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**Recommendation GSM 08.51**

BSC - BTS Interface, General Aspects

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## **PREFATORY NOTE**

ETSI has constituted stable and consistent documents which give specifications for the implementation of the European Cellular Telecommunications System. Historically, these documents have been identified as "GSM recommendations".

Some of these recommendations may subsequently become Interim European Telecommunications Standards (I-ETTs) or European Telecommunications Standards (ETTs), whilst some continue with the status of ETSI-GSM Technical Specifications. These ETSI-GSM Technical Specifications are for editorial reasons still referred to as GSM recommendations in some current GSM documents.

The numbering and version control system is the same for ETSI-GSM Technical Specifications as for "GSM recommendations".

ETSI/GSM

GSM Recommendation 08.51

version 3.0.2

Title :Base Station Controller (BSC) to Base Transceiver Station (BTS)  
Interface

General aspects

Date : February 1992

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0. SCOPE

This recommendation is an introduction to the 08.5X - 08.6X series of recommendations 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 recommendations 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. 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.

2. INTERFACE RECOMMENDATION OBJECTIVES

The BSC to BTS interface recommendations 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 recommendations.
- (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.

3. 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 GSM recommendation 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 Recommendation GSM 03.50.

4. OTHER RECOMMENDATIONS ON THE BSC-BTS INTERFACE

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

4.1 RECOMMENDATION 08.52 BSC-BTS Interface Principles

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

4.2 RECOMMENDATION 08.54 BSC-BTS Layer 1 Specification

This recommendation 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.

4.3 RECOMMENDATION 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 Q.920 and Q.921 of CCITT.

4.4 RECOMMENDATION 08.58 BSC-BTS Layer 3 Specification

This recommendation 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 recommendation 08.52.

4.5 RECOMMENDATION 08.59 BSC-BTS Operation/Maintenance Signalling

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

4.6 RECOMMENDATION 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 recommendation describes the protocol which carries the speech and data frames between the transcoder and the radio link codec across a 16 kbit/sec interface. Both full rate speech and full and half rate data services is 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.