(Draft) Spectrum Plan for the Accommodation of Land Mobile Radiocommunications Systems

Maintenance History		
Date	**Change Details**	**Version**
21st July 2011	First Draft	0.1

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Executive Summary

Land Mobile radiocommunications systems have been used in Trinidad and Tobago over the past decades to provide data and voice communication for private businesses, government organizations and public health and safety services such as police, fire and emergency relief agencies. The Telecommunications Authority of Trinidad and Tobago (The Authority) is responsible for regulating the use of the spectrum in accordance with the Telecommunications Act 2001. According to the Authority's records there are approximately 200 land mobile licences issued in their various designations, such as Conventional Land Mobile, Trunked Land Mobile.

In Trinidad and Tobago the demand for land mobile services has been moderate to low in recent times with the advent of newer technologies such as cellular mobile and broadband wireless services. Spectrum Audits of the land mobile frequency blocks conducted during July to August of 2008 revealed much more spectrum usage than that authorized by the Authority, particularly in the frequency range of 138-174 MHz.

This Spectrum Plan for the Accommodation of Land Mobile Radiocommunication Systems defines the channel plan for the designated bands, designed to accommodate existing 25 kHz assignments and new 12.5 kHz assignments and outlines the licensing approach. This approach would accommodate both new and existing spectrum users. In addition this would facilitate spectrum planning and more efficient use of the radio frequency spectrum.

Table 1 summarizes the proposed frequency band plans and the respective licensing approaches for each frequency range of operation for land mobile radiocommunication systems.

Table 1: Summary of Land Mobile Radiocommunications Systems Operating Frequency Ranges and the Respective Licensing Approaches for Trinidad and Tobago

Frequency Range of Operation	Licensing Approach
138 – 174 MHz	A first-come, first served licensing process shall be employed for the assignment of available spectrum. A competitive licensing process is not warranted at this time.
450 – 470 MHz	A first-come, first served licensing process shall be employed for the assignment of available spectrum. A competitive licensing process is not warranted at this time.
806 – 824 MHz 849 – 869 MHz	A first-come, first served licensing process shall be employed for the assignment of available spectrum. A competitive licensing process is not warranted at this time.

1. Introduction

In Trinidad and Tobago the demand for new land mobile systems has decreased especially due to the emergence of cellular technology and broadband services for voice and data applications. However, the use of land mobile radiocommunications systems continues mainly in the energy sector due to advantageous features such as durability, relatively low cost, low maintenance and intrinsically safe radios. In countries such as the USA and Canada, the demand for this service has grown resulting in the need to implement, appropriate regulation and more advanced technologies to improve spectrum efficiency and availability. This growth was due to the increase in demand for wireless services for an increasing number of industries and users that understood the value of such services to their businesses.

While Trinidad and Tobago does not share the same issues of congestion and spectrum constraints in the land mobile bands as the USA and Canada, there is need for a review of the existing spectrum assignment channel plan. This is necessary to efficiently manage the spectrum and ensure it takes into consideration the changing international landscape for land mobile radiocommunications systems in the UHF and VHF bands.

This document is a subset of the National Spectrum Plan and should be considered as part of the entire National Spectrum Plan. The National Spectrum Plan provides a framework to regulate the efficient use of spectrum, in an orderly manner, in accordance with the Authority's mandate.

2. Objectives

The objectives of this Spectrum Plan are to:

1. Identify the frequency ranges which will be allocated to the provision of land mobile radiocommunication systems, with consideration of all stakeholders.

2. Indicate the licensing strategy to be implemented for the allocated frequency ranges, including any specific licensing conditions;

3. Specify the maximum technical operating conditions and specifications to be imposed on the licensed radiocommunication systems in the allocated frequency ranges.

3. Review Cycle

This document will be modified periodically to meet changing and unforeseen circumstances. The Authority will review and modify this Spectrum Plan as necessary and in consultation with stakeholders to ensure that the plan is guided by appropriate policy guidelines and objectives.

Comments regarding the maintenance of this spectrum plan should be submitted on or before Monday 22nd August 2011 to technical@tatt.org.tt or mailed to:

Telecommunications Authority of Trinidad and Tobago
#5, Eighth Avenue Extension, off Twelfth Street,
Barataria.

4. The Consultation Process

The Authority will seek, in accordance with its "Procedures for Consultation in the Telecommunications Sector of Trinidad and Tobago" (on the Authority's website: www.tatt.org.tt), the views of industry stakeholders on the first draft of this document. The document will be revised with considerations given to the comments and recommendations made during the consultation process.

