

SPECIFICATION FOR TELECOMMUNICATIONS BASED PERSONAL EMERGENCY RESPONSE SYSTEMS (PERS)

PART 1 – ALARM EQUIPMENT PROVIDER TECHNICAL AND OPERATIONAL
REQUIREMENTS

OCTOBER 2016

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1. INTRODUCTION

1.1 PREFACE

This specification has been prepared by an independent standards expert and is intended to supersede the Australian standard 'AS 4607:1999 Personal Emergency Response Systems (PERS)' in New Zealand until such a time as the standard is revised or a New Zealand specific standard is written.

Where the Australian standard relates to Australian legislation and environmental conditions, this specification makes reference to New Zealand legislation and provides requirements for a New Zealand operating environment.

This specification is technology and materials agnostic and is intended as a set of minimum technical requirements for the delivery of a robust, resilient and safe telecommunications based Personal Emergency Response System (PERS), built with Redundancy.

All Alarm Equipment Providers (providing equipment, devices and systems) shall comply with this part (Part 1) of the specification.

Please note that the requirements for establishing the suitability of Alarm Equipment for a Client, planning for the deployment of a suitable Alarm Monitoring System and maintaining and supporting the installed Personal Emergency Response System is covered in *Specification for Telecommunications Based Personal Emergency Response Systems Part 2: Alarm Service Provider Requirements*. All Alarm Service Providers who are engaged in these activities shall comply with Part 2 of the specification.

1.2 SCOPE

This specification covers the technical requirements for a telecommunications based Personal Emergency Response System.

1.3 TERMS

Where system and device functions and features are critical to the deployment of a quality sustainable service, these are specified as mandatory requirements, using the word "shall" or "must". The word "should" is used for a recommendation and the word "may" is used to describe an option. Key terms with specific meaning for this specification have been capitalised.

General hardware requirements apply to all physical components of the system. Stage requirements are specific to each part of the system (see section 3 for general hardware and specific stage requirements).

1.4 UNIVERSAL DEFINITIONS & ACRONYMS

The following definitions and acronyms are common to both Part 1 and Part 2 of the Specification for Telecommunications Based Personal Emergency Response Systems (PERS):

UNIVERSAL DEFINITIONS

Additional Peripherals – any sensors or devices beyond the basic Trigger Devices that complement and expand the monitoring capability of the Communications Unit. These include environmental sensors (e.g. for temperature or humidity) as well as detector devices that alert the Client to dangers such as smoke or other toxic gases. Additional Peripherals can also include smart devices such as movement sensors that detect exceptions to normal behavioural patterns based on personally configured data, telemonitoring devices (such as blood pressure cuffs or weight scales) that measure and track vital signs, and basic devices such as bathroom pull cords set up as Trigger Devices. Activations via Additional Peripherals may occur automatically without human initiation or interaction.

Alarm Activation (or Activation) – the pressing of the help button on the Communications Unit, or a Trigger Device, or an automatic alert via an Additional Peripheral. An Activation shall trigger the Pre-Alarm Period and (if not cancelled by the Client) the transfer of an Emergency Call Event by the Communications Unit to the Alarm Monitoring System (AMS).

Alarm Equipment (or Client's Alarm Equipment) – a system used by the Client (usually an elderly or “at risk” person), to summon emergency help without the need to make a telephone call. The Alarm Equipment consists of various components including a Communications Unit, Trigger Device(s) and/or Additional Peripherals. In an emergency event, an Emergency Call Event is sent from the Alarm Equipment to the AMS.

Alarm Equipment Provider – the organisation that supplies the physical Alarm Equipment to the Client Alarm Service Provider, which shall be compliant with Part 1 of this specification. An Alarm Equipment Provider that is also an Alarm Service Provider (provider of Alarm Services), shall comply with both Part 1 and Part 2 of this specification.

Alarm Monitoring Facility (AMF) – a facility that contains monitoring equipment and a Client information system. The AMF receives notifications from Alarm Equipment including Emergency Call Events and Self-Check reports that have been processed by the Alarm Monitoring System (AMS).

Alarm Monitoring System (AMS) – the system that receives notifications from Alarm Equipment and forwards them to an Alarm Monitoring Facility and on to an Alarm Monitoring Team for response.

Alarm Monitoring Team (AMT) – the team charged with responding to alerts and notifications from Alarm Equipment, especially Emergency Call Events. They respond by taking appropriate action based on service levels agreed in Client contracts and/or Service Level Agreements (SLAs).

Alarm Service – the ancillary and ongoing service delivered by the Alarm Service Provider to the Client that facilitates or supports the Client's use of the Alarm Equipment including rental or purchase services, installation, monitoring, maintenance and response.

Alarm Service Provider – the organisation that provides the Alarm Services to the Client, which shall be compliant with Part 2 of this specification. An Alarm Service Provider that is also an Alarm Equipment Provider (supplier of the physical Alarm Equipment), shall comply with both Part 1 and Part 2 of this specification.

Client – a consumer of PERS services where a Client Service Agreement exists. This includes prospective and existing Clients, but excludes past Clients and those who have enquired about but declined the service.

Client Service Agreement - is a formal document outlining a service commitment provided by an Alarm Service Provider and their Client.

Client Service Representative (or CSR or Representative) – a member of the support team of the Alarm Service Provider organisation who responds to Client requests and enquiries, installs Alarm Equipment and services fault and maintenance requests, and/or monitors and responds to Emergency Call Events and other notifications from Alarm Equipment.

Communications (or Base or Alarm) Unit – the primary device acting as the collection and processing point for signals from all Trigger Devices and Additional Peripherals located at a Client property. The Communications Unit must be connected via an appropriate long range communication link to an Alarm Monitoring System, such that the link can pass any alerts and notifications originating from Additional Peripherals, Trigger Devices, or the Communications Unit through to an Alarm Monitoring Team. The Communications Unit must be capable of sending an Emergency Call Event to the Alarm Monitoring System, independently of Trigger Devices or Additional Peripherals. Where a communications pathway is available the Communications Unit must provide two way communication with the AMT. The Communications Unit should be able to generate an Emergency Call Event with full functionality at any moment throughout the full 30 hours of a power failure event.

