**3GPP TSG-RAN2 Meeting #121R2-230xxxx**

**Athens,Greece 27th Feb – 3rd Mar, 2023**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | | |
|  | | | | | | | | | |
|  | **38.306** | **CR** | **0846** | **rev** | **3** | **Current version:** | **16.11.0** |  | |
|  | | | | | | | | | |
| *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)*.* | | | | | | | | | |
|  | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | | | | | |
| ***Title:*** | Clarification on capabilities reported in different granularity with prerequisite | | | | | | | | | | | | | |
|  |  | | | | | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | | | | | |
| ***Source to TSG:*** | RAN2 | | | | | | | | | | | | | |
|  |  | | | | | | | | | | | | | |
| ***Work item code:*** | TEI16 | | | | | | |  | ***Date:*** | | | | 2023-02-17 | |
|  |  | | | | | |  | |  | | | |  | |
| ***Category:*** | **F** | |  | | | | | | | ***Release:*** | | | | Rel-16 |
|  | *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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)*  *Rel-19 (Release 19)* | | |
|  |  | | | | | | | | | | | | | |
| ***Reason for change:*** | In current spec, there are some eMIMO capabilities reported in different granularity with their prerequisite(s). For example, according to current 38.306, UE supports *supportNewDMRS-Port-r16* (which is defined in perband level) should indicate support *singleDCI-SDM-scheme-r16* (which is defined in perFS level) for the band. It is not clear what is the pre-condition to signal *supportNewDMRS-Port-r16* capability, (a) UE shall indicate support *singleDCI-SDM-scheme-r16* for the band in each of the related band combination reported in *BandCombinationList*; or (b) UE shall indicate support *singleDCI-SDM-scheme-r16* for the band in at least one related band combination reported in *BandCombinationList*.  According to the RAN1 LS R2-2209319, RAN1 confirms that for eMIMO features with prerequisite in a finer granularity, the UE shall indicate support of the prerequisite for at least one band/component carrier in at least one band combination. Besides, in the cases the prerequisite is indicated as ‘supported’, the dependent capability with coarser granularity is supported, as long as the dependent capability is indicated as ‘supported’. In other words, the dependent capability is supported in the granularity (e.g. band/component carrier in the band combination) based on the granularity of both the prerequisite and itself. In the case above, *supportNewDMRS-Port-r16* is supported in the FS of the band combination where *singleDCI-SDM-Scheme-r16* is supported, as long as *supporteNewDMRS-Port-r16* is supported in corresponding band.  The above interpretation should be clarified in TS 38.306. | | | | | | | | | | | | | |
|  |  | | | | | | | | | | | | | |
| ***Summary of change:*** | Clairfy that for the capabilties with prerequisite in a finer granularity, UE shall indicate support of the prerequisite for at least one band/component carrier in at least one band combination. Besides, the dependent capability is supported in the granularity (e.g. band/component carrier in the band combination) of the prerequisite when the dependent capability is supported.  **Impact analysis**  Impacted 5G architecture options:  SA, (NG)EN-DC, NE-DC, NR-DC  Impacted functionality:  UE Radio Capability  Inter-operability:  If the network is implemented according to this CR while the UE is not, the UE can not indicate support of the capabilities with prerequisite in finer granulairty if the prerequisite is not supported in any one band/component carrier in one band combination.  If the UE is implemented according to this CR while the network is not, the network may consider the capabilities with prerequisite in finer granulairty as not supported if the prerequisite is not supported in any one band/component carrier in one band combination. Besides, the network may configure the depedent capability in a coarser granularity without taking the granularity of the prerequisite into account, which will exceed UE capability and lead to RRC re-establishment. | | | | | | | | | | | | | |
|  |  | | | | | | | | | | | | | |
| ***Consequences if not approved:*** | The capabilities with prerequisite reported in finer granularity can not be signalled by UE/used by network if the prerequisite is not supported in any one band/component carrier in one band combination.  The dependent capability may be configured in a coarser granularity than its prerequisite, which exceeds UE capability and leads to RRC re-establishment. | | | | | | | | | | | | | |
|  | | | |  | | | | | | | | | | |
| ***Clauses affected:*** | | 4.2.1 | | | | | | | | | | | | |
|  | |  | | | | | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | | | | | |
|  |  | | | | | | | | | | | | | |

<Start of modification>

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.

For capabilities that required to be set consistently for all FDD-FR1 bands (i.e. capabilities that are supposed to be per UE), the UE shall also set capability values for all SUL bands with same values for FDD-FR1 bands if SUL band is supported by 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. Regarding to the per UE capabilities that are FDD/TDD differentiated(i.e. capabilities indicated as "Yes" in the column by "FDD-TDD DIFF"), the corresponding capabilities indicated by the FDD capability is applied to SUL if SUL band is supported by the UE. "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 and not applicable to SUL carriers. "N/A" in the column indicates it is not applicable to the feature (e,g. the signalling supports the UE to have different values between FDD and TDD or between FR1 and FR2).

1> set all fields of UE-NR/MRDC-Capability except fdd-Add-UE-NR/MRDC/Sidelink-Capabilities, tdd-Add-UE-NR/MRDC/Sidelink-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 (or SUL) and TDD and if (some of) the UE capability fields have a different value for FDD (or SUL) and TDD

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

3> include field fdd-Add-UE-NR/MRDC/Sidelink-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/SidelinkParameters:

3> include field tdd-Add-UE-NR/MRDC/Sidelink-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 1: 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 signalling.

NOTE 2: 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 B.

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.

NOTE 3: Unless otherwise specified, for dependent capabilities with prerequisite in a finer granularity, the UE should indicate support of the prerequisite for at least one band/component carrier in at least one band combination. The dependent capability is supported in the finer granularity (e.g. band/component carrier/band combination) where the prerequisite is supported, e.g. a UE indicating support of *supportNewDMRS-Port-r16* (which is defined per band) should indicate at least one band combination with the support of *singleDCI-SDM-scheme-r16* (which is defined per feature set) for the band, and *supportNewDMRS-Port-r16* is supported in the corresponding band of the band combination where *singleDCI-SDM-scheme-r16* is supported.

<End of modification>