3GPP TSG-T plenary meeting #21 ***Tdoc TP-030182***
Frankfurt, Germany, 17-19 September 2003

Source: T3

Title: CRs to TR 31.900: SIM/USIM internal and external interworking

Document for: Approval

This document contains the following change requests:

T3 Doc	Spec	CR	Rev	Rel	Subject	Cat	Version-Current	Version-New
T3-030629	31.900	010	-	Rel-5	Clarification of SIM/USIM file mapping table	F	5.2.0	5.3.0
T3-030694	31.900	011	-	Rel-5	Consequences if USIM services n° 27 and n° 38 are not available.	F	5.2.0	5.3.0
T3-030707	31.900	012	-	Rel-5	Clarification on the interface protocol when SIM and USIM cohabit on a UICC	B	5.2.0	5.3.0

3GPP TSG-WG3 Meeting #28
Marseilles, France, 19-22 August 2003

Tdoc ⌘T3-030629

CR-Form-v7

CHANGE REQUEST

⌘ **31.900** **CR** **010** ⌘**rev** **-** ⌘ Current version: **5.2.0** ⌘

*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⌘ [X] ME [ ] Radio Access Network [ ] Core Network [ ]

Title:	⌘	Clarification of SIM/USIM file mapping table
Source:	⌘	T3
Work item code:	⌘	TEI
Date:	⌘	22/08/2003
Category:	⌘	**F**
Release:	⌘	Rel-5

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:	⌘	FPLMN can be mapped only if its size is 12 bytes
Summary of change:	⌘	Addition of a note Correction of a wrong reference to note 2
Consequences if not approved:	⌘	Without this correction, some cards may be personalized with FPLMN files mapped while its size is larger than 12 bytes. This may result into interworking problems with some GSM only terminals which are accepting 12 bytes only as file size.

Clauses affected:	⌘	Annex C

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

Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm.
Below is a brief summary:

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Annex C:
SIM/USIM file mapping table

The following table lists all SIM and USIM files that can be mapped in a UICC. It should be noted that most files are optional and these files are not necessarily present in the SIM or USIM application. Files not mentioned do not have a corresponding file in both applications. Mapping with multiple USIMs is not considered.

SIM Application DF / EF	USIM Application DF / EF	Mapping possible	
		single subscription UICC	double subscription UICC
GSM / IMSI	USIM / IMSI	yes	No
GSM / HPLMN	USIM / HPLMN	yes	Yes, 1)
GSM / ACM	USIM / ACM	yes	Yes, 1)
GSM / ACMmax	USIM / ACMmax	yes	Yes, 1)
GSM / PUCT	USIM / PUCT	yes	Yes, 1)
GSM / GID1	USIM / GID1	yes	Yes, 1)
GSM / GID2	USIM / GID2	yes	Yes, 1)
GSM / SPN	USIM / SPN	yes	Yes, 1)
GSM / CBMI	USIM / CBMI	Yes	
GSM / CBMIR	USIM / CBMIR	Yes	
GSM / CBMID	USIM / CBMID	yes	Yes, 1)
GSM / ACC	USIM / ACC	yes	No
GSM / FPLMN	USIM / FPLMN	Yes, 7)	Yes, 1)
GSM / LOCI	USIM / LOCI	Yes	
GSM / LOCIGPRS	USIM / PSLOCI	yes, 5)	
GSM / AD	USIM / AD	Yes	
GSM / eMLPP	USIM / eMLPP	yes	Yes, 1)
GSM / AAeM	USIM / AAeM	yes	Yes, 1)
GSM / DCK	USIM / DCK	yes	Yes, 1)
GSM / CNL	USIM / CNL	yes	Yes, 1)
GSM / PLMNwACT	USIM / PLMNwACT	Yes	
GSM / OPLMNwACT	USIM / OPLMNwACT	yes	Yes, 1)
GSM / HPLMNwACT	USIM / HPLMNwACT	yes, 3)	
GSM / RPLMNACT	USIM / RPLMNACT	No	
GSM / SUME	TELECOM / SUME	Yes	
GSM / Kc	USIM / GSM / Kc	Yes	No
GSM / KcGPRS	USIM / GSM / KcGPRS	Yes	No
GSM / CPBCCH	USIM / GSM / CPBCCH	Yes	
GSM / INVSCAN	USIM / GSM / INVSCAN	Yes	Yes, 1)
GSM / PNN	USIM / PNN	Yes	Yes, 1)
GSM / OPL	USIM / OPL	Yes	Yes, 1)
GSM / MBDN	USIM / MBDN	Yes	No
GSM / EXT6	USIM / EXT6	Yes	No
GSM / MBI	USIM / MBI	Yes	No
GSM / MWIS	USIM / MWIS	Yes	No
GSM / CFIS	USIM / CFIS	Yes	No
GSM / EXT7	USIM / EXT7	Yes	No
GSM / SPDI	USIM / SPDI	Yes	Yes, 1)

