3GPP TSG RAN Meeting #19 **RP-030128**
Birmingham, United Kingdom, 11 – 14 March 2003

Title:	**Revised Draft Report of the "Early UE" Ad Hoc meeting (Sophia Antipolis, France 29 – 30 January 2003)**
Document for:	**Approval**
Source:	**3GPP support team**

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1 Opening of the Meeting

Francois Courau (Chairman) opened the meeting at 9:00 Wednesday 29th. The agenda proposed in document **RPA030001** was approved without comments.

As a reminder, the requirement from TSG RAN for this Ad Hoc is the following:

> *The TSG RAN Ad Hoc shall select the content of the Information Element to be sent from the Core Network to the RNC. The identified solutions are either the full IMEI-SV or a bit string based on IMEI-SV defining what is correctly or not supported by the UE. After having selected a solution, a LS shall be sent to relevant CN and SA working groups*

The chairman informed the participants about the IPR obligations of the 3GPP member companies according to the Policies of Organizational Partners.

The attention of the members of this Technical Specification Group is drawn to the fact **that 3GPP Individual Members have the obligation** under the IPR Policies of their respective Organizational Partners to **inform their respective** Organizational Partners **of Essential IPRs they become aware of**.

The members take note that they are hereby invited:

- to investigate in their company whether their company does own IPRs which are, or are likely to become Essential in respect of the work of the Technical Specification Group.
- to notify the Director-General, or the Chairman of their **respective** Organizational Partners, of all potential IPRs that their company may own, by means of the IPR Statement and the Licensing declaration forms.

2 Documents and discussions

RPA030004 Efficient handling of early mobiles with the UTRAN (Vodafone)

Alan Law (Vodafone) presented this document.

The documents first highlights the requirements from an operators perspective:

- Ensure that a UE with specific behaviour issues, despite a legitimate attempt to implement the standards, can be handled in a stable manner within the UTRAN in a timely fashion
- Validated UE behaviour should be documented in the standards, together with recommended handling of the behaviour. This should result in common behaviour of UEs in the long term, with consistent handling across networks aiding roaming.

Vodafone also remarks that a solution has to be reached in this Ad Hoc, so vendors can start the implementation it as soon as possible. Vodafone recommends the adoption of the IMEISV solution, a number of arguments are proposed in the document.

Laurent Thiebaut (Alcatel) noted that document **RPA030003** (Efficient handling of early mobiles with the UTRAN, Alcatel) gives remarks and responses to the arguments presented by Vodafone in RPA030004. The document was not comprehensively presented, but it was however used as a basis for the discussion.

The chairman noted that the intention of the mechanism being discussed is not to solve the situation of a new UE being put into service and behaving incorrectly in existing networks or, plainly, not working; but the case instead when a feature is activated in the network, and as a result all UE (or many) stop working or start malfunctioning.
In such scenario, a feature, which might have been part of the standard, was not implemented in the networks against whom the terminals were tested in the IOTs. The feature is implemented at a later stage, and many of the old UEs, not tested under the new conditions, may start presenting problems.
As an exemple, he cited DSCH (already in the standard) that may not be used in the first deployment of networks, but activated later.

Denis Fauconnier (Nortel) questioned the "Validated UE behaviour" (requirement 2) and warned that incorrect behaviour could become a new option in the standard, as a solution is implemented in the networks without prior discussion in 3GPP. In a way such a solution could be considered "validated" and forced into the standard.
Some UEs models may have incorrect behaviour, if this is somehow documented in the standard, and even new test cases may be created, the incorrect behaviour may become an standarised optional behaviour.
Denis also pointed the importance of the IOT. If these tests are done properly and comprehensively, the cases of new UEs presenting incorrect behaviour under existing networks would me low.

Haschem Madadi (Three) briefly supported Vodafone's arguments and positioned Three as a supporting company for the IMEISV solution.

Alan clarified that the specific problem on the UTRAN mentioned (bullet 6) actually appear, equipment in operator's networks is normally from more than one vendor. A given UE model may behave differently when connected to the different vendor's equipment. This is very much undesirable from the operator's perspective and it shouldn't be the case, but in real life it is very likely to happen.

Donglin Shen (ATT) noted that the IMEISV might be the best solution for an operator, but probably it is not the best compromise in terms of complexity. The complexity of multiple UE faulty database and solution management/maintenance for IMEI/SV over Iu proposal will result in higher maintenance and operational cost to operators. He also noted that the solution will lead to different behaviour of terminals on different operators, as each will, at least on a first stage, implement a "proprietary" solution. In ATT's view, this is undesirable and so, Donglin expressed support for the bitmap solution.

