

Standard Radio System Plan

**REQUIREMENTS FOR RADIO FREQUENCY
IDENTIFICATION DEVICE - (RFID) -
OPERATING IN THE FREQUENCY BAND
FROM 919 MHz TO 923 MHz**

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1.0 GLOSSARY

ANSI	American National Standards Institute
Battery-less tag	Transponder that derives all of the power necessary for its operation from the field generated by an interrogator.
Battery- assisted tag	Transponder that includes a battery to enhance it's receive performance and power its internal circuitry.
EPC Global	Electronic Product Codes Global
ERP	Effective Radiated Power
ETSI	European Telecommunication Standards Institute
FCC	Federal Communications Commission
Frequency agile technique	The technique used to determine an unoccupied sub-band in order to minimize interference with other users of the same band.
Integral antenna	Permanent fixed antenna, which may be built-in, designed as an indispensable part of the equipment.
Interrogator	Equipment that will activate an adjacent tag and read its data. It may also enter or modify the information in a tag.
ISO	International Organization for Standardization
ITU	International Telecommunication Union
JTAC	Joint Technical Advisory Committee
MCMC	Malaysian Communications and Multimedia Commission
Non Interference Basis (NIB)	A condition of use relative to other specified uses that affords no protection from harmful interference from the other specified users, and prohibits causing harmful interference to the other specified users.
Radiated measurements	Measurements which involve the absolute measurement of a radiated field.
Spurious emission	Emission on a frequency or frequencies which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, inter-modulation products and frequency conversion products, but exclude out-of-band emissions.
Tag	Transponder that holds data and responds to an interrogation signal.
Transponder	Electrical device designed to receive a specific signal and automatically transmit a specific reply upon proper interrogation.
UCC	Uniform Commercial Code

REQUIREMENTS FOR RADIO FREQUENCY IDENTIFICATION DEVICE - (RFID) - OPERATING IN THE FREQUENCY BAND FROM 919 MHz TO 923 MHz

2.0 INTENT

- 2.1 This Standard Radio System Plan (SRSP) states the requirements for the utilisation of the frequency band 919 – 923 MHz for Radio Frequency Identification Device (RFID) systems in Malaysia.
- 2.2 It is meant to facilitate fast deployment of RFID as the technology that will enable the wireless transmission of the identity (in the form of a unique serial number) of an object or a person, using the specified radio waves.
- 2.3 RFID systems comprise of interrogators and tags. The tags can be active or passive. Active tags contain an internal power source (battery) while passive tags are powered by the radio frequency energy transmitted by the interrogators.
- 2.4 The scope of this SRSP is limited to interrogators of battery-less and battery-assisted tags.
- 2.5 In general, SRSP is a document designed to provide information on the minimum requirements in the use of a frequency band as described in the Malaysian Table of Frequency Allocation (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 detail equipment standards.

3.0 GENERAL

- 3.1 Technical characteristics of equipment used in RFID 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 All RFID installations must comply with safety rules as defined by applicable standards.
- 3.3 It is acknowledged that the standardisation of RFID system will involve various industries and standardisation bodies. RFID system should refer to specification by standardisation bodies such as ISO, EPCGlobal, UCC, etc, for the system compliance where available.

- 3.4 The equipment used shall be certified under the Communications and Multimedia (Technical Standards) Regulations 2000.
- 3.5 The allocation and allotment of these frequency bands and the SRSP are subject to review from time to time in tune with new industry developments, technical or non-technical for more efficient utilisation and management of spectrum, or for the improvement of the services offered by such systems.

4.0 CHANNELLING PLAN

- 4.1 The SRSP defines a frequency band 919MHz to 923MHz providing a total bandwidth of 4MHz for the RFID system. The suggested minimum bandwidth proposed for RFID usage is 1 MHz which is 5 x 200 kHz or 2 x 500 kHz.
- 4.2 The suggested channelling plan is as showed in Appendix B.

