TSG RAN meeting #14 **RP-010820**

11th-14th of December 2001, Kyoto, Japan

Agenda Item: 8.2.2

Source: Nokia

Title: Comments UP positioning CR's in RP-010766, document R2-012755.

Document for: Discussion

1. Introduction

RAN WG2 sent an LS to RAN WG4 but unfortunately RAN WG4 did not have time at its last meeting to respond to the LS as the main part of LS was an incomplete CR to TS25.331. It would have required quite some time to thoroughly analyse the impacts of CR on the requirements of RAN WG4. Furthermore, it was not indicated by RAN WG2 that all the corrections were intended to Relese-99. Instead it was written in the attached RAN WG2 contribution that "*The amount of changes needed to complete the specifications and possible impact on UEs should be used as a basis for which release these corrections should included. Possible corrections could be part of Rel'99 and the complete set of corrections are introduced in a later release (e.g. Rel'4).*" It seems as RAN WG2 has taken an opinion that more or less all changes are possible for Release99. If this was the intention of RAN WG2, it would have been very beneficial from the RAN WG4 point of view that to receive this information.

The Nokia RAN WG4 delegates have now read the RAN2 CR through and made some observations, which are listed in the following sections.

UE measurement behaviour in different RRC states

Section 9 "Measurements Performance Requirements" of TS25.133 specifies relevant requirements on the measurement period, reporting range, granularity and performance in terms of accuracy for the physical layer measurements (FDD). The physical layer measurements are described and defined in TS25.215 "Physical layer - Measurements (FDD)". On the other hand in the start of Section 9.1"Measurement Performance for UE" it is clearly stated that the requirements of the clause are only applicable for CELL_DCH and state CELL_FACH states.

In idle mode, CELL_PCH and URA_PCH states the UE is required to measure neighbour cells according to the procedures of TS25.304 and the requirements of TS25.133 in order to perform correct cell reselections with reasonable activity in these states. Hence, all relevant parameters and neighbour cell information are broadcast on the BCCH of the serving cell so that the UE does not even need to decode the SFN of the neighbour cell before the actual cell reselection decision has been made. After the actual decision of cell reselection the UE checks the access parameters etc. from the target cell. The proposed UP measurements in CELL_PCH and URA_PCH states may, however, contradict with the assumptions of TS25.304 and TS25.133 since the reporting of time difference between the serving cell and the target cell is not enough for location purposes. In order to achieve good positioning accuracy the network needs to receive as many CPICH code phase time difference measurements as possible.

The impacts of this CR on TS25.304 and TS25.133 are not mentioned either in the isolated impact analysis of the CR, the summary of change or the LS to RAN WG4. Thus, it seems to us that RAN2 has not thoroughly discussed and analysed how these two specifications are affected.

TS25.304 contains measurement rules to allow the optimisation of neighbour cell measurements in HCS and non-HCS cases. This means that the UE may not measure cells enough for UP purposes. If these measurement rules are ignored, especially in case of mandatory measurements (SFN-SFN observed time difference, type 2), which are requested to be reported to the network, we have a clear contradiction between different specifications and functionality descriptions.

The inclusion of UP measurements and measurement reporting into CELL_PCH and URA_PCH states is a new functionality, which significantly affects other procedures and requirements. In addition it can be questioned why this functionality is added at this late stage, since it is known that Iu, Iur and Iub interfaces do not support UP functionality in release-99. On the other hand it is far from clear that this new functionality is essential from the system point of view, and needs to be added for rel-99 terminals and networks.

Radio network based methods

The SFN-SFN observed time difference type 2 measurement is mandatory for the UE. If UP measurements and measurement reporting are required in CELL_PCH and URA_PCH states, it will either reduce the standby time of the UE due to the requirement of decoding the SFN's from all cells the UE can detect or the quality of cell reselections suffers. Either way it will have an impact on the requirements of TS25.133 since the current assumptions would not longer be valid.

