**3GPP TSG-RAN WG2 Meeting #109e *R2-2001140***

**Online, 24 February – 6 March 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  |  | **CR** |  | **rev** | **1** | **Current version:** |  |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:***  | Clarification on codebook-HARQ-ACK-r13 capability for CA with more than 5CCs |
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| ***Source to WG:*** | Nokia, Nokia Shanghai Bell, Qualcomm Incorporated? |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | LTE\_CA\_enh\_b5C-Core |  | ***Date:*** | 2020-02-28 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | 13 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | To indicate a method which UE supports to determine HARQ-ACK codebook size, the UE signals the capability: *codebook-HARQ-ACK-r13 (*see: TS36.331) as follows:* first bit of the capability set to "1" implies the UE supports the DAI-based codebook size determination
* second bit is set to "1" if the UE supports the codebook determination based on the number of configured CCs.

To support Rel-13 CA aggregation enhancements, RAN1#82bis agreed (see: [report](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_82b/Report/)):* eNodeB can configure by RRC signaling an eCA UE to determine HARQ-ACK codebook size according to either (a) or (b) as follows:

a) DAI based solution (…)b) Number of configured CCs based solution (…)* Both solution (a) and solution (b) are mandatory feature as UE capability from RAN1 recommendation point of views for UEs supporting more than 5 CCs

The requirement added on codebook-HARQ-ACK-r13 in this specification, that was supposed to follow the recommendation, does not explicitly reflect the RAN1 agreement:“For both solutions, it is mandatory for UEs of this release of the specification if carrier aggregation with more than 5 DL component carriers is supported. “  |
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| ***Summary of change:*** | The following change is made:* codebook-HARQ-ACK-r13 capability is updated to reflect better RAN1#82bis agreement:
* Both solution (a) and solution (b) are mandatory feature as UE capability from RAN1 recommendation point of views for UEs supporting more than 5 CCs

**Impact analysis**Impacted functionality: functionality impacted.Inter-operability: 1. If the network is implemented according to the CR and the UE is not the UE may use single HARQ-ACK codebook size determination method that won’t allow more than 5 CCs configuration.
2. If the UE is implemented according to the CR and the network is not there is no interoperability issue.
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| ***Consequences if not approved:*** | Different interpretations regarding support of HARQ-ACK codebook size determination methods exist.  |
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| ***Clauses affected:*** | 4.3.4.42 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*Modified Subclause*

#### 4.3.4.42 *codebook-HARQ-ACK-r13*

This first bit of this bitmap defines whether HARQ ACK codebook size determination based on the DAI-based solution as specified in TS 36.213 [22] is supported by the UE. If the UE supports carrier aggregation with more than 5 DL component carriers, it is mandatory to support HARQ ACK codebook size determination based on the DAI-based solution. .

The second bit of this bitmap defines whether HARQ ACK codebook size determination based on the number of configured CCs as specified in TS 36.213 [22] is supported by the UE. If the UE supports carrier aggregation with more than 5 DL component carriers, it is mandatory to support HARQ ACK codebook size determination based on the number of configured CCs.

*End of Modified Subclause*