5. Other Relevant Documents

In addition to the National Spectrum Plan, other relevant policies, plans and regulations prepared by the Authority that should be read in addition to the Spectrum Plan for the Accommodation of Land Mobile Radiocommunications Systems include the following:

- Authorization Framework for the Telecommunications and Broadcasting Sectors in Trinidad and Tobago;
- Spectrum Management Policy (Draft);
- Recommendations for Radio Spectrum Regulations;
- Trinidad and Tobago Frequency Allocation Table (9 kHz – 1000 GHz);
- Fee Structure for Concessions and Licences for the Provision of Telecommunications and Broadcasting Resources (network and/or service) in Trinidad and Tobago (Fee Methodology); and
- Telecommunications (Fees) Regulations.

6. Summary of Frequency Ranges

In order to comprehensively allocate and plan the use of the frequency bands as specified in Table 2, the following information was considered by the Authority:

1. The frequency bands allocated to the Land Mobile Service, in accordance with *the International Telecommunications Union, Radiocommunications Bureau (ITU-R) Region 2 Table of Frequency Allocations* and *the Trinidad and Tobago Frequency Allocation Table (TTFAT);*

2. The spectrum used by land mobile radiocommunication systems presently licensed in Trinidad and Tobago and other findings from the Land Mobile Spectrum Audits conducted by the Authority;

3. The general direction of other Regulators with respect to land mobile radiocommunication systems.

4. The availability of spectrum in Trinidad and Tobago to accommodate land mobile radiocommunication systems.

5. The appropriate licensing method for the assignment of spectrum to users.

6. The Trinidad and Tobago land mobile market and sector interests.

Table 2: Summary of the frequency ranges for Land Mobile Systems which can be considered for licensing in the Republic of Trinidad and Tobago

Type of Land Mobile Service	Frequency Range of Operation	Trinidad and Tobago Frequency Allocation Table	Current Spectrum Availability
Conventional Land Mobile Service/Trunked Systems	138– 174 MHz	The radiocommunication services allocated to this band are Fixed Services and Mobile Services on a co-primary basis, which follows from the ITU Region 2 Table of Frequency Allocations. However, there are TT footnotes which sub-allocate various frequency bands in this range for Maritime distress calling. These are (156.4875-156.5125 MHz and 156.5375-156.5625 MHz)	According spectrum audits conducted in July 2010 the spectrum usage was 70%
Conventional Land Mobile Service/Trunked Systems	450– 460 MHz	The radiocommunication services allocated to this band are Fixed Services and Mobile Services on a co-primary basis, which follows from the ITU Region 2 Table of Frequency Allocations. However, there are TT footnotes which sub-allocates various frequencies bands in this range for other radiocommunication services, such as telemetry and control (e.g. SCADA systems), medical radiocommunications systems, Radio Studio-to-Transmitter Links, Outside Broadcast stations, Family Radio Services and General Mobile Radio Services. The frequencies 457.525 MHz, 457.550 MHz, 457.575 MHz, 467.525 MHz, 467.550 MHz and 467.575 MHz may be used by on-board communication stations. Where needed, equipment designed for 12.5 kHz channel spacing may use also the additional frequencies 457.5375 MHz, 457.5625 MHz, 467.5375 MHz and 467.5625 MHz.	According to the spectrum audits conducted in July 2010 the spectrum usage was 15%.
Supervisory Control and Data Acquisition (SCADA)	460-470MHz		
Trunked Land Mobile Service	806-824 MHz 849-869 MHz	The radiocommunication services allocated to this band are Fixed Mobile Services on a co-primary basis, which follows from the ITU Region 2 Table of Frequency Allocations. However, there is a TT footnote which sub-allocates 849-851 MHz and	According to the spectrum audits conducted in July the spectrum usage was 12%.

Type of Land Mobile Service	Frequency Range of Operation	Trinidad and Tobago Frequency Allocation Table	Current Spectrum Availability
		894-896 MHz for future services to the aeronautical mobile service on a primary basis, for public correspondence with aircraft.	

7. Frequency Assignment Principles

The following principles apply to the frequency assignment plans developed for the accommodation of land mobile systems in Trinidad and Tobago:

1. The frequency assignment plan for the land mobile band shall follow the relevant ITU-R recommendation and take into consideration the existing Frequency Assignment Plan utilized for land mobile systems currently operating in Trinidad and Tobago.