The SFN-SFN observed time difference type 2 measurement reporting is totally network driven. The network may request this measurement to be reported regardless of whether the user has activated location services or not. Thus, the user has no chance to affect the standby of the UE by not activating location services. The reference cell for reporting can be controlled by the network, which implies that UE may be required to report cells, which UE has not selected according the cell selection criteria. Also it is not clear from this document about how frequently the UE should update the reference cell information.

As agreed in the RAN WG2 and RAN WG4 joint ad hoc in Sophia Antipolis, Nov. 2000 RAN WG4 has defined that the UE is allowed to have an additional delay of N_{RACH}*50 ms in RACH transmission compared to the normal RACH transmission delay, when SFN decoding is required for the reporting of SFN-SFN observed time difference measurement results for N_{RACH} number of cells on RACH. (Here it is assumed that N_{RACH} intra frequency cells are measurement based on the measurement rules and requirements) For UP measurements in CELL_PCH and URA_PCH states would require similar treatment expect but in this case it is not that simple since the CR defines that UP measurement may also trigger events and periodical reporting.

A separate item there is no concept description on how the "vertical" and " horizontal" positioning estimates are derived. These can be seen as new requirements, and no technical feasibility discussion on physical layer has been concurred based on this proposal. Hence it is highly questionable if the decision of including these is technically feasible.

Assisted GPS methods

CR introduces the UTRAN and GPS time difference to cell frames reporting requirement for time stamping also for terminals having and UE based location calculation. Hence this means that UE is providing assistance data to network. So far in all architecture descriptions this scheme receives assistance data from network to improve the GPS receiver sensitivity. This is a new technical requirement, which makes the UE behaving as a network element. Our understanding is that the UE should not be a network element but instead GPS should be a module, which serves the users or positioning e.g. in case of emergency calls. Time stamping does not serve the UE, which performs the measurements, but on the contrary it burdens the UE e.g. in terms of battery consumption. As pointed out in previous section, the measurement frequency is controlled by the network, which furthermore may result reduced standby times in terminals even in case user may not use the service.

As mentioned in previous section, here as well the network can control the reference cell for reporting, which will degrade the cell reselection performance, due that UE is not in correct cell when it should be. This requirement makes GPS module and UE receiver behaviour dependent to each other, which has not been the original intention in UE based calculation.

The CR sets quite precise procedures how to treat assistance date and measurement reports and for location functionality, which leaves little freedom for optimising the implementation. We do not see this feasible, since it does not allow enough implementation freedom.

Conclusions

If RAN WG2 constantly changes the procedures as basis for RAN WG4, it is impossible to have solid and stable UE performance requirements on physical layer measurements. RAN WG4 requirements have been frozen for considerable time, and only corrections of the requirements of TS25.133 are made at the moment. This proposal includes a multiple of new procedures and technical requirements, which would cause inconsiderate delay to the RAN WG4 work. We also believe that it is too late to change elementary requirements any longer since this would affect the design of physical layer.

The UE performance requirements are essential in order to ensure that all UEs behave on similar manner and hereby the related functions can be taken in use in the network. If any new functionality is added in the very late stage of the finalization of Release-99 and this new functionality causes a contradiction between the current requirements, we cannot guarantee controlled UE behaviour any longer. This means that each manufacture may have to choose its own implementation for incorporating the new functionality into its terminals.

Before the CR could be agreed following topics needs to be addressed:

- The proposal will change the UE implementation in URA_PCH and CELL_PCH states, due to the requirement of decoding of all detectable SFN in these states.
- It is not clear how the reference cell information for reporting purposes will impact the cell selection performance.
- In case of UE based GPS positioning the requirement to UE to report the GPS time difference to UTRAN frame borders has not been a requirement in any RRC states before. This is making UE as a network element, and this is not our understanding of how UE's should behave in the system.

Based on these concerns presented here we think that the CR should not be approved.

4. References

[1] R2-017255 "Correction of UE Positioning"