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Technical Specification

**Digital cellular telecommunications system (Phase 2+);
Base Station Controller - Base Transceiver Station
(BSC - BTS) interface;
General aspects
(GSM 08.51 version 7.0.0 Release 1998)**



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Foreword

This Technical Specification (TS) has been produced by the Special Mobile Group (SMG).

The present document defines the general aspects Base Station Controller (BSC) to Base Transceiver Station (BTS) interface within the digital cellular telecommunications system (Phase 2/Phase 2+).

The contents of the present document is subject to continuing work within SMG and may change following formal SMG approval. Should SMG modify the contents of the present document it will be re-released with an identifying change of release date and an increase in version number as follows:

Version 7.x.y

where:

- 7 indicates Release 1998 of GSM Phase 2+
- x the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- y the third digit is incremented when editorial only changes have been incorporated in the specification.

1 General

1.1 Scope

The present document is an introduction to the 08.5X - 08.6X series of GSM Technical Specifications and deals with the definition of the base station controller (BSC) to base transceiver station (BTS) interface defined inside the base station system (BSS) for the GSM system. These Technical Specifications define the basic interface with some identified options requiring further elaboration. The BSC-BTS interface is mandatory within GSM only if the BSC and the BTS are not collocated.

1.2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.
- For this Release 1998 document, references to GSM documents are for Release 1998 versions (version 7.x.y).

- [1] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".
- [2] GSM 03.50: "Digital cellular telecommunications system (Phase 2+); Transmission planning aspects of the speech service in the GSM Public Land Mobile Network (PLMN) system".
- [3] GSM 08.08: "Digital cellular telecommunications system (Phase 2+); Mobile Switching Centre - Base Station System (MSC - BSS) interface Layer 3 specification".
- [4] GSM 08.51: "Digital cellular telecommunications system (Phase 2+); Base Station Controller - Base Transceiver Station (BSC - BTS) interface General aspects".
- [5] GSM 08.52: "Digital cellular telecommunications system (Phase 2+); Base Station Controller - Base Transceiver Station (BSC - BTS) interface Interface principles".
- [6] GSM 08.54: "Digital cellular telecommunications system (Phase 2+); Base Station Controller - Base Transceiver Station (BSC - BTS) interface Layer 1 structure of physical circuits".
- [7] GSM 08.56: "Digital cellular telecommunications system (Phase 2+); Base Station Controller - Base Transceiver Station (BSC - BTS) interface Layer 2 specification".
- [8] GSM 08.58: "Digital cellular telecommunications system (Phase 2+); Base Station Controller - Base Transceiver Station (BSC - BTS) interface Layer 3 specification".
- [9] GSM 08.60: "Digital cellular telecommunications system (Phase 2+); Inband control of remote transcoders and rate adaptors".
- [10] GSM 08.61: "Digital cellular telecommunications system (Phase 2+); Inband control of remote transcoders and rate adaptors (half rate)".
- [11] GSM 12.00: "Digital cellular telecommunications system (Phase 2+); Objectives and structure of Network Management (NM)".
- [12] GSM 12.01: "Digital cellular telecommunications system (Phase 2+); Common aspects of GSM Network Management (NM)".
- [13] GSM 12.07: "Digital cellular telecommunications system (Phase 2+); Operations and performance management".
- [14] GSM 12.02: "Digital cellular telecommunications system (Phase 2+); Subscriber, Mobile Equipment (ME) and services data administration".
- [15] GSM 12.03: "Digital cellular telecommunications system (Phase 2+); Security management".
- [16] GSM 12.04: "Digital cellular telecommunications system (Phase 2+); Performance data measurements".

- [17] GSM 12.05: "Digital cellular telecommunications system (Phase 2+); Subscriber related event and call data".
- [18] GSM 12.06: "Digital cellular telecommunications system (Phase 2+); GSM Network change control".
- [19] GSM 12.10: "Digital cellular telecommunications system (Phase 2+); Maintenance provisions for operational integrity of Mobile Stations (MS)".
- [20] GSM 12.11 "Digital cellular telecommunications system (Phase 2+); Maintenance of the Base Station System (BSS)".
- [21] GSM 12.13: "Digital cellular telecommunications system (Phase 2+); Maintenance of the Mobile-services Switching Centre (MSC)".
- [22] GSM 12.14: "Digital cellular telecommunications system (Phase 2+); Maintenance of location registers".
- [23] GSM 12.20: "Digital cellular telecommunications system (Phase 2+); Network Management (NM) procedures and messages".
- [24] GSM 12.21: "Digital cellular telecommunications system (Phase 2+); Network Management (NM) procedures and message on the A-bis interface".
- [25] GSM 12.22: "Digital cellular telecommunications system (Phase 2+); Interworking of GSM Network Management (NM) procedures and messages at the Base Station Controller (BSC)".
- [26] CCITT Recommendation Q.920: "ISDN user-network interface data link layer - General aspects".
- [27] CCITT Recommendation Q.921: "ISDN user-network interface - Data link layer specification".

1.3 Definitions and abbreviations

Abbreviations used in the present document are listed in GSM 01.04.

2 Interface capabilities

The BSC-BTS interface shall be capable of supporting all the services offered to the GSM users and subscribers. In addition it shall also allow control of the radio equipment and radio frequency allocation in the BTS.

