Standard Radio System Plan

REQUIREMENTS FOR DEVICES USING ULTRA-WIDEBAND (UWB) TECHNOLOGY OPERATING IN THE FREQUENCY BANDS OF 30 MHz TO 960 MHz, 2.17 GHz TO 10.6 GHz, 21.65 GHz TO 29.5 GHz AND 77 GHz TO 81 GHz

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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)

2.0 INTENT

2.1 In general, Standard Radio System Plan ('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. 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 said bands. It is intended to regulate the usage of spectrum and does not attempt to establish any detailed equipment standards.

2.2 This SRSP states the requirements for the utilization of the frequency bands of 30 MHz to 960 MHz, 2.17 GHz to 10.6 GHz, 21.65 GHz to 29.5 GHz and 77 GHz to 81 GHz ('the said bands') for devices using Ultra-Wideband ('UWB') technology in Malaysia.

2.3 The objective of this SRSP is to ensure efficient use of the UWB technology in Malaysia with minimal service disruption and radio frequency interference to radiocommunication services within the said bands.

2.4 Devices using UWB technology are devices meant for short-range radiocommunication, involving the intentional generation and transmission of radio-frequency energy that spreads over a very large frequency range, which may overlap with several frequency bands allocated to radiocommunication services.

2.5 UWB technology can be integrated into many wireless applications which include communication, radar imaging and automotive radar devices.

2.6 For the purpose of this SRSP, the definitions of various UWB applications are as follows:

2.6.1 UWB communication device is a short range communication device using UWB technology to transmit and/or receive information between devices.

2.6.2 UWB automotive radar device is a radar device using UWB technology mounted on land transportation vehicles to detect the location and/or movement of persons or objects near the vehicle.

2.6.3 UWB radar imaging device is a device using UWB technology used to obtain images of obstructed objects. This includes in-wall and through-wall detection, ground penetrating radar, medical imaging and surveillance devices.

2.7 The use of the said bands for other than UWB technology is covered under different SRSPs and relevant sections of the Spectrum Plan.

3.0 GENERAL

3.1 The technical characteristics for devices using UWB technology shall conform to all applicable technical standards which may include the mandatory standards, technical codes, Malaysian standards, international standards, International Telecommunications Union (ITU) recommendations and its Radio Regulations as well as other standards as agreed and adopted by Malaysia.

3.2 The installation of all devices using UWB technology shall comply with safety rules as specified in applicable Malaysian standards.

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

3.4 The requirements 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 SRSP defines the use of devices using UWB technology in the frequency bands of 30 MHz to 960 MHz, 2.17 GHz to 10.6 GHz, 21.65 GHz to 29.5 GHz and/or 77 GHz to 81 GHz.

4.2 The use of UWB communication device shall be contained within the frequency band of 3.1 GHz to 10.6 GHz. The suggested channelling plan for UWB communication device operating in the frequency band of 3.1 GHz to 10.6 GHz is as showed in **Figure 1**.

