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RADIO LICENCE POLICY RULES

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Disclaimer

This document outlines the policy rules that the Chief Executive of the Ministry of Economic Development may consider when granting (or declining) a Radio Licence when presented with an application under Regulation 8 of the Radiocommunications Regulations 2001 (the Regulations). The application must also meet the requirements of the Radiocommunications Act 1989 and its amendments (“The Act”).

The Licensee, being the entity to hold a radio licence and Approved Persons¹, being Approved Radio Engineers and Approved Radio Certifiers, are required to comply with these rules when applying for the granting of radio licences.

These rules will be amended from time to time to reflect evolving policies, technologies and services. It is the responsibility of the Licensee and Approved Persons to ensure that they are familiar with the latest edition of these rules as published on <http://www.rsm.govt.nz/cms>. Changes to this document will be notified through the Ministry of Economic Development ‘Business Update’ publication that is emailed to licence holders, Approved Radio Engineers, Approved Radio Certifiers and other radio industry participants, and also in the Latest News section on the welcome page. Further information can be found at <http://www.rsm.govt.nz/cms>.

No liability is or will be accepted by the Ministry, or its officers, servants or agents for any loss suffered, whether arising directly or indirectly, due to sole reliance on the accuracy or contents of these rules.

The Ministry welcomes any suggestions for improvement, or advice relating to inaccuracies or ambiguity in this document. These can be emailed to radiospectrum@med.govt.nz.

Amendment history		
Date of effect	Issue	Description of amendment
March 2011	1	First Public Release

¹ In the context of this document Approved Persons are Authorised Persons

1. General

1.1 Purpose

Radio licences are granted under the Radiocommunications Regulations 2001 in frequency bands that are not subject to Management Rights. Such licences must comply with a range of policy and technical requirements.

This document prescribes the policy rules that an application for a Radio Licence must comply with before it will be granted by the Chief Executive and entered into the Register of Radio Frequencies. These rules, which also apply to amendments to radio licences, complement the technical rules prescribed in the 'Radio Licensing Certification Rules' (PIB 38) publication.

These rules:

1. Include discussion of regulatory matters, but do not purport to provide legal advice on the Radiocommunications Act 1989 (the Act) or the Radiocommunications Regulations 2001 (the Regulations). Readers should take independent legal advice on interpretation of legislation.
2. Must be read in conjunction with PIB 38, and other Public Information Brochures (PIBs) and information² published on the Ministry website <http://www.rsm.govt.nz/>.
3. Do not include all the knowledge and expertise that applicants or approved persons (Approved Radio Engineers and Approved Radio Certifiers) need to have for the preparation of licence applications. They are intended, however, to provide key principles and information to assist the correct completion of applications.

1.2 Procedure

Before a licence will be granted:

- The application must meet the requirements of these rules and be certified by an Approved Person, being an Approved Radio Engineer or Approved Radio Certifier, in accordance with PIB 38.
- The annual fees must be paid for the balance of the current year.

² Should there appear to be a conflict between these rules and other PIB's or Ministry publications, please email rsmlicensing@med.govt.nz.

1.3 Terminology

The Act	The Radiocommunications Act 1989
The Regulations	The Radiocommunications Regulations 2001
ALMR	Analogue Land Mobile Radio
Approved Person	ARC or ARE
ARC	Approved Radio Certifier
ARE	Approved Radio Engineer
CTCSS	Continuous Tone Control Squelch System
DLMR	Digital Land Mobile Radio
ES	Emergency Services
GURL	General User Radio Licence
LMR	Land Mobile Radio
PSRFMG	Public Safety Radio Frequency Management Group
RSM	Radio Spectrum Management
RRF	Register of Radio Frequencies
SCADA	Supervisory Control And Data Acquisition
SMART	Spectrum Management And Registration Technology, is the online system that incorporates the RRF
SRD	Short Range Device

Frequency bands (in frequency order)

MF	Medium Frequency (0.3 – 3 MHz)
HF	High Frequency (3 – 30 MHz)
VHF	Very High Frequency (30 – 300 MHz)
UHF	Ultra High Frequency (300 – 3,000 MHz)
SHF	Super High Frequency (3,000 – 30,000 MHz)
EHF	Extremely High Frequency (30,000 – 300,000 MHz)

1.4 Equipment Standards

Transmitters operating pursuant to radio licences must comply with technical standards where these are prescribed in notices made under regulation 32 of the Radiocommunications Regulations 2001. The current radio standards notice may be found at <http://www.rsm.govt.nz/cms/importers-and-exporters/suppliers/standards-and-compliance-requirements>.

1.5 Fees

Annual fees (GST inclusive) for radio licences are prescribed in Schedule 6 of the Regulations

Each client (or licensee) has an anniversary date at the end of the month when their annual licence fees are invoiced.

1.5.1 Fees for Fixed Term Licences

The fees for fixed term (or short term) radio licences are set in proportion to the number of months of the licence period, rounded up to whole months. (E.g. for the period from February 25 to March 24 is one month, whereas to March 25 would be two months, i.e. two-twelfths of the annual fee.)

All fees for fixed term licences must be paid prior to the commencement of transmission.

1.6 Licensing Multi-Carrier Systems

Licences are generally required on a per transmitter basis where:

- the spectrum is not channelled to a specific plan; or
- the usage is not aligned to the approved plan for the band

Systems using orthogonal frequency-division multiplex modulation (OFDM), such as digital terrestrial television (DVB-T), fourth generation cellular mobile (LTE) or WiMAX, are each considered to be a single system, and require only one licence per transmitter.

1.7 Dispensations

These rules must be followed by licensees and Approved Persons, however on occasion due to special circumstances dispensation for minor variation from the rules may be considered by Radio Spectrum Management (RSM). Requests for dispensations must be justified in writing to RSM. In turn, the Approved Person must upload the dispensation document received from RSM to the licence 'Event Summary' in SMART.

1.8 Geographic Coordinates

The mapping system used by the Ministry is New Zealand Topo50 (NZTopo50) and New Zealand Transverse Mercator 2000 (NZTM2000). NZTopo50 and NZTM2000 are the primary geographic coordinate system used to describe site locations within SMART. They use geodetic datum NZDG2000 that is based on the international standard reference WGS84 used by systems such as GPS.

When providing RSM with the details of new sites to be added to the SMART database, the geographic coordinate data must be given in either TOPO50 or NZTM2000 format as illustrated below.

Table 1 – Example of geographic coordinate data to be provided when requesting a new location in SMART

Site name: WINDY POINT				
Georeference	Map	Easting	Northing	Height
TOPO50	BZ12	952.88	827.18	543 m
NZTM2000		1295288 mE	5082718 mN	543 m

Geographic coordinates must not be provided as latitude and longitude.

Although site geographic data is only accepted in TOPO50 or NZTM2000 coordinates, SMART will internally convert this location data to other formats for output. The following table illustrates the output formats available from SMART.

Table 2 – Example of geographic coordinate output data available in SMART

Georeference	Map	Easting	Northing	Height
TOPO50	BZ12	952.88	827.18	543 m
NZTM2000		1295288 mE	5082718 mN	543 m
LAT/LONG (NZGD2000/WGS84)		169.1772278	-44.3448088	543 m
NZMS260	F39	052.87	444.02	543 m
NZMG (LONG REF)		2205288 mE	5644402 mN	543 m
LAT/LONG (NZGD1949)		169.1771489	-44.3464625	543 m

Note in the above example, that the two LAT/LONG references show different values. This is because NZGD2000/WGS84 and NZGD1949 use different datums. LAT/LONG is not acceptable as an input format to avoid uncertainty as to the datum used.

2. Common Rules for all services

2.1 Fixed Term licences

2.1.1 Conventional Fixed Term Licences

Applications that conform to current band plans and the relevant rules (such as this document and PIB 38) may apply for a fixed-term radio licence where there is an expiry date. Please note that some categories of licences may require an expiry date such as crane control and bush winch simplex (see section 3.15.3)

2.1.2 Non-Conventional Fixed Term Licences

Applications that do not conform to current band plans or the relevant rules are generally not permitted or granted. However on occasion, RSM may consider a dispensation for a fixed term licence for a non renewable period up to one year in accordance with section 1.7. Dispensations are considered for licences facilitating:

- special events; and,
- tests and demonstrations.

