3GPP TSG SA 3 Meeting #14
Oslo, Norway, 1-4 August 2000

***Document* S3-000494**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

33.105	CR	012	Current Version:	3.4.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	SA#9	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [X] ME [ ] UTRAN / Radio [ ] Core Network [ ]

Source: Siemens Atea **Date:** 1 August 2000

Subject: Calculation of AK in re-synchronisation

Work item: Security

Category: *(only one category shall be marked with an X)*

F	Correction		**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification	X		Release 99	X
				Release 00	

Reason for change: The length of MAC-S was described as 12 octets. It should have been 8 octets.
Editorial change to description of maximum length of RES

Clauses affected: 5.1.1.3, 5.1.1.4, 5.1.7.8

Other specs Affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

5.1.1.3 Generation of re-synchronisation token in the USIM

Upon the assertion of a synchronisation failure, the USIM generates a re-synchronisation token as follows:

a) The USIM computes MAC-S = $f1^*_K(SQN_{MS} \| RAND \| AMF^*)$, whereby AMF* is a default value for AMF used in re-synchronisation.

b) If SQN_{MS} is to be concealed with an anonymity key AK, the USIM computes AK = $f5_K$(MAC-S || 0…0), whereby MAC-S forms the ~~12~~ 8 most significant octets and ~~32~~ 64 zeros form the ~~8~~4 least significant octets of the required 16 octet input parameter, and the concealed counter value is then computed as $SQN_{MS} \oplus AK$.

c) The re-synchronisation token is constructed as AUTS = SQN_{MS} [⊕ AK] || MAC-S.

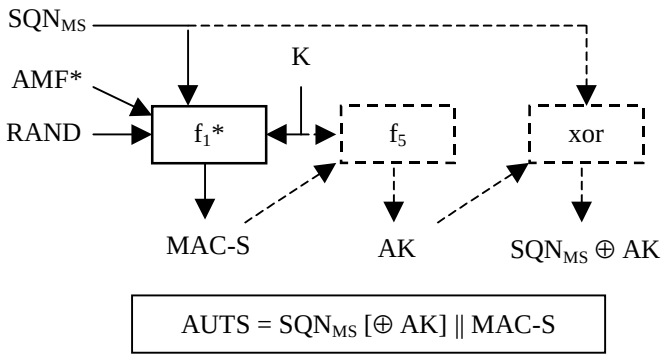

Figure 3: Generation of re-synchronisation token in the USIM

5.1.1.4 Re-synchronisation in the HLR/AuC

Upon receipt of an indication of synchronisation failure and a (AUTS, RAND) pair, the HLR/AuC may perform the following cryptographic functions:

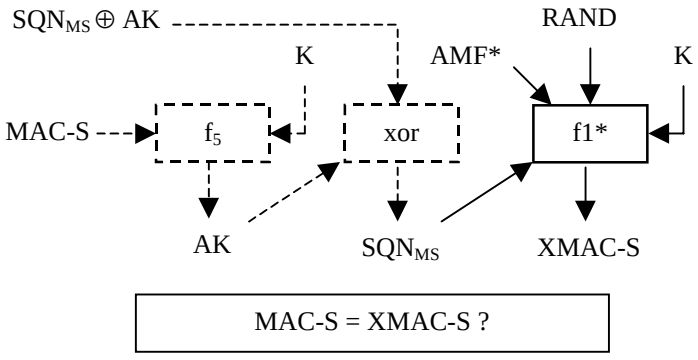

Figure 4: Re-synchronisation in the HLR/AuC

a) If SQN_{MS} is concealed with an anonymity key AK, the HLR/AuC computes AK = $f5_K$(MAC-S || 0…0), whereby MAC-S forms the ~~12~~ 8 most significant octets and ~~32~~ 64 zeros form the ~~8~~4 least significant octets of the required 16 octet input parameter and retrieves the unconcealed counter value as SQN_{MS} = (SQN_{MS} ⊕ AK) xor AK.

b) If SQN generated from SQN_{HE} would not be acceptable, then the HLR/AuC computes XMAC-S = $f1^*_K(SQN_{MS} \| RAND \| AMF^*)$, whereby AMF* is a default value for AMF used in re-synchronisation.

5.1.7.8 RES (or XRES)

RES: the user response

RES[0], RES[1], …, RES[~~31 ... 127~~n-1]

The ~~maximum~~ length n of RES and XRES is at most 128 bits and ~~the minimum is~~ at least 32 bits. RES and XRES constitute to entity authentication of the user to the network.