# TP9900 Multiband, Multi-Protocol Portable Radio

## User's Guide

MPH-00006 - Issue 01 - June 2024

www.taitradio.com

# 1 Contents

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Tait will comply with environmental requirements in other markets as they are introduced.

# About this Guide

## Scope of Manual

This manual provides information about all TP9900 Multiband, Multi-Protocol Portable Radios.

To check the radio's firmware version, see "Viewing Radio Information" on page 108. If the radio does not operate as expected, please contact the radio provider for assistance.

## Alerts

Please follow exactly any instruction that appears in the text as an ‘alert’. An alert provides necessary safety information as well as instructions about the proper use of the product. This manual uses the following types of alert:

**Warning** This alert is used when there is a hazardous situation which, if not avoided, could result in death or serious injury.

This alert is used when there is a hazardous situation which, if not avoided, could result in minor or moderate injury.

**Notice** This alert is used to highlight information that is required to ensure procedures are performed correctly. Incorrectly performed procedures could result in equipment damage or malfunction.

This alert is used to highlight significant information that may be required to ensure that you perform procedures correctly, or to draw your attention to ways of doing things that can improve your efficiency or effectiveness.

## Associated Documentation

The following associated documentation for this product is available on the Tait Partner Portal.

- MPD-00002-xx TP8000/TP9000 Battery Charging Guide
- MTA-00011-xx TM8000/TP8000/TM9000/TP9000/TU2000 Safety and Compliance Information
- MPH-00005-xx TP9900 Specifications Manual

The characters **xx** represent the issue number of the documentation.

Technical notes are published from time to time to describe applications for Tait products, to provide technical details not included in manuals, and to offer solutions to any problems that arise. Look for new or updated technical notes on the Tait Partner Portal

## Publication Record

| Issue | Publication Date | Description |
|---|---|---|
| 1 | June 2024 | First Release |

# 1 For your safety

Before using the radio, please read the following important safety and compliance information.

## 1.1 Radio frequency exposure information


For individual safety and to ensure compliance with the radio frequency (RF) exposure guidelines of the United States Federal Communication Commission's (FCC), Industry Canada, and those from other administrations, please read the following information before using this radio.

### 1.1.1 Using this radio

This radio should only be used for work-related purposes (it is not authorized for any other use) and when the user is fully aware of, and can exercise control over, exposure to RF energy. To prevent exceeding FCC RF exposure limits, the user must control the amount and duration of RF that they and other people are exposed to.

It is also important that you:

- Do not remove the RF Exposure label from the radio.
- Ensure this RF exposure information accompanies the radio when it is transferred to other users.
- Do not use the radio if you do not adhere to the guidelines on controlling your exposure to RF.

### 1.1.2 Controlling exposure to RF energy

This radio emits radio frequency (RF) energy or radio waves primarily when calls are made. RF is a form of electromagnetic energy (as is sunlight), and there are recommended levels of maximum RF exposure.

To control your exposure to RF and comply with the maximum exposure limits for occupational/controlled environments, follow these guidelines:

- Do not talk (transmit) on the radio more than the rated transmit duty cycle. This is important because the radio radiates more energy when it is transmitting than when it is receiving.
- When listening and talking on the radio, hold it upright in front of your face so that it is at least one inch (2.5cm) away from any part of your face. Keeping the radio at the recommended distance is important because exposure to RF decreases rapidly the further away the antenna is from your body.
- Keep the antenna at least one inch (2.5cm) from your face at all times.
- If you wear the radio, you must always put it in a carrying accessory that has been specifically approved by Tait for this radio. Using non-approved body-worn accessories may mean you expose yourself to higher levels of RF than recommended by the FCC's occupational/controlled environment RF exposure limits.
- Ensure you only use Tait-approved antennas, batteries, and accessories.

For more information on what RF energy is and how to control your exposure to it, visit the FCC website at www.fcc.gov/oet/rfsafety/rf-faqs.html.

### 1.1.3 Compliance with RF energy exposure standards

This two-way radio complies with these RF energy exposure standards and guidelines:

- United States Federal Communications Commission, Code of Federal Regulations; 47 CFR §§ 1.1307, 1.1310, and 2.1093.
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers (IEEE) C95.1-1992.
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999 Edition.

- European Directive 2004/40/EC on minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields).

This radio complies with the IEEE and ICNIRP exposure limits for occupational/controlled RF exposure environments at operating duty factors of up to 50% talk to 50% listen.

## 1.2 Radio frequency emissions limits in the USA

### 1.2.1 CFR Title 47 Part 15.19 (a) (1) - Receivers

Part 15 of the FCC Rules imposes RF emission limits on receivers. This radio complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

### 1.2.2 CFR Title 47 Part 15.19 (a) (3) - All other devices

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions. (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

## 1.3 Radio frequency emissions limits in Canada

This device complies with Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de license. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

## 1.4 USA public safety bands (764–776MHz and 794–806MHz)

The Code of Federal Regulations (CFR) Title 47 Subpart R deals with the use of frequencies in the 764 to 776MHz and 794 to 806MHz bands.

### 1.4.1 Low-power channels

This radio complies with §90.531 (b) (3) and §90.531 (b) (4) of 47 CFR. These sections state that only low-power transmission is permitted on the following channels:

- Regional Planning channels, as defined in §90.531 (b) (3).
- Itinerant channels, as defined in §90.531 (b) (4).

### 1.4.2 Use of encryption

This radio complies with §90.553 (a) of 47 CFR. This states that:

- Encryption is not permitted on the nationwide Interoperability calling channels. These channels are defined in §90.531 (b) (1) (ii).
- Radios using encryption must have a readily accessible switch or control to allow the radio user to disable encryption.

## 1.5 EMC regulatory compliance in Australia

This product meets all ACMA regulatory requirements for electromagnetic compatibility (EMC). For more information about EMC compliance, visit the ACMA website at www.acma.gov.au.

## 1.6 Frequency band reserved for distress beacons

Frequency band 406 to 406.1 MHz is reserved for use by distress beacons. Transmissions should not be made within this frequency band.

## 1.7 Health, safety and electromagnetic compatibility in Europe

In the European Community, radio and telecommunications equipment is regulated by Directive 2014/53/EU. The requirements of this directive include protection of health and safety of users, as well as electromagnetic compatibility.

### 1.7.1 Intended purpose of product

This product is an FM radio transceiver. It is intended for radiocommunication in the Private Mobile Radio (PMR) or Public Access Mobile Radio (PAMR) services, to be used in all member states of the European Union (EU) and states within the European Economic Area (EEA).

### 1.7.2 Restrictions

This product can be programmed to transmit on frequencies that are not harmonized throughout the EU/EEA, and will require a license to operate in each member state.

This product can be programmed for frequencies or emissions that may make its use illegal. Where applicable, a license must be obtained before this product is used. All license requirements must be observed. Limitations may apply to transmitter power, operating frequency, channel spacing, and emission.

### 1.7.3 Declaration of conformity

Brief Declarations of Conformity appear under "Simplified Declaration of Conformity" on page 111 of this booklet. To download the formal declaration of conformity, go to https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity.

## 1.8 Interference with electronic devices

**Warning** Some electronic devices may be prone to malfunction due to the lack of protection from RF energy that is present when the radio is transmitting.

Examples of electronic devices that may be affected by RF energy are:

- aircraft electronic systems
- vehicular electronic systems such as fuel injection, anti-skid brakes, and cruise control
- medical devices such as pacemakers and hearing aids
- medical equipment in hospitals or health care facilities.

Switch off the radio before boarding an aircraft. Using the radio while in the air is not permitted.

Consult the manufacturer (or its representative) of any such electronic devices to determine whether electronic circuits in those devices will perform normally when the radio is transmitting.

**Warning**
If you have a pacemaker:

- immediately turn off the radio if you suspect it is interfering with the pacemaker
- keep the radio at least 6 inches (15cm) from the pacemaker while the radio is on
- use the radio on the side opposite to the pacemaker to minimize interference
- never carry the radio in a breast pocket

If there is interference between your hearing aid and the radio, please discuss an alternative solution with the hearing aid manufacturer.

## 1.9 Potentially explosive atmospheres and blasting areas

**Warning** Unless the radio is specifically certified for use in a potentially explosive atmosphere, turn off the radio before entering such an atmosphere. An explosion could cause serious injury or death. Examples of potentially explosive atmospheres include filling stations, and any environment where there are flammable liquids, gases, or dusts.

**Warning** Turn off the radio before approaching blasting caps, a blasting area, or any area where you are instructed to turn off a two-way radio. Obey all signs and instructions. Interference with blasting operations could cause serious injury or death.

## 1.10 Radio installation and operation in vehicles

**Warning** Keep the radio away from airbags and airbag deployment areas. Do not install, charge, or place a radio near such areas. An activated airbag can propel a portable radio with sufficient force to cause serious injury to vehicle occupants. An airbag may not perform to specification if obstructed by a radio.

**Warning** To avoid damage to existing wiring, airbags, fuel tanks, fuel and brake lines, or battery cables, refer to the installation guide for the radio, and to the vehicle manufacturer’s manual, before installing electronic equipment in the vehicle.

Using a handheld microphone or a radio while driving a vehicle may violate the laws and legislation that apply in your country or state. Please check the vehicle regulations in your area.

## 1.11 Vehicle charger installation and operation

For detailed instructions necessary to the safe installation and operation of the vehicle charger, please refer to the documentation supplied with the vehicle charger.

## 1.12 Multicharger safety information

**Warning** This device must be connected to an earthed mains socket-outlet.

## 1.13 Electromagnetic compatibility in European vehicles

In the European Community, radio equipment fitted to automotive vehicles is regulated by UNECE Regulation R10 Revision 5 and its amendments. The requirements of this regulation cover the electromagnetic compatibility of electrical or electronic equipment fitted to automotive vehicles.

## 1.14 Unapproved modifications or changes to radio

The radio is designed to satisfy the applicable compliance regulations. Do not make modifications or changes to the radio that are not expressly approved by Tait. Failure to do so could invalidate compliance requirements and void the user's authority to operate the radio.

### 1.14.1 Attaching of labels

**Warning** Do not obstruct the vent hole on the battery or the vent hole on the radio chassis label. If the vent on the battery is obstructed, the battery may explode, causing personal injury and/or damage to property. If the vent on the radio is obstructed, audio quality and/or key function may deteriorate and radio seals may be damaged.

Tait recommends that you do not affix additional labels to the surfaces between the radio chassis and the battery. The fit between these surfaces is intentionally firm and any added thickness will damage the points of attachment between radio and battery. If you must attach a customized label, use only a thin gummed paper label applied to the bottom 25% of the radio chassis label and/or to the top 25% of the battery label. Do not obstruct the vent holes (see Warning above). Do not allow the paper label to extend beyond the recessed label area or to conceal relevant product information.

### 1.14.2 Use of lithium-ion batteries

**Warning** A damaged battery can cause an explosion or fire, and can result in personal injury and/or property damage. To prevent personal injury and/or damage to property, read the important safety information supplied with the battery.

### 1.14.3 Short-circuiting battery contacts

**Warning** Do not short-circuit the battery contacts, neither intentionally nor accidentally, e.g. by placing the battery with conductive materials such as keys or jewelry inside a pocket or container. Short-circuiting the battery contacts can heat up the conductive material and cause personal injury and/or damage to property.

# 2 Before Using the Radio

## 2.1 For your safety - Battery Warning

**Warning** This radio uses a lithium-ion battery. If the battery is damaged or handled in an unsafe manner, it can cause personal injury and/or damage to property. Read the important safety information included with the battery.

## 2.2 Attaching labels to the Radio or Battery

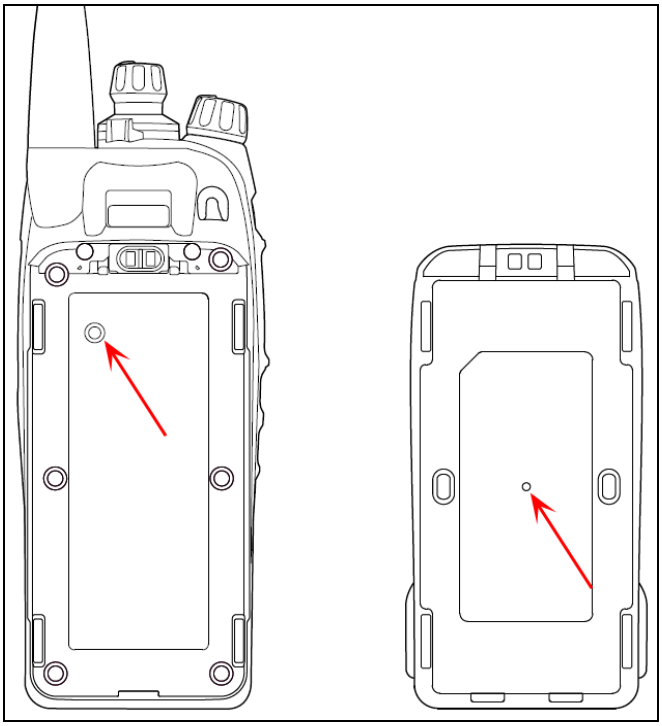


**Figure 2.1 Radio chassis and battery vent holes**

## 2.3 Attaching a Label to the Front Panel

If a customer requires an additional label, attach the label in the spare label recess in the bottom surface of the radio front panel. In this position, the label is still visible while the battery is attached to the radio.

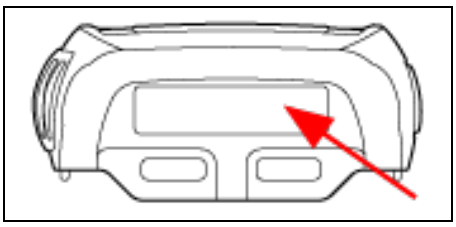


**Figure 2.2 Spare label recess**

The diagram below shows the specified dimensions of the label.

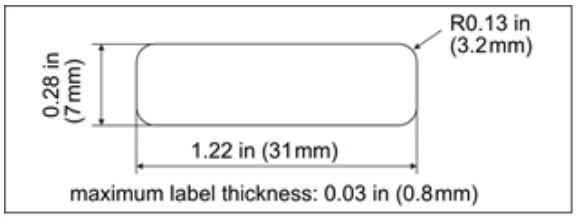



**Figure 2.3 Spare label dimensions**

4-key models have a specially designed recess for custom labels.

Users can also stick labels over the top of the model label. This recess will accommodate 1/4" label maker labels. Please ensure the labels have a suitable adhesive surface before application.

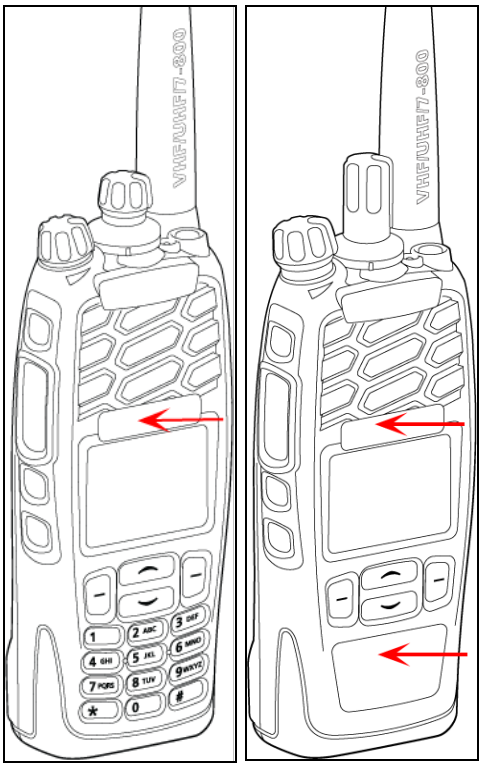


**Figure 2.4 Location of model and custom labels**

Tait offers custom labelling for TP9900s. Contact your Tait representative for more information.

## 2.4 Charging the Battery Before First Use

Before using the battery for the first time, it must be charged. Follow the instructions included with your Tait charger.

For best charging performance, switch off the radio before placing it in the charger.

### 2.4.1 2.4.1 Li-ion batteries

Fully charge a Li-ion battery before using it for the first time. This will take up to 3 hours. It is not necessary to prime a Li-ion battery.

## 2.5 Attaching the Battery

**Warning** Use only genuine Tait manufactured batteries with Tait radios. Fitting a battery that is not Tait-approved may damage the radio or cause harm.

1. Rotate the power/volume control switch counterclockwise to turn off the radio.
2. Holding the radio firmly, align the back of the battery with the back of the chassis.
3. Place the two lugs at the bottom edge of the battery into the two slots in the bottom of the front panel.
4. Lightly press the top of the battery towards the radio until the battery catch clicks.
5. Make sure that the battery is firmly in position.

If the battery has been attached while the radio is turned on, turn the radio off and then on again before use.

## 2.6 Removing the Battery

**Warning** Do not change the battery in a hazardous location. An explosion could cause serious injury or death.

The battery is secured to the radio by a battery catch in the radio's rear panel.

To remove the battery from the radio so that the battery can be charged or replaced:

1. Rotate the power/volume control switch counterclockwise to turn off the radio.
2. Slide the battery catch up.
3. From the sides, pull (tilt) the top end of the battery away from the radio.
4. Lift the lugs at the bottom of the battery upwards out of the mating features at the bottom of the radio body.

If the battery has been removed while the radio is turned on, turn the radio off and then on again before use.

## 2.7 Attaching the Antenna

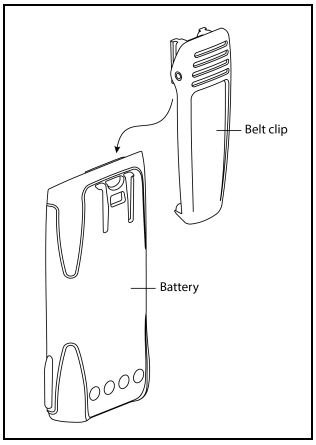
Before using the radio, screw the antenna clockwise into the antenna connector. The antenna should be screwed sufficiently tight so that it doesn't unscrew easily. This is important as it creates a seal.

## 2.8 Removing the Antenna

**Warning** Do not change the antenna in a hazardous location. An explosion could cause serious injury or death.

Use a firm grip and turn the antenna counterclockwise half a turn. Use a lighter grip to fully unscrew the antenna, and carefully remove it.

## 2.9 Attaching a Belt Clip




### 2.9.1 To attach a belt clip to the radio

1. Slide the belt clip into the two grooves at the top of the battery.
2. Press down on the belt clip until it snaps into place.

## 2.10 Removing a Belt Clip

The belt clip has been designed to prevent accidental removal, but it can be removed, if required.

To remove a belt clip from a battery:

1. Insert a flat screwdriver blade or similar flat object under the lip of the release lock (that is, between it and the metal slider).
2. Lift the release lock up (away from the metal slider) and hold it in position.
3. Slide the belt clip out.

## 2.11 Installing an Audio Accessory

**Warning** Use only Tait-supplied, or Tait-approved audio accessories with Tait radios. Fitting an audio accessory that is not Tait-approved may result in a poor user experience. For an up-to-date list of approved audio accessories, contact your regional Tait office.

Audio accessories plug into the radio's accessory connector. The accessory connector is protected by a cover, which needs to be removed before an accessory can be installed.

**Notice** The accessory cover protects the accessory connector from electrostatic discharge. Keep the cover in place unless the connector is in use.

### 2.11.1 Removing the accessory cover

1. Use a coin or other blunt object to loosen the screw that secures the accessory cover to the radio.
2. Remove the accessory cover and store it in a safe place.
3. Plug the accessory into the accessory connector.
4. Tighten the screw.

The screw only needs to be finger tight when assembling the accessory and replacing the accessory cover.

### 2.11.2 Installing an Accessory Connector

To prevent damage to the radio and accessory connector, angle the connector as shown. Insert the top of the connector ① into its designated groove, then press the bottom of the connector ② into the pins.

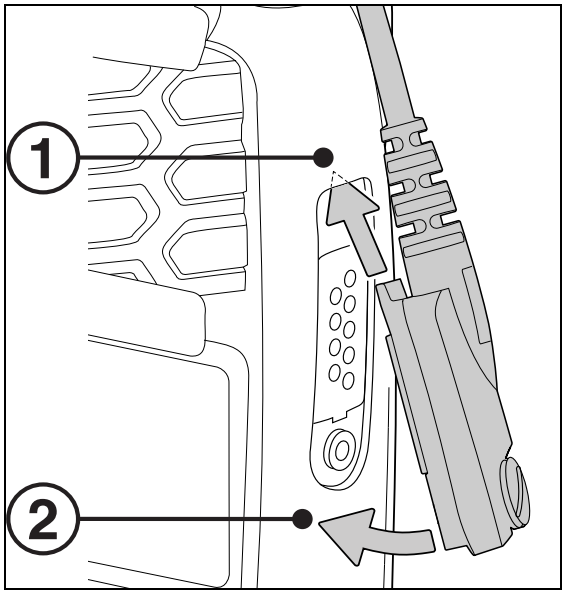



**Figure 2.5 Accessory connection instructions**

Do not slide the accessory's connector along the radio connector's pins – doing so will damage the radio's connector and may prevent a reliable connection to the accessory.

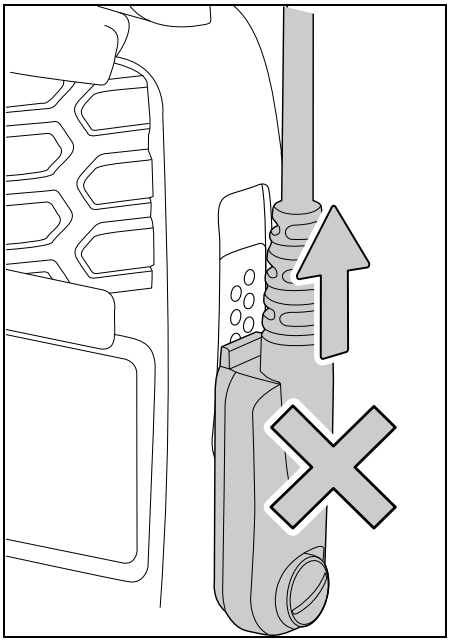


**Figure 2.6 Improper connection method**

# 3 Getting Started

This section provides an overview of the TP9900 Multiband, Multi-Protocol Portable Radio. It describes the radio's controls and indicators, and explains how the radio menus are organized.