Coverage – for portable Alarm Equipment, the geographic area in which the Alarm Equipment can communicate as intended with the Alarm Monitoring System. Coverage consists of two components:-
1) Coverage (At home) – The required parameters for correct operation of the Trigger function of the portable Alarm Equipment in and around the home of the Client, as tested at installation, and 2)
Coverage (Beyond home) – The required parameters for correct operation of the Trigger function of the portable Alarm Equipment beyond the range of the Client’s home. Coverage (Beyond home) of the Alarm Equipment is evaluated at installation, as is the network of the communications service used by the Alarm Equipment Provider. Choice of the network of the communications service determines the range of Coverage (Beyond home). For fixed Alarm Equipment, refer also to the term ‘Range’.

Dependent Communications Services – any devices or equipment under the Client’s control or in the Client’s home required for the operation of the Alarm Equipment. This could include a basic (POTS) telephone line, a broadband modem with Ethernet or Wi-Fi, or fibre equipment such as an ONT and router.

Emergency Call Out – any Emergency Call Event that leads to Emergency Services being sent to the Client’s home by the Alarm Monitoring Team.

Emergency Call Event – the signal sent from the Communications Unit to the Alarm Monitoring System indicating the Activation of a high priority triggered incident. It occurs post Activation and the Pre-Alarm Period.

Emergency Response Personnel – personnel duly authorised to respond to emergency situations as instructed by Emergency Services or Alarm Monitoring Teams.

Emergency Services – organisations tasked to deal quickly with emergencies when they occur; especially ambulance, police and fire services.

Indicators – audible and/or visual signs to advise status of the Communications Unit and connected Trigger Devices and Additional Peripherals (including normal operating, fault or error states).

New Zealand Radio Spectrum Requirements – such requirements as may be prescribed by regulations made under the Radio communications Act 1989 or by any other legislation regulating radio spectrum in force in New Zealand from time to time.

Nominated Contact – a person selected by the Client for notification following Emergency Call Events and other events related to their Alarm Service as outlined and agreed in the Client agreement.

Pre-Alarm Period/Pre-Alarm Process/Guard Time – this is the period immediately after an Activation occurs but prior to an Emergency Call Event being sent to the AMS. During this time an audible notification is sounded and the Client has the opportunity to cancel (i.e. not send) an Emergency Call Event to the Alarm Monitoring System. It is recommended that the Pre-Alarm Period is between 0-30 seconds.

Range Specification (or Range) – the distance from the Communications Unit in which a Trigger Device will continue to operate correctly. It consists of two components:- 1) Range Specification (Design) – The open space (i.e. direct line of sight with no obstructing physical barriers) design requirement, and 2) Range Specification (Home Installation) – The required parameters for continued correct operation of the Trigger Device in and around the home of the Client, as tested at installation. For portable Alarm Equipment that integrate the Trigger Device and Communications Unit into a single device, refer also to the term 'Coverage'.

Redundancy – duplication of system components so that services can continue to operate as intended, even if one component fails.

Self-Checking Function (or Self-Check or Automated Testing or Automated Self Checks) – a process whereby the core components of the Alarm Equipment are checked for correct operation with the results of such checks, including any fault conditions, being reported to the Alarm Monitoring System.

Service Check – a review completed by a Client Service Representative remotely or at the home of the Client to check the Client's Alarm Equipment is functioning as expected.

Service Funder (or Funder) – any third party organisation (private or public) providing funding to pay in part or in totality the PERS provided to the Client. Often the nature of the provision and the relationship between the Alarm Service Provider, Service Funder and the Client is formalised by way of a Service Level Agreement (SLA).

Service Level Agreement (SLA) – is a formal document outlining a service commitment provided by an Alarm Service Provider to a Service Funder in relation to their funded Clients.

Trigger Device (or Wearable Portable Trigger Device) – a portable means of Activating an Emergency Call Event via the Alarm Equipment. Trigger Devices are supplied with the Alarm Equipment and are worn by the Client. Their purpose is to make Activation easier and more convenient by avoiding the need to get to the Communications Unit or telephone in an emergency. Trigger Devices may take the form of a pendant or a wristband or other similar device with a single, simple Activation button or mechanism. Some Trigger Devices integrate Additional Peripheral functions into a single device (e.g. to alert about a fall, specific event, inactivity or other important condition).

UNIVERSAL ACRONYMS

AMS Alarm Monitoring System.

AMT Alarm Monitoring Team.

ONT Optical Network Terminator.

PERS Personal Emergency Response System (a.k.a. medical alarm). It incorporates the Alarm Equipment as well as the associated Alarm Service. See Figure 1 for more detail.

POTS Plain Old Telephone Service – this is a traditional voice telephone line.

