

Standard Radio System Plan

**REQUIREMENTS FOR FIXED SERVICE
LINE OF SIGHT RADIO-RELAY SYSTEMS
OPERATING IN THE FREQUENCY BAND
8275 MHz TO 8500 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 FIXED SERVICE LINE OF SIGHT RADIO-RELAY
SYSTEMS OPERATING THE FREQUENCY BAND
8275 MHz TO 8500 MHz**

2.0 INTENT

- 2.1 This Standard Radio System Plan (SRSP) states the requirements for the utilization of the frequency band 8275 MHz - 8500 MHz for line-of sight medium and small capacity radio-relay systems in the fixed service, these systems being:
- 2.1.1 Digital radio-relay systems with capacities of 34 Mbit/s.
 - 2.1.2 Digital radio-relay systems with capacities of 2 x 8 Mbit/s.
 - 2.1.3 Digital radio-relay systems with channel spacing of 7 MHz, 14 MHz and 28 MHz.
- 2.2 Radio-relay systems are intended as bearers for telephony, data and image.
- 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 at the time of authorisation, 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 F.386-8 (09/07)**.
- 4.2 For systems with capacities of 34 Mbit/s, the RF channels are arranged according to **Figure 1(A)** that provides for six (6) two-way channels (1/1' to 6/6').
- 4.3 For systems with capacities of 2 x 8 Mbit/s, the RF channels are arranged according to **Figure 1(B)** that provides for twelve (12) two-way channels (1/1' to 12/12') by adding interleaved channels at 7 MHz to form a homogeneous pattern.
- 4.4 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 systems with Tx/Rx separation of 119 MHz:

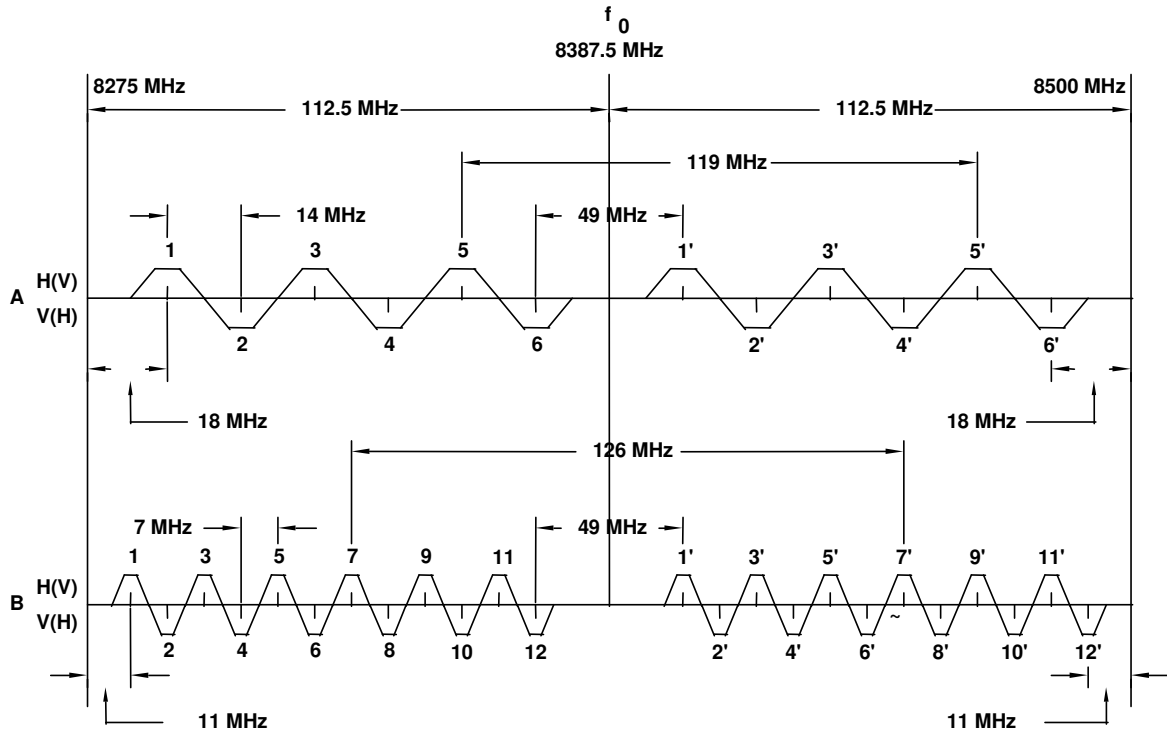
lower half of the band:	$f_n = f_o - 108.5 + (7 \text{ or } 14 \text{ or } 28) n \text{ MHz}$	$n = 1, 2, \dots, 12$
upper half of the band:	$f_{n'} = f_o + 10.5 + (7 \text{ or } 14 \text{ or } 28) n \text{ MHz}$	

