3GPP TSG SA WG3 meeting #24
Helsinki, Finland, July 9th – 12th 2002

Tdoc ⌘S3-020343

CR-Form-v7

CHANGE REQUEST

⌘ **23.035** **CR** **xxx** ⌘ **rev** **-** ⌘ Current version: **4.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Correction of use IST Command message and Call Termination Indication parameter
Source:	⌘	L.M. Ericsson
Work item code:	⌘	SEC-IST
Date:	⌘	10 June 2002
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change:	⌘	The description of the non-CAMEL based IST function does not correctly distinguish the use of MAP **IST Command** message and *Call Termination Indicator* parameter in MAP **IST Alert**_response message. In the 3GPP TS 23.035 v4.0.0, the use of the phrase 'IST command' implies that the MAP **IST Command** message is sent by the HLR in response to the MAP **IST Alert** message. The MAP **IST Command** message should only be used when the (G)MSC server supports the IST Standalone mechanism (in addition to supporting the basic IST Periodic Reporting mechanism). The *Call Termination Indicator* parameter should only be included by the HLR in MAP **IST Alert**_response message when the (G)MSC supports the basic IST Periodic Reporting mechanism. The *Call Termination Indicator* parameter in MAP **IST Alert**_response message was introduced in 3GPP TS 29.002 to avoid sending the embedded MAP **IST Command** within the **IST Alert** dialogue for efficiency reasons, but the Stage 2 TS 23.035 was never updated to introduce this modification.
Summary of change:	⌘	There is no IST command sent from HLR to (G)MSC server in response to MAP **IST Alert** message, a Call Termination Indicator is sent in the **IST Alert**_response. The IST Command message is only sent when the (G)MSC additionally supports IST Standalone mechanism, no MAP **IST Alert** message needs to be received by the HLR. In addition to this distinction between MAP **IST Command** message and *Call Termination Indicator* in MAP **IST Alert**_response, various editorial changes have been done.
Consequences if not approved:	⌘	The Stage 2 (TS 23.035) and Stage 3 (TS 29.002) specifications of the non-CAMEL IST feature will contain contradicting descriptions of the signalling flows, which may lead to conflicting implementations.

Clauses affected:	⌘	4.3, 6.1, 6.2, 6.3, 6.4, 7

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	Refer to 3GPP TS 29.002 (Rel-4)

First modified section

1 Scope

This GSM Technical Specification specifies the stage 2 description of the Immediate Service Termination (IST) service which provides the means for the HPLMN to terminate all the activities of an HPLMN subscriber in a VPLMN.

Two implementations of IST are described: an implementation based on CAMEL, and an implementation based on a new MAP ~~command~~message.

Next modified section

4.2 Non-CAMEL implementation

For each non-CAMEL-subscriber under IST control, the HLR shall request the MSCs during location update and routeing information retrieval to report for each remaining activity periodically at the frequency defined by the IST A~~a~~lert timer value about the remaining activity for this subscriber in the node by sending an IST Alert m~~M~~essage to the HLR, as long as the activity is ongoing. The IST A~~a~~lert timer value is set by HPLMN and communicated to VPLMN and IPLMN on subscriber basis.

The HLR ~~-~~shall be able to request termination of ongoing call activities for a subscriber by returning a call termination indicator~~sending an IST command~~ to the MSC in response to the IST Alert m~~M~~essage initiated by this MSC. When this call termination indicator~~this IST command~~ is received, the MSC shall terminate the call activities for that s~~S~~ubscriber (the MSC shall terminate the call activity that triggered the IST A~~a~~lert dialogue, and optionally other call activities in that MSC if the MSC is able to link the calls related to the s~~S~~ubscriber).