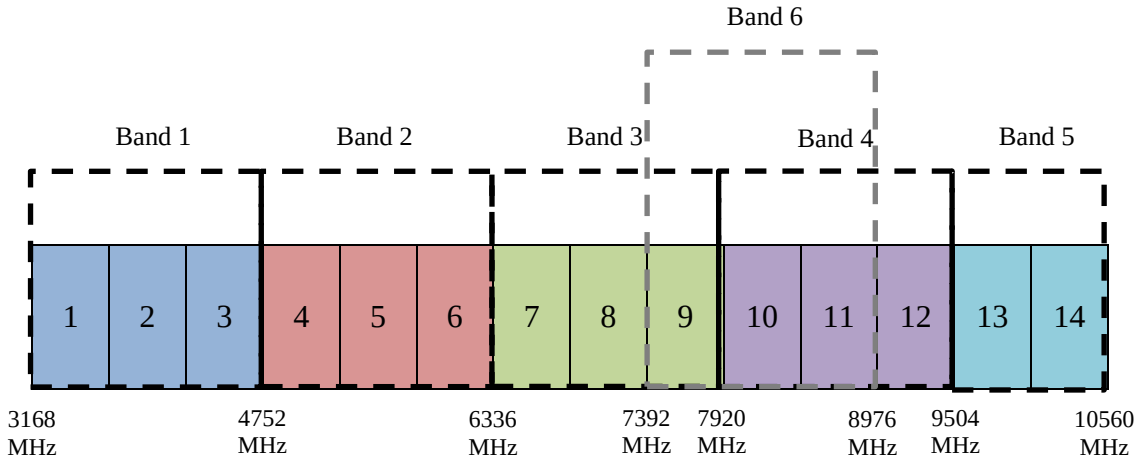

Figure 1 : Channelling plan for the frequency band 3.1 GHz to 10.6 GHz

4.3 The use of UWB automotive radar device shall be contained within the frequency bands of 21.65 GHz to 29.5 GHz and/or 77 GHz to 81 GHz.

4.4 The use of UWB radar imaging device shall be contained within the frequency bands of 30 MHz to 960 MHz and/or 2.17 GHz to 10.6 GHz.

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 said bands.

5.2 The allocation of spectrum and shared services within the said bands are found in the Spectrum Plan which can be downloaded from the Commission's website (http://www.mcmc.gov.my/Spectrum/Spectrum-Management.aspx).

5.3 Devices using UWB technology shall be tested for compliance with the technical requirements, following the appropriate techniques for measuring UWB transmissions given in ETSI EN 302 065, EN 302 066-1 or ITU-R SM.1754.

5.4 The operation of devices using UWB technology on aircraft, ship or satellite is not permissible.

5.5 Devices using UWB technology shall not cause harmful interference to primary radiocommunication services operating in the said bands, operate on a non-interference basis and cannot claim protection from these radiocommunication services.

5.6 Devices using UWB technology shall be capable of implementing mitigation techniques to provide protection to radiocommunication services and may deploy, but is not limited to the following mitigation techniques to reduce the impact on radiocommunication systems:

5.6.1 Detect and avoid (DAA) technology: the device detects the presence of signals from other radio systems and reduces its transmitted power down to a level where it does not cause interference to these systems;

5.6.2 Low Duty Cycle (LDC) technique: the device operates by lowering the pulse repetition interval or pulse occupation time; and/or

5.6.3 Any other mitigation techniques as stipulated in the ITU-R SM.1757 document.

5.7 In some cases, devices using UWB technology conforming to the requirements of this SRSP may require modifications if harmful interference is caused to other radio stations or systems.

UWB communication device

5.8 The use of UWB communication device shall be used for the intended purposes only.

5.9 The use of UWB communication device shall comply with the technical requirements as given in **Appendix A**.

UWB automotive radar device

5.10 The use of UWB automotive radar device shall be used for the intended purposes only.

5.11 The use of UWB automotive radar device shall comply with the technical requirements as given in **Appendix B**.

UWB radar imaging device

5.12 The use of UWB radar imaging device shall only be operated by trained personnel.

5.13 The use of UWB radar imaging shall be used for the following purposes only:

5.13.1 Ground Probing Radar;

5.13.2 In-Wall/Through-Wall Probing Radar;

5.13.3 Medical Imaging; and

5.13.4 Surveillance.

5.14 The use of UWB radar imaging shall comply with the technical requirements as given in **Appendix C**.

5.15 UWB radar imaging device may only be certified by way of Special Approval by the Commission or a registered certifying agency appointed by the Commission for exclusive use of the applicant only.

6.0 PRINCIPLES OF ASSIGNMENT

UWB communication device

6.1 Authorisation to use the frequency band of 3.1 GHz to 10.6 GHz for the UWB communication device is by way of Class Assignment (CA).

6.2 Any person operating UWB communication device is 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, subject to conditions imposed by the Commission.

6.3 The use of spectrum under CA does not require any application to be made to the Commission. Please refer to www.skmm.gov.my for the conditions of use in the CA.

UWB automotive radar device

6.4 Authorisation to use the frequency bands of 21.65 GHz to 29.5 GHz and/or 77 GHz to 81 GHz for the UWB automotive radar device is by way of CA.

6.5 Any person operating UWB automotive radar device is 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, subject to conditions imposed by the Commission.

6.6 The use of the frequency bands of 24 GHz to 24.25 GHz and/or 76 GHz to 77 GHz for automotive radar device using other than UWB technology is also authorised by way of CA.

6.7 The use of spectrum under CA does not require any application to be made to the Commission. Please refer to www.skmm.gov.my for the conditions of use in the CA.