2. Channel bandwidths of 25 kHz and 12.5 kHz shall be assigned for all new radiocommunications systems. All existing systems will be allowed to operate, providing that they conform to multiples of 12.5 kHz frequency bandwidth and other technical conditions for that band. The exceptions to these conditions are the 30 kHz assignments.

3. Frequency assignments shall be made in accordance with the appropriate licensing process, as established by the Authority.

4. A frequency assignment plan shall be used for the assignment of a single frequency channel, for a simplex mode of operation, or a frequency pair (i.e. an upper and a lower frequency channel separated by a duplex spacing) for a duplex mode of operation.

5. Spectrum Licences shall be granted for the assignment of a frequency channel or channel pair. Station licensing of a frequency channel or channel pair and frequency re-use shall be considered when the spectrum utilization in the specified band exceeds spectrum availability in that band.

8. Frequency Assignment Plans for Land Mobile Radiocommunications Systems

The frequency assignment plans for the land mobile radiocomunication systems are aimed at maximizing the efficient use of the allocated spectrum and promoting the re-use of assigned frequencies. The various frequency bands allocated for the accommodation of land mobile radiocommunications systems can be further sub-divided into frequency channel assignments, in accordance with the principles outlined in section 7.

The following sub-sections illustrate, for each of the frequency ranges, the frequency assignment plan, the recommended licensing process and conditions, the technical operating conditions and specifications for the radiocommunications systems operating in the stated frequency band.

8.1 138 – 174 MHz Band

8.1.1 Frequency Assignment Plan

8.1.1.1 In the 138-174 MHz band the frequency ranges to be used for land mobile systems are:

- 138-144 MHz
- 148-149.9 MHz
- 150.05-156.025 MHz
- 157.425-161.500 MHz
- 162.025- 174 MHz

8.1.1.2 The ranges between the land mobile frequencies are assigned as follows:

- 144-148 MHz to the amateur radio service.
- 149.9-150.05 MHz to the mobile satellite service.
- 156.025-157.425 MHz and 161.500 – 162.025 MHz to the maritime radio service.

8.1.1.3 The radiocommunications systems in this range are presently conventional land mobile systems with assignments of 25 kHz bandwidth and fewer 12.5 kHz bandwidth assignments. The systems in this band can operate in a simplex mode or full duplex mode, with the use of a base (repeater) station, with a duplex separation up to 5 MHz between transmit and receive frequencies.

8.1.1.4 Land mobile systems based on a 25 kHz bandwidth channel assignment plan would be allowed to continue operation, until such time as the frequencies used are required for assignment or whenever the licensees choose to change their radio equipment that operate on those frequencies.

8.1.1.5 Land mobile systems which were licenced based on a 30 kHz bandwidth channel assignment plan would be allowed to continue operation, until such time as the frequencies used are required for 12.5 kHz channel assignments or whenever the licensees choose to change their radio equipment that operate on those frequencies.

8.1.1.6 The Authority shall consult with licensees, who are currently licensed to operate in this band in the development of a migration plan. The Authority will undertake a migration process only when it is deemed necessary.

8.1.1.7 Frequency assignments will begin 50 kHz above the lower band edge for the 25 kHz and 12.5 kHz channel spacing plans. The total spectrum in this band will be divided into three blocks of spectrum, block A, B and C resulting in 2354 12.5 kHz channels.

In view of the above, the frequency assignment plan for Block A (138-144 MHz), which sums to 7.9 MHz, shall be as follows:

Frequency range 138-144 MHz with upper and lower guard bands of 50 kHz

$$f_m = 138.05 + (n-1)*(0.0125) \text{ where } n = 1 \text{ to } 473$$

Frequency range 148-149.9 MHz with upper and lower guard bands of 50 kHz

$$f_n = 148.05 + (n-1)*(0.0125) \text{ where } n = 1 \text{ to } 145$$

Frequency range 138-144 MHz shall be used for duplex assignments with a duplex spacing of 5 MHz. Frequency range 148-149.9 MHz shall be used for simplex assignments in addition to frequencies from the previous range which cannot be assigned for duplex operation.

