3GPP TSG_CN **Tdoc NP-000369**
Plenary Meeting #8, Dusseldorf, Germany
21st – 23rd June 2000.

Source: **TSG_N WG4**

Title: **CRs to 3G Work Item "Technical Enhancement and Improvements" on Hexa IMEI**

Agenda item: **6.6.4**

Document for: **APPROVAL**

Introduction:

This document contains **"5"** CRs on **Work Item "Technical Enhancement and Improvements", subject Hexa IMEI** that have been agreed by **TSG_N WG4,** and are forwarded to **TSG_N Plenary** meeting #8 for approval.

TDoc	SPEC	CR	REV	PHAS	VERS	SUBJECT	CAT	NEW_VERS
N4-000403	03.03	A047		2	4.10.0	Hexa IMEI	C	4.11.0
N4-000402	03.03	A046		R96	5.3.0	Hexa IMEI	C	5.4.0
N4-000404	03.03	A048		R97	6.5.0	Hexa IMEI	C	6.6.0
N4-000405	03.03	A049		R98	7.4.0	Hexa IMEI	C	7.5.0
N4-000406	23.003	020	3	R99	3.4.1	Hexa IMEI	C	3.5.0

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22-26 May 2000
Rotenburg, Germany

Document *N4-000403*
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03.03	**CR**	**A047**	Current Version:	4.10.0

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

For submission to:	CN#08	For approval	X	strategic		*(for SMG use only)*
list expected approval meeting # here ↑		for information		non-strategic	X	

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		ME	X	UTRAN / Radio		Core Network	X

Source: N4 **Date:** 30.05.00

Subject: Hexa IMEI

Work item: TEI

Category: *(only one category Shall be marked With an X)*

F	Correction		
A	Corresponds to a correction in an earlier release		
B	Addition of feature		
C	Functional modification of feature	X	
D	Editorial modification		

Release:

Phase 2	X
Release 96	
Release 97	
Release 98	
Release 99	
Release 00	

Reason for change:

The current IMEI structure is proposed to be changed to use hexadecimal coding instead of current BCD. The usage of "F" in hexadecimal IMEI is restricted, because in the case of emergency call without SIM-card, the IMEI is used as calling party number. The calling party number is used in ISUP and according to ISUP specifications (Q.762, Q.763, and Q.764), "F" is not allowed in calling party number.

The change is proposed in 3GPP TSG-CN,TSG-S, TSG-T and TSG-R to allow 11.4 million mobile terminals to be produced with one Type Approval Code. The current restriction for one million units per TAC is already a problem in the GSM terminal manufacturing and can only be predicted to worsen in the future.

Change to use hexadecimal coding is most simple since it does not affect to existing message lengths in GSM air interface and network interfaces.

The proposal is to have certain deadline, after which all networks support hexadecimal coded IMEI. This should take care of the compability issues between hexadecimal and decimal coded IMEI. The feasibility of the whole hexadecimal IMEI scheme will be decided in coming TSG-CN and TSG-SA plenaries.

Clauses affected: 6.2.1, 6.2.2

Other specs affected:	Other 3G core specifications		→ List of CRs:	
	Other GSM core specifications	X	→ List of CRs:	04.08, 02.16
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:	

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

6.2.1 Composition of IMEI

The International Mobile station Equipment Identity (IMEI) is composed as shown in figure 8.

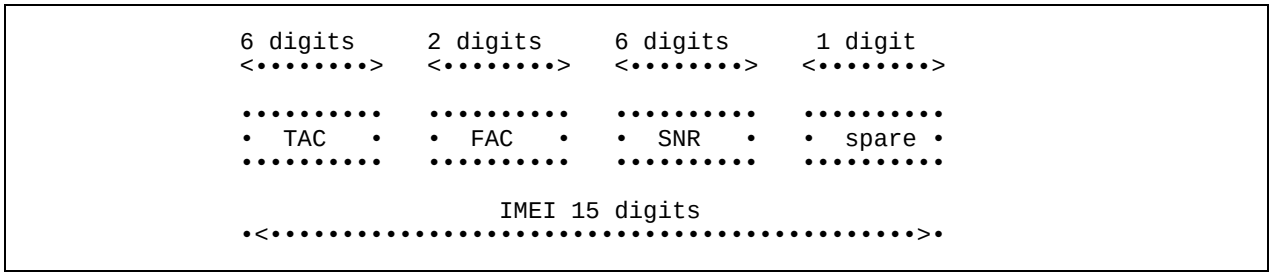

Figure 8: Structure of IMEI

The IMEI is composed of the following elements (each element shall consist of hexadecimal digits excluding the digit 'F' due to ISUP restrictions i.e. values (0-E) are allowed only):

