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Digital cellular telecommunications system (Phase 2+) (GSM); Terminal Adaptation Functions (TAF) for services using synchronous bearer capabilities (GSM 07.03 version 5.2.1)

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**Digital cellular telecommunications system (Phase 2+);
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for services using synchronous bearer capabilities
(GSM 07.03 version 5.2.1)**

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Contents

Foreword	5
1 Scope	7
2 Normative references	7
2.1 Abbreviations	9
3 General	9
3.1 Customer access configuration	9
3.2 Terminal Adaptation Function	9
3.3 TAF Interfacing to other MT functions	10
4 Terminal Adaptation Functions for synchronous transparent services	10
4.1 Rate Adaptation	10
4.1.1 Rate adaptation - V-series	11
4.1.2 Rate adaptation - X.21	11
4.1.3 Rate adaptation - S-interface	11
4.2 Interchange Circuit Signalling Mapping	13
4.2.1 V-series interchange circuit mapping	13
4.2.1.1 Multislot configurations (Channel coding TCH/F9.6 or TCH/F4.8 kbit/s)	15
4.2.1.2 Channel coding TCH/F14.4	15
4.2.2 X.21 Interchange circuit mapping	15
4.2.3 Case of S-interface	16
4.3 Call establishment signalling mapping at TE/MT interface	17
4.3.1 V-series interfaces	17
4.3.1.1 Call establishment manual operation - utilizing Alternate Speech/Data or Speech followed by Data Capabilities	17
4.3.1.2 Call establishment manual operation - utilizing the Unrestricted Digital Capability	17
4.3.1.3 V.25 bis auto call/auto answer	17
4.3.2 X-series interfaces	18
4.3.2.1 X.21 bis call establishment manual operation - utilizing the Unrestricted Digital Capability	18
4.3.2.2 X.21 bis/V.25 bis call establishment signalling mapping	18
4.3.2.3 X.21 call establishment signalling mapping	18
4.3.3 S-interface (I.420) signalling mapping	18
4.3.4 X.25 procedures mapping	19
5 Terminal Adaptation Functions for synchronous non-transparent services	19
5.1 Rate Adaptation and protocol model	19
5.1.1 R-interface	19
5.1.2 S-interface	19
5.2 Signalling Mapping	19
5.2.1 Interchange circuit signalling mapping	19
5.2.2 Call establishment signalling mapping	19
5.3 Flow Control	19
5.3.1 Conditions requiring flow control towards the network	19
5.3.2 Conditional requiring flow control towards TE2	20
5.3.3 Local flow control	20
5.4 Buffers	20
5.4.1 TX buffers	20
5.4.2 RX buffers	20
6 V- and S-series interface procedures to 04.08 mapping	21
6.1 Mobile Originated calls	21
6.2 Mobile Terminated calls	22

7	X.21 interface procedures to 04.08 mapping.....	22
7.1	X.21 procedures mapping.....	22
7.1.1	Mobile originated call (see figure 10).....	22
7.1.2	Mobile terminated call (see figure 10).....	23
7.1.3	Mobile termination clearing (see figure 11).....	23
7.1.4	Distant end terminal clearing.....	23
7.1.5	Network generated clearing (see figure 11).....	23
7.2	Dm Signalling causes mapping to X.21 call progress signals.....	25
7.3.	X.21 FACILITIES MAPPING.....	25
8	Support for packet service.....	27
8.1	Terminal configurations.....	27
8.2	Support for basic packet access.....	28
8.3	Support for dedicated packet access.....	29
Annex A (normative):	L2R Functionality.....	30
A.1	Introduction.....	30
A.2	L2RBOP.....	30
A.3	Use of the L2RBOP.....	32
A.3.1	Radio Link Connection Control.....	32
A.3.2	Status transfer.....	33
A.3.3	LAPB connection control.....	33
A.3.4	LAPB exchange identification.....	33
A.3.5	Data Transfer.....	33
A.3.6	Flow control.....	33
History	34

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Foreword

This European Telecommunications Standard (ETS) has been produced by the Special Mobile Group (SMG) of the European Telecommunications Standards Institute (ETSI).

This ETS defines the interfaces and Terminal Adaptation Functions (TAF) integral to a Mobile Termination (MT) which enables the attachment of synchronous terminals to a MT within the digital cellular telecommunications system (Phase 2+).

The contents of this ETS is subject to continuing work within SMG and may change following formal SMG approval. Should SMG modify the contents of this ETS, it will be resubmitted for OAP 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 ETS has been derived was originally based on CEPT documentation, hence the presentation of this ETS may not be entirely in accordance with the ETSI drafting rules.

