



SLOVENSKI STANDARD SIST ETS 300 575 E1:2003

01-december-2003

9 j fcdg]`X][]HUb]`WV] b]`h`Y_ca i b]_UV]`g_]`g]ghYa `fZJhU&L`E`?cX]fUb`Y`_UbUcj
fl GA`\$)`\$`Ł

European digital cellular telecommunications system (Phase 2); Channel coding (GSM 05.03)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: **ETS 300 575 Edition 1**
<https://standards.iteh.ai/catalog/standards/sist/ca5b197-cb7b-48b2-ac86-bac0919ead28/sist-ets-300-575-e1-2003>

ICS:

33.070.50	Globalni sistem za mobilno telekomunikacijo (GSM)	Global System for Mobile Communication (GSM)
35.040	Nabori znakov in kodiranje informacij	Character sets and information coding

SIST ETS 300 575 E1:2003

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST ETS 300 575 E1:2003](#)

<https://standards.iteh.ai/catalog/standards/sist/ea5f9197-eb7b-48b2-ac86-bac0919ead28/sist-ets-300-575-e1-2003>



EUROPEAN
TELECOMMUNICATION
STANDARD

ETS 300 575

September 1994

Source: ETSI TC-SMG

Reference: GSM 05.03

ICS: 33.060.30

Key words: European digital cellular telecommunications system, Global System for Mobile communications (GSM)

iTeh STANDARD PREVIEW
European digital cellular telecommunications system (Phase 2);
Channel coding
(GSM 05.03)
<https://standards.iteh.ai/catalog/standards/sist/ets-300-575-e1-2003>
<https://standards.iteh.ai/catalog/standards/sist/ets-300-575-e1-2003>

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE

Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE

X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 92 94 42 00 - Fax: +33 93 65 47 16

Copyright Notification: No part may be reproduced except as authorized by written permission. The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 1994. All rights reserved.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST ETS 300 575 E1:2003](https://standards.iteh.ai/catalog/standards/sist/ea5f9197-eb7b-48b2-ac86-bac0919ead28/sist-ets-300-575-e1-2003)

<https://standards.iteh.ai/catalog/standards/sist/ea5f9197-eb7b-48b2-ac86-bac0919ead28/sist-ets-300-575-e1-2003>

Contents

Foreword	5
1.1 Scope	7
1.2 Normative references	7
1.3 Definitions and abbreviations	7
2. General	8
2.1 General Organization	8
2.2 Naming Convention	8
3 Traffic Channels (TCH)	10
3.1 Speech channel at full rate (TCH/FS)	10
3.1.1 Parity and tailing for a speech frame	10
3.1.2 Convolutional encoder	11
3.1.3 Interleaving	11
3.1.4 Mapping on a Burst	11
3.2 Speech channel at half rate (TCH/HS)	12
3.3 Data channel at full rate, 12.0 kbit/s radio interface rate (9.6 kbit/s services (TCH/F9.6))	12
3.3.1 Interface with user unit	12
3.3.2 Block code	12
3.3.3 Convolutional encoder	12
3.3.4 Interleaving	12
3.3.5 Mapping on a Burst	13
3.4 Data channel at full rate, 6.0 kbit/s radio interface rate (4.8 kbit/s services (TCH/F4.8))	13
3.4.1 Interface with user unit	13
3.4.2 Block code	13
3.4.3 Convolutional encoder	13
3.4.4 Interleaving	13
3.4.5 Mapping on a Burst	13
3.5 Data channel at half rate, 6.0 kbit/s radio interface rate (4.8 kbit/s services (TCH/H4.8))	14
3.5.1 Interface with user unit	14
3.5.2 Block code	14
3.5.3 Convolutional encoder	14
3.5.4 Interleaving	14
3.5.5 Mapping on a Burst	14
3.6 Data channel at full rate, 3.6 kbit/s radio interface rate (2.4 kbit/s and less services (TCH/F2.4))	14
3.6.1 Interface with user unit	14
3.6.2 Block code	14
3.6.3 Convolutional encoder	14
3.6.4 Interleaving	15
3.6.5 Mapping on a Burst	15
3.7 Data channel at half rate, 3.6 kbit/s radio interface rate (2.4 kbit/s and less services (TCH/H2.4))	15
3.7.1 Interface with user unit	15
3.7.2 Block code	15
3.7.3 Convolutional encoder	15
3.7.4 Interleaving	15
3.7.5 Mapping on a Burst	15

