



## **Specification PTC 253: 2001**

### **Technical Requirements for Connection of Trunked Mobile Radio Equipment**

Access Standards  
Spark New Zealand Limited  
Wellington  
New Zealand

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# SPECIFICATION PTC 253: 2001 TECHNICAL REQUIREMENTS FOR CONNECTION OF TRUNKED MOBILE RADIO EQUIPMENT

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FIG. 1           FLOW CHART OF TELEPERMIT APPLICATION PROCEDURE

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                  OF MPT 1343 IN THE TELECOM NETWORK

APPENDIX 2    BASE STATION SITE NUMBERING

APPENDIX 3    PTC253 APPLICATION FORM FOR MOBILE TESTING

## REFERENCE DOCUMENTS

**Website:** [www.telepermit.co.nz](http://www.telepermit.co.nz) for Telecom NZ PTC Specifications

PTC 100 Permit to Connect General Conditions

PTC 253 Technical Requirements for Connection of Trunked Mobile Radio  
Terminals

**Website:** [www.radio.gov.uk](http://www.radio.gov.uk) for MPT Specifications

United Kingdom Department of Trade and Industry Specifications:

MPT 1327 A Signalling Standard for Trunked Private  
Land Mobile Radio Services

MPT 1343 System Interface Specification for Radio Units to be used with  
Commercial Trunked Networks Operating in Band III Sub-Band 2

MPT 1352 Declaration to be completed by Manufacturers applying for an MPT  
Phase II Type Approval Certificate

**Website:** [www.rsm.govt.nz](http://www.rsm.govt.nz) for NZ Radio Spectrum Specifications and Information

RFS 26 VHF and UHF Land Mobile Radiotelephone (12.5 kHz channeling)

PIB18 Declaration of Conformance

PIB23 VHF and UHF Mobile Services Bands in NZ

## REVISION HISTORY

Version 3.0: 2001 updates Version 2.0: 1993.

Major Changes are:

Updated document for online PDF format

Updated contact and address details

Provided web linkages for reference documents

Updated Control channel hunt list

Updated Frequency range of band plan

Stipulated that mobiles must be able to respond to bcast messages for adjacent site data

Stipulated applicants must complete mobile test sheets for submission of mobiles for testing

Stipulated Network file requirements and mobile programming

Deleted appendix 1 Trunked Frequency Band Plan as this is available in PIB23

PTC 253 test request sheet included as Appendix 3

## **TELECOM DISCLAIMER**

Telecom makes no representation or warranty, express or implied, with respect to the sufficiency, accuracy, or utility of any information or opinion contained in this Specification. Telecom expressly advises that any use of or reliance on such information is at the risk of the supplier. Telecom shall not be liable for any damage or injury incurred by any person or organisation arising out of the sufficiency, accuracy, or utility of any such information or opinion.

Telecom has provided this information to assist suppliers and will expect the basic operations of any device covered by this Specification to be tested to ensure that the product does operate as claimed by the supplier.

The grant of a Telepermit for a device in no way indicates Telecom acceptance of responsibility for the correct operation of that device under all operating conditions.

## **FOREWORD**

This Specification covers the minimum requirements for trunked mobile radio terminals intended for connection to the Fleetlink Network operated by Telecom Mobile Radio. The Specification has been prepared by Telecom Mobile Radio who will assess the technical suitability of such terminals for connection.

The Access Standards Section of the Telecom Corporate Office, on behalf of Telecom Mobile Radio, issues all Telepermits.

For mobile radio terminals covered by this Specification, Telepermit grants will be made on recommendation from Telecom Mobile Radio, to whom applications for testing and assessment are made in the first instance.

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## 1 SCOPE

This Specification defines the requirements of trunked mobile radio terminals for use on the Fleetlink Trunked Dispatch Network operated by Telecom Mobile Radio.

## 2 INTRODUCTION

### 2.1 Trunking signalling standard

(1) Telecom Mobile Radio provides trunked dispatch mobile radio service using the digital trunking signalling standard for trunked mobile radio systems in the United Kingdom, Band III.

(2) The trunking signalling standard is a non-proprietary protocol developed by a joint committee of mobile manufacturers under the auspices of the United Kingdom Department of Trade and Industry and published as Specification MPT 1327 - "A Signalling Standard for Trunked Private Land Mobile Radio Services".