Radio Spectrum Management will decide any appropriate conditions of the licence. Approved Person creating the licence must upload the consent received from RSM; to the event summary of the licence in SMART.

2.2 Use or Lose

'Use or lose' applies in accordance with Regulation 15C.

2.3 International Co-ordination

Some services in some frequency bands, notably those below 30 MHz and those used by satellite services must be coordinated by RSM in accordance with New Zealand's international treaty obligations.

This requirement may delay the processing of licence applications.

2.4 Licence Agencies

Prior to granting licences in certain frequency bands, RSM may seek advice and recommendations from a range of organisations with either specific statutory responsibilities, or particular knowledge and expertise. These are known as Licensing Agencies (LA's). The most common LA's are:

CAA	Civil Aviation Authority
MNZ	Maritime New Zealand
RNZCF	Royal New Zealand Coastguard Federation
NZART	New Zealand Association of Radio Transmitters
PSRFMG	Public Safety Radio Frequency Management Group
NZDF	New Zealand Defence Force

2.4.1 Licence Agency Recommendation

When a licence application relates to a band subject to the LA procedure, SMART automatically sends the application to the relevant LA for approval, prior to the application being referred to an Approved Person for certification.

LA recommendations are normally accepted, although RSM ultimately exercises the authority to grant or reject any radio licence application.

The following table summarises LA and certification roles.

Table 3 – Licensing agency approval and who can certify

Service	System		Licensing Agency approval required	Who can certify
Aeronautical	Beacon	Marker	CAA	RSM
		VOR	CAA	RSM
	Land	<30 MHz	CAA	RSM
		≥30 MHz	CAA	All
	Mobile	<30 MHz	CAA	RSM
		≥30 MHz	CAA	All
	Radionavigation	ILS		RSM
		Radar		RSM
Amateur	Beacon		NZART	All
	Fixed		NZART	All
	Repeater		NZART	All
Defence	230-328.6 MHz & 335.4-399.9 MHz		NZDF	NZDF
Fixed	Point to point	<30 MHz		RSM
		≥30 MHz		All
	Point to multipoint			All
	TVOB			RSM

Service	System		Licensing Agency approval required	Who can certify
Land mobile	Repeater	<30 MHz		RSM
		≥30 MHz		All
		ES bands	PSFRMG	All
	Simplex	<30 MHz		RSM
		≥30 MHz		All
		ES bands	PSFRMG	All
	Paging			All
	Citizen band / PRS			All
Maritime	Beacon		MNZ	RSM
	Coast	<30 MHz	MNZ	RSM
		≥30 MHz	MNZ	All
	Mobile		MNZ	All
	Radionavigation		MNZ	RSM
	Repeater	VHF MM80 – MM88	RNZCF	All
		Other VHF channels	MNZ	All
Meteorological Aid	Radar			RSM
Radiodetermination				RSM

Service	System		Licensing Agency approval required	Who can certify
Satellite	Fixed			All
	Receive Protection			All
	VSAT/SNG			All
	Mobile			RSM

2.5 Authorising Others to Use a Licence

Licensees may authorise other persons to operate pursuant to their licence in accordance with an agreement made under regulation 13. A copy of such agreements should be uploaded to the licence Events Summary in SMART.

2.6 Cross-Band Linking

Cross-band linking generally refers to the practice of transmitting on a frequency in one service, while receiving on a different frequency in another service – rather than in accordance with the channel pairs as defined in ‘Mobile Service Band in New Zealand’ (PIB 23).

- Cross band linking cannot be licensed and protected.
- Cross band linking is not permitted between the following services:
 - Land Mobile and Aeronautical; and
 - Land Mobile and Maritime.

3. Land Mobile Service

3.1 Land Mobile Radio

The VHF and UHF bands available to Land Mobile Radio (LMR) services are defined in the publication 'Mobile Service Bands in New Zealand' (PIB 23). Licence applications must comply with the channel use restrictions outlined in PIB 23.

Analogue Land Mobile Radio (ALMR) is permitted in all bands. Digital Land Mobile Radio (DLMR) is permitted in some bands.

A transition policy is in place to migrate all voice ALMR to 12.5 kHz or 6.25 kHz channelling. These 12.5 kHz and 6.25 kHz channels can be used for either ALMR or DLMR.

In most LMR bands, new voice ALMR 25 kHz licences are no longer granted. In all bands, 25 kHz voice ALMR licensing will be discontinued from 2015.

3.2 Restricted Channels

PIB 23 restricts certain simplex and duplex channels for use solely by individual organisations or solely for specific uses.

Where the assignment is to a government organisation, the assignment is exclusive to that department or service, and that channel must not be assigned to other organisations. For example if a channel is listed in PIB 23 as a Government Exclusive, then it is exclusive and must not be assigned to another licensee.

3.3 All New Zealand Exclusive Simplex Licences

Other than simplex channels in Emergency Service (ES) bands 'All New Zealand' exclusive simplex licences will only be considered for government agencies on a case by case basis where there is a special need for an exclusive licence.

If allowed, an empty channel in a simplex band must be available. That channel will then become restricted and be listed in PIB 23.

3.4 Multiple Site Licences

Multiple site licences are a particular licence category labelled 'Multiple repeaters on a common channel throughout New Zealand.' This licence category allows a licensee to have a single channel pair and have multiple repeater locations recorded on the licence.

Each multiple-site licence must have recorded on the licence all locations where the channel is to be used. A transmitter can only be used at locations recorded on the licence.

3.5 Allocation Rules for Digital Land Mobile Radio (DLMR)

This section outlines the arrangements for the introduction of digital land mobile radio (DLMR) and the phase out of 25 kHz voice ALMR.

DLMR can be licensed as indicated in the table below; however, 12.5 kHz ALMR may continue in all bands beyond July 2015.

Table 4 – Frequency bands for Land Mobile services

Band	Frequency Range	Channel spacing	Typical Use	Modulation
ESA	75.2-80 MHz	12.5 kHz	Emergency Services	Analogue
A	80-87.5 MHz	12.5 kHz	Commercial	Analogue and Digital
ESB	138-144 MHz	12.5 kHz	Emergency Services	Analogue and Digital
E	150.05-156 MHz	12.5 kHz	Commercial	Analogue ³
EE	162.58125-173 MHz	12.5, 6.25 kHz	Commercial	Analogue and Digital
TD	406.1-420.00625 MHz	12.5, 6.25 kHz	Commercial Trunked Radio only	Analogue and Digital
C	449.75-458.3375 MHz	12.5, 6.25 kHz	Commercial	Analogue and Digital
D	458.3375-470 MHz	12.5, 6.25 kHz	Commercial	Analogue and Digital
F	471.5-494 MHz	12.5, 6.25 kHz	Commercial	Analogue and Digital
ESC	494-502 MHz	12.5, 6.25 kHz	Emergency Services	Analogue and Digital
TS	813-869.025 MHz	25, 12.5, 6.25 kHz	Commercial Trunked Radio only	Analogue and Digital

³ Digital services may be deployed in accordance with section 3.8.

3.6 Offset Bands and Interlaced Band Plans

There are two arrangements for the subdivision of channels in the LMR bands to provide for narrower channelling. These are:

- Interlaced bands
- Offset bands

These are illustrated below.

