation of the mitigation plan to the satisfaction of the Commission.