Transposition dates	
Date of adoption of this ETS:	2 January 1998
Date of latest announcement of this ETS (doa):	30 April 1998
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 October 1998
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1 Scope

This European Telecommunications Standard (ETS) defines Terminal Adaptation Functions (TAF) which are integrated in a Mobile Termination (MT) and which enable the attachment of Synchronous Terminals to an MT (see GSM 04.02 [4]). The general aspects of Terminal Adaptation Functions are contained in specification GSM 07.01 (ETS 300 913) [8]. This ETS covers support of synchronous data services (see GSM 02.02 (ETS 300 904)[2]) for the following interfaces and procedures:

- V.22 DTE/DCE Interface
- V.22 bis DTE/DCE Interface
- V.26 ter DTE/DCE Interface
- V.32 DTE/DCE Interface
- X.21 DTE/DCE Interface
- X.21 bis DTE/DCE Interface
- X.25 Procedure
- X.32 Procedure
- V.25 bis Procedure
- I.420 Interface (S)

LAPB is the only synchronous non-transparent protocol which is considered here.

2 Normative references

This ETS 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 ETS 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 350): "Digital cellular telecommunication system (Phase 2+); Abbreviations and acronyms".
- [2] GSM 02.02 (ETS 300 904): "Digital cellular telecommunication system (Phase 2+); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".
- [3] GSM 03.10: "Digital cellular telecommunication system (Phase 2+); GSM Public Land Mobile Network (PLMN) connection types".
- [4] GSM 04.02: "Digital cellular telecommunication system (Phase 2+); GSM Public Land Mobile Network (PLMN) access reference configuration".
- [5] GSM 04.08 (ETS 300 940): "Digital cellular telecommunication system (Phase 2+); Mobile radio interface layer 3 specification".
- [6] GSM 04.21 (ETS 300 945): "Digital cellular telecommunication system; Rate adaption on the Mobile Station - Base Station System (MS - BSS) interface".
- [7] GSM 04.22 (ETS 300 946): "Digital cellular telecommunication system (Phase 2+); Radio Link Protocol (RLP) for data and telematic services on the Mobile Station - Base Station System (MS - BSS) interface and the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".
- [8] GSM 07.01 (ETS 300 913): "Digital cellular telecommunication system (Phase 2+); General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".
- [9] GSM 08.20 : "Digital cellular telecommunication system; Rate adaption on the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

- [10] GSM 09.06 (ETS 300 975): "Digital cellular telecommunication system (Phase 2+); Interworking between a Public Land Mobile Network (PLMN) and a Packet Switched Public Data Network/Integrated Services Digital Network (PSPDN/ISDN) for the support of packet switched data transmission services".
- [11] GSM 09.07 (ETS 300 976): "Digital cellular telecommunication system (Phase 2+); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".
- [12] CCITT Series V Recommendations: "Data communication over the Telephone network".
- [13] CCITT Series X Recommendations: "Data communication networks".
- [14] CCITT Recommendation V.10: "Electrical characteristics for unbalanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications".
- [15] CCITT Recommendation V.11: "Electrical characteristics for balanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications".
- [16] CCITT Recommendation V.25: "Automatic answering equipment and/or parallel automatic calling equipment on the general switched telephone network including procedures for disabling of echo control devices for both manually and automatically established calls".
- [17] CCITT Recommendation V.25 bis: "Automatic Calling and/or Answering Equipment on the General Switched Telephone Network (GSTN) using the 100-series interchange circuits".
- [18] CCITT Recommendation V.28: "Electrical characteristics for unbalanced double-current interchange circuits".
- [19] CCITT Recommendation V.110: "Support of data terminal equipments (DTEs) with V-Series interfaces by an integrated services digital network".
- [20] CCITT Recommendation V.24: "List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment".
- [21] CCITT Recommendation X.24: "List of definitions for interchange circuits between Data Terminal Equipment (DTE) and Data Circuit Terminating Equipment (DCE) on Public Data Networks".
- [22] CCITT Recommendation X.25: "Interface between Data Terminal Equipment (DTE) and Data Circuit Terminating Equipment (DCE) for terminals operating in Packet Mode and connected to Public Data Networks by dedicated Circuit".
- [23] CCITT Recommendation X.21: "Interface between Data Terminal Equipment (DTE) and Data Circuit Terminating Equipment (DCE) for synchronous operation in public data networks".
- [24] CCITT Recommendation X.21 bis: "Use on public data networks of data terminal equipment (DTE) which is designed for interfacing to synchronous V-Series modems".
- [25] CCITT Recommendation X.26: "Electrical characteristics for unbalanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications".