Interlaced bands

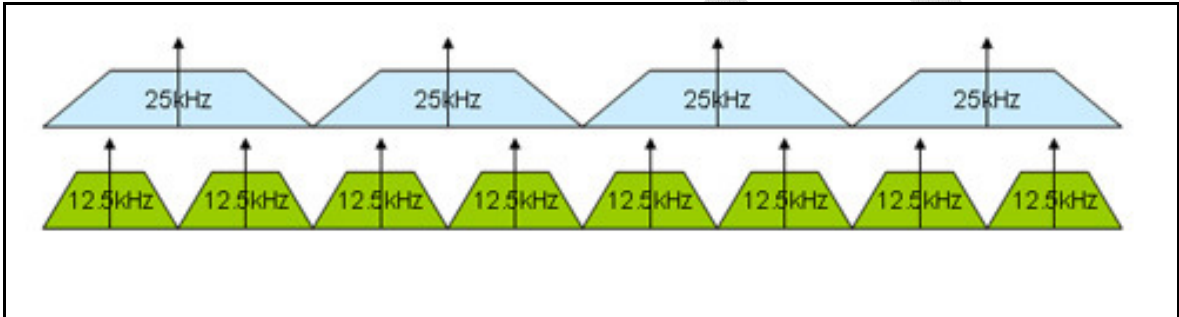


Figure 1 – Interlaced bands showing 25kHz and 12.5kHz channels

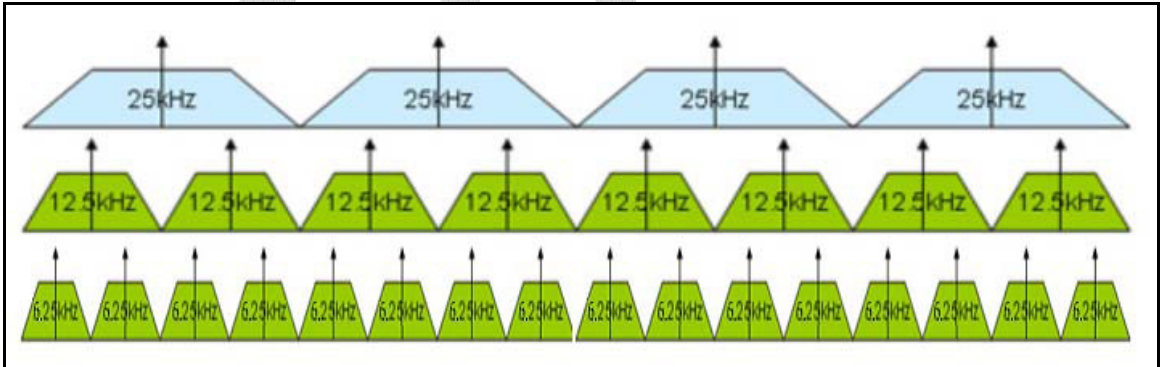


Figure 2 – Interlaced bands including 6.25 kHz channels

Offset bands

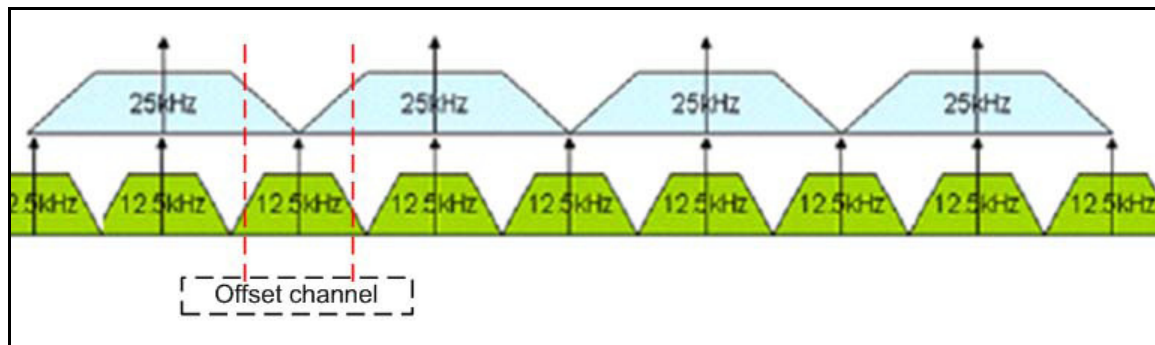


Figure 3 – Offset bands showing 25 kHz and 12.5 KHz channels

The offset design was developed in response to band congestion arising from the use of 25 kHz channels for analogue services. By introducing an underlying offset channel plan for the newer 12.5 kHz analogue channels, greater technical efficiency is achieved by utilising the 'white space' spectrum between emissions from adjacent channels. Because digital emissions tend to spread their power across the entire channel, offset channels can cause adjacent channel interference to the channels they overlap. Hence offset channel plans are not suited to DLMR. Because of these considerations, the rules for interlaced and offset bands differ.

3.7 LMR Bands with Interlaced Band Plans

ALMR licences with channel bandwidths of 25 kHz are no longer granted.

All 25 kHz voice ALMR services must cease operation by 1 November 2015. This period is in accordance with the minimum transition period (five years) specified in 'Security of Tenure for Radio Licences Transitional Plan Guidelines, for giving notice of revocation of a licence of an undefined duration' (PIB 48).

All LMR bands, except E band, may be licensed for digital services designed to operate in 12.5 kHz and 6.25 kHz channels without the need for band migrations, provided the selected technology standards are compatible with existing analogue equipment.

When converting services from 12.5 kHz assignment to two 6.25 kHz channelling, a separate licence is required for each 6.25 kHz transmission. A Time Division Multiple Access (TDMA) transmitter carrying more than one circuit in a 12.5 kHz channel is deemed to be one transmission, and therefore requires only one licence.

3.8 LMR Bands with Offset Band Plans

E band (E, EN, and ENX bands) requires special treatment for the introduction of DLMR to manage potential interference. A licensee of 25 kHz channels in E band wishing to convert to 12.5 kHz DLMR has two options:

1. Migrate to any other band, such as the EE band (which is in a nearby VHF range).
2. Apply for a DLMR licence in EN and ENX bands in areas either where 25 kHz analogue E band users have vacated the band, or when an rigorous engineering analysis shows no risk of interference to other band users.

3.9 Coded Squelch / Unique Addressing

New licences for simplex LMR must use either coded squelch such as CTCSS (in accordance with PIB 23), or unique digital addressing. The Approved Person must include the licence conditions on the licence in accordance with PIB 38.

3.10 SCADA and Data Links in LMR Bands

In the interests of spectrum efficiency, SCADA and data links should use DLMR technology.

SCADA and data links may be licensed in 12.5 kHz LMR channels.

Applications for a dispensation to use 25kHz channels for SCADA and data links must be made in accordance with section 1.7. Factors taken into consideration include extension of existing SCADA systems with significant investment; and necessary data rates.

3.11 Mesh Networks

Licences for Fixed Service Mesh Networks are generally not granted in LMR bands. This is because of the risk of the mesh receivers suffering interference (including receiver overload or blocking) in the wrong receive duplex portion of the band, or mesh transmitters creating spectrum denial to conventional LMR services. This is an inefficient use of paired-frequency channelled LMR bands.

Mesh networks can be licensed in Fixed Service bands, or operate under General User Radio Licences.

3.12 Emergency Services Bands

3.12.1 Bands Exclusive to Emergency Services

Certain bands have been allocated to Emergency Services (ES) in New Zealand. These are known as the ESA Band (75 – 80 MHz), ESB Band (138 – 144 MHz) and ESC Band (494 – 502 MHz).

These bands are allocated for the sole use of the members of the Public Safety Radio Frequency Management Group (PSRFMG).

Composition of the PSRFMG Group

The group currently has representation from:

Ambulance New Zealand
Department of Conservation
Maritime New Zealand
Ministry of Civil Defence and Emergency Management
Ministry of Economic Development (Advisor Status)
New Zealand Customs Service
New Zealand Defence Force
New Zealand Fire Service
New Zealand Police

3.12.2 Licences in the Emergency Services Bands

For the purpose of licence applications in the ES bands, the PSRFMG is an LA in accordance with section 2.4. Generally it is not PSRFMG policy to agree to licences being granted to non-members.

A person who is not a PSRFMG member may operate on ES channels subject to an agreement made under section 2.5 with the relevant channel licensees.

It should be noted that PSRFMG policy presently requires all mobiles operating in the ESB Band to be fitted with PSRFMG liaison channels ES164 and ESX39.

3.12.3 Licence Conditions for Emergency Services

Approved persons are required to use the following conditions on all licences applications for frequencies in the ES Band:

“The licence permits radiocommunication solely for non-commercial public safety and security operations relating to the protection of life and property.”

Licences where the licensee is the Ministry of Civil Defence and Emergency Management must also carry the following additional condition:

“Primary use is for Civil Defence and Emergency Management purposes.”

3.13 Back-to-Back Linking

Back-to-back linking, in regard to an LMR channel, describes the situation where a fixed location receiver tuned to the mobile receive frequency of one channel, is directly connected to a transmitter at the same location tuned to the mobile transmit frequency of another channel. Such configuration will not be licensed or protected because to do so would cause unreasonable spectrum denial on a radio site. Fixed links, or other wired services, must be used to connect repeaters to form wide-area networks.