## 3.1 Setting and Viewing the Radio's Time and Date

The radio may be programmed to use its internal real-time clock. It may be possible to view the time and date via a function key or via the radio menu. Other features may also make use of the radio's time and date by showing entries based on the current clock setting.

### 3.1.1 Setting the time, date, and time format

The radio may be programmed to allow you to set time and date manually, or time and date can be updated using a GPS source.

1. Press **Menu** and select **Time and Date** and the corresponding option.
2. Follow the prompts on the display.

### 3.1.2 Viewing the time and date

Press **Menu** and select **Time and Date** > **View clock** (depending on how the radio is programmed, it may be possible to press a function key to view the time and date).

## 3.2 About the radio

The TP9900 supports both digital and analog modes.

Differences between digital and analog calls can be noticed in terms of static noise in low signal areas and radio coverage in marginal reception areas.

### 3.2.1 Programming modes

TP9900 radios can be programmed for operation on P25 Phase-1 Conventional, P25 Phase-1 and Phase-2 Trunked, DMR Tier II Conventional, DMR Tier III Trunked, MPT1327 Analog Trunked and Analog Conventional systems.

In DMR Tier III, MPT1327 Trunked and P25 Conventional operation 'dual-mode' network configuration allows the radio to receive both digital and analog calls.

### 3.2.2 Lack of static noise

On digital networks there is no static noise, even in low signal areas. This lack of static is because the digital radio removes the 'noise' from the call, so that only clear voice is audible.

### 3.2.3 Active noise cancellation

Active noise cancellation uses a secondary microphone to actively filter out background noise in loud and noisy environments. This feature is available in both analog and digital modes. When the radio's internal speaker is being used, a microphone on the back of the radio is utilized as the secondary microphone.

When a wired accessory speaker/microphone is being used, the radio's internal front speaker is utilized as the secondary microphone.

When using a Bluetooth audio device, active noise cancellation (secondary microphone) is not enabled. To optimize its performance, Tait recommends positioning the microphone 1 - 2 inches (2.5 - 5 cm) from the mouth and speaking directly into it. Additionally, it is essential to ensure that the rear microphone remains uncovered by your hand or clothing during calls.

**Warning** Active noise cancellation can be left on regardless of environment. However, for better audio performance, Tait recommends turning it off in quiet areas.

### 3.2.4 Coverage

With digital networks, a call remains clear and then drops off quickly at the border of a coverage area. The reason for this is that a digital call is either received or it isn't. With analog networks, the background noise in a call gets progressively worse when the user is in fringe areas or even slightly outside normal coverage areas.

### 3.2.5 What is audible on an analog channel

On analog channels, the radio may be programmed so that all conversations on a channel can be heard, or one user group may be segregated from other user groups through special signaling. The special signaling is used to control the muting and unmuting of radios, so that the radio is muted when other user groups are talking and unmuted for members of your user group.

There are two muting controls that operate in the radio:

#### Signaling mute

The radio’s signaling mute only allows the radio to unmute if the incoming call carries the tones specific to your user group. Your user group may use tones that are either audible, subaudible or both.

#### Squelch

The radio’s squelch function allows the radio to unmute only when the strength of the incoming signal is above a predetermined threshold. This means that only signals of reasonable intelligibility are made audible.

## 3.3 About the Radio Controls

The radio controls and their functions are described in subsequent sections.

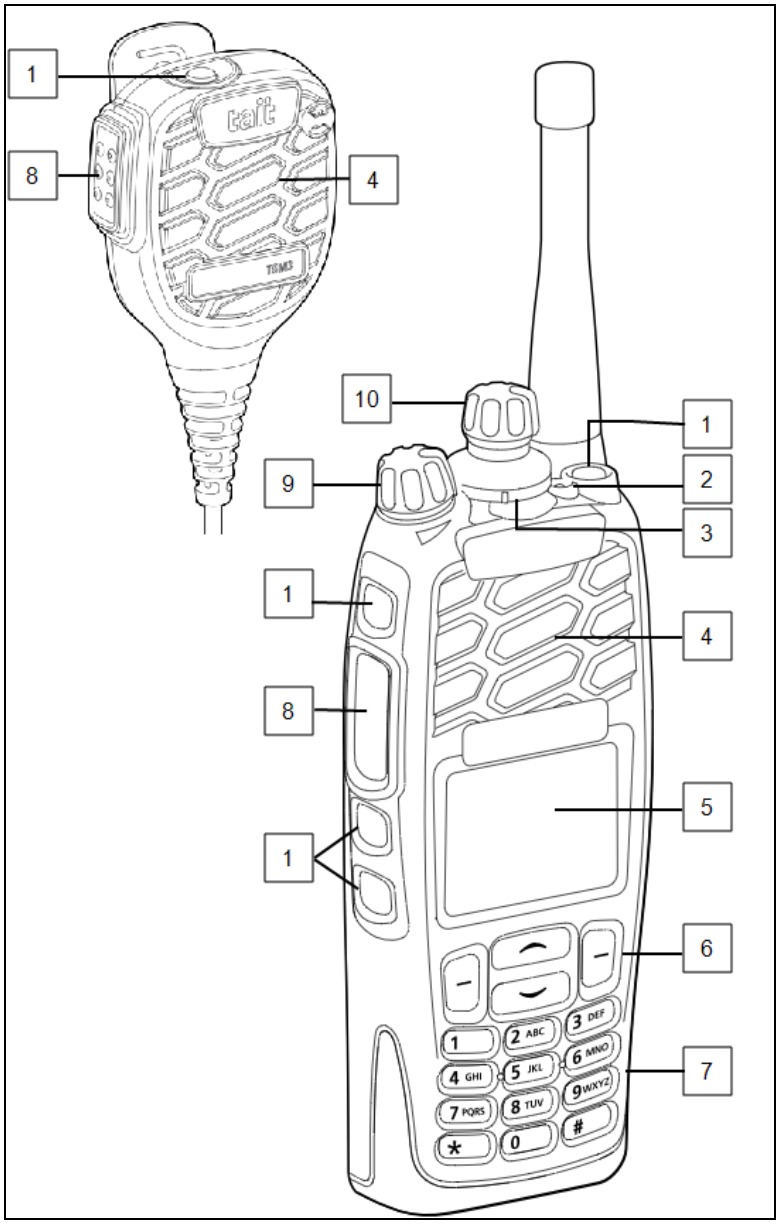



**Figure 3.1 Radio Control Functions**

**Table 3.1 Radio controls**

| | Name | Function |
|---|---|---|
| 1 | Function keys | As programmed |
| 2 | Status LED | To provide information about the state of the radio |
| 3 | 3 way selector | To select frequent functions |
| 4 | Speaker/microphone | Where audio signals are played |
| 5 | Display | Screen that shows menus and messages |
| 6 | Scroll and selection keys | To select a menu option or scroll |
| 7 | Alphanumeric keys | To enter numbers and letters |
| 8 | Push To Talk (PTT) | Press and hold to speak, release to listen |
| 9 | Volume on/off | Turn to the left to reduce the volume or switch off, turn to the right to switch on or increase the volume |
| 10 | 16 way selector | Turn to select channels |

## 3.4 Understanding the Radio Display

The messages and icons on the radio display depend on the mode in which the radio is operating and the way it is programmed.

### 3.4.1 Radio display icons

These are some of the icons you may see on the radio display:

**Table 3.2 Icon descriptions**

| Icon | Meaning |
|---|---|
|  | Battery indicator: shows how much charge is available in the battery |
|  | Scanning: the radio is monitoring a group of channels or talkgroups for activity |
|  | Silent operation: the radio's audible tones have been turned off |
|  | Low-power transmit: the radio is transmitting in low power |
|  | Transmit: the radio is transmitting |
|  | Automatic/Manual mode: automatic channel or zone selection has been turned on/off |

| Icon | Meaning |
|---|---|
|  | Bluetooth Audio Device Connected: there is a Bluetooth audio device connected to the radio<br>Flashing: the radio is attempting to connect to a Bluetooth audio device, or the device connection has been lost |
|  | Scrambler: the voice-inversion scrambler is turned on (analog channels only)<br>Encryption: the radio's transmissions are encrypted |
|  | Signal strength indicator: the more bars, the stronger the signal being received by the radio |
|  | Scrolling: you can use  or  to move through a list, or access a pre-programmed menu |
|  | Queuing: there are calls or messages in the queue |
| **Trunked mode icons** | |
|  | Scanning: scanning has been turned off |
|  | Homegroup: the radio has been returned to the homegroup using the homegroup toggle function key |
|  | Network (steady): the radio is registered on a DMR or MPT trunked network<br>Network (flashing): the radio is hunting for a trunked network<br>Trunking system available: the radio is operating on a P25 trunking system |
|  | ‘Full’ queuing activated: all calls and messages are sent directly to the queue (see "Checking the queue" on page 44) |
|  | Trunking: the radio has established a call and you are now able to speak to the other party |
| **Conventional mode icons** | |
|  | Monitor or squelch override: monitor or squelch override is turned on |
|  | Scanning: the radio is monitoring a group of channels or talkgroups for activity, and the currently selected channel or talkgroup is a member of the scanning group |
|  | Repeater talkaround: the radio is operating in repeater talkaround mode, or you are on a simplex channel |
|  | Zone: this letter represents the zone in which the radio is operating, where A is zone 1, Z is zone 26 |

## 3.5 Understanding the Radio Indicators

The status LED indicator and the radio's audible tones—together with the radio display—all combine to provide information about the state of the radio.

The most common way the indicators work is described in the following sections.

The way these indicators behave may be affected by the way the radio is programmed.

### 3.5.1 Status indicators

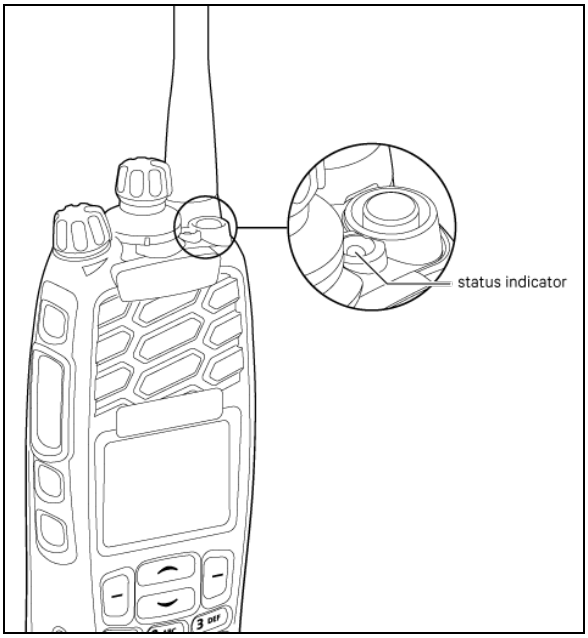



**Figure 3.2 Location of LED status indicator**

**Table 3.3 LED indicator types**

| Color | | Meaning |
|---|---|---|
| Red (transmit) | | Glowing: the radio is transmitting<br>Flashing: the transmit timer is about to expire |
| Green (receive) | | Glowing: the current channel is busy<br>Flashing: the radio has received a call (analog channel only) |
| Orange (network) | | Flashing: the radio is registered on a trunked network |
| All LEDs off | | Trunked: network not available, or the radio is attempting to register on a trunked network<br>Conventional: receive standby |

### 3.5.2 Audible tones

The radio uses audible tones to alert the user to its status:

- radio controls and keypress tones—the tones and beeps that are audible when the radio's keys are pressed or the controls are used
- incoming call tone—when the radio is receiving a call
- warning tones—when there is an error, or the battery is low, for example

**Warning** If quiet or silent mode is turned on, you will not hear any alert tones.

Some of the more common audible tones are described below:

**Table 3.4 Tones**

| Tone | Meaning |
|---|---|
| One short beep | Valid keypress: the action you have attempted is permitted<br>Function activated: a function has been turned on (using a function key) |
| One short, low-pitched beep | Function deactivated: a function has been turned off (using a function key) |
| One long, low-pitched beep | Invalid keypress: the action you have attempted is not permitted<br>Transmission inhibited: you have attempted to transmit, but for some reason you cannot make a call at this time |
| Two short beeps | Radio turned on: the radio is powered on and ready to use<br>Radio is revived: the radio has been made operable by your service provider |
| Three long beeps | Transmit timeout imminent: your transmit timer will expire and your current transmission will be terminated |
| One short, high-pitched beep | Radio is stunned: the radio has been made inoperable by your service provider |
| Two low-pitched beeps | Radio's temperature is high: the radio's temperature is in the high-temperature range, but the radio will continue to operate |
| Two high-pitched beeps | Radio's temperature is very high: the radio's temperature is in the very high temperature range and all transmissions will now be at low power; if the radio's temperature rises outside this range, transmissions will be inhibited. Turn off the radio and allow it to cool down |
| Continuous low-pitched tone | Radio system error: a system error has occurred and the radio may be inoperable. Contact the radio provider |
| Two long high-low pitched tone pairs | Synthesizer out-of-lock: the radio's synthesizer is unstable, causing frequency drift and signal issues, preventing operation on the current channel (display shows "Out of lock"). Constact the radio provider |

### 3.5.3 Voice annunciation

Your radio may be programmed to play a pre-recorded message for the start-up zone and channel, when changing the zone or channel, for the battery condition, or when loneworker monitoring has been turned on or off.

In trunked mode, the radio may be programmed to play a pre-recorded message for the start-up zone, workgroup or preset, and when changing the zone, workgroup or preset.

In both modes, the radio may be programmed to play a pre-recorded message for the battery condition or when loneworker monitoring has been turned on or off.

## 3.6 Using Function Keys to Access Frequently Used Features

Some keys have functions assigned to both short and long key presses: a short key press is shorter than 1 second, while a long key press is longer than 1 second.

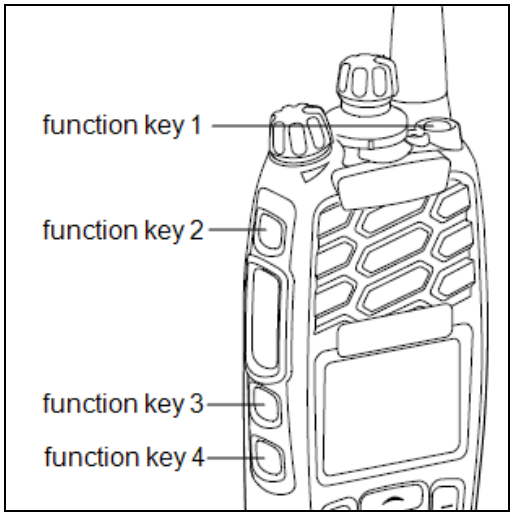



**Figure 3.3 Function keys**

### 3.6.1 Viewing the function key settings

Use the Main menu to check the features assigned to the radio's function keys:

1. Press **Menu** and select **Radio settings** > **Radio info** > **Key settings**.
2. In the **Key Settings** menu, scroll through the list of function keys.
3. Press **Select** to view details of the function associated with a particular function key.
4. Press **Back** to return to the **Key Settings** menu.

Use the following table to record the function keys programmed for the radio:

**Table 3.5 Programmed function keys**

| | Short key press | Long key press |
|---|---|---|
| F1 | | |
| F2 | | |
| F3 | | |
| F4 | | |
| F5[1] | | |
| F6[1] | | |

For more information about the function keys that can be programmed on the radio, contact the radio provider.

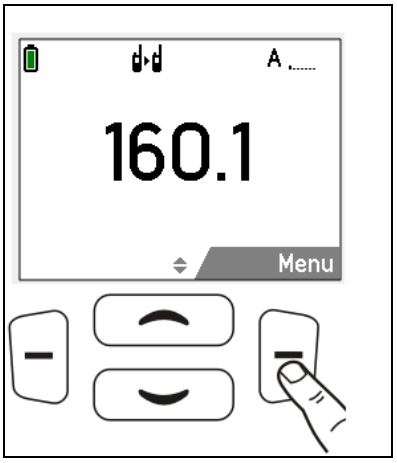
[1] On speaker microphone (if fitted)

## 3.7 Navigating the Radio's Menus

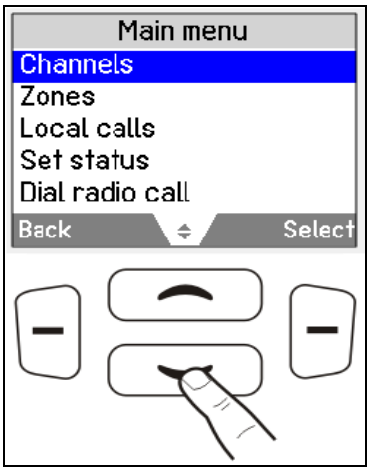
the radio has a number of menus, each containing lists or sub-menus. The menus available depend on the way the radio is programmed.

### 3.7.1 Using the main menu

1. To access the Main menu, press the right selection key whenever **Menu** appears above it.




2. Use the scroll keys to move through the menu list.




3. When the desired menu item is highlighted, press **Select** to open.

The radio may be programmed to use the scroll keys or the left selection key to directly access a menu.

To quickly exit the menu system, press and hold the left selection key when the word **Cancel** or **Back** appears above it.

## 3.8 Using the Alphanumeric Keys to Search a List

If a blinking cursor appears when you select a list, you are able to search for the menu item you want using the alphanumeric keys. This is of particular benefit if you have a large number of items in a list.

Lists that you may be able to search are channels, zones, workgroups, and preset calls.

To search a list, type the entire name using the keypad.

## 3.9 Accessing Frequently Used Menus

Depending on how the radio is programmed, there may be two different Quick Access menus. One Quick Access menu is displayed when a scroll key is pressed, and the other when the left selection key is pressed. These allow easy access to the menus used most often.

### 3.9.1 Using the scroll key Quick Access menu

There are two ways to use this Quick Access menu:

- use the scroll keys to scroll through a list of zones or channels
- press the scroll keys and the Quick Access menu appears

### 3.9.2 Using the left selection key Quick Access menu

The text above the left selection key corresponds to the Quick Access menu, for example, **Zones**.

To use this Quick Access menu, press the left selection key and the associated menu appears.

# 4 Basic Operation

This section describes the basic operations of the radio.

## 4.1 Turning the Radio On and Off

Rotate the power/volume control switch clockwise to turn the radio on. Rotate the switch counterclockwise to turn the radio off.

When the radio is first turned on, the status LED briefly glows red, and the radio gives two short beeps.

> The radio may not turn on if its battery is very low.

### 4.1.1 Security lock on power-up feature

The radio may be automatically locked each time it is powered-up. If the message **Enter PIN** appears on the display, enter your assigned PIN (personal identification number) to unlock the radio.

> To unlock the radio, use the unlock sequence you have been given (this is a pre-programmed sequence of four keys).

**Locking the radio**

1. Press **Menu** and select **Radio settings** > **Functions** > **Lock radio** (depending on how the radio is programmed, you may be able to press a function key to turn radio lock on and off).
2. Scroll to either **On** or **Off** and press **Select** (the current setting is highlighted). The radio is now locked, and the message **Enter PIN** appears on the display. The radio remains locked until the correct sequence of keys is pressed. If you forget the unlock sequence or you do not know it, contact the radio provider for assistance.

## 4.2 Adjusting the Speaker Volume

Rotate the power/volume control clockwise to increase the speaker volume and counterclockwise to decrease the volume.

> The volume control also changes the volume level of the radio's audible indicators.

## 4.3 Locking and Unlocking the Keypad

The keypad lock feature prevents keys being pressed accidentally. The number of keys that are locked depends on the way the radio is programmed.

### 4.3.1 To lock/unlock the keypad

1. Press and hold the right selection key for about one second.

> Depending on the radio model and the way it is programmed, the radio may have a 3-way selector that can be used to lock the keypad, or the left selection key can be configured to lock the keypad.

The message **Keypad locked** briefly appears on the display, and **Unlock** appears above the right selection key, in place of **Menu**. When any of the locked keys are pressed, the message **Keypad lock active** appears.

## 4.4 Holding the Radio

To ensure that effective communication is not hindered:

1. Grip the radio with your hand so that your thumb is on one side, and your fingers are on the other side.
2. Hold the radio vertically in front of your face, angled slightly away, about 1 - 2 inches (2 - 5 cm) from your mouth.

In this position, the mic and speaker are at the correct distance, and the antenna is facing straight up to maximize range.

Do not hold the radio speaker directly against your ear. This can damage your ear.

Do not pick up or hold a radio by the antenna. This can damage the antenna.

## 4.5 Speaking into the Radio

Press and hold the PTT button, wait a few seconds, then speak slowly and clearly. Some radios will have a beep, so wait for the beep before you begin speaking.

Push and hold the PTT button throughout transmission. Avoid speaking before pressing the PTT button to prevent cutting off the start of your sentence. Refrain from shouting for clear transmission. Speaking near an active noise-canceling microphone may cancel ambient noise and voice. See "Turning On Active Noise Cancellation" on page 33 for details.

## 4.6 Using a Bluetooth Audio Device

This feature is controlled by a software license (SFE) and may not be available with the radio.

Active noise cancellation (secondary microphone) is not enabled when using a **Bluetooth audio device®** (see "Active noise cancellation" on page 19 under "About the radio " on page 19 for more information).

A Bluetooth audio device may be connected to a radio using the **Bluetooth audio device** menu or a function key.

When a menu option has been selected in the **Bluetooth audio device** menu, calls can still be received and replied to without interrupting the selected operation.

### 4.6.1 Bluetooth audio compatibility with Tait radios

Bluetooth audio devices may operate with Tait radios, provided the accessory is compatible with the Bluetooth Specification Version 2.0 or higher. Tait recommends Bluetooth Specification Version 2.1 or higher. Additionally, the accessory must include Bluetooth Headset Profile (HSP) version 1.1 or 1.2, or Bluetooth Handsfree Profile (HFP) version 1.5 or 1.6.

### 4.6.2 Wearing the Bluetooth audio device

With a device worn over the head, place it on the ear. Depending on which ear the device will be worn, simply adjust the ear hook accordingly.

