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GSM-R Handbook
Handbook RS523

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You will need this handbook if you carry out the duties of a:

- driver
- operations controller
- signaller
- train operator’s controller.
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Purpose of this handbook

This handbook is intended as guidance to users of the GSM-R system used on the GB mainline railway.

It has been designed as a day-to-day reference guide for the less frequently used processes and functions of the GSM-R system. The handbook looks at these from the perspective of a driver, operations controller, signaller and train operator’s controller.

Note: This handbook contains train radio and fixed terminal information typically found on the Great Britain mainline railway. Other equipment may differ in functionality.
2.1 Train radio functions

These are some of the buttons found on the GSM-R driver’s control panel (DCP) and an explanation of their functions.

**Accept**: Used to answer calls and accept user entries on the display.

**Reject or cancel**: Used to reject or delete entries on the display or to end a call.

**Menu**: Provides access to the in-built menu.

**TOC phonebook**: Provides access to the train operator’s phonebook.

**Up within menu or increase volume**: Used to scroll up through the screen or menu options or to increase the volume.

**Down within menu or decrease volume**: Used to scroll downwards through the screen or menu options or reduce the volume.

**Test button**: Used to test the train radio.
Increase brightness/scroll right: Increases the brightness of the display or used to scroll to the right when the text on the screen is longer than 20 characters.

Reduce brightness/scroll left: Reduces the brightness of the display or used to scroll to the left when the text on the screen is longer than 20 characters.

Registration/turn on: Enables registration and deregistration of the train radio. Turns driver’s control panel on when pressed for two seconds.

Standing at signal: Used to inform the signaller that the train is at a stand at a stop signal.

ST: Used to acknowledge to the signaller that a broadcast has been received and understood.

Call signaller: To make a call to the signaller.

Railway emergency group call (REC): Used to make a railway emergency group call.
Urgent call: Used to make an urgent call to the signaller.

2.2 Fixed terminal functions

These are some of the buttons on the fixed terminal and their functions.

- **Incoming message**: To acknowledge a message.
- **Hold**: Used to place a call on hold.
- **Forward**: Allows a call to be forwarded to a third party.
- **Conference**: Allows third parties to be dialled in to a call.
- **Dial pad**: Used to dial telephone numbers.
- **Phonebook**: Makes the phonebook entries visible.
- **Record and broadcast**: To record and broadcast messages.
**More:** To display more functions.

**Less:** To display less functions.

**Settings:** To adjust the brightness of the display and volume controls.

**Roles:** To change signaller roles.

**SMS:** To compose and send a message.

**NR about:** Displays the software version of the fixed terminal.

**Emergency dial pad:** Displays a sub menu that will display the speed dial keys for group call areas.
3.1 Train radio

The train radio system is generally connected to the train battery supply, this enables usage of any train radio on which the batteries are switched on. During normal operation the supply to the train radio is provided when the master switch is moved away from the off position. The driver control panel can also be powered up by pressing the Registration/Deregistration button for more than two seconds.

3.2 Fixed terminal

If the power supply to the signaller’s or controller’s fixed terminal is interrupted, it will reboot and return to the log in screen.
4.1 Registration of the train radio

When preparing a train for service the train radio is always required to be registered with the GSM-R network. This enables the registration of a headcode and will allow the signaller to contact the train radio. It will also support the correct routing of calls from the train radio to the signaller.

Drivers should always make sure that the correct headcode is displayed on the train radio.

4.2 Pending registration

If GSM-R network coverage is not available, pending registration will be used. Pending registration enables the train radio to be prepared to register once GSM-R network coverage becomes available.

**Note:** Pending registration is not available through the menu.

In order for the pending registration to be completed, the driver needs to follow these steps.

1. Press the **Registration** button.
2. Press the **Accept** button.

After five seconds the ‘Reg code saved’ message is cleared and replaced by a ‘Searching networks - Please wait’ message.

The registration process will only be complete once GSM-R coverage is detected and the driver has responded to the prompt from the train radio to press the **Accept** button.

The pending registration state can be cancelled by pressing the **Cancel** button at any time.
4.3 Company wild card codes (99x)

The ‘99x’ company wild card code should only be used when registration problems are being experienced.

