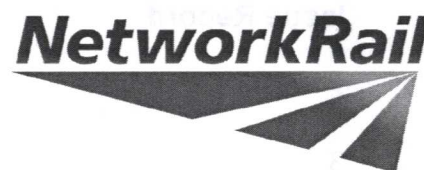


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Level 2

GSM-R Air Interface Functionality, Availability Management and Compliance Validation

Endorsement and Authorisation

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Issue Record

1

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October 2006

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Issue 1

2

August 2008

Updated to reflect Phase 2A reorganisation

3

March 2010

Updated to reflect Engineering reorganisation

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.

Reference documentation

NR/SP/TEL/30024, *Fault priority and response times for operational telecommunications services*

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1 Purpose

Network Rail's GSM-R availability assurance rationale relies primarily on Trainborne Coverage Measurement supplemented by TOC Feedback to identify critical trends or changes to the characteristics of the air interface. This document is a specification defining how the technical and operational functionality of the GSM-R system air interface will be assured at the point of bringing into service and throughout its operational life.

2 Scope

This specification applies to Network Rail's Telecoms Engineering, Maintenance and Train-borne Examination functions, along with any project introducing additions or changes to the GSM-R system or other infrastructure that will impact upon the characteristics of the GSM-R air interface.

3 Definitions

Air Interface

Comprises, for the purposes of this document, the specification and configuration of BTS antenna and feeder system, along with the radio propagation path between that system and the train antenna.

BSS

The Base Station Subsystem - the portion of the GSM-R ground system comprising the BSC and BTS, including the BSS configuration parameter functionality.

BTS

A GSM-R Base Transmitter Station (fixed station)

CELLID

A GSM-R internal report of the identity of a received cell

CTRL

Channel Tunnel Rail Link

Connect Portal

NR's means of electronic access to asset data via its Intranet site.

Dedicated Mode

A GSM-R mobile in active communications with the GSM-R BSS (i.e. in a call)

Downlink

The communication path from the GSM-R BTS site to the mobile/handportable.

EIRENE SRS & FRS

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The base documents underpinning the functionality of inter-operable GSM-R functionality and performance.

ETCS

European Train Control System

GI Portal

The NR electronic mapping and asset record system.

GSM-R

Global System for Mobile Communications (Rail)

Idle Mode

A GSM-R mobile in passive monitoring mode, awaiting instructions from the GSM-R BSS

MOD

The UK Ministry of Defence; primary user of the radio spectrum employed by NR for GSM-R.

MOS

Mean Opinion Scoring - an automated measure of perceived call audio quality.

Ofcom

The UK radio spectrum regulator

RxLev

A GSM-R internal measure of received signal level

RxQual

A GSM-R internal measure of received signal quality (not voice quality).

TECC

Telecoms Engineering Control Centre - Network Rail's technical monitoring and management centre for GSM-R.

Uplink

The communication path from the GSM-R mobile/handportable to the BTS site.

VGCS

Voice Group Call Service

VBCS

Voice Broadcast Call Service

VSWR

Voltage Standing Wave Ratio; a measure of antenna system health.

WCML

West Coast Mainline

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4 Essential Requirements

4.1 Radio Coverage

The level of radio coverage required for Network Rail's GSM-R systems is based upon that defined in the current EIRENE SRS and FRS as amended by Network Rail's specific requirements. This specification defines measures necessary to maintain sufficient call quality in areas requiring GSM-R coverage.

4.1.1 Areas Requiring Coverage

Prior to full network-wide GSM-R coverage being achieved, geographical areas or lines of route requiring GSM-R coverage are defined by Network Rail's GSM-R roll-out plan; coverage compliance becoming mandatory at the point in time where GSM-R is commissioned for a particular geographical area or line of route.

4.1.2 Design Coverage Levels

Radio signal coverage levels are dependent upon the operational requirement of the line of route. The main categories being:

- a) TENS high speed routes: -92dBm in 95% of locations
- b) ETCS >220kph routes: -92dBm in 95% of locations
- c) ETCS <220kph routes: -95dBm in 95% of locations
- d) Voice Only Routes: -98dBm in 95% of locations

4.1.3 Other Coverage Levels

Certain other routes have unique minimum radio signal coverage levels which differ from the GB standard.

- a) WCML (Euston - Manchester): -93dBm in 99.5% of locations
- b) CTRL (Folkestone - St Pancras): -95dBm in 98% of locations

4.2 Call Quality

The levels of radio signal coverage required for UK GSM-R systems have been defined as a design baseline to achieve an acceptable level of call quality; however a measurement of signal level alone is not sufficient to guarantee acceptable call quality. This specification defines measures necessary to maintain acceptable call quality.

4.3 Air Interface Availability

Whilst the location, height and characteristics of fixed station antenna systems are engineered to provide an acceptable level of call quality, the characteristics of the air interface path between the GSM-R BTS antenna port and GSM-R mobile antenna is