> Ensure that the rear microphone is not covered by your hand or clothing when making a call. **This does not apply when using Bluetooth.**

### 4.6.3 Pairing and disconnecting a Bluetooth audio device with the radio

> Before attempting to connect a **Bluetooth audio device**, Tait recommends that the device be fully charged. Refer to the **Bluetooth Audio Device** installation instructions for charging instructions.

Pairing creates a unique and encrypted wireless link between the Bluetooth-capable radio and the **Bluetooth audio device**. To use a **Bluetooth audio device** with a radio, the devices must first be paired.

### 4.6.4 Pairing a Bluetooth audio device with the radio for the first time

1. Turn on the radio.
2. Put the **Bluetooth audio device** into pairing mode.
3. Press **Menu** and select **Bluetooth audio device** > **Find new devices**.

The **New devices** menu opens, and while the radio searches for the new device, the message **Searching ...** appears.

4. Select **Connect** when the required accessory appears in the list of new devices, then **Yes** to add the **Bluetooth audio device** to **My Headsets**.

The message **Connecting** appears, while the radio attempts to pair with the device.

5. When the message **Calling. Answer on headset** appears, press the **Answer** button on the **Bluetooth audio device** to confirm the connection.
6. Repeat the previous steps to add other Bluetooth audio devices.

> While the **Bluetooth audio device** is connected, the **Bluetooth audio device** icon appears on the display.

### 4.6.5 Managing your Bluetooth audio devices

Once a Bluetooth audio device has been added to **My Headsets**, the **Manage headsets** menu item appears under the **Bluetooth audio device** menu. The **Manage Bluetooth audio devices** menu shows the devices currently in My Headsets, along with the following information:

- **+** this device is currently connected
- **a** this device will be automatically connected
- **c** the radio will ask for confirmation before connecting this **accessory**

Press **Options** to disconnect or connect a **Bluetooth audio device** (**Disconnect**, **Connect**), change the priority order of the devices (**Move down**), or remove a device from **My Headsets** (**Remove**, **Remove all**).

### 4.6.6 Disconnecting the Bluetooth audio device

To disconnect the device from the radio:

- press **Menu** and select **Bluetooth audio device** > **Disconnect**
- alternatively, in the **My headsets** menu select **Options** > **Disconnect**

### 4.6.7 Reconnecting the Bluetooth audio device

The radio may be programmed so that each time the device is turned on, it will automatically reconnect to the radio. If the radio does not automatically reconnect to the device:

1. On the radio, press **Menu** and select **Bluetooth audio device** > **Reconnect last**.

The radio then prompts to connect to the devices in **My Headsets**, in priority order.

2. Select **Yes** to connect, or **No** to choose another device.

### 4.6.8 Changing the way the Bluetooth audio device reconnects

The **Power-on option** in the menu can be used to change the way the radio reconnects with a device when the radio is first turned on. The choices are:

- None: The radio does not connect to any devices, and will need to be manually connected or reconnected to the device
- Reconnect last: The radio connects to the previously connected device
- Connect: The radio will attempt to connect to the devices in **My Headsets**, in priority order

To change the power-on option:

1. Press **Menu** and select **Bluetooth audio device** > **Options** > **Power-on option**, and change to the required option.

### 4.6.9 Getting the best performance from the Bluetooth audio device

- do not block the device's internal antenna (see the device's user documentation). The human body can interfere with a Bluetooth signal
- if the radio is used with the right hand, wear the over-the-head device on the right ear
- avoid coming in contact with the internal antenna of a device or radio
- ensure that the rear microphone is not covered by your hand or clothing when making a call

## 4.7 Turning On Active Noise Cancellation

Active noise cancellation uses a secondary microphone on the back of the radio to actively filter noise in loud environments, making it easier for recipients to discern the speech of the talking party who is in a noisy environment.

Active noise cancellation can be left on regardless of environment. However, when safety features, Emergency Operation, Radio Unit Monitor or Radio Monitor are activated, the listener may lose awareness of the noisy environment. Tait recommends users implement supplementary procedures to account for this.

The complementary feature of microphone sensitivity allows the internal and external microphones to be configured to suit the type of environment the user is in, further improving audio quality. When active noise cancellation is enabled, sensitivity should be decreased. In a quiet environment, increasing the sensitivity is suggested.

Speaking to the side (nearest the noise canceling microphone) could result in both ambient noise and voice being canceled. To use the radio correctly and achieve the best results, Tait recommends holding the radio 1 - 2 inches (2 - 5 cm) from the mouth and speaking directly into the front of the radio speaker/microphone.

### 4.7.1 Turning active noise cancellation on or off

1. Press **Menu** and select **Radio settings** > **Functions** > **Noise cancellation**.
2. Scroll to either **On** or **Off** and press **Select**.

Ensure that the rear microphone is not covered by your hand or clothing when making a call.

Depending on how the radio is programmed, you may be able to press a function key to toggle active noise cancellation on and off.

## 4.8 Changing the Radio's Operating Mode

The way the radio performs basic functions, such as sending and receiving calls, depends on the network operating mode. The two operating modes that may be available on the radio are:

- conventional mode (see "Operating on Conventional Channels" on page 38), and,
- trunked mode (see "Operating on DMR or MPT Trunked Networks" on page 72).

To change the operating mode:

1. Press **Menu** and select **Change mode**.

Depending on how the radio is programmed, the function key may be pressed to change mode.

2. Select **Yes** to confirm selection, and the radio now shows the default display for either trunked or conventional.

## 4.9 Limiting Call Time

This feature is for P25 channels only.

The radio may limit the amount of time you can talk (transmit) continuously. This is known as the ‘transmit timer’ or ‘time-out timer’ and allows other radio users to make calls on that channel.

The message **Transmit Timeout Imminent** appears in the display.

## 4.10 Checking Recent Calls

This feature is for P25 channels only.

This feature is available for digital channels only and applies to individual calls and call alert pages only.

The radio may be able to store a list of the last 20 calls. These calls may be calls that have been received, calls that have been made, or calls that have been missed.

### 4.10.1 To use the recent calls list to make a call

1. Press **Menu** and select **Recent calls**.

The most recent call is displayed at the top of the list. If you have not participated in any calls since the radio was switched on, the message **No items in list** appears in the display.

The radio's behavior depends on the mode the radio is set to. See "Making an individual call" on page 40.

# 5 About Multi-Protocol Operations

The TP9900 Multiband, Multi-Protocol Portable Radio supports P25, DMR, and analog (analog channels must be configured with the P25 protocol). This section explains basic interaction between each protocol type, with descriptions of how each protocol works on different networks in the following sections.

## 5.1 Protocol Adoption

The TP9900 adopts the protocol according to the selected channel or talkgroup, eliminating the need for manual selection. There is no indicator on the TP9900's display that identifies the protocol in which the radio is operating.

If operations require users to know the protocol of a selected channel/talkgroup, Tait recommends choosing channel/talkgroup names that denote protocol type.

## 5.2 Multi-Protocol Switching

The TP9900 switches between P25 and DMR protocols in approximately 3 seconds. The message, "**Please wait...**" appears on the screen during this time.

If the radio is configured to start on the "Last Selected" channel, and the one that was last selected was a DMR channel, the radio may take up to 6 seconds to begin DMR operation.

If backlight has been enabled, this will remain on during the switch.

## 5.3 Analog Support

Analog operations, including Selcall, DTMF, 2-Tone (Type 99), and MDC1200 signaling types, are supported but analog channels/talkgroups cannot be placed in scanning groups with DMR channels/talkgroups.

## 5.4 DMR Tiers

The TP9900 user interface varies in appearance and operation between different protocols, with notable differences between P25 and DMR Tier II, and between DMR Tier II and DMR Tier III.

In DMR Tier III mode, direct mode switching to P25 via the 3-way and 16-way selectors is not supported. To switch from operations in DMR Tier III to P25, a user should use the "Change Mode" operation, provided the radio is configured to start up on a P25 channel.

## 5.5 Scanning and Roaming

Scanning is only supported in P25 mode for groups with P25 and analog channels, and in DMR mode for groups with DMR conventional channels.

The TP9900 does not support scanning or roaming between channels, talkgroups, or systems of different protocols. A user that tries to add a DMR channel/talkgroup to a scan list of P25 and/or analog channels/talkgroups will receive an error message. Likewise, a user that tries to add a P25 or analog channel/talkgroup to a scan list of DMR channels/talkgroups will receive an error message.

## 5.6 Functional Behavior and Emergency Messages

If the radio is configured to receive "Stun" or "Inhibit" commands on a channel or talkgroup of a specific protocol, receiving that command will stun or inhibit the TP9900 on all protocols.

Encryption key zeroization commands affect only the keys used by the same protocol.

Emergency messages can be sent on the chosen channel or a different one. However, if the different channel is of a different protocol, there will be a 4-second delay to switch protocols before the emergency message is transmitted.

Function control actions programmed for conventional mode (P25 and DMR Conventional, excluding DMR Tier III) are common to both protocols where possible.

# 6 Operating on Conventional Channels

This section covers operations on conventional channels, beginning with analog functions, followed by those for both P25 and DMR channels. It concludes with subsections for features unique to P25-only and DMR-only channels.

## 6.1 Analog Channel Operation Only

This subsection covers operations that only function on analog networks.

### 6.1.1 Setting your status

The radio may be able to maintain a record of its current status. This status may be sent with outgoing calls programmed to contain status information. If the radio receiving the call has been programmed with the same status messages, it will decode and display its status. The status indicates the current activity or location, such as “en route” or “at lunch”.

#### Changing the Current Status

1. Press **Menu** and select **Set status**.
2. In the **Set status** menu, scroll through the list of status messages until the desired message appears.
3. Press **Select**. The message **Status updated** appears on the display.

### 6.1.2 Resending calls automatically

On an analog channel that is configured for SelCall/5-Tone operations, the radio may have been programmed to resend individual and group calls when transmission is refused because the channel is busy.

There are two automatic callback features: 'Deferred calling' and 'No acknowledgment retries'.

#### Deferred calling

On an analog channel that is configured for SelCall/5-Tone operations, when attempting to make a call on a channel that is busy, the radio can store and send the call once the channel is free. The radio gives a low-pitched beep if the channel is busy, and then waits until the channel is free to retry the call.

> A deferred calling time limit may have been configured. Once the time limit has expired the radio will no longer attempt to retry the call. Any user interaction (such as pressing PTT) will cancel a deferred call.

#### No acknowledgment retries

On an analog channel that is configured for SelCall/5-Tone operations, when you send a call and there is no reply, the call is resent.

Any user interaction (such as pressing PTT) will cancel a call that is being resent.

### 6.1.3 Using monitor and squelch override (on analog channels)

> This feature is for DMR channels only.

The monitor function allows the user to override some or all of the radios' mutes and hear if there is any traffic on a channel before making a call.

The squelch override function allows the user to override the squelch (carrier) mute and hear all noise on a channel, including weak signals that are below the programmed squelch threshold.

**To turn monitor on and off**

1. Press **Menu** and select **Radio settings** > **Functions** > **Monitor**.
2. Scroll to **On** (or **Off**) and press **Select**.

While monitor is on, the LED slowly flashes green and the monitor icon appears in the display.

> The radio may be programmed so that monitor turns off automatically after a short time.

**To turn squelch on and off**

1. Press **Menu** and select **Radio settings** > **Functions** > **Squelch o'ride**.
2. Scroll to **On** (or **Off**) and press **Select**.

> Squelch is often programmed as a long keypress of the same function key that turns monitor on and off.

This allows even faint and noisy signals to be heard.

While squelch override is on, the LED flashes green, and the squelch override icon appears on the display.

> Press the monitor function key again to return the radio to a quiet state.

> Squelch cannot be overridden when the radio is scanning.

### 6.1.4 Bypassing the repeater (on analog channels)

For analog channels, users can bypass the radio repeater and communicate directly with another radio. This feature is known as repeater talkaround. This can be done, for example, when you are out of range of the repeater, or if the repeater is busy or stops working. While repeater talkaround is active, all transmissions are made on the receive frequency of the channel you are on.

To activate repeater talkaround, you may be able to either use a programmed function key, or use the Main menu.

**Using the main menu**

1. Select the required channel.
2. Press **Menu** and select **Radio settings** > **Functions** > **Talkaround**.
3. In the **Talkaround** menu, choose **On**.

4. Press **Select**. The message **Talkaround activated** appears briefly, and the repeater talkaround icon appears on the display.
5. Proceed with your call.
6. To turn repeater talkaround off, either change the channel, or choose **Off** in the **Talkaround** menu.

**Using a function key**

1. Select the required channel.
2. Press the programmed function key to turn repeater talkaround on. The message **Talkaround activated** appears briefly, and the repeater talkaround icon appears on the display.
3. Proceed with your call.
4. To turn repeater talkaround off, either change the channel, or press the function key again.

### 6.1.5 Communicating directly with other radios (on analog channels)

You can bypass the radio repeater and communicate directly with another radio using the radio talkaround feature. This is useful when you are out of range of the repeater, or if the repeater is busy.

While repeater talkaround is active, all calls are made on your current channel's receive frequency.

**Turning repeater talkaround on and off**

You can turn repeater talkaround on and off using a function key, if the radio is programmed in this way.

- press the function key to turn repeater talkaround on

The message **Talkaround activated** (or **deactivated**) appears and appears in the display.

Repeater talkaround remains on until the function key is pressed again.

## 6.2 P25 Channel Operation Only

This subsection covers operations that only function on P25 channels.

### 6.2.1 Making an individual call

This feature is available for digital channels only. For analog individual calls, see "Making a local call" on page 50.

**To make a call to one person**

1. Press **Menu** and select **Individual call**.
2. Scroll to the desired person to call and press the PTT key to make the call immediately. Alternatively, press **Call** and then PTT.

### 6.2.2 Radio inhibit and uninhibit (P25)

When a radio is immobilized (‘inhibited’), the encryption keys may be automatically deleted from the radio.

This feature is only available for digital channels operating in conventional mode, and for radios configured for dispatcher operation.

If you want to make another radio on the system inoperable, you can use the radio inhibit feature. This feature is also known as ‘stun’.

To the user of the inhibited radio, it appears as though the radio has turned off. The radio remains inoperable even if it is turned off and then on again.

The radio cannot return to operation until it receives an uninhibit request. This is also known as ‘revive’.

**To send a radio inhibit request**

1. Press **Menu** and select **Services** > **Radio inhibit**.
2. Scroll to the desired radio to make it inoperable.
3. Press **Send to**.

The LED glows red, and a message appears on the display indicating the radio has been successfully immobilized.

**To send a radio uninhibit request**

1. Press **Menu** and select **Services** > **Radio uninhibit**.
2. Scroll to the radio to be made operable.
3. Press **Send to**.

If the radio has been successfully returned to operation, the uninhibited radio will briefly display **Radio revived**.

If an acknowledgment is not received from the recipient’s radio, users will have the option of either canceling or resending the request.

### 6.2.3 Bypassing the repeater (on P25 channels)

This section applies to Analog and P25. For detailed information on this feature, see "Bypassing the repeater (on analog channels)" on page 39.

## 6.3 DMR Channel Operation Only

This subsection covers operations that only function on DMR channels.

### 6.3.1 Making a preset call

The radio may be programmed to use a function key to initiate a call to an individual or group that may or may not be part of the current talkgroup (e.g. the dispatcher).

### 6.3.2 Sending and receiving text messages

The radio may be programmed to send text messages by selecting a preset text message, editing a draft text message, or creating a new text message.

### Using the alphanumeric keys to enter text

When the alphanumeric keys are used to enter a text message, they have special functions.

- Use the **#** key to select the type of text entry: upper and lower case characters (**ABC**, **abc**), initial capitals (**Abc**), or numbers (**123**).
- Use the left selection key (**Clear**) to delete a character from the display.
- Use the scroll keys to move through a message.

Repeated presses of these keys will provide the characters shown in the following table:

**Table 6.1 Alphanumeric keys with corresponding characters**

| Key | Characters | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | . | , | ? | ! | - | / | 1 |
| 2 ABC | A | B | C | | | | 2 |
| 3 DEF | D | E | F | | | | 3 |
| 4 GHI | G | H | I | | | | 4 |
| 5 JKL | J | K | L | | | | 5 |
| 6 MNO | M | N | O | | | | 6 |
| 7 PQRS | P | Q | R | S | | | 7 |
| 8 TUV | T | U | V | | | | 8 |
| 9 WXYZ | W | X | Y | Z | | | 9 |
| 0 | space | | | | | | 0 |

In the example below, a preset text message has been selected and is being edited:

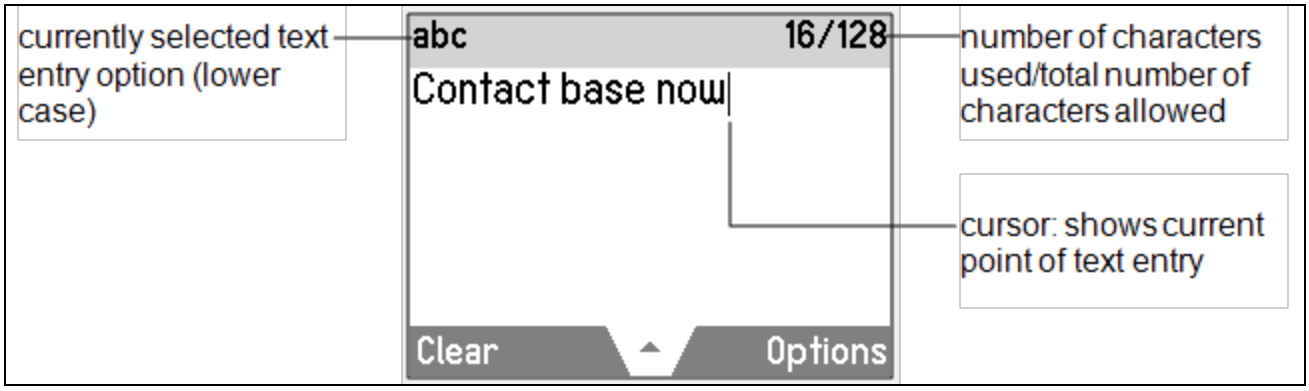



**Figure 6.1 Editing a preset text message**

### Sending a preset text message

1. Press **Menu** and select **Services** > **Text message** > **Preset message**.

   In the **Preset message** menu, a short label representing each message is displayed.

2. Scroll through the list of preset message labels until the desired one appears.
3. Press **Select**, and the chosen text message is now displayed.
4. Press **Send** to send the message, or **Edit** to change the message.

> Pressing ⌒ will place the cursor at the start of the message. Pressing ⌣ will place the cursor at the end of the message.

5. When the message is complete, press **Options** > **Send**.

### Creating a new text message

1. Press **Menu** and select **Services** > **Text message** > **New message**.
2. Use the alphanumeric keys to add characters and the **Clear** key to delete them. Use the scroll keys to move through the characters.
3. When the message is complete, press **Options** > **Send**.

> If canceling out of editing a text message or receiving a call while editing, the current draft will be saved and is available for editing later.

#### Editing a draft text message

1. Press **Menu** and select **Services** > **Text message** > **Edit message**.

   The last sent or edited text message will appear.

2. Use the scroll keys to move through the characters. Use the alphanumeric keys to add characters and the **Clear** key to delete them.

3. When the message is complete, press **Options** > **Send**.

#### Sending a text message

1. When a message has been chosen or entered, press **Options**. The **Text options** menu opens.
2. In the **Text options** menu, scroll through the list of options until the desired one appears.
3. Select **Send** and press **Select**.

The call details appear on the display.

#### Receiving a text message

If the radio is programmed for call queuing, incoming text messages are added to the queue. For more information, see "Checking the queue" below.

1. Press **Options** and select whether to reply, call or delete.

The radio may be programmed to automatically view text messages on receipt.

If the radio is not programmed for call queuing, incoming text messages will not be stored or displayed.

### 6.3.3 Checking the queue

If an incoming call or call alert has been missed, or if a status message or text message has been received, it may be stored in the queue. The queue icon appears and information about the missed call or message may be shown on the display.

The queue can be programmed to store multiple calls or messages, or just the last call or message.

Press **Options** to either view, reply, call back, look at the entry details, or delete the entry.

The radio may also be programmed to automatically view the full status update or text message on receipt.

If there are calls or messages in the queue, the radio may emit a warble tone for a period of time. The notification starts again when the radio is restarted or another call is received.

#### Accessing the queue

1. If the call or message information is not shown already, press **Menu** > **Call queue**.
2. Use the scroll keys to move through the calls or messages in the queue until the desired item appears.
3. Press **Options**.

> Depending on how the radio is programmed, a function key may be used to access the queue.

The available options depends on the call type. For voice calls, select **Call** to return the call. For status or text messages, select **View** to read, **Reply** to respond, or **Call** to return the call. The radio may automatically display full messages. You can delete selected or all calls and messages.

### 6.3.4 Radio Inhibit and uninhibit (DMR)

When a radio is immobilized (‘inhibited’), the encryption keys may be automatically deleted from the radio.

If another radio needs to be uninhibited on the same DMR conventional channel, use the radio inhibit feature. This feature is also known as ‘stun’.

On the inhibited radio, **Radio stunned** will appear briefly on the display, and the radio will return to the idle display. The radio remains inoperable even if it is turned off and then on again.

The radio cannot return to normal operation until it receives an uninhibit request. This is also known as ‘revive’.

**To send a radio inhibit request**

1. Press **Menu** and select **Services** > **Radio inhibit**.
2. Scroll to the desired radio to make it inoperable.
3. Press **Send to**.

The LED glows red, and a message appears on the display indicating the radio has been successfully immobilized.

**To send a radio uninhibit request**

1. Press **Menu** and select **Services** > **Radio uninhibit**.
2. Scroll to the radio you want to be operable.
3. Press **Send to**.

If the radio has been successfully returned to operation, the uninhibited radio will briefly display **Radio revived**.

If an acknowledgment is not received from the recipient’s radio, users will have the option of either canceling or resending the request.

### 6.3.5 Ending active calls

For analog channels, a function key may be programmed to either end the current call, or end the current call and all other active calls in your group. This can be done either by:

- using the function key programmed for reset monitor to end the current call, or
- using the function key programmed for call cleardown to end the current call and all other calls in the group, or,
- using the function key programmed for both reset monitor and call cleardown

**Using a function key to end your current call**

- Press the function key programmed for reset monitor. The radio’s monitor is turned off, ending the current call.