If a train radio has been registered using a company wild card code, it will not be possible for a call to the signaller to be routed to the controlling signaller. It may be necessary to use the phonebook to contact the correct signaller.

The company wild card codes can be found in the Sectional Appendix.

4.4 Preregistration

The preregistration function is available by using the menu.

If it is necessary for trains to be preregistered at a location where this is not normally done, the signaller will normally arrange for drivers to be told. This will avoid delay in registering the train radio.

When preregistering the train radio, the company wild card code should be used.

Preregistration can be triggered manually by the driver pressing the Accept button.
4.5 Registration problems

4.5.1 Registration failure

There may be times when ‘Registration failed’ is displayed after an attempt has been made to register the train radio. The driver would normally check the registration code was entered correctly by attempting to register the train radio a second time.

If the second attempt also fails, the first point of contact would be the signaller who may know about a problem that is causing registration failures.

Two attempts should be made at registration using the details provided before contacting the signaller. The call to the signaller will need to be made using the phonebook. This step also confirms that the train radio is correctly connected to the network and calls can be made.

After contacting the signaller, one further attempt can be made using a ‘99x’ company wild card code if necessary.

When a train is registered with the ‘99x’ company wild card code, voice calls and operational text messages may be routed to the wrong signaller. The driver should always check the train radio display to make sure the connection is to the correct signaller and to confirm the correct identity of the signaller once communication is established.

The driver would tell the signaller if the ‘99x’ company wild card code has also failed to register the train.

This flowchart indicates the process that a driver can follow to determine their actions when experiencing a train radio registration failure.
**Fig 1. Registration failure flowchart**

**Abbreviations**

DCP Drivers control panel  
NR Network Rail  
TD Train describer  
TRN Train reporting number (headcode)
4.5.2 Wrong train reporting number displayed

If the headcode displayed on the driver’s control panel is incorrect, the train radio should be deregistered and reregistered using the correct headcode and location code.

4.5.3 Duplicate registration identity

There may be instances when a registration code is already in use by another train radio. Any new registration will be rejected and the message ‘Duplicate’ will appear on the display. If it appears that the correct code has been entered, contact can be made with the signaller for a new code. In most cases, the signaller would advise the driver to use the ‘99x’ company wild card code.

If the attempt using the ‘99x’ company wild card code also results in ‘duplicate’ being displayed on the train radio, the driver will need to contact the signaller for an alternative ‘99x’ company wild card code.

Note: As the train radio is not registered, the driver would be required to find the signaller’s number from the phonebook or dial the signaller’s full number using the ‘12nn’ short code if this is available.
4.5.4 Loss of registration

If the train radio loses registration at any time, a reregistration is required.

4.5.5 Failure of the train radio to deregister

If the train radio fails to deregister, the driver should attempt to deregister. If this also fails it should be reported to the signaller.

4.5.6 Unregistered trains

A train can continue in service following unsuccessful attempts to register the train radio. Provided GSM-R GB is displayed on the screen, the core functionality of the radio system is still available.

If the signaller needs to contact an unregistered train they may make a broadcast call to the area in which the unregistered train is travelling and request the driver to contact them.

The signaller can use the train headcode to gain the attention of the driver.

The driver will need to use the Network Rail phonebook to contact the controlling signaller.

A railway emergency group call will still operate correctly on an unregistered train but it is important to confirm that the correct signaller has been contacted.
4.5.7 Display is blank, shows a failure message or remains stuck at ‘Searching Networks’

If the display is not showing the expected message, the driver can contact the signaller to ascertain if a network failure has occurred.

There is an option that allows the driver to manually select the GSM-R GB network via the menu using ‘Settings’ and ‘Select Network’.

4.5.8 Radio unable to identify the GSM-R GB network

If the train radio connects to a network but only displays ‘Network?’ in the ‘Network Name’ field, then a manual selection of the network is required. The driver can access the menu and use ‘Settings’ and ‘Select Network’ to manually select the required network.

4.5.9 The radio connects to the wrong network

In GB the train radio would normally default to the ‘GSM-R GB’ network. In the unlikely event that it logs on to another network, the driver can change to the GB network via the menu using Settings and Select Network.
5.1 GSM-R call types

There are two types of GSM-R calls, point-to-point and group calls.

5.1.1 Point-to-point calls

Point-to-point calls can be separated into four types.

