



SLOVENSKI STANDARD SIST ETS 300 562 E3:2003

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European digital cellular telecommunications system (Phase 2); Rate adaptation on the Mobile Station - Base Station System (MS - BSS) interface (GSM 04.21)

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**European digital cellular telecommunications system (Phase 2);
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(MS - BSS) Interface
(GSM 04.21)**

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Contents

Foreword	5
0 Scope	7
1 Normative references	7
2 Abbreviations.....	8
3 General approach.....	8
4 The RA0 Function	8
4.1 Asynchronous-to-Synchronous Conversion (RA0)	8
4.2 Break signal	8
4.3 Overspeed/Underspeed.....	9
4.4 Parity Bits	9
4.5 Flow Control.....	9
5 The RA1 Function	9
5.1 Network Independent Clocking.....	10
5.1.1 Multiframe Structure	10
5.1.2 Encoding and compensation	10
6 The RA2 Function	11
7 The RA1/RA1' Function.....	11
7.1 Radio Interface rate of 12 kbit/s	12
7.2 Radio Interface rate of 6 kbit/s	13
7.3 Radio Interface rate of 3,6 kbit/s (transparent services only)	14
7.4 Synchronisation	15
7.5 Idle frames	15
8 The RA1' Function.....	15
9 Support of Non-Transparent Bearer Services.....	15
Annex A (Informative): Stacks of rate adaptation.....	19
History.....	20

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Foreword

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

This ETS defines the rate adaptation functions to be used in Mobile Stations (MS) for adapting terminal interface data rates to the Mobile Station - Base Station System (MS - BSS) interface data rates, within the European digital cellular telecommunications system (Phase 2).

This ETS correspond to GSM technical specification, GSM 04.21 version 4.6.0.

The specification from which this ETS has been derived was originally based on CEPT documentation, hence the presentation of this ETS is not entirely in accordance with the ETSI/PNE rules.

Reference is made within this ETS to GSM Technical Specifications (GSM-TS) (note).

Reference is also made within this draft ETS to GSM 07.xx. series. The specifications in the series can be identified, with their full title, within the normative reference Clause of this draft ETS by the first two digits of their GSM reference number e.g. GSM 07.xx series, refers to GSM 07.01, GSM 07.02, .etc.

NOTE: TC-SMG has produced documents which give the technical specifications for the implementation of the European digital cellular telecommunications system. Historically, these documents have been identified as GSM Technical Specifications (GSM-TS). These TSs may have subsequently become I-ETs (Phase 1), or ETs (Phase 2), whilst others may become ETSI Technical Reports (ETRs). GSM-TSs are, for editorial reasons, still referred to in current GSM ETs.

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0 Scope

This European Telecommunication Standard (ETS) defines the rate adaptation functions to be used in GSM PLMN Mobile Stations for adapting terminal interface data rates to the MS-BSS interface data rates in accordance with GSM 03.10.

The provision of these functions will depend on the services a particular station is designed to support.

NOTE: This ETS should be considered together with GSM Specification 08.20 (Rate Adaptation on the BSS-MSC Interface) to give a complete description of PLMN rate adaptation.

1 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 100): "European digital cellular telecommunication system (Phase 2); Abbreviations and acronyms".
- [2] GSM 03.10 (ETS 300 528): "European digital cellular telecommunication system (Phase 2); GSM Public Land Mobile Network (PLMN) connection types".
- [3] GSM 05.03 (ETS 300 575): "European digital cellular telecommunication system (Phase 2); Channel coding".
- [4] GSM 07.01 (ETS 300 582): "European digital cellular telecommunication system (Phase 2); General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".
- [5] GSM 07.02 (ETS 300 583): "European digital cellular telecommunication system (Phase 2); Terminal Adaptation Functions (TAF) for services using asynchronous bearer capabilities".
- [6] GSM 07.03 (ETS 300 584): "European digital cellular telecommunication system (Phase 2); Terminal Adaptation Functions (TAF) for services using synchronous bearer capabilities".
- [7] GSM 07.05 (ETS 300 585): "European digital cellular telecommunication system (Phase 2); Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)".
- [8] GSM 07.06 (ETS 300 586): "European digital cellular telecommunication system (Phase 2); Use of the V series Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface at the Mobile Station (MS) for Mobile Termination (MT) configuration".
- [9] GSM 08.20 (ETS 300 591): "European digital cellular telecommunication system (Phase 2); Rate adaption on the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".
- [10] CCITT Recommendation V.110: "Support of data terminal equipments (DTEs) with V-Series interfaces by an integrated services digital network".
- [11] CCITT Recommendation X.30: "Support of X.21,X.21 bis and X.20 bis based terminal equipments (DTEs) by integrated services digital network (ISDN)".

