**3GPP TSG-RAN WG1 Meeting # 103-e *R1-200xxxx***

**e-Meeting, October 26th – November 13th, 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **36.213** | **CR** | **xxxx** | **rev** | **-** | **Current version:** | **16.3.0** |  |
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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:*** | 36.213 CR on Single UL Tx for EN-DC | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Moderator (Nokia) | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | |  |
|  | *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 can be 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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The UE capability of *semi-staticULTransInAllSubframe* has been divided into two UE capabilities, i.e., .*tdd-PCellUL-TX-AllUL-Subframe-r16* for EN-DC with TDD primary cell and *fdd-PCellUL-TX-AllUL-Subframe-r16* for EN-DC with FDD primary cell. However, the current TS36.213 is still based on the UE capability of *semi-staticULTransInAllSubframe*, which is not correct. | | | | | | | | |
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| ***Summary of change:*** | | Add the correct UE behavior corresponding to *tdd-PCellUL-TX-AllUL-Subframe-r16* for EN-DC with TDD primary cell and *fdd-PCellUL-TX-AllUL-Subframe-r16* for EN-DC with FDD primary cell. | | | | | | | | |
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| ***Consequences if not approved:*** | | Incorrect UE behavior corresponding to *tdd-PCellUL-TX-AllUL-Subframe-r16* for EN-DC with TDD primary cell and *fdd-PCellUL-TX-AllUL-Subframe-r16* for EN-DC with FDD primary cell. | | | | | | | | |
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| ***Clauses affected:*** | | 5.1, 8 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | **Isolated impact analysis:**  This CR is based on RAN1’s common understanding, which has no impact on UE behavior. | | | | | | | | |
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| ***This CR's revision history:*** | | This is the first version for this CR. | | | | | | | | |

## 5.1 Uplink power control

If the UE is configured with *shortTTI*, PUCCH in this clause refers to SPUCCH defined in [3] if the HARQ-ACK is sent in response to PDSCH scheduled by DCI format 7-1A/1B/1C/1D/1E/1F/1G or if the scheduling request is sent on resources configured by higher layer parameter *sr-SlotSPUCCH-IndexFH or sr-SlotSPUCCH-IndexNoFH or sr-subSlotSPUCCH-Resource* for slot/subslot-based transmissions, unless otherwise noted.

If the UE is not configured with *shortTTI* or the UE is configured with *shortTTI*, and UCI is to be transmitted in a subframe, the term 'subframe/slot/subslot' or 'subframe/slot' refers to a subframe in this clause.

If the UE is configured with *shortTTI*, and UCI is to be transmitted in a slot, the term 'subframe/slot/subslot' or 'slot/subslot' or 'subframe/slot' refers to a slot in this clause.

If the UE is configured with *shortTTI*, and UCI is to be transmitted in a subslot, the term 'subframe/slot/subslot' or 'slot/subslot' refers to a subslot in this clause.

Throughout this subclause,

- if the UE is configured with higher layer parameter *shortProcessingTime* and the corresponding PDCCH with CRC scrambled by C-RNTI is in the UE-specific search space, **, otherwise **.

- if the UE is configured with higher layer parameter *shortTTI* and the corresponding PDCCH/SPDCCH with DCI format 7-1A/7-1B/7-1C/7-1D/7-1E/7-1F/7-1G is detected in a subslot, if the UE is configured for subslot uplink transmissions, **is given by higher layer parameter *proc-TimeAdv* from **, otherwise**.

Uplink power control controls the transmit power of the different uplink physical channels.

If a UE is configured with a LAA SCell for uplink transmissions, the UE shall apply the procedures described for PUSCH and SRS in this clause assuming frame structure type 1 for the LAA SCell unless stated otherwise.

For a UE configured with EN-DC/NE-DC and serving cell frame structure type 1, if the UE is configured with *subframeAssignment-r15* for the serving cell, the UE is not expected to transmit any uplink physical channel or signal in the serving cell on subframes other than offset-UL subframes, where the offset-UL subframes are determined by applying an offset value given by *harq-Offset-r15* to the subframes denoted as uplink in the UL/DL configuration *subframeAssignment-r15*.

