Source: **TSG SA1**

Title: **CRs to International Mobile Equipment Identities (IMEI) (22.016)**

Document for: **Approval**

Agenda Item: **6.1.3**

Doc-1st-Level	Doc-2nd-Level	Spec	CR	Rev	Phase	Cat	Subject	Version-Current	Version-New
SP-000195	S1-000441	22.016	003	1	R99	F	IMEI coding	3.1.0	3.2.0

CHANGE REQUEST

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

22.016	CR	003r1	Current Version:	3.1.0

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

For submission to:	TSG#8	for approval	X	strategic		(for SMG
list expected approval meeting # here ?		for information		non-strategic		use only)

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 [X]   UTRAN / Radio [ ]   Core Network [X]
(at least one should be marked with an X)

Source:	Nokia		**Date:**	10/4/00

Subject:	IMEI coding

Work item:	

Category:	F	Correction	X	**Release:**	Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:	Move of Annex A to 23.003 as it should not be part of stage 1 descrition. Also implementation related details has been removed from main body of stage 1.

Clauses affected:	3,7, Annex A

Other specs affected:	Other 3G core specifications	X	?	List of CRs:	CR to 22.003 by TSG-CN WG4
	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.

3 Composition of IMEI

The composition of the IMEI shall be such that each individual mobile station equipment can be separately identified. Information is contained in the IMEI by which the PLMN, after requesting it, can immediately decide whether or not to accept calls made by means of this equipment.

Secondly, the IMEI shall directly or indirectly contain all information which is necessary for the network operator to make relations through its administrative system to trace the equipment to its origin of production. TS 23.003 [2] describes the structure of the IMEI in detail.

The IMEI ~~(14 digits)~~ is complemented by a check digit. The check digit is not part of the digits transmitted at IMEI check occasions, as described below. The Check Digit shall avoid manual transmission errors, e.g. when customers register stolen MEs at the operators customer care desk. ~~The Check Digit is defined according to the Luhn formula, as defined in annex A.~~

NOTE: The Check Digit is not applied to the Software Version Number.

7 MS Software Version Number (SVN)

A Software Version Number (SVN) field shall be provided. This allows the ME manufacturer to identify different software versions of a given type approved mobile.

The SVN is a separate field from the IMEI, although it is associated with the IMEI, and when the network requests the IMEI from the MS, the SVN (if present) is also sent towards the network. ~~It comprises 2 decimal digits.~~

The white list shall use the IMEI, The Black and Grey Lists may also use the SVN.

Annex A (normative):
IMEI Check Digit computation

A.1 Representation of IMEI

The International Mobile station Equipment Identity and Software Version Number (IMEISV), as defined in TS 23.003, is a 16 digit decimal number composed of four distinct elements:

- a 6 digit Type Approval Code (TAC);
- a 2 digit Final Assembly Code (FAC);
- a 6 digit Serial Number (SNR); and
- a 2 digit Software Version Number (SVN).

The IMEISV is formed by concatenating these four elements as illustrated below:

TAC	FAC	SNR	SVN

Figure A.1: Composition of the IMEISV

The IMEI is complemented by a check digit as defined in section 3. The Luhn Check Digit (CD) is computed on the 14 most significant digits of the IMEISV, that is on the value obtained by ignoring the SVN digits.

The method for computing the Luhn check is defined in Annex B of the International Standard "Identification cards - Numbering system and registration procedure for issuer identifiers" (ISO/IEC 7812) [3].

In order to specify precisely how the CD is computed for the IMEI, it is necessary to label the individual digits of the IMEISV, excluding the SVN. This is done as follows:

The (14 most significant) digits of the IMEISV are labelled $D_{14} D_{13} ... D_1$, where:

- TAC = $D_{14} D_{13} ... D_9$ (with D_9 the least significant digit of TAC);
- FAC = $D_8 D_7$ (with D_7 the least significant digit of FAC); and
- SNR = $D_6 D_5 ... D_1$ (with D_1 the least significant digit of SNR).

A.2 Computation of CD for an IMEI

Computation of CD from the IMEI proceeds as follows:

Step 1: Double the values of the odd labelled digits D_1, D_3, D_5 ... D_{13} of the IMEI.

Step 2: Add together the individual digits of all the seven numbers obtained in Step 1, and then add this sum to the sum of all the even labelled digits D_2, D_4, D_6 ... D_{14} of the IMEI.

Step 3: If the number obtained in Step 2 ends in 0, then set CD to be 0. If the number obtained in Step 2 does not end in 0, then set CD to be that number subtracted from the next higher number which does end in 0.

A.3 Example of computation

IMEI (14 most significant digits):

TAC						FAC		SNR					
D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
2	6	0	5	3	1	7	9	3	1	1	3	8	3

Step 1:

2	6	0	5	3	1	7	9	3	1	1	3	8	3
	x2		x2		x2		x2		x2		x2		x2
	12		10		2		18		2		6		6

Step 2:

$$2+1+2+0+1+0+3+2+7+1+8+3+2+1+6+8+6=53$$

Step 3:

$$CD = 60 - 53 = 7$$