- Type Approval Code (TAC). Its length is 6 digits;

- Final Assembly Code (FAC) identifies the place of manufacture/final assembly. Its length is 2 digits;

- Serial Number (SNR) is an individual serial number uniquely identifying each equipment within each TAC and FAC. Its length is 6 digits.

- Spare digit: this digit shall be zero, when transmitted by the Mobile Station.

The security requirements of the IMEI are defined in TS GSM 02.16.

6.2.2 Composition of IMEISV

The International Mobile station Equipment Identity and Software Version Number (IMEISV) is composed as shown in figure 9.

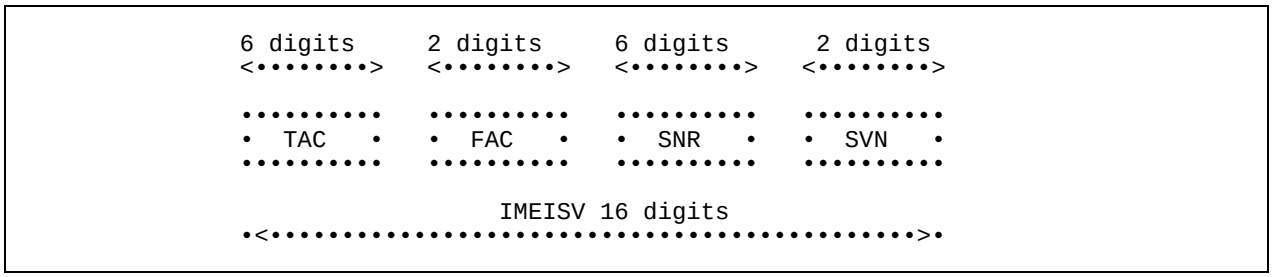

Figure 9: Structure of IMEISV

The IMEISV is composed of the following elements (each element shall consist of hexadecimal digits excluding the digit 'F' due to ISUP restrictions i.e. values (0-E) are allowed only):

- Type Approval Code (TAC). Its length is 6 digits;

- Final Assembly Code (FAC) identifies the place of manufacture/final assembly. Its length is 2 digits;

- Serial Number (SNR) is an individual serial number uniquely identifying each equipment within each TAC and FAC. Its length is 6 digits.

- Software Version Number (SVN) identifies the software version number of the mobile equipment. Its length is 2 digits.

Regarding updates of the IMEISV: the TAC, FAC and SNR shall be protected against change after the ME's final production process, i.e. only the SVN part of the IMEISV can be modified (see GSM 02.16).

6.3 Allocation principles

The Type Approval Code (TAC) is issued by a central body.

The place of final assembly (FAC) is encoded by the manufacturer.

Manufacturers shall allocate individual serial numbers (SNR) in a sequential order.

For a given ME, the combination of TAC, FAC and SNR used in the IMEI shall duplicate the combination of TAC, FAC and SNR used in the IMEISV.

The Software Version Number is allocated by the manufacturer after authorisation by the type approval authority. SVN value 99 is reserved for future use.

The IMEI digit values have restrictions which are modified at cut-off date. Before the CUT-OFF DATE (TBD) only bcd coded values (0-9) are allowed. After CUT-OFF DATE (TBD) IMEI digits may have hexadecimal values excluding the digit 'F' i.e. values (0-E) are allowed.

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CHANGE REQUEST

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03.03	**CR**	**A046**	Current Version:	5.3.0

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

For submission to: CN#08 *list expected approval meeting # here ↑*

For approval [X] for information [ ]

strategic [ ] non-strategic [X] *(for SMG 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: *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [X]

Source: N4 **Date:** 30.05.00

Subject: Hexa IMEI

Work item: TEI

Category: *(only one category Shall be marked With an X)*

F	Correction		
A	Corresponds to a correction in an earlier release	X	
B	Addition of feature		
C	Functional modification of feature		
D	Editorial modification		

Release:

Phase 2	
Release 96	X
Release 97	
Release 98	
Release 99	
Release 00	

Reason for change:

The current IMEI structure is proposed to be changed to use hexadecimal coding instead of current BCD. The usage of "F" in hexadecimal IMEI is restricted, because in the case of emergency call without SIM-card, the IMEI is used as calling party number. The calling party number is used in ISUP and according to ISUP specifications (Q.762, Q.763, and Q.764), "F" is not allowed in calling party number.