RPA030008 3GPP's role on handling UE faults using Bitmap on Iu (Alcatel, ATT Wireless, Fujitsu, Lucent technologies, NEC, Nokia, Nortel, Orange, Panasonic, Philips, Siemens & T-Mobile)

Michael Roberts (NEC) presented this document.
The document supports the bitmap approach and emphasizes the importance of discussing the problems and faults in an open and public forum like 3GPP. It presents the following consequences of having the IMEISV available in the RNC:

- Bespoke implementations between UE and RNC manufacturers which give an unfair advantage over those UE and RNC manufacturers that have only implemented the standard. This is foreseen as being both undesirable and unfair, in what is meant to be a global and open standard.
- If a UE has a fault, the fact that IMEI-SV is available to the RNC there is no onus on the mobile manufacturer to bring the problem to the standard and there is no way to force this UE manufacturer to come to the standard. In fact the UE manufacturer may choose to deliberately not announce the

problem. In this case, it is sufficient for the UE manufacturer to negotiate directly with the RNC/Operator in order to fix his problem.

Additionally, it is remarked that an implementation of the patches via a bitmap will ensure that the UEs will have the same behaviour and level of service when roaming from one network vendor to another, or nationally or internationally.

It was discussed the misuse of a particular bit of the bitmap for a proprietary solution, in the form of an operator requesting its mobile providers to set up a bit to one to mark a particular behaviour. It was noted that the same situation can happen with the IMEISV solution, it would be even easier since each different mobile can be immediately identified. Denis Fauconnier (Nortel) explained there is a subtle difference: with IMEISV, it would be possible to have differentiated behaviour and proprietary solutions, and still be in accordance with the standard; whereas the misuse of one of the bits of the bitmap would make those terminals or network uncompliant with the standard as far as the usage of the bit has not been agreed and standardised.

It was raised the situation where UE and network manufacturers address the malfunctioning of a given combination UE & network in an undisclosed way. This arrangements might actually be triggered by the concerned operator. This will produce de facto solutions that are not discussed and agreed by the full comunity. Andrea De Pasquale (Vodafone) addressed these concerns, since even a big operator like Vodafone has different network providers and multiple combinations UE-Network, so it is not foreseeable to arrange in a hidden way each malfunctioning situation.

After some discussion, the requirements from Vodafone in **RPA030004** were edited and agreed as follows:

Operators need a solution that will ensure that a UE with specific behaviour issues, despite a legitimate attempt to implement the standards, can be handled in a stable manner within the UTRAN in a timely fashion.
UE specific behaviour should be documented in 3GPP Documentation, together with recommended handling of the behaviour.

It is agreed that this Iu solution is to be used in "exceptional" cases that affect a high number of terminals, and not for small issues. Notably the case of existing terminals that stop working properly when a feature is activated. Per Beming (Ericsson) noted that the other "small" issues have to be addressed somehow, and wondered if those cases would be discussed in 3GPP at all, or documented in the TR approved time ago. ~~Han van Bussel (T-Mobile) clarified that most of these problems can be handled differently and don't need to be brought to 3GPP, the experience of GSM shows that it can be done so. He explained that the problem & solution can be however documented in a 3GPP TR, even if the discussion takes place elsewhere~~ Han van Bussel (T-Mobile) clarified that most of the problems can probably be handled with solutions different to Iu based solutions, e.g. by avoiding certain parameter settings and combinations, as the experience of GSM shows. He explained that the problem & solution can and should be documented in a 3GPP TR.

Andrea Buldorini (TIM) asked which solution would be faster when a problem is detected. Denis Fauconnier clarified that both solutions are equally fast, since the behaviour and the solution has to be discussed and agreed.

Per Beming questioned why "a single solution which is far more likely to be implemented by the operator community" (section 1.1). It was clarified that it is up to the operator to decide if it implements the agreed solution or not. Han van Bussel explained that it is a matter of the cost of the patches and their effect on the

operation of the network. It is clarified that this consideration affects both solutions, with the IMEISV solution a patch would be required for each IMEISV.

There was debate on the size of the information to be transferred on the Iu. Alan Law noted that the IMEISV is fixed, but the bitmap is unpredictable. It may happen that there is a huge number of problems to be solved and bits assigned. It is noted that, even using a bitmap the size of the IMEISV (64 bits), it allows for a huge number of problems to be covered.

RPA030013 LS on Message Size Limitations on Iu and A interface (SA WG2)

Laurent Thiebaut (Alcatel) presented this LS.
This LS contains **RPA030005** (Liaison statement from GERAN2 on Architectural Impacts of Early UE Handling) attached. In this LS, SA WG2 reports the size constraints in the SCCP message "Connection Request" which is normally used to transfer the "HO Request" RANAP & BSSMAP messages.

