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3RD GENERATION PARTNERSHIP PROJECT 2 "3GPP2"

3G Mobile Equipment Identifier (MEID)

Stage 1

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2 Scope

The objective is to define and standardize the structure of the 3G Mobile Equipment Identifier.

3 References

3.1 Normative Reference

[1] 3GPP TS 23.003 Numbering, Addressing, and Identification

[2] X.S0008 Support for the Mobile Equipment Identity (MEID)

3.2 Informative References

Annex 8.1: Mobile Equipment Numbering JEM Report and Conclusion

4 Abbreviations

For the purpose of this document, the following abbreviations apply:

5 General

To facilitate mobile equipment identification and reduce the need to rely on ESNs to track mobiles the need for a new identifier is required. The Mobile Equipment Identifier (MEID) is proposed as a means to achieve these goals. Additionally as global roaming and harmonization between 3G technologies becomes a reality the need for a universal mobile equipment identifier is needed. The MEID is meant to address these issues.

6 Requirements

MEID-01 The MEID shall have a number structure and allocation system that is globally recognized and applied in multiple access technologies.

MEID-02 The MEID shall be able to be transmitted over the air upon a request from the network.

MEID-03 The MEID shall be unique and it shall not be used for subscription authentication.

MEID-04 The network shall be able to deny telecommunication services for a given MEID.

Note: Service denial does not apply to locally allowed services (e.g. Emergency, Customer Service, etc.)

MEID-05 MSs that support MEID shall not use ESN code resources.

MEID-06 The analog air interface shall not be required to support MEID.

MEID-07 The digital air interfaces shall provide a mechanism to notify the MS that it supports MEID on digital only. This may require new procedures and messages for requesting the MEID from the MS by the network.

MEID-08 Backward compatibility should be maintained with introduction of MEID.

MEID-09 Duplication of the Public Reverse Link Long Code Mask in cdma2000®[1] systems should be avoided. For systems that support MEID, such duplication shall be avoided.

MEID-10 It shall be possible to perform OTA on MEID equipped mobiles in all cdma2000 protocol revisions that support OTA.

MEID-11 It shall be possible to perform OTA on ESN-equipped mobile stations in cdma2000 Release D networks and later releases.

7 Procedures

7.1 Normal Procedures With Successful Outcome

This section describes the normal procedures that result in a successful outcome.

7.1.1 Call Detail Record

MEID or pseudo-ESN (or both) should be included in the call detail record.

7.2 Exception Procedures or Unsuccessful Outcome

None identified.

8 Annexes

8.1 Annex 1: Mobile Equipment Numbering JEM Report and Conclusions

Mobile Equipment Numbering JEM

Report and Conclusions

1. Introduction

[1] cdma2000® is the trademark for the technical nomenclature for certain specifications and standards of the Organizational Partners (OPs) of 3GPP2. Geographically (and as of the date of publication), cdma2000® is a registered trademark of the Telecommunications Industry Association (TIA-USA) in the United States.

1.1 The Purpose of the JEM

The group determined the need and the desire to have unique mobile equipment identifiers applicable globally with population capacity far beyond forecasts available to the group for many decades. The JEM focus was on IMT-2000 technologies and their 2G predecessors, however the proposed scheme does not preclude adoption by other RF technologies, provided that this is done under the auspices of the global administrators (GHA and GDA) outlined in this Report.

1.2 The Purpose of this Document

This report reflects the consensus opinion of JEM participants convened to address global circulation of mobile terminals and impacts on the wireless industry equipment numbering. The expectation is that this output document will be considered by the SDO's for adoption in the relevant specifications.

JEM did not recognize any need for regulatory involvement.

1.3 Numbering JEM Terms of Reference (ToR)

Article 1: Numbering Joint Expert Meeting (NUM JEM) is the group of experts convened to propose an equipment numbering structure and administrative guidelines for global applicability in mobile communications.

Article 2: The role of NUM JEM is advisory to the industry.

Article 3: NUM JEM is a temporary joint meeting of experts, convened to provide a recommendation to standards organizations.

2. Planned Uses of Equipment Identifiers

The sole purpose of the identifier is to uniquely identify mobile equipment.

