



# SLOVENSKI STANDARD SIST ETS 300 627 E2:2003

01-december-2003

---

8 [[ [HJb]`W] b]`hY`\_ca i b]\_UW`g\_]`g]ghYa `fZuU&L`3`E`Dcd]g`dcXU`c\_j `c`bUfc b]\_i  
]b`cdfYa ]`f GA `%&\$, žfU`h] ]WU( `) `)%

Digital cellular telecommunications system (Phase 2) (GSM); Subscriber and equipment trace (GSM 12.08 version 4.5.1)

**iteh STANDARD PREVIEW**  
**(standards.iteh.ai)**

Ta slovenski standard je istoveten z: **ETS 300 627 Edition 2**  
<https://standards.iteh.ai/catalog/standards/sist/c38c240e-d84a-418f-9ee5-53940cf13fb6/sist-ets-300-627-e2-2003>

---

**ICS:**

33.070.50	Globalni sistem za mobilno telekomunikacijo (GSM)	Global System for Mobile Communication (GSM)
-----------	---	--

**SIST ETS 300 627 E2:2003**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST ETS 300 627 E2:2003

<https://standards.iteh.ai/catalog/standards/sist/c58c240e-d84a-418f-9ee5-53940cf13fb6/sist-ets-300-627-e2-2003>



**E**UROPEAN  
**T**ELECOMMUNICATION  
**S**TANDARD

**ETS 300 627**

February 1998

Second Edition

Source: SMG

Reference: RE/SMG-061208PR1

ICS: 33.020

**Key words:** Digital cellular telecommunications system, Global System for Mobile communications (GSM)



**Digital cellular telecommunications system (Phase 2);  
Subscriber and equipment trace  
(GSM 12.08 version 4.5.1)**

**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 4 92 94 42 00 - Fax: +33 4 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 1998. All rights reserved.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST ETS 300 627 E2:2003](https://standards.iteh.ai/catalog/standards/sist/c58c240e-d84a-418f-9ee5-53940cf13fb6/sist-ets-300-627-e2-2003)

<https://standards.iteh.ai/catalog/standards/sist/c58c240e-d84a-418f-9ee5-53940cf13fb6/sist-ets-300-627-e2-2003>

## Contents

Foreword .....	7
Introduction .....	7
1 Scope .....	9
2 Normative references .....	9
3 Definitions and abbreviations .....	10
3.1 Definitions .....	10
3.2 Abbreviations .....	10
4 Trace overview .....	11
5 Trace activation and deactivation .....	13
5.1 General .....	13
5.2 Subscriber Tracing (Tracing of IMSI) .....	13
5.2.1 General .....	13
5.2.2 HPLMN Operator Traces Home Subscriber within the HPLMN .....	13
5.2.3 HPLMN Operator traces the HLR activities of own IMSI roaming in a VPLMN .....	14
5.2.4 PLMN Operator wishes to trace foreign subscribers (IMSI) in own PLMN ...	14
5.3 Equipment Tracing (Tracing of IMEI) .....	15
5.3.1 General .....	15
5.3.2 Tracing of IMEI via VLR .....	15
5.4 TMN Management Functions for Activation/Deactivation .....	16
5.4.1 List of Functions .....	16
5.4.1.1 HLR .....	16
5.4.1.2 MSC/VLR .....	16
5.4.2 Activate Home Subscriber Trace .....	16
5.4.3 Deactivate Home Subscriber Trace .....	17
5.4.4 Activate Foreign Subscriber Trace .....	17
5.4.5 Deactivate Foreign Subscriber Trace .....	18
5.4.6 Activate Equipment Trace .....	18
5.4.7 Deactivate Equipment Trace .....	19
5.5 HLR Functional Entities .....	20
5.5.1 Managed Object Classes in HLR .....	20
5.5.1.1 tracedHomeSubscriberInHlr .....	20
5.5.1.2 Attributes .....	20
5.5.1.2.1 tracedHomeSubscriberInHlr .....	20
5.5.1.3 Notifications .....	21
5.6 VLR Functional Entities .....	22
5.6.1 Managed Object Classes in VLR .....	22
5.6.1.1 tracedForeignSubscriberInVlr .....	22
5.6.1.2 tracedEquipmentInVlr .....	22
5.6.1.3 Attributes .....	23
5.6.1.3.1 tracedForeignSubscriberInVlr .....	23
5.6.1.3.2 tracedEquipmentInVlr .....	23
5.6.1.4 Notifications .....	24
6 Trace Types .....	25
6.1 MSC/BSS Trace Type .....	25
6.2 HLR Trace Type .....	26
7 Trace record contents .....	28
7.1 General .....	28