**Normal call and urgent call**

These are similar to telephone calls in which both people can speak at the same time.

**Driver's Safety Device (DSD) alarm**

This is an alarm sent from the train radio to the fixed terminal in the event that the driver does not acknowledge and reset the DSD in the allotted timescale for the traction type being driven.

**Public address (PA) calls**

These are calls made by the signaller or train operator’s control and are a one-way method of communication. The driver will also be able to hear the PA announcement over the train radio loudspeaker.

**Berth-triggered broadcast calls**

A berth-triggered broadcast call is a pre-recorded message received by the train when it enters a selected berth. The berth-triggered broadcast can be acknowledged when instructed to do so by pressing the ST button once the message has completed, the call terminated and the instructions understood. The berth-triggered broadcast allows the signaller to caution a train in certain circumstances without the need to bring the train to a stand first.
5.1.2 Group calls

Group calls can be separated into three types.

Railway Emergency Group Call (REC)
This is a multi-party method of communication but only one person can speak at a time.

Broadcast area call
This is a method of communication which allows a signaller to broadcast a message to several trains within a given area.

Shunting group calls
These are conference calls where multiple drivers and shunters can participate in the call.

5.2 Urgent calls

An urgent call is given a higher priority by the GSM-R system and will override a normal call. An urgent call can be made in relation to an incident affecting one train only.

5.2.1 Driver actions and indications

If the signaller makes an urgent call to a train, the message will begin with the following script.

‘This is an urgent call from the signaller at______to the driver of (train reporting number) ______’.

If this call is received the driver should respond as quickly as possible.

5.2.2 Signallers actions and indications

If a driver makes an urgent call, the call will be displayed on the signaller’s incoming call screen. The active call button will flash yellow.

An urgent call must be answered as a priority over existing calls with the exception of a REC call.
5.3 Railway Emergency Group Calls

A REC is the highest priority call and can be made from any terminal or train radio that is connected to the GSM-R network. The Press to Talk button (PTT) must be used by the driver to speak during a REC. If the PTT button is not used correctly, the signaller is able to override it, see 5.3.3.

On receiving a REC the driver must stop the train and confirm that they are at a stand by pressing the ST button.

A REC can be used during any emergency situation affecting more than one line or more than one train.

It is important that, when a REC is initiated, the details of the incident are established quickly in order for the incident to be dealt with correctly and for unaffected trains to proceed as soon as possible.

5.3.1 Signaller and route controller actions and indications (Lead and non-lead signallers)

Making a REC

In an emergency situation the signaller may need to initiate a REC.

The lead signaller who initiates the REC call will be the lead signaller during the conversation. All other signallers will be able to monitor the call.

After the REC has been made and the signaller is sure that the emergency has been protected, the lead signaller will close the REC.

Receiving a REC

If receiving a REC, an alarm will sound on the fixed terminal and the call will be answered automatically. The call will be heard over the loudspeaker.

The lead signaller will be able to participate in the call, any non-lead signallers will only be able to monitor the call.
5.3.2 Driver actions and indications

Making a REC
In an emergency situation the driver may need to initiate a REC. Once the REC has commenced the PTT button should be used to speak.

Receiving a REC
If you receive a REC the train radio will sound an audible alarm and display the message ‘STOP EMERGENCY’.

It is good practice for other drivers not to speak unless requested by the lead signaller or if they have important information to add to the call.

After the audible alarm, the call will be automatically connected. If a signaller is making the REC you will hear the following message.

“This is a railway emergency call. I repeat this is a railway emergency call from the signaller at_____to all trains in the _____ area.”

The lead signaller will indicate the end of each REC by stating “end of railway emergency group call.”

An emergency group call is not considered completed until this phrase has been heard.

When the railway emergency group call has ended, any train that has not been instructed by the lead signaller to remain at a stand, can proceed if the driver is certain that the train is not affected by the incident.

5.3.3 PTT override

When a driver is pressing the PTT button the lead signaller cannot be heard.

If the driver forgets to release the PTT, then the lead signaller can override the PTT by pressing the override button on the fixed terminal.
5.3.4 REC closure

The call can only be ended by the lead signaller. It is important that the call is closed correctly to avoid unnecessary delays.