The change is proposed in 3GPP TSG-CN,TSG-S, TSG-T and TSG-R to allow 11.4 million mobile terminals to be produced with one Type Approval Code. The current restriction for one million units per TAC is already a problem in the GSM terminal manufacturing and can only be predicted to worsen in the future.

Change to use hexadecimal coding is most simple since it does not affect to existing message lengths in GSM air interface and network interfaces.

The proposal is to have certain deadline, after which all networks support hexadecimal coded IMEI. This should take care of the compability issues between hexadecimal and decimal coded IMEI. The feasibility of the whole hexadecimal IMEI scheme will be decided in coming TSG-CN and TSG-SA plenaries.

Clauses affected: 6.2.1, 6.2.2

Other specs affected:	Other 3G core specifications		→ List of CRs:	
	Other GSM core specifications	X	→ List of CRs:	04.08, 02.16
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:	

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

6.2.1 Composition of IMEI

The International Mobile station Equipment Identity (IMEI) is composed as shown in figure 10.

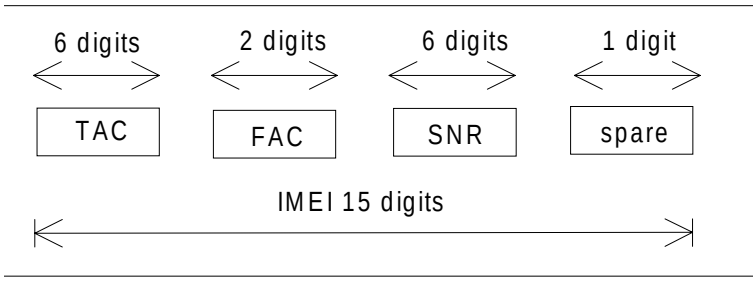

Figure 10: Structure of IMEI

The IMEI is composed of the following elements (each element shall consist of hexadecimal digits excluding the digit 'F' due to ISUP restrictions i.e. values (0-E) are allowed only):

- Type Approval Code (TAC). Its length is 6 digits;
- Final Assembly Code (FAC) identifies the place of manufacture/final assembly. Its length is 2 digits;
- Serial Number (SNR) is an individual serial number uniquely identifying each equipment within each TAC and FAC. Its length is 6 digits.
- Spare digit: this digit shall be zero, when transmitted by the MS.

The security requirements of the IMEI are defined in TS GSM 02.16.

6.2.2 Composition of IMEISV

The International Mobile station Equipment Identity and Software Version Number (IMEISV) is composed as shown in figure 11.

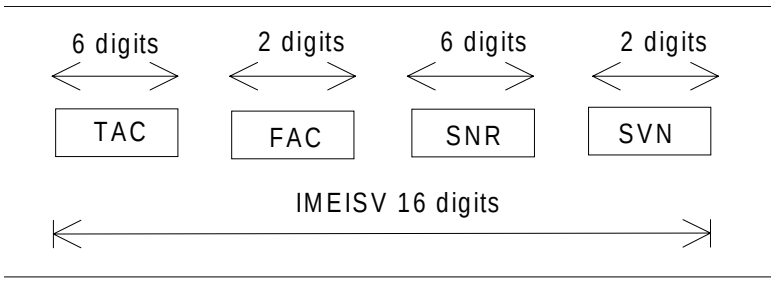

Figure 11: Structure of IMEISV

The IMEISV is composed of the following elements (each element shall consist of hexadecimal digits excluding the digit 'F' due to ISUP restrictions i.e. values (0-E) are allowed only):

- Type Approval Code (TAC). Its length is 6 digits;
- Final Assembly Code (FAC) identifies the place of manufacture/final assembly. Its length is 2 digits;
- Serial Number (SNR) is an individual serial number uniquely identifying each equipment within each TAC and FAC. Its length is 6 digits.
- Software Version Number (SVN) identifies the software version number of the mobile equipment. Its length is 2 digits.

