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**Railways Telecommunications (RT);
GPRS/EGPRS requirements for
European Train Control System (ETCS)**

Reference

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Contents

Intellectual Property Rights	4
Modal verbs terminology.....	4
Foreword.....	4
Introduction	4
1 Scope	5
2 References	5
2.1 Normative references	5
2.2 Informative references.....	7
3 Definitions and abbreviations.....	7
3.1 Definitions	7
3.2 Abbreviations	7
4 General requirements	8
4.1 ETCS application characteristics.....	8
4.2 Coexistence between ETCS and non-ETCS applications.....	8
4.3 Reference 3GPP Release	9
4.4 Applicability.....	9
5 Bearer services and features for ETCS operation.....	9
5.1 Basic features	9
5.1.0 General.....	9
5.1.1 Network - Bearer Service capabilities	9
5.1.2 Mobile - Bearer Service capabilities.....	10
5.1.3 Quality of Service Management	11
5.1.4 Multislot Operation.....	11
5.1.5 Optimized LLC-PDU delivery.....	11
5.1.6 Mobility	11
5.1.7 Gathering radio resources	12
5.1.8 Radio resource allocation.....	12
5.1.9 Automatic GPRS Attach.....	12
5.1.10 Summary basic features	12
5.2 Mixed packet data traffic operation.....	14
5.2.0 General.....	14
5.2.1 Quality of Service Management	14
5.2.2 Summary mixed packet data traffic operation	14
Annex A (informative): Bibliography.....	15
Annex B (informative): Change History	16
History	17

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Railway Telecommunications (RT).

Introduction

Railway undertakings are facing the challenge to evolve their networks to support the ETCS operation in high density railway traffic areas. The limited GSM-R spectrum resources put additional pressure on air interface traffic capabilities and as well radio spectrum efficiency. Also, the continuous development of further voice services e.g. GSM-R based shunting communication using circuit switched technology requires increased traffic resource capabilities.

When ETCS is using circuit switched data mode, radio traffic channel capacity utilization is low compared to the requested/assigned bandwidth. Having more than one ETCS session multiplexed to one radio resource using packet switched mode is therefore desirable. Taking into account GSM evolution GPRS/EGPRS bearer services provide packet oriented data transmission that allocates transmission resources on demand and release those resources if no further data are to be exchanged. ETCS message sizes are rather small and the typical message frequency are in the range of several seconds. This allows to multiplex several ETCS sessions to one transmission resource and facilitating use of ETCS level 2 in high density rail traffic areas.

The present document identifies the features required to allow the support of ETCS using GPRS/EGPRS bearer services, in particular the basic ones and those needed to fulfil End-to-End performance requirements.

1 Scope

The present document defines the minimum set of 3GPP GPRS features to support ETCS application and to guarantee QoS required. Two operational cases are applicable in GSM-R networks:

- GSM-R GPRS packet switched bearer service is only utilized by ETCS PS-mode operation - **ETCS only operation**.
- GSM-R GPRS packet switched bearer service is utilized by simultaneous ETCS and other packet data oriented applications - **Simultaneous operation of ETCS and non-ETCS applications**.

Both operational scenarios require basic GPRS features but in case of simultaneous ETCS and non-ETCS operation, ETCS packet data session requires priority over non-ETCS packet data traffic.

The present document is focussing on the relevant references needed for the GSM-R PS-domain. It does not describe the detailed requirements for each of the referred GSM feature.

The minimum requirements on ETSI/3GPP for the use of GSM for application on railway networks are based on the Release 99 version of the Technical Specifications and are described in ETSI EN 301 515 [1.1]. The features serving as the basis for GSM-R PS-domain are described in releases later than Release 99. So the present document is referring to specifications versions later than Release 4 but is not mandating any other functionality than covered by the applicable 3GPP Work Items and referenced in the applicable clauses as listed in clauses 5.1.10 and 5.2.2.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

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The following referenced documents are necessary for the application of the present document.

- [1] ETSI TS 123 002 (V4.8.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Network architecture (3GPP TS 23.002 version 4.8.0 Release 4)".
- [2] ETSI TS 123 060 (V4.11.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); General Packet Radio Service (GPRS); Service description; Stage 2 (3GPP TS 23.060 version 4.11.0 Release 4)".
- [3] ETSI TS 123 107 (V4.6.0): "Universal Mobile Telecommunications System (UMTS); Quality of Service (QoS) concept and architecture (3GPP TS 23.107 version 4.6.0 Release 4)".
- [4] ETSI TS 123 207 (V5.10.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); End-to-end Quality of Service (QoS) concept and architecture (3GPP TS 23.207 version 5.10.0 Release 5)".
- [5] ETSI TS 124 008 (V4.17.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Mobile radio interface Layer 3 specification; Core network protocols; Stage 3 (3GPP TS 24.008 version 4.17.0 Release 4)".
- [6] ETSI TS 103 368 (V1.1.1): "Railway Telecommunications; Commands necessary for mobile radio equipment operation on railways".