SKMM SRSP-532 BWA Rev1
15 October 2009

Standard Radio System Plan

REQUIREMENTS FOR BROADBAND WIRELESS ACCESS (BWA) SYSTEMS

OPERATING IN THE FREQUENCY BAND

2300 MHz TO 2400 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 SKMM website. (http://www.skmm.gov.my/what_we_do/spectrum/srsp.asp)

REQUIREMENTS FOR BROADBAND WIRELESS ACCESS (BWA) SYSTEMS OPERATING IN THE FREQUENCY BAND FROM 2300 MHz TO 2400 MHz

2.0 INTENT

2.1 This Standard Radio System Plan (SRSP) states the requirements for the utilization of the frequency band between 2300 MHz to 2400 MHz for Broadband Wireless Access (BWA) systems in Malaysia.

2.2 BWA systems are two way point-to-point, point-to-multipoint or mesh digital radio systems consisting of BWA distribution base stations and their associated subscriber stations (or BWA access devices).

2.3 BWA services are intended for providing wireless broadband connectivity to subscribers and can include applications such as voice, video, images, interactive multimedia, high-speed data and mobile TV.

2.4 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, minimise interference and optimise the usage of the band. It is 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 BWA 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 Additional frequency bands for IMT systems were identified at the WRC-2007 which includes the bands 2300 MHz to 2400 MHz. In the recent Radio Assembly 2007 (RA07), the revision to Recommendation ITU-R M.1457-6 (Detailed specifications of the radio interfaces of IMT-2000) was approved where a new radio interface, IMT-2000 OFDMA TDD WMAN which is based upon Orthogonal Frequency Division Multiple Access (OFDMA), has been included as among the radio interfaces for IMT-2000.

3.3 Likely use for this frequency band will be WiMAX (Worldwide Interoperability for Microwave Access), the IEEE 802.16 WirelessMAN (Wireless Metropolitan Area Network) or the IMT standards for radio access systems.

3.4 All BWA installations must comply with safety rules as specified in applicable standards.

3.5 The equipment used shall be certified under the Communications and Multimedia (Technical Standards) Regulations 2000.

3.6 The allocation and allotment 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.

4.0 CHANNELLING PLAN

4.1 The frequency band 2300 MHz to 2400 MHz provides a total bandwidth of 100MHz for the BWA service.

4.2 The channel arrangements are shown in **Appendix B**.

4.3 The channelling plan is developed based on 5 MHz channel spacing. However, the use of multiple channels of 5 MHz is allowed to create channel widths of 10MHz, or 20MHz for future high speed technologies.

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 This BWA band is 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. It may also be used for backhaul links from a base station to an exchange and from an exchange to a base station.

5.3 Only systems using digital technologies that promote spectral efficiency will be issued with an assignment. Capacity enhancing digital techniques are being developed rapidly and such techniques that promote efficient use of spectrum, without reducing quality of service are encouraged.

5.4 Maximum radiated power:

5.4.1 Base Station transmissions should **not exceed +61dBm/5MHz** EIRP.

5.4.2 On a case to case basis, higher EIRP may be permitted if acceptable technical justification is provided.

5.4.3 Subscriber terminal station should comply with the technical specification set under "Technical Specification For Broadband Wireless Access (BWA) Equipment" and Class Assignment (CA).

5.5 In some cases, a radio system conforming to the requirements of this SRSP may require modifications if major interference is caused to other radio stations or systems.

5.6 The allocation of spectrum and shared services within these bands are found in the Spectrum Plan and an extract of it is shown in **Table 1** in **Appendix A**.

5.7 It is noted that there is potential of interference to be occurred when 2 different operators operates on adjacent channel blocks. However, this potential interference could be mitigated such as via synchronization between the TDD operators or geographical separation. If there is a need to introduce guard spectrum, it is inclusive within the designated spectrum blocks allocated to the operators.