4.	Control Channels	15
4.1	Slow associated control channel (SACCH)	15
4.1.1	Block constitution.....	15
4.1.2	Block code.....	16
4.1.3	Convolutional encoder	16
4.1.4	Interleaving	16
4.1.5	Mapping on a Burst	16
4.2	Fast associated control channel at full rate (FACCH/F).....	17
4.2.1	Block constitution.....	17
4.2.2	Block code.....	17
4.2.3	Convolutional encoder	17
4.2.4	Interleaving	17
4.2.5	Mapping on a Burst	17
4.3	Fast associated control channel at half rate (FACCH/H)	17
4.3.1	Block constitution.....	17
4.3.2	Block code.....	17
4.3.3	Convolutional encoder	18
4.3.4	Interleaving	18
4.3.5	Mapping on a Burst	18
4.4	Broadcast, Paging, Access grant and Cell broadcast channels (BCCH, PCH, AGCH, CBCH).....	19
4.5	Stand-alone dedicated control channel (SDCCH)	19
4.6	Random access channel (RACH).....	19
4.7	Synchronization channel (SCH)	20
4.8	Handover Access Burst.....	20
Annex A (informative):	Summary of Channel Types	23
Annex B (informative):	Summary of Polynomials Used for Convolutional Codes	24
History		25

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 specifies the channel coding of used within the European digital cellular telecommunications system (Phase 2).

This ETS correspond to GSM technical specification, GSM 05.03 version 4.1.3.

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/PNE rules.

Reference is made within this ETS to GSM Technical Specifications (GSM-TSs) (NOTE).

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-TSs). These TSs may have subsequently become I-ETTs (Phase 1), or ETs (Phase 2), whilst others may become ETSI Technical Reports (ETRs). GSM-TSs are, for editorial reasons, still referred to in GSM ETs.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST ETS 300 575 E1:2003](https://standards.iteh.ai/catalog/standards/sist/ea5f9197-eb7b-48b2-ac86-bac0919ead28/sist-ets-300-575-e1-2003)

<https://standards.iteh.ai/catalog/standards/sist/ea5f9197-eb7b-48b2-ac86-bac0919ead28/sist-ets-300-575-e1-2003>

Blank page

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST ETS 300 575 E1:2003](https://standards.iteh.ai/catalog/standards/sist/ea5f9197-eb7b-48b2-ac86-bac0919ead28/sist-ets-300-575-e1-2003)

<https://standards.iteh.ai/catalog/standards/sist/ea5f9197-eb7b-48b2-ac86-bac0919ead28/sist-ets-300-575-e1-2003>

1.1 Scope

A reference configuration of the transmission chain is shown in GSM 05.01. According to this reference configuration, this technical specification specifies the data blocks given to the encryption unit.

It includes the specification of encoding, reordering, interleaving and the stealing flag. It does not specify the channel decoding method.

The definition is given for each kind of logical channel, starting from the data provided to the channel encoder by the speech coder, the data terminal equipment, or the controller of the MS or BS. The definitions of the logical channel types used in this technical specification are given in GSM 05.02, a summary is in Annex A.

1.2 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 100): "European digital cellular telecommunication system (Phase 2); Definitions, abbreviations and acronyms".
- [2] GSM 04.08 (ETS 300 557): "European digital cellular telecommunication system (Phase 2); Mobile radio interface layer 3 specification".
- [3] GSM 04.21 (ETS 300 562): "European digital cellular telecommunication system (Phase 2); Rate adaptation on the Mobile Station - Base Station System (MS - BSS) interface".
- [4] <https://standards.iteh.org/catalog/standards/sist/ets-300-575/e1-2003/gsm-05-01-ets-300-573> GSM 05.01 (ETS 300 573): "European digital cellular telecommunication system (Phase 2); Physical layer on the radio path General description".
- [5] GSM 05.02 (ETS 300 574): "European digital cellular telecommunication system (Phase 2); Multiplexing and multiple access on the radio path".
- [6] GSM 06.10 (ETS 300 580-2): "European digital cellular telecommunication system (Phase 2); Full rate speech transcoding".

1.3 Definitions and abbreviations

Definitions and abbreviations used in this specification are listed in GSM 01.04.

2. General

2.1 General Organization

Each channel has its own coding and interleaving scheme. However, the channel coding and interleaving is organized in such a way as to allow, as much as possible, a unified decoder structure.

Each channel uses the following sequence and order of operations:

- The information bits are coded with a systematic block code, building words of information + parity bits.
- These information + parity bits are encoded with a convolutional code, building the coded bits.
- Reordering and interleaving the coded bits, and adding a stealing flag, gives the interleaved bits.

All these operations are made block by block, the size of which depends on the channel. However, most of the channels use a block of 456 coded bits which is interleaved and mapped onto bursts in a very similar way for all of them. Figure 1 gives a diagram showing the general structure of the channel coding.

This block of 456 coded bits is the basic structure of the channel coding scheme. In the case of speech TCH, this block carries the information of one speech frame. In case of control channels, it carries one message.

In the case of Fast ACCH, a coded message block of 456 bits is divided into eight sub-blocks. The first four sub-blocks are sent by stealing the even numbered bits of four timeslots in consecutive frames used for the TCH. The other four sub-blocks are sent by stealing the odd numbered bits of the relevant timeslot in four consecutive used frames delayed 2 or 4 frames relative to the first frame. Along with each block of 456 coded bits there is, in addition, a stealing flag (8 bits), indicating whether the block belongs to the TCH or to the fast ACCH. In the case of slow ACCH, BCCH or CCCH, this stealing flag is dummy.