Regarding updates of the IMEISV: the TAC, FAC and SNR shall be protected against change after the ME's final production process, i.e. only the SVN part of the IMEISV can be modified (see GSM 02.16).

6.3 Allocation principles

The Type Approval Code (TAC) is issued by a central body.

The place of final assembly (FAC) is encoded by the manufacturer.

Manufacturers shall allocate individual serial numbers (SNR) in a sequential order.

For a given ME, the combination of TAC, FAC and SNR used in the IMEI shall duplicate the combination of TAC, FAC and SNR used in the IMEISV.

The Software Version Number is allocated by the manufacturer after authorization by the type approval authority. SVN value 99 is reserved for future use.

The IMEI digit values have restrictions which are modified at cut-off date. Before the CUT-OFF DATE (TBD) only bcd coded values (0-9) are allowed. After CUT-OFF DATE (TBD) IMEI digits may have hexadecimal values excluding the digit 'F' i.e. values (0-E) are allowed.

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CHANGE REQUEST

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03.03	**CR**	**A048**	Current Version:	6.5.0

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

For submission to: CN#08 *list expected approval meeting # here ↑*

For approval [X] for information [ ]

strategic [ ] non-strategic [X] *(for SMG 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: *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [X]

Source: N4 **Date:** 30.05.00

Subject: Hexa IMEI

Work item: TEI

Category: *(only one category Shall be marked With an X)*

F	Correction		
A	Corresponds to a correction in an earlier release	X	
B	Addition of feature		
C	Functional modification of feature		
D	Editorial modification		

Release:

Phase 2	
Release 96	
Release 97	X
Release 98	
Release 99	
Release 00	

Reason for change:

The current IMEI structure is proposed to be changed to use hexadecimal coding instead of current BCD. The usage of "F" in hexadecimal IMEI is restricted, because in the case of emergency call without SIM-card, the IMEI is used as calling party number. The calling party number is used in ISUP and according to ISUP specifications (Q.762, Q.763, and Q.764), "F" is not allowed in calling party number.

The change is proposed in 3GPP TSG-CN,TSG-S, TSG-T and TSG-R to allow 11.4 million mobile terminals to be produced with one Type Approval Code. The current restriction for one million units per TAC is already a problem in the GSM terminal manufacturing and can only be predicted to worsen in the future.

Change to use hexadecimal coding is most simple since it does not affect to existing message lengths in GSM air interface and network interfaces.

The proposal is to have certain deadline, after which all networks support hexadecimal coded IMEI. This should take care of the compability issues between hexadecimal and decimal coded IMEI. The feasibility of the whole hexadecimal IMEI scheme will be decided in coming TSG-CN and TSG-SA plenaries.

Clauses affected: 6.2.1, 6.2.2

Other specs affected:	Other 3G core specifications		→ List of CRs:	
	Other GSM core specifications	X	→ List of CRs:	04.08, 02.16
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:	

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

6.2.1 Composition of IMEI

The International Mobile station Equipment Identity (IMEI) is composed as shown in figure 10.

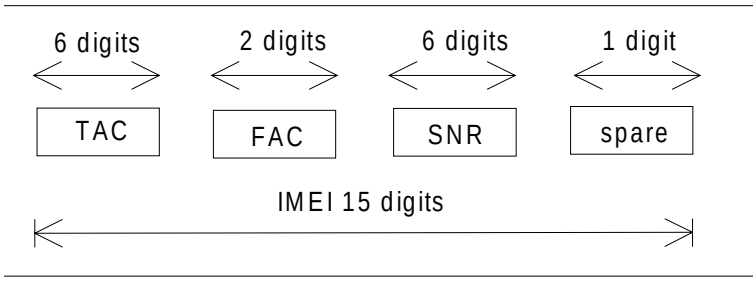

Figure 10: Structure of IMEI

The IMEI is composed of the following elements (each element shall consist of hexadecimal digits excluding the digit 'F' due to ISUP restrictions i.e. values (0-E) are allowed only):

- Type Approval Code (TAC). Its length is 6 digits;
- Final Assembly Code (FAC) identifies the place of manufacture/final assembly. Its length is 2 digits;
- Serial Number (SNR) is an individual serial number uniquely identifying each equipment within each TAC and FAC. Its length is 6 digits.
- Spare digit: this digit shall be zero, when transmitted by the MS.