For systems with Tx/Rx separation of 126 MHz:

lower half of the band:	$f_n = f_o - 108.5 + (7 \text{ or } 14 \text{ or } 28) n \text{ MHz}$	$n = 1, 2, \dots, 12$
upper half of the band:	$f_{n'} = f_o + 17.5 + (7 \text{ or } 14 \text{ or } 28) n \text{ MHz}$	

- 4.5 The centre frequencies of the RF channels for radio systems of capacities 34 Mbit/s and 2 x 8 Mbit/s operating in the frequency band 8275 MHz - 8500 MHz are shown below in **Table 1**.

Figure 1
Radio frequency Channel Arrangements of Radio-Relay Systems
Operating in The Frequency band 8275 MHz - 8500 MHz



Note:

1. Centre Frequency $f_0 = 8387.5$ MHz
2. Separation between adjacent channels = A (14 MHz), B (7 MHz)
3. Separation between corresponding go and return channels = A (119 MHz), B (126 MHz)

Table 1
Channel Carrier Centre Frequencies for Systems with bandwidth equal or greater than 7 MHz
and equal or less than 28 MHz for Tx/Rx separation of 119 MHz

Channel No.	Bandwidth = 7MHz		Bandwidth = 14MHz		Bandwidth = 28MHz	
	Frequency (MHz)		Frequency (MHz)		Frequency (MHz)	
	Go Channel	Return Channel	Go Channel	Return Channel	Go Channel	Return Channel
1	8286.000	8405.000	8293.000	8412.000	8307.000	8426.000
2	8293.000	8412.000	8307.000	8426.000	8335.000	8454.000
3	8300.000	8419.000	8321.000	8440.000	8363.000	8482.000
4	8307.000	8426.000	8335.000	8454.000		
5	8314.000	8433.000	8349.000	8468.000		
6	8321.000	8440.000	8363.000	8482.000		
7	8328.000	8447.000				
8	8335.000	8454.000				
9	8342.000	8461.000				
10	8349.000	8468.000				
11	8356.000	8475.000				
12	8363.000	8482.000				

5.0 REQUIREMENTS FOR USAGE OF SPECTRUM

- 5.1 This SRSP covers the minimum key characteristics considered necessary in order to make the best use of the available frequencies.
- 5.2 The separation between transmit and receive channel are 151.614 MHz, 119 MHz and 126 MHz for bandwidth between 7 MHz – 28 MHz.
- 5.3 126 MHz and 151.614 MHz channel separations are essentially applicable for those systems deployed or purchased prior to the issuance of this SRSP. The usage of 126 MHz and 151.614 are 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 119 MHz channel separation for new applications.
- 5.4 The channel arrangements above provide for six (6) go and six (6) return radio frequency channels on the same route using the main channel arrangement (**Table 1**) or alternatively twelve (12) go and twelve (12) return channels using the interleaved channel arrangement. The main channels and interleaved channels shall not be mixed along the same route.
- 5.5 For adjacent radio frequency channels in the same half of the band, different polarization should be used alternately.
- 5.6 A channelling schemes using the main radio frequency channels (A) and the interleaved channels (B) for multi-hop radio-relay systems are shown in **Appendix B** and **C** respectively.
- 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 are required shall be shut down immediately when there is major interference to FSS earth stations which cannot be mitigated. Implementation of mitigation techniques to avoid interference shall be borne by 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, which provides radio communication 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 has 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 8275 MHz to 8500 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 FACSMA (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 D**.

9.0 REVOCATION

- 9.1 MCMC SRSP 517, 18 August 2003 Issue 2 is hereby revoked.