### 2.2 Air interface standard

(1) The air interface compatibility standard defining how a mobile shall implement the trunking protocol and respond to MPT 1327 signalling commands is published as Specification MPT 1343 "System Interface Specification for Radio Units to be used with Commercial Trunked Networks Operating in Band III Sub-band 2".

(2) Copies of specifications MPT 1327 and MPT 1343 can be obtained from the website: [www.radio.gov.uk](http://www.radio.gov.uk)

or by writing to:      Mobile Technology Section  
                             Radiocommunications Agency  
                             South Quay Three  
                             189 Marsh Wall  
                             London E4 9SX  
                             ENGLAND

### 2.3 Network Files and Programming of the Mobiles

(1) An important component of how the mobile works on the network is the "networkfile". The applicant must submit a default network file with the mobile for test. Telecom Mobile Radio, in conjunction with the applicant, may alter or change some of the parameters and threshold settings to optimize the working of the mobile for the Fleetlink network.

(2) Where issues and problems arise once the mobile is on the network and a new network file needs to be issued, it is the responsibility of the applicant to ensure that this file and information are circulated to the dealers. It is also the applicant's responsibility to ensure that all dealers implement the upgrades as and when needed.

(3) Dealers are to source the current network files and any upgraded files from the applicant.

(4) In addition the applicant shall ensure that its dealers are suitably trained in the programming of the mobiles and that the dealers know how to configure the mobiles to work correctly on the Fleetlink Network.

## **2.4 Frequency band**

The frequency band used for the Telecom Mobile Radio Fleetlink Trunked Dispatch Network is 406 MHz to 412 MHz Mobile Transmit and 414 MHz to 420 MHz Base Transmit (ref PIB23). This Band comprises 480 channels designated TD1-TD480 and mobiles shall be capable of being assigned to any channel in the Band. Note channels TD1-TD8 and TD460-TD480 are not available for use.

# **3 GENERAL REQUIREMENTS**

## **3.1 Telepermit grant**

(1) All mobile terminals used on the Telecom Mobile Radio Fleetlink Network are required to bear a Telepermit label and comply with Telecom Mobile Radio requirements for network connection. Specification PTC 100 defines the general conditions for granting a Telepermit.

(2) PTC253 defines specific requirements for trunked mobile radio terminals that are based on overseas specifications and also covers the Ministry of Economic Development Radio Spectrum Management requirements, system compatibility and performance aspects. Where there is a conflict between the requirements of PTC 100 and the requirements of this specification, then this specification shall prevail.

(3) The granting of a Telepermit will require equipment to meet two basic requirements:

(a) Ministry of Economic Development, Radio Spectrum Management approval.

(b) Network Connection approval. Figure 1 outlines the approval process.

# **4 RADIO SPECTRUM MANAGEMENT APPROVAL**

(1) Radio equipment used in New Zealand is required to be licensed in accordance with the Radiocommunications Act 1989 and other relevant legislation managed by the Ministry of Economic Development, Radio Spectrum Management.



- (2) A condition of licensing for the trunked mobile radio service is that the equipment shall conform to Specification RFS 26 which gives minimum technical standards for efficient use of the radio spectrum. RFS 26 does not cover aspects of network compatibility or overall system performance dealt with in this Specification.
- (3) Requirements for submission of equipment for approval to Specification RFS 26 are detailed in PIB18 (Declaration of Conformance).
- (4) Applications for Ministry of Economic Development, Radio Spectrum Management approval, or correspondence regarding Specification RFS 26, should be addressed to either:-

The local Radio Spectrum Management Branch of the Ministry of Economic Development

or The Technical Officer (Regulatory)  
Radio Spectrum Management  
Ministry of Economic Development  
PO Box 8562  
Riccarton  
CHRISTCHURCH

Telephone 03-343 1240

Fax 03-343 1219

## 5 NETWORK CONNECTION APPROVAL

### 5.1 General

- (1) Network connection approval is conditional upon Ministry of Economic Development, Radio Spectrum Management, having approved a Declaration of Conformity.
- (2) Network connection approval will be based on a declaration by the mobile manufacturer/supplier that the equipment meets MTP1327/1343 specifications. This declaration is termed "attestation" and the procedure is described in clause 5.2.
- (3) An application fee will be charged by Telecom Access Standards for carrying out network approval assessments. Where inspections or quality control audits are required, additional negotiated charges will be made.