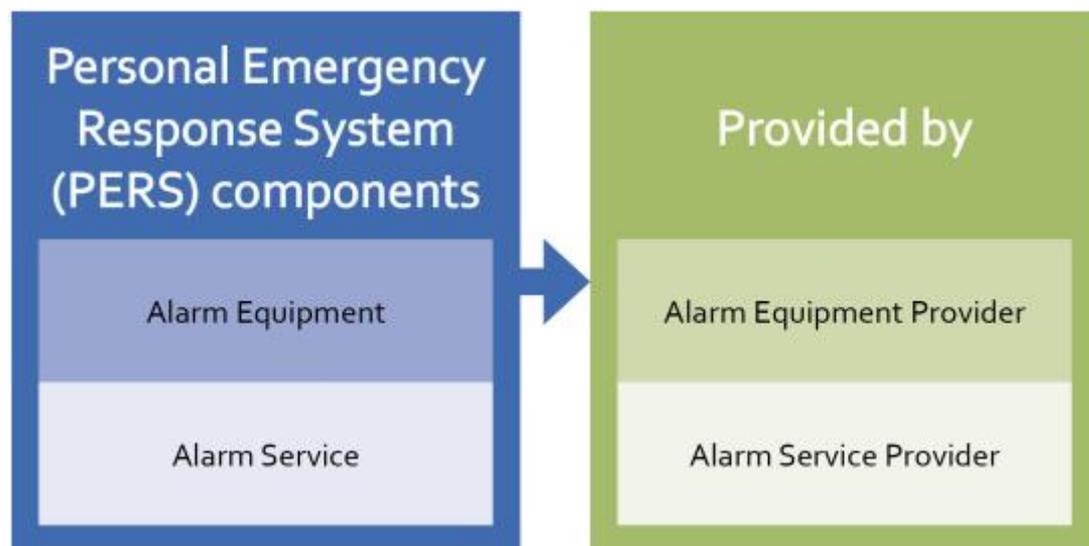


Figure 1 - Personal Emergency Response System (PERS) components and the Providers of those components

1.5 DEFINITIONS & ACRONYMS SPECIFIC TO PART 1

The following definitions and acronyms are specific to this Part 1 of the Specification for Telecommunications Based Personal Emergency Response Systems (PERS):

DEFINITIONS SPECIFIC TO PART 1

Mains Failure – when the mains electrical power source to the Communications Unit is no longer available. This could be due to a power supply network outage, a fuse board outage in the Client’s home, or a disconnection of the Communications Unit from the power supply plug or socket or damage to the power connection equipment.

Non-Volatile Memory – memory used for permanent storage of configuration and other settings so that these are not lost during power outages or during a reset operation.

Power Supply – the mains purpose built power supply to the Communications Unit, usually via a certified AC/DC plug pack.

Range Test Mode – a special mode on the Communications Unit that provides a margin of safety when testing the range of the Trigger Device. Used during the installation process when the communication

unit is installed in a client location and subsequent service visits, if required (such as replacement of Communications Unit due to fault or age of the Unit).

Reassurance Signal – an audio signal played by the Communications Unit, together with an optional audio/visual or vibration from the Trigger Device to indicate to the Client that their alarm Activation is being processed. A separate tone/pattern or message indicates that the Emergency Call Event has been successfully passed from the Communications Unit to the Alarm Monitoring System.

Response Time – the elapsed time from an Emergency Call Event arriving at the Alarm Monitoring Facility until the Alarm Monitoring Team attempts to make voice contact with the Client.

Safety Breaking Strength – the force that is required to cause cords, chains and straps worn by the Client, especially around the neck, to release in order to prevent injury if they become snagged.

ACRONYMS SPECIFIC TO PART 1

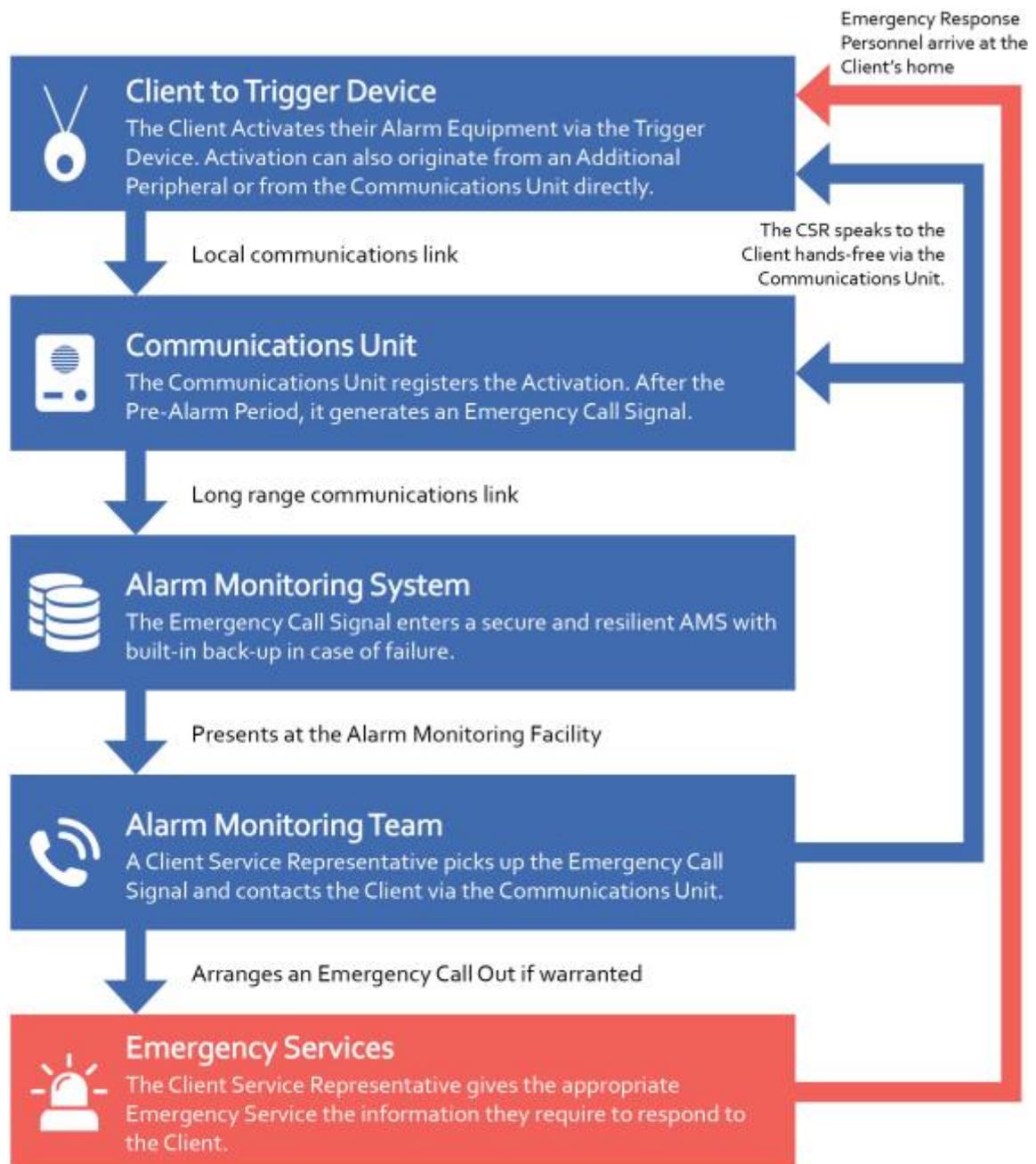
GPS	Global Positioning System.
IP	Internet Protocol.
ISP	Internet Service Provider.
PABX	Private Automatic Branch Exchange (Private telephone system).
SMS	Short Message Service (Cellular network text message).
UPS	Uninterruptible Power Supply.
VoIP	Voice over Internet Protocol.