10.0 REFERENCES

- [1] **ITU-R F.386-8 (09/07)** Radio Frequency Channel Arrangements for Medium and High Capacity analogue and Digital Radio-relay Systems operating the 8 GHz Band.
- [2] **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.
- [3] **ITU-R SF.765-1 (02/03)** Intersection of Radio-relay Antenna Beams with Orbits used by Space Station of the Fixed Satellite System.
- [4] **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

8 175 MHz to 8 400 MHz

Frequency Band (MHz)	ITU Allocation			Malaysian Allocation
	Region 1	Region 2	Region 3	
8 175-8 215	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
8 215-8 400	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

5.462A 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 (θ), without the consent of the affected administration:

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

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

8 400 MHz to 8 550 MHz

Frequency Band (MHz)	ITU Allocation			Malaysian Allocation
	Region 1	Region 2	Region 3	
8 400-8 500	FIXED			FIXED MLA47 MLA67
	MOBILE except aeronautical mobile			MOBILE except aeronautical mobile
	SPACE RESEARCH (space-to-Earth) 5.465 5.466			Space research (space-to-Earth) 5.465 MLA51

5.465 In the space research service, the use of the band 8 400-8 450 MHz is limited to deep space.

5.466 *Different category of service:* in Israel, Singapore and Sri Lanka, the allocation of the band 8 400-8 500 MHz to the space research service is on a secondary basis (see No. **5.32**). (WRC-03)

MLA47 The fixed service in the bands 1429MHz to 1452 MHz and 8400MHz to 8500MHz is for civil use only.

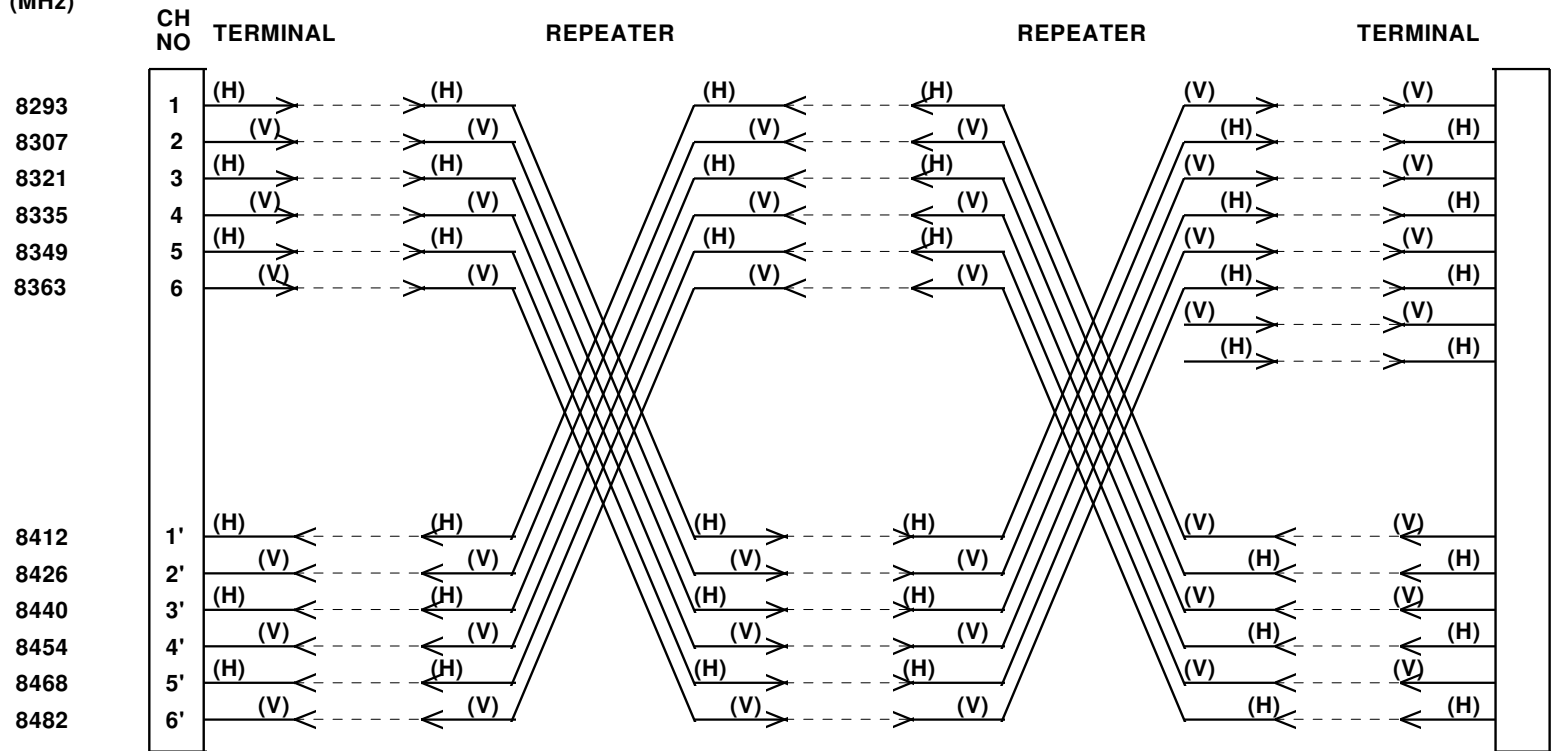
MLA 51 The frequency bands 1697.8 - 1699.2 MHz, 1705.08 - 1708.2 MHz, 2201.95 - 2210 MHz, 2221 - 2234 MHz and 7952 - 8500 MHz are allocated for Earth Exploration-Satellite service.