The security requirements of the IMEI are defined in TS GSM 02.16.

6.2.2 Composition of IMEISV

The International Mobile station Equipment Identity and Software Version Number (IMEISV) is composed as shown in figure 11.

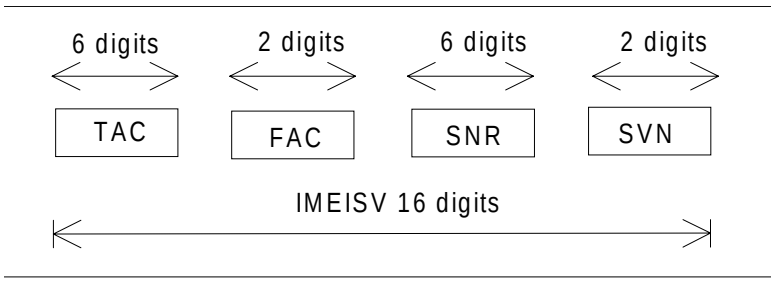

Figure 11: Structure of IMEISV

The IMEISV is composed of the following elements (each element shall consist of hexadecimal digits excluding the digit 'F' due to ISUP restrictions i.e. values (0-E) are allowed only):

- Type Approval Code (TAC). Its length is 6 digits;
- Final Assembly Code (FAC) identifies the place of manufacture/final assembly. Its length is 2 digits;
- Serial Number (SNR) is an individual serial number uniquely identifying each equipment within each TAC and FAC. Its length is 6 digits.
- Software Version Number (SVN) identifies the software version number of the mobile equipment. Its length is 2 digits.

Regarding updates of the IMEISV: the TAC, FAC and SNR shall be protected against change after the ME's final production process, i.e. only the SVN part of the IMEISV can be modified (see GSM 02.16).

6.3 Allocation principles

The Type Approval Code (TAC) is issued by a central body.

The place of final assembly (FAC) is encoded by the manufacturer.

Manufacturers shall allocate individual serial numbers (SNR) in a sequential order.

For a given ME, the combination of TAC, FAC and SNR used in the IMEI shall duplicate the combination of TAC, FAC and SNR used in the IMEISV.

The Software Version Number is allocated by the manufacturer after authorization by the type approval authority. SVN value 99 is reserved for future use.

The IMEI digit values have restrictions which are modified at cut-off date. Before the CUT-OFF DATE (TBD) only bcd coded values (0-9) are allowed. After CUT-OFF DATE (TBD) IMEI digits may have hexadecimal values excluding the digit 'F' i.e. values (0-E) are allowed.

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CHANGE REQUEST

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03.03	**CR**	**A049**	Current Version:	7.4.0

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

For submission to:	CN#08	For approval	X	strategic		*(for SMG use only)*
list expected approval meeting # here ↑		for information		non-strategic	X	

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 [ ] ME [X] UTRAN / Radio [ ] Core Network [X]

Source: N4 **Date:** 30.05.00

Subject: Hexa IMEI

Work item: TEI

Category: *(only one category Shall be marked With an X)*

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

Reason for change:

The current IMEI structure is proposed to be changed to use hexadecimal coding instead of current BCD. The usage of "F" in hexadecimal IMEI is restricted, because in the case of emergency call without SIM-card, the IMEI is used as calling party number. The calling party number is used in ISUP and according to ISUP specifications (Q.762, Q.763, and Q.764), "F" is not allowed in calling party number.

The change is proposed in 3GPP TSG-CN,TSG-S, TSG-T and TSG-R to allow 11.4 million mobile terminals to be produced with one Type Approval Code. The current restriction for one million units per TAC is already a problem in the GSM terminal manufacturing and can only be predicted to worsen in the future.

Change to use hexadecimal coding is most simple since it does not affect to existing message lengths in GSM air interface and network interfaces.

The proposal is to have certain deadline, after which all networks support hexadecimal coded IMEI. This should take care of the compability issues between hexadecimal and decimal coded IMEI. The feasibility of the whole hexadecimal IMEI scheme will be decided in coming TSG-CN and TSG-SA plenaries.

