Security Group
GSM Association   Restricted - Confidential Information

Meeting Number	**SG#36**	**SG Doc 034/00**
Meeting Date	**31st May to 2nd June 2000**	
Meeting Location	**Istanbul, Turkey**	

Title	Liaison statement to 3GPP and TWG
Source	SG#36
Date	26th June 2000

Read Access*:		
Unrestricted		✔

Information Category	Liaison Statement

Summary:
Liaison statement to 3GPP, copied to TWG, regarding support for hexadecimal coding of IMEIs.

Security Group

GSM Association	Restricted - Confidential Information

Liaison Statement:

Title: **Liaison statement regarding IMEI format for UMTS**
To: **3GPP TSG SA1, dated 1st May 2000**
From: **GSM Association, Security Group**
Copy: **GSMA TWG, TADIG**
Date: **26th June 2000**

The GSM Association Security Group thanks 3GPP TSG SA1 for the sight of the above LS.

We have no security concerns about the extension of the IMEI by using the hexadecimal format.

Concerns were expressed about how the new format IMEI's could be introduced without using mechanisms such as default values, as it was felt that a default IMEI would certainly cause security and technical problems. The SG thought the right approach would be to introduce an agreed date by which operators could have ensured that their networks could support the new IMEI. This would depend on manufacturers producing releases to handle this issue.

This LS is copied to TWG for information, and TADIG for the CEIR issues.

End of LS

TSG-SA Working Group 1 (Services) meeting #8   **TSG S1 (00) 370**
Beijing, China: 10-14th April 2000   **Agenda Item: 6.12**
SOURCE: TSG SA WG1

TITLE: **LIAISON STATEMENT ON HEXADECIMAL IMEI FORMAT**

TO: **SA WG5, CN WG1, CN WG4, RAN WG2, RAN WG3, GSM ASSOCIATION**

CC: **SA WG2,**

Contact: tommi.kokkola@nokia.com

S1 received the attached contribution to change IMEI format. S1 would like other WGs and GSM assiciation to study the proposal and comment.

Change of the coding is proposed for release 2000. S1 asks the WGs to consider if this late proposal for R99 would be possible so that all the UMTS terminals could use this coding from the beginning.

3GPP TSG-SA, WG1 meeting #8   **TDoc S1#8 (00)0275**
Peking, China, April 10-15, 2000

Source: **Nokia**

Title: Proposal to modify IMEI format

Background

The current IMEI format is structured in the following way:

- Type Approval Code (TAC): 6 digits. The first 2 digits constitute the code allocated to Notified Body = Reporting Body Identifier(1900 MHz phones in USA and test terminals have different coding)
- Final Assembly Code (FAC): 2 digits
- Serial Number: 6 digits
- Check digit

These digits have been presented in BCD format. New Type Approval Codes have been issued with a 6 BCD digits Serial Number set (1Million units) is not sufficient any more. This format has served well and no problems have been envisaged as far as an unambiguous terminal coding for GSM is concerned. However, the introduction of the IMEI into 3G mobile terminal identification changes the situation as soon as a great variety of products manufactured in larger volumes will flow to market place. Nevertheless, any modification in the IMEI coding must not jeopardize smooth migration from one mobile generation to the next one.

Proposal

Given the strong reliance on the interoperability with legacy products no change to IMEI length or structure is considered feasible. In contrast, the coding format of the Serial Number is proposed to be modified.

- Instead using BCD, a hexadecimal code format is proposed. It would offer a capacity of 16.7 Million units manufactured with one Type Approval Code.
- TAC would set a trigger for interpretation (Network would identify from which TAC number onwards a serial number would be interpreted as binary presentation)

This proposal will require modifications to network management system for both installed and new (GSM and 3G). But no modifications to existing Rel '99 signalling is foreseen.

Change of coding is proposed for release 2000. However, change should be considered already for release 1999 in order to allow new IME coding in all 3G terminals.

Attached CR to 22.016 for Release 2000.

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**	**002**	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   **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 **X**   Release 98 ☐
with an X)   D Editorial modification   Release 99 ☐
          Release 00 **X**

Reason for change: Change of IMEI coding from decimal format to hexadecimal.

Clauses affected: Annex A:

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.

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 hexadecimal 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:
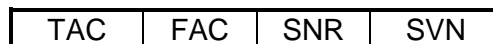
TAC	FAC	SNR	SVN

Figure A.1: Composition of the IMEISV

The IMEI is complemented by a check digit as defined in section 3. The modulus 16 Luhn Check Digit (CD) is computed on the 14 most significant hexadecimal 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]. The modulus 16 Luhn Check Digit is identical, but number base has been transformed from 10 to 16.
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 D14 D13 ... D1, where:
- TAC = D14 D13 ... D9   (with D9 the least significant digit of TAC);

- FAC = D8 D7   (with D7 the least significant digit of FAC); and

- SNR = D6 D5 ... D1   (with D1 the least significant digit of SNR).

Note: Even though all digits D1… D14 are changed to use hexadecimal coding, this has no effect to the previously assigned values of all fields when the fields were using BCD coding. The same code values can still be used for the previously assigned codes. The hexadecimal coding allows more codes to be used for all fields. Especially this applies to the SNR field, which has number space of $2^{24} = 16,777,216$ units – with BCD coding the number space is 1,000,000 units.

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 HD1, HD3, HD5, ... HD13 of the IMEI using hexadecimal number base.

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 HD2, HD4, HD6, ... HD14 of the IMEI using hexadecimal number base.

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 hexadecimal number which does end in 0.

A.3   Example of computation

IMEI (14 most significant digits):

TAC						FAC		SNR					
H~~D~~14	H~~D~~13	H~~D~~12	H~~D~~11	H~~D~~10	H~~D~~9	H~~D~~8	H~~D~~7	H~~D~~6	H~~D~~5	H~~D~~4	H~~D~~3	H~~D~~2	H~~D~~1
2	6	0	5	3	1	7	9	3	8~~1~~	D~~1~~	3	E~~8~~	3

Step 1:

2	6	0	5	3	1	7	9	3	8~~1~~	D~~1~~	3	E~~8~~	3
	x2		x2		x2		x2		x2		x2		x2
	C~~12~~		A~~10~~		2		12~~8~~		10~~2~~		6		6

Step 2:

$2 + \underline{C1} + 2 + 0 + \underline{A1} + 0 + 3 + 2 + 7 + 1 + 2\underline{8} + 3 + \underline{1 + 0}2 + \underline{D1} + 6 + \underline{E8} + 6 = \underline{52}53$

Step 3:

$CD = 60 - 5\underline{2}3 = \underline{E7}$