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 Channel Arrangement
for Multi-hop System (34 Mbit/s)**

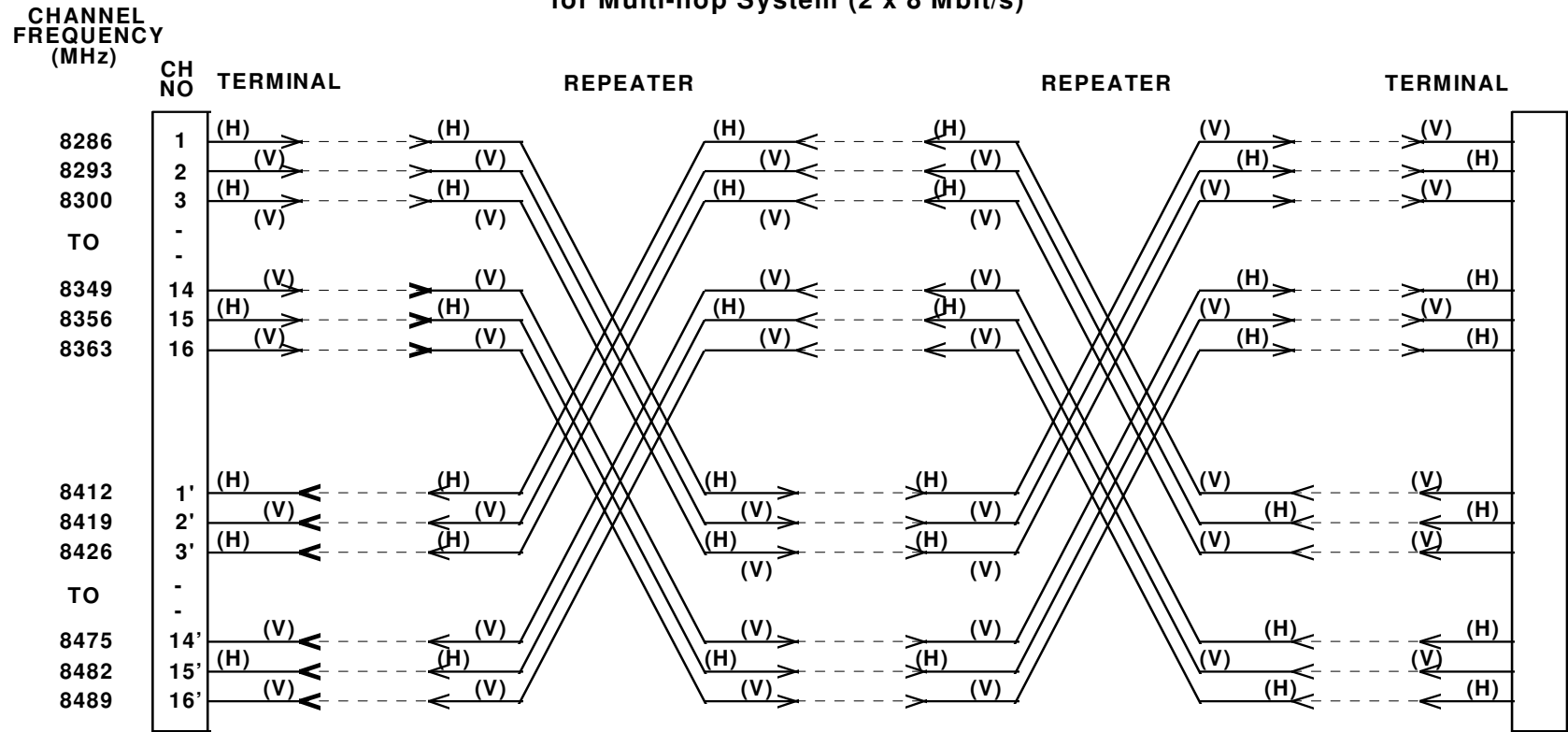
**CHANNEL
FREQUENCY
(MHz)**



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

APPENDIX C

Radio Channel Arrangement
for Multi-hop System (2 x 8 Mbit/s)



