ETSI TS 122 031 V15.0.0 (2018-06)

Digital cellular telecommunications system (Phase 2+) (GSM);
Universal Mobile Telecommunications System (UMTS);
LTE;
3G Security;
Fraud Information Gathering System (FIGS);
Service description;
Stage 1
(3GPP TS 22.031 version 15.0.0 Release 15)

Reference
RTS/TSGS-0322031vf00

Keywords
GSM,LTE,SECURITY,UMTS

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (https://ipr.etsi.org/).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Foreword

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under http://webapp.etsi.org/key/queryform.asp.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

This Technical Specification specifies the stage 1 description of the Fraud Information Gathering System (FIGS) feature which provides the means for the HPLMN to monitor the activities of its subscribers in a VPLMN.

The purpose of this network feature is to enable the HPLMN to monitor the activities of its subscribers while they are roaming. The VPLMN collects information about a defined set of activities on monitored subscribers and sends this information back to the HPLMN. This enables the HPLMN to clear certain types of calls and so stop fraudulent use of the GSM system.

This specification enables service providers/ network operators to use FIGS, and service limitation controls such as Operator Determined Barring (ODB) and Immediate Service Termination (IST), to limit their financial exposure to subscribers producing large unpaid bills.

HPLMNs may also choose to monitor the activities of its subscribers within the HPLMN.

2 Normative 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] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2] 3GPP TS 42.033: "Digital cellular telecommunications system (Phase 2+); Lawful Interception - stage 1".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this specification the following definitions apply:

A subscriber: The calling mobile subscriber.

B subscriber: The mobile subscriber originally called by the A subscriber.

C subscriber: The subscriber to whom the B subscriber has requested that calls be forwarded. The C subscriber may be fixed or mobile.

call: both connection-oriented and connectionless services/events.

call information: information about a call.

call reference: a reference number for a call that shall remain constant throughout the duration of that call and that shall be unique to that call and the switch on which the call was made for a period of at least one week.

home network: The home PLMN including non-GSM elements such as the Fraud Detection System (FDS), customer service systems and billing.

monitored activities: subscriber activities that shall be reported to the HPLMN. These can be call related events (e.g. call-set-up, call termination) or the invocation of call related and call independent supplementary services (e.g. Call Hold, Call Waiting, Call Transfer, Call Forwarding, Unstructured Supplementary Service Data).

3.2 Abbreviations

Abbreviations used in this specification are also listed in GSM 01.04.

For the purposes of this specification the following abbreviations apply:

FIGS	Fraud Information Gathering System
FDS	Fraud Detection System
IST	Immediate Service Termination
MO	Mobile Originated
MT	Mobile Terminated
CGI	Cell Global Identifier

4 Fraud Information Gathering System high level requirements

4.1 Description

It shall be possible for the HPLMN to request the VPLMN to supply certain information about a subscriber from the time the subscriber registers in that VPLMN to the time the last of the monitored activities is finished in that VPLMN, which can be after the subscriber's de-registration from the VPLMN. The information received by the HPLMN shall be passed to the relevant network or service providers and used to instruct the VPLMN to act in an appropriate way.

Fraud information gathering is controlled by the HPLMN and can be activated and deactivated by the HPLMN only.

The information is received in the HPLMN and is forwarded to fraud detection and control systems. Such systems are out of the scope of this standard.

The subscriber is specified by the IMSI or MSISDN.

4.2 Applicability

This network feature applies to all subscribed Bearer Services and Teleservices and supplementary services of the subscriber. It is not possible to apply FIGS independently to individual Services.

The HPLMN shall be able to specify whether it would like call information on MO calls, MT calls, or both.

4.3 Normal Procedure

The HPLMN shall be able to request a VPLMN to monitor a subscriber.

See Annex A for the definition of the information to be sent for each call event.

If the VPLMN cannot monitor the subscriber, it shall indicate this as a response to the FIGS request.

The FDS will process this information and may then limit the activities of the subscriber using ODB or terminate the subscriber activities using IST, or may allow the subscriber to proceed.

When the home network no longer wishes the subscriber to be monitored by the VPLMN it requests the VPLMN to stop monitoring the activities of the subscriber.

Figure B.1 shows the sequence of FIGS messages passed during a normal case.