TELECOM / SMS	USIM / SMS	Yes	
TELECOM / SMSP	USIM / SMSP	Yes	Yes, 1)
TELECOM / SMSS	USIM / SMSS	Yes	
TELECOM / SMSR	USIM / SMSR	Yes	
TELECOM / SDN	USIM / SDN	Yes	Yes, 1)
TELECOM / FDN	USIM / FDN	Yes	
TELECOM / BDN	USIM / BDN	Yes	
TELECOM / CMI	USIM / CMI	yes, 6)	
TELECOM / MSISDN	USIM / MSISDN	yes, 4~~2~~)	No
TELECOM / EXT2	USIM / EXT2	Yes	
TELECOM / EXT3	USIM / EXT3	yes	Yes, 1)
TELECOM / EXT4	USIM / EXT4	yes, 5)	
TELECOM / ADN	... / PHONEBOOK / ADN	yes, required, 2)	
TELECOM / EXT1	... / PHONEBOOK / EXT1	yes, required, 2)	
TELECOM / ECCP	... / PHONEBOOK / CCP1	yes, required, 2)	
GSM / MEXE / all files	USIM / MEXE / all files	yes	Yes, 1)
GSM / SoLSA / all files	USIM / SoLSA / all files	yes	Yes, 1)

Note:
1) No mapping, if subscription specific differences are required
2) SIM file to be mapped with related USIM file either in DF PHONEBOOK under DF USIM or in DF PHONEBOOK under DF TELECOM
3) Only if the same settings apply to 2G and 3G operation
4) No mapping of EF-MSISDN if EF-EXT1 is used in the SIM and / or EF-EXT5 is used in the USIM
5) Caution: Different file identifiers in SIM and USIM
6) ~~6)~~ No mapping if coding "FF" is used in the content
7) Mapping is possible only if the size of FPLMN is 12 bytes.

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Marseille, France, 19.-22.08.2003

Tdoc ⌘T3- 030694

CR-Form-v7

CHANGE REQUEST

⌘ **31.900** **CR** **011** ⌘**rev** **-** ⌘ Current version: **5.2.0** ⌘

*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⌘ [X] ME [ ] Radio Access Network [ ] Core Network [ ]

Title:	⌘	Consequences if USIM services n° 27 and n° 38 are not available.
Source:	⌘	T3
Work item code:	⌘	TEI
Date:	⌘	20/08/2003
Category:	⌘	**F**
Release:	⌘	Rel-5

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)*
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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:	⌘	It was clarified in TS 33.102 that a disabled USIM service n° 27 prevents access to a 2G BSS only if that requires ciphering. Further, the negative impact of access restrictions by unavailability of the optional USIM services n° 27 and n° 38 on emergency calls needs to be mentioned.
Summary of change:	⌘	The explanations on services n° 27 and n° 38 are extended to cover the reasons for change.
Consequences if not approved:	⌘	TR 31.900 may not completely reflect the core specifications.

Clauses affected:	⌘	Section 5.1			
Other specs affected:	⌘	**Y**	**N**		
		[ ]	[ ]	Other core specifications	⌘
		[ ]	[ ]	Test specifications	
		[ ]	[ ]	O&M Specifications	
Other comments:	⌘				

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5.1 3G ME and UICC

A 3G ME has to support the UICC. 3G TS 31.101 [1] and 3G TS 31.102 [2] apply.

According to 3G TS 21.111 [3] a 3G ME does not support a 5V ME/UICC interface. This is valid even when it accesses the SIM application on the UICC. According to the same specification, a UICC does always support at least two voltage classes, i.e. a 5V only UICC cannot exist.

In case of a UICC inserted in a 3G ME, nothing but the 3G command set (as defined in 3G TS 31.101 [1] and 3G TS 31.102 [2]) can be used by the ME. In particular, the 2G command RUN GSM ALGORITHM is not available.

To support a 2G/3G dual mode ME in a 2G radio access network, the USIM may provide functions for 2G backward compatibility. Two particular USIM services are defined for such purposes:

1. **Service n° 27:** "GSM Access". This service is essential when a 2G BSS is involved and ciphering is active in the BSS. The USIM additionally generates the 2G ciphering key Kc required by the 2G air interface. From the security point of view, this behaviour can be characterised as "**3G + Kc mode**" (see below). Further, the USIM supports some additional 2G data storage elements that are necessary for 2G radio access. If service n° 27 is not available in the USIM, the lack of Kc prevents operation with a 2G BSS when ciphering is active. No ciphering key derivation is done by the ME.