2. PERSONAL EMERGENCY RESPONSE SYSTEM (PERS) OVERVIEW

Figure 2 shows how a typical telecommunications based PERS responds to an emergency experienced by the Client:

1. A Trigger Device worn by a Client is Activated.
2. It connects through a local communications link to a Communications Unit.
3. The Communications Unit connects to an Alarm Monitoring System through a long range communications link and sends an Emergency Call Event on to an Alarm Monitoring Facility.
4. At the facility an Alarm Monitoring Team consisting of Client Service Representatives pick up the Emergency Call Event.
5. A Client Service Representative contacts the Client to confirm that they need assistance. Upon confirmation, they organise for the appropriate Emergency Service to respond to the Client.

Figure 2 shows how a typical telecommunications based PERS functions. Other configurations may meet the same functional objectives.



Note: The Emergency Services stage above will not be defined in this specification as the process is the responsibility of the relevant Emergency Services Provider (e.g.. Fire, Police, Ambulance).

Figure 2 - Activation of a typical Personal Emergency Response System (PERS)

2.1 PERSONAL EMERGENCY RESPONSE SYSTEM (PERS) STAGES

For a Personal Emergency Response System to work reliably and effectively, each stage of the system must be set up correctly.

The stages defined in this specification are as follows:

1. Client to Trigger Device
2. Trigger Device to Communications Unit
3. Communications Unit to Alarm Monitoring System
4. Alarm Monitoring System to Alarm Monitoring Team

5. Alarm Monitoring Team to Client
6. Repeat step 1-5 until all peripherals and base unit have been successfully tested
7. Any unsuccessful tests should be rectified in line with the SLA

3. PERSONAL EMERGENCY RESPONSE SYSTEM (PERS) MANDATORY REQUIREMENTS

3.0 GENERAL HARDWARE REQUIREMENTS

The following requirements shall apply primarily to **all** Communications Units used in Alarm Equipment, but also to Trigger Devices and Additional Peripherals as applicable. Such Alarm Equipment shall be:

- a. Designed and manufactured fit for purpose to a recognised quality system (eg. ISO 9001), and subjected to unit testing of each unit during manufacturing.
- b. Wired in accordance with AS/NZS 3000 and the manufacturer's requirements.
- c. Designed with a safety margin to accommodate variations in environmental conditions.
- d. Designed to reduce the risk of corrosion or degradation due to vibration, with the minimum number of electromechanical components reasonably practicable.
- e. Designed to comply with AS/NZS CISPR22 for electronic emissions and AS/NZS 61000.6.1 for electronic immunity.
- f. Compliant with the New Zealand Radio Spectrum Requirements for frequency, power and channel bandwidth requirements and safety.
- g. Designed to operate in a temperature range of – 5 to 45 degrees Celsius.
- h. Designed to operate within a relative humidity range of 20% to 90% (non-condensing) at 30 degrees Celsius.
- i. Configured with Indicators to visibly and/or audibly warn of a fault condition.
- j. Configured with key operating parameters (that are required to successfully send an Emergency Call Event), loaded into Non-Volatile Memory so that they are not lost in a power outage.
- k. Configured so that when testing the Trigger Device at install, the Communications Unit or Trigger Device can be placed into Range Test Mode, which provides a safety margin of at least 6 dBm compared to the 'normal operation' Range.
- l. Configured to automatically time out and exit Range Test Mode after no more than 15 minutes of non-use.
- m. Able to be cleaned easily and safely (including by the Client) without compromising the design or function or safety or increase the risk of becoming hazardous.
- n. Able to report low battery status to the Client and to the AMS when power is provided from a battery and power capacity falls below 20%.

- o. Fitted with buttons or other mechanisms that are readily identified through a tactile or vibrating surface and/or distinguishable through the use of contrasting colours and/or symbols. There shall be an option for illumination for night time use, where Client interaction with the hardware component is required.
- p. Designed to support Clients with hearing, vision and movement impairment.
- q. Certified and tested according to relevant NZ authority where out of medical scope additional peripheral devices are configured.

3.1 STAGE 1 - CLIENT TO TRIGGER DEVICE

The Client shall be provided with at least one Trigger Device and instructed to wear it on their person at all times – advised of the benefits of wearing at all times and they must be made aware of any restrictions in use.