The LED stops flashing green, and the monitor icon disappears from the display.

#### Using a function key to end all active calls

- Press the function key programmed for call cleardown and monitor is turned off for all radios in the radio group.

The LED stops flashing green, and the monitor icon disappears from the display.

#### Using the function key programmed for reset monitor/call cleardown to end active calls

The function key programmed for reset monitor may be programmed so that a short key press ends the current call, and a long key press ends all active calls in the group.

### 6.3.6 Radio check

If users want to find out whether a particular radio is available on the same DMR conventional channel, they can use the radio check feature. This sends a radio check message to the selected radio.

1. Press **Menu** and select **Services** > **Radio check**.
2. Scroll to the radio that needs checking.
3. Press **Send to**.

If the radio is available on the system, an acknowledgment message is displayed.

If an acknowledgment is not received from the recipient's radio, users will have the option to either cancel or resend the request.

## 6.4 P25 and DMR Channel Operations

This subsection covers operations that function on both P25 and DMR channels.

### 6.4.1 Selecting a zone

The radio may be programmed to use zones, which are collections of channels and groups. Zones are a way of grouping channels, for example, by public safety agency type (fire, police, ambulance, etc) or by geographical region (Dallas, Houston, etc). When a zone is selected, only the channels and groups assigned to that zone are available.

#### Using the main menu

1. Press **Menu** and select **Zones**.

> Depending on how the radio is programmed, scroll keys or left selection keys may be used to select the **Zones** menu.

2. In the **Zones** menu, scroll through the list of zones until the desired one appears.
3. Press **Select**, and the zone indication appears either below the channel information, beside the RSSI icon, or in both positions. These can also be set to not be displayed.

#### Other ways of selecting a zone

The following controls may also be used to select a zone:

- left selection key (see "Using the left selection key Quick Access menu" on page 29)

- scroll keys (see "Using the scroll key Quick Access menu" on page 29)
- function keys to scroll through zones
- 3-way selector

If the 3-way selector is turned while pressing the PTT key, the zone will change after the PTT key is released.

### 6.4.2 Selecting a channel

For DMR digital channels, a talkgroup will be assigned to a channel. For more information, see "Understanding talkgroups" on the next page.

#### Using the main menu

1. Press **Menu** and select **Channels**.

Depending on how the radio is programmed, the scroll keys, the left selection key, or a function key may be used to select the **Channels** menu.

2. In the **Channels** menu, scroll through the list of channels until the desired channel appears.
3. Press **Select**, and the programmed channel is now shown on the display.

#### Using the scroll keys

The radio may be programmed to use the scroll keys to scroll through the channels.

#### Using the channel selector

The channel selector can be used to either select 16 channels, or continuously scroll through all available channels if the continuous selector model has been purchased.

If the channel selector is turned while pressing the PTT key, the channel will change after the PTT key is released.

#### Using the keypad

Dialing a channel may be available from the radio's idle display but is always available while in the **Channels** menu.

1. Dial the number associated with the channel using the alphanumeric keys.

To delete a digit that you have dialed incorrectly, press **Clear**.

2. Press **Select** or **#**, and the programmed channel is now shown on the display.

#### Automatic channel selection

The radio may be configured to change channels automatically based on current location. The automatic mode icon

will be visible on the display.

Selecting a channel manually as described above will end automatic mode, and the manual mode icon will appear on the display.

The radio may be configured to use a timer or a function key to return to automatic mode.

#### Using the numeric keypad to store and recall channels

Channels may be stored and recalled using the numeric keypad.

- Long-press a numeric key to store the current channel.
- Short-press a numeric key to recall the stored channel.

Only one channel can be stored and recalled for each numeric key

#### Other ways of selecting a channel

The following controls may also be used to select a channel (see "Accessing Frequently Used Menus" on page 29):

- function key
- left selection key
- scroll keys

### 6.4.3 Understanding talkgroups

A talkgroup (sometimes referred to as 'workgroup') is a collection of radio users with whom to have private conversations. For example, a state's public safety agencies could have the following talkgroups:

- Local talkgroups: used by a specific agency to communicate within their own local agency. It may even be made up of a county of public safety officers.
- Regional talkgroups: used by large state agencies that have regional divisions.
- Statewide talkgroups: used by an agency to communicate with public safety members in other regions (such as counterparts across entire states).
- Special event talkgroups: may be used to manage emergencies encompassing a large area, or even events such as visits by heads of state.

Talkgroups are configured during set up and cannot be created by the radio user.

Talkgroups can be assigned to each channel, to allow a user to:

- initiate a call to a talkgroup by pressing the PTT key
- listen and respond to conversations on none, one or multiple talkgroups

The channel may be named to reflect its talkgroup association. When making a call, the talkgroup name will appear.

the radio may also be programmed to show the **talkgroups** menu which allows users to change the talkgroup they want to call and listen to on the current channel.

**Making a talkgroup call**

1. Select the correct talkgroup.
2. Press the PTT key.
3. Wait for the channel to clear.
4. Speak clearly.
5. Release PTT key when done.
6. Optional: End the call.

**Changing a talkgroup**

1. Press **Menu** and select **talkgroups**.
2. Scroll through the list of talkgroups to the desired one and press **Select**.
3. Press the PTT key to make a call to the currently selected talkgroup.

Depending on how the radio is programmed, it may be possible to use a Quick Access menu to go to the talkgroup menu.

### 6.4.4 Making a call

Ensure that the rear microphone is not covered by your hand or clothing when making a call.

1. Select the required zone (see "Selecting a zone" on page 46).
2. Select the required channel (see "Selecting a channel" on page 47).
3. Hold the radio so that the microphone is about one inch (2.5 cm) from your mouth and press the PTT key to transmit.
4. Speak clearly into the microphone and release the PTT key when you have finished talking.
5. Finish the conversation as soon as possible and release the PTT key. For a short time, the radio may prevent you from making another call.

If the channel is busy, you may not be able to transmit. Wait until the status LED has stopped glowing green, and then try again.

While transmitting, the LED glows red and the transmit, , or low power transmit, , icon appears on the display.

**Limiting call time**

the radio may limit the amount of time you can talk (transmit) continuously. This is known as the ‘transmit timer’ or ‘time-out timer’ and allows other radio users to make calls on that channel.

The message **Transmit Timeout Imminent** appears on the display. If the transmit timer has timed out, you must release the PTT before you can transmit again.

the radio may be configured with a lockout time which prevents you from immediately starting a new transmission after the transmit timer has timed out.

### 6.4.5 Utilizing active noise cancellation when making a call

Background noise can be filtered out in loud and noisy environments by turning on Active Noise Cancellation before a call. For more information, see "Active noise cancellation" on page 19

### 6.4.6 Making a call (DMR)

This feature is for DMR channels only.

The radio's behavior when making a call changes depending on the type of channel selected.

Channels can be programmed for:

- DMR calls over a DMR network
- DMR calls between radios

If the selected programmed channel is for calls over a network, the green LED indicates whether the network is active. By default, the network is inactive (green LED is off).

Initiating a call will activate the network which will remain active for a programmed time. While the network is active (green LED is on), the call can be completed, and a new call can begin.

If the current channel is programmed for DMR calls between radios (without a radio network), the green LED indicates activity on the channel, i.e. whether someone is talking.

For all DMR calls (over the network or radio to radio), a go-ahead double-beep may sound after pressing the PTT key (if programmed).

The radio may be programmed to ring or beep when a new DMR call is received.

DMR calls have an inactivity timeout. If a pause in the conversation exceeds the timeout, the next press of the PTT key will establish a new call.

### 6.4.7 Making a local call

For analog channels, each channel on the radio may have one or more local calls programmed. For digital radio-to-radio calls, see "Making an individual call" on page 40.

**Using the main menu**

1. Select the required channel.
2. Press **Menu** and select **Local calls**.
3. In the **Local calls** menu, scroll through the list of local calls until the desired call appears.
4. Press **Send**.

The call details appear on the display, the LED glows red, and the transmit, , or low power transmit, , icon appears on the display.

**Using the Quick Access menu**

1. Select the required channel.
2. Press one of the scroll keys or the left selection key to open the **Local calls** menu.
3. Scroll through the list of local calls until the desired call appears.
4. Press **Send**.

The call details appear on the display, the LED glows red, and the transmit, , or low power transmit, , icon appears on the display.

**Dialing a local call**

1. Select the required channel.
2. Press **Menu** and select **Dial radio call**.
3. Dial the number using the alphanumeric keys.
4. Press **Send** (if the Send option appears).

The radio may be programmed so a local call can be dialed directly from the default display. In this case, the call can be dialled without selecting the menu option.

The radio may be programmed so group tones can be dialed using the ***** and **#** keys. Dial ***** to fill one **X**. Dial **#** to fill the current **X** and all subsequent **X** characters in the current burst.

When the party receives a call, the LED glows red and the call details plus  appears on the display. The message **Ack received** may also appear.

### 6.4.8 Dialing a radio call

**To dial a call to another radio, or group of radios**

1. Select the required channel.
2. Press **Menu** and select **Dial radio call**.
3. Dial the number using the alphanumeric keys. For analog calls, press **Send**.
4. **DMR-only:** For DMR conventional calls, press the PTT key to make the call immediately. Alternatively, press **Call** and then the PTT button.

The call details appear on the display, the LED glows red, and  appears on the display.

The radio may be programmed so a call can be dialed directly from the default display. In this case, it's possible to start dialing the call without selecting the menu option.

On an analog channel using SelCall/5-Tone Network setup, you may encounter **X** and **S** characters, prompting the user to dial over them. When the called party responds to the call, the message **Ack received** may display. Additionally, on the same analog channel, the radio can be programmed to utilize group tones by pressing the asterisk (*) or hash (#) keys. Dialing asterisk (*) fills one **X**, while hash (#) fills the current **X** and all subsequent **X** characters in the current burst.

### 6.4.9 Making a phone call or DTMF patch call

A telephone network can be directly connected to by manually dialing the number or using preset dialing sequences if the network is configured to support phone calls.

1. Select the required channel.
2. Press **Menu** and select **Phone call**.
3. Press **Call**.

The call details appear on the display, the LED glows red, and appears on the display.

#### Using a function key

Depending on how DTMF patch calls are programmed, some of the following steps may not be necessary.

1. Select the required channel.
2. Press the function key programmed for DTMF patch call (the radio may send tones to capture the line).
3. Press **Send**, or press the function key a second time, to send the preset number (there may be telephone dialing and ringing tones).
4. Proceed with the call.
5. Press **End**, or give a long press on the function key, to end the call (the radio may send tones to release the line).

#### Using the main menu

1. Select the required channel.
2. Press **Menu** and select **Dial patch call**.
3. Dial the required number using the alphanumeric keys.
4. Press **Send** (the radio may send tones to capture the line).
5. Press **Send** to send the number dialed in step 3 (there may be telephone dialing and ringing tones).
6. Once the call has finished, press **End** (the radio may send tones to release the line).

#### Dialing DTMF tones (overdialing)

The radio may be programmed to allow dialing of DTMF tones using the numeric keypad while on a channel or in a call. The dialing may be either sent out immediately (as it's typed) or sent after pressing **Send**.

### 6.4.10 Making an emergency call

Users may be able to activate emergency mode by using a programmed function key.

During emergency mode, the radio automatically cycles between receive and transmit for dispatcher monitoring. It deactivates after a set duration, or can be instantly canceled by pressing the function key again if it is enabled as a toggle.

1. Press the function key programmed for Emergency Mode and an emergency call is sent to the dispatcher, or some other predetermined location.
2. Reset the radio to normal operation at any time by turning the radio off and then on.

### 6.4.11 Sending and receiving status messages

A status message is sent to another party to indicate current activity or location, such as “en route” or “at lunch”. If the radio receiving the message has been programmed with the same status messages, it will decode and display the message. If a status message is received, the message is automatically queued, since a response is not expected. Status messages can also be used to control external devices.

#### Sending a status message

1. Press **Menu** and select **Services** > **Status update**.
2. In the **Status update** menu, scroll through the list of status messages until the desired message appears.
3. When a message has been chosen, press **Select**.

Depending on how radio is programmed, the message may be sent directly to a pre-configured radio or group, or the user will be presented with options to select a destination.

The call details appear on the display.

#### Receiving a status message

If the radio is programmed for call queuing, incoming status messages are added to the queue. For more information, see "Checking the queue" on page 44.

1. Press **Options** and select whether to reply, call or delete.

The radio may be programmed to automatically view status messages on receipt.

If the radio is not programmed for call queuing, incoming status messages are displayed briefly.

### 6.4.12 Call alert

Users can let other radio users know they wish to communicate by sending them a call alert page. When the other radio user receives the call alert page, they can call back when it is convenient.

If on a DMR conventional channel, users can send a call alert to any other radio on the same DMR conventional channel.

#### Sending a call alert page

1. Press **Menu** and select **Services** > **Call alert**.
2. Select the desired radio to page.
3. Press **Send to**.

A message showing the radio destination appears on the display. The LED glows red, and a notification indicates whether the message was sent successfully.

If an acknowledgment is not received from the recipient’s radio, users will have the option of either canceling or resending the request.

#### Answering a call alert page

If a call alert page is received from another radio user, **Call alert** and the caller name appears onscreen.

Select **Call** to return the page or **Clear** to delete it. If the call alert page is missed, a call alert entry is added to the queue. See "Checking the queue" on page 44.

### 6.4.13 Radio monitor

The radio unit monitor feature can be used when concerned about the safety of a radio user on the same DMR conventional channel. When sending a radio-unit monitor request to a radio, it calls the user back without giving any indication that it is making a call. Users can hear any activity near the radio for up to 120 seconds.

#### To send a radio unit monitor request

1. Press **Menu** and select **Services** > **Radio monitor**.
2. Scroll to the radio to be monitored.
3. Press **Send to**.

A message showing the radio destination appears on the display. The LED glows red, and a notification indicates whether the message was sent successfully.

If the other radio has received the user's request, it will now call them, so that they can monitor activity near the radio.

If an acknowledgment is not received from the recipient’s radio, the user will have the option of either canceling or resending the request.

If Active Noise Cancellation is turned on, the user may not be able to hear any background noise.

### 6.4.14 Transmitting at low power

When low power transmit is turned on, a notification appears on the display and calls are made at low power rather than at the programmed power setting.

Some channels may always transmit at low power.

#### Using the main menu

To turn low power transmit on or off for all channels, see the following:

1. Press **Menu** and select **Radio settings** > **Functions** > **Low power tx**.
2. Scroll to **On** (or **Off**) and press **Select**.

> The current setting is highlighted.

The message **Low power tx activated** (or **deactivated**) appears on the display.

#### Using a function key

1. Press the function key programmed for low-power transmit to transmit at low power on your current channel and any channels subsequently used.

> The message **Low power tx activated** appears briefly, and the low-power transmit icon appears on the display.

2. Press the low-power transmit function key again to turn low-power transmit off, and the message **Low power tx deactivated** appears on the display.

### 6.4.15 Using the radio in different repeater areas

The radio may have a group of channels programmed as a voting group. The channels in the voting group all carry the same traffic, but from different repeaters. As the radio moves in and out of different repeater coverage areas, the best communication channel is automatically selected for use.

This channel is known as the ‘home’ channel, and will be the channel used to make and receive calls. While voting is active, the scanning icon appears on the display.

> For those on DMR channels, the section "Selecting a scanning or voting group" on the next page explains how to select a group. A group can be either a voting or a scanning group.

### 6.4.16 Selecting a voting group

#### Using the channel selector

Users can use the channel selector to select a preset voting group, if the radio is programmed in this way.

- Rotate the channel selector to the group you want.

#### Using a function key

To use a function key to select a voting group:

- Press the function key to select and activate a preset voting or scanning group.

**Using the main menu**

To select a voting group using the Main menu:

1. Press **Menu** and select **Channels**.
2. Scroll to the group you want and press **Select**.

### 6.4.17 Suspending a channel from a voting group

Users may be able to use the function key programmed for nuisance delete to temporarily delete one of the channels from the voting group.

When that voting group is next selected, or after the radio has been turned off and then on, the deleted channel is again part of the voting group.

Alternatively, the function key programmed for voting may be programmed so that a short key press turns on voting, and a long key press activates nuisance delete.

- Press and hold the function key programmed for voting to remove the current channel from the voting group.

If the operation has been successful, the message **Channel nuisance deleted** appears on the display.

### 6.4.18 Selecting a scanning or voting group

A scan or voting group is a collection of channels that are grouped together for either scanning or voting. In the **Channels** menu, the scan or voting group is shown as being a single channel item, e.g. “Scan1”.

The sections "Using the radio in different repeater areas" on the previous page and "Scanning a group of channels" on the next page explain how the radio operates once a scan or voting group has been selected.

**Using the main menu**

1. Press **Menu** and select **Channels**.
2. In the **Channels** menu, scroll through the list of channels and groups until the desired group appears.
3. Press **Select**, and the programmed scan or voting group is now shown on the display. The scanning icon appears on the display.

Depending on how the radio is programmed, a function key, the scroll keys or left selection key may be used to select a group.

### Dialing a scan or voting group

Dialing a scan or voting group may be available from the radio's idle display and is always available while in the **Channels** menu.

To dial the group number from the default display:

1. Dial the number associated with the scan or voting group using the alphanumeric keys.
2. Press **Select**, and the programmed scan or voting group is now shown on the display. The scanning icon  appears on the display.

## 6.4.19 Scanning a group of channels

This feature is for DMR channels only.

The scan function is used to monitor a programmed group of channels, looking for activity. While the radio is scanning for activity, the scanning icon appears on the display. When activity is detected on a channel in the scanning group, the radio stops on that channel. The radio unmutes and the call can be heard. Scanning resumes once the channel is no longer busy.

The section "Selecting a scanning or voting group" on the previous page explains how to activate scanning.

### Standard and background scanning

The two types of scanning that may be available on the radio are standard scanning and background scanning. Background scanning can only be activated by using a function key programmed for background scanning. It differs from standard scanning in that the channel that was selected when background scanning was activated is also included as a scanning group member.

### Making a call while scanning

To make a call while the radio is scanning:

1. Press the PTT key to transmit. If background scanning is active, the radio will now call the currently selected channel.
2. If standard scanning is active and there has been no recent activity on the channel, then the channel that is called depends on the way the radio has been programmed. The possible options are:
    - the radio calls a predetermined channel, e.g. the dispatcher,
    - the radio calls the channel where activity was last detected, or
    - the radio calls the last free channel.
3. When the called party responds, proceed with the conversation.

### Suspending a channel from a scanning group

If a member channel of a scanning group is busy for a long time and the user does not wish to hear the conversation, the user may be able to use the function key programmed for nuisance delete to temporarily delete it from the scanning group.

When the scanning group is next selected, or after the radio has been turned off and then on, the deleted channel is again part of the scanning group.

Alternatively, the function key programmed for scanning may be programmed so that a short key press turns on scanning, and a long key press activates nuisance delete.

- Press and hold the function key programmed for scanning to remove the current channel from the scanning group.

If the operation has been successful, the message **Channel deleted from group** appears on the display.

### Adding or deleting member channels of a group

The radio may be programmed so users can add or delete channels in a voting or scanning group. Changes made are permanent, and will remain after restarting the radio.

1. Select the group. See "Selecting a scanning or voting group" on page 56.
2. Press **Edit**.

Alternatively, users may be able to edit groups by pressing **Menu** and selecting **Advanced** > **Program groups**, then select the group they wish to edit.

3. In the **Edit group** menu, choose **Add channel** or **Delete channel**.
4. Press **Select**.
5. Press the scroll keys to select the desired channel to add or delete.
6. Press **OK**.

If successful, the message **Channel added** or **Channel deleted** appears.

To check the new group details, press **Back** and select the **Group members** menu option.

### Changing a group's transmit channel

Users may be able to change the transmit channel of a standard scanning group. The transmit channel is identified by the **Tx** icon.

1. Select the group. See "Selecting a scanning or voting group" on page 56.
2. Press **Edit**.

If there is no edit option for the left selection key, the group cannot be changed.

Alternatively, users may be able to edit groups by pressing **Menu** and selecting **Advanced** > **Program groups**, then select the group they wish to edit.

1. In the **Edit group** menu, choose **Change tx**.
2. Press **Select**.
3. Press the scroll keys to select the new transmit channel.
4. Press **OK**.

If successful, the message **Tx channel changed** appears.

To check the new group details, press **Back** and select the **Group members** menu option. The new transmit channel has the **Tx** icon next to it.

### Changing a group's first or second priority channel

Users may be able to change the priority channels of a scanning group. Priority channels are scanned more frequently than other channels in the group. If valid activity is found on another channel, the radio continues to scan the priority channel or channels at regular intervals. The first priority channel is identified by the P1 icon, and the second priority channel is identified by the P2 icon.

1. Select the group. See "Selecting a scanning or voting group" on page 56.
2. Press **Edit**.

If there is no edit option for the left selection key, the group cannot be changed.

Alternatively, users may be able to edit groups by pressing **Menu** and selecting **Advanced** > **Program groups**, then select the group they wish to edit.

3. In the **Edit group** menu, choose **Change P1** or **Change P2**.
4. Press **Select**.
5. Press the scroll keys to select the new priority channel.
6. Press **OK**.

If successful, the message **P1 channel changed** or **P2 channel changed** appears.

To check the new group details, press **Back** and select the **Group members** menu option. The new priority channel has the P1 or P2 icon next to it.

### Icons and messages that may appear when changing group details

Table 6.2 on the next page lists the icons associated with viewing group membership details, adding or deleting channels from a group, or changing a group's transmit or priority channels.

**Table 6.2 Icon meanings**

| Icon | Meaning |
|---|---|
| $T_X$ | This channel is used to transmit on when there has been no recent activity. You cannot delete this channel (it will not appear under **Delete channel**) |
| $P_1$ | This channel is the group's first priority channel. You cannot delete this channel (it will not appear under **Delete channel**) |
| $P_2$ | This channel is the group's second priority channel. Deleting this channel is configurable |
| + | There is more than one instance of this channel in the group (the channel will be scanned more often). If this channel is deleted, the radio will attempt to delete all instances of the channel |

Table 6.3 below lists the messages that may appear when using nuisance delete to temporarily remove a channel from a group, adding or deleting channels, or adjusting transmit or priority channels within a group.