As an implementation option the HLR may for each non-CAMEL-subscriber under IST control maintain a list of MSCs which possibly have ongoing activities for the subscriber. The HLR may then send at any time (i.e. without waiting for the IST A~~a~~lert message) an unsolicited IST C~~c~~ommand~~s~~ message to these MSCs in order to request termination of all ongoing activities for the subscriber. The HLR should send unsolicited IST C~~c~~ommand~~s~~ messages only to those MSCs that are likely to be carrying a call that needs to be terminated.

Before sending of any IST C~~c~~ommand message for a subscriber, the HLR should send the MAP ~~command "~~Cancel Location~~"~~ message to the VLR at which the subscriber is registered. This will ensure that the subscriber cannot re-commence service at the corresponding MSC after the IST C~~c~~ommand message has been executed. See Annex B of GSM 02.32. The MSC shall be prepared to receive an IST C~~c~~ommand message before and/or after the s~~S~~ubscriber record has been removed from the VLR.

End modified section

Next modified section

6 Functional behaviour - Non-CAMEL implementation

This clause describes the implementation of IST using non-CAMEL implementation. This mechanism can be used to terminate all the originated (MO), terminated (MT) Deflected (CD), Transferred (ECT) and forwarded (CF) calls of a subscriber, provided that this IST mechanism is supported in the HLR and in the serving MSC/VLRs (visited MSC or GMSC controlling the call or forwarding leg).

6.1 Subscriber Settings

The subscriber is marked as a non-CAMEL IST subscriber by setting an IST Alert timer value in the subscriber data stored in the HLR. The IST Alert timer value is sent to the VLR in response to an Update Location request which indicates that the MSC/VLR supports IST; the IST Alert timer value is sent to the GMSC in the response to a request for routeing information which indicates that the GMSC supports IST.

The IST Alert timer value is in a range from 15 to 255 minutes with steps of 1 minute. For the subscribers not marked as IST non-CAMEL subscribers, the IST Alert timer value is not transmitted to the VLR or to the GMSC. The IST Alert timer value may be assigned on subscriber basis depending on the risk associated to the specific subscriber. As a network option the IST Alert timer value transmitted for a certain subscriber may be different for different entities (or PLMNs).

If the HLR operator wishes to mark a subscriber as a non-CAMEL IST subscriber when the subscriber is already registered in a VLR, provided that the VLR supports IST, the HLR modifies the subscriber data in the VLR using the ~~command~~ MAP Insert Subscriber Data message. Note that this does not affect already ongoing activities in the MSC. If the s~~S~~ubscriber is under IST condition and the HLR operator decides to remove this condition, the HLR modifies the subscriber data in the VLR using the MAP~~command~~ Delete Subscriber Data message. Note that this does not affect the operation of any timer which is currently running.

6.2 Periodic reporting mechanism

6.2.1 IST Alert timer Settings

The call termination ~~-~~shall be provided based on a “notification relationship”. The HLR shall request to the MSCs during location update and routing information retrieval to report for each remaining activity periodically at the frequency defined by the IST alert timer value about the remaining activity for that subscriber in the node by sending an IST Alert m~~M~~essage to the HLR, as long as the activity is ongoing.

The timer supervision starts in the MSC after initiation of any outgoing call activity [MO, CD, CF, ECT calls] for that s~~S~~ubscriber. A separate timer supervision shall be initiated per each outgoing call activity for each subscriber. The notification ~~command~~ IST Alert message is then transmitted to the HLR per call activity whenever the IST A~~a~~lert timer running for that call expires. When the HLR receives an IST A~~a~~lert message from an MSC, it can either return an empty result component, return a component including the subscribed IST Alert timer value, return an indication that the IST condition has been removed for the ~~S~~subscriber or ~~send back an IST command~~ return a call termination indicator. This ~~IST command~~ returned call termination indicator is used by the MSC to terminate the outgoing call activities (either the call activity that initiated the IST alert dialogue, or optionally to release all outgoing call activities) for that s~~S~~ubscriber in the MSC. Release of all call activities ~~with only one IST command~~using the returned call termination indicator is possible only if the MSC is able to link all call activities related to that s~~S~~ubscriber. If the HLR has returned an indication that the IST condition has been removed from the ~~-~~s~~S~~ubscriber, IST control for that call in the MSC is terminated. The IST Alert timer that monitors the activity that initiated the IST A~~a~~lert is restarted when ~~no IST command~~no call termination indicator has been received in the IST A~~a~~lert dialogue and the IST A~~a~~lert response received does not indicate termination of IST condition; the IST Alert timer value shall be the same as in the previous count, or the new value received in the IST A~~a~~lert response if any.