• *The Telepermit testing fee is \$500 exclusive of GST. In addition there is a \$100 processing charge by the Telecom Access Standards Group to process the application.*

(4) Whenever a significant change to hardware or software specification is made, Telecom Mobile Radio must be notified of the changes. Re-application for a Telepermit may be required if any changes are likely to affect compliance.

## **5.2 Procedure**

The procedure for Manufacturers or Suppliers seeking Network Connection approval is detailed in the following clauses.

### **5.2.1 Attestation**

(1) The manufacturer shall submit attestation that the mobile equipment submitted for approval complies with: -

(a) the protocol and message code format standard given in Specification MPT 1327 "A Signalling Standard for Trunked Private Land Mobile Radio Services"; and

(b) the mobile air interface compatibility standard given in Specification MPT 1343 "System Interface Specification for Radio Units to be used with Commercial Trunked Networks Operating in Band III Sub-band 2"; and

(c) the compatibility requirements concerning the application of MPT 1343 to the Telecom Network attached as Appendix 2.

(2) This attestation shall be a signed declaration by a Senior Manager in an appropriate position in the manufacturer's organisation, and shall include details of any particular areas where the mobile performance is different to that defined in these specifications.

(3) The attestation for (1)(a) and (b) above may be provided in the form included as Appendix B of Specification MPT 1352 "Declaration to be completed by manufacturers applying for an MPT 1352 Phase II Type Approval Certificate, or their agents applying on their behalf".

(4) The attestation should state compliance with all "Mandatory" sections of the above specifications and include a list of any "standard options" or "non standard options" supported by the equipment.

(5) The issue of a Telepermit will be conditional on equipment operating in accordance with the attested performance standards. If an in-service problem develops because a particular type of mobile equipment does not comply with the attested performance, then the Telepermit may be revoked and all mobiles of this type disconnected from the network until the problem is corrected.

### **5.2.2 Supporting information**

The applicant shall provide supporting information, which shall include the following:-

(a) Examples of tests carried out on the equipment for other type approval applications, with full details of these tests, including;

- the name and address of the test laboratory,
- the manufacturer's name and type number of the test equipment,
- details of test procedures,
- a sample of test results.

(b) Details of quality assurance methods and procedures used to ensure that production units meet the required standards.

### **5.2.3 Samples**

- (1) Two sample mobile units shall be pre-programmed with the Fleetlink Network parameters and be supplied, complete with accessories, operation manuals and service manuals, to Telecom Mobile Radio. These units will be tested by Telecom Mobile Radio for conformity to the MTP1327/1343 specifications and for the suitability of connection to the Fleetlink network.
- (2) Full instructions and any special hardware or software required for programming must be included.
- (3) Telecom reserves the right to retain one unit, programming cord, software and technical documentation.

### **5.2.4 Ministry of Economic Development, Radio Spectrum Management**

A copy of the Radio Spectrum Management acceptance of the Declaration of Conformity shall be supplied to Telecom Mobile Radio.

### **5.2.5 Mobile Test Sheets**

(1) To assist in the Telepermit process (and to the reduce time required by Telecom Mobile Radio to assess the radios) a series of test sheets have been developed. It is a requirement that these test sheets are filled out and submitted with the mobiles for PTC approval.

- *The test sheets are not included with the PTC253 documentation but will be supplied on request to Telecom Mobile Radio.*

### **5.2.6 Assessment**

In carrying out assessments of suitability for Network Connection approval, Telecom Mobile Radio reserves the right to: -

- (a) request the supply of additional information as required;
- (b) audit test results, methods and procedures;

- (c) request the supply of additional sample units for inspection and operational testing;
- (d) inspect production and testing facilities
- (e) review validity of Telepermit

### 5.3 Applications

(1) Telepermit applications, together with two samples of each product or products concerned shall be submitted to Telecom Mobile Radio for assessment.