**Table 6.3 Message meanings**

| Message | Meaning |
|---|---|
| **Scanning not on** | Users cannot use nuisance delete to temporarily delete a channel from a group, as there is no group currently selected |
| **No channel captured** | Users cannot use nuisance delete to temporarily delete a channel from the group, as there is no channel currently captured |
| **Not enough channels in group** | Users cannot use nuisance delete to temporarily delete the channel from the group, as the captured channel is the last remaining group member |
| **Cannot delete channel** | Users cannot use nuisance delete to temporarily delete the channel from the group. The captured channel may be the selected channel in a background scanning group |
| **Cannot delete priority chan** | Users cannot use nuisance delete to temporarily delete the channel from the group, as the captured channel is a priority channel |
| **Only two channels in group** | Users cannot delete a channel from the group, as there would be only one group member left |
| **No items in list** | Users cannot perform the action due to:<br>• the group not having preset transmit channel or priority channels programmed<br>• the user having added all the channels in the zone to the current group |
| **Group full** | Users cannot add any more channels to the group, as the maximum number of members (50) has been reached |

# 7 Operating on P25 Trunking Networks

This section explains how the radio operates on a P25 trunking system. This includes how to make group calls, individual calls and phone calls.

This feature is controlled by a software license (SFE) and may not be available with you radio.

## 7.1 About P25 Trunking

The radio may be able to operate on a P25 trunking system as well as a conventional repeater-based system. On a conventional system, radio users compete for access to individual channels, and one channel can be overloaded with traffic while others are often unused.

The trunking system allows several channels to be automatically shared by a number of radio users. These traffic channels are pooled and allocated, as required, for the duration of a call. As calls are completed, the traffic channels are returned to the pool, to be used for other calls. This system means reduced waiting times to make calls.

## 7.2 Checking that the System is Available

When you first switch to a talkgroup configured for P25 trunking, the radio attempts to access the network and register on a control channel.

If registration is successful, the trunking system available icon appears in the display.

### 7.2.1 Registration is unsuccessful

If registration is not successful, does not appear, and the display shows **No service**.

The radio may sound five beeps, followed by a repeating double beep. The double beep continues until registration is successful.

### 7.2.2 Service is lost

If access to the trunking system is lost, no longer appears, the bars in the RSSI icon disappear , and the display shows **No service**.

The radio sounds five beeps to indicate the loss of service, followed by a repeating double beep. The double beep continues until service is restored.

### 7.2.3 Site trunking operation

During normal trunking operation, the radio may roam between a number of sites. This behavior is transparent to you, unless there is a problem with a system controller. When this happens, the radio enters ‘site trunking’ mode, and you will only be able to communicate with other users within a single site.

While in site trunking mode, the display shows **Site Trunking**, and the radio sounds a repeating double beep. The double beep continues until normal service is restored.

When access to the zone controller is available again, the radio automatically returns to normal multi-site operation.

### 7.2.4 P25 phase 1 features not supported in P25 phase 2

If the user tries to use a P25 phase 1 feature which is not yet supported in P25 phase 2, the radio may show a system error.

### 7.2.5 P25 phase 2 fallback mode

If there is a fault on the phase 2 network, operation may fall back to phase 1 mode.

### 7.2.6 Failsoft operation

The radio may be programmed to enter ‘failsoft’ mode when service is lost due to failure of a trunking site controller. For information about failsoft mode, see "Failsoft Mode Operation" on page 105.

## 7.3 Making a Talkgroup Call

Ensure that the rear microphone is not covered by your hand or clothing when making a call.

A talkgroup is a collection of radios on a trunking system. Trunked talkgroups are found in the Channels menu, along with conventional channels that may also be available for the currently selected zone.

Depending on how the radio is programmed, the user may be able to press a function key, use the Quick Access menu or use the channel selector to select a trunked talkgroup.

In some situations, the call will not proceed. For an explanation of the radio behavior, see "Unconnected Calls" on page 106.

### 7.3.1 To make a talkgroup call on a trunking system

1. Select the required zone:
    - Press **Menu** and select **Zones**.
    - Scroll to the required zone, and press **Select**.

Depending on how the radio is programmed, the user may be able to press a function key, use the Quick Access menu or use the 3-way selector to select a zone.

The radio can be configured to indicate the zone in which it is operating, either as a letter in the top right corner of the display, or as a zone name in the second line of the display, or neither.

1. Select the required talkgroup:
    - Press **Menu** and select **Channels**.
    - Scroll to the required talkgroup, and press **Select**.

Depending on how the radio is programmed, the user may be able to press a function key, use the Quick Access menu or use the channel selector to select a talkgroup.

2. To call this talkgroup, hold the radio so that the microphone is about one inch (2.5 cm) from your mouth.
3. Press and hold the PTT key to transmit.
4. When you hear three short beeps, speak clearly into the microphone. Release the PTT key when you have finished talking, and the radio will indicate the currently selected talkgroup.

While transmitting, the LED glows red and the transmit, , or low power transmit, , icon appears in the display.

## 7.4 Utilizing Active Noise Cancellation when Calling a Talkgroup

Background noise can be filtered out in loud and noisy environments by turning on Active Noise Cancellation before calling a talkgroup. For more information, see "Active noise cancellation" on page 19

## 7.5 Receiving a Talkgroup Call

To hear calls from other members of a talkgroup, the radio must have that talkgroup selected, or the talkgroup must be part of an active scanning group.

For information about selecting a talkgroup, see "Making a Talkgroup Call" on the previous page, and for information about talkgroup scanning, see "Activating Talkgroup Scanning" on page 92.

When you receive a call from a talkgroup, the radio displays the name or the identity of the talkgroup, and that of the calling radio.

## 7.6 Making an Individual Call

⚠ in some situations, your call will not proceed. For an explanation of the radio behavior, see "Unconnected Calls" on page 106.

### 7.6.1 To make a call to one radio on a trunking system

1. Press **Menu** and select **Individual call**.

Depending on the radio model and how it is programmed, you may be able to dial the identity of the radio you want to call, press a function key or use your Quick Access menu to select an individual call.

1. Scroll to the person you want to call and press **Select** or press the PTT key.
2. The message **Calling...** briefly appears.
3. When the called party accepts the call, you will hear three short beeps.
4. Once the called party has finished talking, press and hold the PTT key to transmit, speak clearly into the microphone, and release the PTT key when you have finished talking.

## 7.7 Utilizing Active Noise Cancellation when Making an Individual Call

Background noise can be filtered out in loud and noisy environments by turning on Active Noise Cancellation before a call. For more information, see "Active noise cancellation" on page 19

## 7.8 Receiving an Individual Call

When you receive a call from an individual radio, the radio displays the caller’s name or identity.

The radio rings until the call is answered.

1. Press the PTT key to accept the call, or **Cancel** to reject the call.

## 7.9 Emergency Calls

In an emergency, you can summon help by sending an emergency call. When an emergency call is initiated, the radio enters ‘emergency mode’.

### 7.9.1 Making an emergency call

You can make an emergency call using the emergency function key (function key 1):

1. Press the function or emergency key to activate emergency mode.

The message **Emergency mode** appears and the radio sounds three short beeps, rising in pitch.

### 7.9.2 Receiving an emergency call

When you receive an emergency call, the radio displays the caller’s name or identity and sounds a long beep.

## 7.10 Making a Phone Call

You may be able to use the radio to connect to a telephone network and make a phone call.

In some situations, your call will not proceed. See "Unconnected Calls" on page 106.

### 7.10.1 To make a phone call on a trunking system

1. Press **Menu** and select **Phone call**.

The phone call you last dialed appears in the display, unless that number was manually dialed.

2. Scroll to the number or person you want to call, or  dial the required number using the alphanumeric keys.
3. Press **Select** or the PTT key.
   Call progress will be indicated by “ring” or “busy” tones as for a standard telephone call.
4. When the call is answered, proceed with your conversation.
5. At the completion of the call, or if the dialed number is busy or does not answer, press the **End** left selection key.

## 7.11 Dynamic Regrouping

The dynamic regrouping feature allows the user to send a dynamic regrouping request to the dispatcher. The dispatcher can then reassign the user's radio to a special communications group.

While are operating on this group, normal channel selection may be disabled.

### 7.11.1 To send a dynamic regrouping request

- Press **Menu** and select **Trunking** > **Dyn Regrouping**.

When **Select** is pressed, 'Sending dynamic regroup rqst' appears in the display.

If the request is successful, an acknowledgment message is displayed.

# 8 P25 Services

This section describes the P25 services that may be available on the radio.

This feature is controlled by a software license (SFE) and may not be available with the radio.

## 8.1 P25 Emergency Operations

The features described in this chapter are for P25 channels/networks only.

This section describes how to make different types of emergency calls.

### 8.1.1 About emergency calls

**Warning** The radio can be configured to automatically delete ("zeroize") encryption keys when emergency mode is activated.

In an emergency you can summon help by sending an emergency call. Table 8.1 below lists the types of emergency calls:

**Table 8.1 Types of Emergency Calls**

| Call type | Explanation |
|---|---|
| Priority call | Priority call applies to digital channels only. An emergency alert is automatically sent to the current talkgroup when the priority call feature is turned on. Calls made with this feature activated are flagged as 'emergency' calls. For further information, see "Making a priority call" below |
| Standard emergency call | When an emergency call is initiated, the radio enters ‘emergency mode’. For further information see "Standard emergency mode" on the next page |
| Manual emergency call | Manual emergency call applies to digital channels only. When activated, the emergency mode is triggered and the radio sends an alert to the dispatcher and other group members, including the radio's digital alias and location. For further information, see "About manual emergency operation" on page 67 |

### 8.1.2 Making a priority call

**Notice** This feature is available for digital channels only.

When you turn the priority call feature on, the radio automatically sends an emergency alert (message) to the current talkgroup.

Any calls you make while the priority call feature is turned on are flagged as emergency calls.

**To turn the priority call feature on and off**

1. Press **Menu** and select **Priority call**.
2. Scroll to **On** (or **Off**) and press **Select**.

### 8.1.3 Standard emergency mode

When you press the emergency key the radio enters ‘emergency mode’, if the radio is programmed in this way.

When the radio enters emergency mode, it will automatically send alerts together with the radio unit ID to the dispatcher. These alerts are usually sent on a designated emergency channel.

**Warning** The way the radio behaves in emergency mode depends on how it is programmed.

**What happens during an emergency call?**

The exact way the radio behaves when it enters emergency mode depends on how it is programmed.

The main phases for emergency modes are summarized below. The length of each phase is determined when the radio is programmed.

**When the emergency key is pressed**

1. **Digital Channels:** The radio continually sends emergency alerts to the dispatcher until a response is received. Details of your location may also be sent (if this feature is available for the radio).
2. The radio alternately transmits and receives so the dispatcher can hear what is happening in the vicinity of the radio. Emergencies end once this phase is complete or when emergency mode is ended.

**Activating emergency mode**

You can activate emergency mode using the emergency function key.

1. Press the function or emergency key to activate emergency mode.

**Warning** How emergency mode is activated depends on how it has been configured. Confirm this step with your administrator.

‘Emergency mode’ appears in the display.

One or more emergency calls are sent to your dispatcher or another predetermined radio user. During emergency mode, the radio will behave as described in "Standard emergency mode" above.

2. To end emergency mode and return the radio to normal operation, either:
    - turn the radio off and on again to end emergency mode,
    - push the function or emergency key again, or
    - if configured, press the PTT button

### 8.1.4 About manual emergency operation

This feature is available for digital channels only.

When you press the emergency key, the radio sends an alert to your dispatcher and other members of your group, along with the radio digital alias and location.

While the emergency call is active, the emergency information is sent out periodically, until either you or another member of your group end the emergency call.

You are still able to make and receive voice calls while emergency information is being sent, but the radio does not display caller details.

#### Making a manual emergency call

**Warning** You will not be able to make a voice call on the channel until the 3-second emergency alarm has finished.

1. Press and hold the emergency key for longer than three seconds.

**Warning** How emergency mode is activated depends on how it has been configured. Confirm this step with your administrator.

The radio gives three short beeps, rising in pitch.

**Emergency** appears in the display, and remains until the manual emergency call is canceled.

If you receive an acknowledgment from another radio in your group, the manual emergency call is canceled, and the message **Emergency Acked** briefly appears in the display.

This feature is controlled by a software license (SFE) and may not be available with the radio.

#### Canceling a manual emergency call

If the emergency situation has been resolved, the manual emergency call can be canceled either by you or another member of your group.

- Press and hold the emergency key until the message **Emergency canceled** appears in the display.

the radio now returns to the channel that it was operating on prior to the emergency call.

#### Canceling a manual emergency call you have received

When you have received a duress emergency call, the Emergency menu always moves to the top of the menu list. In the Emergency Menu, you can manually acknowledge the duress emergency call. This acknowledgment cancels the call.

1. Press **Menu** and select **Emergency** > **Acknowledge**.

The name of the radio that initiated the emergency call appears in the display.

2. Press **Send** to cancel the manual emergency call from that number.

The message **Emergency ack. sent** briefly appears in the display.

### 8.1.5 Accessing emergency location information

If **Location** appears in the display, above the left selection key, you can display the current location of the radio that has sent a manual emergency call. The last location of the radio will still be available even if the radio is turned off and then on again.

To access the location information, either press **Location** or use the **Last Stored** menu.

#### Using the location menu

1. Press **Location** to display the current location of the radio.
2. Use the scroll keys to view more location information.
3. Press **Exit** to return to the previous display.

#### Using the last stored menu

1. Press **Menu** and select **Emergency** > **Last stored** to display the current location of the radio.
2. Use the scroll keys to view more location information.
3. Press **Exit** to return to the previous display.

## 8.2 Call Alert

You can let another radio user know that you want to talk to them by sending them a call alert page. When the other radio user receives the call alert page, they can call you back when it is convenient.

- If you are on a P25 trunked channel, you can send a call alert to any other radio on a trunk channel on the same network.
- If you are on a P25 conventional channel, you can send a call alert to any other radio on the same conventional channel.

### 8.2.1 To send a call alert page

1. Press **Menu** and select **Services** > **Call alert**.
2. Select the radio you want to page.
3. Press **Send to**. A message appears in the display.

A message showing the radio destination appears on the display. The LED glows red, and a notification indicates whether the message was sent successfully.

If an acknowledgment is not received from the recipient’s radio, you will have the option of either canceling or resending the request.

### 8.2.2 Answering a call alert page

If you receive a call alert page from another radio user, the message **Page rx’d from...** briefly appears in the display.

Select **Call** to return the page or **No** to delete it. If you miss the call alert page, the identity of the caller may be saved in your recent calls list.

## 8.3 Messages

You may be able to send short messages to another radio user. These messages are defined at programming time.

- If you are on a P25 trunked channel, you can send a message to any other radio on a trunk channel on the same network.
- If you are on a P25 conventional channel, you can send a message to any other radio on the same conventional channel.

To read and display a sent message, receiving radios must have the same message programmed.

### 8.3.1 Sending a message

You may be able to send your message to a predetermined person or to the dispatcher administering the current talkgroup, or to a person of your choice.

**Sending a message to a predetermined person or talkgroup administrator**

1. Press **Menu** and select **Services** > **Messages**.
2. Select the required message from the list.
3. Press **Select**.

A message showing the radio destination appears on the display. The LED glows red, and a notification indicates whether the message was sent successfully.

If an acknowledgment is not received from the recipient's radio, you will have the option of either canceling or resending the request.

**Sending a message to a person of your choice**

1. Press **Menu** and select **Services** > **Messages**.
2. Select the required message from the message list.
3. Press **Select**.
4. Select the message recipient from the list and press **Send to**.

A message showing the radio destination appears on the display. The LED glows red, and a notification indicates whether the message was sent successfully.

If an acknowledgment is not received from the recipient's radio, you will have the option of either canceling or resending the request.

## 8.4 Radio Check

This feature is only available on P25 conventional channels.

If you want to find out whether a particular radio is available on the system, you can use the radio check feature. This sends a radio check message to the radio unit you have specified.

1. Press **Menu** and select **Services** > **Radio check**.
2. Scroll to the radio you want to check.
3. Press **Send to**.

A message showing the radio destination appears on the display. The LED glows red, and a notification indicates whether the message was sent successfully.

If the radio is available on the system, an acknowledgment message is displayed.

If an acknowledgment is not received from the recipient's radio, you will have the option of either canceling or resending the request.

## 8.5 Radio Unit Monitor

This feature is controlled by a software license (SFE) and may not be available with the radio. This software license is only required for the radio that sends the radio unit monitor request. The receiving radio does not need the software license.

This feature is only available for digital channels operating in conventional mode, and for radios configured for dispatcher operation.

The radio unit monitor feature ensures user safety by silently calling back the sender, allowing them to listen to nearby activity for up to 20 seconds.

If Active Noise Cancellation is turned on, you may not be able to hear any background noise.

### 8.5.1 Sending a radio unit monitor request

1. Press **Menu** and select **Services** > **Radio monitor**.
2. Scroll to the radio you want to monitor.
3. Press **Send to**.

A message showing the radio destination appears on the display. The LED glows red, and a notification indicates whether the message was sent successfully.

If the other radio has received your request, it will now call you so that you can monitor activity near the radio.

If an acknowledgment is not received from the recipient's radio, you will have the option of either canceling or resending the request.

## 8.6 Status Request

This feature is only available on P25 conventional channels.

You can find out what another radio user is currently doing by asking their radio to send you a status update.

### 8.6.1 To send a status request

1. Press **Menu** and select **Services** > **Status request**.
2. Select the status request recipient from the list.
3. Press **Send to**.

A message showing the radio destination appears on the display. The LED glows red, and a notification indicates whether the message was sent successfully.

If an acknowledgment is not received from the recipient's radio, you will have the option of either canceling or resending the request.

## 8.7 Status Update

You can inform another radio user of your current status by sending them a status update, for example, 'At scene'. You may be able to send the status update to a predetermined person or talkgroup, or to a person of your choice.

- If you are on a P25 trunked channel, you can send your status to any other radio on a trunk channel on the same network.
- If you are on a P25 conventional channel, you can send your status to any other radio on the same conventional channel.

When you send a status message, you are also *setting* your status, which the dispatcher may be able to check by 'interrogating' the radio. You can change your status at any time by selecting another status message and sending it. See "Status Request" above.

### 8.7.1 To send a status update

1. Press **Menu** and select **Services** > **Status update**.
2. Select the required status message from the list.
3. Press **Send to** or **Select**.

A message showing the radio destination appears on the display. The LED glows red, and a notification indicates whether the message was sent successfully.

If an acknowledgment is not received from the recipient's radio, you will have the option of either canceling or resending the request.

To set a status without sending it to anyone, see "Setting your status " on page 38

# 9 Operating on DMR or MPT Trunked Networks

This section explains how the radio operates on a DMR (digital), MPT (analog) or dual-mode trunked network.

These features are controlled by software licenses (SFE) and may not be available with the radio.

the radio must have trunking functionality programmed before it can operate in DMR or MPT trunked mode.

## 9.1 Checking that the Network is Available

Check that the orange LED is flashing and the network icon appears on the display. These are the indications that the radio has access to a trunked network.

- If the network icon is flashing and **No service** appears on the display, the radio is attempting to access the trunked network.
- If the network icon remains flashing, the radio may be out of the network coverage area.

If **Limited service** appears on the display, one of the network sites or the connection between the network sites has been interrupted. Users can still make calls to radios covered by the same site but not to radios on other sites.

## 9.2 Changing the Network

The radio may be programmed to operate in up to four completely separate trunking networks, either DMR (digital), MPT (analog) or both (dual mode). Users may wish to change networks because they are out of the network coverage area, or they need to have access to another trunking network.

To change the radio's operating network, users may be able to either use the main menu or dial the new network using the alphanumeric keys.

Changing the radio's workgroup may also change the network in which users are operating.

### 9.2.1 Using the main menu

1. Press **Menu** and select **Change network**.
2. In the **Change network** menu, scroll through the list of networks until the desired network appears.
3. Press **Select**.

The radio will restart and display the name of the new network.

### 9.2.2 Dialing a new network

1. Dial ***700#** to display the name of the current trunked network.
2. Dial ***70n#** to change to a new network, where **n** is the number of the new network (1 to 4).

The radio will restart and display the name of the new network.

## 9.3 Making a Preset Call

The preset calls programmed for the radio may be to other radios, to PABX extensions or to PSTN numbers.

1. Press **Menu** and select **Preset calls**.
2. In the **Preset calls** menu, scroll through the list of calls until the required call appears, then press **Send**.

> While the call is being set up, it can be canceled by pressing **Clear**.

### 9.3.1 Dialing a preset call

It may be possible to dial preset calls, if preset calls are programmed for the radio and you know the number associated with the preset call.

1. Dial **p**, where **p** is the number of the preset call.

If your preset call number is the same as a call to another radio, then you need to dial a leading **0**. For example, dial **23#** to call radio 23 and dial **023#** for preset call number 23.

2. Press **Send** or the **#** or PTT key.

> While the call is being set up, it can be canceled by pressing **Cancel**.

## 9.4 About Trunked Zones and Workgroups

Trunked zones and workgroups are used to manage the calls on the trunked system. Zones, if used, typically define geographic areas (towns, suburbs or counties), or branches of an organization. Workgroups span multiple zones, and typically define functions, work areas or job roles.

When the radio belongs to a workgroup, it is said to be ‘subscribed’, and users receive all calls directed to that group of users. A group’s members are dynamic, in that a group only contains radios that are currently registered on the system and subscribed to the same group.

> The radio may be programmed to use different names for a ‘zone’ and ‘workgroup’. For example, ‘district’ or ‘area’ may be used in place of zone, and ‘role’ or ‘group’ may be used in place of workgroup.

### 9.4.1 Selecting a zone

1. Press **Menu** and select **Set zone**.
2. In the **Set zone** menu, scroll through the list of zones until the desired zone appears.
3. Press **Select**.
4. Check that the network icon appears on the display.

### 9.4.2 Automatic zone selection

The radio may be configured to change zones automatically based on a user location.