5 Service conditions

5.1 Control of monitoring of subscriber activities

The HPLMN can request a VPLMN to begin monitoring the activities of a subscriber when the subscriber has registers on that VPLMN or at any time after registration. If the VPLMN is able to monitor a subscriber as requested it shall send a confirmation of monitoring message to the HPLMN.

The HPLMN does not need to know the status of the target subscriber before initiation or subsequent termination of fraud information gathering.

Fraud information cannot be switched on or off by the subscriber or other (unauthorised) party.

Subscribers upon which fraud information gathering has been set shall not be able by interrogating the network to determine that they are subject to fraud information gathering.

Subscribers upon which fraud information gathering has been set shall not be able, for example by significant changes to normal call set up times, speech quality or general transmission characteristics, to determine that they are subject to fraud information gathering.

If the VPLMN receives a request to monitor the activities of a subscriber and an activity to be monitored is already ongoing it is not necessary for the VPLMN to send information on this particular activity to the HPLMN.

If the VPLMN receives a request to cease monitoring the activities of a subscriber and an activity is already ongoing and being monitored, the VPLMN shall immediately cease sending information on this activity to the HPLMN.

5.2 Number of calls monitored by a VPLMN

If the VPLMN has to monitor the activities of a large number of subscribers for FIGS this may degrade the performance of the VPLMN. Each VPLMN (in reality, each network entity involved in FIGS monitoring) will therefore have a maximum number of subscribers that it can monitor.

If the number of monitored subscribers has reached this upper limit the VPLMN shall reject requests for monitoring of subscribers from HPLMNs until the number of monitored subscribers decreases below the limit.

Each VPLMN may have a limit per HPLMN on the number of subscribers from that HPLMN that it will monitor. When an HPLMN has requested a VPLMN to monitor a number of subscribers equal to the limit for that HPLMN, the VPLMN can refuse any subsequent requests for FIGS monitoring from that PLMN, until the number of monitored subscribers drops below the limit. The principles behind the setting of these limits are outside the scope of this specification.

In order to minimise the number of subscribers that a VPLMN has to monitor, the HPLMN should ideally limit itself to requesting information about subscriber's monitored activities in:

- the current VPLMN;
- the last previously served VPLMN.

5.3 Interworking with non-supporting networks

If the HPLMN does not receive a positive acknowledgement to the request for FIGS monitoring sent to a VPLMN, it shall assume that the VPLMN does not support FIGS. The HPLMN may then act as appropriate (e.g. put appropriate ODB categories in place).

5.4 Information Delivery Time

The need for up to date information is a critical part of any fraud information system. The sooner data is transferred to the HPLMN, the sooner fraud can be stopped. Therefore the prescribed information shall be transferred from the VPLMN network to the HPLMN within two minutes of the occurrence of a FIGS-monitored event, if real time implementations of FIGS are used.

The information should be transferred from the VPLMN to the HPLMN over appropriate communication links.

6 Monitored activity

The authorised party can request the VPLMN to monitor both call activity and supplementary services.

The monitoring of call activity shall take the form of transmission of call information from the VPLMN to the HPLMN, at the start and end of all calls. For long calls, the VPLMN shall also send partial call information a certain time (e.g. 15 minutes) after the call has begun.

Call information shall be sent to the HPLMN by the VPLMN on the invocation of all supplementary services, e.g.:

- call deflection;
- call forwarding;
- call hold;
- Multi Party (MPTYY);
- Explicit Call Transfer (ECT).

The HPLMN can decide to prevent future invocation of the same or all supplementary services using ODB. The decision mechanism is out of the scope of this specification.

7 Interface between HPLMN and FDS

Information gathered by the HPLMN may be transferred to Non-GSM systems, e.g. an FDS. These systems will decide if the monitored activity is fraudulent and will advise the home network to take appropriate action, e.g. send an IST command to the VPLMN, change the subscriber's ODB categories.

The contents of call information messages to be transferred on this interface shall be specified but not the transfer mechanism. This is in line with the approach used for the X-interface as specified in 3GPP TS 42.033. The message formats are defined in annex A.

The system needs the ability to handle the volume of information returned to the home network.

8 Security Requirements between HPLMN and VPLMN

It is expected that there will be a need for authentication, data integrity and confidentiality of the communication made between PLMNs.

These issues are for study under other work items within the SMG 10 work programme.

