**3GPP TSG-RAN2 Meeting #110-e *R2-2006278***

**Electronic, June 1 – 12, 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.306** | **CR** | **0303** | **rev** | **1** | **Current version:** | **15.9.0** |  |
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| *For* [***HELP***](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:*** | Correction on UE capabilities with xDD and FRx differentiations | | | | | | | | | |
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| ***Source to WG:*** | Qualcomm Incorporated | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Core | | | | |  | ***Date:*** | | | 2020-06-11 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-15 |
|  | *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)* | |
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| ***Reason for change:*** | | It was identified that there are multiple possible ways of UE capability indication for the UE capabilities with both xDD and FRx differentiations. | | | | | | | | |
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| ***Summary of change:*** | | It is proposed to clarify that two ways of UE capability indication are allowed by the standard for the UE capabilities with both xDD and FRx differentiations.  **Impact Analysis**:  Impacted 5G architecture options:  NR SA, (NG)EN-DC, NE-DC  Impacted functionality:  UE capability setting for the UE capabilities with both xDD and FRx differentiations.  Inter-operability:   * If the network is implemented according to the CR and the UE is not; The UE may use another way to indicate the UE capabilities that is not allowed by the standard. The network may misunderstand the UE capabiltiies. * If the UE is implemented according to the CR and the network is not; The network may misinterpret the UE capabilities. | | | | | | | | |
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| ***Consequences if not approved:*** | | The UE capability indication for the for the UE capabilities with both xDD and FRx differentiations would not work. | | | | | | | | |
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| ***Clauses affected:*** | | 4.2.1, Annex X (new) | | | | | | | | |
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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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

### 4.2.1 Introduction

The following clauses define the UE radio access capability parameters. Only parameters for which there is the possibility for UEs to signal different values are considered as UE radio access capability parameters. Therefore, mandatory features without capability parameters that are the same for all UEs are not listed here.

The network needs to respect the signalled UE radio access capability parameters when configuring the UE and when scheduling the UE.

The UE may support different functionalities between FDD and TDD, and/or between FR1 and FR2. The UE shall indicate the UE capabilities as follows. In the table of UE capability parameter in subsequent clauses, "Yes" in the column by "FDD-TDD DIFF" and "FR1-FR2 DIFF" indicates the UE capability field can have a different value for between FDD and TDD or between FR1 and FR2 and "No" indicates if it cannot. "FD" in the column indicates to refer the associated field description. "FR1 only" or "FR2 only" in the column indicates the associated feature is only supported in FR1 or FR2 and "TDD only" indicates the associated feature is only supported in TDD.

1> set all fields of UE-NR/MRDC-Capability except fdd-Add-UE-NR/MRDC-Capabilities, tdd-Add-UE-NR/MRDC-Capabilities, fr1-Add-UE-NR/MRDC-Capabilities and fr2-Add-UE-NR/MRDC-Capabilities, to include the values applicable for all duplex mode(s) and frequency range(s) that the UE supports;

1> if UE supports both FDD and TDD and if (some of) the UE capability fields have a different value for FDD and TDD

2> if for FDD, the UE supports additional functionality compared to what is indicated by the previous fields of UE-NR/MRDC-Capability:

3> include field fdd-Add-UE-NR/MRDC-Capabilities and set it to include fields reflecting the additional functionality applicable for FDD;

2> if for TDD, the UE supports additional functionality compared to what is indicated by the previous fields of UE-NR/MRDC-Capability:

3> include field tdd-Add-UE-NR/MRDC-Capabilities and set it to include fields reflecting the additional functionality applicable for TDD;

1> if UE supports both FR1 and FR2 and if (some of) the UE capability fields have a different value for FR1 and FR2:

2> if for FR1, the UE supports additional functionality compared to what is indicated by the previous fields of UE-NR/MRDC-Capability:

3> include field fr1-Add-UE-NR/MRDC-Capabilities and set it to include fields reflecting the additional functionality applicable for FR1;

2> if for FR2, the UE supports additional functionality compared to what is indicated by the previous fields of UE-NR/MRDC-Capability:

3> include field fr2-Add-UE-NR/MRDC-Capabilities and set it to include fields reflecting the additional functionality applicable for FR2;

NOTE: The fields which indicate "shall be set to 1" or "shall be set to *supported*" in the following tables means these features are purely mandatory and are assumed they are the same as mandatory without capability signaling.