Some cases do not fit in the general organization, and do not use the block of 456 coded bits. They are the random access messages of the RACH on uplink and the synchronization information broadcast on the SCH.

2.2 Naming Convention

For ease of understanding a naming convention for bits is given for use throughout the technical specification:

- General naming

"k" and "j" for numbering of bits in data blocks and bursts.

"K_x" gives the amount of bits in one block, where "x" refers to the data type

"n" is used for numbering of delivered data blocks where

"N" marks a certain data block

"B" is used for numbering of bursts or blocks where

"B₀" marks the first burst or block carrying bits from the data block with n = 0 (first data block in the transmission)

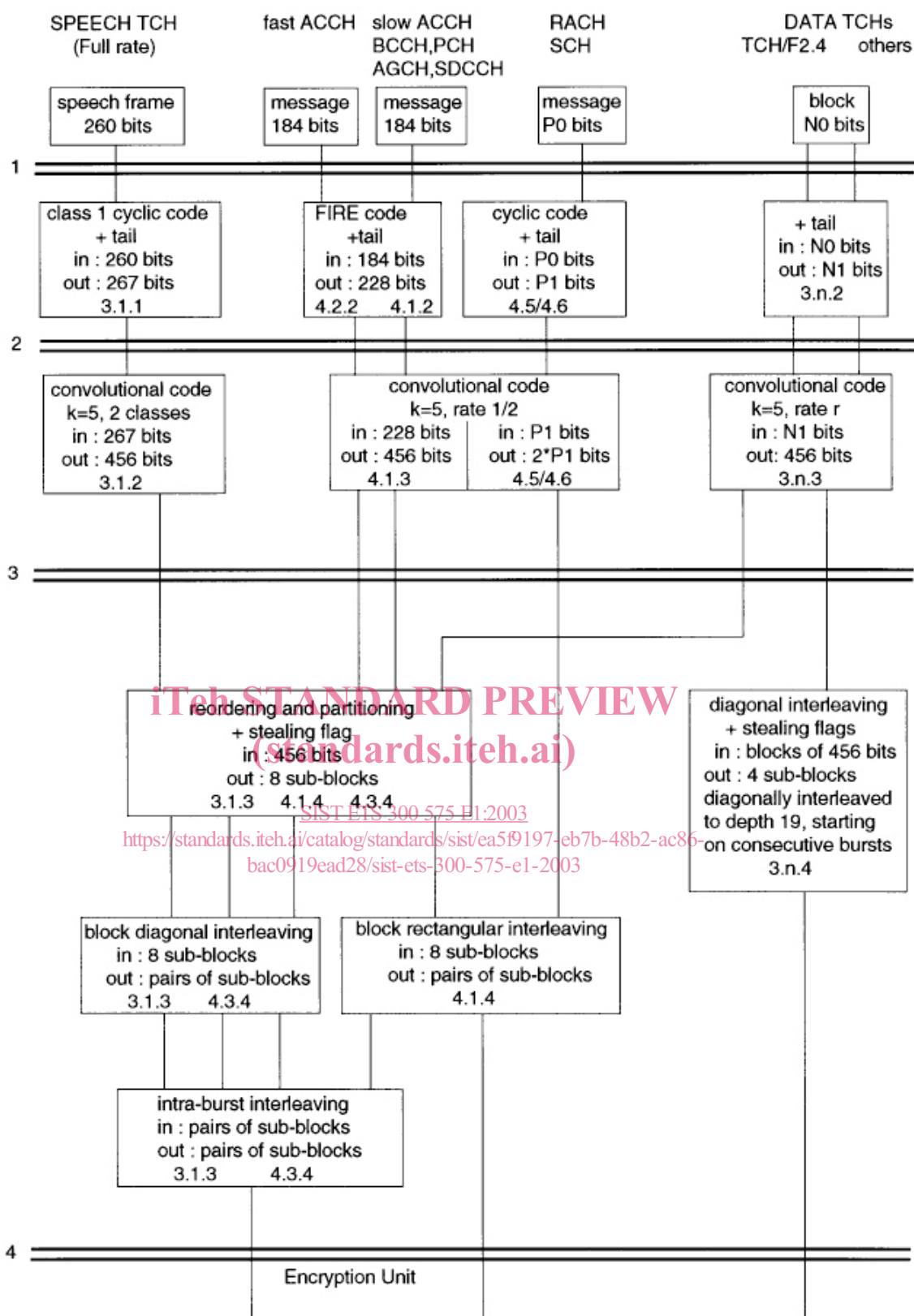


Figure 1 : Channel Coding and Interleaving Organisation

In the case of DATA TCHs. N0, N1, n depends on the type of data TCH.
In each box, the last line indicates the chapter defining the function.

Interface 1: Information bits (d)
3: coded bits (c)

2: Information + parity bits (u)
4: interleaved bits (e)