5.0 REQUIREMENTS FOR USAGE OF SPECTRUM

- 5.1 This SRSP covers the minimum characteristics considered necessary in order to make the best use of the available frequencies. It does not necessarily include all the characteristics that may be required by a user, nor does it necessarily represent the optimum performance achievable.
- 5.2 This SRSP applies to RFID interrogators and tags operating together as a system. The interrogators transmit using a modulated or non-modulated carrier. The tags respond with or without a modulated signal and this will be received back by the interrogators. Interrogators may be used with either integral or external antennas.
- 5.3 The method of communication between battery-less tags and an interrogator shall be based on backscatter technique. In this method, RFID tags will reflect back to interrogator radio waves from an interrogator.
- 5.4 Interrogator equipment shall operate only within the band 919 MHz to 923 MHz and employing sub channels with maximum 500 kHz of 20dB bandwidth. It is recommended that the interrogators be capable of operating at sub-bands or hopping channels with lower bandwidth in certain locations to resolve interference issues.
- 5.5 The total maximum effective radiated power (ERP) of the interrogator equipment shall not exceed 4 Watts.
- 5.6 The interrogator equipment shall comply with the technical requirements as stipulated under any of the following:

- ETSI EN 302 208-1; or
 - FCC Part 15
- 5.7 Transmitter & Receiver spurious emissions:
- FCC Part 15, Section 15.247 and 15.249; or
 - EN 300 220-1 § 8.7 and 9.4 or EN 302 208-1 § 8.5 and 9.6
- 5.8 Test Reference:
- FCC Part 15; or
 - EN 300 220-1 or EN 302 208-1
- 5.9 Frequency agile technique should be utilised in order to accommodate a large number of interrogators at a single site while minimizing interference with other users of the same band.
- 5.10 In environments containing many interrogators, the range and rate at which interrogators communicate to tags can be improved by preventing interfering interrogator transmissions from colliding with desired tags responses, either spectrally or temporally. The multiple access scheme specified by ETSI and FCC may minimize or eliminate Interrogator-on-Tag collisions. The following references specify the multiple access scheme:
- a) ETSI Specification
- Refer to section 4 and section 9 of ETSI EN 302 208-1 for general performance criteria and receiver parameters respectively.
- b) FCC Specification
- Refer to section 15.247 of FCC part 15 for further information.

6.0 PRINCIPLES OF ASSIGNMENT

- 6.1 Authorization to use the spectrum for RFID interrogator with ERP below 2W is by way of **Class Assignment (CA)** and up to 4W ERP is by way of an **Apparatus Assignment (AA)**. The use of equipment with ERP exceeding 4W is not permitted.
- 6.2 Conditions of RFID equipment are specified in the Class Assignment (CA) published on MCMC website (www.mcmc.gov.my). The use of spectrum under Class Assignment does not require any application to be made to MCMC and no fees are payable.
- 6.3 In the case where an AA is required, Applicants are required to submit AA application for the apparatus on the prescribed AA forms available on MCMC web site.
- 6.4 The maximum validity period of an AA for all RFID systems in these bands is five (5) years and the AA holder may make fresh application for the AA not less than 60 days before expiry.

- 6.5 The application for an AA shall be considered on a first come first served basis. In the event of unavailability of spectrum, applicants will be placed in a queue.

7.0 IMPLEMENTATION PLAN

- 7.1 This SRSP shall be effective three months after the date of issuance of this document.
- 7.2 Installations before the effective date are allowed to operate under NIB to new installations complying with this SRSP.

8.0 COORDINATION REQUIREMENT

- 8.1 Use of these frequency bands for ERP power rating of more than 2 W shall require coordination with the neighbouring countries within the following coordination zones of 50 kilometres from our neighbouring countries. Note that the above coordination distance is continuously being reviewed with our neighbouring countries.
- 8.2 Border coordination for systems below 2W is not required.
- 8.3 In the event of any harmful interference, MCMC 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 MCMC for a resolution. MCMC will decide the necessary modifications and schedule of modifications to resolve the dispute.

9.0 REFERENCES

For further information on the above, kindly refer to the following:

- 9.1 **ETSI EN 302 208-1:** "Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio Frequency Identification Equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W; Part 1: Technical requirements and methods of measurement".
- 9.2 **ETSI EN 300 220-1:** "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; Radio Equipment to be used in the 25

MHz to 1000 MHz frequency range with power levels ranging up to 500 mW;
Part 1: Technical characteristics and test methods“

9.3 **FCC Part 15: “Radio Frequency Devices”.**

Subpart A-

General

§ 15.31

Measurement Standards

§ 15.33

Frequency Range of Radiated Measurements

§ 15.35

Measurement Detector Functions and Bandwidths

Subpart C-

Intentional Radiators

§ 15.209

Radiated emission limits, general requirements

§ 15.245

Operation in the bands 902 – 928 MHz, 2435 – 2465 MHz, 5785 – 5815 MHz, 10500 – 10550 MHz and 24075– 24175 MHz

§ 15.247

Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

§ 15.249

Operation within the bands 902 – 928 MHz, 2400 – 2483.5 MHz, 5725 – 5875 MHz and 24.0 – 24.25 GHz

