**3GPP TSG RAN Meeting #18** ***Tdoc: RP-020817***
**New Orleans, USA 03-06 Nov 2002**

**Source:** 3, **Ericsson, Telecom Italia spa**

**Title:** **Handling of Early Mobiles**

**Agenda item:** **8.7.1**

**Document for:** **Discussion & Approval**

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## 1. Introduction

At RAN#17 there was discussion about the handling of early mobiles. The outcome of the discussion was the creation of an SI to study various solutions by RAN Working Groups. Further discussion took place in RAN2 and RAN3 resulting in a set of technically endorsed CRs for approval by TSG RAN dependent on the final decision.

The intention of this contribution is to highlight the view of the proponents of this contribution on the preferred solution to address the handling of early mobiles.

## 2. Requirements

The chosen solutions must fulfil the following requirements:

- Shall provide an effective tool for operators to handle early/faulty mobiles. Solutions, which don't meet operators' requirements will defeat the very purpose of the solution especially, because the operators have to live with early/faulty mobiles.
- Shall facilitate segregation of faulty mobiles. The use of good implementation of a specific feature in a particular terminal should not be penalised due to some bad implementations of the same feature.
- Shall not introduce changes to the terminals at this late stage of R99, unless a major fault is observed.
- Shall address ALL early R99 mobiles. Introducing changes to R99 mobiles in Dec02 version of the specification will not address mobiles tested up to Stage1(Mar 02 of the core spec) and Stage2(Sep 02 of the core spec) of GCF certification criteria. Terminals tested up to Stage1 and Stage2 are expected to be widely available in the market by Dec03.
- Shall provide means for operators to take contingency measures in the event of deadlock situations (e.g. arguments regarding misinterpretation of spec vs violation of the core spec) in standards when a fault is observed.
- The solution shall be capable of handling faults likely to arise during the early part of the RRC connection establishment.
- The chosen solution should be complete i.e. any solution adopted in the UTRAN should compliment any CN solution.

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## 3. Solutions Being Considered

Initially, any fault identified that affect network implementations of standardised features is expected to be captured in a TR (equivalent to 09.94). This should highlight the fault and any possible workaround or actions expected by networks implementing the feature, where the

feature is shown to be broken due to incorrect or non-compatible standards specification, or possibly due to a different interpretation of an ambiguous specification.

Secondly the following additional mechanisms are being considered to help the UTRAN manage possible faults with specific early mobiles:

?? **Extension Container Mechanism to RRC messages**
This is a general mechanism being proposed for RRC, to allow R99 changes to be introduced after Rel4 will be frozen for non-backward compatible changes. We expect this mechanism to be used also to support the addition of Hooks as well as Compressed IMEISV to RRC messages. This mechanism, as such, is not an alternate solution for handling of early mobiles.

?? **Hooks included in some RRC messages.**
We believe that, with this mechanism, when identified faults are fixed, they are mapped to a specific bitmap that will be coded within the Extension Containers. This will provide the RNC, with an early indication that an identified problem is fixed in a specific terminal. It is expected that the extension containers can be included in all the required RRC messages with the exception of RRC Connection Request message, where a fixed size(4 bits) of extension bits will be added due to a limitation in the available number of bits that may be coded in this message. There are two hooks mechanism identified:

- UE Specific Behaviour 1 (4 bits/8 bits): This does not require any changes to terminals unless any major fault related to RRC connection establishment is identified. This information becomes available to the RNC during early phase of RRC Connection establishment.
- UE Specific Behaviour 2(16 bits + 256 bits variable): This would require changes to terminals even before(now) observing any major fault. This will also not address Stage1 and Stage2 terminals of GCF certification criteria. This information becomes available to the RNC during early phase of RRC Connection establishment.

This mechanism will not facilitate segregation of just the faulty mobiles, but rather all mobiles without the hook.

?? **Compressed IMEISV send from UE to RNC**
This mechanism will facilitate segregation of just the faulty mobiles. However, this mechanism will introduce changes to the mobiles at this stage of R99 as it would be required in all mobiles, whereas mobiles supporting earlier versions of the specification will not support this indication and so can not be managed accordingly.

?? **Bitmap derived from IMEISV in the CN and send to the RNC**
This mechanism rely on providing standardised fault bitmap derived from IMEISV being delivered from CN to RAN over the Iu interface. The bitmap information becomes available to the RNC late during the call setup phase. This mechanism would require a database to be maintained in the CN. The database should do the mapping between IMEISV and the known faults associated with the mobiles.

This mechanism doesn't provide means for operators to take contingency measures in the event of deadlock situations (e.g. arguments regarding misinterpretation of spec vs violation of the core spec) in standards when a fault is observed. Alternative could be to use operator-defined bitmaps leading to a proprietary Iu interface (or) recall the faulty terminals (or) turn-off the feature.

?? **Full IMEISV send from CN to the RNC**
This mechanism rely on providing full IMEISV from CN to RAN over the Iu interface. This will require a database to be maintained in the RAN. IMEISV becomes available to the

RNC late during the call set up phase. The size of the database can be kept small depending upon the implementation. Proprietary fixes(as feared by some companies) will not be desirable by operators as it will prove to be very costly and the impact, that such fixes would have, on roaming. However, the mechanism can help avoid re-calling early terminals.

## 4. Proposed Solutions

We believe that the solution, which will fulfil the requirements provided in section '2' above is the combination of the following:

- Faults captured in the TR.
- Hooks(UESB1), which do not introduce changes to the terminals at this late stage of R99 and which will provide an indication early, i.e. during RRC connection establishment phase.
- Full IMEISV provided by CN to the RAN.

## 5. Conclusion

It is proposed that TSG RAN discuss and agree on the solution proposed in section 4 of this contribution and approve the relevant CRs. TSG RAN should then inform SA of their recommendation.