3.14 Land Mobile Repeaters

LMR repeaters are fixed location installations that consist of a transmitter on one frequency of a two-frequency channel pair (known as the base transmit), and a receiver on the other frequency (known as the mobile transmit). Most repeaters are located at elevated locations to relay communications over a wide area between mobile transceivers (vehicles or portables) operating on the reverse frequencies of the repeater channel configuration. Mobile transceivers can also be connected to a mains power supply at a fixed location.

Land mobile repeaters are used in applications such as analogue voice communications, digital voice communications (in certain bands), data communications such as Supervisory Control And Data Acquisition (SCADA) systems and other control systems.

Repeater Channels

PIB 23 lists the bands and channels available for repeater licences. The base transmit frequency is the same as the mobile receive frequency, and the mobile transmit frequency is the same as the base receive frequency. A typical example:

Base Transmit (TX)		Mobile Transmit (TX)	
Channel	Frequency	Channel	Frequency
A20	81.25 MHz	A20#	85.21875

The mobile transmit frequency is identified by the # symbol.

3.14.1 Duplex Direction

All LMR repeater installations must observe the correct transmit and receive configurations. Other configurations are neither permitted nor protected. In particular, no protection is given to receivers in the mobile transmit portion of the duplex band that are not at the repeater base station location stated on the licence.

3.14.2 Mobile Operating Area

Mobiles are not licensed to operate outside the -95 dBm coverage contour of the licensed base station, because of the potential for interference to other licensed services in the band.

3.14.3 Linear Repeaters

Under some circumstances linear repeaters may be licensed to provide coverage to relatively small areas within primary coverage service areas. Examples include where existing receive signal levels may be compromised by surrounding environmental factors, such as RF “shadowing” due to tall buildings physically blocking the base station’s direct line of sight radio signal path.

From a spectrum management perspective, linear repeaters exhibit several potentially undesirable characteristics. They are liable to transmit other signals in addition to the intended signals being repeated. Linear repeaters may also suffer system overload from exposure to other signals in the neighbouring spectrum, and may generate unwanted intermodulation products. Linear repeaters also have the potential to become unstable if operated with an excessively high system gain and if the output to input coupling factor changes with time.

Given the constraints on system gain, linear repeaters operate with characteristically low margins. This necessitates significantly more stringent interference protection levels than other systems. Linear repeaters must only be used to provide “in-fill” coverage and not to extend the primary coverage area of the land mobile service.

To avoid these problems linear repeaters to provide in-fill coverage must be located, engineered, and operated with caution.

3.15 Simplex

LMR Simplex refers to single frequency simplex (ie one way at a time) communication. It is usually bi-directional but may be uni-directional. At least one transceiver must be mobile, that is, not permanently operated at a fixed location (such as an office).

'VHF and UHF Mobile service bands in New Zealand' (PIB 23) details the bands allocated for Land Mobile simplex use.

Simplex frequencies must not be used to provide 'point-to-point' / 'point-to-multipoint' Fixed Services or be located at fixed locations such as hilltops or where other radio services' (such as land mobile repeaters) operate.

A number of simplex channels in PIB 23 are restricted, meaning that these channels have been reserved for particular purposes and are not available other than for the specified purposes.

Multiple Simplex Channels with Different Emission Designations

Simplex services with different channel widths, and hence different emission designations, must have separate licences for each channel width. For example, if the user of a service with a 25.0 kHz channel width also wishes to operate a 12.5 kHz channel, then a separate licence will be required for the 12.5 kHz channel.

Multiple Simplex Channels with the Same Emission Designations

Where an application uses simplex channels with the same bandwidth and emission designation in a number of separate simplex bands, these may be amalgamated on one licence. Such VHF and UHF simplex bands include AX, ENX, EEX, CNX, DNX and FNX.

Categories of simplex channels

There are three categories of simplex channels:

1. Shared Simplex
2. Exclusive Simplex
3. Crane Control and Bush Winch Simplex

3.15.1 Shared Simplex

Simplex channels that are designated 'General' in PIB 23 are shared simplex channels. These are the most common type of simplex, where channels are shared among multiple users with no interference protection from those other users sharing the channel.

Users of shared simplex can expect to experience some level of degradation at times from other users in the same area.

All shared simplex channels are to be licensed and used for voice transmissions. A limited amount of data is permitted in bursts of no more than 3 seconds duration, and no more frequently than five times per hour. For continuous data there are shared channels designated solely for data in PIB 23.

A shared simplex licence may cover multiple channels at multiple locations using an unlimited number of mobile terminals (sets or transceivers). As with all radio licences, the number of channels should not exceed reasonable needs. Where the number of channels appears excessive, justification may be sought.

3.15.2 Exclusive Simplex

Exclusive simplex channels are only available for Emergency Services administered by government agencies such as; Police, Fire, Defence, Customs, Ministry of Civil Defence and Emergency Management, and Ambulance New Zealand. The decision to allocate an exclusive simplex channel in a commercial (non ES) bands to Emergency Services will be on a case by case basis.

There are historic exclusive simplex assignments for organisations other than government agencies; however, these exclusive licences are no longer granted.

Exclusive simplex channels are only licensed on a single channel per licence basis.

3.15.3 Crane Control and Bush Winch Simplex

Channels and bands for Crane Control and Bush Winch services are designated in 'VHF and UHF Mobile service bands in New Zealand' (PIB 23) and in SMART as restricted channels. Crane Control and Bush Winch licences have particular safety implications and need special care in selection and use.

Crane Control channels are reserved for cranes temporarily operating at discrete fixed locations - typically at construction sites.

Bush Winch channels are reserved for log hauling winches operating at discrete locations, or in defined forest areas.

All Crane Control and Bush Winch licences must be issued as Fixed Term licences with a specific location (point location for crane control. Bush Winch are either point locations or a forest area) and a specific expiry date see PIB 38 for further details.

In the interests of safety, it is extremely important that Crane Control and Bush Winch licence records are accurate.

The Approved Person should communicate these obligations to the licensee, together with instructions that they must re-apply if the location of the crane or winching operation is to be changed.

3.16 Trunked Mobile Radio

3.16.1 Spectrum Efficiency

Trunked radio are spectrally efficient land mobile systems where a few channels can serve a large number of users. Trunked systems are controlled by central computing system that can dynamically allocate users a voice circuit when required.

The TD and TS bands are allocated solely to Trunked Mobile Radio.

To realise the spectrum efficiency in these bands, licences for a Trunked Mobile Radio system must, at each repeater location, have a minimum of:

- three analogue voice channels; or
- digital voice circuits equivalent to three analogue voice channels.

Two simplex bands are restricted for use associated with Trunked Mobile Radio bands:

- Licensing in the TDX Band is restricted to licence holders of a Trunked Mobile Radio system licensed in the TD Band.
- Licences in the TX Band are only available for an operator of a Trunked Mobile Radio system licensed in the TS Band or to users of that system.

3.16.2 Use of Frequency Assignment Block Plan

Trunk mobile channels shall be assigned according to the block plan in PIB 23, unless there is a scarcity of channels. For the purposes of licensing, a scarcity of channels will be deemed to exist in an area when all blocks of channels have licences amounting to at least the minimum (three) number of circuits.

With the exception of areas where a scarcity of channels is deemed to exist under the above criteria, channels can generally be licensed in any area for any individual or organisation.

Every attempt should be made to assign new channels from blocks already used by a licensee in a given area.

4. Fixed Service

The Fixed Service (FS) is defined in the International Radio Regulations (IRR) as a “radiocommunication service between specified fixed points”, and are commonly known as “fixed links”. This covers a wide range of point-to-point and point-to-multipoint radiocommunication systems. The various bands and channels allocated to the Fixed Service are defined in ‘Fixed Service Bands in New Zealand’ (PIB 22).

Fixed Service bands above 1 GHz in New Zealand conform closely to ITU-R Recommendations for channel plans and other technical parameters. These are identified in ‘Radio Licence Certification Rules’ (PIB 38), Table 9, ‘Fixed service frequency bands and antenna requirements’ for Fixed Services. This table also specifies restrictions on usage of particular bands.

Links in the Fixed Service must be engineered to achieve efficient spectrum re-use. Consequently, licences for fixed links must contain detailed parameters of the system so that subsequent licences can be engineered to achieve this efficient re-use of spectrum.

