TSG-RAN *RP-010799*

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Title: Proposal for Technical Enhancement and Improvement to the OTDOA methods in Release 5. To be conducted under WI35 (UE Positioning Enhancements) or TEI5.

Source: CPS

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Attachments:

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1. Statement of the Problem

Extensive modelling and simulation of OTDOA has indicated that UE positioning is likely to fail approximately 40% of the time in a typical network without the use of an additional technique to mitigate against the "hearability" problem. Idle Period on the Down Link (IP-DL) is a method that overcomes this problem and yields satisfactory coverage for positioning. However, IP-DL reduces network downlink capacity and is complex and costly to implement. With recent improvements in algorithms and technology there is an alternative way of satisfactorily implementing OTDOA.

The Technical Document R2-012313 [1] describes an alternative implementation referred to as Cumulative Virtual Blanking (CVB). By gathering a sample of the signal received by the UE and samples of the signal transmitted by the Node Bs, the algorithms are able to perform interference cancellation in the signal processing domain at the SMLC rather than physically turning off Node Bs as with IP-DL. Therefore, CVB does not impact air interface capacity on the downlink. It is also much simpler to implement, particularly in the UE, and extensive simulations have shown its performance to be significantly better than IP-DL. [2] Another key advantage is that the all the processing is carried out at the SMLC, reducing the computational load on the UE and offering the possibility of future enhancements simply through improvements to the signal processing algorithms at the SMLC.

2. Proposal

It is proposed that further work on improvements to the OTDOA positioning methods in Release 5 be carried out in order to assess CVB as an alternative to IP-DL.

Given the short timescale before the completion of Release 5, it is proposed that initially the work be focussed on changes and enhancements that affect the UE and air interface. Specifically the ability for the UE to return a sample of the received signal to the RNC. This will allow for the possibility of completing the network aspects of the solution in Release 6 knowing that Release 5 UEs are already becoming available.

If the enhancements and improvements are found acceptable to the Work Groups, the results will be presented to RAN and CPS would propose bringing forward a new UE Positioning Work Item at the next Plenary, in order to progress towards full adoption in Release 6.

CPS seeks guidance from RAN as to which of the current Work Items, WI35 or TEI5, is the best vehicle for this work. The aim is to ensure that the current UE Positioning methods will adequately support 3G applications from the launch of commercial networks. CPS is acutely aware that central to this aim is the availability of UEs supporting the required positioning methods.

3. References

[1] R2-012313, Virtual Signal Blanking for the implementation of OTDOA solutions without the need for IP-DL, presented for information in the RAN2#24 workgroup meeting, New York 22-26 October 2001.

[2]   UMTS Hearability Analysis for OTDOA Positioning Methods, Cambridge Positioning Systems, 12th November 2001, http://www.cursor-system.com/sitefiles/engineering/3ghearabilityanalysis1.0.pdf