The chairman commented that SA WG2 actually acknowledges that IMEISV can be transported safely, only the case of bitmap bigger size than the IMEISV would present problems. Hence, a bitmap same size of the IMEISV or shorter wouldn't impact the transfer in SCCP.

RPA030006 Considerations on SCCP limitations for the transfer of information between the core network and the access network (Vodafone)

Ian Park (Vodafone) presented this document.
The document presents a solution to transfer large payload with the SCCP "Connection Request" message, in order to overcome the limitation explained in the LS from SA WG2 in the previous document. It is however noted that the workaround is not compatible with GSM phase 1.

The use of vendor specific ID within the bitmap was heavily contested, Antti Toskala (Nokia) commented that the principle of the bitmap, 3GPP specified, was that it would be vendor independent. Antti questioned also the need to transfer the bitmap in such early SCCP message. Alan Law (Vodafone) explained that in order to have the information in the RAN as soon as possible, such solution is preferable against using the "Common ID" procedure, which takes place later. There was some debate on which option, early SCCP messages or "Common ID", would be better from RAN WG3 perspective. It seems that the proposal for the SCCP "Connection Request" message has not been reviewed in RAN WG3, Vodafone is then invited to present it there.

RPA030007 Management of UE faults information in the future (NTT DoCoMo)

Jean Jacques Davidian (NTT DoCoMo) presented this document.
The document deals with architecture issues, and gives two alternatives on where to store the data with the mapping between the IMEISV and the bitmap and when to access that data. It was noted that this is an issue to be discussed in SA WG2, anyhow Juan Noguera (NEC) commented that some impact on UTRAN can be observed in this paper, the first architecture requires that the IMEISV is always sent to the RNC, even if no especial requirements are associated to that IMEISV; in the second architecture the MSC checks with the mapping database first and would only send the specific UE information if it is required. This has an impact on performance. Per Beming (Ericsson) objected this view, the impact on RNC workload of receiving and checking the IMEISV is negligible.

Jean Jacques clarified that NTT's position is to support the bitmap solution rather than the IMEISV.

It was questioned where would the mapping IMEISV-faults be stored in the case of the IMEISV solution. Would it be the RNC or an external centralised database? Vodafone commented that this shouldn't be subjected to standardisation. Denis Fauconnier explained that moving to the RNC the information with the mapping IMEISV-to-problem & patch could be done via O&M in a first stage, but at some point this may become very big to handle and a centralized database, with an additional interface to the RNCs, will be required; this new interface will have to be standardised.

As a summary, the IMEISV solution will put a heavier load in the UTRAN nodes, and the bitmap will charge more the core network. In one case, the database will be distributed in the RNCs, in the second, the mapping database will be centralised. However, no agreement was reached on any solution.

RPA030009 Network implementation considerations for early UE handling (NEC, Alcatel, Fujitsu)

Michael Roberts (NEC) presented this document.
The document examines the impact on network nodes of the two alternatives proposed, and concludes two main differences:

- For the IMEI-SV solution the RNCs must process the IMEI-SV every time an Iu connection is established, irrespective on whether the UE is faulty or not. For the bitmap solution, RNCs only receive the bitmap for UEs requiring special handling.
- In both case the RNC needs to be updated when a new fault is detected, but in addition, with IMEI-SV solution, RNCs need also be updated each time a new terminal version is discovered to have an already existing fault.

It is therefore concluded that the bitmap solution presents lower impact on the RNC.
No comments were made after the presentation.

RPA030011 Early UE Handling (Nokia)

Antti Toskala (Nokia) presented this document
The document presents the requirements to be fulfilled as shown in last RAN TSG meeting (RP-020856), and lists a number of benefits of the bitmap solution against the IMEISV solution.
Alan Law (Vodafone) questioned the storage requirements for IMEISV against bitmap. The 50/100 figures do no seem to be justified, Andrea De Pasquale (Vodafone) noted that the memory requirements are significative if the absolute values are considerable, but 100 times a small memory may still be a small memory.

RPA030010 Early UE - proposal for further work (Siemens)

Alexander Vesely (Siemens) presented this document.
The document proposes a collection of methods to encode UE information into a bitstring, including plain IMEISV. A list of the requirements expressed in the past is also compiled, and then each method is evaluated for each requirement. The solution of choice proposes a bitmap of UE faults together with a pointer to the version of the "Early UE"
.
Juan Noguera (NEC) warned about the flexibility of current network implementations. It might prove very difficult to create a patch to the RNC software given its current state of development.
Juan also commented that situations brought to 3GPP would be those where roaming or handover is affected. The situation were a particular mobile malfunctions in the network of a vendor can be solved among the involved parties and it is unlikely that it is brought to 3GPP. Similar agreements will be reached with other network vendors, and only very few situations would not be solved this way.