Annex A (normative): Information transferred by the VPLMN

The reports generated by the VPLMN shall take the form of "call information" records for each monitored subscriber. The content of the call information will depend on the type of event (call start, end etc.). To simplify matters, there will be one format for both MO and MT calls with an MO/MT indicator within the call information to distinguish between the two.

A partial call information will be sent to the HPLMN when there is an mid-call invocation of a supplementary service and when a call in progress has exceeded a defined duration.

Justification is given for the content of the call information message.

Table A.1: Call information content

Information
Dialled digits
A subscriber
B subscriber
C subscriber
CGI
IMSI
IMEI
Call Start Time/Date
Call Duration
Call Reference
MO/MT indicator
Visited MSC address
Type of SS event
Type of Basic Service

The **Dialled digits** are required as these are an important indicator in deciding if a call is fraudulent or not - certain call destinations are more likely to be called fraudulently than others.

A subscriber can be used to identify the subscriber

B, C subscriber are relevant as some call destinations are more subject to fraud than others.

Cell Global Identifier (**CGI**) is relevant as some cells in a PLMN are more subject to fraud than others.

The **IMSI** is used to reference the subscriber.

The **IMEI** can be used to check if a stolen handset has been used.

The **Call Start Time/Date** is required so that the call duration can be calculated (if the call end time and not call duration is given at call conclusion) and because the call start time can also an important indicator of fraudulency.

The **Call Duration** gives the duration of the call at the sending of the partial call information - call duration can be an important indicator of fraudulency. If call end is sent instead, the duration can be calculated using the call start and end times.

The **Call Reference** is used to reference a particular call.

The **MO/MT indicator** is required because call charging is different for MO and MT calls.

The **Visited MSC address** gives the PLMN on which the call was made.

The **Type of SS event** record is sent if the “call” start is actually the invocation of a supplementary service, e.g. ECT. The Type of SS event is required as this can help to indicate if the mobile is being fraudulently used or not.

The **Type of Basic Service** indicates whether a teleservice or bearer service is being used and which sort of teleservice or bearer service is being used and is sent if the event is a call and not a supplementary service. The Type of Basic Service is required as this can help to indicate if the mobile station is being fraudulently used or not.