In addition to the General Hardware Requirements, Trigger Devices provided to the Client shall meet the following minimum requirements:

- a. Distinctly visible and readily identifiable.
- b. Lightweight, not easily removed accidentally and able to be worn over or under clothing for easy accessibility.
- c. Shower resistant, hot water proof to 60 degrees Celsius and to provide water proofing to IP67, as defined in the IEC 60529 standard.
- d. Drop resistant as tested by continued and correct functionality after a 5 times repeated free fall test from 1 metre (+/- 0.1 m) onto a smooth concrete surface not less than 10 mm thick.
- e. Uniquely paired to a Communications Unit.
- f. Able to be triggered, in any orientation, by a deliberate action such as press of a button or activation of a mechanism on the device for the duration of 0.25 second to 1 second.
- g. Designed with a Range Specification (Design) of at least 100 metres in open space. This requirement does not apply to portable Alarm Equipment that incorporates the Trigger Device and Communications Unit into a single device.
- h. Passed a Range Specification (Home Installation) test, confirming that the Trigger Device works correctly in all rooms in the home of the Client and at least 5 metres beyond the perimeter of the home. Ideally the Range should extend to the boundary of property immediately surrounding the Client's house as the Client is likely to access this area frequently. The Client shall be notified verbally, and should also be notified in writing, of locations within the boundary of the Client's property where the Trigger Device does not Activate (i.e. communication blind spots). This requirement applies to fixed Alarm Equipment only. For portable Alarm Equipment, refer to the following clause (clause i).
- i. Portable Alarm Equipment shall pass the following tests:
 - l. Portable Alarm Equipment with a fixed primary Communications Unit and an additional portable secondary Communications Unit:

- a. Shall pass a Range Specification (Home Installation) test for the fixed primary Communications Unit. This shall be the Communications Unit used when the Client is at home.
 - b. Shall pass a Coverage (Beyond home), test for the secondary Communications Unit such that the Trigger Device works correctly beyond the boundary of the Client's property.
 - c. Shall use a communications network service that provides Coverage within a reasonable radius of the Client's home (e.g. 2km) and to any close (e.g. 5km distance) townships. The extent of Coverage shall be confirmed during installation by checking the Coverage map of the chosen communications service.
- II. Portable Alarm Equipment that integrates the Communications Unit and Trigger Device into a single device:
- a. Shall pass a Coverage (At home) test confirming that the Trigger Device works correctly in all rooms in the Client's home and at least 5 metres beyond the perimeter of the Client's home.
 - b. Shall pass a Coverage (Beyond home) test such that the Trigger Device works correctly beyond the boundary of the Client's property.
 - c. Shall use a communications network service that provides Coverage within a reasonable radius of the Client's home (e.g. 2km) and to any close (e.g. 5km distance) townships. The extent of Coverage shall be confirmed during installation by checking the Coverage map of the chosen communications service.
- j. Tested at installation with the Trigger Device held or worn as intended for normal operation at standing height and at ground level.
 - k. The Trigger Device is recommended to provide a Reassurance Signal to confirm that the Activation is being processed by the Communications Unit.
 - l. Configured to reset immediately after Activation and to be able to send a repeat Activation.
 - m. Designed such that the neckband or wristband connected to the Trigger Device has a Safety Breaking Strength at a force approaching 50N. ("N" or "Newton" is a measure of force. 50 Newton of force is the force required to accelerate an object with a mass of 50 kilograms through 1 metre in one second.)
 - n. Designed for Trigger Device supervision such that a fault is registered with the Communications Unit if the Trigger Device becomes unpaired or faulty, or has moved out of range for a predetermined period (see 'Self Check and Security' section for more).
 - o. Fitted with batteries that:
 - I. Operate in a range of – 5 to + 45 degrees Celsius.
 - II. Do not require any maintenance in their life expectancy.
 - III. Have a 2-year minimum shelf life when stored at 20 degrees Celsius.

- IV. Operate for more than 4000 four second presses/Activations (permanent batteries) and 50 four second presses/Activations (rechargeable batteries).
 - V. Enable the device to send battery low status messages to the Communications Unit when the charge level falls below 20% capacity.
 - VI. Come with a replacement and maintenance programme that the Alarm Service Provider can follow. As a guideline, alkaline batteries should be replaced every 18 months and lithium batteries replaced every 7 years. Zinc Carbon batteries shall not be used at all. Where Clients buy the Alarm Equipment and assume responsibility for maintenance, they shall be provided with appropriate information and training by the Alarm Service Provider to ensure they can reasonably meet the requirements of the maintenance programme.
 - VII. In the case of rechargeable batteries (Trigger Devices only), have a battery level Indicator and a secondary Trigger Device with a secondary battery so one Trigger Device can be charging while the other is in use.
 - VIII. Cannot be changed easily by the Client, if the batteries are not intended to be user-replaceable. Where the Client buys the Alarm Equipment and assumes responsibility for maintenance, batteries should be able to be changed easily by the Client without the need for special tools.
 - IX. Have been installed and are operating in accordance with the manufacturers' instructions.
- p. Additional Peripherals, where fitted, shall meet these minimum requirements or conditions:
- I. 'Section 3.1, Stage 1 - Client To Trigger Device', clauses e, k, l and n.
 - II. Tested at installation and confirmed to have sufficient Range to function correctly in their intended location - client to be advised of performance and restrictions verbally.
 - III. Designed for supervision such that a fault is registered with the Communications Unit if the Additional Peripheral becomes unpaired or faulty.
 - IV. Placed so as not to create an additional hazard, such as a trip hazard.
 - V. Designed to meet any other requirements applicable to their specific use.