2. **Service n° 38:** "GSM Security Context". This service is required when a 2G VLR/SGSN and/or a 2G HLR/AuC is involved. The USIM performs 2G AKA, i.e. it accepts 2G input data and generates 2G output data. From the security point of view, this behaviour can be characterised as "**virtual 2G mode**" (see below). If service n° 38 is not available in the USIM, 2G AKA is not supported and network access is impossible with a 2G VLR/SGSN and/or a 2G HLR/AuC.

   A 2G VLR/SGSN never goes with a 3G BSS. Hence when a 2G VLR/SGSN is involved, then a 2G BSS is always part of the transmission chain and service n° 27 is additionally required, i.e. services n° 27 and n° 38 have to be available at the same time.

If services n° 27 and n° 38 are not supported by the USIM (which the ME can detect from the USIM Service Table during the USIM activation procedure) network access is impossible in a mixed 2G/3G environment, even if a SIM application is available on the UICC. A 3G ME only accesses the USIM application on the UICC.

From the security point of view, the compatibility services are connected to up to three different operation modes (see also Annex B):

- **Normal 3G mode:** The results of the 3G algorithm are sent to the ME without any change. The USIM receives RAND and AUTN and responds with RES, CK and IK. This mode applies if service n° 27 is not available.

- **3G + Kc mode:** The 2G ciphering key Kc (derived from CK, IK) is additionally included in the response. The USIM receives RAND and AUTN and responds with RES, CK, IK and Kc. This requires conversion function c3 to be supported by the USIM. If service n° 27 is available in the USIM, this mode is always active and the ME picks the relevant values from the USIM response according to the present network situation.

- **Virtual 2G mode:** The USIM receives a 2G authentication request with RAND and returns a 2G authentication response with SRES (derived from RES) and ciphering key Kc (derived from CK, IK). This requires a particular algorithm execution mode plus conversion functions c2 and c3 to be supported by the USIM. If service n° 38 is available in the USIM, this mode is not always active. The ME may switch the USIM from normal 3G mode or 3G + Kc mode to virtual 2G mode by sending a particular command parameter according to the present network situation.

The services n° 27 and n° 38 are both optional. Network operators can decide whether to include them into their USIMs and hence to allow network access with lower security level. It should be noted that this access limitation also affects emergency call set-up and handover.

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Marseille, France, 19-22 August 2003

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CHANGE REQUEST

⌘ **31.900** **CR** **012** ⌘ **rev** **-** ⌘ Current version: **5.2.0** ⌘

*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:	⌘	Clarification on the interface protocol when SIM and USIM cohabit on a UICC
Source:	⌘	T3
Work item code:	⌘	TEI
Date:	⌘	19/08/2003
Category:	⌘	**B**
Release:	⌘	Rel-5

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Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Some interface requirements are different between a SIM and a UICC/USIM interface. They are not incompatible but sorting out how the interface should behave to comply with both GSM 11.11 and SCP TS 102 221 takes some time and thinking. This CR clarifies the issue in TR 31.900 to avoid any confusion.
Summary of change:	⌘	Clarify that in order to satisfy the requirements of both specifications, the strongest constraints must apply. In particular, to comply with both the SIM and the USIM interfaces, a UICC or terminal must get ready to receive data fast enough (the SIM interface is the most demanding here), and wait long enough before sending its data (the UICC interface is the most demanding here).
Consequences if not approved:	⌘	

Clauses affected:	⌘	Section X (new section added)

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

Other comments:	⌘	

X SIM and UICC Interworking on the Card/Terminal Interface

The SIM specification in GSM 11.11 [7] / TS 51.011 [8] and the UICC/USIM specification in TS 31.101 [1] contain some different requirements affecting the physical card/terminal interface.

As the interface behavior needs to be independent of the applications supported, a UICC holding both a SIM and a USIM application, or a terminal accepting both legacy SIM and UICCs, satisfies all the requirements from all the specifications they are complying with.

GSM 11.11 [7] / TS 51.011 [8] and TS 31.101 [1] contain no contradictory requirements, but the strongest requirements from these two sets of specifications need to apply.

In particular, such cards and terminals are ready to receive data 12 etus after they begin sending their last outgoing character (to comply with the SIM specification) but do not start transmitting outgoing data less than 16 etus after they begin receiving the last incoming character (to comply with the USIM specification).

This implies that a 12 etu reception turnaround guardtime is supported at all speeds supported, as indicated by the card in the ATR,

The highest speed supported is compliant with the requirements of TS 31.101 [1].