4.1 Common Rules

All ends of FS links must be at the fixed geographical locations stated on the licence.

One licence is required for each transmitter. For example, a bi-directional link requires two licences, one for each transmit end. Similarly, each frequency requires a separate licence. The use of both polarisations on a channel is covered by a single licence.

Bands cannot be split. Each bi-directional link must use the corresponding pair of channels (n and $n\#$) from the channel plan for the band, as described in PIB 22.

The Fixed Service bands are mostly available only for point-to-point use. Point-to-multipoint use is only permitted as defined in PIB 38.

Certain Fixed Service bands are restricted solely to frequency diversity protected “ $n + 1$ bearer” systems, as defined in PIB 38.

4.2 Studio to Transmitter Links

Some bands with wideband channels, typically >50 kHz, and bands in the 400 MHz and 800-900 MHz frequency bands are reserved for uni-directional Studio to Transmitter Links (STLs) carrying sound broadcast programming. PIB 22 details these bands and channels.

In all cases the following rules apply:

1. At least one terminal (end) of an STL licence must have either the transmitter located at the broadcasting studio or the receiver located at a sound broadcasting transmission site.
2. An STL transmitter must not be located at a sound broadcasting transmitter site.
3. In a Defined Metropolitan Area (DMA)⁴, STL links must have the transmitter located at the broadcasting studio and the receiver located at the sound broadcasting transmission site. No intermediate links are permitted.

4.2.1 Specific STL Bands

STL bands: 400 MHz

The 400 MHz bands available for STL use have a limited number of channels and channel bandwidths. Hence, the bands 800 / 900 MHz are preferred for STLs.

The 400 MHz STL bands listed in PIB 22 are restricted for be used for fixed links serving

- AM broadcast sites
- Mono FM broadcast sites, and must only be used over difficult or obstructed paths.

STL band: 915 - 921 MHz

The 915-921 MHz band currently used for STLs will be fully opened to Short Range Devices (SRDs) from 24 December 2015. Consequently no new STL licences or amendments to STL licences are to be made in this band.

Existing STL licensees will not be required to exit the band when it is opened for SRDs in December 2015, but they will have their protection from interference removed at that time.

Licensees in the 915-921 MHz band will therefore need to assess if their STL is in a location that is likely to be at risk of interference from SRDs. If so, they may wish to either obtain a licence in a different STL band (a replacement licence will remain reserved for them for this purpose until December 2016 – further details below), or use a different technology to transport their programme from the studio to the broadcast transmitter (e.g., leased lines, microwave radio, satellite linking).

STL bands: 841 - 851 MHz and 928 - 935 MHz

These bands are in the process of being expanded from the existing 849 - 851 MHz and 929 - 935 MHz allocations.

⁴ DMA's are defined in PIB 38, Appendix B, table 19

The Ministry has prepared channel plans for the additional spectrum. The Ministry is also reserving replacement licences in these bands for existing STLs in the 915 - 921 MHz band. There will be no requirement for a licensee in the 915 - 921 MHz band to take up the replacement licence, or to take up the licence at a particular time. The replacement licence will remain reserved until the end of 2016. However, once a licensee decides to take up a replacement licence, they must cancel their existing licence in the 915 - 921 MHz band.

Once the Ministry has completed the reservation of replacement licences, it will open the additional spectrum at 841-849 MHz for licensing STLs. The Ministry expects to open the band in the second quarter of 2011. The 841 – 845 MHz portion of the band is currently under Crown Management Right 230 expiring 29 October 2012. Upon expiry this band will revert to radio licensing. Up to the expiry date applicants will need to apply for spectrum licences in this band.

The 928 - 929 MHz band will be opened for licensing once all of the 915-921 MHz replacement licences have been taken up or after December 2016. In the meantime, this frequency range will be available, as a last resort, for licensees who hold a current permanent licence in the 915 – 921 MHz band who are having difficulty with the transition. Approval for use of the 928 – 929 MHz frequency range will be on a case by case basis by RSM.

4.3 Telemetry and Telecommand

Telemetry and Telecommand are a group of channels and frequency bands listed in PIB 23 and are denoted with the channel label TT. Telemetry and Telecommand channels are shared. Users of Telemetry and Telecommand may expect some level of degradation of service. The use of coded squelch or unique digital addressing is recommended.

Telemetry and Telecommand frequencies are only available for specific locations; however, usage within the premises and grounds of such locations for example a factory or industrial facility, is permitted.

Telemetry and Telecommand frequencies are not available for “Area Locations”.

4.4 EE band

Plans for 12.5 kHz and 25 kHz channels in the Fixed Service portion of EE band are specified in PIB 22. The EE band plan includes two blocks of paired channels within the range of 162.2 to 170.31 MHz. There are only a small number of channels available for Fixed Services in this frequency range, so this band is reserved for applications involving high data rate digital services over relatively obstructed paths. High gain antennas should be used to help maximize re-use of the channels.

Licences may only be assigned with 25 kHz channels for high efficiency digital services using at least a 16-state modulation scheme, such as 16-QAM or

equivalent. Single-channel voice or single-low-rate digital transmissions must be assigned 12.5 kHz EE band channels.

4.5 LL Band

The LL band (1427.0 - 1429.5 and 1522.0 - 1525.0 MHz) is only available for high efficiency digital point-to-point links. Only point-to-point operations are permitted in this band.

As there are only a small number of channels available, especially when 250 kHz channels are used, all possible steps must be taken to ensure maximum reusability of the channels.

To achieve maximum efficiency of spectrum use, operation in the band is restricted to high efficiency digital links using at least 16-state modulation methods such as 16-QAM. Minimum antenna performance constraints apply. In order to mitigate potential interference, as identified in Table 9 of PIB 38.

4.6 5 GHz Band

The 5 GHz Band (4.4 - 5.0 GHz) is designed to be used for high capacity medium to long haul radio relay systems.

This band is only available for $n+1$ frequency diversity protected systems carrying high capacity data at, or equivalent to, Synchronous Transport Module Level 1 (STM1) rates per bearer.

4.7 18 GHz Band

Co-primary allocations

Because the 18 GHz Fixed Service band (17.7 - 19.7 GHz), is partly shared with satellite services the following rules must be observed.

(1) Channels available to the Fixed Service in the 18 GHz band

Channels defined in the table below as '(1) Channels available for the Fixed Service' have no restrictions as these channels avoid the satellite band: 18.8 - 19.3 GHz.

(2) Restricted channels in the 18 GHz band

Where an Approved Person's analysis has shown that a Fixed Service licence cannot be accommodated in channels in column (1) of the following table, the restricted channels in the 19.05 - 19.3 GHz spectrum may be used. These restricted

channels are shown in the table below as '(2) Channels restricted for the Fixed Service.'

(3) Channels unavailable to the Fixed Service in the 18 GHz band

There will be no further licences to the Fixed Service in the 18.8 - 19.05 GHz spectrum. These channels are shown in the table below as '(3) Channels unavailable to the Fixed Service.'

Table 3 – Channel availability in the 18GHz band

Channel size (MHz)	(1) Channels available for the Fixed Service	(2) Channels restricted for the Fixed Service	(3) Channels unavailable to the Fixed Service
110	18G6A - 18G8A & 18G6A# - 18G8A#	18G4A - 18G5A & 18G4A# - 18G5A#	18G1A - 18G3A & 18G1A# - 18G3A#
55	18G6B2 - 18G8B2 & 18G6B2# - 18G8B2#	18G4B1 - 18G6B1 & 18G4B1# - 18G6B1#	18G1B1 - 18G3B2 & 18G1B1# - 18G3B2#
27.5	18G6C2 - 18G8C4 & 18G6C2# - 18G8C4#	18G4C1 - 18G6C1 & 18G4C1# - 18G6C1#	18G1C1 - 18G3C4 & 18G1C1# - 18G3C4#
7	18G6D4 - 18G6D12 & 18G6D4# - 18G6D12#	nil	nil
3.5	18G6E1 – 18G6E7 & 18G6E1# – 18G6E7#	nil	nil

4.8 Protection of the Geostationary Orbit (GSO)

The 'Table of Radio Spectrum Usage in New Zealand' (PIB 21) identifies bands allocated by the ITU-R to both the Fixed Service (FS) and other services on a co-primary basis. These other services include the Fixed Satellite Service (FSS), the Broadcast Satellite Service (BSS) and the Mobile Satellite Service (MSS). PIB 21 also identifies the services with primary allocations specifically applying in New Zealand. Where the bands with FS allocations in New Zealand coincide with international FSS (Earth-to-space), BSS (Earth-to-space) or MSS (Earth-to-space) uplink allocations, fixed links in New Zealand must not cause interference to the satellite uplinks.