5.8 It should further be noted that the introduction of the BWA in this band is allowed to operate without causing any interferences 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. The operating recommendations as stated below are to be fully observed and complied by the BWA system at all time, unless subsequently modified and updated in this document:

5.8.1 For BWA base stations, the power of any emission outside a licensee's assigned frequency blocks shall be attenuated below the transmitter power (P) (in Watts) by at least 43 + 10 log (P) dB at the block edge. Compliance with the emission limit is to be measure based on the use of measurement instrumentation employing a resolution bandwidth as shown in **Exhibit 1**.

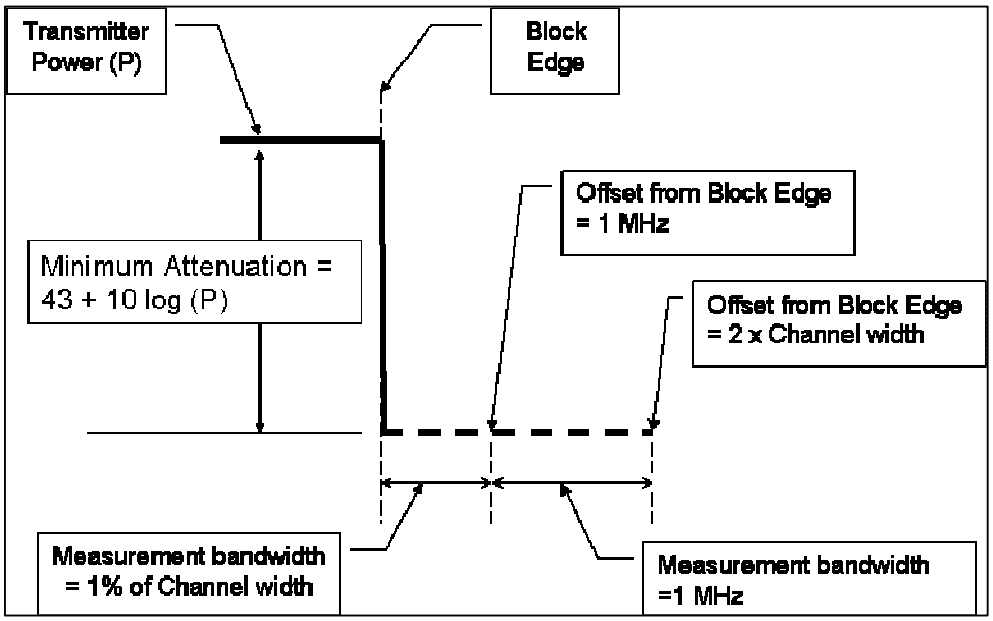


Exhibit 1: Block Edge Emission limit and measurement bandwidth

5.8.2 When an emission outside of an assigned frequency block causes major interference, SKMM may, at its discretion, imposed greater attenuation than specified in this section.

6.0 PRINCIPLES OF ASSIGNMENT

6.1 Authorisation to use the BWA spectrum for the **base station** apparatus is by way of Apparatus Assignment (AA) and the **terminal station or subscriber's BWA access device** installed at customer premises is by way of Class Assignment (CA). Please refer to www.skmm.gov.my for the conditions of use in the Notification of Issuance of Class Assignments for the BWA subscriber terminal access devices.

6.2 Eligible persons who may apply for assignments are:

6.2.1 Network Facilities Provider Individual (NFP(I)) license holder, which provides radio communication transmitters and links.

6.3 Applicants are required to:

6.3.1 Submit AA application for the apparatus on the prescribed AA forms.

6.3.2 Submit a roll out plan (minimum of 5 central/hub sites per every defined geographic area set out in Appendix C using the requested spectrum within a block) showing the sites or locations and implementation timelines (at least for the period of one (1) year) for each site or location in the defined coverage area.

6.3.3 Submit topographical maps (preferably in electronic format) which clearly show the coverage boundary of each proposed service area.

6.4 The AA for these bands shall be valid for a period of five (5) years or such lesser period as specified in the AA. AA holders may apply for a new assignment at least sixty (60) days before the expiry date.