2 Abbreviations

Abbreviations used in this ETS are listed in GSM 01.04.

3 General approach

GSM 03.10 defines the PLMN connection types necessary to support the GSM PLMN data and telematic services.

Within the MS there are several different data rate adaptation functions which are combined as shown in GSM 03.10 as part of the connection type.

These functions are RA0, RA1, RA2, RA1' and RA1/RA1'. The RA0, RA1 and RA2 are equivalent to those functions described in CCITT recommendation V.110.

The RA1' function is similar to RA1 but has a reduced bit rate output compatible with the coding scheme proposed for data services on the radio interface.

The RA1/RA1' is a relay function, used as indicated in GSM 03.10.

4 The RA0 Function

4.1 Asynchronous-to-Synchronous Conversion (RA0)

The RA0 Function is only used with asynchronous interfaces. Incoming asynchronous data is padded by the addition of stop elements to fit the nearest channel defined by $(2 \text{ to the power } n) \text{ times } 600 \text{ bit/s}$. Thus both 75 bit/s and 300 bit/s user data signalling rates shall be adapted to a synchronous 600 bit/s stream. The resultant synchronous stream is fed to RA1 or RA1'.

Asynchronous user rate	Synchronous user rate
$\leq 0.6 \text{ kbit/s}$	0.6 kbit/s
1.2 kbit/s	1.2 kbit/s
2.4 kbit/s	2.4 kbit/s
4.8 kbit/s	4.8 kbit/s
9.6 kbit/s	9.6 kbit/s

4.2 Break signal

The RA0 shall detect and transmit the break signal in the following fashion:

If the converter detects M to $2M+3$ bits, all of start polarity, where M is the number of bits per character in the selected format including start and stops bits, the converter shall transmit $2M+3$ bits of start polarity.

If the converter detects more than $2M+3$ bits all of start polarity, the converter shall transmit all these bits as start polarity.

The $2M+3$ or more bits of start polarity received from the transmitting sides shall be output to the receiving terminal.

The terminal must transmit on circuit 103 at least $2M$ bits stop polarity after the start polarity break signal before sending further data character. The converter shall then regain character synchronism from the following stop to start transition.

4.3 Overspeed/Underspeed

A RA0 shall insert additional stop elements when its associated terminal is transmitting with a lower than nominal character rate. If the terminal is transmitting characters with an overspeed of up to 1%, the asynchronous-to-synchronous converter may delete stop elements as often as is necessary to a maximum of one for every eight characters at 1% overspeed. The converter on the receiving side shall detect the deleted stop elements and reinsert them in the received data stream (circuit 104).

The realization of overspeed handling, as described above, at the interface to the associated terminal is implementation dependent. Possible implementations are e.g. the reduction of the length of the stop elements according to V.110 or increased data rates between the TA and terminal.

4.4 Parity Bits

Possible parity bits included in the user data are considered as data bits by the RA0 function (and RA1 function).

4.5 Flow Control

Where applicable, this function is as specified in the relevant terminal adaptation function Specification (GSM 07 series).

5 The RA1 Function

This function is used to adapt between the synchronous user rates, or the output of the RA0 function and the intermediate rate of 8 or 16 kbit/s.

Synchronous user rate	Intermediate rate
≤ 2.4 kbit/s	8 kbit/s
4.8 kbit/s	8 kbit/s
9.6 kbit/s	16 kbit/s

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A CCITT V.110 80 bits frame is constructed using the user data bits received (from the RA0 in the asynchronous case), the values of the S bits are deduced from the R interface.

Adaptation of 600 bit/s to 8Kbit/s is performed by 8 times consecutive duplication of each user data bit.

Adaptation of 1200 bit/s to 8 Kbit/s is performed by 4 times consecutive duplication of each user data bit.

Adaptation of 2400 bit/s to 8kbit/s is performed by 2 times consecutive duplication of each user data bit.

Adaptation of 4800 bit/s to 8 Kbit/s is performed by transmitting the bit stream with no duplication.

Adaptation of 9600 bit/s to 16 Kbit/s is performed by transmitting the bit stream with no duplication (the emitting period is halved with respect to the 4800 bit/s case).

The CCITT V.110 80 bit frame shown in Figure 3 is used. The D bits are used to convey the user data and the S and X bits are used to convey channel control information according to the relevant terminal adapter function Specification.

The E bits are used to convey the following information:

- i) User Data Rate - E1, E2, E3 (see Figure 4)
- ii) Network Independent Clocking - E4, E5, E6
- iii) Multiframe Synchronisation - E7

The order of transmission of the 80 bit frame is from left to right and top to bottom.