RPA030012 Process to handle early UEs in RAN (Nortel, NEC)
Denis Fauconnier (Nortel) presented this document.
The document presents the procedure to follow in 3GPP when faults are detected and a solution is discussed. The document was endorsed in principle, although it was recommended not to make use of the vote by correspondence. Also it is noted that the text is oriented to the bitmap solution, and no agreement has been reached on the solution yet.

3 Conclusion

After many off line sessions, no agreement could be reached on what of the two solutions would be preferable. However, some conclusions could be drawn:

It seemed acceptable that the "Early UE" solutions, as being discussed, will address the case of many different UE models showing the same incorrect behaviour, due to the activation in the networks of a feature that, for whatever reason, had not undergone proper interoperability testing.

The case of faulty mobiles, due to insufficient IOT testing or erroneous implementation of the standard by one manufacturer, was believed to be a completely different situation which should be addressed separately. It was unclear if these cases should be handled by 3GPP, by an external fora (i.e. GCF) or by private agreements between the interested parties.

It was accepted that work could progress even if the actual solution isn't agreed. Both cases imply the transfer of an Information Element with some kind of UE specific information (UESBI), it is believed that the architecture could be defined independently. Also, the changes to the RANAP, and other Core Network protocols, could be agreed without having the actual semantics of the IE defined.

As a conclusion, the meeting drafted a LS informing the interested parties of the status of the discussions.

RPA030014 LS on early UE handling (TSG RAN Ad Hoc)
Denis Fauconnier (Nortel) presented this LS
The LS informs SA WG2, CN WGs, RAN WGs and GERAN of the lack of agreement on the actual contents of the information element UESBI to be transferred. The LS notes that this will be decided by TSG RAN at a later stage . However, SA WG2 is prompted to finish the work on the architecture to exchange the UESBI, independently of the semantics, RAN WG3 and CN WGs are required to prepare the CRs to the relevant protocols and to point to 25.413 (RANAP) for the final definition of the IE semantics.

Alexander Vesely (Siemens) noted that this is probably the worst result, as no decision has been actually taken. He noted that approving the CRs for a UESBI container now, but not defining the contents or the use, would allow proprietary implementation of that content. It was noted that the extension container mechanism, already approved at last RAN, would allow for any the implementation of proprietary procedures for information exchanges between the nodes.
Some debate aroused on the size of the container, and the possibility to transfer it through the MAP. It seems however that a size between 8 and 16 octets is informally agreed.

The chairman recommended companies to task their SA WG2 delegates to put as much effort as possible to study the issue.

4 Closing of the meeting

The chairman closed the meeting on Thursday 30th at 13:00. He thanked the participants for their involvement and ETSI for the organization.

Annex A: List of participants

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Annex B: List of documents

All the meeting documents can be found at:
ftp://ftp.3gpp.org/tsg_ran/TSG_RAN/TSGR_AHs/2003_01_Early_UE/

Tdoc	Title	Source
RPA030001	Draft Agenda	Chairman
RPA030002	On the location of the conversion IMEISV to bitmap of UE faults (BMUEF)	Alcatel
RPA030003	Efficient handling of early mobiles with the UTRAN	Alcatel
RPA030004	Efficient handling of early mobiles with the UTRAN	Vodafone
RPA030005	Liaison statement from GERAN2 on Architectural Impacts of Early UE Handling	Vodafone
RPA030006	Considerations on SCCP limitations for the transfer of information between the core network and the access network	Vodafone
RPA030007	Management of UE faults information in the future	NTT DoCoMo
RPA030008	3GPP's role on handling UE faults using Bitmap on Iu	Alcatel, ATT Wireless, Fujitsu, Lucent technologies, NEC, Nokia, Nortel, Orange, Panasonic, Philips, Siemens & T-Mobile
RPA030009	Network implementation considerations for early UE handling	NEC, Alcatel, Fujitsu
RPA030010	Early UE - proposal for further work	Siemens
RPA030011	Early UE Handling	Nokia
RPA030012	Process to handle early UEs in RAN	Nortel, NEC
RPA030013	LS on Message Size Limitations on Iu and A interface	SA WG2
RPA030014	LS on early UE handling	3GPP TSG RAN ad-hoc