

## CHANGE REQUEST

⌘ **33.102 CR CR-Num** ⌘ rev **-** ⌘ Current version: **3.8.0** ⌘

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

<b>Title:</b>	⌘ THRESHOLD Check at RRC connection establishment.		
<b>Source:</b>	⌘ SA WG3		
<b>Work item code:</b>	⌘ Security Architecture	<b>Date:</b>	⌘ 23-May-01
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ R99
	<i>Use one of the following categories:</i> <b>F</b> (essential correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (Addition of feature), <b>C</b> (Functional modification of feature) <b>D</b> (Editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900.		<i>Use one of the following releases:</i> <b>2</b> (GSM Phase 2) <b>R96</b> (Release 1996) <b>R97</b> (Release 1997) <b>R98</b> (Release 1998) <b>R99</b> (Release 1999) <b>REL-4</b> (Release 4) <b>REL-5</b> (Release 5)

<b>Reason for change:</b>	⌘ Initial "L3 message" might be prepared before request of RRC connection establishment so it might contain a valid KSI even when the START values have reached THRESHOLD (R2-010981).
<b>Summary of change:</b>	⌘ Main changes includes: - Editorial changes, - THRESHOLD value is checked at RRC connection release (START value, KSI and keys of corresponding CN domain are set to invalid and deleted if THRESHOLD is reached).
<b>Consequences if not approved:</b>	⌘ Use of THRESHOLD is not serving its purpose and old keys are used in an additional RRC connection.

<b>Clauses affected:</b>	⌘ 6.4.3
<b>Other specs affected:</b>	⌘ <input type="checkbox"/> Other core specifications ⌘ <input type="checkbox"/> <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications
<b>Other comments:</b>	⌘

### 6.4.3 Cipher key and integrity key lifetime

Authentication and key agreement, which generates cipher/integrity keys, is not mandatory at call set-up, and there is therefore the possibility of unlimited and malicious re-use of compromised keys. A mechanism is needed to ensure that a particular cipher/integrity key set is not used for an unlimited period of time, to avoid attacks using compromised keys. The USIM shall therefore contain a mechanism to limit the amount of data that is protected by an access link key set.

Each time an RRC connection is released the values  $START_{CS}$  and  $START_{PS}$  of the bearers that were protected in that RRC connection are stored in the USIM. When the next RRC connection is established that values are read from the USIM.

Each time an RRC connection is released the values  $START_{CS}$  and  $START_{PS}$  of the bearers that were protected in that RRC connection are compared with the maximum value, THRESHOLD. If  $START_{CS}$  and/or  $START_{PS}$  have reached the maximum value (THRESHOLD), the ME marks the START value in the USIM for the corresponding core network domain(s) as invalid by setting the  $START_{CS}$  and/or  $START_{PS}$  to THRESHOLD, deletes the cipher key and the integrity key stored on the USIM and sets the KSI to invalid (refer to subclause 6.4.4). Otherwise, the  $START_{CS}$  and  $START_{PS}$  are stored in the USIM. The maximum value THRESHOLD is set by the operator and stored in the USIM.

When the next RRC connection is established, that START values are read from the USIM. Then, the ME shall trigger the generation of a new access link key set (a cipher key and an integrity key) if  $START_{CS}$  and/or  $START_{PS}$  has reached a the maximum value THRESHOLD, for the corresponding core network domain(s) set by the operator and stored in the USIM at the next RRC connection request message sent out. When this maximum value is reached the cipher key and integrity key stored on USIM shall be deleted.

This mechanism will ensure that a cipher/integrity key set cannot be reused beyond the limit set by the operator.