Clauses affected: 6.2.1, 6.2.2

Other specs affected:	Other 3G core specifications		→ List of CRs:	
	Other GSM core specifications	X	→ List of CRs:	04.08, 02.16
	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.

6.2.1 Composition of IMEI

The International Mobile station Equipment Identity (IMEI) is composed as shown in figure 10.

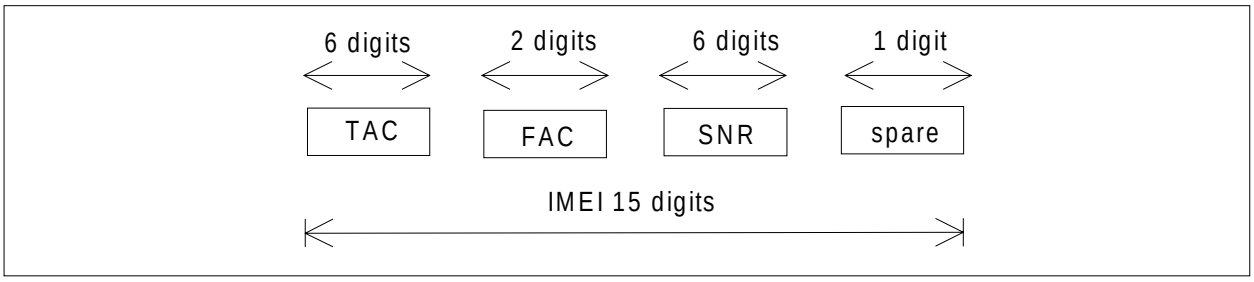

Figure 10: Structure of IMEI

The IMEI is composed of the following elements (each element shall consist of hexadecimal digits excluding the digit 'F' due to ISUP restrictions i.e. values (0-E) are allowed only):

- Type Approval Code (TAC). Its length is of 6 digits;
- Final Assembly Code (FAC) identifies the place of manufacture/final assembly. Its length is of 2 digits;
- Serial Number (SNR) is an individual serial number uniquely identifying each equipment within each TAC and FAC. Its length is of 6 digits.
- Spare digit: this digit shall be zero, when transmitted by the MS.

The security requirements of the IMEI are defined in TS GSM 02.16.

6.2.2 Composition of IMEISV

The International Mobile station Equipment Identity and Software Version Number (IMEISV) is composed as shown in figure 11.

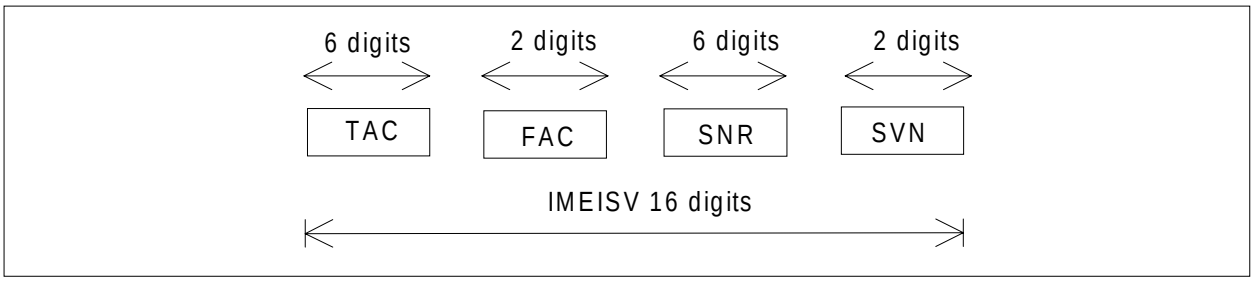

Figure 11: Structure of IMEISV

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- Software Version Number (SVN) identifies the software version number of the mobile equipment. Its length is of 2 digits.

Regarding updates of the IMEISV: the TAC, FAC and SNR shall be protected against change after the ME's final production process; i.e. only the SVN part of the IMEISV can be modified (see TS GSM 02.16).

6.3 Allocation principles

A central body issues the Type Approval Code (TAC).

The manufacturer encodes the place of final assembly (FAC).

Manufacturers shall allocate individual serial numbers (SNR) in a sequential order.

For a given ME, the combination of TAC, FAC and SNR used in the IMEI shall duplicate the combination of TAC, FAC and SNR used in the IMEISV.