3. Scope and Timeline for Equipment ID

3.1. 3GPP

The GSM IMEI Strategy Forum (GISF) consisting of representatives from the GSM Association (GSMA) representing operators, the European Information, Communications, and Consumer Electronics Technology Industry Association - Cellular Communications Issue Group (EICTA-CCIG) representing most of the global manufacturers, together with representatives from ARIB (Japan) and the GSM North America (GSMNA), have adopted a revised IMEI structure, which is backwards compatible, anticipating the need for expanded numbering capacity as a result of the introduction of third generation terminals and multi-mode terminals.

Since the summer of 2001, administration of the revised system has been entrusted to a third party Contractor, currently BABT Ltd., sponsored

by the GSMA, prior to the establishment of a formal system. Regional allocations are provided by parties such as ARIB under the guidance of the Contractor.

Change requests are now being prepared for submission to the SDO for revision of the ETSI TS 100 508 and 3GPP TS 22.016 specifications to reflect the GISF industry initiative.

3.2. 3GPP2

The three critical items are:

- Global Circulation requirements for unique mobile equipment identification
- Anticipated ESN Exhaustion
- R-UIM and ESN resource pooling

The technical focus is primarily concerned with the global circulation requirements. However, ESN exhaustion and the R-UIM/ESN resource pooling issues provide the impetus for resolving these three items in an expeditious time frame.

3.3. IEEE

The recommendation of this JEM is intended for the sole use in cellular communications.

IEEE expressed no interest to participate in the global equipment identifiers at the time of their March 2002 meeting.

3.4. Others

The final JEM report will be distributed within the industry as widely as possible.

4. Structure, Format, and Capacity of Equipment ID

This group recommends that there should be coordination between the appropriate SDO's and industry groups to ensure that there is no conflict or overlap between the numbering ranges allocated to any group.

A consensus was reached on the use of 56-bit identifier structure expected to be compatible between 3GPP and 3GPP2. The details are described in Sections 4.1 and 4.2

4.1. Structure of Equipment ID for 3GPP

The following structure shall be followed.

TAC								Serial Number						
N	N	T	T	T	T	F	F	Z	Z	Z	Z	Z	Z	CD

Basic 3GPP Format

TAC								Serial Number						SVN
N	N	T	T	T	T	F	F	Z	Z	Z	Z	Z	Z	S S

3GPP Format with SVN

Note that the same structure shall also be used for GSM. The network shall indicate which format is to be utilized.

The function of the digits is:

NN - Reporting Body

TAC - Type Allocation Code

FF - Formerly Final Assembly Code; proposed to be fixed to '00' until Q2 2004 to allow network operators to modify billing systems and associated analysis software.

ZZZZZZ - Serial Number

CD - Check Digit; transmitted as a '0' integrity protection.

SS - Software Version Number

There is a slight transition issue with this approach from an existing Operator's viewpoint. Any existing tools identifying terminals from their TACs would need to be modified to look across an 8-digit field, rather than a 6-digit field. To address this, for the interim period the allocated TAC codes have their two least significant digits (the 'FF' digits) set to '00'. This will allow Operators to use existing software tools. By Q2 2004 the remaining 99 FF values for each NNTTTT can begin to be allocated.

Existing 6-digit TAC codes in the 35 range have been allocated from 350000 to 350299. This means that there are some 9,700 TAC codes still available, whose two LSDs are 00. This range should be sufficient for any reasonable interim period.

Following the interim period, the maximum number of IMEIs available using this scheme would be:

77 (number of free 'NN groups') * 1,000,000 (TAC Codes) * 1,000,000 (Serial Numbers) which is 77,000,000,000,000 terminals (77 * 1012). This quantity is far in excess of any estimated requirements.

4.2. Structure of Equipment ID for 3GPP2

4.2.1. Structure and Format

The proposal is to utilize a structure that is hexadecimal encoded, and syntactically consistent with the IMEI structure. This structure would not utilize all of the fields in the exact semantic manner as is currently utilized with the IMEI. The numbering space would be allocated in a manner that does not impact the current users of the decimally encoded IMEI. The proposed structure is also consistent with the existing ESN allocation scheme using 24-bit Serial Numbers.

The proposed MEID structure:

Manufacturer Code								Serial Number						CD
R	R	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	C

All of these fields are defined as hexadecimal values with the following valid range.