For a UE configured with EN-DC with primary cell frame structure type 1, if the UE is configured with *subframeAssignment-r16* for a serving cell, and if the UE indicates a capability *fdd-PCellUL-TX-AllUL-Subframe-r16* (as specified in [11]), the UE transmits any uplink physical channel or signal without associated DCI if configured, in the serving cell on any uplink subframes. Otherwise, if the UE is configured with *subframeAssignment-r16* for the serving cell and if the UE does not indicate a capability *fdd-PCellUL-TX-AllUL-Subframe-r16*, the UE is not expected to transmit any uplink physical channel or signal without associated DCI except for PRACH in the serving cell on subframes other than offset-UL subframes, where the offset-UL subframes are determined by applying an offset value given by *harq-Offset-r16* to the subframes denoted as uplink in the UL/DL configuration *subframeAssignment-r16*.

For a UE configured with EN-DC with primary cell frame structure type 2, if the UE is configured with *subframeAssignment-r16* for a serving cell, and if the UE indicates a capability *tdd-PCellUL-TX-AllUL-Subframe-r16* (as specified in [11]), the UE transmits any uplink physical channel or signal without associated DCI if configured, in the serving cell on any uplink subframes. Otherwise, if the UE is configured with *subframeAssignment-r16* for the serving cell and if the UE does not indicate a capability *tdd-PCellUL-TX-AllUL-Subframe-r16*, the UE is not expected to transmit any uplink physical channel or signal without associated DCI except for PRACH in the serving cell on subframes other than offset-UL subframes, where the offset-UL subframes are determined by applying an offset value given by *harq-Offset-r16* to the subframes denoted as uplink in the UL/DL configuration *subframeAssignment-r16*.

For PUSCH, the transmit power  defined in Subclause 5.1.1, is first scaled by the ratio of the number of antennas ports with a non-zero PUSCH transmission to the number of configured antenna ports for the transmission scheme. The resulting scaled power is then split equally across the antenna ports on which the non-zero PUSCH is transmitted.

For PUCCH or SRS, the transmit power , defined in Subclause 5.1.1.1, or is split equally across the configured antenna ports for PUCCH or SRS.  is the linear value ofdefined in Subclause 5.1.3.

A cell wide overload indicator (OI) and a High Interference Indicator (HII) to control UL interference are defined in [9].

For a serving cell with frame structure type 1, a UE is not expected to be configured with *UplinkPowerControlDedicated-v12x0*.

# 8 Physical uplink shared channel related procedures

If the UE is configured with a SCG, the UE shall apply the procedures described in this clause for both MCG and SCG

- When the procedures are applied for MCG, the terms 'secondary cell', 'secondary cells' , 'serving cell', 'serving cells' in this clause refer to secondary cell, secondary cells, serving cell, serving cells belonging to the MCG respectively.

- When the procedures are applied for SCG, the terms 'secondary cell', 'secondary cells', 'serving cell', 'serving cells' in this clause refer to secondary cell, secondary cells (not including PSCell), serving cell, serving cells belonging to the SCG respectively. The term 'primary cell' in this clause refers to the PSCell of the SCG.

If a UE is configured with a LAA SCell for UL transmissions, the UE shall apply the procedures described in this clause assuming frame structure type 1 for the LAA SCell unless stated otherwise.

For a UE configured with EN-DC/NE-DC and serving cell frame structure type 1, if the UE is configured with *subframeAssignment-r15* for the serving cell, the UE is not expected to transmit any uplink physical channel or signal in the serving cell on subframes other than offset-UL subframes, where the offset-UL subframes are determined by applying an offset value given by *harq-Offset-r15* to the subframes denoted as uplink in the UL/DL configuration *subframeAssignment-r15*.