3.2 STAGE 2 - TRIGGER DEVICE TO COMMUNICATIONS UNIT

The Client shall be supplied with a fixed and/or portable Communications Unit to act as a communication aggregation point for all Trigger Devices and Additional Peripherals. In addition to the General Hardware Requirements, the Communications Unit shall meet the following minimum requirements:

3.2.1 HELP AND CANCEL FUNCTIONALITY

The Communications Unit shall be configured such that:

- a. It has both help AND cancel functionality. Where there is a help button, that button is to be at least 10 mm from other buttons and 15 mm in size across the diagonal. Note: In the case of portable Communications Units the following shall apply:

- I. Where the Alarm Equipment consists only of a portable device that integrates the Trigger Device and Communications Unit into the same device, and there is a help button, the help button is to be at least 2mm from other buttons and 10 mm in size across the diagonal.
 - II. Where the Alarm Equipment includes, in addition to a fixed 'home' based primary Communications Unit, a secondary, portable Communications Unit for use when the Client is away from home, the minimum requirement for any help button on the secondary Communications Unit shall be a single help button 10 mm in size across the diagonal. If a cancel button is available, it (as well as any other buttons) must be at least 2mm from the help button. If a cancel button is not available, the secondary Communications Unit should provide the Client with an alternative, simple and easy means of cancelling an Activation when using that device.
- b. Pressing the help button (or otherwise initiating the help functionality) will manually Activate the Communications Unit and send an Emergency Call Event to the Alarm Monitoring System.
 - c. Where there is a help button and a cancel button, if the help and cancel buttons are pressed simultaneously, the help button will override the cancel button and send an Emergency Call Event to the Alarm Monitoring System.
 - d. The cancel button, or the cancel feature, shall allow the Client to cancel an Emergency Call Event during the Pre-Alarm Period only. The Pre-Alarm Period shall be 15 seconds in duration for a fixed Communications Unit, but may be shorter (e.g. 10 seconds) for a portable Communications Unit.

3.2.2 ACTIVATION

Once the Communications Unit has been Activated by the help button (or help functionality), Trigger Device or an Additional Peripheral, then:

- a. If the Activation originates from a remote Trigger Device or Additional Peripheral, the Alarm Equipment will employ an appropriate coding system to uniquely identify the Trigger Device or Additional Peripheral. A recognised technique such as checksum or CRC error correction shall be used for the differentiation and validation of the coded signals from each other and from background noise.
- b. A visual Indicator shall display.
- c. An audible notification within the frequency band of 400 hz to 3 khz shall sound with either a pulsing frequency or a swept frequency tone at a minimum sound level of 70 dB(A) at a distance of 1 metre. This shall sound for the duration of the Pre-Alarm Period.
- d. When sending the Emergency Call Event, the Communications Unit shall use configured long range communication link(s) to connect to the Alarm Monitoring System and shall, if unsuccessful, re-try repeatedly until successful transmission has occurred, or maximum re-try attempts have been reached. An audible Reassurance Signal or tone pattern should be used to indicate that the Emergency Call Event has been sent to the Alarm Monitoring System.
- e. The Communications Unit shall be capable of operating in hands-free speakerphone mode or in such a way as to facilitate voice communication between the Alarm Monitoring Team and the Client in an emergency situation when the Client is at least one room removed from the location of the Communications Unit.

- f. The Communications Unit shall hold open a voice channel to the Alarm Monitoring System or permit the Alarm Monitoring System to call back for a period of 10-20 minutes following an Emergency Call Event upon which time the Communications Unit will auto answer in hands-free speakerphone mode. The Communications Unit shall not be capable of being used as a listening device except in a 20-minute period following receipt of an Emergency Call Event from the Communications Unit, or with the express permission and acknowledgement of the Client.
- g. The Communications Unit shall be ready to send further Emergency Call Events upon the conclusion and termination of the AMS call back/response.

3.2.3 INDICATORS

Visual Indicators on a Communications Unit shall be used to display to the Client, Communications Unit status and function mode, using a single light that changes colour or flashes according to status, or a series of lights, each associated with a different function of the Communications Unit. Indicators shall be configured as follows:

- a. Visual Indicators in a prominent position on the Communications Unit shall show unit on/off status, power status, long range communication link(s) status and shall display any Activations as they occur. Any fault conditions shall trigger within two minutes of an error occurring and stay illuminated until the issue is resolved.
- b. Accompanying audible Indicators should be used where warranted with the provision to avoid Clients being disturbed at night by a Communications Unit fault condition.

3.2.4 POWER

The Communications Unit shall be designed to be electrically safe and to meet the requirements of AS/NZS 3000, using extra low voltage via a transformer or plug pack Power Supply that meets the requirements of AS/NZS3260. In addition, a Communications Unit, which operates from mains power, shall:

- a. Report a Mains Failure to the AMS within 4 hours of the occurrence of the failure.
- b. Have battery back-up capacity of at least 30 hours (stand-by state) with the ability to send two Emergency Call Events at the end of the 30-hour battery powered period before exhaustion.
- c. Send a 'power failure' event and if not restored a 'battery low' event to the AMS when the battery level falls below 20% capacity.
- d. Be designed to maximise resistance to large transient voltage spikes, such as those experienced in lightning strikes, and to maximise electrical isolation between the communications and mains power circuitry.
- e. Be fitted with a power switch that is recessed or that works from a combination of button presses to avoid unintentional powering off by the Client.

3.2.5 SELF CHECK AND SECURITY

The Communications Unit shall be configured to highlight fault conditions through a regular checking facility such that:

- a. The Communications Unit conducts an automated, Self-Check of the Alarm Equipment's core components to ensure they are working correctly. The results of such checks, including any fault conditions, are reported to the Alarm Monitoring System for follow-up. Self-Checks shall occur at least once every 24 hours, and report on the following conditions:
 - I. Communications Unit status: - Battery low or failed to charge conditions
 - II. Trigger Device and Additional Peripheral status including:
 - i. Present and in-range devices. A fault condition shall be generated when devices have been absent for 4 days and continues to display this fault condition until resolved.
 - ii. Battery low conditions
 - III. State of the long range communications link to the Alarm Monitoring System inasmuch that a successful transmission of the Self-Check report confirms correct operation of the long range communications link.
- b. The Communications Unit transmits critical error faults or states to the AMS as they occur, and transmits non-critical error faults within 24 hours of fault occurrence. Critical error faults are faults that prevent the Alarm Equipment from being Activated or sending an Emergency Call Event to the AMS.
- c. All Communications Unit configuration settings are stored in Non-Volatile Memory to ensure they are not lost when the Communications Unit is powered off or reset.
- d. The Communications Unit data is secured behind a password or other method of user authentication, if the Communications Unit can be accessed or programmed remotely.