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

APPENDIX D: INTERFERENCE RESOLUTION PROCESS

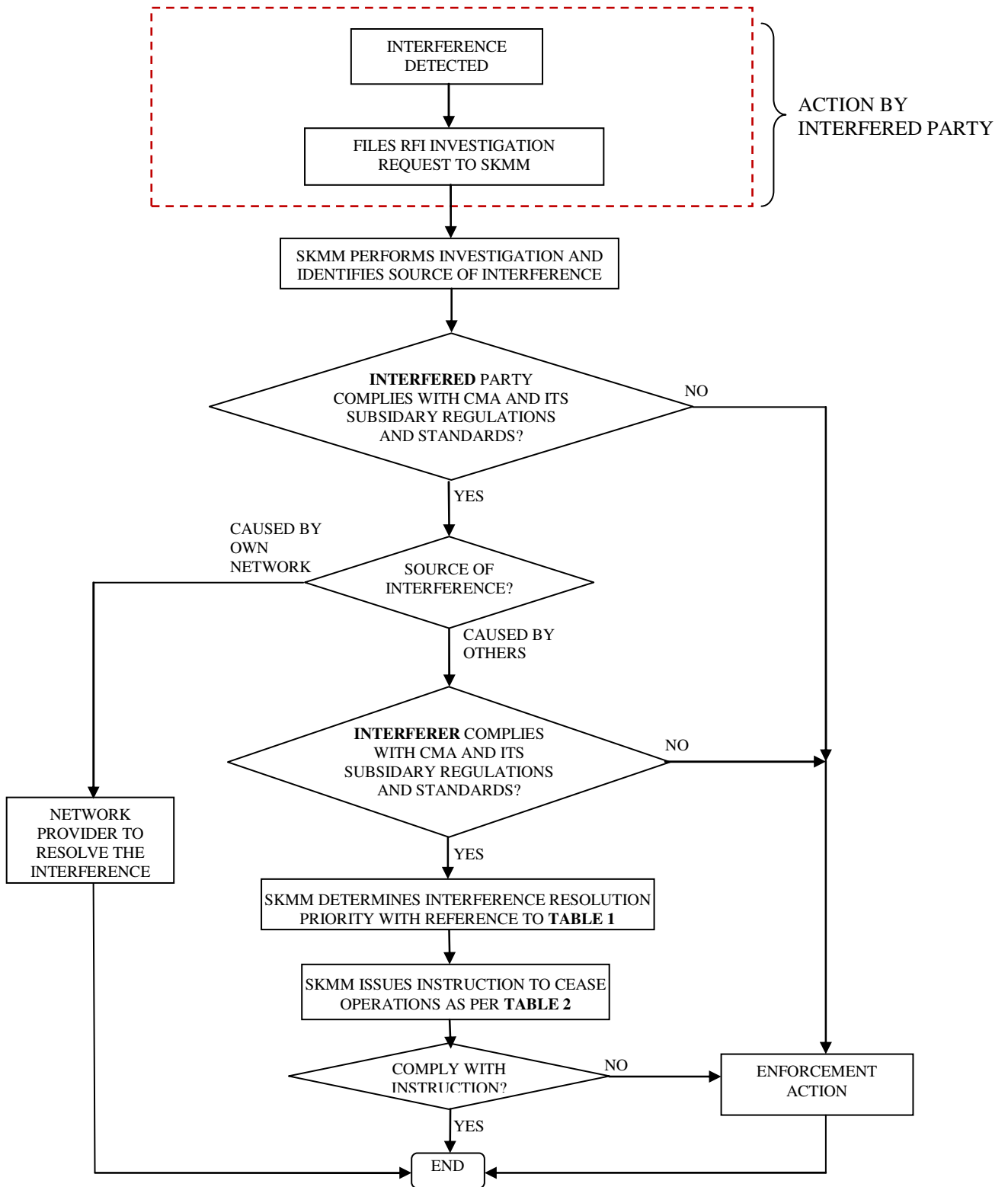


TABLE 1: INTERFERENCE RESOLUTION PRIORITY

	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): <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 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.