UWB radar imaging device

6.8 Authorisation to use the frequency bands of 30 MHz to 960 MHz and/or 2.17 GHz to 10.6 GHz for the UWB radar imaging device is by way of Apparatus Assignment (AA).

6.9 Eligible persons who may apply for the AA must be from one of the following categories:

6.9.1 Emergency and rescue agencies;

6.9.2 Law enforcement agencies;

6.9.3 Government department and agencies; or

6.9.4 A body registered with Suruhanjaya Syarikat Malaysia (SSM) where the operation of the said body is limited to the purpose associated with scientific, research, commercial mining, medical and construction.

6.10 Applicants are required to submit:

6.10.1 AA application for the apparatus on the prescribed AA form in accordance with the Act, the Communications and Multimedia (Spectrum) Regulations 2000 ('the Regulations') and any relevant instruments issued by the Commission from time to time;

6.10.2 Proof that the Applicant is well trained and competent in handling the device;

6.10.3 Recommendation or support letter from the Applicant's organization;

6.10.4 The information details and nature of business of the UWB radar imaging device's importer or vendor; and

6.10.5 Any other documents and/or information that may be requested by the Commission.

6.11 A log book containing the UWB radar usage information shall be kept by the AA holder and shall be provided to the Commission for inspection upon request. The information in the log book shall include, but not limited to, the following:

6.11.1 The serial number of the device;

6.11.2 The details of location at which the device is used;

6.11.3 The date and duration of use at each time the device is used; and

6.11.4 The frequency band and power used to operate the device.

6.12 The UWB radar imaging device shall only be operated by the personnel named in the AA application and operated within the geographical area mentioned the AA application.

6.13 The maximum validity period of an AA for all UWB radar imaging device in the frequency bands of 30 MHz to 960 MHz and/or 2.17 GHz to 10.6 GHz is five (5) years and the AA holder may make fresh application for the AA not less than 60 days before expiry.

6.14 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 assignment in the frequency bands of 30 MHz to 960 MHz and/or 2.17 GHz to 10.6 GHz.

6.15 Any organization or company intending to provide training or for purpose of demonstration may apply for a trial AA.

6.16 Applications for AA for the purpose of trial shall comply with the applicable trial guidelines and any condition 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.

8.0 COORDINATION REQUIREMENT

8.1 The use of devices using UWB technology in the said bands may not require border coordination with the neighbouring countries.

8.2 Due to shared use between devices using UWB technology and other existing services in the said bands, special care must be taken during the installation of devices using UWB technology to avoid harmful interference to the existing services.

8.3 In the event of any interference, the Commission will be guided by the interference resolution process as shown in **Appendix D**.

9.0 REVOCATION

9.1 Not applicable.

10.0 REFERENCES

[1] Recommendation ITU-R SM.1755 Characteristics of ultra-wideband technology.

[2] Recommendation ITU-R SM.1754 Measurement techniques of ultra-wideband transmissions.

[3] Recommendation ITU-R SM.1756 Framework for the introduction of devices using ultra-wideband technology.

[4] Recommendation ITU-R SM.1757 Impact of devices using ultra-wideband technology on systems operating within radio-communication services.

[5] Recommendation ITU-R M.1452-2 Millimetre wave vehicular collision avoidance radars and radiocommunication systems for intelligent transport system applications.

[6] ETSI EN 302 065 Electromagnetic compatibility and radio spectrum matters; Ultra wideband (UWB) technologies for communication purposes; Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive.

[7] ETSI EN 302 066-1 Electromagnetic compatibility and radio spectrum matters; Short Range Devices (SRD); Ground- and Wall- Probing Radar applications; Part 1: Technical characteristics and test methods.

[8] ETSI EN 302 288 parts 1 & 2 Short Range Devices; Road Transport and Traffic Telematics (RTTT); Short range radar equipment operating in the 24 GHz range.

[9] ECC/DEC/(06)04 Amended 6 July 2007 ECC Decision of 24 March 2006 amended 6 July 2007 at Constanta on the harmonized conditions for devises using ultra-wideband (UWB) technology in bands below 10.6 GHz.

[10] ECC/DEC/(06)08 ECC Decision of 1 December 2006 on the conditions for use of radio spectrum by Ground- and Wall-Probing Radar (GPR/WPR) imaging systems.