7.2	MSC Trace Record Content.....	30
7.3	BSS Trace Record Content.....	32
7.4	HLR Trace Record Content.....	34
7.5	Trace Record fields.....	35
7.5.1	Radio channel information.....	35
8	Creation of Trace Records.....	36
8.1	General.....	36
8.2	Trace Record Control.....	36
8.2.1	General.....	36
8.2.2	Attributes.....	37
8.2.3	Other Trace Record Criteria.....	37
9	Trace Record Transfer.....	38
9.1	General.....	38
9.2	Transfer of Records.....	39
9.2.1	Bulk record transfer.....	39
9.2.2	Log control.....	39
9.2.3	Log access.....	39
9.2.4	Event Reporting.....	39
9.2.4.1	Event Forwarding Discriminators.....	39
9.2.4.2	Direct Transfer by Trace Control Function.....	40
10	Managed Object Model.....	41
10.1	Naming Hierarchy.....	41
10.2	Inheritance.....	41
10.3	Object Classes.....	42
10.3.1	tracedHomeSubscriberInHlr.....	42
10.3.2	tracedForeignSubscriberInVlr.....	42
10.3.3	tracedEquipmentInVlr.....	43
10.3.4	Trace control.....	44
10.3.5	Trace log record.....	44
10.3.6	Log.....	46
10.3.7	Event Forwarding Discriminators.....	46
10.4	Attributes.....	46
10.4.1	traceActivatedInVlr.....	46
10.4.2	foreignSubscriberRegisteredInVlr.....	46
10.4.3	equipmentRegisteredInVlr.....	47
10.4.4	mapErrorOnTrace.....	47
10.4.5	IMEI.....	47
10.4.6	IMSI.....	47
10.4.7	Trace record content.....	48
10.4.8	Trace control id.....	48
10.4.9	HLR Trace type.....	48
10.4.10	Trace reference.....	48
10.4.11	Trace type.....	48
10.4.12	Record criteria.....	48
10.4.13	Event types.....	49
10.4.14	Operation system ID.....	49
10.4.15	Operational State.....	49
10.4.16	Administrative State.....	49
10.4.17	MSC BSS trace type used.....	49
10.4.18	HLR trace type used.....	49
10.4.19	MSC BSS trace type.....	49
10.5	Notifications.....	49
10.5.1	General.....	49
10.5.2	Trace report.....	50
10.6	Name Bindings.....	50
10.6.1	tracedHomeSubscriberInHlr-hlrFunction Name Binding.....	50
10.6.2	tracedForeignSubscriberInVlr-vlrFunction Name Binding.....	50
10.6.3	tracedEquipmentInVlr-vlrFunction Name Binding.....	51
10.6.4	traceLogRecord-Log Name Binding.....	51
10.6.5	traceControl-hlrFunction Name Binding.....	51

10.6.6	traceControl-mscFunction Name Binding .....	51
10.6.7	traceControl-bssFunction Name Binding .....	51
11	Syntax.....	52
	History.....	63

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST ETS 300 627 E2:2003](https://standards.iteh.ai/catalog/standards/sist/c58c240e-d84a-418f9ee5-53940cf13fb6/sist-ets-300-627-e2-2003)

<https://standards.iteh.ai/catalog/standards/sist/c58c240e-d84a-418f9ee5-53940cf13fb6/sist-ets-300-627-e2-2003>

Blank page

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST ETS 300 627 E2:2003](https://standards.iteh.ai/catalog/standards/sist/c58c240e-d84a-418f-9ee5-53940cf13fb6/sist-ets-300-627-e2-2003)

<https://standards.iteh.ai/catalog/standards/sist/c58c240e-d84a-418f-9ee5-53940cf13fb6/sist-ets-300-627-e2-2003>



## Foreword

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

This ETS specifies trace facilities for the Digital cellular telecommunications system.

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.

Transposition dates	
Date of adoption of this ETS:	23 January 1998
Date of latest announcement of this ETS (doa):	31 May 1998
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	30 November 1998
Date of withdrawal of any conflicting National Standard (dow):	30 November 1998

## Introduction

The trace facility enables customer administration and network management to trace the activities of various entities when specific events occur within the PLMN. This facility should also enable the tracing of all the information that is available to the PLMN concerning the call path used by the associated entity. Examples of information that could be in a trace record are:

- the identity of the originating and terminating equipment of the mobile or fixed subscriber;
- the identity of the incoming and outgoing circuits of the nodes involved;
- supplementary Services invoked;
- all A-Interface messages.