The frequency assignment plan for Block B, 10.05 MHz, shall be as follows:

Frequency range 150.05-156.025 MHz with upper and lower guard bands of 50 kHz

$f_o = 150.1 + (n-1)*(0.0125)$ *where* $n = 1$ *to* 471

Frequency range 157.425-161.500 MHz with upper and lower guard bands of 50 kHz

$f_p = 157.475 + (n-1)*(0.0125)$ *where* $n = 1$ *to* 319

Both Frequency ranges shall be used for duplex assignments with a duplex spacing of 5 MHz. Frequencies that cannot be assigned for duplex operation can be assigned for simplex operation

The frequency assignment plan for Block C, 11.975 MHz, shall be as follows:

Frequency range 162.025-174 MHz with upper and lower guard bands of 50 kHz

$f_q = 162.075 + (n-1)*(0.0125)$ *where* $n = 1$ *to* 951

This range shall be used for duplex assignments with a duplex spacing of 5 MHz. Frequencies that cannot be assigned for duplex operation can be assigned for simplex operation.

NOTE: In the event that a duplex assignment has to be used for simplex operation, both duplex frequencies shall be assigned as simplex assignments.

8.1.2 Recommended Licensing Process and Conditions

8.1.2.1 The Authority shall develop a Frequency Channel Plan in accordance with the formula stated above.

8.1.2.2 The licensing of all new land mobile radiocommunication systems shall be done in accordance with the Frequency Channel Plan.

8.1.2.3 Any incumbent licensee that does not conform to the proposed frequency assignment plan shall be allowed to continue operation until such time that the Authority deems it necessary for them to align to this plan. The Authority shall consult with such licensees, in the development of a migration plan to effect this alignment.

8.1.2.4 The licensing of a frequency channel or channel pair shall be on a first come, first served basis, via the licence application process as established by the Authority.

8.1.2.5 The use of this band is intended for private and closed user groups only. No public telecommunications network and services shall have access to this spectrum.

8.13 Technical Operating Conditions and Specifications

All licensed land mobile radiocommunications systems shall not exceed the maximum technical operating conditions and specifications identified in the following table.

Table 3: Maximum Technical Operating Specifications for Land Mobile Systems

Parameter	Maximum Value	Comments
Mobile Stations Maximum RF Output Power of Transmitter	25 W	The ERP designed for and used by a system shall be the minimum amount necessary to effect a balanced radio system (i.e. employing mobile talk-back coverage), but shall under no circumstances exceed the maximum output power of 25 W.
Portable Stations (hand held) Maximum RF Output Power of Transmitter	5 W	Under no circumstances shall the portable stations exceed the maximum output power of 5 W.
Fixed Stations Maximum RF Output Power of Transmitter	100 W	The ERP designed for and used by a system shall be the minimum amount necessary to effect a balanced radio system (i.e. employing mobile talk-back coverage), but shall under no circumstances exceed the maximum output power of 100 W.
Base (Repeater)Station Maximum RF Output Power of Transmitter	100 W	The ERP designed for and used by a system shall be the minimum amount necessary to effect a balanced radio system (i.e. employing mobile talk-back coverage), but shall under no circumstances exceed the maximum output power of 100 W.

NOTE: The output powers mentioned above are maximum limits for different types of stations, notwithstanding this, the power employed by license radiocommunication systems shall be determined by the Authority based on the application submitted taking into consideration factors such as coverage etc.

Notwithstanding the parameters identified in the Table above, amended or additional technical operating conditions may be instituted and identified in the respective schedule of the licence document for the specific radiocommunications system deployed, for example, antenna polarization and emission limits.

8.2 450 - 470 MHz Band

8.2.1 Frequency Assignment Plan

8.2.1.1 The systems in this range are presently conventional land mobile systems with assignments of 25 kHz bandwidth and fewer 12.5 kHz bandwidth assignments. The systems in this band can operate in a simplex mode or full duplex mode with a duplex spacing, between upper and lower frequency channels, up to 5 MHz. In this band land mobile systems will be licenced within the ranges 450-460 MHz.

8.2.1.2 Land mobile systems based on a 25 kHz bandwidth channel assignment plan would be allowed to continue operation, until such time that the frequencies used are required for 12.5 kHz channel assignments or whenever the licensee chooses to change their radio equipment that operate on those frequencies.

8.2.1.3 Land mobile systems which were licenced based on a 30 kHz bandwidth channel assignment plan would be allowed to continue operation, until such time as the frequencies used are required for 12.5 kHz channel assignments or whenever the licensees choose to change their radio equipment that operate on those frequencies.

8.2.1.4 This frequency band shall be used by radiocommunications systems, in the deployment of narrowband access networks such as Supervisory Control and Data Acquisition (SCADA) and Control and Telemetry between the ranges 460-470 MHz.

