Source: **SA WG3**

Title: **1 Corrective CR to 03.35 version 8.0.0**

Document for: **Approval**

Agenda Item: **7.3.3**

The following CR was agreed at SA WG3 meeting #17 and is presented to TSG SA #11 for approval.

Spec	CR	Rev	Phase	Subject	Cat	Ver	WG	Meeting	S3 doc
03.35	001		R99	IST implementation for non-CAMEL subscribers	F	8.0.0	S3	S3-17	S3-010049

CR-Form-v3

CHANGE REQUEST

⌘ **03.35**	CR **001**	⌘ rev **-**	⌘ Current version: **8.0.0**	⌘

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network ☐   Core Network **x**

Title:	⌘	IST implementation for non-CAMEL subscribers
Source:	⌘	SA WG3
Work item code: ⌘	Security	**Date:** ⌘ 19/2/2001
Category: ⌘	**F**	**Release:** ⌘ R99

Use <u>one</u> of the following categories:
F (essential 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 <u>one</u> 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)

Reason for change:	⌘	This CR was reviewed by CN2 in July 1999 as Tdoc N2-99898, but never sent to SA3 for approval. The incomplete package of IST CRs was endorsed by CN#5 (see "other specs affected" below) in October 1999. The original reason for change was: "Implementation of the IST functionality has been identified to be necessary for both CAMEL and non-CAMEL subscribers. The CR explains how to implement this IST functionality when the subscriber has not CAMEL."
Summary of change: ⌘		Implementation of the IST functionality
Consequences if not approved:	⌘	No standardised implementation of IST for non-CAMEL subscribers. Inconsistency with other specifications.

Clauses affected:	⌘	Modified chapters: 4.2 and 6. New chapters: 6.1 to 6.4
Other specs affected:	⌘ ☐	Other core specifications ⌘ 23.008-002, 23.026-003, 29.002-029, all approved by CN#5
	☐	Test specifications
	☐	O&M Specifications
Other comments:	⌘	

4.2   Non-CAMEL implementation

~~FFS~~

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 alert timer value about the remaining activity for this subscriber in the node by sending an IST Alert Message to the HLR, as long as the activity is ongoing. The IST alert 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 sending an IST command to the MSC in response to the IST Alert Message initiated by this MSC. When this IST command is received, the MSC shall terminate the call activities for that Subscriber (the MSC shall terminate the call activity that triggered the IST alert dialogue, and optionally other call activities in that MSC if the MSC is able to link the calls related to the Subscriber).

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 alert message) unsolicited IST commands to these MSCs in order to request termination of all ongoing activities for the subscriber. The HLR should send unsolicited IST commands only to those MSCs that are likely to be carrying a call that needs to be terminated.

Before sending of any IST command for a subscriber, the HLR should send the MAP command "Cancel Location" 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 command has been executed. See Annex B of GSM 02.32. The MSC shall be prepared to receive an IST command before and/or after the Subscriber record has been removed from the VLR.

6   Functional behaviour - Non-CAMEL implementation

~~FFS~~

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 Insert Subscriber Data. Note that this does not affect already ongoing activities in the MSC. If the Subscriber is under IST condition and the HLR operator decides to remove this condition, the HLR modifies the subscriber data in the VLR using the command Delete Subscriber Data. 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 Message 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 Subscriber. A separate timer supervision shall be initiated per each outgoing call activity for each subscriber. The notification command IST Alert is then transmitted to the HLR per call activity whenever the IST alert timer running for that call expires. When the HLR receives an IST alert message from an MSC, it can either return an empty result component, return a component including the subscribed IST timer value, return an indication that the IST condition has been removed for the Subscriber or send back an IST command. This IST command 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 Subscriber in the MSC. Release of all call activities with only one IST command is possible only if the MSC is able to link all call activities related to that Subscriber. If the HLR has returned an indication that IST condition has been removed from the Subscriber, IST control for that call in the MSC is terminated. The IST timer that monitors the activity that initiated the IST alert is restarted when no IST command has been received in the IST alert dialogue and the IST alert 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 alert 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 alert timer running for that call expires. When the HLR receives an IST alert message from a GMSC, it can either return an empty result component, return a component including the subscribed IST timer value, return an indication that the IST condition has been removed for

the Subscriber or send back an IST command. This IST command is used by the GMSC to terminate the incoming call activities (either the call activity that initiated the IST alert dialogue, or optionally to release all incoming call activities) for that Subscriber in the GMSC. Release of all incoming call activities with only one IST command is possible only if the GMSC is able to link all call activities related to that Subscriber. If the HLR has returned an indication that IST condition has been removed from the Subscriber, IST control for that call in the GMSC is terminated. The IST timer that monitors the activity that initiated the IST alert is restarted when no IST command has been received in the IST alert dialogue and the IST alert 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 alert 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 message IST Alert. This message contains the IMSI of that Subscriber. Each of the originating, deflected, transferred or forwarded calls for a specific subscriber can be terminated in the MSC by sending the IST command from the HLR to the controlling MSC in response to the IST alert 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 message IST Alert. This message contains the IMSI of that Subscriber. Each of the terminating or forwarded calls for a specific subscriber can be terminated in the GMSC by sending the IST command from the HLR to the controlling GMSC in response to the IST alert 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 Subscriber is not under IST condition i.e. the MSC shall be able to terminate the call activities upon reception of the standalone IST command without having any previous IST Subscriber 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 to the current VLR, and afterwards the IST command to the current VMSC without waiting for an IST alert message.

The HLR may also be able to request the immediate disconnection of outgoing call activities of a Subscriber in previous VMSCs; for this purpose, the HLR may maintain a list of previous VMSCs with possibly remaining activities, to which the IST command may be sent without waiting for an IST alert 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 command may be sent without waiting for an IST alert message. The mechanism used to maintain this list is outside the scope of this specification.

The standalone IST command 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 command 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 command 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 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 alert 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 alert command.