

Document for: Discussion

Agenda Item: 14.1.1

Motivation for New Wi proposal:

LTE Carrier Aggregation Enhancement Beyond 5 Carriers

Nokia Corporation, NTT DoCoMo Inc., Nokia Networks

Rel-13 WI Proposal: LTE Carrier aggregation enhancement beyond 5 carriers

Review of RAN#65 status:

- At RAN#65, NTT DoCoMo proposed a WI on *UCI Enhancements for LTE Carrier Aggregation* in [RP-141173](#) suggesting to enable PUCCH on SCell.
- At RAN#65, Nokia Corporation proposed a SI on *LTE Carrier aggregation enhancement beyond 5 carriers* in [RP-141418](#), suggesting to study carrier aggregation enhancements enabling up to 16 (at least DL) component carriers.

Changes/Developments since RAN#65:

- DoCoMo and Nokia Corporation decided to merge the individual proposals to a single WI containing the specification of PUCCH on SCell and enabling the aggregation of up to 16 component carriers in UL and DL

Rel-13 WI Proposal: LTE Carrier aggregation enhancement beyond 5 carriers

Motivation and Benefits

- Lot of interest in extending LTE towards capturing the unlicensed spectrum opportunities in the 5GHz band.
 - WLAN operating in the 5GHz band already supports 80MHz in the field and 160MHz to follow in Wave 2 deployment of IEEE 802.11ac.
 - Also on other bands – e.g. 3.5 GHz – allocations may enable more than single carrier on one frequency band in addition to the bands already widely in use for LTE.
 - RAN4 has also been progressing well lately with the CA requirements specification (especially in DL direction) with several 3-DL CA work items being completed as well as several 4-DL CA configurations are under discussion.
- RAN1/RAN2 LTE CA specifications may soon be a limiting factor for further DL CA enhancements
- CA extension beyond 5 carriers provides an opportunity to efficiently utilize the available spectrum for communication needs
 - Increased PUCCH load on (macro-) PCell with increasing no. of carriers or increasing no. small cells in CA scenario 4 calls for enhancements enabling PUCCH on SCell also for the CA framework

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Proposed WI Objectives

Specify mechanisms to enable the **LTE carrier aggregation of up to 16 carriers**:

- Focus on extending the currently available CA framework
- Enhancements to UL control signalling (including how to efficiently accommodate more than 5 CCs)
- Enhancements to DL control signalling
- Enhancements to the higher layer CA framework enabling more than 5 CCs

Specify **support of PUCCH on SCell** for UEs supporting uplink Carrier Aggregation