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To: **TSG-RAN WG4**

Cc: **TSG-RAN WG1, TSG-RAN WG3**

Title: **Response to LS (R4-010193) on Effect of a repeater on OTDOA-based positioning accuracy**

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WG2 is not currently in a position to provide a conclusive answer to the issue of the effect the presence of a repeater will have on positioning accuracy as there are also layer 1 implications. The following reasoning is provided as a means of furthering the discussion.

Multipath poses a problem when fading paths cannot be detected. Paths that can be detected do not decrease accuracy as all but the earliest detectable path are ignored in the OTDOA measurement. In the example given (figure 1 in R2-010301), the signal from the repeater would be ignored and the OTDOA measurement would yield the same accuracy as if the repeater was not there.

OTODA as well as are RTT measurements are meaningful if they can be associated with the reference points – Node B or repeater – that originated the signals on which the measurements were made. Making this association when a repeater is present may not be a simple matter as the repeater is meant to appear as one or many UEs to the Node B. One way would be to use the RTT and OTDOA measurements, the known locations of repeaters in the system, the delay of the repeater (either constant and known or given by LMU measurements), and associate the measurements with the most likely reference point from which they could have been derived.

Although both the RTT and OTDOA measurements will be available in the network for the network based method, for the UE based method only the RTT measurement can be used to deduct which reference point it was taken from. If it has been possible to reliably make this association, in the UE based method the RTT measurement together with the co-ordinates of the reference point will be relayed to the UE and the UE will utilize them as if they relate to a Node B even if the actual reference point may be a repeater.

A tentative conclusion therefore is that provided that the association of the RTT and OTDOA measurements and their reference point has been correctly made, the accuracy of the position calculation will be the same as that made in a network that does not have repeaters.