3 Interface specification objectives

The BSC to BTS interface specifications should allow the following:

- (I) Connection of various manufacturers BTS/TRX to the same BSC, according to the location of the transcoder.
- (II) The use of several manufacturers BSC to the same type of BTS/TRX, according to the location of the transcoder.
- (III) The use of the same BTS/TRX in any PLMN, according to the location of the transcoder.
- (IV) The use of the same BSC in any PLMN.
- (V) Separate evolution of BSC and BTS/TRX technology.
- (VI) Separate evolution of O & M facilities.
- (VII) Sub-multiplexing of speech channels on a 64 kbit circuit.
- (VIII) Evolution towards lower speech coding rates.
- (IX) Location of transcoders either in BSC or in BTS.
- (X) Support of all services defined in the 02 series of GSM Technical Specifications.
- (XI) A stepwise expansion of capacity in a BTS.
- (XII) Different physical solution of the various equipment in the BTS.
- (XIII) Support of a single TRX forming a BTS.

- (XIV) Support of a set of TRX'S forming a BTS.
(XV) Support of a BTS as one entity.

4 Interface characteristics

The interface is defined to be at the terrestrial link of a remote BTS connected to the BSC.

The BSC to BTS interface is specified by a set of characteristics, including:

- a) physical and electrical parameters;
- b) channel structures;
- c) signalling transfer procedures;
- d) configuration and control procedures;
- e) operation and maintenance information support.

The definition of the BSC to BTS/TRX interface follows a layered approach similar to the ISDN. Layer 3 is for the most part based on Technical Specification GSM 08.08 with additional procedures for control of radio resources. Layer 2 is based on the LAPD protocol. Layer 1 is either digital (at a rate 2048 kbit/sec with a frame structure of 32 x 64 kbit/sec time slots or at a rate of 64 kbit/sec.) or analogue with the data being passed by the use of modems (this latter case is a national option).

In the case that the transcoder is positioned outside the BTS, the overall one way propagation delay between the Point Of Interconnection to PSTN/ISDN and the MS is limited to 1.5 ms (approximately 300 km). With the transcoder in the BTS, the limit is 6.5 ms (approximately 1300 km). These limits may be subject to increase resulting from savings made in the overall network. See also Technical Specification GSM 03.50.

5 Other technical specifications on the BSC-BTS interface

The full structure of the Technical Specifications specifying the BSC to BTS interface are as follows:

5.1 Technical Specification GSM 08.52 BSC-BTS Interface Principles

This specification gives the principle basis for the rest of the specifications specifying the interface between the base station controller and the base transceiver station. It gives the functional split between these two entities.

5.2 Technical Specification GSM 08.54 BSC-BTS Layer 1 Specification

This specification defines the structure of the physical layer at the BSC - BTS interface. The physical interface is either chosen as 2048 kbit/sec or as 64 kbit/sec, both according to standard CCITT recommendations.

Depending on location of transcoders, speech is standard A-law or it is 16 kbit/sec remote control protocol multiplexed or rate adapted to 64 kbit/sec in the same way as data.

5.3 Technical Specification GSM 08.56 BSC-BTS Layer 2 Specification

At layer 2 the signalling information is passed by a standard LAPD protocol mechanism in accordance with the CCITT Recommendations Q.920 and Q.921.

5.4 Technical Specification GSM 08.58 BSC-BTS Layer 3 Specification

This specification specifies the layer 3 procedures used on the BSC-BTS interface for control of the GSM services. The functional split between BSC and BTS is defined in Technical Specification GSM 08.52.

5.5 Technical Specification GSM 12.21 BSC-BTS Operation/Maintenance Signalling

This specification defines the transport mechanism for O&M messages over the Abis interface. O&M procedures and messages are defined in GSM 12 series.

5.6 Technical Specification GSM 08.60 Inband Control of Remote Transcoders and Rate Adaptors

The transcoder is a part of the BSS and may optionally be located outside the BTS (e.g. at MSC-site or at BSC-site) in order to make it possible to multiplex speech and data channels on the links within the BSS and on the BSC-BTS link.

This specification describes the protocol which carries the full rate speech and data frames between the transcoder and the radio link codec across a 16 kbit/sec interface. Both full rate speech and full rate data services are covered. It also defines the signals needed for remote controlling the timing of the transcoder in accordance to the transmission time at the radio link. It also addresses the signals for voice activity and comfort noise. It interfaces the 06- series to the 05-series.

5.7 Technical Specification GSM 08.61 Inband Control of Remote Transcoders and Rate Adaptors for Half Rate Traffic Channels

This Technical Specification describes the protocol which carries the half rate speech and data frames between the transcoder and the radio link codec across a 16 kbit/sec or an 8 kbit/sec interface. Both half rate speech and half rate data services are covered. It also defines the signals needed for remote controlling the timing of the transcoder in accordance to the transmission time at the radio link. It also addresses the signals for voice activity and comfort noise.

Annex A (informative): Change Request History

Change history					
SMG No.	TDoc. No.	CR. No.	Section affected	New version	Subject/Comments
SMG#07				4.0.4	ETSI Publication
SMG#13		003		4.1.0	8 kbit/s submultiplexing
SMG#20				5.0.0	Release 1996 version
SMG#27				6.0.0	Release 1997 version
SMG#29				7.0.0	Release 1998 version

History

Document history		
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