The timer supervision starts in the GMSC after reception of the response to a request for routeing information. A separate timer supervision shall be initiated per each incoming call activity [MT, CF] for each subscriber An IST Alert message is then transmitted to the HLR per call activity whenever the IST A~~a~~lert timer running for that call expires. When the HLR receives an IST A~~a~~lert message from a GMSC, it can either return an empty result component, return a component including the subscribed IST Alert timer value, return an indication that the IST condition has been ~~removed~~withdrawn for the s~~S~~ubscriber or ~~send back an IST command~~return a call termination indicator. This ~~IST command~~ returned call termination indicator is used by the GMSC to terminate the incoming call activities (either the call activity that initiated the IST A~~a~~lert dialogue, or optionally to release all incoming call activities) for that s~~S~~ubscriber in the GMSC. Release of all incoming call activities ~~with only one IST command~~ using the returned call termination indicator is possible only if the GMSC is able to link all call activities related to that s~~S~~ubscriber. If the HLR has returned an indication that IST condition has been ~~removed~~withdrawn from the s~~S~~ubscriber, IST control for that call in the GMSC is terminated. The IST Alert timer that monitors the activity that initiated the IST A~~a~~lert is restarted when ~~no IST command~~ no call termination indicator has been received in the IST A~~a~~lert dialogue and the IST A~~a~~lert response received does not indicate termination of IST condition; the timer value shall be the same as in the previous count, or the new value received in the IST ~~-~~A~~a~~lert response if any.

6.2.2 Call termination

The VMSC (current or previous) will inform the HLR about each of the remaining outgoing call activities (MO, ~~-~~CD, ECT and CF) of the subscriber with a ~~message~~ IST Alert message. This message contains the IMSI of that s~~S~~ubscriber. Each of the originating, deflected, transferred or forwarded ~~-~~calls for a specific subscriber can be terminated in the MSC by ~~sending the IST command~~returning a call termination indicator from the HLR to the controlling MSC in response to the IST A~~a~~lert message. The MSC shall then terminate the call activity that initiated the alert, or it may also terminate all call activities for that subscriber if these activities are linked in the MSC.

The GMSC will inform the HLR about each of the remaining incoming call activities (MT and CF) of the subscriber with a ~~message~~ IST Alert message. This message contains the IMSI of that s~~S~~ubscriber. Each of the terminating or forwarded calls for a specific subscriber can be terminated in the GMSC by ~~sending the IST command~~ returning a call termination indicator from the HLR to the controlling GMSC in response to the IST A~~a~~lert message. The GMSC shall then terminate the call activity that initiated the alert, or it may also terminate all call activities for that subscriber if these activities are linked in the GMSC.

6.3 IST standalone mechanism

In addition to the periodic reporting mechanism, the IST standalone mechanism can optionally be supported in the HLR, the VMSC and the GMSC. This mechanism can be used to immediately terminate all outgoing subscriber activities in a VMSC and all incoming subscriber activities in the GMSC even when the s~~S~~ubscriber is not under IST condition i.e. the MSC shall be able to terminate the call activities upon reception of the standalone IST C~~c~~ommand without having any previous IST s~~S~~ubscriber settings defined.

Provided that the MSC/VLR supports IST standalone mechanism, the HLR may request the immediate disconnection of the outgoing calls by sending a MAP Cancel Location ~~command~~message to the current VLR, and afterwards the IST C~~c~~ommand message to the current VMSC without waiting for an IST A~~a~~lert message.