The trace facility is a useful maintenance aid and development tool which can be used during system testing and proving. In particular it may be used in conjunction with test-MSs to ascertain the digital cell "footprint", the network integrity and also the network QOS as perceived by the PLMN customers.

The facility may be used by subscriber administration and network management for subscriber observation, e.g. following a customer complaint or on suspicion of equipment malfunction by the operator or at the request of the police.

As the amount of information that can be collected for a single call is very large, Network Elements can limit the number of simultaneous traces by either rejecting a trace request or by only producing a sub-set of the information required.

Blank page

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST ETS 300 627 E2:2003](https://standards.iteh.ai/catalog/standards/sist/c58c240e-d84a-418f-9ee5-53940cf13fb6/sist-ets-300-627-e2-2003)

<https://standards.iteh.ai/catalog/standards/sist/c58c240e-d84a-418f-9ee5-53940cf13fb6/sist-ets-300-627-e2-2003>

## 1 Scope

This European Telecommunication Standard (ETS) specifies the Trace facility for GSM where it refers to:

- subscriber tracing (tracing of International Mobile Subscriber Identity (IMSI));
- equipment tracing (tracing of International Mobile station Equipment Identity (IMEI)).

It does not cover:

- types of trace which relate more to network elements than to individual subscribers e.g. tracing events within a Base Station System (BSS), and so on;
- tracing of all possible parties in e.g. a multi-party call.

It also refers only to tracing activated from the OSF and not to that activated by means of local Man Machine Interface (MMI).

## 2 Normative references

This ETS incorporates by dated or 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): "Digital cellular telecommunications system (Phase 2); Abbreviations and acronyms".
- [2] GSM 04.08 (ETS 300 557): "Digital cellular telecommunications system (Phase 2); Mobile radio interface layer 3 specification".
- [3] GSM 08.06 (ETS 300 589): "Digital cellular telecommunications system (Phase 2); Signalling transport mechanism specification for the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".
- [4] GSM 08.08 (ETS 300 590): "Digital cellular telecommunications system (Phase 2); Mobile Switching Centre - Base Station System (MSC - BSS) interface Layer 3 specification".
- [5] GSM 08.58 (ETS 300 596): "Digital cellular telecommunications system (Phase 2); Base Station Controller - Base Transceiver Station (BSC - BTS) interface Layer 3 specification".
- [6] GSM 09.02 (ETS 300 599): "Digital cellular telecommunications system (Phase 2); Mobile Application Part (MAP) specification".
- [7] GSM 12.00 (ETS 300 612-1): "Digital cellular telecommunications system (Phase 2); Objectives and structure of Network Management (NM)".
- [8] GSM 12.01 (ETS 300 612-2): "Digital cellular telecommunications system (Phase 2); Common Aspects of GSM Network Management (NM)".
- [9] GSM 12.02 (ETS 300 613): "Digital cellular telecommunications system (Phase 2); Subscriber, Mobile Equipment (ME) and services data administration".
- [10] GSM 12.05 (ETS 300 616): "Digital cellular telecommunications system (Phase 2); Subscriber related event and call data".
- [11] GSM 12.20 (ETS 300 622): "Digital cellular telecommunications system (Phase 2); BSS Management Information".

- [12] CCITT Recommendation X.227 - ISO 8650: "Information technology - Open Systems Interconnection - Connection-oriented protocol for the association control service element: Protocol specification".
- [13] CCITT Recommendation X.721 (ITU-T | ISO/IEC 10165-1): "Information technology - Open Systems Interconnection - Structure of management information: Definition of management information".
- [14] CCITT Recommendation X.734 (ITU-T | ISO/IEC 10164-5): "Information technology - Open Systems Interconnection - Systems Management: Event report management function".
- [15] CCITT Recommendation X.735 (ITU-T | ISO/IEC 10164-6): "Information technology - Open Systems Interconnection - Systems Management: Log control function".
- [16] CCITT Recommendation X.731 (ITU-T | ISO/IEC 10164-2): "Information technology - Open Systems Interconnection - Systems Management: State management function".

### 3 Definitions and abbreviations

#### 3.1 Definitions

For the purposes of this ETS, the following definitions apply:

**activation of a trace:** An action taken at the OSF through MMI commands to allow a trace record to be produced for a particular IMSI or IMEI when an Invocation Event occurs. This equates to "activation of a trace" in GSM 09.02 [6].