[11] ECC/DEC/(04)03 ECC Decision of 19 March 2004 on the frequency band 77 – 81 GHz to be designated for the use of Automotive Short Range Radars.

[12] ECC/DEC/(04)10 ECC Decision of 12 November 2004 on the frequency bands to be designated for the temporary introduction of Automotive Short Range Radars.

Issued by:

Suruhanjaya Komunikasi dan Multimedia Malaysia
Malaysian Communications and Multimedia Commission

APPENDIX A: TECHNICAL REQUIREMENTS FOR UWB COMMUNICATION DEVICE

A.1 UWB communication device which operates in the frequency band of 3.1 GHz to 10.6 GHz shall only be utilized for communication purposes and shall only be used in confined areas of buildings or localized on-site operations. The use of outdoor mounted antennae is not permissible.

A.2 The emission of UWB communication device shall not be intentionally directed outside of the building in which the device is being used.

A.3 The transmission of UWB communication devices shall only be permitted when it is in communication with an intended receiver. The device shall cease transmission unless it receives acknowledgment from the intended receiver.

A.4 The operation of UWB communication device is not permissible to:

A.4.1 Devices and/or antenna used or connected at outdoor location.

A.4.2 Devices installed in flying models, aircraft or other aviation.

A.4.3 Devices installed in road and rail vehicles.

A.5 The use of UWB communication device in the frequency band of 3.1 GHz to 10.6 GHz shall be contained within the permitted maximum mean Effective Isotropic Radiated Power (EIRP) spectral density (dBm/MHz) given in TABLE A.

TABLE A
Frequency Bands and Maximum EIRP

Frequency Bands	**Maximum mean EIRP spectral density (dBm/MHz)**	**Maximum peak EIRP (dBm)[1]**
3.1 GHz to 3.4 GHz	-70	-36
3.4 GHz to 3.8 GHz	-80	-40
3.8 GHz to 6.0 GHz	-70	-30
6.0 GHz to 8.5 GHz	-41.3	0
8.5 GHz to 10.6 GHz	-65	-25

[1]The maximum peak of EIRP is defined in 50MHz bandwidth

A.6 The spectrum emission mask for frequency band 3.1 GHz to 10.6 GHz for the use of UWB communication is as shown in Figure A:

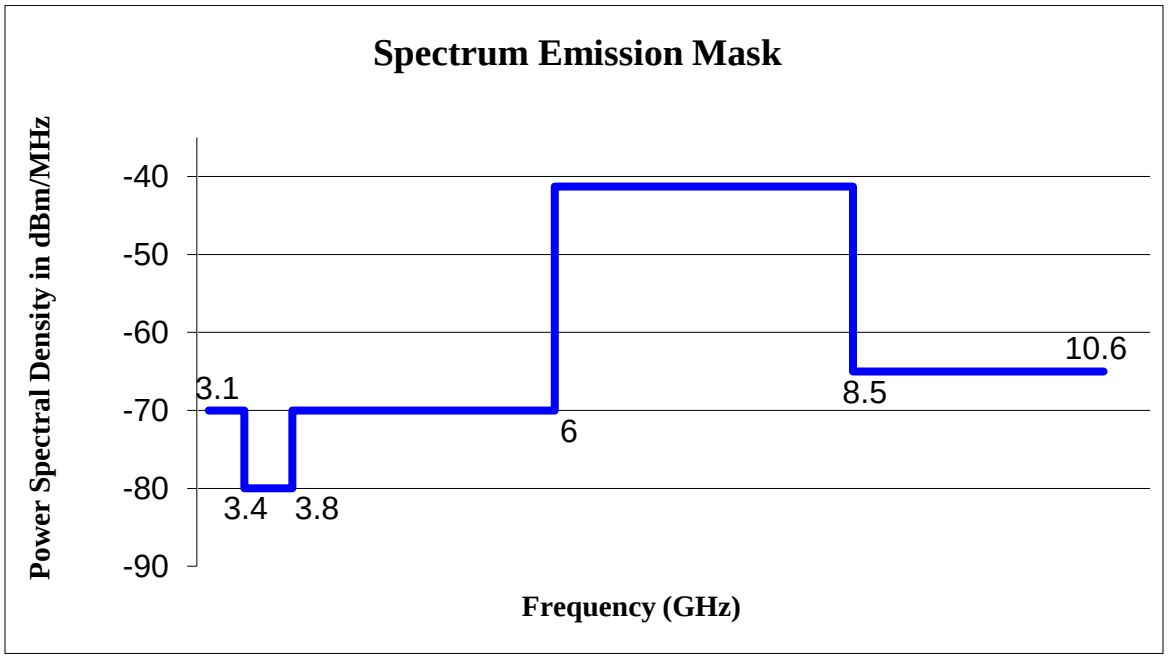

Figure A: Spectrum emission mask for UWB communication device

APPENDIX B: TECHNICAL REQUIREMENTS FOR UWB AUTOMOTIVE RADAR DEVICE

B.1 UWB automotive radar device which operates in the frequency bands of 21.65 GHz to 29.5 GHz and/or 77 GHz to 81 GHz shall be permitted for land transportation only.

B.2 The operation of UWB automotive radar device shall only be activated when the land transportation or vehicle is operating.

B.3 The use of UWB automotive radar device in the frequency bands of 21.65 GHz to 29.5 GHz and/or 77 GHz to 81 GHz shall be contained within the permitted maximum mean Effective Isotropic Radiated Power (EIRP) spectral density (dBm/MHz) given in TABLE B.

TABLE B
Frequency Bands and Maximum EIRP

Frequency range	**Maximum mean EIRP spectral density (dBm/MHz)**	**Maximum peak EIRP (dBm)** [2]
21.65 GHz to 22 GHz	-61.3	0
22 GHz to 29.5 GHz	-41.3	0
77 GHz to 81 GHz	-3	55

[2] *The maximum peak of EIRP is defined in 50MHz bandwidth*

B.4 The emissions within the 23.6 GHz to 24 GHz frequency band that appear 30° or greater above the horizontal plane shall be attenuated by at least 35 dB. The level of attenuation can be achieved through antenna directivity, reduction of output power or any other means.

B.5 For the frequency band of 24.00 GHz to 24.25 GHz, narrow band emission with a maximum peak EIRP of 30 dBm is allowed.

APPENDIX C: TECHNICAL REQUIREMENTS FOR UWB RADAR IMAGING DEVICE

C.1 The use of UWB radar imaging device shall be contained within the frequency bands of 30 MHz to 960 MHz and/or 2.17 GHz to 10.6 GHz.

C.2 The UWB radar imaging device shall not be used for communication purposes where the radiation into free space is not permissible.

C.3 The UWB radar imaging device shall have a deactivation mechanism to deactivate the device when it is interrupted in normal use. This mechanism shall fulfil the following requirements:

C.3.1 Contain a manually operated non-locking switch which ensures that the UWB radar imaging device deactivates (i.e. the transmitter switches off) within 10 seconds of the control system being switched off; and

C.3.2 In the case of remotely/computer controlled imaging equipment, the UWB radar imaging device is deactivated via the control system provided that deactivation takes place within 10 seconds of the control system being switched off.

C.4 The UWB ground probing radar device, in-wall probing radar device and through-wall probing radar device shall operate only when in contact with, or within close proximity of the ground or the wall and the emission from these devices shall intentionally be directed towards ground or wall for the purpose of detecting or obtaining the images of objects.

C.5 The permitted maximum mean Effective Isotropic Radiated Power (EIRP) spectral density (dBm/MHz) for the use of ground probing radar device, in-wall probing radar device, and through-wall probing radar device is given in TABLE C.

TABLE C
Frequency Bands and Maximum EIRP

Frequency range	**Maximum mean EIRP spectral density (dBm/MHz)**	**Maximum peak power**
30 MHz to 230 MHz	-65	-44.5 dBm/120 kHz (ERP)
230 MHz to 960 MHz	-60	-37.5 dBm/120 kHz (ERP)
2.17 GHz to 3.4 GHz	-51.3	-30 dBM/50 MHz (EIRP)
3.4 GHz to 5.0 GHz	-41.3	
5.0 GHz to 6.0 GHz	-51.3	
6.0 GHz to 10.6GHz	-65	

Note: Effective Radiated Power (ERP)

C.6 The permitted maximum mean Effective Isotropic Radiated Power (EIRP) spectral density (dBm/MHz) for the use of medical imaging device and surveillance device is given in TABLE D.