5.3.5 Accidental use of REC

If you accidentally initiate a REC you should speak to the lead signaller and explain the circumstances. This is to avoid extensive delays whilst the initiator of the REC is determined.

5.4 Short dial codes

The train radio includes a function which enables short dial code calls to the signaller (1200), operations control (1300) and electrical control operator (ECO) (1400) with the use of the key pad. When using these short dial codes, the call will normally be connected to the correct controlling area in which the train radio is registered. The train must be correctly registered in order for the short dial codes to work correctly.

5.5 Using the train radio phonebooks

If it is necessary to contact a signaller not controlling the signalling on the line on which the train is located or the train radio is unregistered, the train radio phonebooks should be used.

The Network Rail phonebook has details of signallers, operations controllers and ECOs. The train operator’s phonebook contains contacts specific to the train operator.

The entries in the train radio phonebooks are listed alphabetically and can be searched using the scroll buttons to move the cursor up and down the list. Alternatively, the first three letters of the location can be entered into a search field using the keypad.
5.6 Cab-to-cab calls

Examples of when cab to cab calls are authorised in the Rule Book are:

- Locomotives coupled in tandem.
- Working trains with a locomotive at each end.
- Assistance from the rear of a failed train.
- Locomotive assisting in the rear (where banking is authorised in the Sectional Appendix).
- Driving a traction unit from other than the leading cab (for example if the controls in the leading cab are defective).

A cab-to-cab call can be made via the menu and requires both drivers to enter the same headcode and location code.

5.7 Misrouted calls

The train radio does not provide an indication of network problems that may prevent calls being routed to the correct signaller. If the signaller is aware of such a fault they should set up a broadcast call to alert trains entering the area of the known fault.

In these circumstances a normal call may be wrongly routed to another signaller who does not control the signalling in that area. Drivers should always check that they are communicating with the correct signaller using normal communication protocols.

If a driver receives a broadcast telling them about network problems in a specific area and they need to contact the signaller, they should do so using the Network Rail phonebook or by dialling the telephone number shown in the Periodical Operating Notice (PON).

The signaller should record and report details of any misrouted calls.
5.8 Role profiles

The role profile sets the limits of a signaller’s area of responsibility for receiving GSM-R messages.

If appropriately configured, a single role profile can be used by more than one user at the same time. For example by a signaller and signal box supervisor.

5.9 Role transfer

A single role profile can be transferred to another signaller’s terminal. This should only be done in the following circumstances.

- A signal box is to be closed or opened with a switching out facility.
- A signaller is unable to log into the system or the fixed terminal has failed.
- A signaller is to leave the signal box for other than normal duties.

A clear understanding should be reached between the signallers concerned before the transfer takes place.

5.10 Call transfer

Signallers are able to forward calls to third parties such as other signallers, drivers, maintenance control or the emergency services.

The signaller should come to a clear understanding with all parties involved in the call when a call transfer is taking place.

If the signaller receives a misrouted call, the call transfer facility can be used to direct the call to the correct signaller. Please refer to section 5.7.

REC calls cannot be transferred.
6.1 DSD alarm calls

The train radio will send a DSD alarm message to the signaller after one minute if:

- the master switch is in the ‘forward’ or ‘reverse’ position, and
- no action is taken by the driver to reset the DSD.

If a DSD alarm message is received the signaller should attempt to contact the driver.

If a driver is aware that a DSD alarm call has been triggered, they should inform the signaller and advise them that the alarm was triggered in error.

6.2 PA calls

If the signaller is unable to contact the driver, it may be necessary for the signaller to make a PA announcement to a driver-only operated (DOO) passenger train. This allows the signaller to seek assistance if the driver is suspected of being incapacitated.

If the driver is able to respond to the PA announcement, a point-to-point call should be made after the PA announcement has terminated.
7.1 Standing at signal message

This is used by drivers to indicate that their train is standing at a signal at danger, or an end of authority and it is not immediately obvious why the train has been brought to a stand.

The signaller can respond to this message by:
- clearing the signal or issuing a new movement authority
- sending a ‘wait’ message
- making a voice call to the driver to explain why the train is being detained.

7.2 Contact signaller message

This is normally the first method a signaller uses to contact the driver.

The driver should only reply when it is safe to do so by pressing the Accept button.

7.3 Contact train operator control message

This will be received if the train operator wishes to speak to the driver.

