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GLOBAL SYSTEM FOR
MOBILE COMMUNICATIONS

Digital cellular telecommunications system (Phase 2+); Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Layer 1 structure of physical circuits (GSM 08.54)

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Foreword

This Global System for Mobile communications Technical Specification (GTS) has been produced by the Special Mobile Group (SMG) Technical Committee (TC) of the European Telecommunications Standards Institute (ETSI).

This GTS defines the structure of the physical layer (layer 1) of the BSC - BTS/TRX interface for supporting traffic channels and control channels within the digital cellular telecommunications system (Phase 2/Phase 2+).

This GTS is a TC-SMG approved GSM technical specification version 5, which contains GSM Phase 2+ enhancements/features to the version 4 GSM technical specification. The European Telecommunications Standard from which this Phase 2+ GTS has evolved is Phase 2 GSM ETS 300 594 Edition 2 (GSM 08.54 version 4.1.0).

GTS are produced by TC-SMG to enable the GSM Phase 2+ specifications to become publicly available, prior to submission for the formal ETSI standards approval procedure to become European Telecommunications Standards (ETS). This ensures the earliest possible access to GSM Phase 2+ specifications for all Manufacturers, Network operators and implementors of the Global System for Mobile communications.

The contents of this GTS are subject to continuing work within TC-SMG and may change following formal TC-SMG approval. Should TC-SMG modify the contents of this GTS it will then be republished by ETSI with an identifying change of release date and an increase in version number as follows:

Version 5.x.y

where:

- y the third digit is incremented when editorial only changes have been incorporated in the specification;

- x the second digit is incremented for all other types of changes, i.e. technical enhancements, corrections, updates, etc.

The specification from which this GTS has been derived was originally based on CEPT documentation, hence the presentation of this GTS may not be entirely in accordance with the ETSI rules.

Reference is made within this GTS to GSM-TSs (note).

NOTE: TC-SMG has produced documents which give the technical specifications for the implementation of the digital cellular telecommunications system. Historically, these documents have been identified as GSM Technical Specifications (GSM-TSs). These TSs may have subsequently become I-ETSs (Phase 1), or ETSs/ETSI Technical Reports (ETRs) (Phase 2). TC-SMG has also produced ETSI GSM TSs which give the technical specifications for the implementation of Phase 2+ enhancements of the digital cellular telecommunications system. These version 5.x.x GSM Technical Specifications may be referred to as GTSs.

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1 Scope

The use and general aspects of the A-bis interface are given in Technical Specification GSM 08.51.

This Global System for Mobile communications Technical Specification (GTS) defines the structure of the physical layer (layer 1) of the BSC - BTS/TRX interface for supporting traffic channels and control channels. Use of the physical layer for supporting link protocol is covered in Technical Specification GSM 08.56.

The physical layer is the lowest layer in the OSI Reference Model and it supports all functions required for transmission of bit streams on the physical medium.

For this specification only digital transmission will be considered, the use of analogue transmission is a national concern.

2 Normative references

This GTS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this GTS only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

[1] GSM 01.04 (ETR 100): "European digital cellular telecommunications system (Phase 2); Abbreviations and acronyms".

[2] GSM 08.20 (ETS 300 591): "European digital cellular telecommunications system (Phase 2); Rate adaption on the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[3] GSM 08.51 (ETS 300 592): "European digital cellular telecommunications system (Phase 2); Base Station Controller - Base Transceiver Station (BSC - BTS) interface General aspects".

[4] GSM 08.56 (ETS 300 595): "European digital cellular telecommunications system (Phase 2); Base Station Controller - Base Transceiver Station (BSC - BTS) interface Layer 2 specification".

[5] GSM 08.60 (ETS 300 597): "European digital cellular telecommunications system (Phase 2); Inband control of remote transcoders and rate adaptors".

[6] GSM 08.61 (ETS 300 598): "European digital cellular telecommunications system (Phase 2); Inband control of remote transcoders and rate adaptors (half rate)".

[7] CCITT Recommendation G.703: "Physical/electrical characteristics of hierarchical digital interfaces".

[8] CCITT Recommendation G.705: "Characteristics required to terminate digital links on a digital exchange".

[9] CCITT Recommendation G.711: "Pulse code modulation (PCM) of voice frequencies".

[10] CCITT Recommendation G.732: "Characteristics of primary PCM multiplex equipment operating at 2048 kbit/s".

[11] CCITT Recommendation I.460: "Multiplexing, rate adaption and support of existing interfaces".

3 Abbreviations

Abbreviations used in this specification are listed in GSM 01.04

4 Layer 1 specification

All the CCITT recommendations referred to are Blue Book.

Layer 1 shall utilize digital transmission at a rate of 2 048 kbit/sec with a frame structure of 32 * 64 kbit/sec time slots, as specified in CCITT Recommendation G.705 section 3 or at a rate of 64 kbit/sec.

The physical/electrical characteristics are defined in CCITT Recommendation G.703.

Synchronization at the BTS/TRX for the transmitted bit stream toward the BSC shall be derived from the received bit stream from the BSC.

For transmission rate at 64 kbit/sec it shall be an interface as defined in CCITT Recommendation G.703.

For transmission rate at 2048 kbit/sec the functional characteristics are defined in CCITT Recommendation G.732 section 2 and 3, and fault conditions should be treated in accordance with CCITT Recommendation G.732 section 4.

The idle pattern must be transmitted on every timeslot that is not assigned to a channel, and to every timeslot of a channel that is not allocated to a call. The idle pattern shall be 01010100 for a 64 kbit/sec channel and the 2-bit pattern 01 for 16 kbit/sec channels. For 8 kbit/s channels, the idle pattern shall be consecutive ones or zeros according to the corresponding idle pattern bit of a 16 kbit/s channel.

If transcoders are located in BTS speech encoding shall be the A-law as defined in CCITT Recommendation G.711.

If speech transcoders are located in the BSC the speech, data and signalling channels will utilize transmission rates of 8 kbit/sec, 16 kbit/sec or 64 kbit/sec according to Technical Specifications GSM 08.60 and GSM 08.61. They shall be rate adapted or multiplexed according to CCITT Recommendation I.460 with fixed format, to fit into the physical interface.

Data encoding is covered in Technical Specification GSM 08.20.

In the case of a 2 048 kbit/sec circuit, multidrop solutions should be possible. Dynamic sharing of terrestrial 64 kbit/sec channels between BTS:s on a per-call basis must not be used.

History

Document history	
November 1995	Creation of Version 5.0.0 (Version 4.1.0 +AR08.54-003)
December 1995	Publication of Version 5.0.0

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