8.2.1.5 Preference shall be given to the assignment of frequencies within the range 460-470 MHz for SCADA radiocommunication systems. Notwithstanding this, land mobile assignments can be made in this range in the event that additional spectrum is required in the 450- 470 MHz band.

8.2.1.6 It is recognized that presently, there exists studio to transmitter links (STLs) and Outside Broadcast (OB) links in this band, other than those used for broadcast auxiliary services. These incumbent point-to-point links shall be allowed to continue operation until such time that the frequencies used are required for assignment.

8.2.1.7 In the maritime mobile service the following frequencies shall be reserved for on board communication services; 457.525 MHz, 477.550 MHz, 457.575 MHz, 467.525 MHz, 467.550 MHz, 467.775 MHz . The 457.5375MHz, 457.5625MHz, 467.5375MHz and 467.5625MHz shall be reserved for on board communication services utilizing equipment designed for 12.5 kHz channel spacing.

8.2.1.8 The Authority shall consult with licensees, who are currently licensed to operate in this band in the development of a migration plan. The Authority will undertake a migration process only when it is deemed necessary.

8.2.1.9 Frequency assignments will begin 50 kHz above the lower band edge for the 25 kHz and 12.5 kHz channel spacing plans. Channels will start at 450.05 MHz and are spaced 12.5 kHz across. The 10 MHz of spectrum will result in a total of 792 12.5 kHz bandwidth channels. This channel plan will accommodate the existing 25 MHz channel assignments.

In view of the above, the frequency assignment plan formula shall be as follows:

Frequency range 450-460 MHz with upper and lower guard bands of 50 kHz

$f_r = 450.05 + (n-1)*(0.0125)$ *where n= 1 to 793*

Frequency range 460-470 MHz with upper and lower guard bands of 50 kHz

$f_s = 460.05 + (n-1)*(0.0125)$ *where n= 1 to 793*

These ranges shall be used for duplex assignments with a duplex spacing of 5 MHz. Frequencies that cannot be assigned for duplex operation can be assigned for simplex operation.

NOTE: In the event that a duplex assignment has to be used for simplex operation, both duplex frequencies shall be assigned as simplex assignments.

8.2.2 Recommended Licensing Process and Conditions

8.2.2.1 The Authority shall develop a Frequency Channel Plan in accordance with the formula stated above.

8.2.2.2 The Licensing of all new land mobile radiocommunication sytems shall be done in accordance with the Frequency Channel Plan.

8.2.2.3 Any incumbent licensee that does not conform to the proposed frequency assignment plan shall be allowed to continue operation until such time that the Authority deems it necessary for them to align to this plan. The Authority shall consult with such licensees, in the development of a migration plan to effect this alignment.

8.2.2.4 The licensing of a frequency channel or channel pair shall be on a first come, first served basis, via the licence application process as established by the Authority.

8.2.2.5 The use of this band is intended for private and close user groups only. No public telecommunications network and services shall have access to this spectrum.

8.2.3 Technical Operating Conditions and Specifications

All licensed land mobile radiocommunications systems shall not exceed the maximum technical operating conditions and specifications identified in the following table.

Table 4: Maximum Technical Operating Specifications for Land Mobile Systems

Parameter	Maximum Value	Comments
Mobile Stations Maximum RF Output Power of Transmitter	25 W	The ERP designed for and used by a system shall be the minimum amount necessary to effect a balanced radio system (mobile talk-back capability), but shall under no circumstances exceed the maximum output power of 25 W.
Portable Stations (hand held) Maximum RF Output Power of Transmitter	5W	Under no circumstances shall the portable stations exceed the maximum output power of 5 W.
Fixed Stations Maximum RF Output Power of Transmitter	100 W	The ERP designed for and used by a system shall be the minimum amount necessary to effect a balanced radio system (mobile talk-back capability), but shall under no circumstances exceed the maximum output power of 100 W.
Base (Repeater) Station Maximum RF Output Power of Transmitter	100 W	The ERP designed for and used by a system shall be the minimum amount necessary to effect a balanced radio system (mobile talk-back capability), but shall under no circumstances exceed the maximum output power of 100 W.

NOTE: The output powers mentioned above are maximum limits for different types of stations, notwithstanding this, the power employed by license radiocommunication systems shall be determined by the Authority based on the application submitted taking into consideration factors such as coverage etc.