The HLR may also be able to request the immediate disconnection of outgoing call activities of a s~~S~~ubscriber in previous VMSCs; for this purpose, the HLR may~~-~~ maintain a list of previous VMSCs with possibly remaining activities, to which the IST C~~c~~ommand message may be sent without waiting for an IST A~~a~~lert message. The mechanism used to maintain this list is out of the scope of this specification. The HLR may~~-~~ also be able to request the immediate disconnection of incoming call activities of a subscriber in any GMSC that may have requested routeing info from the HLR; for this purpose, the HLR may~~-~~ maintain a list of GMSCs with possibly remaining activities to which the IST C~~c~~ommand message may be sent without waiting for an IST A~~a~~lert message. The mechanism used to maintain this list is outside the scope of this specification.

The standalone IST C~~c~~ommand is used in the MSC to terminate immediately all outgoing call activities for a subscriber. This is only possible if the MSC is able to link all the call activities for the same subscriber using the IMSI as key. Then, when a standalone IST command is received including the IMSI of the subscriber, the MSC can terminate all the outgoing call activities for that subscriber. If the MSC does not support IST standalone ~~command~~ mechanism, it shall return an error in response to the HLR.

The standalone IST C~~c~~ommand is used in the GMSC to terminate immediately all incoming call activities for a subscriber. This is only possible if the GMSC is able to link all the call activities for the same subscriber using the IMSI as key. Then, when a standalone IST C~~c~~ommand is received including the IMSI of the subscriber, the GMSC can terminate all the incoming call activities for that subscriber. If the GMSC does not support IST standalone ~~command~~ mechanism, it shall return an error in response to the HLR.

6.4 Exception procedure

The MSC/VLR shall inform the HLR about the support of IST function whenever a ~~Subscriber~~ subscriber roams into that MSC/VLR area. Information about support of the IST standalone mechanism shall also be included. This information shall be included in the Update Location message sent to the HLR. The HLR can use the absence of any of these information to allow alternative actions in HLR in case of interworking with MSC/VLRs not supporting IST.

The alternative actions when the MSC/VLR does not support the IST function can be, as an operator option:

- Limit the service for the subscriber:

  Activating temporarily an Operator Determined barring of Roaming, Incoming or outgoing calls.

- Allowing the service assuming associate risk of not having the IST mechanism available.

The GMSC shall inform the HLR about the support of IST function whenever it requests routeing information to establish a call. Information about support of the IST standalone mechanism shall also be included. This information shall be included in the Send Routeing Information message sent to the HLR. The HLR can use the absence of any of these information to allow alternative actions in HLR in case of interworking with GMSCs not supporting IST.

The alternative actions when the GMSC does not support the IST function can be, as an operator option:

- Limit the service for the subscriber:

  Activating temporarily an Operator Determined barring of incoming calls, deactivate temporarily the Call forwarding services invoked in the GMSC.

- Allowing the service assuming associate risk of not having the IST mechanism available.

Error responses from HLR are also part of the exception procedures. Whenever the error "Unknown Subscriber" is received from the HLR in response to an IST Aalert message ~~command~~, the receiving entity (MSC or GMSC) shall terminate the call that initiated the alert procedure. Also, if the receiving entity is able to link the activities for that Subscriber (outgoing call activities in the MSC and incoming call activities in the GMSC), it shall terminate all of them if an “Unknown Subscriber” error is received in response to any IST Aalert message~~command~~.

7 Control of IST

Definition of the method used by a PLMN to decide which subscribers to use IST upon is outside the scope of this specification. However, it is likely that the decision will be made by some sort of FDS within the PLMN. The interface between the FDS and the PLMN node that sends the IST Ccommand message to the VPLMN (the CAMEL server for a CAMEL implementation of IST) is outside the scope of this specification.

End modified section