Annex B (normative): Message flow in FIGS monitoring, normal procedure

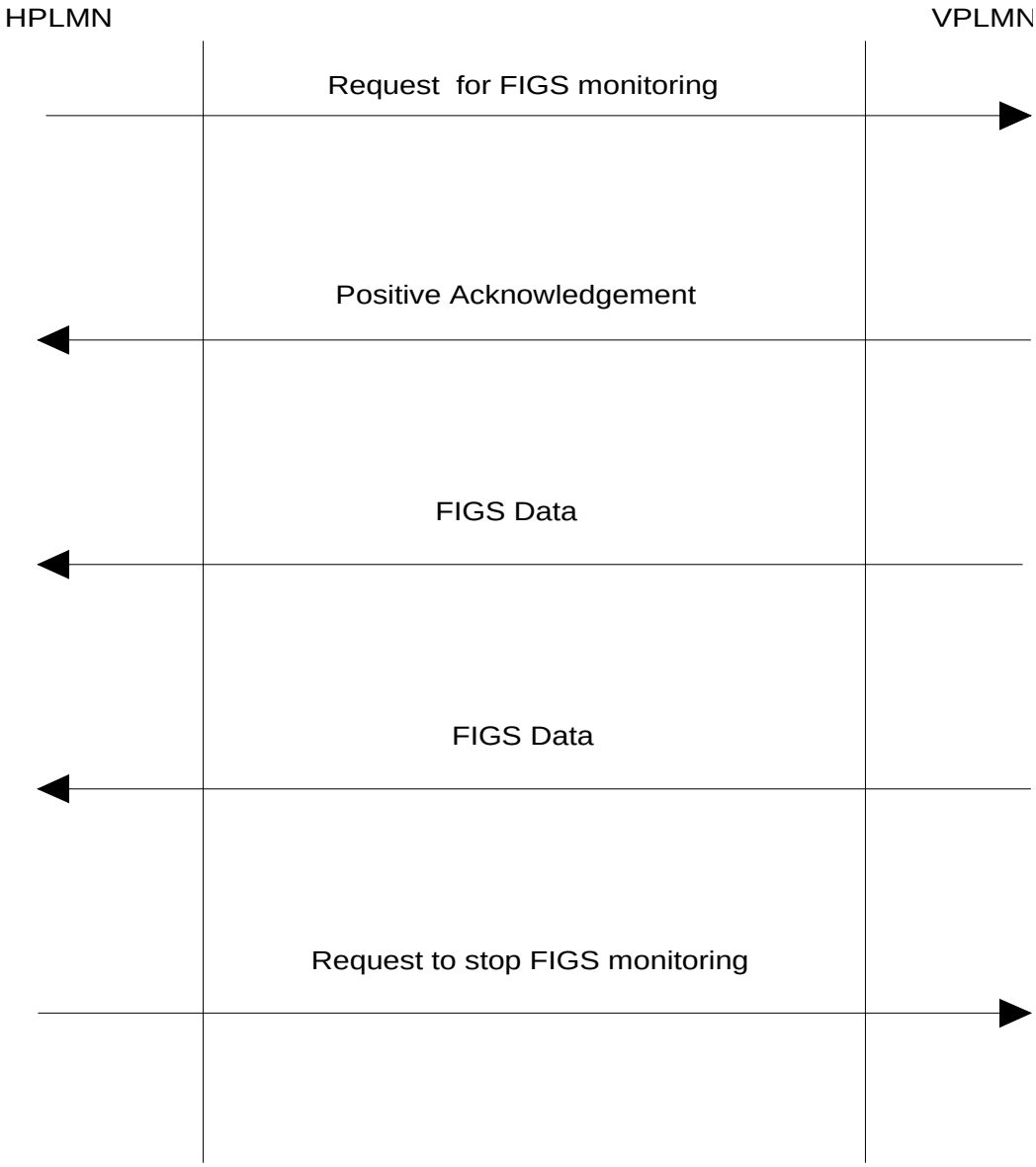

Figure B.1: Message flow in FIGS monitoring, normal procedure

Annex C (informative): Change history

Change history GSM 02.31							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
					No Phase 1 version		
06-1997	SMG#22				To SMG#22 for information		1.0.0
10-1997	SMG#23				To SMG#23 for approval		2.0.0
10-1997	SMG#23				TS approved by SMG#23	2.0.0	5.0.0
03-1998	SMG#25				The specification was converted to version 7.0.0 because the work item is related to Release 98; **version 5.0.0 withdrawn**. (SMG#25)	5.0.0	7.0.0
06-1998	SMG#26		A001	1	CR 02.31-A001r1 (correction) approved by SMG#26	7.0.0	7.1.0
08-1999					Publication version	7.1.0	7.1.1
04-2000					Release 1999 publication version	7.1.1	8.0.0
06-2001					ETSI Publication	8.0.0	8.0.1
Change history 3GPP TS 42.031							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
03-2001	SA#11				Upgrade to Release 4 (3GPP numbering)	02.31 V8.0.0	42.031 V4.0.0
06-2002	SA#16				Upgrade to Release 5	4.0.0	5.0.0
Change history 3GPP TS 22.031							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
12-2002	SA#18				Agreed to convert to 3GPP/GSM joint numbering scheme. **42.031 WITHDRAWN.** **Technically equivalent to 42.031 version 5.0.0**	42.031 v5.0.0	22.031 v5.0.0
12-2004	SA#26	-	-	-	Upgrade to Release 6	5.0.0	6.0.0
06-2007	SA#36	-	-	-	Upgrade to Release 7	6.0.0	7.0.0
12-2008	SA#42	-	-	-	**Upgrade to Release 8**	7.0.0	8.0.0
12-2009	SA#46	-	-	-	**Upgrade to Release 9**	8.0.0	9.0.0
2011-03	-	-	-	-	**Update to Rel-10 version (MCC)**	9.0.0	10.0.0
2012-09	-	-	-	-	**Update to Rel-11 version (MCC)**	10.0.0	11.0.0
2014-09	-	-	-	-	**Update to Rel-12 version (MCC)**	11.0.0	12.0.0
2015-12					**Update to Rel-13 version (MCC)**	12.0.0	13.0.0
2017-03	-	-	-	-	**Update to Rel-14 version (MCC)**	13.0.0	**14.0.0**
2018-06	-	-	-	-	**Update to Rel-15 version (MCC)**	14.0.0	**15.0.0**

History

Document history		
V15.0.0	June 2018	Publication