Notwithstanding the parameters identified in the Table above, amended or additional technical operating conditions may be instituted and identified in the respective schedule of the licence document

for the specific radiocommunications system deployed, for example, antenna polarization and emission limits.

8.3 806 – 824 MHz and 849-869 MHz Band

8.3.1 Frequency Assignment Plan

8.3.1.1 The systems in this range are presently trunked land mobile systems with assignments of 25 kHz bandwidth and fewer 12.5 kHz bandwidth assignments. The systems in this band can operate in full duplex mode where the Go frequency is in the range 806-824 MHz and the Return frequency is in the range 849-869 MHz.

8.3.1.2 Land mobile systems based on a 25 kHz bandwidth channel assignment plan would be allowed to continue operation, until such time that the frequencies used are required for 12.5kHz channel assignments or whenever the licensee chooses to change their radio equipment that operate on those frequencies.

8.3.1.3 The Authority shall consult with licensees, who are currently licensed to operate in this band in the development of a migration plan. The Authority will undertake a migration process only when it is deemed necessary.

8.3.1.4 Supervisory Control and Data Acquisition (SCADA) and Control and Telemetry systems will not be authorised in these ranges.

8.3.1.5 Within the 806 – 824 MHz frequency range there will be an upper and lower guard band of 50kHz.The channel assignments will start at 806.05 MHz and are spaced 12.5 kHz apart. This channel plan will accommodate the 25 MHz channel assignments.

8.3.1.6 Within the 849 – 869 MHz frequency range there will be an upper and lower guard band of 50kHz.The channel assignments will start at 849.05 MHz and are spaced 12.5 kHz apart. This channel plan will accommodate the 25 MHz channel assignments.

In view of the above, the frequency corresponding to the channel number can be determined by the following formula, where n is the channel number:

f_t= 806.05+ (n-1)*(0.0125) where n= 1 to 1433

f_u= 849.05+ (n-1)*(0.0125) where n= 1 to 1593

These ranges shall be used for duplex assignments with a duplex spacing of 5 MHz. Frequencies that cannot be assigned for duplex operation can be assigned for simplex operation.

8.3.2 Recommended Licensing Process and Conditions

8.3.2.1 The Authority shall licence a frequency channel pair in accordance with the frequency assignment plan formula stated above.

8.3.2.2 The licensing of all new land mobile radiocommunication systems shall be done in accordance with the Frequency Channel Plan.

8.3.2.3 Any incumbent licensee that does not conform to the proposed frequency assignment plan shall be allowed to continue operation until such time that the Authority deems it necessary for them to align to this plan. The Authority shall

consult with such licensees, in the development of a migration plan to effect this alignment.

8.3.2.4 The licensing of a channel pair shall be on a first come, first served basis, via the licence application process as established by the Authority.

8.3.2.5 The use of this band is intended for private and closed user groups only. No public telecommunications network and services shall have access to this spectrum.

8.3.3 Technical Operating Conditions and Specifications

All licensed land mobile radiocommunications systems shall not exceed the maximum technical operating conditions and specifications identified in the following table.

Table 5: Maximum Technical Operating Specifications for Land Mobile Systems

Parameter	Maximum Value	Comments
Mobile Stations Maximum RF Output Power of Transmitter	25 W	The ERP designed for and used by a system shall be the minimum amount necessary to effect a balanced radio system (mobile talk-back capability), but shall under no circumstances exceed the maximum output power of 25 W.
Portable Stations (hand held) Maximum RF Output Power of Transmitter	5W	Under no circumstances shall the portable stations exceed the maximum output power of 5 W.
Fixed Stations Maximum RF Output Power of Transmitter	100 W	The ERP designed for and used by a system shall be the minimum amount necessary to effect a balanced radio system (mobile talk-back capability), but shall under no circumstances exceed the maximum output power of 100 W.

Parameter	Maximum Value	Comments
Base (Repeater) Station Maximum RF Output Power of Transmitter	100 W	The ERP designed for and used by a system shall be the minimum amount necessary to effect a balanced radio system (mobile talk-back capability), but shall under no circumstances exceed the maximum output power of 100 W.

NOTE: The output powers mentioned above are maximum limits for different types of stations, notwithstanding this, the power employed by license radiocommunication systems shall be determined by the Authority based on the application submitted taking into consideration factors such as coverage etc.

Notwithstanding the parameters identified in the Table above, amended or additional technical operating conditions may be instituted and identified in the respective schedule of the licence document for the specific radiocommunications system deployed, for example, antenna polarization and emission limits.