**3GPP TSG-RAN Meeting #24** **Tdoc RP-040250**
**Seoul, Korea, 2nd- 4th June 2004**

**Agenda Item:** 7
**Source:** Nokia
**Title:** RAN Guidance for handling of problematic UEs with early UE solution(s)
**Document for:** Discussion & Decision
**Contact**: Antti Toskala, Nokia Networks, antti.toskala@nokia.com

# 1 INTRODUCTION

TSG RAN concluded in June 2003 early UE handling methods with 3 options covered how to address problems with early UEs, namely:

- Bit map over the Iu
- Spare bits in connection set up
- Recommended UTRAN parameterisation/behaviour to overcome particular problems

Recently a problem is detected which is related to the UE support of CELL/URA_PCH state. As this is the first case raised in the actual process of handling early UEs, TSG RAN guidance is needed how to proceed. Also we have received requests rather recently from the field to find solutions to address the 3rd party device in question, the on-going TSG RAN meeting was also the first opportunity to raise the awareness for the issue.

Usage of these RRC states is an important feature of the WCDMA system for long living PS connections and already widely used by the WCDMA networks currently in the field (from the start of the service typically) and is obviously a mandatory one for UEs to support as there is no separate UE capability in 25.306 for this feature.

# 2 Problem description

Recently, a problem related to the UE capability to support CELL/URA _PCH state has been observed. Even though the CELL/URA_PCH state is a mandatory feature of the Rel99 specifications, it has been noted that some UEs on the market do not support this feature.

Therefore, in the scenario where the inactivity of the UEs data transmission in CELL_DCH state is observed in the UTRAN, typically UTRAN implementation will first start state transition from CELL_DCH state to the CELL_FACH state and when inactivity exceeds the thresholds defined, the state transition towards the CELL/URA_PCH state is initiated.

When this very frequent (with NRT data) case occurs to the UE that does not support CELL/URA_PCH state, the radio bearer control procedure used for the state transition attempt will fail, and the UE sends a failure message to the RNC indicating an unsupported configuration. As the network does not know what caused the invalid configuration, the only reasonable solution from the network point of view is to release the RRC connection of the UE after this unsuccessful attempt.

This introduces frequent RRC connection releases and RRC connection establishment procedures when the application of the UE continues data transmission again, thus the setup delay of the RRC connection establishment and RAB assignment deteriorates the packet data transfers performance of the WCDMA network from the end user's service point of view.

# 3 Solution analysis

The first easy conclusion is that as the problem is not related to the connection set-up, the use of the few spare bits in RRC connection set-up is not justified.

The most preferred option should always be common parameterisation for terminals to solve the problem. The obvious approach would be to keep the UEs rather long time in CELL_FACH state. This would however cause all the terminals to have increased power consumption and would be a very bad solution for the industry as whole. Thus this is not recommended either. Additionally increased RNC resource consumption could be observed as well.

What is left is the solution is to use the bits over Iu interface, which could enable to use the different CELL_FACH parameterisation (for inactivity timers) for the problematic terminals only.

Additional problems in the field may rise still from the increased signalling load and connection Releases even in this case, but this seems to be most proper solution to ensure proper support for the terminals in question.

The best solution from the network point of view would be replacement/software update for the devices if the number of the field is still reasonable compared to the cost of implementing workaround in the network side.

# 4 CONCLUSION

It is proposed that problem and the severity of it is discussed, and TSG-RAN gives it's guidance for the way forward.

If it is agreed to use the bit map for the purpose, then CR could be provided still during this meeting to indicate the meaning of the particular bit in the bit map over Iu interface. Alternatively the coming TSG RAN WG2 (Ad Hoc) meeting could be tasked to agree the CR in principle to enable early implementation and use of the workaround in the field.