- (a) Applications for Telepermit testing and related correspondence is to be forwarded to:-

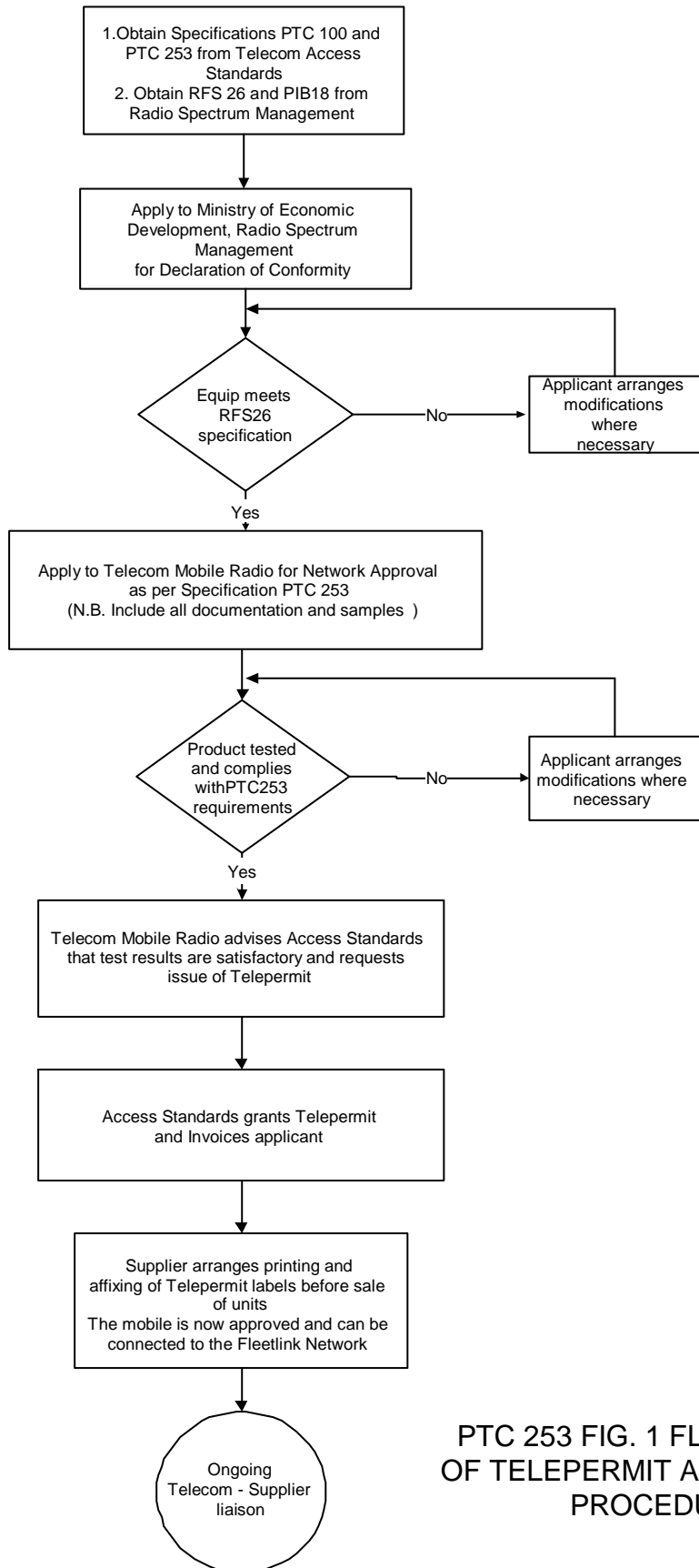
Telecom Mobile Radio  
PO Box 550  
Wellington  
Attention: Neil Denize

Telephone: 04-802 9895  
Fax: 04-385 4762

- (b) The courier address for samples and associated documentation is:-

Telecom Mobile Radio  
Level 13 Mid City  
141 Willis St  
Wellington  
Attention: Neil Denize

(2) When a Telepermit is granted label artwork, showing the Telepermit number, the manufacturer's name and mobile type number, will be issued by Access Standards. This label shall be displayed on all mobiles used on the Telecom Mobile Radio Fleetlink Network. The format of the Telepermit label to be used for the mobiles is given in Specification PTC 100.



PTC 253 FIG. 1 FLOW CHART OF TELEPERMIT APPLICATION PROCEDURE

## PTC 253 APPENDIX 1

### QUALIFICATIONS AND RECOMMENDATIONS concerning THE APPLICATION OF SPECIFICATION MPT 1343 on THE TELECOM NETWORK

#### 1 Radio Frequency Requirements

Specification MPT 1343 makes reference to Specification MPT 1323 for the general radio frequency requirements. For the New Zealand Network, Specification RFS 26 should be read in place of MPT 1323. Compliance with RFS 26 has precedence over requirements of either Specification MPT 1323 or MPT 1343.

