

**Standard Radio System Plan**

**REQUIREMENTS FOR FIXED SERVICE  
LINE OF SIGHT RADIO-RELAY SYSTEMS  
OPERATING IN THE FREQUENCY BAND  
7725 MHz TO 8275 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](http://www.skmm.gov.my/what_we_do/spectrum/srsp.asp))

**REQUIREMENTS FOR FIXED SERVICE LINE OF SIGHT RADIO-RELAY  
SYSTEMS OPERATING IN THE FREQUENCY BAND  
7725 MHz TO 8275 MHz**

**2.0 INTENT**

- 2.1 This Standard Radio System Plan (SRSP) states the requirements for the utilization of the frequency band 7725 MHz - 8275 MHz for line of sight multiple-hop radio-relay systems in the fixed service, these systems being:
  - 2.1.1 Radio systems using digital modulation with RF channel capacities of the order of 140 Mbit/s or higher synchronous digital hierarchy (SDH) and plesiochronous digital hierarchy (PDH) bit rates using appropriate modulation method, and
  - 2.1.2 Radio systems using analogue or digital modulation of lower channel capacities when main and interleaved channels are used simultaneously.
- 2.2 Radio-relay systems are intended as bearers for telephony, data, video and television signals.
- 2.3 The intended use of these radio-relay systems is mainly for Trunk/Main link only. However, the use of these radio-relay system for Mini/Spur links may be considered due to the reasons of economic and technical constraints.
- 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 this 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 Use of improved digital modulation techniques which increase channel loading capacity is encouraged and will be given priority in frequency assignment.
- 3.3 Although a radio system conforms to the requirements of this SRSP, the SKMM may require that modifications be made to the system whenever interference is caused or is liable to be caused to other radio stations or systems as listed in **Appendix A**.
- 3.4 All 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 channelling plan is based on the preferred radio frequency channel arrangement of ITU-R Recommendation **ITU-R F.386-8 (09/07)** which provides for up to eight two-way main channels (1/1' to 8/8') and eight two-way interleaved channels (1r/1'r to 8r/8'r) as shown in **Figure 1**.
- 4.2 The frequencies (MHz) of the individual channels are expressed by the following relationship:

Let  $f_o$  be the frequency of the centre of the band of frequencies occupied (MHz)

$f_n$  be the centre frequency of one RF channel in the lower half of this band (MHz)

$f_{n'}$  be the centre frequency of one RF channel in the upper half of this band (MHz)