Selecting a zone manually as described above will end automatic mode, so the automatic mode icon will disappear and the manual mode icon will appear on the display.

The radio may be configured to use a timer or a function key to return to automatic mode.

### 9.4.3 Selecting a workgroup

1. Press **Menu** and select **Set workgroup**.
2. In the **Set workgroup** menu, scroll through the list of workgroups until the desired workgroup appears.
3. Press **Select**.
4. Check that the network icon appears on the display.

### 9.4.4 Making a call to a workgroup

Different types of calls may be associated with user workgroups. These calls can be any types of calls.

#### To make a call to a workgroup

1. Select the required zone. See "Selecting a zone" on the previous page.
2. Select the required workgroup. See "Selecting a workgroup" above.
3. Press the PTT key, and a call to that workgroup is made.

#### Dialing a workgroup call

It may be possible to dial workgroup calls, if the number associated with the workgroup is known.

1. Dial **w**, where **w** is the number of the workgroup.

If the workgroup call number is the same as a call to another radio, then the user needs to dial a leading **0**. For example, dial **23#** to call radio 23 and dial **023#** for workgroup call number 23.

2. Press **Send** or the **#** or PTT key.

While the call is being set up, users can cancel the call by pressing **Cancel**.

### 9.4.5 Selecting the homegroup

'Homegroup' is the workgroup in which the radio usually operates. To return to the homegroup at any time, users may be able to use the main menu, or an allocated function key.

#### Using the main menu

1. Press **Menu** and select **Go to homegroup**.
2. Press **Select**, and the radio now shows the homegroup in the default display.

#### Using function keys

Users may be able to use function keys to go to their homegroup or to toggle between the homegroup, and the currently selected zone and workgroup.

- Press the function key programmed to go to the homegroup.

The radio now shows the homegroup on the default display.

- Press the function key programmed to toggle between the homegroup and the currently selected zone and workgroup.

The radio now shows the homegroup on the default display, along with the homegroup icon .

The homegroup icon only appears if using a function key to toggle between the homegroup and the currently selected zone and workgroup.

### 9.4.6 Scanning workgroups

The ‘My Workgroups’ list comprises the current workgroup, the homegroup, and other programmed groups. When scanning is active, the radio will receive activity from any subscribed groups in the My Workgroups list.

### 9.4.7 To activate scanning

1. Press **Menu** and select **Scanning**.
2. Scroll to **On** (or **Off**) and press **Select**.

## 9.5 About Emergency Operation

In an emergency, users may be able to summon help by sending an emergency call. After making the call, the radio may be programmed to enter emergency mode. While emergency mode is active, the radio may cycle between receive and transmit, so that the dispatcher or the called party can hear any activity near the radio.

On most networks, an emergency call takes precedence over other call types, and existing calls are cleared down so that the emergency call can proceed.

To make an emergency call from a radio, users may be able to either:

- use a function key programmed for emergency mode
- make an emergency call using a preset (see "Making a Preset Call" on page 73)

### 9.5.1 Activating emergency mode

Users can activate emergency mode using a function key programmed for emergency mode. Once emergency mode is activated, the radio makes an emergency call to a dispatcher or some other predetermined location. The radio then enters emergency mode.

The radio may send an emergency alarm status before the call, and an emergency end alarm status after the call.

The radio may only send an emergency alarm status and then remain in emergency mode, where any call made will be made as an emergency call until the user cancels emergency mode.

### 9.5.2 Dialing an emergency call

1. Dial ***9**.
2. Press **Send** or the **#** or PTT key.

An emergency call is now sent to the emergency location that has been programmed for the radio.

If users wish to send an emergency call to another radio, they may be able to dial ***9*n** then press the **#** or PTT key. In this case, **n** is the radio unit number or group number users wish to send the emergency call to and may be a two- or three-digit number.

### 9.5.3 Canceling emergency mode

Reset the radio to normal operation at any time by turning the radio off and then on.

Emergency mode can be canceled without turning the radio off and on:

- it will automatically end after a fixed period
- you can press the function key a second time if it is set as a toggle key

## 9.6 Dialing a PABX Number

### 9.6.1 To dial a PABX extension for MPT1327, MPT1343 and Nokia ANN

1. Dial **n**, where **n** is the PABX extension desired to call.
2. Press **Send** or the **#** or PTT key.

The call details appear on the display. While the call is being set up, users can cancel the call by pressing **Cancel**.

### 9.6.2 To dial a PABX extension for DMR

1. Dial **02n**, where **n** is the PABX number.
2. Press **Send** or the **#** or PTT key.

The call details appear on the display. While the call is being set up, users can cancel the call by pressing **Cancel**.

## 9.7 Dialing a PSTN Number

### 9.7.1 To dial a PSTN number for MPT1327, MPT1343 and Nokia ANN

1. Dial **0n**, where **n** is the PSTN number desired to call.

The numbers dialed before the 0 depend on the way a user's network operates.

2. Press **Send** or the **#** or PTT key.

The call details appear on the display. While the call is being set up, users can cancel the call by pressing **Cancel**.

### 9.7.2 To dial a PSTN extension for DMR

1. Dial **01n**, where **n** is the PSTN number.
2. Press **Send** or the **#** or PTT key.

The call details appear on the display. While the call is being set up, users can cancel the call by pressing **Cancel**.

## 9.8 Receiving a Call

When the radio receives a call, it may:

- automatically accept the call. The GO icon appears on the display. The radio may also be programmed to beep or ring. In this case, the caller will usually talk first.
- ring like a telephone. Press **Answer** to accept the call. The radio gives a beep and the GO icon appears in

the display. You may also be able to accept the call if you press the PTT key. In this case, you will usually talk first.

Once the GO icon appears, you can proceed with the call, as follows:

1. Hold the microphone about 2 inches (5cm) from your mouth.
2. Press and hold the PTT key to transmit.
3. Speak clearly into the microphone and release the PTT key when you have finished talking.

> While you are transmitting, the LED glows red and appears in the display.

> Ensure that the rear microphone is not covered by your hand or clothing when making a call.

End the call by pressing **End**. The network may also end the call if neither you nor the other party transmits for a predetermined time or if your call time limit is exceeded.

### 9.8.1 Transmit timer

the radio may have a transmit timer that limits the amount of time you can transmit continuously.

When the transmit timer is about to expire, the message **Transmit timeout imminent** appears in the display, the LED flashes red, and the radio gives three beeps.

If the transmit timer times out, the call clears down.

### 9.8.2 Call time limit

In trunked mode, the length of your call may be limited by the network or by the radio. the radio may be programmed to display the time remaining for your call.

## 9.9 Re-establishing a Call

The last number recall, unanswered call and callback functions may allow users to re-establish calls using the PTT key.

### 9.9.1 Last number recall

When an outgoing call has ended, the message **Last call to** and the called unit's identity may appear on the display.

To make a call to that person again, briefly press the PTT key.

> This function needs to be configured.

### 9.9.2 Unanswered call

When an incoming call is missed, the message **Missed call** and the caller's identity may appear in the display.

To return the call, briefly press the PTT key.

### 9.9.3 Callback

When an incoming call has been ended, the message **Last call from** and the caller's identity may appear in the display.

To make a call to that person, briefly press the PTT key.

This function needs to be configured.

# 9.10 Checking the Queue

If an incoming call has been missed, or a status message or text message has been received, it may be stored in the queue. The queue icon appears and information about the missed call or message may be shown on the display.

The queue can be programmed to store multiple calls or messages or just the last call or message.

In the example below, a status message was received from Car 1. This is the first of three calls or messages stored in the queue.

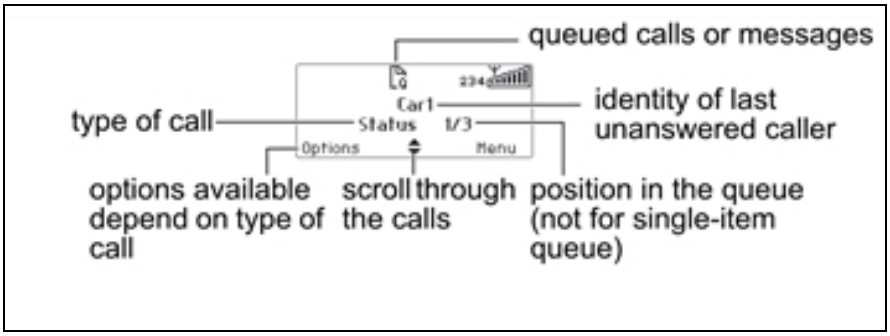



**Figure 9.1 The queue**

Press **Options** to either view, reply, call back, look at the entry details, or delete the entry.

The radio may be also programmed to automatically view the full status message or text message on receipt.

If there are calls or messages in the queue, the radio may emit a warble tone for a period of time. The notification starts again when the radio is restarted or another call is received.

## 9.10.1 Accessing the queue

1. If the call or message information is not shown already, press **Menu** > **Call queue**.
2. Use the scroll keys to move through the calls or messages in the queue until the desired item appears.
3. Press **Options**.

The options available depend on the type of call it is. For a voice call, select **Call** to return the call.

For a status message or a text message, select **View** to read the message, **Reply** to reply, or **Call** to return the call.

The radio may be also programmed to automatically view the full status message or text message on receipt.

Users can also delete the selected call or messages, or delete all queued calls and messages.

## 9.10.2 Changing the queue settings

The radio may be programmed so that they are able to change queuing between “unanswered” and “full”.

In “unanswered” queuing, incoming individual voice calls are only queued if unanswered.

In “full” queuing, incoming individual voice calls are queued immediately and users don’t get an option to answer the call.

In both cases, all status and text messages are queued immediately.

If the radio has alphanumeric keys, users may be able to change the call queuing setting using the keypad.

**Activating full queuing**

1. Press **Menu** and select **Radio settings** > **Call settings** > **Call queuing** and choose **On**.
2. Press the function key programmed for call queuing, or dial ***48** then press the **#** or PTT key.

The message **Call queuing activated** appears.

**Changing call queuing to “unanswered” queuing**

1. Press **Menu** and select **Radio settings** > **Call settings** > **Call queuing** and choose **Off**.
2. Press the function key programmed for Call queuing, or dial **#48** then press the **#** or PTT key.

The message **Call queuing deactivated** appears.

# 9.11 About Status Messages

A status message is sent to another party to indicate the user's current activity or location, such as “en route” or “at lunch”. If the radio receiving the message has been programmed with the same status messages, it will decode and display the user's message. If the user receives a status message, the message is automatically queued, since a response is not expected.

## 9.11.1 Selecting a status message

1. Press **Menu** and select **Send** > **Status**.
2. In the **Status** menu, scroll through the list of status messages until the desired message appears.

## 9.11.2 Sending a status message

1. When a message has been chosen, press **Send** and the **Send to** menu opens.
2. In the **Send to** menu, scroll through the list of options until the desired choice appears.
3. Press **Select**.

The call details appear on the display. While the call is being set up, the user can cancel the call by pressing **Cancel**.

## 9.11.3 Dialing a status message

If the radio has alphanumeric keys, the status messages programmed for the radio can be dialed. To dial the message, the user will need to know the number associated with the status message.

**To dial a status message**

1. Dial ***0s*n**, where **s** is the number of the status message and **n** is the called party's number.
2. Alternatively, dial ***0s*p**, where **p** is the number of a preset call or workgroup. See "Dialing a preset call" on page 73 or "Dialing a workgroup call" on page 74.
3. Press **Send** or the **#** or PTT key.

The call details appear on the display. While the call is being set up, the user can cancel the call by pressing **Cancel**.

### 9.11.4 Receiving a status message

If the radio is programmed for call queuing, incoming status messages are added to the queue. For more information, see "Checking the Queue" on page 78.

Press **Options** and select whether to reply, call or delete.

The radio may be programmed to automatically view status messages on receipt.

If the radio is not programmed for call queuing, incoming status messages will not be stored or displayed.

## 9.12 About Trunked Text Messages

The radio may be programmed so that a user can send text messages. The three options for creating text messages are selecting a preset text message, editing a draft text message, or creating a new text message.

### 9.12.1 Using the alphanumeric keys to enter text

When the alphanumeric keys are used to enter a text message, they have special functions. Use the:

- **#** key to select the type of text entry: upper and lower case characters (**ABC**, **abc**), initial capitals (**Abc**), or numbers (**123**).
- left selection key (**Clear**) to delete a character from the display.
- scroll keys to move through a message.

Repeated presses of these keys will give you the characters shown in the following table:

**Table 9.1 Alphanumeric keys with corresponding characters**

| Key | Characters | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | . | , | ? | ! | - | / | 1 |
| 2 ABC | A | B | C | | | | 2 |
| 3 DEF | D | E | F | | | | 3 |
| 4 GHI | G | H | I | | | | 4 |
| 5 JKL | J | K | L | | | | 5 |
| 6 MNO | M | N | O | | | | 6 |
| 7 PQRS | P | Q | R | S | | | 7 |
| 8 TUV | T | U | V | | | | 8 |
| 9 WXYZ | W | X | Y | Z | | | 9 |
| 0 | space | | | | | | 0 |

In the example below, a preset text message has been selected, and is being edited:

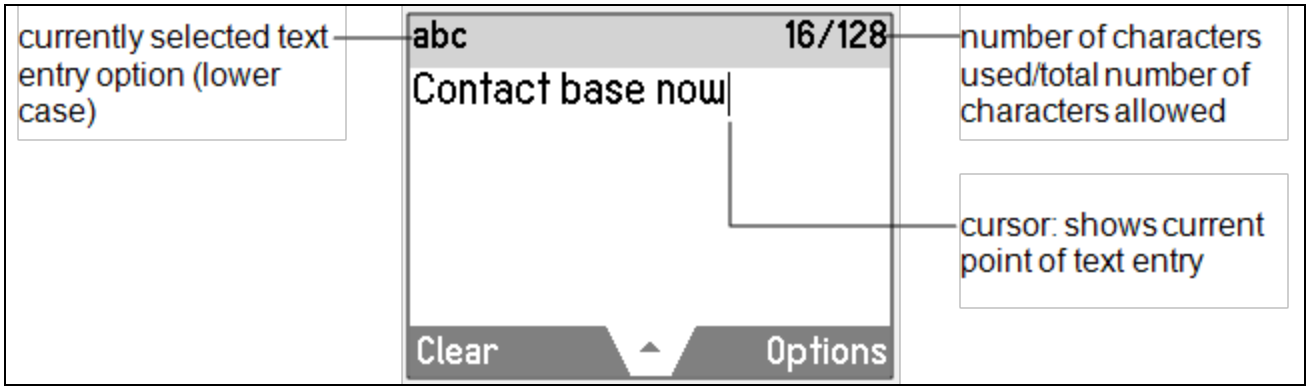



**Figure 9.2 Editing a preset text message**

## 9.12.2 Sending a preset text message

1. Press **Menu** and select **Send** > **Text message** > **Preset message**. In the **Preset message** menu, a short label representing each message is displayed.
2. Scroll through the list of preset message labels until the desired one appears.
3. Press **Select**, and the text message that's been chosen is now displayed.
4. Press **Send** to send the message, or **Edit** to change the message.

Pressing ⌒ will place the cursor at the start of the message. Pressing ⌣ will place the cursor at the end of the message. When the message is complete, press **Options** and select **Send**.

### 9.12.3 Creating a new text message

1. Press **Menu** and select **Send** > **Text message** > **New message**.
2. Use the alphanumeric keys to add characters and the **Clear** key to delete them. Use the scroll keys to move through the characters.
3. When the message is complete, press **Options** and select **Send**.

If the user wishes to cancel out of editing a text message or receive a call while editing, the current draft will be saved and is available for editing later.

### 9.12.4 Sending a text message

1. Once the message has been edited, press **Options** and the **Text options** menu opens.
2. In the **Text options** menu, select **Send**.
3. In the **Send to** menu, scroll through the list of options until the desired choice appears.

> If the radio has alphanumeric keys, users can choose the option **Dialed**, then dial the number of the party they wish to call.

4. Press **Select**.

The call details appear on the display. While the call is being set up, users can cancel the call by pressing **Cancel**.

### 9.12.5 Editing a draft text message

1. Press **Menu** and select **Send** > **Text message** > **Edit message**.

The last sent or edited text message will appear.

2. Use the scroll keys to move through the characters. Use the alphanumeric keys to add characters and the **Clear** key to delete them.
3. When the message is complete, press **Options** and select **Send**.

> If the user decides to cancel out of editing a text message or receive a call while editing, the current draft will be saved and is available for editing later.

### 9.12.6 Receiving a text message

If the radio is programmed for call queuing, incoming text messages are added to the queue. For more information, see "Checking the Queue" on page 78.

1. Press **Options** and select whether to reply, call or delete.

The radio may be programmed to automatically view text messages on receipt.

If the radio is not programmed for call queuing, incoming text messages will not be stored or displayed.

## 9.13 Placing the Radio in Do-Not-Disturb Mode

If a user doesn't want to accept calls for a while, they can place the radio in 'do-not-disturb mode' so that incoming calls can be ignored. Users can still make outgoing calls in the usual way.

While do-not-disturb mode is active, incoming calls cannot be stored in the call queue.

### 9.13.1 Using a function key

1. To activate the do-not-disturb function, press the function key programmed for do not disturb.

The message **Do not disturb activated** appears on the display. The radio will now ignore all incoming calls.

2. To deactivate the do-not-disturb function, press the do-not-disturb function key again.

The message **Do not disturb deactivated** appears on the display.

### 9.13.2 Using the main menu

1. Press **Menu** and select **Radio Settings** > **Call Settings** > **Do not disturb**.
2. In the **Do not disturb** menu, choose **On**.
3. Press **Select**.

The message **Do not disturb activated** appears on the display. The radio will now ignore all incoming calls.

## 9.14 Switching to Conventional Channels or Conventional Groups

You may be able to dial conventional channels or groups, using **101** to **110**. The channels or groups called using these numbers are programmed for the radio.

**Notice** Only valid for MPT1327, MPT1343 and Nokia ANN dialing schemes. Does not apply to DMR dialing scheme.

### 9.14.1 To call a conventional channel or group

1. Dial the number for the channel or group that is being called.
2. Press **Send** or the **#** or PTT key.

The radio switches to the conventional channel programmed for that number.

## 9.15 Dialing Calls on DMR/MPT Trunked Networks

If the radio has alphanumeric keys, users can make dialed calls from their radio. The numbers dialed and the dialing features available depend on the way the radio is programmed and the way the user's network operates. Contact the radio provider for further assistance.

### 9.15.1 MPT 1343 dialing

If a user's MPT or DMR trunked network uses the MPT 1343 dialing scheme, the radio’s unique number on the network consists of:

- a three-digit prefix,
- a four-digit fleet number, and
- a two- or three-digit radio unit number.

The user may also be part of a group, with a two- or three-digit group number.

### Finding the radio’s MPT number

To find the radio’s full MPT number:

1. Dial ***700**.
2. Press the **#** or PTT key.

The name associated with the user's network and the radio’s full MPT number appears.

### MPT 1343 dialed calls

Table 9.2 below summarizes the way calls are dialed to other radios and groups of radios using the MPT 1343 dialing scheme.

In the following examples, the final **#** may be replaced by a short press of the PTT key.

**Table 9.2 MPT 1343 Dialing Scheme**

| Call to | Dialing code and example |
|---|---|
| Radio **23** in the same fleet as the user | 23 # |
| Radio **234** in the same fleet as the user | 234 # |
| Radio **23** in fleet **3078** with the same prefix as the user | 3078 23 # |
| Radio **234** in fleet **3078** with the same prefix as the user | 3078 234 # |
| Radio **234** in fleet **3078** with a different prefix to the user (**300**) | 300 3078 234 # |
| Group **92** in the same fleet as the user | 92 # |
| Group **923** in the same fleet as the user | 932 # |

## 9.15.2 DMR dialing

If the user's trunked network uses the DMR dialing scheme, the radio’s unique number on the network consists of:

- a three-digit prefix
- a two-digit fleet number, and
- a three-digit unit number

The user may also be part of a group, with a three-digit group number.

### Finding the radio’s DMR number

To find the radio’s full DMR number:

1. Dial ***700**.
2. Press the **#** or PTT key.

The name associated with the user's network and the radio’s full DMR number appears.

### DMR dialed calls

Table 9.3 below summarizes the way the user dials calls to other radios and groups of radios using the DMR dialing scheme.

In the following examples, the final **#** may be replaced by a short press of the PTT key.

**Table 9.3 DMR Dialing Scheme**

| Call to | Dialing code and example |
|---|---|
| Radio **332** in the same fleet as the user | 332 # |
| Radio **521** in the same fleet as the user | 521 # |
| Radio **332** in fleet **78** with the same prefix as the user | 78 332 # |
| Radio **521** in fleet **78** with the same prefix as the user | 78 521# |
| Radio **332** in fleet **78** with a different prefix to the user(**350**) | 350 78 332 # |
| Group **990** in the same fleet as the user | 990 # |
| Group **923** in the same fleet as the user | 923 # |

## 9.15.3 Nokia ANN fleet calls

If the user's trunked network uses Nokia ANN dialing, the numbers they dial will depend on their fleet size. Fleets are defined as either large, small or mini. The radio's unique number on the network consists of:

- a lead number **7**, **8** or **9**, depending on the fleet size,
- a zero-, one-, two- or three-digit prefix,
- a one- or two-digit fleet number, and
- a two- or three-digit radio unit number

See the radio provider or network administrator for Nokia ANN call details.

### Finding the radio's Nokia ANN number

To find the radio's full Nokia ANN number:

1. Dial ***700**.
2. Press the **#** or PTT key.

The name associated with the user's network and their radio's full Nokia ANN number appears.

The number is in the form: Lead-Prefix-Fleet-Radio Unit Number

### Nokia ANN dialed calls

Table 9.4 below summarizes the way the user will dial calls to other radios.

In the following examples, the final **#** may be replaced by a short press of the PTT key.