**active pending:** The state of an activated trace is called Active Pending in a particular NE when the subscriber or equipment being traced is not registered in that NE.

**invocation of a trace:** An event relating to a particular IMSI or IMEI that occurs in the network that causes data to be collected in a trace record in circumstances where trace has been activated for that IMSI or IMEI. This equates to "tracing subscriber activity" in GSM 09.02 [6] and "Trace Invocation" in GSM 08.08 [4]. It is possible that an event relating to the IMSI/IMEI may still be active when another event or events relating to the same IMSI/IMEI occurs which requires additional information to be collected. These additional events are termed parallel events. This additional trace information for parallel events is collected in the same trace record as the first event.

**trace record:** In the NEF a trace record is a set of traceable data collected as determined by the trace type. The trace record is collected under the trace record criteria specified by the OSF and transferred to the OSF.

#### 3.2 Abbreviations

For all abbreviations used in this ETS, refer to GSM 01.04 [1].

## 4 Trace overview

Figure 1 gives an outline of the subscriber and equipment tracing and shows the relationship between the inputs on activation and deactivation and the trace record outputs.

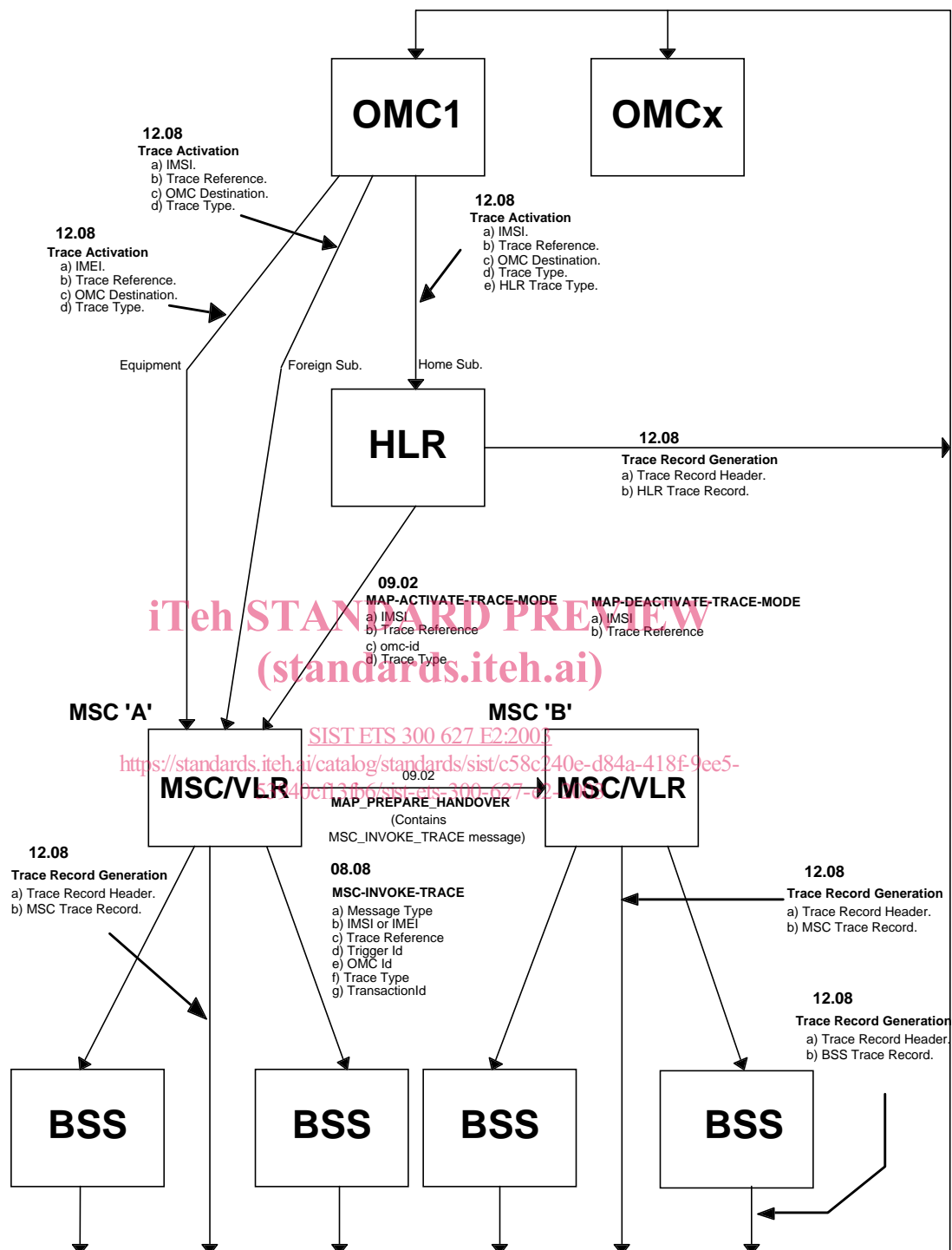


Figure 1: Subscriber and Equipment Trace for 12.08

Trace Activation and Deactivation are described in clause 5.