3.2.6 PORTABILITY

If the Communications Unit and/or Trigger Device is intended to be portable, such that it can operate beyond the home of the Client, then the following additional requirements apply:

- a. The device shall use an appropriate connectivity method to connect to the AMS ensuring the network of the chosen communications service delivers Coverage that meets the requirements of this specification. There must also be a Coverage Indicator on the Communications Unit to show if the Client is travelling out of network Coverage areas.
- b. A GPS value shall be transmitted with an Emergency Call Event, so that the location of the Communications Unit can be validated.
- c. The battery life requirement of a portable Communications Unit shall permit continuous operation for at least 30 hours before recharging is required.
- d. For a portable Communications Unit, 'Section 3.2.4 Power' of this specification does not apply. Rather, the Communications Unit shall send a 'battery low' signal to the AMS when the battery level drops below 20% capacity. All other requirements for the functionality of the Communications /Alarm Unit shall remain valid.

3.3 STAGE 3 - COMMUNICATIONS UNIT TO ALARM MONITORING SYSTEM (AMS)

The Communications Unit should connect to the Alarm Monitoring System (AMS) over a resilient long range communications link. A secondary long range communications link shall be available if the primary link relies on Dependent Communications Services (e.g. Client or ISP provided routers, ONT units, VoIP modems or PABX units) that do not have battery back-up, UPS or auxiliary power provision.

3.3.1 COMMUNICATIONS LINK PROVISION

The Alarm Equipment Provider shall:

- a. Select the most suitable Communications Unit and long range communications link for the Client and shall have a range of Communications Units available to cover different requirements for network provision and portability.
- b. Ensure that the configuration of the Communications Unit and communications link(s) are robust, resilient and compliant with this specification.
- c. Carry out an annual Service Check on the Communications Unit and trigger device(s) to ensure the Client is able to successfully complete a test Activation of their Alarm Equipment.
- d. Inform the Client of his/her responsibility to maintain provision (at their cost) of Dependent Communication Services (except where cellular Alarm Equipment is utilised).
- e. For New Zealand Government funded Clients, the Alarm Equipment Provider shall not charge the Client an additional fee for telecommunication service or messaging costs attributed to the Alarm Equipment. Where the Communications Unit includes a telephone feature that allows the Client to place and receive private telephone calls from the device, the Alarm Service Provider may charge market rates for these calls in addition to the PERS charge. All calls of this nature shall be detailed and invoiced separately and the Client shall have the right to refuse or cancel such features at any time.

3.3.2 GENERAL REQUIREMENTS FOR COMMUNICATIONS UNIT TO ALARM MONITORING SYSTEM COMMUNICATIONS

All communication links from the Communications Unit to the Alarm Monitoring System (AMS), including web based monitoring solutions, shall meet the following requirements:

- a. A communication protocol and data validation process shall be used to confirm that a message has been sent correctly.
- b. If a message has not been sent correctly, the Communications Unit shall re-attempt transmission until the message is successfully transmitted.
- c. Subsequent transmissions of Emergency Call Events from the Communications Unit shall present to the AMS no differently to the initial Emergency Call Event, i.e. subsequent transmissions of Emergency Call Events must not be suppressed, locked out, or ignored.

3.3.3 LONG RANGE COMMUNICATIONS LINK

A long range communications link between the Communications Unit and the AMS shall meet the following requirements:

- a. A Communications Unit using the home telephone line (POTS) connection shall be New Zealand telepermit approved.
- b. The Communications Unit connected using the home telephone line (POTS) shall assume highest priority by providing line grabbing capability to disable any off hook or busy handsets when outbound calling.
- c. A POTS connected Communications Unit shall be capable of dialling a range of AMS numbers, local and non-local, with different numbers configured to terminate on different answering equipment at the AMS.
- d. All components and network devices that together make up the long range communications link shall be clearly labelled as required for Alarm Equipment connectivity. They shall be set up so that they cannot be powered off accidentally.
- e. A Communications Unit connected through a Private Access Branch Exchange (PABX) should be subject to a formal change control process such that the Communications Unit is always tested after system level changes are made.
- f. A Communications Unit connected through a cellular network shall be certified for use by the relevant New Zealand network provider(s), and shall be configured with at least two answer point addresses, using two different network connections at the AMS.
- g. SMS texting from a Communications Unit shall not be used as a primary method to communicate Emergency Call Events.
- h. An internet connected Communications Unit shall be configured with at least two physically different answer point addresses, using two different network connections at the AMS.
- i. A Communications Unit connected through any other form of network shall comply with the relevant compliance requirements for that network, and should incorporate safeguards in terms of communication redundancy (multiple pathways) as well as network redundancy (multiple networks) wherever possible.
- j. In addition, POTS receivers in all cases, relevant handshaking protocols shall be used between the Communications Unit and AMS wherever possible. In addition, receivers in the AMS shall operate with passband, band rejection and dynamic range specifications that maximise clarity and minimise interference for all Client interactions through the Communications Unit.

3.4 STAGE 4 – ALARM MONITORING SYSTEM TO ALARM MONITORING FACILITY AND TEAM

3.4.1 AMS OPERATIONS

AMS infrastructure shall be designed for resilience to minimise potential points of failure for the receiving of, or responding to, Emergency Call Events. The following requirements shall also be met:

- a. The AMS shall operate an Uninterruptible Power Supply (UPS) capable of running the AMS for at least 12 hours (or 1 hour if there is a standby generator compliant to AS/NZS 3009). The UPS shall be serviced in accordance with the supplier and manufacturer instructions and tested every 3 months.
- b. The AMS standby generator shall be serviced in accordance with the supplier and manufacturer's instructions and run once a month for at least 30 minutes. It shall be capable at all times of providing uninterrupted power for 24 hours or longer.

