**3GPP TSG-RAN WG2 #128**

**Orlando, US, 18-22 November, 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** | **3** | **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 of UE capability restrictions in MUSIM | | | | | | | | | |
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| ***Source to WG:*** | , Huawei, HiSilicon, Samsung, Xiaomi, LG Electronics Inc., Vivo | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
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| ***Reason for change:*** | | 1. RAN2 specified a UE indication (in UE assistance info) allowing the UE to indicate how its capabilities are restricted. But RAN2 also added an indication (e.g. in the RRCSetupComplete) which simply indicate that the UE capabilities are restricted  The intention is that the gNB can understand from the indication that the UE has limited capabilities and configure the UE to be allowed to send UE assistance information wherein the UE can indicate how the capabilities are restricted.  This is an important aspect of the feature, and clarifies how the bits-and-pieces of the stage-3 specification fits together. 2. The term “forbidden and/or affected band(s) or band combination(s)” is changed to “avoided and/or affected band(s) or band combination(s)”, to align with Stage 3 terminology. 3. There is no need in stage 2 to mention that the Early indication (in *RRCSetupComplete/ RRCResumeComplete/RRCReestablishmentComplete* message) sent to Network A is allowed only when UE is in RRC\_CONNECTED state in Network B. Still, text should indicate UE is communicating via the Network B.   One smaller correction is also made:   * Current wording contains a sentence where “Network” should be changed to “Network A“ | | | | | | | | |
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| ***Summary of change:*** | | 1. Added text to describe the use of the indication in RRCSetupComplete/ RRCResumeComplete/RRCReestablishmentComplete to indicate temprary restricted UE capabilities. 2. The term “forbidden and/or affected band(s) or band combination(s)” is changed to “avoided and/or affected band(s) or band combination(s)”, to align with Stage 3 terminology. 3. Replaced text “…while the MUSIM device is already in RRC\_CONNECTED state in Network B.”, with “…due to ongoing transmission/reception in Network B”   Added missing “A” in “Network A” in 20.3.  **Impact Analysis**  Impacted 5G architecture options: NR SA, NR-DC, NE-DC  Impacted functionality: MUSIM  Inter-operability:  If the network is implemented according to the CR and the UE is not, or 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:*** | | The stage 2 text for MUSIM will remain missing important parts of the feature. | | | | | | | | |
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| ***Clauses affected:*** | | 20.3, 20.4 | | | | | | | | |
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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:*** | | R2-2408854, R2-2409224, R2-2409994 | | | | | | | | |

## 20.3 UE notification on Network Switching

For MUSIM operation, a MUSIM device in RRC\_CONNECTED state in Network A may have to switch from Network A to Network B. Network A is NR and Network B can either be E-UTRA or NR. Before switching from Network A, a MUSIM device should notify Network A to either leave RRC\_CONNECTED state, or be kept in RRC\_CONNECTED state in Network A while temporarily switching to Network B.

When configured to do so, a MUSIM device can signal to the Network A a preference to leave RRC\_CONNECTED state by using RRC (see TS 38.331 [12]) or NAS signalling (see TS 23.501 [3]). After sending a preference to leave RRC\_CONNECTED state by using RRC signalling, if the MUSIM device does not receive an *RRCRelease* message from the Network A within a certain time period (configured by the Network A, see TS 38.331 [12]), the MUSIM device can enter RRC\_IDLE state in Network A.

When configured to do so, a MUSIM device can signal to the Network A a preference to be temporarily switching to Network B while remaining in RRC\_CONNECTED state in Network A. This is indicated by scheduling gaps preference. This preference can include information for setup or release of gap(s). The Network A can configure at most 4 gap patterns for MUSIM purpose: three periodic gaps and a single aperiodic gap. The Network A should always provide at least one of the requested gap pattern or no gaps. Network providing an alternative gap pattern instead of the one requested by the UE is not supported in this release.

When configured to do so, a MUSIM device can include priority of periodic gap(s) in addition to scheduling gaps preference, and the priority preference should be indicated for all periodic gap(s). If the MUSIM device indicates gap priority preference, it can also indicate its preference on using *keep solution* (defined in TS 38.133 [13]).

## 20.4 Temporary UE capability restriction and removal of restriction

For MUSIM operation, a MUSIM device in RRC\_CONNECTED state in Network A may indicate its preference on temporary UE capability restriction or removal of restriction via UE assistance information with Network A when the MUSIM device needs transmission or reception in Network B (e.g., including start/stop connection to Network B). Network A is NR and Network B can either be E-UTRA or NR. The MUSIM device may request a temporary capability restriction only after the Network signals via RRC that this is allowed.

When configured to do so, a MUSIM device can indicate one or more of the following temporary capability restriction or removal of restriction to the Network A:

- A MUSIM device can explicitly request SCell(s) or SCG to be released;

- A MUSIM device can indicate its preference on temporary maximum MIMO layers and/or supported channel bandwidth for specific serving cells for both UL/DL;

- A MUSIM device can indicate its preference on the temporary maximum number of CCs per UL/DL;

- A MUSIM device can indicate its preference on the concerned band(s) or band combination(s) (e.g. avoided and/or affected band(s) or band combination(s)) based on a band-filter list configured by network. For affected band(s) and band combination(s), this preference can include temporary maximum MIMO layers and/or supported channel bandwidth for both UL/DL;

- A MUSIM device can indicate the measurement gap requirement changes.

When it is allowed by Network A in SIB1, a MUSIM device can indicate in *RRCSetupComplete/RRCResumeComplete/RRCReestablishmentComplete* message to the Network A that its capabilities are temporarily restricted due to ongoing transmission/reception in Network B. This indication allows Network A to know whether UE capabilities without restrictions can be used by Network A, or if Network A needs to configure the UE to indicate its temporary capability restrictions, as described above. When configured to do so, a MUSIM device can also indicate to the Network A there is no temporary capability restriction via UE assistance information.

When a MUSIM device is in RRC\_CONNECTED state in both Network A and Network B, if Network B is NR, it is up to UE implementation to select which network to request temporary UE capability restriction; if Network B is E-UTRA, the request for temporary UE capability restriction can only be performed on Network A.