**Table 9.4 Dialed Call Types**

| Call to | Dialing code and example |
|---|---|
| Radio **23** in the same fleet as the user | 23 # |
| Group **923** in the same fleet as the user | 923 # |
| **Large fleet** | |
| Call to radio **234** in fleet **1** with the same prefix as the user | 7 1 234 # |
| Call to radio **235** in fleet **2** with a different prefix to the user (**32**) | 7 32 2 235 # |
| Call to radio **236** in fleet **2** with the same lead and prefix [1] | 2 236 # |
| **Small fleet** | |
| Call to radio **23** in fleet **51** with the same prefix as the user | 7 51 23 # |
| Call to radio **24** in fleet **52** with a different prefix to the user (**126**) | 7 126 52 24 # |
| Call to radio **25** in fleet **53** with the same lead and prefix. See "Nokia ANN fleet calls" on the previous page for more information | 53 25 # |
| **Mini fleet** | |
| Call to radio **23** in fleet **80** with the same prefix as the user | 7, 8 or 9 80 23 # |
| Call to radio **24** in fleet **81** with a different prefix to the user (**3**) | 7, 8 or 9 3 81 24 # |
| Call to radio **25** in fleet **81** with the same lead and prefix. See "Nokia ANN fleet calls" on the previous page for more information | 81 25 # |

[1] If 4-digit-dialing is configured in the programming application.

## 9.16 Accessing Common Trunking Functions

The following tables explain how users can access special MPT or DMR trunking functions using the ***** and **#** keys. The availability of these functions is dependent on the way the radio is programmed and the way your network operates.

In the following examples, the final **#** may be replaced by a short press of the PTT key.

**Table 9.5 Accessing Trunking Functions Using * and #**

| ***... # functions** | | |
|---|---|---|
| **Dialing code** | **Functions** | **Example** |
| # | Accept an incoming FOACSU call | |
| *# | Clear call or displayed item, or decline an incoming FOACSU call | |
| *0#<br>#0# | Request base dispatcher to call user back<br>Cancel request | |
| *0*n#<br>#0*n# | Request another dispatcher to call user back<br>Cancel request | *0*234#<br>#0*234# |
| *0s*n#<br>*0s# | Status call to radio **n** (**s** = status 0 to 31, MPT, or 0 to 99, DMR)<br>Status call to dispatcher | *015*23#<br>*015# |
| g# | Conference call to group **g** | 92# |
| *11*g# | Broadcast call to group **g** | *11*92# |
| *41*n#<br>#41# | Divert own calls to radio **n**<br>Cancel divert | *41*23# |
| *41*0n#<br>#41# | Divert own calls to PSTN **n**<br>Cancel divert | *41*03456798# |
| *44*n*m# [1] | Divert 3rd party calls **n** to **m** | *44*23*21# |
| 44*n# [1] | Cancel divert of 3rd party calls | #44*23# |
| *441*m#<br>#441# | Divert of speech calls to **m**<br>Cancel divert of speech calls | *441*21#<br>#441# |
| *442*m#<br>#442# | Divert of packet data calls to **m**<br>Cancel divert of packet data calls | *442*21#<br>#442# |
| *451# | Cancel incoming call diversions (speech only) | |

| *... # functions | | |
|---|---|---|
| **Dialing code** | **Functions** | **Example** |
| *452# | Cancel incoming call diversions (packet data only) | |
| *453# [2] | Cancel incoming call diversions (SDM only) | |
| *454#[2] | Cancel incoming call diversions (status only) | |
| *46# [3] | Toggle encryption | |
| *461# [3] | Turn encryption off | |
| *462# [3] | Turn encryption on | |
| *47# [3] | Display the current network and the user's full radio number | |
| *48#<br>#48# | Queue incoming calls<br>Cancel queue | |
| *49#<br>#49# | Do not disturb<br>Cancel do not disturb | |
| *491#<br>#491# | DMR: Do not disturb (SDM calls)<br>MPT: Do not disturb (voice calls only)<br>DMR: Cancel do not disturb (SDM calls)<br>MPT: Cancel do not disturb (voice calls only) | |
| *492#<br>#492# | Do not disturb—data calls only<br>Cancel do not disturb—data calls only | |
| *50*n# [1] | Select channel **n** (site-select diagnostic function, enabled during programming) | |
| *50*xnnnnn#[2] | Select channel **xnnnn**, where **x** is the logical channel and **nnnn** is the physical channel (site-select diagnostic function, enabled during programming) | |
| #50# | Resume normal channel hunting (site-select diagnostic function, enabled during programming) | |
| *700# | Display the current network and the user's full radio number | |
| *70n# | Change to network **n** (1 to 4) | *702# |
| *8*n#[4] | Priority call (DMR: highest, MPT: high) to radio **n** | *8*23# |
| *8*g#[4] | Priority conference call (DMR: highest, MPT: high) to group **g** | *8*923# |
| *81*n#[4] | Priority call (DMR: highest, MPT: high) to radio **n** | *81*23# |

| *... # functions | | |
|---|---|---|
| **Dialing code** | **Functions** | **Example** |
| *81*g#[4] | Priority conference call (DMR: highest, MPT: high) to group **g** | *81*923# |
| *82*n#[4] | Priority call (DMR: high) to radio **n** | *82*23# |
| *82*g#[4] | Priority conference call (DMR: high) to group **g** | *82*923# |
| *83*n#[4] | Priority call (DMR: medium) to radio **n** | *83*23# |
| *83*g#[4] | Priority conference call (DMR: medium) to group **g** | *83*923# |
| *9*n# | Emergency call to radio **n** | *9*23# |
| *9*g# | Emergency conference call to group **g** | *9*923# |
| **n# [1] | Abbreviated dialed codes (1-49) | **3# |

[1]MPT only

[2]DMR only

[3]DMR dialing scheme only

[4]DMR has three priority levels and MPT has one priority level. *8 and *81 are interchangeable Dialing *82 or *83 in MPT mode has the same effect as dialing *8 or *81

# 10 Scanning

This section explains the different types of scanning that may be available on the radio, and also how to view and edit scanning group members.

Scanning on the TP9900 is limited to groups within the same protocol: P25 for P25 and analog channels, and DMR for DMR channels. The device does not support scanning or roaming across different protocols. Attempting to add a DMR channel or talkgroup to a P25/analog scan list, or vice versa, will result in an error message.

## 10.1 About Scanning

The scan feature monitors groups of channels or talkgroups for activity, allowing operation across multiple channels or talkgroups simultaneously. For example, you can monitor your dispatch channel and local sheriff and highway patrol channels. Scanning groups can include conventional channels (P25 or analog), trunked talkgroups, and vote groups. When scanning, the radio searches for activity among the group members. If activity is detected, the radio stays on that channel or talkgroup until it ends, then resumes scanning. Priority channels or talkgroups are scanned more frequently, and their calls take precedence.

While the radio is scanning for activity, the animated icon appears on the display.

When the radio stops on a channel or talkgroup where there is activity, the icon flashes.

In a background or talkgroup scanning group, a scanning icon with a tick indicates that the selected channel or talkgroup is a member of the scanning group.

The four types of scanning that may be available are:

- standard scanning (P25 conventional and analog channels)
- background scanning (P25 conventional and analog channels, and may include some voting groups)
- in-zone scanning (P25 conventional and analog channels, and P25 trunked talkgroups)
- talkgroup scanning (P25 trunked talkgroups, and may include some P25 conventional and analog channels)

For information about viewing and editing scanning group membership, see "Editing a Scanning Group" on page 93.

## 10.2 Activating Standard Scanning

A standard scanning group scans conventional channels (P25 and analog) from across zones, and can also scan one or two voting groups. A standard scanning group appears and behaves on the radio like a separate channel, and all standard scanning groups are included in the channel list. Standard scanning is activated when a standard scanning group is selected.

### 10.2.1 To select a standard scanning group

1. Press **Menu** and select **Channels**.
2. Scroll to the required group and press **Select**.

> Depending on how the radio is programmed, you may be able to press a function key or use the channel selector or Quick Access menu to select channels.

## 10.3 Activating Background Scanning

A background scanning group scans the group members, as well as the current channel selected on the radio. The group member channels can include conventional channels (P25 or analog) across zones, and can also include one or two voting groups.

Background scanning provides more flexibility than standard scanning, as the radio user can select a current channel to operate on, while still monitoring permanent group members for activity.

To turn background scanning on:

- Press **Menu** and select **Radio settings** > **Functions** > **Scanning**, or press the function key programmed for background scanning.

> Background scanning remains on until you either press the function key again, or select a standard, in-zone or talkgroup scanning group.

### 10.3.1 Changing the background scanning group assigned to the function key

1. Press **Menu** and select **Radio settings** > **Functions** > **Set scan key**.
2. Scroll through the list of background scanning groups available and press **Select**. When you next turn on background scanning, this is the scanning group that is activated.

> This is also available for talkgroup and In-zone scanning. See "Activating Talkgroup Scanning" on the next page and "Activating In-Zone Scanning" below.

## 10.4 Activating In-Zone Scanning

An in-zone scanning group scans the first 50 conventional channels (P25 or analog) or trunked talkgroups from the currently-selected zone. If zones are changed, the radio stops scanning the previous zone’s channels and automatically starts scanning channels from the new zone.

In-zone scanning is useful when scanning conventional channels and trunked talkgroups from within the selected zone, and zones are used to separate different geographic regions or work roles. As you change to a new region or role, you can change to another zone and the radio will automatically start scanning channels or talkgroups in the new zone with no further action required.

### 10.4.1 To turn in-zone scanning on

- Press **Menu** and select **Radio settings** > **Functions** > **Scanning**, or press the function key programmed for in-zone scanning.

In-zone scanning remains on until you either press the function key again, or select a standard, background or talkgroup scanning group.

## 10.5 Activating Talkgroup Scanning

Talkgroup scanning monitors calls from multiple trunked talkgroups, and up to five additional conventional channels (P25 or analog), from across zones.

**Warning** If a talkgroup scanning group contains P25 or analog conventional channels, scanning needs to exit trunked mode briefly to scan the conventional channels. This may result in delayed or even missed calls!

Talkgroup scanning is useful if you need to operate across multiple trunked talkgroups. When talkgroup scanning is activated, the currently-selected talkgroup or channel is temporarily included in the scanning group. If you change zones, the radio continues to monitor group members as well as the currently selected talkgroup or channel from the new zone.

### 10.5.1 To turn talkgroup scanning on

- Press **Menu** and select **Radio settings** > **Functions** > **Scanning**, or press the function key programmed for talkgroup scanning.

Talkgroup scanning remains on until you either press the function key again, or select a standard, background or in-zone scanning group.

## 10.6 Making a Call While Scanning

1. Press the PTT key to transmit.

The channel that is called depends on the way the radio has been programmed.

The possible options are the radio:

- calls a predetermined channel, e.g. the dispatcher.
- calls the channel where activity was last detected.
- calls the last free channel.

2. When the called party responds, proceed with your conversation.

## 10.7 Suspending a Channel From a Scanning group

If a group member is busy for a long time and you do not want to hear the conversation, you may be able to use the function key programmed for nuisance delete to temporarily delete the group member. When the scanning group is next selected, or after the radio has been turned off and then on, the deleted member is again part of the scanning group.

### 10.7.1 To temporarily remove a captured group member from the scanning group

- Press the function key programmed for nuisance delete.

If the channel has been removed successfully, the message **Channel nuisance deleted** appears in the display.

The function key programmed to activate scanning may be programmed so that a short key press activates scanning and a long key press activates nuisance delete.

## 10.8 Editing a Scanning Group

### 10.8.1 Selecting a group to edit

1. Press **Menu** and select **Radio settings** > **Functions** > **Advanced** > **Edit groups**. The **Edit Groups** menu lists all scanning groups programmed for the radio.
2. Scroll to the group to be viewed or edited, press **Select**.
3. In the **Edit Group** menu, select from the following options:
    - **Group members**: shows the current members of a group, and may also show the designated transmit channel and priority channels.
    - **Add** or **Delete channel**: adds or deletes member channels of a group.
    - **Change tx**: changes the group's transmit channel.
    - **Change P1** or **P2**: changes the group's first or second priority channel.

Depending on how the radio is programmed, you may be able to press a function key or use your Quick Access menu to select the Edit Groups menu.

### 10.8.2 Icons and meanings

Table 10.1 below features icons that may appear when viewing group membership details, adding or deleting channels from a group, or changing a group's transmit or priority channels.

**Table 10.1 Icon Meanings**

| Icon | Meaning |
|---|---|
| $T_X$ | This channel is used to transmit on when there has been no recent activity. You cannot delete this channel (it will not appear under **Delete channel**) |
| $P_1$ | This channel is the group's first priority channel. You cannot delete this channel (it will not appear under **Delete channel**) |
| $P_2$ | This channel is the group's second priority channel. Deleting this channel is configurable |
| + | There is more than one instance of this channel in the group (the channel will be scanned more often). If this channel is deleted, the radio will attempt to delete all instances of the channel |

### 10.8.3 Viewing group membership

1. In the **Radio settings** menu, select **Edit groups** and select a scanning group. Press **Select**.
2. In the **Edit Group** menu, select **Group members** and press **Select**.
3. Scroll through the list of group members. The names of the group members may be shortened.

### 10.8.4 Adding a channel to a group

1. In the **Radio settings** menu, select **Edit groups** and select a scanning group. Press **Select**.
2. In the **Edit Group** menu, select **Add channel** and press **Select**. A list of channels that are not group members appears.
3. Select the channel to be added and press **OK**.

For all types of scanning except standard scanning, if the radio is programmed to use the scroll keys to scroll through a list of channels and also has a function key programmed to Nuisance Delete, you can **permanently** add or delete a channel to the active group by scrolling to the channel and pressing the **Nuisance Delete** function key.

### 10.8.5 Deleting a channel from a group

The priority 1 channel cannot be deleted using the Delete Channel menu.

1. In the **Radio settings** menu, select **Edit groups** and select a scanning group. Press **Select**.
2. In the **Edit Group** menu, select **Delete channel** and press **Select**. A list of group members that are able to be deleted appears.
3. Select the channel you want to delete and press **OK**.

For all types of scanning except standard scanning, if the radio is programmed to use the scroll keys to scroll through a list of channels and also has a function key programmed to Nuisance Delete, you can **permanently** add or delete a channel to the active group by scrolling to the channel and pressing the **Nuisance Delete** function key.

### 10.8.6 Changing a group’s transmit channel

The group’s transmit channel can only be changed if it has been pre-programmed.

1. In the **Radio settings** menu, select **Edit groups** and select a scanning group. Press **Select**.
2. In the **Edit Group** menu, select **Change tx** and press **Select**.

The current transmit channel is highlighted at the top of the list.

3. Select the new transmit channel and press **OK**.

The transmit channel remains changed even after the radio is turned off.

### 10.8.7 Changing a group’s first or second priority channel

1. In the **Radio settings** menu, select **Edit groups** and select a scanning group. Press **Select**.
2. In the **Edit Group** menu, select **Change P1** or **Change P2** and press **Select**.

The current priority channels are highlighted at the top of the list.

3. Select the new priority 1 or priority 2 channel and press **OK**.

# 11 Location Services

This section explains how to use the location services that may be available on the radio.

This feature is controlled by a software license (SFE) and may not be available with the radio.

## 11.1 About Location Information

The radio can display location information such as latitude and longitude, true course, speed, and coordinated universal time. The radio can also display universal transverse mercator (UTM) information such as the UTM zone, and northing and easting coordinates.

The radio may also be set up to send and log location information.

## 11.2 About Location Statuses

On the **Own location** screen, the following location status information appears on the display:

- **Trk**: the receiver is displaying up-to-date satellite information
- **stored**: the receiver is having trouble connecting to satellites and the radio is displaying stored information that may not be current
- **no cnx:** the radio has lost serial communications with the receiver

The information displayed can be sent to other radios on the network by pressing the **Share** selection key.

## 11.3 Viewing Location Information

The radio can be programmed to show various displays. Initially, location reporting is set to all zeros until the first satellite fix. Latitude and longitude formats depend on the configuration. In certain situations, the radio may automatically exit the location display.

Location information is displayed if it is available and configured to be visible. The images below show some of the available options.

1. Press **Menu** and select **Location Svs** > **Own location**.
2. Use the scroll keys to scroll though the **Own location** displays.

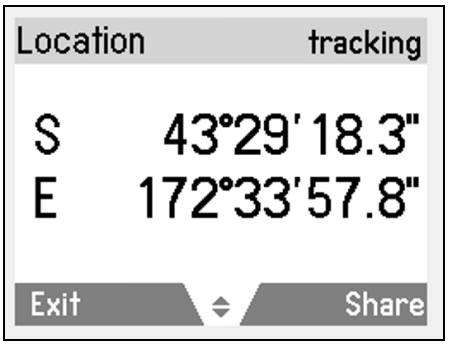



**Figure 11.1 Latitude and longitude in degrees, minutes and decimal seconds**

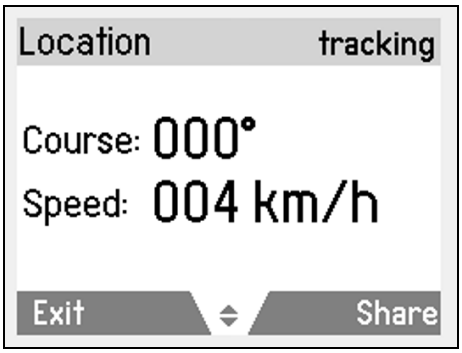



**Figure 11.2 The radio's current course and speed**

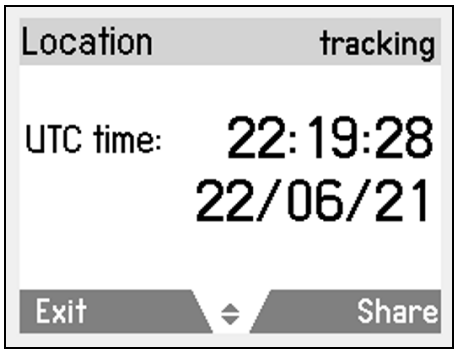



**Figure 11.3 UTC: Coordinated Universal Time, 24-hour clock**

3. Press **Exit** to exit the location display.

# 12 Encryption

This section describes how to use encryption to make user's communications completely private.

This feature is controlled by a software license (SFE) and may not be available with the radio.

## 12.1 About Encryption

The encryption feature is available only for digital and dual mode networks.

To ensure private communication, the radio can encrypt outgoing calls using a confidential encryption key. The receiving radio must have the same encryption key installed to hear the encrypted call.

### 12.1.1 About the proper key detect feature

The radio may be programmed with ‘proper key detect’. This means that you can only hear an encrypted call if the key used to encrypt the incoming call matches the key used to encrypt your outgoing calls on that channel.

Note that encryption does not need to be turned ‘on’ for the radio to unmute.

For example, you are encrypting your outgoing calls using encryption **key 7**. Although **key 1** and **key 2** are also stored in the radio, the radio has been programmed so that it will only unmute for incoming calls encrypted using **key 7**.

## 12.2 Encrypting Calls

The radio may be able to turn encryption on and off. While encryption is on, outgoing calls are encrypted on networks programmed for encryption, and the encryption icon remains in the display.

This setting only affects outgoing calls. Incoming calls will still be decoded by the radio so long as the key required to decode the call is stored in the radio.

### 12.2.1 To turn encryption on or off

#### Using the main menu

1. Press **Menu** and select **Security** > **Encryption** (depending on how the radio is programmed, users may be able to press a function key to turn encryption on and off).
2. Scroll to **On** (or **Off**) and press **Select**.

The message **Encryption activated** (or **deactivated**) appears in the display.

On a DMR channel, if a user attempts to transmit with encryption turned on but they don’t have any keys loaded, the message **Key fail** appears.

#### Using the 3-way selector

1. Rotate the 3-way selector to either position A or B to turn encryption on.

The message **Encryption activated** briefly appears in the display.

2. Rotate the 3-way selector to position C to turn encryption off.

The message **Encryption deactivated** briefly appears in the display.

## 12.3 Making an Encrypted Call

1. Select the desired network to operate on or channel or group.
2. Check that encryption is on (encryption key is showing in the display).
3. Press and hold the PTT key to transmit.

The name of the encryption key that the radio is using for the transmission may briefly appear in the display.

The call details appear on the display, the LED glows red, and appears on the display.

If users transmit or receive an unencrypted call on an encrypted network, disappears and the radio may be programmed to issue an audible alert.

## 12.4 Receiving an Encrypted Call

When receiving an encrypted call, the radio unmutes and clear speech can be heard, so long as the key required to decode the call is stored in the radio.

The name of the encryption key used to encrypt the incoming call may briefly appear in the display, below the name of the caller.

If the key required to decode the call is not stored in the radio, then the radio remains muted and the message **Key fail** appears.

The radio may also remain muted if the currently selected channel has 'proper key detect' programmed.

If users transmit or receive an unencrypted call on an encrypted network, disappears and the radio may be programmed to issue an audible alert.

## 12.5 Changing the Radio's Encryption Key

The **Change All** menu can be used to change the encryption key that encrypts outgoing calls. The **Preset Keys** menu can then be used to change the encryption keys back to the default encryption key for each channel.

**Warning** Once the encryption key is changed, it may also automatically update the encryption keys used to encrypt calls on other channels.

### 12.5.1 Changing the transmit encryption key

1. Press **Menu** and select **Security** > **Change all**.
2. Scroll to the required key and press **Select**. The message **Global key selected** briefly appears in the display.

### 12.5.2 Changing the transmit encryption key back to the default setting

1. Press **Menu** and select **Security** > **Preset keys**. The message **Select preset keys?** appears in the display.
2. Press **OK** and the message **Preset keys selected** briefly appears in the display.

### 12.5.3 Changing the encryption keyset

It may be possible to change the encryption data associated with the encryption keys loaded in the radio.

1. Select **Menu** > **Security** > **Security** > **Change keyset**.
2. Scroll to **01** or **02** and press **Select**. The message **Keyset selected** briefly appears in the display.

## 12.6 Removing Encryption Keys from the Radio

It may be possible for users to delete encryption keys from their radio.

**Warning** When emergency mode is activated, or when the radio is immobilized ('inhibited'), encryption keys may be automatically deleted from the radio.

If the encryption keys are deleted, the message **Key fail** appears and a warning tone will periodically sound. The message **Cannot transmit** will be displayed if the user tries to transmit.

### 12.6.1 Deleting an encryption key

1. Press **Menu** and select **Security** > **Advanced** > **Zeroize key**.
2. Scroll to the desired key and press **Select**. The message **Single key zeroized** briefly appears in the display.