The manufacturer allocates the Software Version Number after authorisation by the type approval authority. SVN value 99 is reserved for future use.

The IMEI digit values have restrictions which are modified at cut-off date. Before the CUT-OFF DATE (TBD) only bcd coded values (0-9) are allowed. After CUT-OFF DATE (TBD) IMEI digits may have hexadecimal values excluding the digit ‘F’ i.e. values (0-E) are allowed.

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or for SMG, use the format P-99-xxx

CHANGE REQUEST

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23.003	**CR**	**020r3**	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:	CN#08	For approval	X	strategic		*(for SMG*
list expected approval meeting # here ↑		for information		non-strategic	X	*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: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio		Core Network	X

Source:	N4			**Date:**	30.05.00	
Subject:	Hexa IMEI					
Work item:	TEI					

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

Reason for change:

The current IMEI structure is proposed to be changed to use hexadecimal coding instead of current BCD. The usage of "F" in hexadecimal IMEI is restricted, because in the case of emergency call without SIM-card, the IMEI is used as calling party number. The calling party number is used in ISUP and according to ISUP specifications (Q.762, Q.763, and Q.764), "F" is not allowed in calling party number.

The change is proposed in 3GPP TSG-CN,TSG-S, TSG-T and TSG-R to allow 11.4 million mobile terminals to be produced with one Type Approval Code. The current restriction for one million units per TAC is already a problem in the GSM terminal manufacturing and can only be predicted to worsen in the future.

Change to use hexadecimal coding is most simple since it does not affect to existing message lengths in GSM air interface and network interfaces.

This CR also moves the Annex A from 22.016 to 23.003, because S1 felt that the Annex is too detailed for S1 specification. The Annex is also modified to include the use of hexadecimal coding.

The proposal is to have certain deadline, after which all networks support hexadecimal coded IMEI. This should take care of the compability issues between hexadecimal and decimal coded IMEI. The feasibility of the whole hexadecimal IMEI scheme will be decided in coming TSG-CN and TSG-SA plenaries.

Clauses affected: 6.2.1, 6.2.2, New Annex A

Other specs affected:				
	Other 3G core specifications	X	→ List of CRs:	24.008, 22.016, 25.331
	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.

6.2.1 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.

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 modified Luhn formula, as defined in annex A.

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

The International Mobile station Equipment Identity (IMEI) is composed as shown in figure 10.

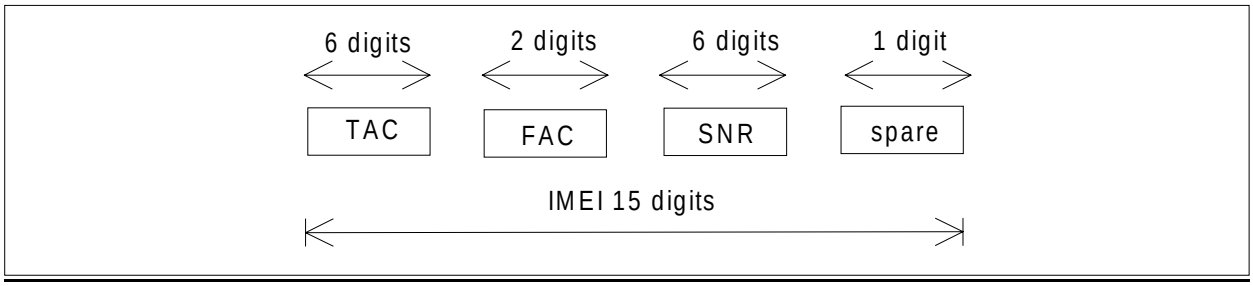

Figure 10: Structure of IMEI

The IMEI is composed of the following elements (each element shall consist of hexadecimal digits excluding the digit 'F' due to ISUP restrictions i.e. values (0-E) are allowed only):

- Type Approval Code (TAC). Its length is 6 digits;
- Final Assembly Code (FAC) identifies the place of manufacture/final assembly. Its length is 2 digits;
- Serial Number (SNR) is an individual serial number uniquely identifying each equipment within each TAC and FAC. Its length is 6 digits;
- Spare digit: this digit shall be zero, when transmitted by the MS.

The security requirements of the IMEI are defined in 3G TS 22.016.

6.2.2 Composition of IMEISV

The International Mobile station Equipment Identity and Software Version Number (IMEISV) is composed as shown in figure 11.