NOTE x: For the case where the UE is allowed to support different functionality between FDD and TDD and between FR1 and FR2 according to the specification, the UE capability indication is clarified in Annex X.

For optional features, the UE radio access capability parameter indicates whether the feature has been implemented and successfully tested. For mandatory features with the UE radio access capability parameter, the parameter indicates whether the feature has been successfully tested. In the table of UE capability parameter in subsequent clauses, "Yes" in the column by "M" indicates the associated feature is mandatory and "No" indicates the associated feature is optional. "CY" in the column indicates the associated feature is conditional mandatory and the condition is described in the field description and the associated feature is considered mandatory with capability parameter, when the described condition is satisfied. "FD" in the column indicates to refer the associated field description. Some parameters in subsequent clauses are not related to UE features and in the case, "N/A" is indicated in the column.

UE capability parameters have hierarchical structure. In the table of UE capability parameter in subsequent clauses, "Per" indicates the level the associated parameter is included. "UE" in the column indicates the associated parameter is signalled per UE, "Band" indicates it is signalled per band, "BC" indicates it is signalled per band combination, "FS" indicates it is signalled per feature set (per band per band combination), "FSPC" indicates it is signalled per feature set per component carrier (per CC per band per band combination), and "FD" in the column indicates to refer the associated field description.

# Annex X: UE capability indication for UE capabilities with both FDD/TDD and FR1/FR2 differentiations

Annex X clarifies the UE capability indication for the case where the UE is allowed to support different functionality between FDD and TDD, and between FR1 and FR2. Table X-1 clarifies the setting of UE capability fields for cases where the UE supports the corresponding feature in different combinations of duplex mode and frequency range. There are two possible ways of UE capability indication in Case 3 and Case 8.

Table X-1: UE capability indication for UE capabilities with both FDD/TDD and FR1/FR2 differentiations

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Support for the feature | | Setting of UE capability fields | | | | | |
| Common UE capability (with suffix ‘-XDD-Diff’) | Common UE capability (with suffix ‘-FRX-diff’) | fdd-Add-UE-NR/MRDC-Capabilities | tdd-Add-UE-NR/MRDC-Capabilities | fr1-Add-UE-NR/MRDC-Capabilities | fr2-Add-UE-NR/MRDC-Capabilities |
| Case 1 | * FR1 FDD: ‘supported’ * FR1 TDD: ‘supported’ * FR2 TDD: ‘supported’ | Included | Included | Not included | Not included | Not included | Not included |
| Case 2 | * FR1 FDD: ‘not supported’ * FR1 TDD: ‘not supported’ * FR2 TDD: ‘not supported’ | Not included | Not included | Not included | Not included | Not included | Not included |
| Case 3 | * FR1 FDD: ‘not supported’ * FR1 TDD: ‘supported’ * FR2 TDD: ‘supported’ | Not included | Included | Not included | Included | Not included | Not included |
| Not included | Not included | Not included | Included | Not included | Not included |
| Case 4 | * FR1 FDD: ‘not supported’ * FR1 TDD: ‘not supported’ * FR2 TDD: ‘supported’ | Not included | Not included | Not included | Included | Not included | Included |
| Case 5 | * FR1 FDD: ‘not supported’ * FR1 TDD: ‘supported’ * FR2 TDD: ‘not supported’ | Not included | Not included | Not included | Included | Included | Not included |
| Case 6 | * FR1 FDD: ‘supported’ * FR1 TDD: ‘not supported’ * FR2 TDD: ‘supported’ | The current UE capability signalling does not support the UE capability indication for this case. | | | | | |
| Case 7 | * FR1 FDD: ‘supported’ * FR1 TDD: ‘not supported’ * FR2 TDD: ‘not supported’ | Not included | Not included | Included | Not included | Included | Not included |
| Case 8 | * FR1 FDD: ‘supported’ * FR1 TDD: ‘supported’ * FR2 TDD: ‘not supported’ | Included | Not included | Not included | Not included | Included | Not included |
| Not included | Not included | Not included | Not included | Included | Not included |