- [26] CCITT Recommendation X.27: "Electrical characteristics for balanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications".
- [27] CCITT Recommendation X.30: "Support of X.21, X.21 bis and X.20 bis based Data Terminal Equipment (DTEs) by an ISDN".
- [28] CCITT Recommendation X.31: "Support of Packet Mode Terminal Equipment in ISDN".
- [29] CCITT Recommendation X.32: "Interface between Data Terminal Equipment (DTE) and Data Circuit Terminating Equipment (DCE) for terminals operating in Packet Mode and accessing a PSPDN through a PSTN or an ISDN or a CSPDN".
- [30] CCITT Recommendation I.461: "Support of X.21, X.21 bis and X.20 bis based data terminal equipment (DTEs) by integrated services digital network (ISDN)".
- [31] CCITT Recommendation I.463: "Support of data terminal equipment (DTEs) with V-Series type interfaces by an integrated services digital network (ISDN)".
- [32] ISO Recommendation 8885: "Information technology - Telecommunication and information exchange between systems - High-level data link control (HDLC) procedures - General purpose XID frame information field content and format".
- [33] ISO Recommendation 8886: "Information technology - Telecommunication and information exchange between systems - Data link service definitions for Open Systems interconnection".
- [34] Personal Computer Memory Card Association: "PCMCIA 2.1 or PC-Card 3.0 electrical specification or later revisions".
- [35] Infrared Data Association IrDA: "IrPHY Physical layer signalling standard".
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- [36] TIA-617: "Data Transmission Systems and Equipment - In-Band DCE Control".
- [37] GSM 02.34: "Digital cellular telecommunications system (Phase 2+); High Speed Circuit Switched Data (HSCSD) - Stage 1"
- [38] GSM 03.34 (TS 101 038): "Digital cellular telecommunications system (Phase 2+); High Speed Circuit Switched Data (HSCSD) -Stage 2 Service Description"

2.1 Abbreviations

In addition to those below abbreviations used in this ETS are listed in GSM 01.04 (ETR 350) [1].

AU Access Unit
PF Packet Function

3 General

3.1 Customer access configuration

The GSM PLMN access reference configuration is described in figure 1 of GSM 04.02 [4]. This specification (GSM 07.03) specifically refers to the MTs which support terminal equipments (TE1 or TE2) that use synchronous bearer capabilities.

3.2 Terminal Adaptation Function

The TAF is functionally part of an MT0, MT1 or MT2 (see GSM 04.02 [4]). The terminal adaptation provides facilities to allow manual or automatic call control functions associated with alternate

speech/data, speech followed by data and circuit switched data services, in case of V series interfaces. The X.21 DTE/DCE interface allows only for automatic call control functions. The following functions are included:

- Conversion of electrical, mechanical, functional and procedural characteristics of the V-series, X-series and ISDN type interfaces to those required by a GSM PLMN.
- Bit rate adaptation of V-series and X-series data signalling rates and the ISDN 64 kbit/s to that provided in the GSM PLMN.
- The mapping of V.25 bis AUTO CALL/AUTO ANSWER procedures and X.21 procedures to the GSM PLMN Dm-channel signalling.
- The mapping functions necessary to convert S-interface signalling to PLMN Dm-channel signalling.
- Synchronization procedure, which means the task of synchronizing the entry to and the exit from the data transfer phase between two subscriber terminals. This is described in the specification GSM 07.01 (ETS 300 913) [8].
- Filtering of channel control information. This is described in the specification GSM 07.01 (ETS 300 913) [8].
- Compatibility checking (see GSM 07.01 (ETS 300 913) [8])
- Layer 2 relaying (see annex 1)
- Flow control
- In Call Modification function (see section 4)
- Splitting and combining of the data flow in case of multislot data configurations

3.3 TAF Interfacing to other MT functions

SIST ETS 300 915 E3:2003

TAF interfacing is shown in figure 1.

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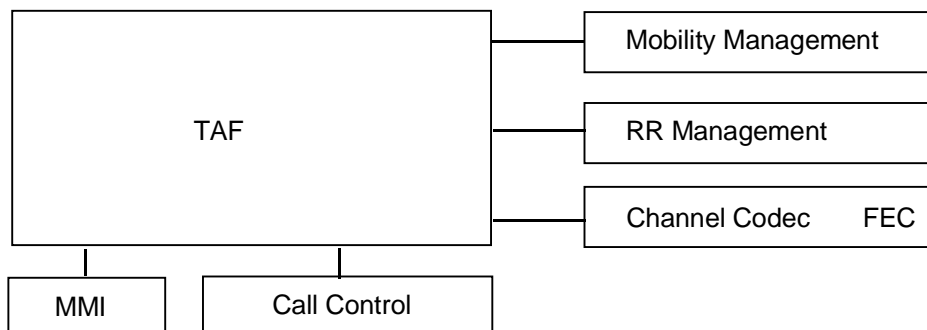


Figure 1: TAF interfacing to other MT functions

4 Terminal Adaptation Functions for synchronous transparent services

Specification GSM 03.10 [3] refers to the models for connection types supporting synchronous transparent services.

4.1 Rate Adaptation

Rate adaptation on the MS-BS interface is described in GSM 04.21. The synchronous data services make use of the following rate adaptation functions: RA1, RA2, RA1/RA1' and RA1'. See also Figure 6 in GSM 03.10. The D-bits of the rate adaptation frames are used to convey user data and the S- and X-bits are used to convey channel status information associated with the data bits in the data transfer state, or to carry substream numbering between the Split/Combine functions in case of multislot operation. For the S- and X-bits, a ZERO corresponds to the ON condition, a ONE to the OFF condition.