TSG-RAN Working Group 2 (Radio L2 and Radio L3)

Agenda item:

Source: Rapporteur

Title: Status Report of Work Item “UE positioning enhancements”

Document for: Information

This document provides a status report of the work item ‘UE positioning enhancements‘. TSG-RAN WG2 is the leading working group for this work item. A technical report was created. The TR shall be used for evaluation of new methods and enhancements of existing methods, respectively. During RAN WG2 #19, decisions were made which methods to include in Release 4. The TR was slightly restructured in order to reflect the decisions.

The status of each involved WG is summarised below:

RAN WG2:

In TSG-RAN #9 it was decided to replace the two WIs UE positioning in UTRA TDD and FDD with one titled as UE positioning enhancements. During TSG-RAN WG2 meeting in Bejing, China 9th to 13th October the technical report was created. It was agreed to study the performance of the existing OTDOA method and of a OTDOA method based on listening to the synchronisation channel in more detail.

During RAN WG2 meeting #17 in Sophia Antipolis, France 13th to 17th November, received results from RAN WG1 have shown that the existing OTDOA method as well as an OTDOA method based on SCH listening do not provide sufficient accuracy. Siemens presented a proposal for an IPDL scheme very similar to the one used in FDD. The proposed scheme was agreed within RAN WG2, a descriptive text was added to the technical report and a detailed investigation was initiated in RAN WG1 by a liaison.

Additionally there was a contribution from Qualcomm on an enhancement to GPS, called DGPS-A. There was no decision on that topic. However, it was agreed to incorporate a descriptive text into the TR for information. Further investigations are necessary especially regarding the improvement compared to the existing DGPS-E method.

During RAN WG2 meeting #18 description of impacts on the UTRAN interfaces by introducing IPDLs for TDD was added in the TR. Besides the OTDOA method based on SCH listening was removed. Panasonic presented a proposal for the OTDOA-PE method. There were a lot of open issues identified and therefore the text proposal was not included in the TR.

During RAN WG2 meeting #19 a description of the impact of IPDLs in TDD on power control was added. Besides minor changes to the existing description and the IPDL scheme were made based on a liaison received from RAN WG1. Panasonic presented a detailed description of the OTDOA-PE method. Although there were still some open issues remaining, e.g. impact on the power control of R’99 UEs, it was decided to include the description in the technical report.

At this meeting it was also decided to include only IPDLs for TDD in Release 4. The decision was made conditionally depending on the decisions taken in RAN WG1 on the remaining open issues, e.g. power control. Change Requests to TS 25.305 and TS 25.331 for Release 4 were presented and agreed. During RAN WG1 meeting #19 IPDLs for TDD were also agreed from a physical layer perspective. Work on IPDLs

for TDD is therefore finished in RAN WG2. The methods/enhancements DGPS-A and OTDOA-PE proposed by Qualcomm and Panasonic will be discussed for Release 5.

RAN WG1:

Work in RAN WG1 was initiated by a liaison sent by RAN WG2 during RAN WG2 meeting #15 in Sophia Antipolis. During RAN WG1 meeting #15 in Berlin, Germany 22nd to 25th August, the performance of the existing OTDOA method and of OTDOA based on SCH listening was studied. The results sent back to RAN WG2 have shown that these methods do not provide sufficient accuracy.

Panasonic presented simulation results to RAN-WG1 group regarding the OTDOA-PE UP method during RAN WG1 meeting #16. The results showed that the OTDOA-PE method had the potential to provide a significant increase in positioning accuracy in comparison to OTDOA-IPDL by using a sufficient number of PEs. WG1 with the LS R1-00-1486 confirmed the potential of the method from the physical layer perspective. Qualitative discussions also concluded that the PE impact on UE cell search and system capapcity was expected to be small. Simulation results to quantify these two system effects will shortly be presented to WG1.

After initiation by RAN WG2, RAN WG1 studied the proposed IPDL scheme during their meeting #17, 10th to 25th November in Stockholm, Sweden. RAN WG1 agreed that the proposed IPDL mechanism is feasible from physical layer point of view. First simulation results have shown that IPDLs provide a significant performance improvement.

During RAN WG2 meeting #18, clarifications and simulation results were presented for the IPDL proposal for TDD. This included an update of the IPDL scheme which was agreed as proposed. Some smaller open issues with respect to power control and cell seach were identified.

During RAN WG1 meeting #19 in Las Vegas, USA, modifications to the UL power control were proposed to maintain the quality of service in frames with idle periods and to solve the backward compatibility issue for R99 terminals. Additionally it was clarified, that in case of IPDLs all the transmission except the ones of the SCH codes will be switched off so that performance of cell search is not affected. The corresponding CRs to TS 25.224 and TS 25.221 were agreed and work regarding IPDLs in TDD is therefore finished within RAN WG1.

RAN WG3:

Within RAN WG3 a WI for Release 4 exists in order to provide support on the Iub and Iur interfaces for the positioning methods that were described in the Release 99 stage 2 description (TS 25.305). Within this WI signalling procedures for setup and reconfiguration of cells were extended to support IPDLs for FDD. Additionally an Information Exchange procedure was introduced that can be used by RNCs to exchange IPDL configurations in order to avoid overlapping IPDLs.

At RAN WG3 meeting #19, the above mentioned signalling procedures were extended to also include IPDLs for TDD. The resulting Release 4 CRs 381 to TS 25.433 and CR 328 to TS 25.423 proposing the necessary changes to the NBAP and RNSAP specifications therefore include both, IPDLs for FDD and TDD. The CRs were agreed and so that from RAN WG3 point of view work on IPDLs for TDD is finished.

Regarding the OTDOA-PE and DGPS-A method no work was done within RAN WG3.