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Level 2

Operation and Management of the National Radio Network

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Issue record

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5	March 2010	Updated to reflect Engineering reorganisation

Reference documentation

NR/L2/TEL/30027, *Technical requirements for train radio communication*

NR/L2/TEL/30047, *Management of Safety Related Reports for telecoms failures*

NR/L3/MTC/TE0092, *Applying for telecoms disconnection*

BR1609, *VHF Band III Radio for the national Radio Network incorporating the Train Overlay System*

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 6 March 2010.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 4 to continue to comply with the Issue of any relevant Network Rail Standards current when GRIP Stage 4 was reached and not to comply with requirements contained herein, unless the designated Standard Owner has stipulated otherwise in the accompanying Briefing Note.

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1 Purpose

The purpose of this document is to describe the Network Rail company policy to support the operation and management of the National Radio Network.

2 Scope

This document is for use by Network Rail for the operation and management of the National Radio Network. It is relevant to Route Control Offices and Electrical Control Rooms, Structural Engineers, and Telecommunications staff involved in the technical management process.

3 Definitions

Broadcast Call

A radio facility that permits a Network Rail Route Control Office to communicate rapidly with all Drivers in a defined area, and takes priority over all non-emergency calls.

Brunel

Product name of the handportable radio used on NRN.

ECR

Electrification Control Room

e.r.p.

Effective radiated power

ETD

Extension Trunk Dialling

FMS

A Network Rail failure recording system for the recording and analysis of failures.

FOC

Freight Operating Company

FRU

Field Radio Unit

Half-duplex

A method of communicating in two directions on two frequencies but is restricted to one way at a time, which necessitates the use of a press to talk switch and voice radio protocol.

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LRU

Locomotive Radio Unit

NRN

National Radio Network

Ofcom

Office of Communications

ORN

Overlay Radio Network

PSTN

Public Switched Telephone Network

PTT

Press To Talk

Radio Channel

A group of adjacent radio base station areas (sharing a common control frequency).

Radio Base Station Area

Radio coverage area from a fixed radio base station site. The limit of area coverage will be determined by the minimum signal level requirements, topography, power and other factors.

Route Control Office

RCO

Network Rail's Designated Location in each Route for communicating to trains fitted with NRN train radios, and for accepting and dealing with emergency calls from drivers using the NRN.

TME

Telecoms Maintenance Engineer

TOC

Train Operating Company

4 Responsibilities

All personnel involved in the operation or management of the National Radio Network shall comply with this procedure.

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5 Overview of NRN – Guidance

5.1 General

5.1.1

The NRN is a trunked radio network based on MPT1327 signalling protocol, but with some proprietary features that make it a non-standard system. The NRN is connected to the railway's private ETD telephone network.

5.1.2

The design criteria for NRN was that it shall cover 98% of the railway network excluding tunnels and cuttings greater than two metres deep.

5.1.3

Trains using the NRN will have a NRN mobile train radio (LRU) fitted in the driver's cab. A version of the mobile radio is also available for use in other situations such as in a road vehicle. It is then referred to as a FRU. The technical requirements for LRUs and FRUs are described in BR1609.

5.1.4

Trackside staff will use handportable radios. The handportable presently in use is known as the Brunel handportable. A transportable radio is also available that could be used in the driver's cab or by trackside staff.

5.1.5

As required the NRN can support:

- Communication between train drivers and trackside staff with the Route Control Office
- Communication between train drivers and trackside staff with ECRs.
- Priority calls from train drivers and trackside staff to the Route Control Offices- Priority calls are given priority over other calls in progress except emergency calls.
- Emergency calls from train drivers to the Route Control Office - Emergency calls are given priority over all other calls in progress.
- Communications between radio users and the railway private ETD telephone network.
- Communication between handportable radio users.
- Communications to the Emergency Telephone Operator.

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- Communications from certain larger Signal Boxes to train drivers via a special telephone unit.
- Emergency broadcast calls from Route Control Office.

5.2 Radio System Configuration

5.2.1

The country is divided into a number areas of NRN radio channels and each NRN channel is subdivided into radio base station areas. For information, a map of the areas of radio channels is provided in Appendix A, a list of Channel Codes in Appendix B, a list of Dialling Codes in Appendix C, and a list of Electrical Control Room NRN numbers in Appendix D.

5.2.2

Train drivers are alerted to manual channel changes by means of line-side signs, known as “channel change boards”, which are provided in accordance with Railway Group Standard GI/RT7033.

5.2.3

The radio system operates in “Half Duplex” which means two-way speech but only one person at a time. It is therefore important that users of the system observe the correct radio and speech protocol (specifically the term “Over”) in order that they know when they may speak. All users shall make use of the Phonetic Alphabet in accordance with Railway Group Standard GE/RT8000 (The Rule Book)

5.3 Train Radio Mobiles

5.3.1

Train operators are responsible for the provision, operation and maintenance of train radio mobiles.

5.3.2

If train mobiles become faulty the individual units are replaced. As a result, the train stock number and the radio number do not have a continuous one-to-one correspondence. The Rolling Stock Library data base is used to maintain the correlation of train numbers against train mobile numbers for look-up purposes. It is the responsibility of the TOCs and FOCs to keep the Rolling Stock Library database up to date as radio mobiles are moved following maintenance and repair.

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6 NRN Calls – Guidance

6.1 General

The process for making Route Control Office and ECR calls are described in BR1609.

6.2 Calls from a Sitronix or Ascom Telephone

6.2.1

Some signal boxes and all signal control centres are equipped with a Sitronix or Ascom telephone to enable the signaller to make NRN calls to train drivers. Similarly, some train operators are equipped with Sitronix or Ascom telephones that enable them to make NRN calls to their drivers.

6.2.2

Instructions on the operation of the Sitronix telephone, is contained in the Sitronix Telephone Instrument Operating Manual available through Network Rail Professional Head (S&T). Instructions on the operation of the ASCOM telephone, is contained in the ASCOM Telephone Instrument Operating Manual available through the Network Rail Professional Head (S&T).

6.3 Calls from a Handportable

The operation of, and the facilities available with a Brunel handportable radio are fully described in the User Handbook, which is available through the Network Rail Professional Head (S&T).

6.4 Calls from a Train

The operation of and the facilities available with a train radio mobile are fully described in Appendix I.

7 Operational Radio Testing

Route Control Offices shall carry out daily testing in accordance with Appendix E.

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8 Fault Reporting

8.1 General

8.1.1

NOTE Specification NR/L2/TEL/30047 explains how a safety management system requires that all operational telecommunications failures and incidents are recorded.

8.1.2

NOTE Appendix F details the procedural flow for management of faults and incidents.

8.2 Fault Reporting

8.2.1

Infrastructure Maintenance shall be responsible for arranging NRN maintenance services including fault reporting.

8.2.2

All NRN failures shall be reported to the Maintainer's fault report centre. The Route Control Office shall note the outage and record on their electronic control log.

8.2.3

The Maintainer shall be required to provide a 24-hour, 7-day week, 365-day fault reporting centre, and shall provide a telephone number, FAX number and E-Mail address for the centre. The reporting centre shall be required to respond to 90% of all telephone calls within 15 seconds at all times.

8.2.4

Where the Route Control Office does not make the initial fault report the Maintainer shall be required to inform the Route Control Office with details of the fault.

8.2.5

The Maintainer shall be required to inform the fault report originator and Controller (if different), within 15 minutes of the fault being cleared. If the fault report originator or Controller (if different) is not available by telephone, notification of fault clearance should be sent to them by FAX or E-Mail, stating the clearance time. The Maintainer shall be required to keep a record of this action for 12 months.