RR - valid range A0 .. FF – globally administered

XXXXXX - valid range 000000 .. FFFFFF

Where possible allocation may be as follows:

000000 - for test/prototype mobiles allocated in small quantities

000001 - FFFFFE - allocated to regional administration bodies or mobile manufacturers, subject to industry agreement

FFFFFF - reserved

ZZZZZZ - valid range 000000 .. FFFFFF

C - valid range 0-F - not transmitted over the air

Note: The distribution of the XXXXXX field may be dependent on the number of administration bodies. In the case of a small number of global administration bodies, the entire XXXXXX may be allocated to identify a mobile manufacturer. In the case of a large number of regional administration bodies, the XXXXXX may be distributed to indicate the regional administration body and the mobile manufacturer, for example XXXX, XX.

4.2.2. Numbering Capacity

The proposed GPP2 identifier structure numbering capacity can be computed as follows:

There are 96 codes when RR is restricted to the A0 .. FF range. Note that additional 60 codes could be made available in the ranges of 0A .. 0F, 1A .. 1F, 2A .. 2F, … , 9A .. 9F, subject to industry agreement.

There are 16,777,215 codes in the XXXXXX field.

There are 16,777,215 Serial Numbers in ZZZZZZ field.

The total numbering capacity would exceed 281 x 10^12 (281 trillion) per RR code.

The current ESN numbering space consists of:

256 Manufacturer Codes (8-bit).

16,777,215 Serial Numbers per Manufacturer Code.

The proposed structure provides for a raw numbering space that is 65,535 times the size of the existing ESN numbering space per RR code. The total numbering space using 96 RR codes represents a space that is 6,291,360 times as large as the current ESN numbering space.

5. Ownership of and Access to Databases for Equipment ID

The group recognizes that the ultimate ownership and content of Equipment Databases rests with the manufacturers of equipment, however the access to databases may be arranged through one or more designated intermediaries as agreed by the industry.

Access to databases should be structured as a lookup to obtain information about a particular type of equipment, and it shall not, for example, reveal any batch information about production lots or equipment quantities of any kind.

6. Administration

The JEM recommends common administrative guidelines for the Mobile Equipment Identifier. It is envisaged that 3GPP, 3GPP2, and their constituent SDOs and market representation partners would develop, approve, and implement the guidelines. Individual participants of the JEM are available to help progress this work.

The principles governing administration include:

- Impartial administrators with clearly defined scope and charter shall be appointed. There shall be a Global Decimal Administrator (GDA) and a Global Hexadecimal Administrator (GHA). The GDA and GHA shall

coordinate the overall allocation of the equipment identifier. The global administrators allocate numbers to regional administrators or to manufacturers. For example, GSMA acts as the GDA, with ARIB as a regional administrator.

- The global administrators shall periodically jointly review the process in line with the guidelines.

- Regional administrators shall allocate numbers to manufacturers, working in conjunction with the global administrators. Administrators shall recognize assignments made by other administrators.

- The GDA and GHA shall provide information to each other on all allocations made.

- The administration process shall not make available confidential detailed information on the numbers of specific types of terminals manufactured.

- The principal duty of the administrator(s) shall be to manage equipment identifier numbering space. Identifiers shall be assigned to permit the most effective and efficient use of a finite resource in order to maximize the existing allocated resource inventory and to defer, as long as practical, the need to request additional identifier resources.

- Mobile equipment manufacturers shall be able to deal directly with the administrator(s).

- The administrator(s) shall in no way impede production flows and shall respond to a request by a manufacturer without undue delay. In the longer term, an automatic process of number assignment should be investigated.

- The administrator(s) shall make assignment allocations available in the fashion that meets industry needs.

7. Migration/Implementation Issues

The specification of the Mobile Equipment ID should consider the most efficient implementation and numbering structure, which will:

(a) Minimize impact on existing infrastructures and systems

(b) Provide for migration from legacy systems as follows:

- completion of modifications to standards (e.g., CRs) by EOY 2002

- deployment by EOY 2003.

These dates are due to impending ESN exhaustion.

The migration path to the Mobile Equipment ID from existing equipment ID schemas, such as ESN, should be clearly outlined.

A detailed schedule for initial implementation, migration milestones, legacy support phases and interoperability shall be the responsibility of the Groups with jurisdiction over the respective existing equipment ID schemas; such as 3GPP, 3GPP2, and their constituent SDOs.

8. Equipment IDs for Multi-Mode Terminals

The JEM agreed that Multi-Mode terminals needed to meet the requirements of all areas. The two basic formats are shown below:

3GPP IMEI

TAC								Serial Number						CD
R	R	T	T	T	T	F	F	Z	Z	Z	Z	Z	Z	C

3GPP2 MEID

Manufacturer Code								Serial Number						CD
R	R	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	C

Digits

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Note that the 3GPP IMEI-SV is not discussed in this section, but is mentioned earlier in this document. It is expected that any Multi-Mode terminal would support the IMEI SV format when operating in the 3GPP modes. This format is not discussed in this section, since it has no direct impact on the multi-mode operation.