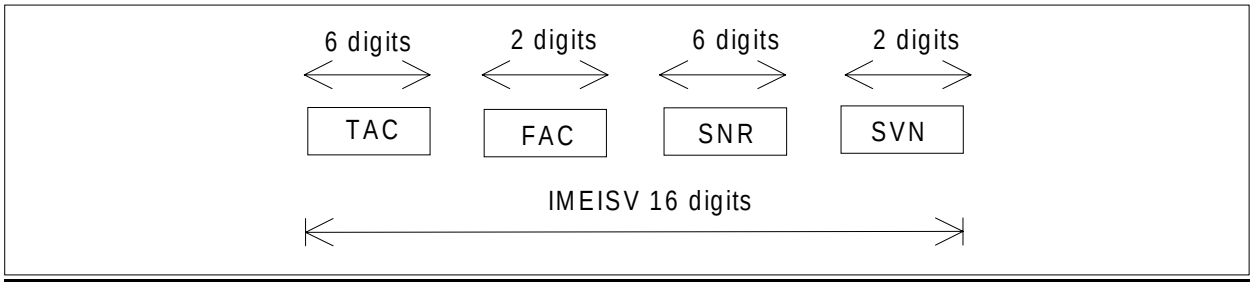

Figure 11: Structure of IMEISV

The IMEISV is composed of the following elements (each element shall consist of hexadecimal digits excluding the digit 'F' due to ISUP restrictions i.e. values (0-E) are allowed only):

- Type Approval Code (TAC). Its length is 6 digits;
- Final Assembly Code (FAC) identifies the place of manufacture/final assembly. Its length is 2 digits;
- Serial Number (SNR) is an individual serial number uniquely identifying each equipment within each TAC and FAC. Its length is 6 digits.
- Software Version Number (SVN) identifies the software version number of the mobile equipment. Its length is 2 digits.

Regarding updates of the IMEISV: the TAC, FAC and SNR shall be protected against change after the ME's final production process; i.e. only the SVN part of the IMEISV can be modified (see 3G TS 22.016).

6.3 Allocation principles

The Type Approval Code (TAC) is issued by a central body.

The place of final assembly (FAC) is encoded by the manufacturer.

Manufacturers shall allocate individual serial numbers (SNR) in a sequential order.

For a given ME, the combination of TAC, FAC and SNR used in the IMEI shall duplicate the combination of TAC, FAC and SNR used in the IMEISV.

The Software Version Number is allocated by the manufacturer after authorization by the type approval authority. SVN value 99 is reserved for future use.

The IMEI digit values have restrictions which are modified at cut-off date. Before the CUT-OFF DATE (TBD) only bcd coded values (0-9) are allowed. After CUT-OFF DATE (TBD) IMEI digits may have hexadecimal values excluding the digit 'F' i.e. values (0-E) are allowed.

Annex A (normative): IMEI Check Digit computation

A.1 Representation of IMEI

The International Mobile station Equipment Identity and Software Version Number (IMEISV), 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:

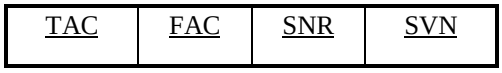

Figure A.1: Composition of the IMEISV

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 decimal converted hexadecimal digits of the IMEISV, that is on the value obtained by ignoring the SVN digits. Note that this slightly modified Luhn check is compatible with the previously employed algorithm, since if none of the digits is >9, the algorithm is reduced to the ISO/IEC 7812.

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 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 D1, D3, D5 ... D13 of the IMEI. Convert the result to decimal numbers.

Step 2: Add together the individual decimal digits of all the seven numbers obtained in Step 1, and then add this sum to the sum of all the even labelled hexadecimal to decimal converted digits D2, D4, D6 ... D14 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 decimal 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	D	3	E	3

Step 1:

2	6	0	5	3	1	7	9	3	8	13	3	14	3
	x2		x2		x2		x2		X2		x2		x2
	12		10		2		18		16		6		6

Step 2:

2 + 1 + 2 + 0 + 1 + 0 + 3 + 2 + 7 + 1 + 8 + 3 + 1 + 6 + 1 +3 + 6 + 1 +4 + 6 = 58

Step 3:

CD = 60 - 58 = 2