#### 2 Transmitter and Receiver Parameters

(1) The channel designations and frequencies required for the New Zealand Network are given in Appendix 1 and should be substituted for those given in Sections 4.1.1 and 5.1.1 of MPT 1343.

(2) The CHAN field binary representation of channel number shall be: -

Channel Number	CHAN field
TD1	0000000001
TD480	0111100000

(3) The radio unit equipment shall operate over channels TD8-TD459 inclusive.

#### 3 Storage requirements

All mandatory functions listed in table 6.1 of MPT 1343 shall be implemented for the New Zealand Network.

#### 4 Security

The scheme for the security number is identical to that used within the United Kingdom. Manufacturer's codes allocated for use in the United Kingdom may also be used in radio units for the New Zealand market. Manufacturers codes and the security algorithm can be obtained from the UK Department of Trade and Industry by writing to the address given in Section 7 of MPT 1343.

#### 5 Call Number Convention

The call number convention, as described in section 8.2 of MPT 1343, applies in the New Zealand Network. The following types of access are supported by the New Zealand Network:- Members of the same fleet.

- Members of the other fleets with the same prefix.

- Members of other fleets with a different prefix (provided all are on the same system).
- Access to nominated PSTN subscribers or Line Units (short form dialing method, ref. MPT 1327 Section 4).
- Access from PSTN to Radio Units.
- Full access to PSTN.
- Access to and from a nominated PABX extension.

## **6 Call Processing**

- (1) Call set up operates in the 'Off Air' mode for Radio Unit to Radio Unit calls. In addition for PSTN and PABX calls, 'Modified Off Air Call Set-Up' (MOACSU) is used. Mobiles shall therefore be capable of operating in both modes.
- (2) The New Zealand network will support the following special types of call:-
  - Conference/Broadcast Calls within same TSC area.
  - Dispatcher Queued Calls (RQQ ('00000'))
  - Status Calls (ROQ as per MPT 1327 Section 13)
  - Non-prescribed Data Calls (RQS with DT set to '1')
  - Short Data Message Calls (MPT 1327 Section 14)
  - Priority Calls (RQS with LEVEL set to 0')
  - Emergency Calls (ROE, MPT 1327 Section 10)
  - Call Diversion Calls (self and third party, MPT 1327 Section 12)
  - Security Check Calls (MPT 1327 Section 15).

## **7 Dynamic Call Time**

- (1) The network supports dynamic call time limits, with the currently applicable time limit broadcast to mobiles using the message. The Mobile must understand and be able to act on those messages.
- (2) Mobiles often have the option of having a count down or count up timer. The call duration on the Fleetlink network can vary, depending on the time of day and the loading on the network. Telecom Mobile Radio recommends that the count down timer is set as the default in the mobile.

## **8 Network Numbering Convention**

The structure of the New Zealand System Identity Code is as per MPT 1343 Clause 9.3.4.2.2. with bit 1 of the SYS field set to 1'.

The NET field will be set to "0' LZ=3 LA=7

## 9 Control Channel Strategy

- (1) The Fleetlink Network employs the dedicated continuous control channel method. However, there may be radio sites in the network which will employ one of the following:-
- Dedicated control channels with load sharing.
  - Time shared control channels.
  - Non-dedicated control channels.
- (2) To minimise the need for a mobile to perform a “Hunt Sequence”, the Telecom Network broadcasts adjacent site data information provided in the BCAST (SYSDEF = ‘00100) and BCAST (SYSDEF = 00101) messages. It is a mandatory requirement that any mobile gaining Telepermit approval shall be able to use this data to ensure the mobile works on the most appropriate site (voting). Ref MPT1343 Clause 9.3.3.6.
- (3) The current normal Hunt List is as follows:-
- |     |     |     |
|-----|-----|-----|
| 301 | 201 | 121 |
| 303 | 203 | 123 |
| 304 | 204 | 124 |
| 305 | 205 | 125 |
| 307 | 207 | 127 |
| 309 | 209 | 129 |
| 310 | 213 | 133 |
| 311 | 214 | 134 |
| 312 | 215 | 135 |
| 313 | 220 | 140 |
| 314 |     |     |
| 315 |     |     |
- (4) The MPT 1343 Optional “Preferential NDD Sub-Set Hunt Stage” (Section 9.3.3.3.1) is a mandatory requirement for all mobiles attaining a Telepermit to PTC 253.
- (5) The MPT 1343 Optional “Preferential Sampled Hunt Stage” (Section 9.3.3.3.2) and “Background Search Sequence” (Section 9.3.3.7) are optional features. However, it is recommended that mobiles support this facility.
- (6) The requirements of (4) and (5) above are optional for hand portable units.

