CHANGE REQUEST Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.										
			33.10	2 CF	R xx	X	Current Versi	on: <u>3.5.0</u>		
GSM (AA.BB) or 3G (AA.BBB) specification number 1										
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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: (U)SIM ME UTRAN / Radio Core Network (at least one should be marked with an X) (U)SIM ME X UTRAN / Radio Core Network										
Source: TSG SA W		G3				Date:	28. July 200	0		
Subject: Clarification UMTS AKA				orking pr	ocedure	when a Ul	CC has to supp	port GSM and		
Work item:		Security								
Category: (only one category shall be marked with an X)	F A B C D	Addition of	modification of		earlier re		K <u>Release:</u>	Phase 2 Release 96 Release 97 Release 98 Release 99 Release 00	X	
<u>Reason for</u> change:		 Correction: There is no requirement that a USIM has to work with R98- ME (no support of GSM 11.11). clarification on interworking conditions 								
Clauses affected: 6.8.1.1, 6.8.1.5										
Other specs affected:	C N E	Other 3G cor Other GSM c specificat AS test spec BSS test spe D&M specific	ions ifications cifications	s X	\rightarrow List \rightarrow List \rightarrow List	t of CRs: of CRs: of CRs: of CRs: of CRs: of CRs:				
<u>Other</u> comments:		No impact upon TSG T WG3 specification TS 31.102. The result of an earlier discussion was to add a note to 6.8.1.1, saying that in addition to a USIM application a UICC may contain a SIM application to achieve interworking with GSM R98- ME (support of GSM 11.11). For interworking reasons this SIM application shall provide SRES and Kc based on the 3G authentication key K and the 3G authentication algorithm implemented in the USIM by applying the 3G conversion functions c2 and c3. Current TS 31.102 does not state that a USIM supports GSM 11.11.								
help.doc										

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

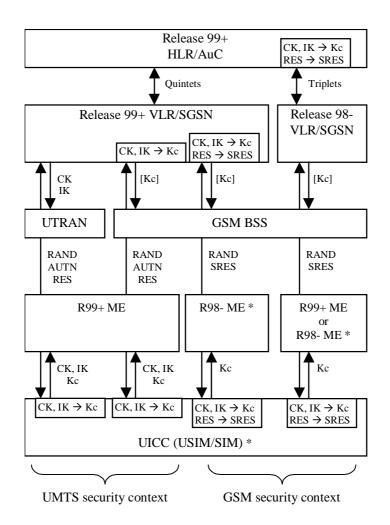
6.8.1.1 General

For UMTS subscribers, authentication and key agreement will be performed as follows:

- UMTS AKA shall be applied when the user is attached to a UTRAN.
- UMTS AKA shall be applied when the user is attached to a GSM BSS, in case the user has R99+ ME and also the VLR/SGSN is R99+. In this case, the GSM cipher key Kc is derived from the UMTS cipher/integrity keys CK and IK, by the VLR/SGSN on the network side and by the USIM on the user side.
- GSM AKA shall be applied when the user is attached to a GSM BSS, in case the user has R98- ME. In this case, the GSM user response SRES and the GSM cipher key Kc are derived from the UMTS user response RES and the UMTS cipher/integrity keys CK and IK. A R98- VLR/SGSN uses the stored Kc and RES and a R99+ VLR/SGSN derives the SRES from RES and Kc from CK, IK.
- NOTE: To operate within a R98- ME, the <u>USIM-UICC</u> may support the SIM-ME interface as defined in GSM 11.11 (which means that the UICC contains a SIM application), and support GSM AKA which provides the corresponding GSM functionality for calculating SRES and Kc based on the 3G authentication key K and the 3G authentication algorithm implemented in the USIM. Due to the fact that the 3G authentication algorithm only computes CK/IK and RES, conversion of CK/IK to Kc shall be achieved by using the conversion function c3, and conversion of RES to SRES by c2.
- GSM AKA shall be applied when the user is attached to a GSM BSS, in case the VLR/SGSN is R98-. In this case, the USIM derives the GSM user response SRES and the GSM cipher key Kc from the UMTS user response RES and the UMTS cipher/integrity keys CK, IK.

The execution of the UMTS (resp. GSM) AKA results in the establishment of a UMTS (resp. GSM) security context between the user and the serving network domain to which the VLR/SGSN belongs. The user needs to separately establish a security context with each serving network domain.

Figure 18 shows the different scenarios that can occur with UMTS subscribers using either R98- or R99+ ME in a mixed network architecture.



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(See the note above for further explanation on * in figure 18).

Figure 18: Authentication and key agreement of UMTS subscribers

Note that the UMTS parameters RAND, AUTN and RES are sent transparently through the UTRAN or GSM BSS and that the GSM parameters RAND and SRES are sent transparently through the GSM BSS.

In case of a GSM BSS, ciphering is applied in the GSM BSS for services delivered via the MSC/VLR, and by the SGSN for services delivered via the SGSN. In the latter case the GSM cipher key Kc is not sent to the GSM BSS.

In case of a UTRAN, ciphering and integrity are always applied in the RNC, and the UMTS cipher/integrity keys CK an IK are always sent to the RNC.

6.8.1.5 USIM

The USIM shall support UMTS AKA and may support backwards compatibility with the GSM system, which consists of:

Feature 1:	GSM cipher key derivation (conversion function c3) to access GSM BSS attached to a R99+ VLR/SGSN using a dual-mode R99+ ME;
Feature 2:	GSM AKA to access the GSM BSS attached to a R98- VLR/SGSN-or when using R98-ME;
Feature 3:	SIM-ME interface (GSM 11.11) to operate within R98-ME.

When the ME provides the USIM with RAND and AUTN, UMTS AKA shall be executed. If the verification of AUTN is successful, the USIM shall respond with the UMTS user response RES and the UMTS cipher/integrity keys CK and IK. The USIM shall store CK and IK as current security context data. If the USIM supports access to GSM cipher key derivation (feature 1), the USIM shall also derive the GSM cipher key Kc from the UMTS cipher/integrity keys CK and IK using conversion function c3 and send the derived Kc to the R99+ ME. In case the verification of AUTN is not

successful, the USIM shall respond with an appropriate error indication to the R99+ ME.

When the ME provides the USIM with only RAND, and the USIM supports GSM AKA (Feature 2), GSM AKA shall be executed. The USIM first computes the UMTS user response RES and the UMTS cipher/integrity keys CK and IK. The USIM then derives the GSM user response SRES and the GSM cipher key Kc using the conversion functions c2 and c3. The USIM then stores the GSM cipher key Kc as the current security context and sends the GSM user response SRES and the GSM cipher key Kc as the current security context and sends the GSM user response SRES and the GSM cipher key Kc as the current security context and sends the GSM user response SRES and the USIM.

In case the USIM does not support GSM cipher key derivation (Feature 1) or GSM AKA (Feature 2), the R99+ ME shall be informed. A USIM that does not support GSM cipher key derivation (Feature 1) cannot operate in any GSM BSS. A USIM that does not support GSM AKA (Feature 2) cannot operate under a R98- VLR/SGSN-or in a R98- ME.