TABLE D
Frequency Bands and Maximum EIRP

Frequency band	**Maximum mean EIRP spectral density (dBm/MHz)**	**Maximum peak EIRP**
2.17 GHz to 10.6 GHz	-41.3	-30 dBM/50 MHz

APPENDIX D: INTERFERENCE RESOLUTION PROCESS

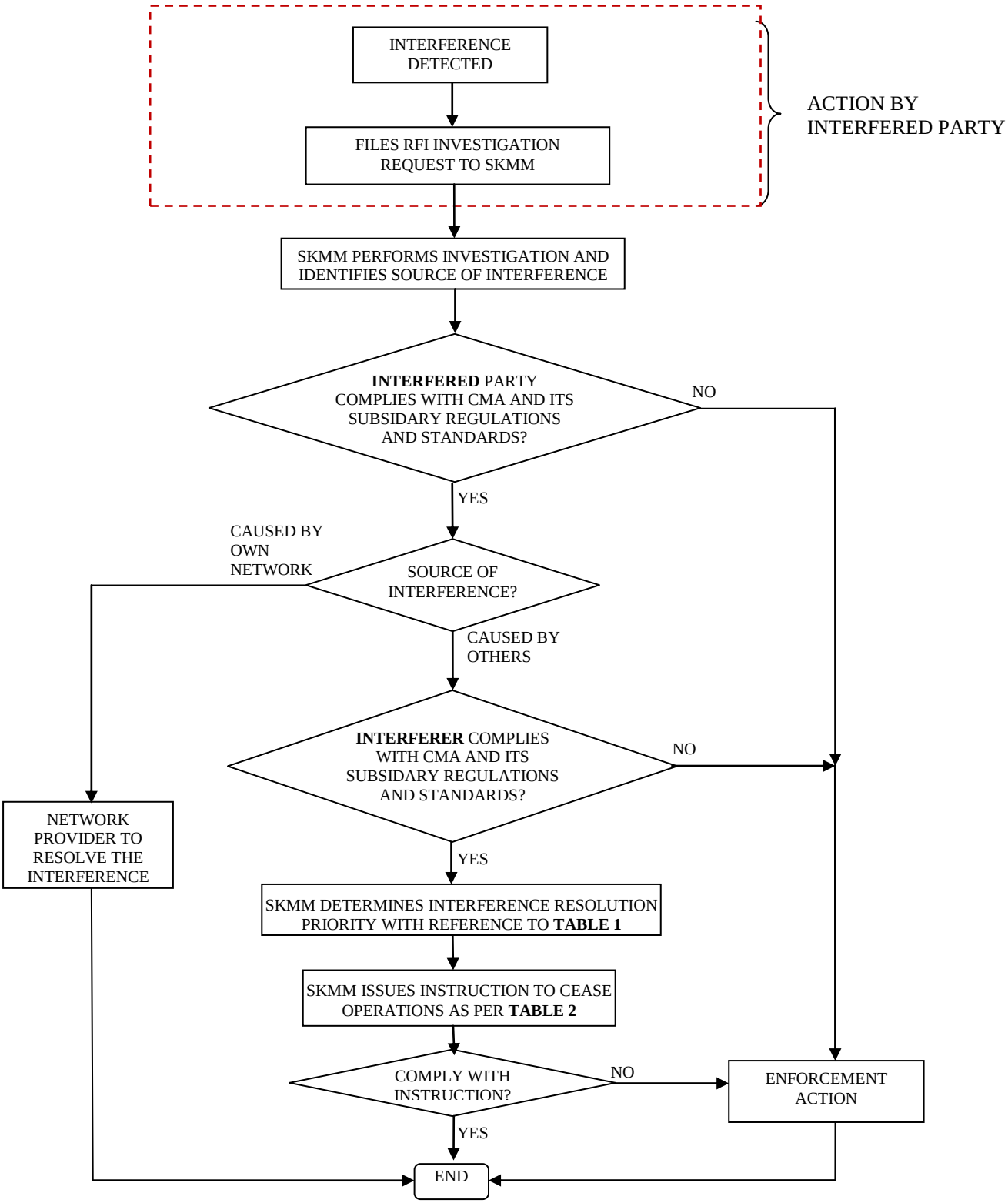

TABLE 1: INTERFERENCE RESOLUTION PRIORITY

	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 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.