PIB 38 sets out the restrictions and methodology for Approved Persons analysing the potential interference to the FSS.

The following table shows the frequency bands with allocations to satellite service uplinks, Earth-to-space (E-s), as defined in the ITU-R Radio Regulations for Region 3 (Asia Pacific). Primary and secondary allocations are indicated with capitals and

lower case respectively. Column three shows those satellite uplink bands that have allocations to the Fixed Service in New Zealand as indicated in the Table of Radio Spectrum Usage in New Zealand (PIB 21). Allocations to other services in these bands are not included in the table, nor are the conditions applying to certain bands by footnotes to the ITU-R Radio Regulations.

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Table 4 – Frequency bands used for satellite services

MHz	ITU-R allocation in Region 3 to Satellite Services with Earth-to-space uplinks	NZL Fixed Service bands
148-150.05	MOBILE-SATELLITE (E-s)	
312-315	Mobile-satellite (E-s)	FIXED
399.9-400.05	MOBILE-SATELLITE (E-s)	
401-403	EARTH EXPLORATION-SATELLITE (E-s) METEOROLOGICAL-SATELLITE (E-s)	FIXED
406-406.1	MOBILE-SATELLITE (E-s)	
1 300-1 350	RADIONAVIGATION-SATELLITE (E-s)	
1 427-1 429	SPACE OPERATION (E-s)	FIXED
1 610-1 626.5	MOBILE-SATELLITE (E-s) Radiodetermination-satellite (E-s)	
1 626.5-1 675	MOBILE-SATELLITE (E-s)	FIXED (1670-1675)
1 980-2 010	MOBILE-SATELLITE (E-s)	FIXED
2 025-2 110	SPACE OPERATION (E-s) and (space-to-space) EARTH EXPLORATION-SATELLITE (E-s) and (space-to-space) SPACE RESEARCH (E-s) and (space-to-space)	FIXED, Management Rights
2 110-2 120	SPACE RESEARCH (deep space) (E-s)	FIXED
2 655-2 670	FIXED-SATELLITE (E-s)	FIXED, Management Rights
2 670-2 690	FIXED-SATELLITE (E-s) MOBILE-SATELLITE (E-s)	FIXED, Management Rights
5 000-5 010	RADIONAVIGATION-SATELLITE (E-s)	
5 150-5 250	FIXED-SATELLITE (E-s)	

5850-6700	FIXED-SATELLITE (E-s)	FIXED
6700-7075	FIXED-SATELLITE (E-s) and (space-to-Earth)	FIXED
7145-7235	SPACE RESEARCH (E-s)	FIXED
7900-8175	FIXED-SATELLITE (E-s)	FIXED
8175-8215	FIXED-SATELLITE (E-s) METEOROLOGICAL-SATELLITE (E-s)	FIXED
8215-8400	FIXED-SATELLITE (E-s)	FIXED

GHz	ITU-R allocation in Region 3 to Satellite Services with Earth-to-space uplinks	NZL Fixed Service bands
12.75-13.25	FIXED-SATELLITE (E-s)	FIXED
13.4-13.75	Standard frequency and time signal-satellite (E-s)	
13.75-14	FIXED-SATELLITE (E-s) Standard frequency and time signal-satellite (E-s)	
14-14.5	FIXED-SATELLITE (E-s) Mobile-satellite (E-s)	
14.5-14.8	FIXED-SATELLITE (E-s)	FIXED
15.43-15.63	FIXED-SATELLITE (E-s)	
16.6-17.1	Space research (deep space) (E-s)	
17.3-17.7	FIXED-SATELLITE (E-s)	

17.7-18.4	FIXED-SATELLITE (space-to-Earth) and (E-s)	FIXED
19.3-19.7	FIXED-SATELLITE (space-to-Earth) and (E-s)	FIXED
24.75-25.25	FIXED-SATELLITE (E-s)	FIXED, Management Rights
25.25-27	Standard frequency and time signal-satellite (E-s)	FIXED, Management Rights
27-28.5GHz	FIXED-SATELLITE (E-s)	FIXED, Management Rights
28.5-29.5	FIXED-SATELLITE (E-s) Earth exploration-satellite (E-s)	FIXED
29.5-29.9	FIXED-SATELLITE (E-s) Earth exploration-satellite (E-s) Mobile-satellite (E-s)	
29.9-30	FIXED-SATELLITE (E-s) MOBILE-SATELLITE (E-s) Earth exploration-satellite (E-s)	
30-31	FIXED-SATELLITE (E-s) MOBILE-SATELLITE (E-s)	
34.2-34.7	SPACE RESEARCH (deep space) (E-s)	
40-40.5	EARTH EXPLORATION-SATELLITE (E-s) SPACE RESEARCH (E-s)	
42.5-43.5	FIXED-SATELLITE (E-s)	
47.2-50.2	FIXED-SATELLITE (E-s)	
50.4-51.4	FIXED-SATELLITE (E-s) Mobile-satellite (E-s)	FIXED
81-84	FIXED-SATELLITE (E-s) MOBILE-SATELLITE (E-s)	
84-86	FIXED-SATELLITE (E-s)	
209-226	FIXED-SATELLITE (E-s)	

252-265	MOBILE-SATELLITE (E-s)	
265-275	FIXED-SATELLITE (E-s)	
275-1 000	No allocations	

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5. Satellite Services

This section addresses three main types of satellite service:

- Fixed Satellite Service (FSS)
- Mobile Satellite Service (MSS)
- Broadcast Satellite Service (BSS).

Other space services are not addressed in this section such as: Aeronautical Mobile-Satellite Service, Radiodetermination Satellite Service, Radiolocation-Satellite Service, Earth Exploration-Satellite Service, etc.

In the case of BSS, the uplink (feeder link) and downlink (service link) are each single frequency links. FSS and MSS feeder links and service links are two-frequency duplex. Feeder links and service links typically operate in different bands.

5.1 Shared Bands

Where the 'Table of Radio Spectrum Usage in New Zealand' (PIB 21) indicates that a satellite service has a co-primary allocation with other services in New Zealand, the satellite service must be co-ordinated with those terrestrial services.

5.2 How Satellite Services are Licensed

5.2.1 Satellite Downlink Notification with ITU-R

Because the satellites themselves are outside the New Zealand territory, satellite emissions are not licensed; however, the space sector portion of satellite services must still be registered with the ITU-R. The Ministry manages this process on behalf of the applicant.

5.2.2 Licences for the Terrestrial Portion of the Satellite Service

Except as provided for under various GURL's, all terrestrial transmissions to satellites must be individually licensed. In the C band, all services require individual licences.

'Receive protection' licences may be appropriate in some circumstances to protect fixed location terrestrial satellite receivers.

Criteria for licensing terrestrial transmitters in Satellite Services bands

- Equipment which is approved by satellite service providers for use with their satellite systems is able to be licensed in New Zealand.

- The off-axis EIRP density shall comply with ITU-R S.524, or the satellite operator's requirements, whichever is more stringent.
- The operation of the terrestrial component of a satellite service must comply with ITU-R recommendations.

General User Radio Licence (GURL)

The majority of Mobile Satellite Service (MSS), Satellite News Gathering services (SNG) and Very Small Aperture Terminal satellite services (VSAT) are covered by a General User Radio Licence for Satellite Services (GURL-SS). This means no individual licence is required as long as transmissions adhere to the terms and conditions set on the GURL-SS.

Aeronautical and Maritime Satellite Services

Licences are not required for most satellite services used on aircraft or on vessels by normal aeronautical and maritime systems. Refer to the GURL for Aeronautical Purposes, and GURL for Maritime Purposes notice for further details.

Coordinating Satellite Services in the 18.8 – 19.3 GHz band

PIB 21 defines a primary allocation in New Zealand for the FSS space-to-Earth (FSS (s-E)) for the band 18.8 – 19.3 GHz.