For a UE configured with EN-DC with primary cell frame structure type 1, if the UE is configured with *subframeAssignment-r16* for a serving cell, and if the UE indicates a capability *fdd-PCellUL-TX-AllUL-Subframe-r16* (as specified in [11]), the UE transmits any uplink physical channel or signal without associated DCI if configured, in the serving cell on any uplink subframes. Otherwise, if the UE is configured with *subframeAssignment-r16* for the serving cell and if the UE does not indicate a capability *fdd-PCellUL-TX-AllUL-Subframe-r16*, the UE is not expected to transmit any uplink physical channel or signal without associated DCI except for PRACH in the serving cell on subframes other than offset-UL subframes, where the offset-UL subframes are determined by applying an offset value given by *harq-Offset-r16* to the subframes denoted as uplink in the UL/DL configuration *subframeAssignment-r16*.

For a UE configured with EN-DC with primary cell frame structure type 2, if the UE is configured with *subframeAssignment-r16* for a serving cell, and if the UE indicates a capability *tdd-PCellUL-TX-AllUL-Subframe-r16* (as specified in [11]), the UE transmits any uplink physical channel or signal without associated DCI if configured, in the serving cell on any uplink subframes. Otherwise, if the UE is configured with *subframeAssignment-r16* for the serving cell and if the UE does not indicate a capability *tdd-PCellUL-TX-AllUL-Subframe-r16*, the UE is not expected to transmit any uplink physical channel or signal without associated DCI except for PRACH in the serving cell on subframes other than offset-UL subframes, where the offset-UL subframes are determined by applying an offset value given by *harq-Offset-r16* to the subframes denoted as uplink in the UL/DL configuration *subframeAssignment-r16*.

For a UE configured with EN-DC/NE-DC, if serving cell frame structure type 1 and if the UE is configured with *subframeAssignment-r15* for the serving cell, or if the UE is configured with *subframeAssignment-r16* for a serving cell with EN-DC, the UE is not expected to be configured with more than one serving cell in the uplink.

For a non-BL/CE UE, and for FDD and transmission mode 1 and a cell that is not a LAA SCell, there shall be 16 uplink HARQ processes per serving cell configured with higher layer parameter *ul-STTI-Length,* otherwise 8 uplink HARQ processes per serving cell for non-subframe bundling operation, i.e. normal HARQ operation, and 3 uplink HARQ processes for subframe bundling operation when parameter *e-HARQ-Pattern-r12* is set to *TRUE* and 4 uplink HARQ processes for subframe bundling operation otherwise. For a non-BL/CE UE, and for FDD and transmission mode 2 configured for subframe-PUSCH and a cell that is not a LAA SCell, there shall be 32 uplink HARQ processes per serving cell configured with higher layer parameters *ul-STTI-Length* and *shortProcessingTime,* otherwise 16 uplink HARQ processes per serving cell for non-subframe bundling operation and there are two HARQ processes associated with a given subframe for subframe-PUSCH as described in [8]. The subframe bundling operation is configured by the parameter *ttiBundling* provided by higher layers.

For FDD and a BL/CE UE configured with CEModeA, there shall be at most 8 uplink HARQ processes per serving cell.

For FDD and a BL/CE UE configured with CEModeB, there shall be at most 4 uplink HARQ processes per serving cell if the UE is configured with higher layer parameter *ce-PUSCH-MultiTB-Config,* 2 uplink HARQ processes per serving cell otherwise.

For a BL/CE UE and PUSCH transmission using preconfigured uplink resource, there shall be 1 uplink HARQ process per serving cell.

For a LAA SCell, and transmission mode 1, there shall be 16 uplink HARQ processes. For a LAA SCell, and transmission mode 2, there shall be 32 uplink HARQ processes.

There shall be 16 uplink HARQ processes per TDD serving cell configured with higher layer parameter *ul-STTI-Length*.

In case higher layers configure the use of subframe bundling for FDD and TDD, the subframe bundling operation is only applied to UL-SCH, such that four consecutive uplink subframes are used.

A BL/CE UE is not expected to be configured with simultaneous PUSCH and PUCCH transmission.