6.5 The issuance of an AA shall be subject to the following conditions:

6.5.1 the AA holder shall comply with the Detailed Business Plan submitted to SKMM in total unless modified with the approval of the SKMM;

6.5.2 the NFP(I) licence holder shall submit a half yearly report to the SKMM outlining the steps taken to implement the Detailed Business Plan as at 31 March and 30 September of each year. The reports shall be submitted to the SKMM not later than 30 April and 31 October of each year for the reporting period from 1 October to 31 March and from 1 April to 30 September respectively.

6.6 Issuance of an AA is subject to successful coordination among assigned stations and with neighbouring countries where it applies.

6.7 To further facilitate planning and efficiency in spectrum management, upon successful application the NFP(I) licence holder shall be allocated with the specific spectrum sub-block/s with a minimum of 4 x 5 MHz (Appendix B) in geographic block arrangements as in **Appendix C** of this document. Such arrangements are only for administrative or spectrum management purposes in order to facilitate the NFP(I) licensees in their roll out planning in the defined geographic area. Spectrum in any areas not utilised or under utilised, shall be opened to other NFP(I) licensees in the queue. [Note: The blocks have been allocated on 16 March 2007 after a tender exercise]

7.0 IMPLEMENTATION

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

7.2 No new assignment for terrestrial point-to-point and point-to-multipoint systems in the band 2300 MHz to 2400 MHz shall be approved unless they comply with this SRSP.

8.0 COORDINATION REQUIREMENT

8.1 Use of these frequency bands shall require coordination with the neighbouring countries within the coordination zones of 50 kilometres from our neighbouring countries. Note that the above coordination distance is continuously being reviewed with our neighbouring countries and may be updated from time to time.

8.2 Technical analysis is carried out by SKMM before an assignment is issued. Assignments for BWA are issued based on defined geographic areas. Operator to operator coordination may be required to reduce interference.

8.3 It should be noted that Radiolocation Service (RLS) share the bands 2300 MHz to 2400 MHz on the basis of primary status in Region 3, which includes Malaysia and its neighbouring countries. Major interference between RLS and terrestrial BWA should be prevented. Assignment holders shall take all steps so as not cause interference to RLS.

8.4 BWA network facility providers must coordinate their frequency requirements with existing licensed terrestrial point-to-point systems and licensed stations in the RLS to avoid interference.

8.5 In the event of any interference, SKMM 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 SKMM for a resolution. SKMM will decide the necessary modifications and schedule of modifications to resolve the dispute. SKMM will be guided by the interference resolution process as shown in **Appendix D**.

8.6 Assignment holders shall take full advantage of 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 MCMC SRSP 532 BWA, 10 March 2006 is hereby revoked.

10.0 REFERENCES

For further information kindly refer to the following:

[1] **ITU-R SF.406-8 (04/93)** Maximum Equivalent Isotropically Radiated Power of Radio-relay Transmitters Operating in the Frequency Bands Shared with Fixed Satellite Services.

[2] **ITU-R SF.765-1 (02/03)** Intersection of Radio-relay Beams with Orbits used by Fixed Sat Space Stations.

[3] **Article 21 Radio Regulations** Terrestrial and space services sharing frequency bands above 1GHz.

Issued by:

Suruhanjaya Komunikasi dan Multimedia Malaysia
Malaysian Communications and Multimedia Commission

15 October 2009

APPENDIX A: SPECTRUM PLAN 2300 MHz TO 2450 MHz

2 300 – 2 450 MHz

Frequency Band (MHz)	ITU Allocation			Malaysian Allocation
	Region1	Region2	Region 3	
2300-2450	FIXED MOBILE 5.384A Amateur Radiolocation 5.150 5.282 5.395	FIXED MOBILE 5.384A RADIOLOCATION Amateur 5.150 5.282 5.393 5.394 5.396		FIXED MOBILE 5.384A RADIOLOCATION Amateur 5.150 5.282 5.396 MLA3 MLA54

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.**

5.282 In the bands 435-438 MHz, 1 260-1 270 MHz, 2 400-2 450 MHz, 3 400-3 410 MHz (in Regions 2 and 3 only) and 5 650-5 670 MHz, the amateur-satellite service may operate subject to not causing harmful interference to other services operating in accordance with the Table (see No. 5.43). Administrations authorizing such use shall ensure that any harmful interference caused by emissions from a station in the amateur-satellite service is immediately eliminated in accordance with the provisions of No. 25.11. The use of the bands 1 260-1 270 MHz and 5 650-5 670 MHz by the amateur-satellite service is limited to the Earth-to-space direction.