The 3GPP and 3GPP2 IMEI/MEID ca be identified as follows.

Digits with Common use:

1-2	RR	Reporting Body Identifier- the body that recorded the IMEI/MEID in the appropriate register. In the case of the 3GPP IMEI this shall be in the range 00 to 99; In the case of the 3GPP2 MEID this shall be in the range A0 to FF
9-14	ZZZZZZ	Serial Number - In the case of the 3GPP IMEI this shall be in the range 000000 to 999999; In the case of the 3GPP2 MEID this shall be in the range

		000000 to FFFFFF
15	C	Check Digit- In the case of the 3GPP IMEI this shall be in the range 0 to 9 when marked on the handset and/or packaging and when displayed on the handset following the input of *#06# to the MMI. It shall, however, be transmitted as 0.In the case of the 3GPP2 MEID this shall be in the range 0 to F, but shall not be transmitted.

Digits with Differing use:

3-8	TTTTFF	TAC Code - 3GPPThis shall be a unique code in the range 000000 to 999999 which identifies the Manufacturer and Model. It shall be allocated by the reporting body on request.
3-8	XXXXXX	Mobile Manufacturer Code – 3GPP2 This shall be a code in the range 000000 to FFFFFF that identifies the mobile manufacturer, or regional administration body & mobile manufacturer. It shall be allocated by the reporting body on request.

For a multi-mode (3GPP2/3GPP or 3GPP2/GSM) terminal to meet the requirements of both regions, the following rules need to be applied:

1. All digits are to be decimal (i.e., none of the A through F digits may be used).

2. The code in digits 1 to 8 shall be assigned by an appropriate body and communicated to all relevant bodies (including the GSM Association).

3. The code in digits 3 to 8 shall specify a terminal type and manufacturer

Since the RR digits cannot be hexadecimal, the allocation must be from the 3GPP RR range. Consequently, in order that these digits can be allocated, the GSM Association's Contractor will need to gather suitable information to allow a six-digit TAC code to be provided.

Blocks of decimal numbers shall be allocated from the 3GPP RR Range by the GDA to the GHA solely for use with multi-mode terminals that include 3GPP (WCDMA / GSM) technologies. Initially, the GDA will allocate from RR=35 upwards and the GHA will allocate from RR=99 downwards. Coordination will ensure that previously allocated blocks will not be overwritten. The GHA shall provide IMEI blocks to handset manufacturers according to the principles embodied in this document.

Should there be a need for the GDA to obtain Hexadecimal blocks then these blocks shall be provided by the GHA.

Both the GDA and GHA shall provide information to each other on all allocations made.

Appendix A: List of Acronyms and Abbreviations

3GPP	Third Generation Partnership Project
3GPP2	Third Generation Partnership Project Two
ARIB	Association of Radio Industries and Businesses
BABT	British Approval Board for Telecommunications
CD	Check Digit
CDMA	Code-Division Multiple Access
EICTA-CCIG	European Information, Communications, and Consumer Electronics Technology Industry Association – Cellular Communications Issue Group
EOY	End of Year
ESN	Electronic Serial Number
ETSI	European Telecommunication Standards Institute
FAC	Final Assembly Code
GDA	Global Decimal Administrator
GHA	Global Hexadecimal Administrator
GISF	GSM IMEI Strategy Forum
GSM	Global System for Mobile Communication
GSMA	GSM Association
GSMNA	GSM North America
IEEE	Institute of Electrical and Electronics Engineers
IMEI	International Mobile Equipment Identity
IMT-2000	International Mobile Telecommunication 2000 Systems

	Systems
JEM	Joint Expert Meeting
LSD	Least-Significant Digit
MAC	Medium Access Control
MEID	Mobile Equipment Identity
MMI	Man-Machine Interface
R-UIM	Removable User Identity Module
SDO	Standards Development Organization
TAC	Type Allocation Code
TS	Technical Specification
SV	Software Version
WCDMA	Wideband Code Division Multiple Access

8.2 Annex 2: Decimal Representation of MEID

See [2].

8.3 Annex 3: Check Digit Computation

See [2].