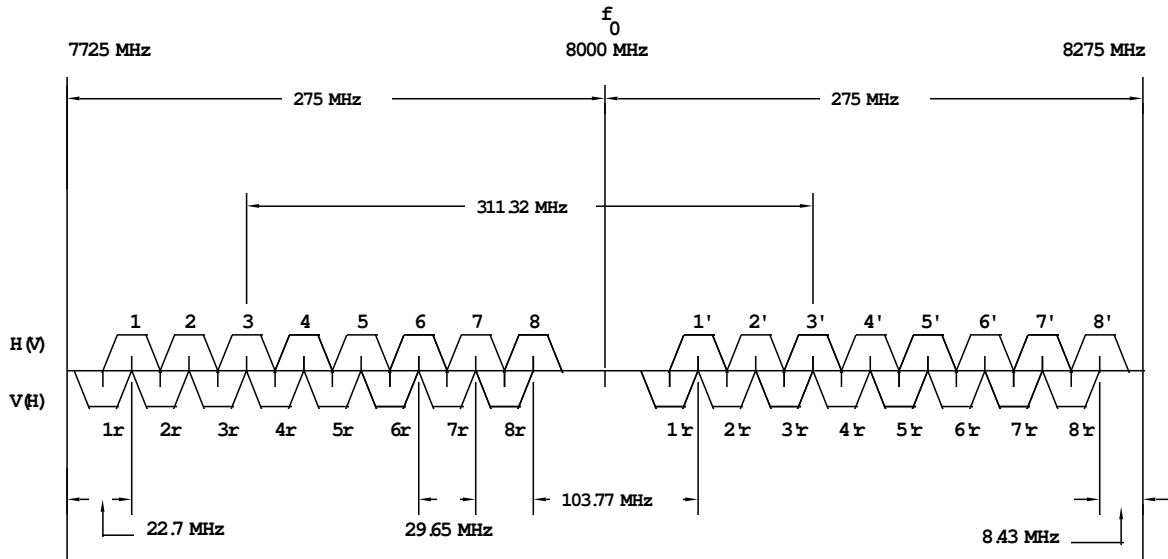
For a channel spacing of 29.65 Mhz

lower half of the band:	$f_n = f_o - 281.95 + 29.65 n$ MHz	$n = 1, 2, \dots, 8$
upper half of the band:	$f_{n'} = f_o + 29.37 + 29.65 n$ MHz	

For additional interleaved digital channel, the formula is;

lower half of the band:	$f_{n' r} = f_o - 297.65 + 29.65 n$ MHz	$n = 1, 2, \dots, 8$
upper half of the band:	$f_{n' r} = f_o + 14.545 + 29.65 n$ MHz	

**Figure 1**  
Radio frequency channel arrangement of radio-relay systems  
operating in frequency band 7725 MHz - 8275 MHz



Note :

1. Centre Frequency  $f_0 = 8000$  MHz
2. Separation between adjacent channels = 29.65 MHz
3. Separation between corresponding go and return channels = 311.32 MHz

4.3 The centre frequencies of the main RF channels for radio systems operating in the frequency band 7725 MHz - 8275 MHz are shown in **Table 1**. **Table 2** shows the centre frequencies of the interleaved RF channels which are 29.65 MHz below those of the corresponding main channel frequencies.

**Table 1**  
Main Channel Carrier Centre Frequencies with  
bandwidth 29.65 MHz

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	7747.700	1'	8059.020
2	7777.350	2'	8088.670
3	7807.000	3'	8118.320
4	7836.650	4'	8147.970
5	7866.300	5'	8177.620
6	7895.950	6'	8207.270
7	7925.600	7'	8236.920
8	7955.250	8'	8266.570

**Table 2**  
Interleave Channel Carrier Centre Frequencies with  
bandwidth 29.65 MHz

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1r	7732.875	1'r	8044.195
2r	7762.525	2'r	8073.845
3r	7792.175	3'r	8103.495
4r	7821.825	4'r	8133.145
5r	7851.475	5'r	8162.795
6r	7881.125	6'r	8192.445
7r	7910.775	7'r	8222.095
8r	7940.425	8'r	8251.745

## 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 Channel bandwidth of 59.3 MHz is essentially applicable for those systems deployed or purchased prior to the issuance of this SRSP. The usage of 59.3 MHz channel bandwidth is limited until the end of the system lifespan of the apparatus. The usage include redeployment to different location and/or upgrade the said apparatus for additional capacity with minimal changes of the system. Moving forward, all radio-relay systems shall use 29.65 MHz channel bandwidth for new applications.
- 5.3 The channel arrangements above primarily provide for eight (8) go and eight (8) return radio frequency channels on the same route using either the main channel arrangement (**Table 1**) or alternatively the interleaved channel arrangement (**Table 2**). The main channels and interleaved channels should not be mixed along the same route.
- 5.4 The go and return channels on a given section should use the polarisations shown in **Table 3**.

**Table 3**  
Polarisation of eight radio-channel system

Polarisation	Go Channels				Return Channels			
H(V)	1	3	5	7	1'	3'	5'	7'
V(H)	2	4	6	8	2'	4'	6'	8'

- 5.5 A channelling scheme using the main radio frequency channels and interleaved channels for multi-hop radio-relay systems is shown in **Appendix B**.
- 5.6 Up to sixteen (16) go and sixteen (16) return radio frequency channels may be obtained by using the main channels and interleaved channels simultaneously. Such use can be considered provided its use can be justified.
- 5.7 Protection channel may be permitted for multi-channel systems subject to approval by SKMM. However systems using hot-standby are encouraged.
- 5.8 Fixed service line of sight radio-relay systems shall not interfere with earth stations of the FSS and shall comply with ITU-R recommendations **ITU-R SF.406-8 (04/93)** and **ITU-R SF.765-1 (02/03)** and **Article 21 of the Radio Regulations**.
- 5.9 Fixed service line of sight radio-relay systems if required shall be shut down immediately when there is a major interference to FSS earth stations which cannot be mitigated. Implementation of mitigation techniques to avoid interference shall be borne by the fixed service line of sight radio-relay service providers.
- 5.10 The shared services within this band are found in the Spectrum Plan and an extract of it is shown in **Appendix A**.