### 12.6.2 Deleting all encryption keys

1. Press **Menu** and select **Security** > **Advanced** > **Zeroize all**. The message **Zeroize all keys?** appears in the display.
2. Press **OK** and the message **All keys zeroized** briefly appears in the display.

## 12.7 Updating Encryption Keys Over-The-Air

Encryption keys may be updating using over-the-air-rekeying (OTAR).

This feature is controlled by a software license (SFE) and may not be available with the radio.

This feature is only available for digital channels.

- press **Menu** and select **Security** > **OTAR** > **Rekey request**

The message **Rekey request ack** appears in the display. If there is no response to the rekey request, the message **Rekey request timeout** appears.

# 13 Customizing Radio Settings

This section describes ways of customizing the radio.

> These features are common to radios operating in either trunked or conventional mode.

## 13.1 Extending Battery Life on Shift

The radio's power consumption can be reduced (thereby extending the life of the battery during a shift) in the following ways:

- transmit at low power (if the radio is not already configured to do this)
- ensure that backlighting automatically turns off when no radio activity is detected (see "Turning on Backlighting" on page 103)

### 13.1.1 Turning low power transmit on or off

If the radio is being used in conditions where signal strength is high, the battery's shift life can be extended by transmitting at low power.

When low power transmit is turned on, appears in the display and calls are made at low power rather than at the programmed power setting.

#### Using the main menu

1. Press **Menu** and select **Radio settings** > **Functions** > **Low power tx**.
2. Scroll to **On** (or **Off**) and press **Select**.

> The current setting is highlighted.

The message **Low power tx activated** (or **deactivated**) appears on the display.

#### Using a function key

1. Press the function key programmed for low-power transmit to transmit at low power on your current channel and any channels subsequently used.

> The message **Low power tx activated** appears briefly, and the low-power transmit icon appears on the display.

2. Press the low-power transmit function key again to turn low-power transmit off, and the message **Low power tx deactivated** appears on the display.

## 13.2 Changing the Color Mode

The display colors can be changed to suit the environment. For example, Red/Black is suited for night display while Color - Dark is ideal for bright environments. The default setting is Color - Light.

### 13.2.1 To change the color mode

1. Press **Menu** and select **Radio settings** > **Display settings** > **Color mode**.
2. Scroll to the desired mode and press **Select**.

Table 13.1 below features the available color modes.

**Table 13.1 Color Modes**

| Mode | Description |
|---|---|
| Color - Dark | Dark background, light text |
| Color - Light | Default setting. Light background, dark text. Best suited for day time display |
| Black/White | White background, black text |
| White/Black | Black background, white text |
| Red/Black | Black background, red text. Best suited for night display |

## 13.3 Changing the Volume of all Audible Indicators

Users can set the volume of all the audible indicators to either high or low. Audible tones include incoming call tones, warning tones and confirmation tones.

### 13.3.1 To change the volume of the radio's audible tones

1. Press **Menu** and select **Radio settings** > **Alert settings** > **Indicator level**.

Depending on how the radio is programmed, users may be able to press a function key to change the level of indicators.

2. Scroll to **High** (or **Low**) and press **Select**.

## 13.4 Changing the Volume of Keypress Tones

Whenever you press the radio keys, the keypress tones give you an audible indication as to whether or not your action is allowed. A short, medium-pitched beep indicates that an action is allowed. A long, low-pitched beep indicates that the action is not allowed.

### 13.4.1 To change the volume of the radio's keypress tones

1. Press **Menu** and select **Radio settings**> **Alert settings** > **Keypress tones**.
2. Scroll to either **Off**, **Low** or **High** and press **Select**.

Depending on how the radio is programmed, you may be able to press a function key to toggle keypress tones on and off, and to change between high and low volume.

## 13.5 Changing to Quiet Operation

When quiet operation is on, keypress tones and confirmation tones are turned off. Incoming call tones, signaling tones and warning tones all remain audible.

### 13.5.1 To turn quiet operation on or off

1. Press **Menu** and select **Radio settings** > **Alert settings** > **Quiet operation**.
2. Scroll to **On** (or **Off**) and press **Select**.

Depending on how the radio is programmed, you may be able to press a function key to toggle quiet operation on and off.

## 13.6 Changing to Silent Operation

When silent operation is on, all the radio's audible tones are turned off, and only channel traffic can be heard.

### 13.6.1 To turn silent operation on or off

1. Press **Menu** and select **Radio settings** > **Alert settings** > **Silent operation**.
2. In the **Silent operation** menu, scroll to either **On** or **Off** and press **Select**.

While silent operation is on, the  icon appears in the display.

Depending on how the radio is programmed, you may be able to press a function key to toggle silent operation on and off.

## 13.7 Turning on Backlighting

If configured, whenever a key is pressed or a call is received, the keypad and display will light up automatically. Backlighting only remains on for a few seconds, unless there is further radio activity. When backlighting is turned on, it remains on until the setting is changed to **Off**, regardless of radio activity.

### 13.7.1 To turn backlighting on or off

1. Press **Menu** and select **Radio settings** > **Display settings** > **Backlighting**.
2. Scroll to either **On** or **Off** and press **Select**.

Depending on how the radio is programmed, you may be able to press a function key to toggle backlighting on and off, or between 'with activity' and 'on'.

### 13.7.2 Turning backlighting on momentarily

You may be able to use a programmed function key to turn backlighting on momentarily, as long as backlighting has been configured to 'with activity'.

- press the assigned function key to turn backlighting on. Backlighting remains on for a few seconds, and then turns off

Alternatively, the function key may be programmed so that:

- a short key press turns backlighting on momentarily, and
- a long key press turns backlighting on, and it remains on until there is a further long key press

## 13.8 Rotating the Display

When the display is rotated, everything appears upside down.

### 13.8.1 To rotate the display

1. Press **Menu** and select **Radio settings** > **Display settings** > **Rotate display**.
2. Scroll to **On** (or **Off**) and press **Select**.

Depending on how the radio is programmed, you may be able to press a function key to toggle rotate display on and off.

# 14 Failsoft Mode Operation

If the radio is unable to access the trunking system, it may be programmed to enter failsoft mode. Failsoft mode operates in one of two ways: ‘radio-based’ failsoft and ‘infrastructure’ failsoft.

## 14.1 Radio-based failsoft

When access to the trunking system is lost,  no longer appears, the bars in the RSSI icon,  , disappear and the display shows **No service**.

After a short time, the radio switches to a programmed conventional communications channel.

The radio remains on that channel until you select a trunked talkgroup with access to the trunking system.

## 14.2 Infrastructure failsoft

The radio receives a message from the trunking infrastructure to say that the trunking system is now operating in failsoft mode.

While in failsoft mode, the display shows **Failsoft**, and the radio sounds a repeating double beep. The double beep continues until normal service is restored.

You may still be able to communicate with your dispatcher and other talkgroup members, depending on the type of system failure that has occurred, and how the radio is programmed.

When the trunking system returns to normal operation, the radio is notified, and will attempt to register on the control channel it was previously using.

# 15 Troubleshooting

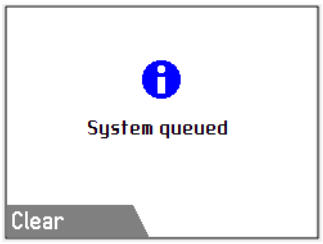
This section describes troubleshooting procedures and basic maintenance.

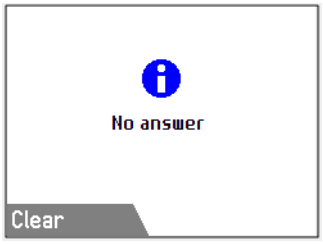
If you are experiencing difficulty operating the radio, you may find the following sections helpful. Consult the radio provider for assistance, if necessary.

## 15.1 Unconnected Calls

Table 15.1 below explains the way a radio behaves if a call is not connected.

**Table 15.1 Radio Behavior of Unconnected Calls**

| Radio behavior | Explanation |
|---|---|
|  | The system is too busy to process your talkgroup or individual call |
|  <br>The radio sounds three short beeps | The system is now available to process your talkgroup or individual call |
|  <br>The radio sounds five beeps, followed by a repeating double beep | You have selected a talkgroup that does not currently exist on the system. The display shows that service is lost, and no longer appears<br>See "Service is lost" on page 61 |

| Radio behavior | Explanation |
|---|---|
|  <br>The radio sounds two short beeps | You have attempted to make an individual call to a radio that does not currently exist on the system |
|  <br>The radio sounds two short beeps | You have attempted to made an individual call to a radio that has never existed on the system |
|  <br>The radio sounds two short beeps | You have attempted to make an individual or phone call, but you are not authorized to do this<br><br>Your individual or phone call has been rejected or is unanswered |

## 15.2 The Radio won't Turn On

If the radio LED doesn’t light up red briefly when the radio is turned on, power is likely not reaching the radio. Check the following:

- Is the battery firmly attached to the radio?
- Is the battery sufficiently charged?
- Is the battery charger working properly?

If all appears to be in order, but the radio still fails to operate properly, contact the radio provider for further assistance.

## 15.3 Identifying the Radio's Audible Tones

The radio’s audible tones can help you identify a potential problem. See "Audible tones" on page 25.

## 15.4 Viewing Radio Information

Use the **Radio info** menu to view information such as the hardware and firmware version of the radio, function key settings, the radio serial number, and various radio identities.

1. Press **Menu** and select **Radio settings** > **Radio info**.
2. Scroll to the radio information you want to view and press **Select**.

### 15.4.1 Checking the version of the radio using the PTT key

1. Turn off the radio.
2. Hold down the PTT key and turn on the radio.

The firmware and hardware versions, and the radio's frequency band is briefly displayed.

## 15.5 General Care

The only radio maintenance required is ensuring the battery has sufficient charge and that the antenna and battery are not damaged.

**Notice** To prevent permanent damage to the radio case, do not allow the radio to come into contact with detergents, alcohol, aerosol sprays, or petroleum-based products.

### 15.5.1 Cleaning the radio

**Warning** Risk of permanent damage to the radio housing! Do not clean the radio with solvents or alcohol based products. This includes (but is not limited to) ethylene glycol (antifreeze), propanone (acetone), ethanol (methylated spirits), isopropyl alcohol, and pool chlorine (calcium hypochlorite).

1. Use a lint-free, dry cloth to remove surface dirt, oil, or grease.
2. Use an alcohol-free, antibacterial wipe to disinfect the radio.
3. Use a water-dampened, lint-free, microfibre cloth to remove any remaining dirt.
4. If the damp cloth is ineffective, dilute a (5 to 10%) solution of alcohol-free dishwashing liquid in clean water, on a cloth, to remove remaining dirt.

**Warning** Always use protective equipment (gloves, face mask) when handling bleach.

5. If the dish-washing liquid solution is ineffective, use a solution of one part household bleach to two parts clean water, on a cloth, to wipe away remaining dirt.

**Notice** **Risk of internal damage!** To avoid damaging the inside of the radio, do not allow excess liquid to enter the radio body (speaker grille, keypad, buttons, and connectors).

### 15.5.2 Cleaning the contacts of the battery

**Notice** Do not scratch or scrape the contacts of the battery. If necessary, wipe the contacts of the battery with a dry, lint-free cloth to remove any dirt, oil or grease.

## 15.6 Changing the Radio ID

The radio ID can be changed if the current ID is not correct.

1. Press **Menu** and select **Radio settings** > **Radio info** > **Radio ID**.
2. Press the right selection key.
3. If **Enter PIN** appears in the display, enter the correct sequence of keys (known as the technician access PIN).
4. Press **Clear** to delete the current ID, and use a combination of the scroll keys and alphanumeric keys to enter a new ID.
5. Press **Options** > **Store** to save the new ID.

## 15.7 Running Diagnostic Tests

Diagnostics tests are available via the main menu.

This feature is controlled by a software license (SFE) and may not be available with the radio.

1. Press **Menu** and select **Diagnostics**.
2. Scroll to the name of the required test and press **Select**.

Table 15.2 below lists diagnostics tests that may be available on the radio.

**Notice** The radio may transmit when you select some tests. Make sure you have a suitable load or antenna connected before running diagnostics tests.

**Table 15.2 Diagnostic tests**

| Test | Description |
|---|---|
| Audio loopback test | Routes audio from an external accessory microphone to the radio's internal speaker<br>Before running this test, turn the volume down to limit interference and reduce the impact of audio artifacts |
| Display freq | Displays the transmit and receive frequencies of the current channel. Also displays the channel status (CNV, TCH, CCH) and the mode (ANA, PH1 or PH2). If the radio is scanning, this information may not be available |
| Display test | Displays a test screen of all colors that appear on the screen. Useful for identifying dead pixels |
| GPS NMEA data | Displays the last raw data received from the radio’s internal GPS. The radio will display all supported sentence formats received (for example $GPRMC and $GPGGA sentences). Note that the display will not automatically refresh when new data is received |
| Keypad test | Sounds an audible tone when a key is pressed or released on the radio, or the 16-way and 3-way selectors are moved. The radio also displays the key or selector name along with “pressed” or “released” or the new selector position |

| Test | Description |
|---|---|
| QoS (P25 channels only) | Displays information about the quality of service (received signal strength (RSSI) with an indication of digital voice quality). Also displays the channel status (CNV, TCH, CCH) and the mode (PH1 or PH2) |
| RSSI | Displays the received signal strength (RSSI) of the current channel |
| Rx tone | Receives a 1011Hz or 1031Hz tone and displays the received signal strength (RSSI) and the bit error rate (BER) of the received signal. Also displays the channel status (CNV, TCH, CCH) and the mode (PH1 or PH2). On a P25 conventional channel, the user can select whether to receive a 1011Hz (Phase 1) or 1031Hz (Phase 2) tone. On a P25 trunked channel, the network selects whether 1011Hz or 1031Hz is used |
| Site display | Shows the channel number, signal strength and system-identity code (SYSCODE) for the currently registered trunked site |
| Site measure | Lists the current trunked site (indicated with an asterisk) and up to six detected adjacent sites, with received signal strength (RSSI) information |
| Tone test | Generates an audible tone for the duration of the test |
| Tx Tone | Transmits a tone of 1011Hz or 1031Hz on the current P25 channel |
| Tx Tone Cal | Transmits a 1011Hz or 1031Hz tone on the current channel with a bit error rate (BER) of 5% |
| Tx power test | Displays hardware-related information while the radio is transmitting. Information includes the final PA current (in mA) |

# 16 Simplified Declaration of Conformity

**EN** Hereby, Tait International Limited declares that the radio equipment type TPHN0A is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**BG** С настоящото Tait International Limited декларира, че този тип радиосъоръжение TPHN0A е в съответствие с Директива 2014/53/ЕС. Цялостният текст на ЕС декларацията за съответствие може да се намери на следния интернет адрес: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**ES** Por la presente, Tait International Limited declara que el tipo de equipo radioeléctrico TPHN0A es conforme con la Directiva 2014/53/UE. El texto completo de la declaración UE de conformidad está disponible en la dirección Internet siguiente: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**CS** Tímto Tait International Limited prohlašuje, že typ rádiového zařízení TPHN0A je v souladu se směrnicí 2014/53/EU. Úplné znění EU prohlášení o shodě je k dispozici na této internetové adrese: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**DA** Hermed erklærer Tait International Limited, at radioudstyrstypen TPHN0A er i overensstemmelse med direktiv 2014/53/EU. EU-overensstemmelses-erklæringens fulde tekst kan findes på følgende internetadresse: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

DE Hiermit erklärt Tait International Limited, dass der Funkanlagentyp TPHN0A der Richtlinie 2014/53/EU entspricht. Der vollständige Text der EU-Konformitätserklärung ist unter der folgenden Internetadresse verfügbar: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**ET** Käesolevaga deklareerib Tait TPHN0A vastab direktiivi 2014/53/EL nõuetele. ELi vastavusdeklaratsiooni täielik tekst on kättesaadav järgmisel internetiaadressil: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**EL** Με την παρούσα ο/η Tait International Limited, δηλώνει ότι ο ραδιοεξοπλισμός TPHN0A πληροί την οδηγία 2014/53/ΕΕ. Το πλήρες κείμενο της δήλωσης συμμόρφωσης ΕΕ διατίθεται στην ακόλουθη ιστοσελίδα στο διαδίκτυο: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**FR** Le soussigné Tait International Limited, déclare que l'équipement radioélectrique du type TPHN0A est conforme à la directive 2014/53/UE. Le texte complet de la déclaration UE de conformité est disponible à l'adresse internet suivante: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**HR** Tait International Limited ovime izjavljuje da je radijska oprema tipa TPHN0A u skladu s Direktivom 2014/53/EU. Cjeloviti tekst EU izjave o sukladnosti dostupan je na sljedećoj internetskoj adresi: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**IT** Il fabbricante, Tait International Limited, dichiara che il tipo di apparecchiatura radio TPHN0A è conforme alla direttiva 2014/53/UE. Il testo completo della dichiarazione di conformità UE è disponibile al seguente indirizzo Internet: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**LV** Ar šo Tait International Limited deklarē, ka radioiekārta TPHN0A atbilst Direktīvai 2014/53/ES. Pilns ES atbilstības deklarācijas teksts ir pieejams šādā interneta vietnē: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**LT** Aš, Tait International Limited, patvirtinu, kad radijo įrenginių tipas TPHN0A atitinka Direktyvą 2014/53/ES. Visas ES atitikties deklaracijos tekstas prieinamas šiuo interneto adresu: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**HU** Tait International Limited igazolja, hogy a TPHN0A típusú rádióberendezés megfelel a 2014/53/EU irányelvnek. Az EU-megfelelőségi nyilatkozat teljes szövege elérhető a következő internetes címen: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**MT** B'dan, Tait International Limited, niddikjara li dan it-tip ta' tagħmir tar-radju TPHN0A huwa konformi mad-Direttiva 2014/53/UE. It-test kollu tad-dikjarazzjoni ta' konformità tal-UE huwa disponibbli f'dan l-indirizz tal-Internet li ġej: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**NL** Hierbij verklaar ik, Tait International Limited, dat het type radioapparatuur TPHN0A conform is met Richtlijn 2014/53/EU. De volledige tekst van de EU-conformiteitsverklaring kan worden geraadpleegd op het volgende internetadres: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**PL** Tait International Limited niniejszym oświadcza, że typ urządzenia radiowego TPHN0A jest zgodny z dyrektywą 2014/53/UE. Pełny tekst deklaracji zgodności UE jest dostępny pod następującym adresem internetowym: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**PT** O(a) abaixo assinado(a) Tait International Limited declara que o presente tipo de equipamento de rádio TPHN0A está em conformidade com a Diretiva 2014/53/UE. O texto integral da declaração de conformidade está disponível no seguinte endereço de Internet: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**RO** Prin prezenta, Tait International Limited declară că tipul de echipamente radio TPHN0A este în conformitate cu Directiva 2014/53/UE. Textul integral al declarației UE de conformitate este disponibil la următoarea adresă internet: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**SK** Tait International Limited týmto vyhlasuje, že rádiové zariadenie typu TPHN0A je v súlade so smernicou 2014/53/EÚ. Úplné EÚ vyhlásenie o zhode je k dispozícii na tejto internetovej adrese: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**SL** Tait International Limited potrjuje, da je tip radijske opreme TPHN0A skladen z Direktivo 2014/53/EU. Celotno besedilo izjave

EU o skladnosti je na voljo na naslednjem spletnem naslovu: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**FI** Tait International Limited vakuuttaa, että radiolaitetyyppi TPHN0A on direktiivin 2014/53/EU mukainen. EU-vaatimusten-mukaisuus-vakuutuksen täysimittainen teksti on saatavilla seuraavassa internetosoitteessa: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

**SV** Härmed försäkrar Tait International Limited att denna typ av radioutrustning TPHN0A överensstämmer med direktiv 2014/53/EU. Den fullständiga texten till EU-försäkran om överensstämmelse finns på följande webbadress: https://www.taitcommunications.com/our-resources/compliance/declarations-of-conformity

# 17 Glossary

**A**

**ACMA**
Australian Communications and Media Authority

**ANA**
Analog

**ANSI**
American National Standards Institute

**B**

**BER**
Bit Error Rate

**C**

**CCH**
Control Channel

**CFR**
Code of Federal Regulations

**CNR**
Carrier-to-noise Ratio

**CNV**
Conventional

**D**

**DMR**
Digital Mobile Radio

**DTMF**
Dual Tone Multi Frequency

**E**

**EEA**
European Economic Area

**EMC**
Electromagnetic Compatibility

**EU**
European Union

**F**

**FCC**
Federal Communications Commission

**FM**
Frequency Modulation

**FOACSU**
Full Off Air Call Set-up

**G**

**GPS**
Global Positioning Signal

**H**

**HFP**
Handsfree Profile

**HSP**
Headset Profile

**I**

**ICNIRP**
International Commission on Non-Ionizing Radiation Protection

**IEEE**
Institute of Electrical and Electronics Engineers

**IS**
Intrinsically Safe

## L

**LED**
Light Emitting Diode

## M

**MDC**
Mobile Digital Computer

**MHz**
Megahertz

**MM**
Millimeter

**MPT**
Ministry of Posts and Telecommunications

## N

**NI**
Non-Incendiary

## O

**OTAP**
Over The Air Programming

**OTAR**
Over The Air Rekeying

## P

**P25**
Project 25

**PABX**
Private Automatic Branch Exchange

**PAMR**
Public Access Mobile Radio

**PH1**
P25 Phase 1

**PH2**
P25 Phase 2

**PIN**
Personal Identification Number

**PMR**
Private Mobile Radio

**PSTN**
Public Switched Telephone Network

**PTT**
Push to Talk

## Q

**QOS**
Quality of Service

## R

**RF**
Radio Frequency

**RSM**
Remote Speaker Microphone

**RSSI**
Received Signal Strength Indicator

**RX**
Receive

## S

**SDM**
Subscriber Data Management

**SFE**
Software License Key

**SYSCODE**
System Identity Code

## T

**TCH**
Traffic Channel

**TX**
Transmit

## U

**UNECE**
United Nations Economic Commission for Europe

**UTC**
Universal Time Coordinated

**UTM**
Universal Transverse Mercator