Technical Specification Group Services and System Aspects
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Introduction

The Observed Time Difference Of Arrival utilising Positioning Elements (OTDOA-PE) method is a variant on the standard OTDOA method whereby the User Equipment (UE) determine its position by measuring radio signals from a number of PEs. The PEs are placed at surveyed locations other than those of the Node B equipment and transmit identifier codes in the downlink at known times with regard to the timing of the serving cell Node B.

This PE based method can be used standalone or used to complement the OTDOA-IPDL methods that use idle periods in the serving base station (leading to traffic loss) to allow the UE to receive neighbouring base stations. The use of PEs should have an advantage over the existing methods in certain environments or locations where other reference sources (Node Bs, satellites) may not be visible to the UEs such as may be the case at the edge of cellular coverage, indoors and rural areas. The PE measurements are very similar to the ones required for OTDOA-IPDL. If supported by terminals, an operator will have the choice of: (i) ignoring this capability, (ii) installing a few PEs in order to achieve positioning where it is not possible with other methods or (iii) installing a significant number of PEs in order to achieve higher accuracy throughout the system.

RAN evolution of the OTDOA-PE method

Details of the OTDOA-PE method were first provided to RAN WG2 in the document R2-001718. The liaison R2-001781 from WG2 requested that RAN WG1 study the performance, applicability and impacts on the system of these enhancements/methods from a physical layer perspective.

Work within RAN WG1 (Papers R1-001186 and R1-00-1389) subsequently 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. Qualitative discussion also concluded that capacity would be affected to a smaller degree than would be the case with the use of idle periods. However, it was also found that by using IPDL, the accuracy of the PE method is better than without IPDL.

The utility of the OTDOA-PE was communicated back to WG2 through the liaison statement R1-001486 issued by WG1.

Next step for OTDOA-PE method

The intention now is to complete the stage 2 functional specification of the OTDOA-PE method for discussion within WG2 and eventual inclusion into Release 4 of documents TS25.171 (Functional stage 2 description of location services in UMTS) and TS25.305 (Stage 2 Functional Specification of UE Positioning in UTRAN).