## 10 Fall-back Mode

The New Zealand Network does not support operation of the Fall-Back



Mode as per Section 13 of MPT 1343. In the event of loss of a TSC or Control Channel landline, the network will continue to operate in multisite or single site trunked configuration, depending on the nature of the failure.

#### **11 Timing Parameters**

The MPT 1343 default parameters given in Appendix B of MPT 1343 will be assumed for the New Zealand Network.

#### **12 Codeword Error Parameters**

The recommended set of Error parameters for control channel acquisition and retention shall be stated by the radio unit manufacturer.

## PTC 253 APPENDIX 2

### BASE STATION SITE NUMBERING

#### 1 Code structure

- (1) The structure of the system identity codes is of the format specified in MPT 1343 clause 9.3.4.2.2. The SYS bit 1 is set to 1, allowing for 9 bits of NDD (site area and zone fields).
- (2) 8 Zone's have been allowed for ( $LZ = 3$ ), which corresponds with 7 Regional Networks and 1 spare for test purposes. Within each Zone there are 16 AREAs allocated ( $LA = 7$ ), which corresponds to 16 individual base sites.
- (3) This leaves 2 bits FREE for possible later use with timeshared control channels or other purposes.

#### 2 Reserved codes

- (1) Area code 0 is reserved for purposes such as testing of mobiles and for use on temporary sites that are available to all mobiles.
- (2) Area code 1 is reserved for site testing where only test mobiles are allowed access to a particular site.

**PTC 253 APPENDIX 3**  
**Application Form for Telepermit testing of**  
**Trunked Mobile Terminals to PTC 253**

**NOTE:** **Two** samples of each model shall be submitted.

Mobile Radio reserves the right to retain **one** sample, programming lead, software and all technical data.

Market Name of Product:

.....  
*[Max. of 40 characters] Brand name Product name Model Number*

Name of Manufacturer:.....

Country.....

Formal Mfr's description/No: .....

Hardware Version No: ..... Firmware Version No:.....

**Proposed Telepermit Holder Details (must be a NZ Company or resident):**

Company requesting testing:

.....

Street Address: .....

.....

.....

Contact Person :..... Position in Company .....

Telephone:..... Fax:.....

Mailing address [include PO Box number if available]:

.....

.....

.....

**DECLARATION:-**

In making this application I undertake to comply with the General Conditions of Telecom Specification PTC253 and with any additional conditions applicable to the grant of a Telecom Telepermit should my application be successful.

I agree to the disclosure of the product functionality and any warning notes associated with the conditions of the Telepermit grant after the product has entered service.

Full name of person authorised to sign on behalf of the proposed Telepermit Holder:-

.....

Position in Company:-.....

Signed: ..... Date .....

**For Telecom use only**

Test Application Number: ...../ .....  
Application initially (date) ...../ ...../ .....  
received:  
Submission documentation (date) ...../ ...../ .....  
completed:  
Application Acknowledged: (date) ...../ ...../ .....

**This Application Form, when completed, should be forwarded with all the necessary supporting information and samples directly to:-**

Telecom Mobile Radio  
PO Box 550  
Level 13 Mid City  
141 Willis St  
WELLINGTON

General Enquiries regarding testing and test procedures to:-

Neil Denize

Telephone +64-4-802 9895

Fax +64-4-385 4762



**NOTE:**

Where any supporting documentation is omitted, testing WILL BE DELAYED as applications will have to be placed on 'HOLD' until the documentation is complete.

**Checklist of Essential Attachments & Supporting Data:-**

<b>Sample of equipment (2)</b>	<b>Yes</b>	<b>No</b>
<b>Attestation</b>	<b>Yes</b>	<b>No</b>
<b>Copy of RFS Compliance Approval</b>	<b>Yes</b>	<b>No</b>
<b>Programming Kit</b>	<b>Yes</b>	<b>No</b>
<b>Technical/Service Manual</b>	<b>Yes</b>	<b>No</b>
<b>Completed Mobile Functionality Sheets</b>	<b>Yes</b>	<b>No</b>