## **6.0 PRINCIPLES OF ASSIGNMENT**

- 6.1 Authorisation to use the line of sight radio-relay spectrum for the radio-relay fixed station is by way of **Apparatus Assignment (AA)**. Priority will be given to the use for a station as trunk or main link.
- 6.2 Eligible persons who may apply for assignments are:
- 6.2.1 Network Facilities Provider Individual NFP(I) Licence holder, who provides radiocommunication transmitters and links.
  - 6.2.2 Private network facility (Government and private corporations/companies) for own **offshore** private use only.
  - 6.2.3 Private network facility (Government and private corporations/companies) for own **inland** private use only.
- 6.3 Applicants are required to:
- 6.3.1 Submit AA application for the apparatus on the prescribed AA forms.
  - 6.3.2 For use by **inland** private network facility, applicant have to provide proof that the existing NFP(I)/NSP(I) licence holders are not able to provide line of sight radio-relay service or any other similar service (wireless or wired) to the applicant.



- 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 Issuance of an AA is also subject to successful co-ordination among assigned stations and with neighbouring administrations where it applies.
- 6.6 The apparatus assignment shall be on a first come first served basis. In the event of unavailability of spectrum, applicants will be placed in the queue that will be reviewed periodically.

## **7.0 IMPLEMENTATION**

- 7.1 This SRSP shall be effective on the date of issuance of this document.
- 7.2 No new assignment for fixed service line of sight radio-relay systems operating in the band 7725 MHz to 8275 MHz shall be approved unless they comply with this SRSP.
- 7.3 Systems installed or purchased before the effective date of this SRSP are allowed to operate until the end of the system lifespan (maximum 15 years from the year of deployment).

## **8.0 COORDINATION REQUIREMENT**

- 8.1 Use of these frequency bands shall require coordination with the neighbouring countries within the following coordination zones:
  - 8.1.1 Within 50 kilometres of the Malaysian border with FACSMAB (Frequency Assignment and Co-ordination between Singapore, Malaysia and Brunei Darussalam).
  - 8.1.2 Within 60 kilometres of the Malaysian border with Indonesia.
  - 8.1.3 Within 35 kilometres of the Malaysian border with Thailand.
- 8.2 Note that the above coordination distance is continuously being reviewed with our neighbouring countries and may be updated from time to time.
- 8.3 Technical analysis is carried out by SKMM before an assignment is issued. If necessary, operator to operator coordination at the defined geographic boundaries may be required to reduce interference.
- 8.4 The technical mitigation guide as mentioned in Section 5 above shall be applied if operator to operator coordination is required.
- 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 C**.

## **9.0 REVOCATION**

9.1 MCMC SRSP 516, 18 August 2003 Issue 2 is hereby revoked.

## **10.0 REFERENCES**

- [1] **ITU-R F.386-8 (09/07)** Radio Frequency Channel Assignments for Medium and High Capacity Analogue and Digital Radio-relay Systems.
- [2] **SRSP (Canada) 307.1** Technical Requirements for line of site Radio-relay Systems in the band 7725 – 8275 MHz.
- [3] **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.
- [4] **ITU-R SF.765-1 (02/03)** Intersection of Radio-relay Antenna Beams with Orbits used by Space Station of the Fixed Satellite System.
- [5] **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

### 7 450 MHz to 7 850 MHz

Frequency Band (MHz)	ITU Allocation			Malaysian Allocation
	Region 1	Region 2	Region 3	
<b>7 550-7 750</b>	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile			FIXED MLA65 MLA66 FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile
<b>7 750-7 850</b>	FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B MOBILE except aeronautical mobile			FIXED MLA66 METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B MOBILE except aeronautical mobile