The preferred portion of the Ka band for FSS downlink in New Zealand is 18.8-19.05 GHz, which supports bandwidths of 250 MHz.

If any satellite service provider requires access outside 18.8-19.05 GHz, then coordination will be required with Fixed Services operating in the band 19.05 - 19.3 GHz.

5.2.3 Fixed Service and Fixed Satellite Service Sharing

There are a number of frequency bands that are shared, by international allocation, on a co-primary basis between the Fixed Satellite Service (FSS) and the Fixed Service (FS). Sharing analysis must be carefully undertaken to avoid interference.

The following table shows the principle shared bands.

Table 5 – Frequency bands used for Fixed Satellite Services

Satellite Band	Frequency range	Affected Fixed Service bands	Conditions
Standard C downlink	3600-4200 MHz	P band	C band available for FSS but must be coordinated with FS
Standard C uplink	5925-6425 MHz	R band	C band available for FSS but must be coordinated with FS
Extended C downlink	3400-3600 MHz	Management rights	Extended C band not available for FSS in New Zealand
Extended C uplink	6425-6670 MHz	T band	Extended C band not available for FSS in New Zealand
Ku downlink	11.7-12.75 GHz	Q band is cleared	Ku band available for FSS, - refer to GURL for restrictions
Ku uplink	14.0-14.5 GHz	BS cleared	Ku band available for FSS, - refer to GURL for restrictions
Ka downlink	17.7-20.2 GHz	18G band	Ka band available for FSS but must be coordinated with FS
Ka uplink	27.5-31.0 GHz	Management rights	Refer to management right holders

6. Aeronautical service

The aeronautical service is a radio service relating to the operation of aeronautical communications. These Radio Licence Policy Rules, International Radio Regulations and ICAO Annex 10 guide the operational policy rules for Aeronautical licences.

All applications for Aeronautical Service licences require licence agency (LA) approval recommendation from the Civil Aviation Authority (CAA).

Civil Aviation Authority requirements and current frequency use for Aeronautical Navigation and Route VHF/HF, and related CAA Aeronautical Information Publications can be found on the web site www.aip.net.nz

Aircraft and aeronautical mobile stations are covered by the General User Radio Licence for Aeronautical Purposes (GURL-AP). Aeronautical base and repeater station licences require appropriate licences.

Table 6 – Aeronautical Services in New Zealand

Service		Purpose	Station	References
Aeronautical Mobile	Aeronautical Mobile (Route)	For communications relating to safety and regularity of flight, primarily along national or international civil air routes.	Aircraft	GURL-AP, Section 6.2
			Land portable handheld etc	GURL-AP, Section 6.3
			Aeronautical Land (Route)	Section 6.3
			Aeronautical Repeaters	Section 6.5
	Aeronautical Mobile (Off Route)	For communications, including those relating to flight coordination, primarily outside national or international civil air routes.	Aircraft	GURL-AP, Section 6.2
			Land portable handheld etc	GURL-AP, Section 6.4
			Aeronautical Mobile (Off Route)	Section 6.4
			Aeronautical Repeaters	Section 6.5

Radiodetermination	Aeronautical Radionavigation	A radionavigation service intended for the benefit and for the safe operation of aircraft.	Aircraft	GURL-AP
			Radio Beacons, NDB, ILS, VOR, DVOR, TACAN and VORTAC, DME.	Section 6.6.2
	Radiolocation	A radio-determination service for the purpose of radiolocation.	Aircraft	GURL-AP
			RADAR, PSR SSR	Section 6.6.1

Channelling and designated use

The frequency bands and channels designated for aeronautical use are contained in, PIB21, PIB 23, GURL-AP, IRR 2008 and ICAO Annex 10.

6.1 Operator Certificates and Callsigns

Refer to 'Radio Operator Certificate and Call Sign Rules (PIB 46)' and the RSM website <http://www.rsm.govt.nz/cms/licensees/types-of-licence/aeronautical-aircraft-licences> for further information on these requirements.

6.2 Aircraft Licence

Aircraft do not normally require individual licensing as they are covered by the General User Radio Licence for Aeronautical Purposes (GURL-AP). However, should an Aircraft licence be required for presentation to overseas authorities, users may apply for an individual licence (fees apply).

Identification codes or a callsigns in the ZK series, are obtainable from the Civil Aviation Authority (CAA).

6.3 Aeronautical Route

Route frequencies are reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes. These frequencies are licensed to aeronautical base stations for control of airspace at international, domestic (served by scheduled airlines) and military airports.

6.4 Aeronautical Off Route

Off Route frequencies are for communication, including those relating to flight co-ordination, primarily outside national civil air routes. These frequencies are licensed to other aeronautical base stations, such as aero clubs, airline companies, air strips.

6.5 Aeronautical repeater

Frequencies for aeronautical repeaters are listed in PIB 23.

6.6 Aeronautical Radiodetermination

Applications for an Aeronautical Radiodetermination system should be first discussed with RSM. Co-ordination with Civil Aviation Authority and Airways Corporation of New Zealand is likely to be necessary. All applications must be in accordance with ICAO annex 10.

6.6.1 Radiolocation

Aeronautical Radiolocation services that are operated in New Zealand are:

- Primary Surveillance Radar (PSR);
- Secondary Surveillance Radar (SSR); and
- Multilateration (MLAT).

6.6.2 Radionavigation

Aeronautical Radionavigation services that are operated in New Zealand are:

- Non Directional Beacon (NDB),
- Instrument Landing System (ILS),

- VHF Omnidirectional Range (VOR),
- Doppler VHF Omnidirectional Range (DVOR),
- Distance Measuring Equipment (DME)

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7. Maritime Mobile Service

The Maritime Mobile Service (MMS) is a radio service relating to ship to ship, ship to shore and shore to ship radiocommunications.

Specific frequencies for distress and safety communications are listed in the International Radio Regulation (IRR) Appendix 15 'Frequencies for distress and Safety communications for the Global Maritime Distress and Safety System (GMDSS)'. Operation and use of these frequencies must be in strict accordance with the IRR.

Most MMS mobile stations (eg ships) are covered by a General User Radio Licence for Maritime Purposes (GURL-MP). Where a station (such as a fixed maritime repeater station) is not covered by the GURL, individual licensing is required.

Every MMS licence application requires a licensing agency recommendation from Maritime New Zealand.

Table 7 –Maritime Services and description

Service	Description
maritime mobile service	A mobile service between coast stations and ship stations, or between ship stations, or between associated on-board communication stations. Survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service
port operations service	A maritime mobile service in or near a port, between coast stations and ship stations, or between ship stations, in which messages are restricted to those relating to the operational handling, the movement and the safety of ships and, in emergency, to the safety of persons
ship movement service	A safety service in the maritime mobile service other than a port operations service, between coast stations and ship stations, or between ship stations, in which messages are restricted to those relating to the movement of ships. Messages which are of a public correspondence nature shall be excluded from this service.
maritime mobile-satellite service	A mobile-satellite service in which mobile earth stations are located on board ships. Survival craft stations and emergency position indicating radiobeacon stations may also participate in this service.
maritime radionavigation service	A radionavigation service intended for the benefit and for the safe operation of ships.

Table 7 –Maritime stations and description

Stations	Description
Coast station	A land station in the maritime mobile service
Ship station	A mobile station in the maritime mobile service located on board a vessel which is not permanently moored, other than a survival craft station.
Ship earth station	A mobile earth station in the maritime mobile-satellite service located on board a ship
Coast earth station	An earth station in the fixed-satellite service or, in some cases, in the maritime mobile-satellite service, located at a specified fixed point on land to provide a feeder link for the maritime mobile-satellite service.
Port station	A coast station in the port operations service
On-board communication station	A low-powered mobile station in the maritime mobile service intended for use for internal communications on board a ship, or between a ship and its lifeboats and life-rafts during lifeboat drills or operations, or for communication within a group of vessels being towed or pushed, as well as for line handling and mooring instructions.

7.1 Operator Certificates and Callsigns

Refer to 'Radio Operator Certificate and Call Sign Rules (PIB 46)' and the RSM website <http://www.rsm.govt.nz/cms/licensees/types-of-licence/maritime-ship-licences> for further information on these requirements.