The driver should only reply when it is safe to do so by pressing the Accept button.

7.4 Wait message

The driver may receive a ‘wait’ message in response to sending the ‘standing at signal’ message.

The driver would need to wait for further instructions, clearance of the signal or the issuing of a new movement authority.
7.5 Acknowledge message

The driver can acknowledge a broadcast call by pressing the **ST** button.

Once the driver has acknowledged a broadcast message, the signaller will receive an acknowledgement message on the fixed terminal.

7.6 Messages between signal boxes

Signallers can send text messages to adjacent signal boxes for regulation purposes only. These messages are automatically recorded and saved on the fixed terminal.
8.1 Types of broadcast calls

Broadcast calls are a method of communication by which the signaller can pass on information to individual drivers or groups of drivers.

These calls are answered automatically by the train radio and the driver will hear the call over the loudspeaker in the driving cab.

There are two types of broadcast calls.

Berth-triggered broadcast call

This type of call is activated once the train enters the berth relevant to the broadcast. The message is pre-recorded by the signaller. The signaller will receive either a ‘failed’ or ‘not sent’ message if the call has not been received by the train radio. These types of calls include advisory and acknowledged (safety) broadcast calls.

Cell-based group broadcast call

This type of call is applicable to a pre-defined service area and will be received by all drivers within that area. These calls can be pre-recorded or live.

The content of the broadcast calls can be separated into three categories: general, advisory and safety. Messages in the safety category must be acknowledged by the driver. General broadcast calls are cell based.
8.2 General broadcast calls

The following communication protocol for a general broadcast call would begin with.

“This is a general broadcast from the signaller at_____to all trains in the_____area”.

Once the message has been communicated, the call is terminated with:

“End of general broadcast.”

In this situation acknowledgement of the broadcast is not required.

8.3 Advisory broadcast calls

An advisory broadcast can be used to provide advice to drivers, for example, concerning line congestion and delays to the service.

The following script must be followed.

“This is an advisory broadcast from the signaller at _____”

Once the advice has been communicated, the call is terminated with:

“End of advisory broadcast”.

In this situation acknowledgement of the broadcast is not required.
8.4 Acknowledged (safety) broadcast calls

Safety broadcast calls are used to reach a clear understanding by using non-verbal acknowledgement.

After listening to the message in its entirety and after the call has been terminated the driver acknowledges their understanding of the message by pressing the ST button.

Uses for safety broadcasts

Safety broadcast calls can be used for the following scenarios.

- Poor rail conditions.
- Animals on the line (Not tunnels).
- Defective Emergency Indicators.
- Missing or obscured Temporary Speed Restriction (TSR) board.
- Unusual events (Not Track or Signalling).

Scripts for safety broadcasts

The following scripts set out the content of a pre-recorded safety broadcast:

**Poor rail conditions**

"This is a safety broadcast from the signaller at ______. There are reportable railhead conditions at/on* the approach to ______. Only acknowledge if you have fully understood this message. To acknowledge, press the ST button. End of safety broadcast."

*Delete as appropriate.

**Animals on or near the line**

"This is a safety broadcast from the signaller at ______. There are animals on or near the line at/between* ______ and* ______, proceed at caution. Only acknowledge if you have fully understood this message. To acknowledge, press the ST button. End of safety broadcast."

*Delete as appropriate.
Defective Emergency Indicators

"This is a safety broadcast from the signaller at ______. There is a defective emergency indicator for a ______ mph emergency speed restriction at ______. Only acknowledge if you have fully understood this message. To acknowledge, press the ST button. End of safety broadcast."

Missing or obscured TSR board

"This is a safety broadcast from the signaller at ______. There is a missing/obscured* warning board or speed indicator* for the ______ mph temporary speed restriction at ______**. Only acknowledge if you have fully understood this message. To acknowledge, press the ST button. End of safety broadcast."

*Delete as appropriate

** Insert name or location.

Note: If more than one TSR board is missing or obscured for a speed restriction then a GSM-R berth-triggered broadcast message cannot be used for this purpose.

Unusual events

"This is a safety broadcast from the signaller at ______. * ______. Only acknowledge if you have fully understood this message. To acknowledge, press the ST button. End of safety broadcast."

*Insert details of the incident, location and any speed restriction in the main body of the broadcast.