**5.461B** The use of the band 7 750-7 850 MHz by the meteorological-satellite service (space-to-Earth) is limited to non-geostationary satellite systems. (WRC-97)

**MLA65** Standard Radio System Plan: Requirements for Line of sight Radio-Relay Systems Operating in the Fixed Service in the Frequency Band 7425 MHz to 7725 MHz

**MLA66** Standard Radio System Plan: Requirements for Line of sight Radio-Relay Systems Operating in the Fixed Service in the Frequency Band 7725 MHz to 8275 MHz

**7 850 MHz to 8 175 MHz**

Frequency Band (MHz)	ITU Allocation			Malaysian Allocation
	Region 1	Region 2	Region 3	
<b>7 850-7 900</b>	FIXED MOBILE except aeronautical mobile			FIXED MLA66 MOBILE except aeronautical mobile
<b>7 900-8 025</b>	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.461			FIXED MLA66 FIXED-SATELLITE (Earth-to-space) MLA51 MOBILE 5.461
<b>8 025-8 175</b>	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A			EARTH EXPLORATION-SATELLITE (space-to-Earth) MLA51 FIXED MLA66 FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A

**5.461** *Additional allocation:* the bands 7 250-7 375 MHz (space-to-Earth) and 7 900-8 025 MHz (Earth-to-space) are also allocated to the mobile-satellite service on a primary basis, subject to agreement obtained under No. 9.21.

**5.462A** In Regions 1 and 3 (except for Japan), in the band 8 025-8 400 MHz, the Earth exploration-satellite service using geostationary satellites shall not produce a power flux-density in excess of the following provisional values for angles of arrival ( $\theta$ ), without the consent of the affected administration:

-174 dB(W/m <sup>2</sup> ) in a 4 kHz band	for	$0^\circ \leq \theta < 5^\circ$
-174 + 0.5 ( $\theta - 5$ ) dB(W/m <sup>2</sup> ) in a 4 kHz band	for	$5^\circ \leq \theta < 25^\circ$
-164 dB(W/m <sup>2</sup> ) in a 4 kHz band	for	$25^\circ \leq \theta \leq 90^\circ$

These values are subject to study under Resolution **124 (WRC-97)\***. (WRC-97)

\* *This Resolution was revised by WRC-2000.*

**5.463** Aircraft stations are not permitted to transmit in the band 8 025-8 400 MHz. (WRC-97)

**MLA 51** The frequency bands 1697.8 - 1699.2 MHz, 1705.08 - 1708.2 MHz, 2201.95 - 2210 MHz, 2221 - 2234 MHz and 7952 - 8500 MHz are allocated for Earth Exploration-Satellite service.

**MLA66** Standard Radio System Plan: Requirements for Line of sight Radio-Relay Systems Operating in the Fixed Service in the Frequency Band 7725 MHz to 8275 MHz

**8 175 MHz to 8 400 MHz**

Frequency Band (MHz)	ITU Allocation			Malaysian Allocation
	Region 1	Region 2	Region 3	
<b>8 175-8 215</b>	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE 5.463  5.462A			EARTH EXPLORATION-SATELLITE (space-to-Earth) MLA51  FIXED MLA66  FIXED-SATELLITE (Earth-to-space)  METEOROLOGICAL-SATELLITE (Earth-to-space)  MOBILE 5.463  5.462A
<b>8 215-8 400</b>	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463  5.462A			EARTH EXPLORATION-SATELLITE (space-to-Earth) MLA51  FIXED MLA66 MLA67  FIXED-SATELLITE (Earth-to-space)  MOBILE 5.463  5.462A