5.384A The bands, or portions of the bands, 1 710-1 885 MHz, 2 300-2 400 MHz and 2 500-2 690 MHz, are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution **223 (Rev.WRC-07)**. 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-07).

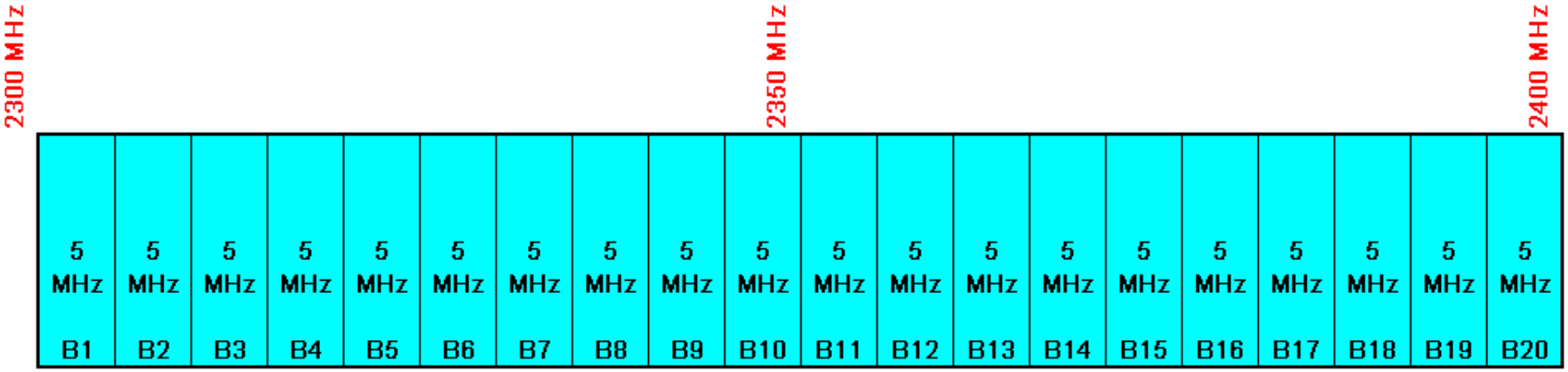
5.393 *Additional allocation:* in Canada, the United States, India and Mexico, the band 2 310-2 360 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial sound broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution **528 (Rev.WRC-03)**, with the exception of *resolves* 3 in regard to the limitation on broadcasting-satellite systems in the upper 25 MHz. (WRC-07)

5.394 In the United States, the use of the band 2 300-2 390 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile services. In Canada, the use of the band

2 360-2 400 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile services. (WRC-07)

5.396 Space stations of the broadcasting-satellite service in the band 2 310-2 360 MHz operating in accordance with No. 5.393 that may affect the services to which this band is allocated in other countries shall be coordinated and notified in accordance with Resolution 33 (Rev.WRC-97). Complementary terrestrial broadcasting stations shall be subject to bilateral coordination with neighbouring countries prior to their bringing into use.

APPENDIX B: **2.3 GHz TO 2.4 GHz FREQUENCY BLOCKS**



APPENDIX C: DEFINED GEOGRAPHIC AREA

Area	Geographic Blocks
1	Wilayah Persekutuan Putrajaya/Wilayah Persekutuan Kuala Lumpur/Selangor
2	Pulau Pinang
3	Johor
4	Kedah
5	Perak
6	Pahang
7	Perlis
8	Melaka
9	Negeri Sembilan
10	Kelantan
11	Terengganu
12	Sabah/Wilayah Persekutuan Labuan
13	Sarawak