- c. The AMS software shall be operated with current anti-virus definitions and operating system updates.
- d. The AMS shall be secured and protected by a maintained firewall that is continually monitored, and updated as required.
- e. A secondary AMS site shall be available with the ability to take Emergency Call Events with no disruption to service and to take over fully from the primary site within 2 hours of assuming control. It shall be geographically separate from the primary AMS site to ensure isolation from any natural or manmade events experienced by the primary site at any given time.
- f. The AMS shall perform a minimum of daily back-ups of all Client data to the secondary AMS site, with back-ups stored off site in a secure, fireproof storage facility or secure cloud storage service. Storage facilities shall comply with all relevant New Zealand standards for secure data storage.
- g. Where the Communication Unit is connected to the internet utilising the broadband or fibre network the local network must have battery back-up capacity of at least 30 hours (stand-by state) with the ability to send two Emergency Call Signals at the end of the 30-hour battery powered period before exhaustion.
- h. The AMS shall have the capability to monitor system stability and the availability of all long range communication links to the AMS software application. Any errors detected shall trigger an audible alert.
- i. In the event of a failure of the AMS software application, with the AMS infrastructure still fully operational, the Alarm Monitoring Team shall have access to a secondary AMS application or a paper-based process for recording Client Emergency Call Event and other notification information.
- j. Access to the AMS system shall be password protected or protected by effective access controls to prevent unauthorised access.
- k. The AMS shall be capable of answering all Emergency Call Events from Communications Units on the first attempt.
- l. Audible and visual alerts shall trigger in the AMS within 10 seconds of an Emergency Call Event being transmitted from a Communications Unit or Additional Peripheral device. Alerts shall be visible and audible to all AMT members in the AMF and shall not cease until acknowledged by a Client Service Representative.
- m. The AMS application software shall display the following Client details as a minimum when a notification such as an Emergency Call Event or Self-Check fault is reported:
 - I. Communications /Alarm Unit ID
 - II. Client name
 - III. Client phone number
 - IV. Client address or GPS co-ordinates
 - V. Type of notification received
 - VI. Date and time stamp of notification received
- n. The AMS application software shall allow the input of details regarding notifications received and any resulting actions that followed. A complete history shall be retained for a period of at least 7 years.
- o. The AMS may be hosted on a third party or cloud based service, provided:
 - I. Evidence of compliance with all AMS requirements can be provided.
 - II. The AMS can be accessed and monitored via two different and separate network connection modes.
 - III. Evidence of sound data governance can be provided.
 - IV. Data protection, security and access methodologies can be identified and demonstrated.
 - V. The AMS hosting service can provide confirmation that data ownership remains with the AMS of the Alarm Service Provider at all times.

- VI. The AMS hosting service can provide confirmation that unauthorised data access can be prevented.
- VII. In cases where the AMS is hosted outside New Zealand, the AMS of the Alarm Service Provider should satisfy the requirements of New Zealand privacy legislation.

3.5 STAGE 5 – ALARM MONITORING TEAM TO CLIENT

3.5.1 AMS CALL HANDLING

Notifications will arrive into the AMS from the Communications Unit to alert the Alarm Monitoring Team of Emergency Call Events, fault Indicators and the successful completion of Self-Checks. The AMS shall be configured for the Alarm Monitoring Team to handle notifications as follows:

- a. Emergency Call Events into the AMS shall be acknowledged and responded to by the Alarm Monitoring Team with urgency and within the timeframe (Response Time) set in the respective Service Funder Service Level Agreement and/or Client agreement which is to achieve minimum within 2 minutes timeframe (Response Time) for 95% of Emergency Call Events.
- b. When voice contact cannot be made with the Client, the call shall be treated as an emergency incident.
- c. The Alarm Monitoring Team shall be responsible for ensuring that the appropriate Emergency Services centre is connected with the Client following an Emergency Call Event, and that relevant Client information has been supplied to ensure that if an Emergency Call Out is required, Emergency Response Personnel can respond accordingly.
- d. The Alarm Monitoring Team shall be responsible for ensuring that the Emergency Services centre has acknowledged assumption of responsibility for the Client.
- e. The Alarm Monitoring Team shall be responsible for confirming and documenting the outcomes of each contact with the Emergency Services centre in response to an Emergency Call Event.
- f. Fault alerts and non-critical alerts shall be escalated to the Nominated Contact(s) of the Client for follow-up, but the Alarm Monitoring Team shall retain responsibility for closing each open issue within the time frames stipulated in respective Service Level Agreements and/or Client agreements.
- g. In cases of widespread outages or faults (e.g. mains power failure throughout a geographic area) with subsequent high reporting rates from Communications Units in that area, the AMF management shall have discretion to delay contacting Clients pending resumption of the affected service to the geographic area.

4. REFERENCE DOCUMENTS

TSANZ Code of Practice v1.7

AS/NZS 3000 Electrical installations

AS/NZS 3009 Electrical Installations – Emergency power supplies in hospitals

AS/NZS 3100 Approval and test specification – General requirements for electrical equipment

AS/NZS 3260 Approval and test specification – Safety of information technology equipment including electrical business equipment

AS/NZS 61000 Electromagnetic Compatibility

AS/NZS CISPR 22 Information technology equipment – Radio disturbance characteristics-Limits and methods of measurement.

IEC 60529 Degrees of protection provided by enclosures (IP codes)

NZ Telepermit Permit to Connect Specifications

NZ Radio Spectrum Management Compliance standards for EMC & Radio