Note: unusual events can include overcrowding on station platforms. The location of the event must be easily identifiable by the signaller and the driver.
9.1 Deregistration of the train radio

If the train radio is not correctly deregistered at the end of the journey, subsequent attempts to register that train radio may not be successful.

Incorrect deregistration could also result in the headcode remaining on the signallers fixed terminal.

If the train radio is not correctly deregistered, a ‘duplicate’ headcode fault message may be displayed on the train radio.

9.1.1 Deregistration - end of journey

The train radio will automatically begin the deregistration process once the driving desk is moved to the off position.

The radio can be allowed to complete the deregistration process automatically or stopped by following the instructions on the screen.

9.1.2 Deregistration - mid journey

If the train is to change headcode mid journey this can be done by manually deregistering and re-registering using the train radio menu.

9.1.3 Deregistration - reversing movement

It is important that the train radio is deregistered during a reversing movement before trying to register the same headcode on the radio of the cab that will become leading in the new movement.
9.2 Deregistration problems

9.2.1 Train radio failed to deregister from previous journey

If the train radio has failed to deregister from the previous journey, the driver will not be able to register a new TRN. If the previous TRN or the registration code is shown in the train number field the driver should attempt to deregister the radio.

Note: The signaller may be able to identify a ‘stuck registration’ on the fixed terminal. It may be possible to register to the exact same registration code but only if the train is standing at the same signal as the previous train. Otherwise the signaller will report this as a fault.

9.2.2 PA deregistration failure

If during registration the train radio displays ‘Deregistration failed PA’, fixed terminal users will be unable to initiate a call to the train’s PA system. This is referred to as a stuck headcode.

If the cancel button is pressed the display will show ‘No PA Reg’ed’.

The driver should attempt to deregister the train radio but if the fault persists the driver should report it to the signaller and await further instructions. The signaller may be able to clarify that the PA is shown on the fixed terminal and will therefore be able to call the PA.
10.1 GSM-R TD failure

If the GSM-R connection to the train describer fails, the signaller will receive a ‘GSM-R TD’ failure message.

During such a failure, calls from trains will be routed to a signaller based on its GSM-R radio cell location and not its signalling location. In cell fringe areas this may mean that calls are not directed to the controlling signaller.

As a result of a TD failure, drivers should need to be informed. The best method of communicating this is via a broadcast call.

Due to the nature of the failure the phonebook should be used.

Any misrouted calls should be dealt with as described in section 5.7.

10.2 Train radio failures

10.2.1 Power-up self-test failures

If the train radio fails the power-up test, the driver will see a failure message. Failures can be split into service affecting failures and non-service affecting failures.

Service affecting failures

If the train radio experiences a service affecting failure it will not be permitted to enter service, unless the Train Operator’s Control gives permission.

Non-service affecting failures

If the train radio experiences a non-service affecting failure the train can continue in service.

Generally, as long as the train radio can make and receive a REC, the radio will not be considered defective.
10.2.2 Service affecting failures

These can be either specific messages, a blank screen or a ‘Radio Failure’ message associated with a fault number. These faults should be reported to the signaller immediately using alternative methods of communication.

A blank screen, or any of the following faults, should be treated as indicating a defective radio. The driver should carry out the instructions in Rule Book GERT8000 module TW5 Preparation and movement of trains Defective or isolated vehicles and on-train equipment.

- Failure XX (range 01-07).
- Radio failure.
- Cab Radio Flt.
- EPROM/RAM Flt.

RAM Test failure and the EPROM test fault message will occur when the control panel initialises.

10.2.3 Non-service affecting faults

Non-service affecting faults are identified by a ‘Warning’ followed by a number which identifies the type of fault to the maintainer. This type of fault means that the train radio will work, but may be limited in its functionality.

If the train is being prepared to enter service it can do so without restriction but the driver should advise the Train Operator’s Control before departure.
10.2.4 Cancelling fault messages

If the message relates to a service affecting failure, the driver will be unable to remove this from the train radio display and the radio would be treated as a failure.

With certain failure types the train radio will attempt to re-boot five minutes after displaying the failure. It may be possible to manually re-boot the radio before this time (as shown in company instructions) to attempt to clear the fault.

The driver will need to acknowledge the fault message by pressing the Cancel button.