7.2 Coast Stations and Repeaters

Coast stations operating below 30MHz, or that are remotely activated (for example, unmanned or hill top coast stations), and maritime VHF repeaters, require individual licensing. Other coast stations that are covered by the GURL-MP do not require individual licensing. The channels available for VHF Maritime coast stations and repeaters are found in PIB 23. The designated use of channels can be found in the GURL-MP.

7.3 High Frequency Maritime Stations

All licences for services below 30MHz are processed by the Ministry as international co-ordination is required.

For general purpose simplex use, frequencies from Appendix 17 of the IRR are licensed. These are shared frequencies and exclusive use is not possible. A coast station will normally be licensed a calling channel and a working channel for each band required.

For the duplex radiotelephone service, the channel numbers and associated frequencies are contained in Appendices 17 and 25 of the IRR. Apart from the 4 MHz band, Appendix 25 shows New Zealand has only two channels in each band allotted. These channels are all allocated on a shared basis with a considerable number of overseas stations. Note that channel 425 in the 4 MHz band is currently reserved for possible future growth and therefore cannot be licensed at this time.

Frequencies in the 8 MHz band are in demand as the propagation characteristics are favourable for long distance communications.

When a Private Coast Radio Station identifies requirements for two-frequency (duplex) operation, the following guidelines apply:

- The duplex radiotelephone channels in each band will be available for use by Private Coast Radio Stations on a non-interference, shared channel basis.
- Successful operation may require co-ordination, and possibly time-sharing. Under such conditions, the number of users may be limited, and therefore applications may be declined should the requirement for two frequency operation not be clear.
- Where interconnection with the PSTN is used, the ITU-T and ITU-R recommendations must be complied with.

7.4 Coastguard Channels

VHF Maritime channels MM80, MM81, MM82, MM83, MM84, MM85, MM86, MM87 and MM88 are reserved for Coastguard operations. Such operations are to be in accordance with the Royal New Zealand Coastguard Federation Operations Manual. Communications on these channels by persons other than the Coastguard are restricted to the following:

- Search and rescue traffic during incidents;
- Trip reports;
- Weather reports;
- Navigation Warnings;
- Initial call to establish a working channel to use;
- Station notices;
- Safety information; and,
- All station calls seeking information on missing vessels.

8. Radiodetermination service

Radiodetermination means the determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to those parameters, by means of radio waves.

When considering a licence application, the Ministry has regard to:

- Table of Radio Spectrum Usage in New Zealand (PIB 21);
- The International Radio Regulations;
- ITU-R recommendations; and,
- Other international agreements, standards and recommendations.

The subset of Radiodetermination services are:

Radionavigation Service

A Radiodetermination service for the purpose of radio navigation (eg, beacons used for navigation).

Radiolocation Service

A Radiodetermination service for the purpose of radiolocation (eg, surveillance radar).

9. Other Services

9.1 Radio paging

9.1.1 Local Area Paging

Local area paging is most suited to local areas such as buildings or building complexes. The frequencies are shared and require careful engineering to minimise co-channel interference. Channel and power restrictions for local area paging can be found in Mobile Service Bands of New Zealand (PIB 23)

9.1.2 Wide Area Paging

Wide area paging is a paging system used to broadcast paging messages over a wide geographical area in the 157.6 MHz to 158.07 MHz band. There are restrictions on the use of the band as it is close in frequency to the international VHF Maritime Band.

In operating a licence the mean field strength of 77 dB μ V/m at a reference height of 10 metres above sea level is not to be exceeded in the following areas:

1. Otago Harbour VHF Maritime Protection Area
2. Lyttelton Harbour VHF Maritime Protection Area
3. Greymouth VHF Maritime Protection Area
4. Picton VHF Maritime Protection Area
5. Nelson VHF Maritime Protection Area
6. Wellington Harbour VHF Maritime Protection Area
7. Auckland VHF Maritime Protection Area
8. Napier VHF Maritime Protection Area
9. Tauranga VHF Maritime Protection Area;

9.2 Radio Reporter

The Radio Reporter (RR) band and channelling are specified in Mobile Service Bands of New Zealand (PIB 23). RR is restricted to outside broadcasts or itinerant linking in conjunction with a sound broadcasting station or sound broadcasting network for the purpose of providing program content back to a studio. RR is used in applications such as sports commentary, mobile street reporters and reporters at events.

Radio reporter licence may only have:

- one frequency per licence; and
- one Regional Authority area per licence.

9.3 Outside Itinerant Linking TVOB

9.3.1 Introduction

The purpose of Television Outside Broadcast (TVOB) is to provide linking of programme material from source back to studio . It is intended for event specific, itinerant, operations that may occur for limited periods anywhere in New Zealand. It is not for permanent fixed linking purposes. TVOB is licenced in the bands OX and V bands as detailed in 'Fixed Service Bands of New Zealand' (PIB 22). TVOB operates on a self managed basis and users are required to co-ordinate with each other to minimise interference

9.3.2 Licensing

Separate licences are required for OX and V Bands.

Applications for this service are made through SMART

Tip: use 'search licences' search on channel using 'OX' or 'VX' (which ever is relevant), click on the licence, click on the licensee number, then click on addresses and contacts. The TVOB contact will be listed as technical and have the responsibility for TVOB coordination.

9.3.3 Terms for OX and V Bands

Applicants must supply a "technical" contact, and the number of radio sets to be licensed, at the time of application. Further sets may be licensed as required by notification to RSM.

Applications will be accepted for this service only where the use is clearly identified as links for temporary television outside broadcasting purposes.

The links must be of a transportable nature, and not conventional fixed links.

Licencees must:

- notify all other licensees in the band of dates, locations and channels to be used prior to use;
- ensure their contact details up to date in SMART; and
- only use the licence for the purpose of broadcasting specific short term events.

TVOB systems in the V band must not cause interference to an existing fixed link between Glenorchy and Queenstown Hill via a passive reflector at Afton Burn. For details refer to the licences in SMART.

All Fixed Service operations in the OX Band are subject to the provisions of §4.4 of the International Radio Regulations, and there is no protection from interference caused by legitimate transmissions originating from outside the jurisdiction of New Zealand. In this regard TVOB licensees need to be aware that the band is allocated to the Aeronautical Radionavigation service on a primary basis, and the Radiolocation service on a secondary basis. Interference to legitimate users of this band operating outside the jurisdiction of New Zealand will not be tolerated and any transmission causing interference will be required to cease operation.

9.4 Citizen Band Radio

Also known as the Personal Radio Service (PRS), Citizen Band Radio (CBR) provides an economical alternative to LMR. Possible uses include sporting and community events, small businesses and hobby activities. No use, or user, has priority and this requires a responsible and cooperative approach by all persons sharing the service.

Most PRS use is covered by the General User Radio Licence for Citizen Band Radio (GURL-CB). However, repeaters must be individually licensed.

Please note that the Ministry is currently reviewing Citizen Band Radio Services. Once the review has been completed the outcomes will be reflected in this document. For details of the review please refer to <http://www.rsm.govt.nz/cms/policy-and-planning/consultation/cb-gul-discussion-paper-2010/>.

9.4.1 PRS Repeaters

PRS repeater base stations are only permitted to operate on a channel specified for this purpose in Mobile Service Bands of New Zealand (PIB 23).

PRS repeaters are used to extend the communication range achievable by users of this service. Where a repeater station is established, communication through the repeater is available to all PRS users on an unrestricted basis, and without charge.

Repeater Rules

- PRS repeaters can not link and/or connect to the Public Switched Telephone Network
- A repeater station may be accessed by any radio apparatus covered by the General User Radio Licence.
- The purpose of the repeater is to re-transmit voice telephony (speech)
- The re-transmission of selective calling tones sent between personal radio apparatus is permitted.

- Only one channel will be licensed at any transmitter site location, with a minimum distance between transmitters of 20 kilometres.
- The minimum separation distance for co-channelled repeaters will be 100 kilometres.
- Frequencies will be assigned on a shared basis and must tolerate interference.
- A remote control facility can be fitted to the repeater. However it must not be used to alter the technical operating parameters of the repeater other than to:-
 1. Allow deactivation / reactivation of the repeater for maintenance purposes only; or
 2. Initiate the transmission of status information; or
 3. Indicate an alarm condition at the repeater site.