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Technical Specification

**Digital cellular telecommunications system (Phase 2+);
General Packet Radio Service (GPRS);
Base Station System (BSS) - Serving GPRS
Support Node (SGSN) interface;
Gb Interface Layer 1
(3GPP TS 48.014 version 4.0.0 Release 4)**



Reference

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Foreword

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1 Scope

The present document specifies the physical layer on the Base Station System (BSS) to Serving GPRS Support Node (SGSN) interface (Gb interface) and references layer 1 standards to be used on this interface.

The protocol stack on the Gb interface is defined in the stage 2 3GPP TS 23.060 [3].

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. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TS 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 22.060: " Stage 1 Service Description of the General Packet Radio Service (GPRS)".
- [3] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description; Stage 2".
- [4] 3GPP TS 48.004: "Base Station System - Mobile-services Switching Centre (BSS - MSC) interface Layer 1 specification".
- [5] FRF 1.1 (January 19, 1996): "The Frame Relay Forum User-to-Network Implementation Agreement (UNI)".
- [6] CCITT Recommendation G.704 (Blue Book): "Synchronous frame structures used at 1544, 6312, 2048, 8488 and 44 736 kbit/s hierarchical levels".
- [7] ANSI T1.403 (1995): "Carrier to Customer Installation DS1 Metallic Interface".
- [8] Bellcore TR-NWT-001203 Issue 2, December 1992: "Generic Requirements for the Switched DS1/Switched Fractional Capability from an ISDN Interface".

3 Abbreviations

For the purposes of the present document the following abbreviations apply. Additional applicable abbreviations can be found in 3GPP TS 21.905 [1] and 3GPP TS 23.060 [3].

DCE	Data Circuit-terminating Equipment
DTE	Data Terminal Equipment
E1	A four wire symmetrical digital transmission path carrying PCM signal at 2048 kbit/s.
FRF	Frame Relay Forum
T1	A four wire symmetrical digital transmission path carrying PCM signal at 1544 kbit/s.

4 Definitions

4.1 Definitions

Refer to 3GPP TS 22.060 [2].

4.2 Symbols

Refer to 3GPP TS 23.060 [3].

5 Layer 1 specification

Since Frame Relay shall be used on the Gb interface for phase 1 of GPRS, see TS 3GPP TS 23.060 [3], this version of this Technical Specification refers to "The Frame Relay Forum User-to-Network Implementation Agreement (UNI)" [5] which recommends physical layer interfaces to be used in conjunction with Frame Relay.

5.1 Physical configuration of the Gb interface

The detailed physical configuration of the Gb interface is subject to negotiation between operators and equipment providers and is out of the scope of this Technical Specification.

For example, point-to-point physical lines or an intermediate Frame Relay network may be used. In the latter case, the two ends of the Gb interface may use different types of physical interfaces.

5.2 Physical layer interface

Each of the physical layer of the Gb interface shall conform to one of the following FRF 1.1 [5] clauses. This does not mean that each BSS and SGSN equipment has to support all of these physical interfaces, it means that the supported physical interfaces shall be compliant with the corresponding clause of FRF 1.1 [5].

- a) clause 2.1.1: ANSI T1.403.
- b) clause 2.1.2: V.35, physical circuit and DTE/DCE interface clauses.
- c) clause 2.1.3: G.703.
- d) clause 2.1.4: G.704.
- e) clause 2.1.5: X.21.
- f) clause 2.1.6: ANSI-530-A-1992.
- g) clause 2.1.7: HSSI.

The Gb interface may be multiplexed with the A interface on the same E1 (2048 kbit/s), or T1 (1544 Kbit/s) digital path. In case of E1 interface, CCITT Recommendation G.704 [6] shall be applied according to FRF 1.1 [5] and 3GPP TS 48.004 [4] as appropriate, and in case of T1 interface ANSI Recommendation T1.403 [7] shall be applied according to FRF 1.1 [5] and 3GPP TS 48.004 [4] as appropriate.

In the case where multiple 64 kbit/s channels are used on an E1 (2048 kbit/s), digital path on the Gb interface, it is recommended to aggregate them into one $n \times 64$ kbit/s channel, see CCITT Recommendation G.704 [6], clause 5 and included clauses. In case where multiple 64 kbit/s channels are used on a T1 (1544 kbit/s) digital path on the Gb interface, it is recommended to aggregate them into $n \times 64$ kbit/s (where $2 \leq n \leq 24$) channel, see Bellcore TR-NWT-1203 [8]. This approach optimises the use of the available bandwidth by taking advantage of the statistical multiplexing at the upper layer. However, this approach requires that no slipping occurs between individual 64 kbit/s channels e.g. when passing through intermediate equipment between BSS and SGSN.

5.3 Error rate

The error rate experienced at the physical layer between the BSS and the SGSN shall be compatible with the operation of the upper layers.

5.4 Provision of physical channels

The physical channels on the Gb interface shall be permanently reserved by means of administrative procedures.

Annex C (informative): Change History

Change history					
TSG #	TSG Doc.	CR	Rev	Subject/Comment	New
GP-04	-	-	-	April 2001. Conversion to 3GPP layout and number. References have been updated.	48.014 v4.0.0

History

Document history		
V4.0.0	April 2001	Publication