APPENDIX D: INTERFERENCE RESOLUTION PROCESS

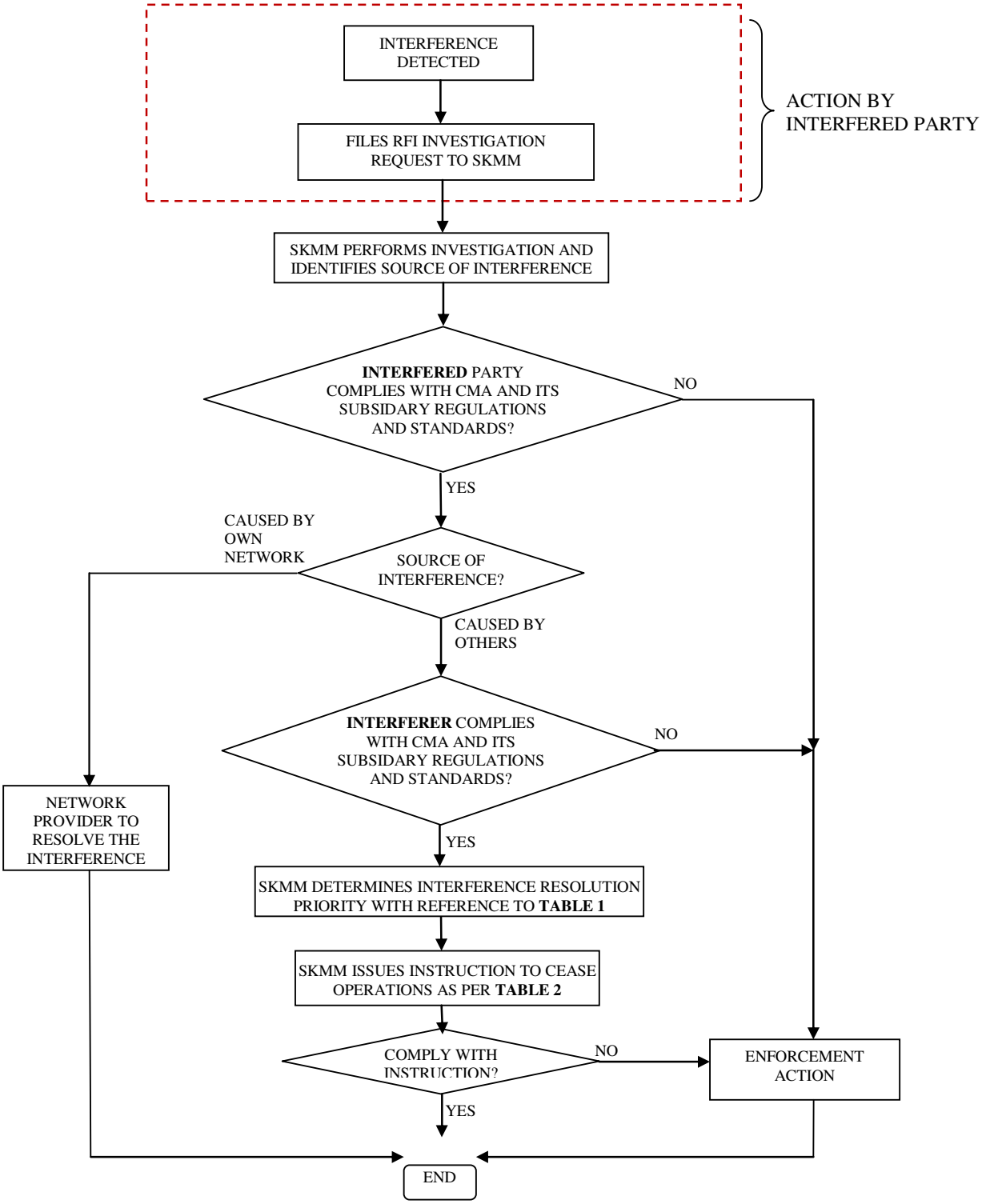


TABLE 1: INTERFERENCE RESOLUTION PRIORITY

	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): 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 CMA (Spectrum) Regulations 2000	To cease* operation immediately within 24 hours or earlier as specified in the notice issued by SKMM
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 SKMM 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 SKMM 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 SKMM to remove/ avoid the interference.