**5.463** Aircraft stations are not permitted to transmit in the band 8 025-8 400 MHz. (WRC-97)

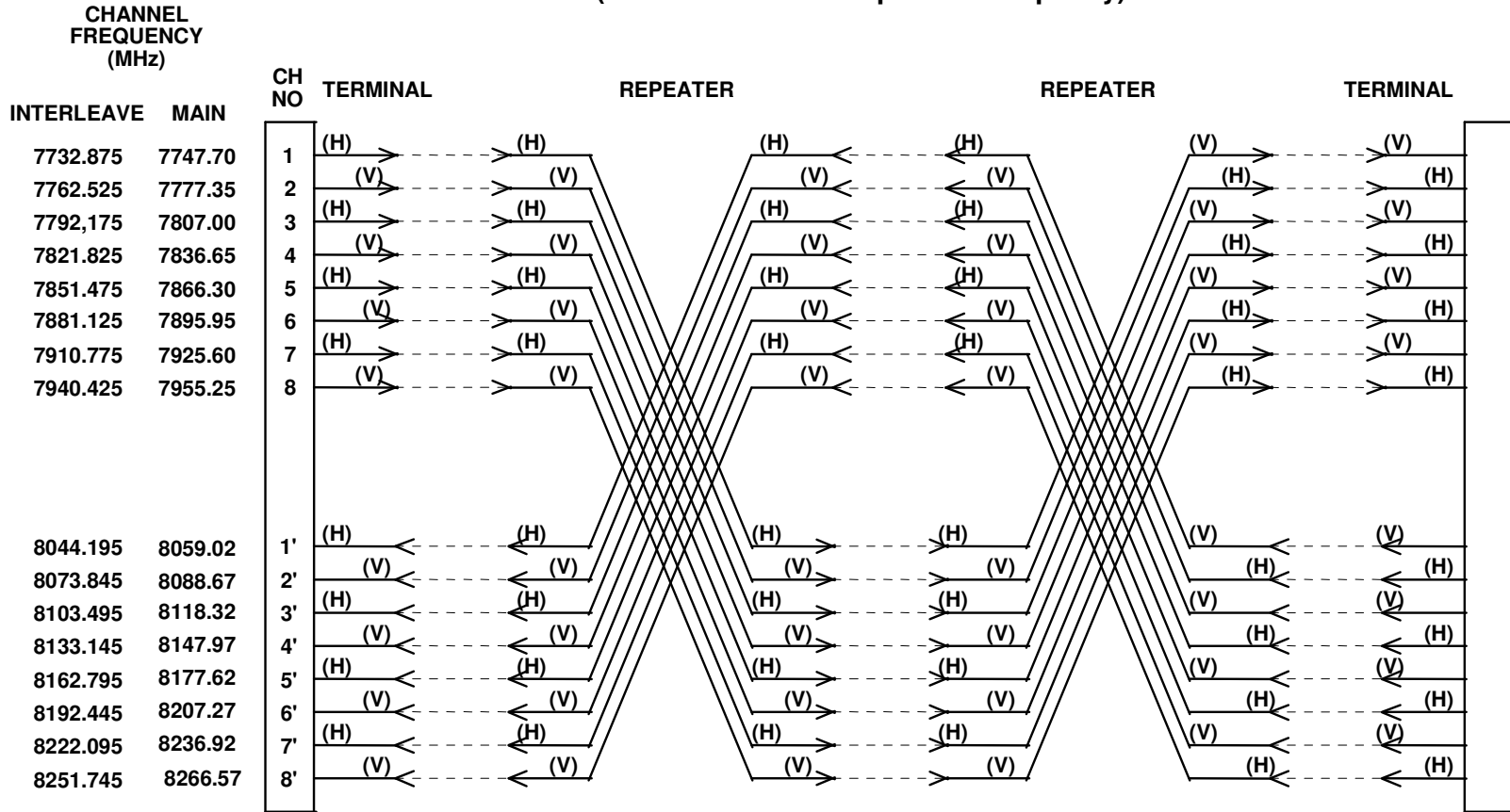
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**MLA66** Standard Radio System Plan: Requirements for Line of sight Radio-Relay Systems Operating in the Fixed Service in the Frequency Band 7725 MHz to 8275 MHz

**MLA67** Standard Radio System Plan: Requirements for Line of sight Radio-Relay Systems Operating in the Fixed Service in the Frequency Band 8275 MHz to 8500 MHz