The Trace Types are defined in clause 6.

The Trace Records are defined in clause 7.

The following events may invoke a MSC or BSS trace:

- Call set-up within MSC (MOC, MTC) (incl. attempts);
- SS-Action;
- Location Update (Normal and Periodic);
- SMS-MO;
- SMS-MT;
- IMSI attach and detach.

Additionally, the following event may invoke a BSS trace:

- Handover.

An HLR Trace may be invoked by one of the following:

- Location updates/cancellations;
- Insert/delete subscriber data;
- Routing enquiry (speech and SM);
- Provide roaming number;
- SS activity;
- SMS: Alert service centre/Ready for SM;

Trace records are generated within the managed elements by the trace control function according to the trace type. Once a trace has been invoked and a trace record is being compiled, subsequent invoking events relating to that IMSI (parallel events) will not cause new records to be compiled simultaneously but will be contained in the same trace record as the first event.

For operator defined trace types the events on which trace records are generated and their contents are defined within the trace record generation control.

These records are then transferred to the OSF (as defined by OMC-Id of the Destination OMC or forwarded by the EFD) either as notifications (CMISE), or with bulk transfer (FTAM).

[SIST ETS 300 627 E2:2003](https://standards.iteh.ai/catalog/standards/sist/c58c240e-d84a-418f-9ee5-53940cf13fb6/sist-ets-300-627-e2-2003)

<https://standards.iteh.ai/catalog/standards/sist/c58c240e-d84a-418f-9ee5-53940cf13fb6/sist-ets-300-627-e2-2003>

## 5 Trace activation and deactivation

### 5.1 General

This document is only concerned with the activation of a trace from an OSF (OMC), and the OSF shall keep a log of all trace activations and their deactivations. All entries in the log shall be date and time stamped.

In the case of an OSF (OMC) failure, it may be possible to activate and deactivate the trace at a particular network element by means of local MMI, but the procedures for doing this are not covered by this ETS.

Facilities shall exist to allow unsolicited trace data to be received by an OSF. This permits the collection of trace data if the triggering entity (i.e. OSF or network element) is different to the collecting OSF.

### 5.2 Subscriber Tracing (Tracing of IMSI)

#### 5.2.1 General

The tracing of both home and foreign roaming subscribers can be handled with this function.

If implemented, then the way the trace facility is used and organized, including restrictions due to national laws and regulations, will be a matter for the PLMN Operator.

All trace records created in the HLR, MSC "A", MSC "B" and BSS are forwarded to the OSF either as notifications and/or with bulk transfer, as defined in the trace parameters.

The following scenarios are identified from the HPLMN operation viewpoint:

- a) HPLMN Operator traces its own (home) IMSI within the HPLMN;
- b) HPLMN Operator traces the HLR activities of its own (home) IMSI while they are roaming in a VPLMN;
- c) HPLMN Operator wishes to trace foreign roaming subscribers (IMSI) within its own HPLMN.

#### 5.2.2 HPLMN Operator Traces Home Subscriber within the HPLMN

The Operator may activate a trace for a home subscriber (IMSI) from any OSF by invoking the management function **Activate Home Subscriber Trace** in the HLR where the IMSI is contained. This request includes the trace parameters in the following list:

- a) IMSI to be traced;
- b) Trace Reference;
- c) OMC-Id of the destination OMC;
- d) Trace Type;
- e) HLR Trace Type.

For each IMSI, only one HPLMN subscriber trace can be active, subsequent requests being rejected.

If the IMSI is roaming within its HPLMN, then the trace request is forwarded to the VLR where the subscriber is registered via a MAP message (MAP-ACTIVATE-TRACE-MODE).

When the HPLMN subscriber trace is activated, a trace record will be created by MSC "A", MSC "B", HLR or BSS when certain invoking events occur i.e. MOC, MTC, SS-Action, SMS-MO, SMS-MT, Location Update, IMSI attach and detach. The trace action and record layout is defined by the trace type parameters.