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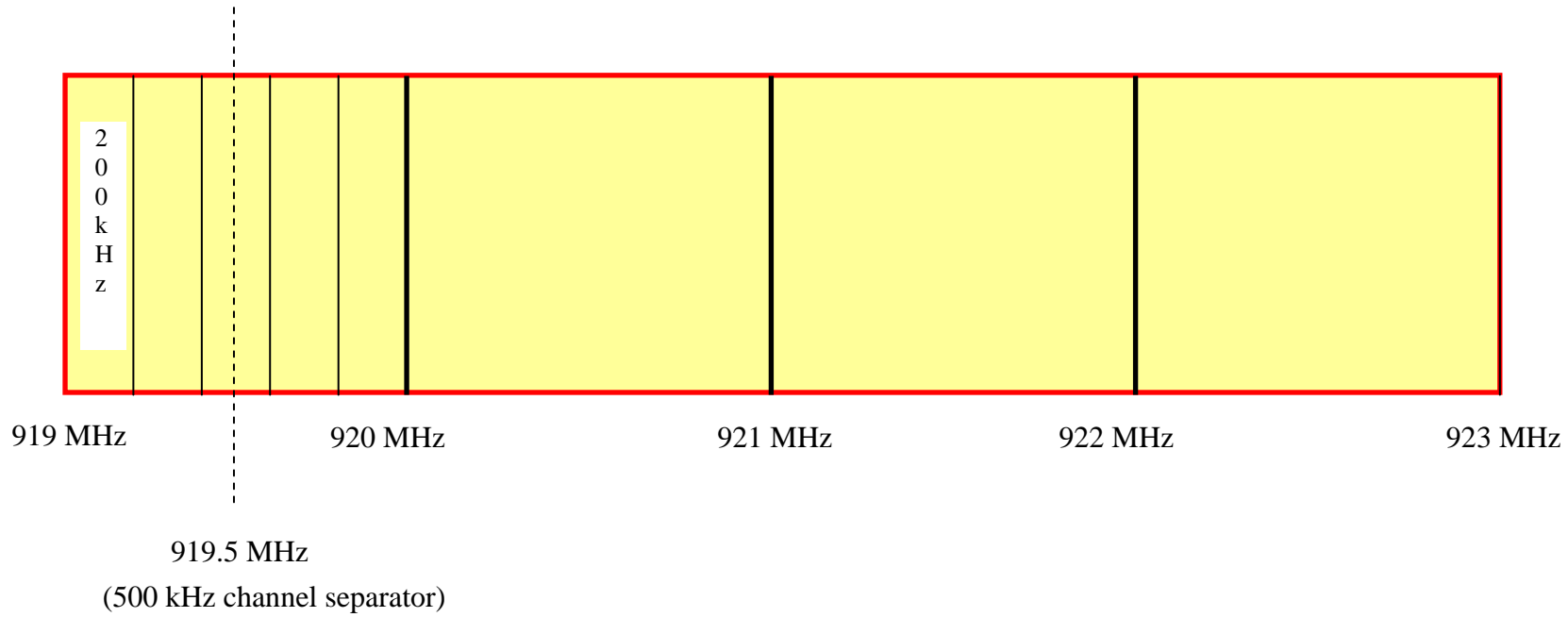
APPENDIX A: TABLE OF FREQUENCY ALLOCATION 890 MHZ TO 942 MHZ

Frequency Band (MHz)	Malaysian Allocation	Notes/Future use
890-942	FIXED MLA27 MOBILE MLA27 BROADCASTING 5.317A Radiolocation MLA29	MLA27: Portion of the band may be used for Low Power Devices throughout Malaysia. MLA29: Portion of the band is sub-allocated for mobile services Frequency Spectrum 806 to 960 MHz may be used for IMT 2000 extension band Bands 806 to 821 MHz and 851 to 866 MHz are allocated for Trunk Radio Services (TRS). All analogue services to be vacated by 2008.

Footnote:

5.317A – Administrations wishing to implement International Mobile Telecommunications-2000 (IMT-2000) may use those parts of the band 806-960 MHz which are allocated to the mobile service on a primary basis and are used or planned to be used for mobile systems (see Resolution 224 (WRC-2000)). 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-2000).

APPENDIX B: CHANNELLING PLAN FOR RFID



The minimum bandwidth proposed for RFID usage is 1 MHz which is 5 x 200 kHz or 2 x 500 kHz.