A reminder of this fault will remain on the display until the radio display is switched off.

10.2.5 Train radio displays a foreign language

The train radio will normally use English when powered up. If the previous user has changed the language and the train radio has been switched off but not powered down, it may display a foreign language. The language can be changed back to English by using the menu short cut. The menu short cut is MENU, 3, 2, 1.

10.3 Network coverage issues

Although the GSM-R system provides full coverage of the Network Rail managed infrastructure, there may be times when there is a temporary break in coverage, for example, a base station fault. There will be a warning tone sounded through the loudspeaker and a message ‘Searching networks - Please wait’ on the cab mobile display.
10.3.1 No network message

The ‘No Network’ message appears when the train radio attempts to connect to the network at power up and:

- receives a corrupted or unintelligible message, or
- receives no response at all, or
- is denied access.

The user can manually reselect the GSM-R GB network through the menu using the following procedure.

Press the **Menu** key
Select Option [3] ‘Settings’
Select Option [1] ‘Select Network’
Select ‘GSM-R GB’ and press the **Accept** button.

This process would be followed at a location where there is known to be GSM-R GB coverage.

10.3.2 If the train radio does not find the network at the starting location

Unless advice of a network failure has been received, the driver should contact the signaller to establish if there is a GSM-R failure.

In locations affected by GSM-R network issues, the train radio can be pre-registered and the train can enter into service as normal.

If network coverage is not regained once the train has passed through the affected area, the train radio should be considered as defective.

The driver should carry out the instructions in Rule Book GERT8000 module *TW5 Preparation and movement of trains Defective or isolated vehicles and on-train equipment.*
10.3.3 Public mobile network interference

In some circumstances, a train radio may be affected by public radio network interference. This interference prevents the train radio automatically connecting to the GSM-R GB network and will result in the train radio displaying ‘Searching Networks’. This is most common in terminal stations when a service terminates and the driver changes ends.

In a high proportion of cases the fault can be rectified by using the following procedure.

Press the Menu key
Select Option [1] ‘Select Network’.
Select ‘GSM-R GB’ and press the Accept button.

If the fault has been successfully rectified the train radio will connect to the GSM-R GB network.

If the above actions do not rectify the fault, the actions in section 10.3.2 should be followed.
10.4 Call failure and dropped calls

The driver should report any instances of call failures or dropped calls to the signaller.

The signaller should log the details of any failed or dropped calls in the train register and report the fault as set out in Network Rail company instructions.

10.5 Checking the train radio can make and receive calls (echo call test)

If the driver believes that the train radio may not be making and receiving calls, this can be checked by making an ‘echo call’ to the network. To do this, use the keypad to dial ‘1900’, record a short message and then wait a few seconds for the recorded message to be played back. If the message is not played back the signaller should be informed, if necessary, by using an alternative method of communication.

10.6 Loss of a signaller’s fixed terminal

A complete failure of the fixed terminal should be reported to the infrastructure manager. The most likely reason is the loss of data connection to the GSM-R network. If the signaller is aware of the failure a general broadcast can be made to alert drivers.

If this occurs a notification will appear. The message should be acknowledged by the driver.

If the connection is lost for a significant period of time, the fixed terminal will log out and will revert to a pink screen.

When connection is restored, the display on the fixed terminal will return to the normal log in screen.

In the event of the loss the fixed terminal, the procedures concerning role transfer and role rescue should be followed. Please refer to section 5.9.
10.7 Loss of a train operator’s fixed terminal

A complete failure of the fixed terminal should be reported to the infrastructure manager. The most likely reason is the loss of data connection to the GSM-R network.

10.8 Use of hand portable devices

In the event of a train radio failure the train may be allowed to remain in service with an operational hand portable device.

This device will not be registered onto the GSM-R system.

Rule Book GERT8000 module *TW5 Preparation and movement of trains Defective or isolated vehicles and on-train equipment* includes information regarding the use of hand portable devices.

10.9 Use of transportable devices

In the event of a train radio failure the train may be allowed to remain in service with an operative transportable device.

The transportable device can be registered onto the GSM-R network in the same manner as the normal train radio.

Rule Book GERT8000 module *TW5 Preparation and movement of trains Defective or isolated vehicles and on-train equipment* includes information regarding the use of transportable devices.