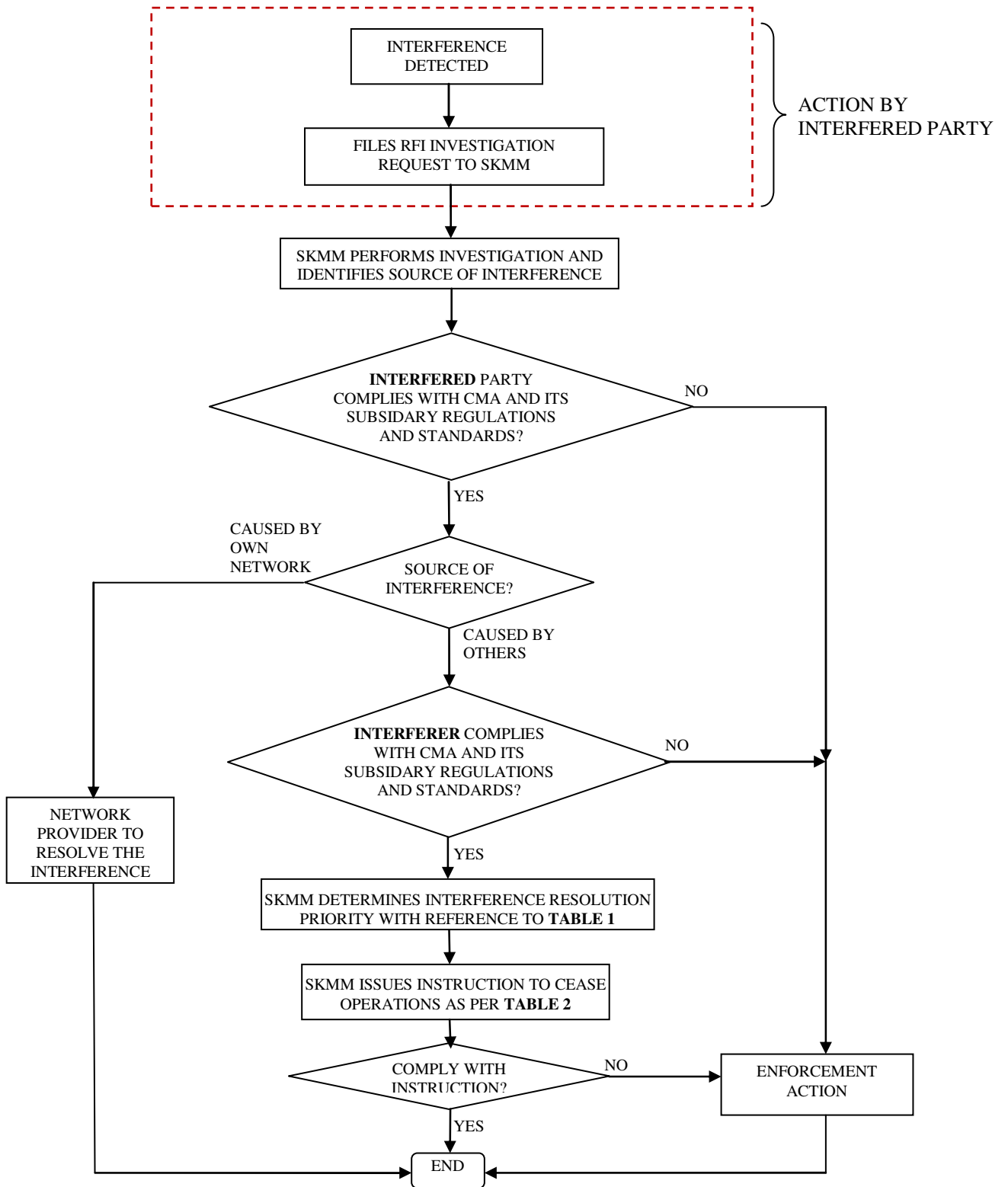
## APPENDIX B

### Radio Frequency Channel Arrangement for Multi-hop System (1800 Channels or Equivalent Capacity)



**Note:**  
H - denotes horizontal  
V - denotes vertical

## APPENDIX C: 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 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.