**3GPP TSG-RAN4 WG4 Meeting #111R4-241x**

**Fukuoka City, Fukuoka, Japan, 20th – 24th May, 2024**

**Title: LS on UE capability for multi-carrier enhancement**

**Response to:**

**Release:** Rel-18

**Work Item:** NR\_MC\_enh-Core

**Source:** RAN4

**To:** RAN2

**Cc:** RAN1

**Contact Person:**

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**1. Overall Description:**

The new DCI formats 0-3 and 1-3 were introduced for multi-carrier enhancements and a new UE capability FG 49-9 was introduced for SCell dormancy indication in RAN1.

According to current RRM requirements for DCI based BWP switch delay on multiple CCs specified in section 8.6.2A in TS38.133, the incremental delay for each additional CC involved in simultaneous BWP switch depends on *bwp-SwitchingMultiDormancyCCs-r16* for switching between non-dormant and dormant BWPs.

*bwp-SwitchingMultiDormancyCCs-r16*, i.e., FG 6-3, was introduced for BWP switching between non-dormant and dormant BWPs on multiple CCs in Rel-16. The prerequisite feature groups for FG 6-3 are FG 18-4 or 18-4a, which are for format 0-1/1-1 or format 2-6, respectively. Thus, FG 6-3 cannot be reused for dormant BWP switching on multiple CCs in RRM requirements if the BWP switch is triggered by SCell dormancy indication in DCI format 0-3/1-3.

RAN4 discussed the following candidate approaches to address the issue.

* Approach 1: In Rel-18 specification, add Rel-18 RAN1 FG 49-9 as the prerequisite for the FG 6-3 introduced in Rel-16.

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| Features | Index | Feature group | Components | Prerequisite feature groups |
| 6. LTE\_NR\_DC\_CA\_enh | 6-3 | Dormant BWP switching on multiple CCs RRM requirements | Incremental delay for BWP switch processing on additional SCells in DCI based simultaneous dormant BWP switching on multiple SCells | RAN1 feature 18-4 or 18-4a or 49-9 |

* Approach 2: Introduce a new Rel-18 UE capability. For the new capability, if defined,
  + Approach 2-1: No prerequisite feature groups to allow flexibility.

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| **Features** | **Index** | **Feature group** | **Components** | **Prerequisite feature groups** |
| 38.  NR\_MC\_enh | 38-9 | Dormant BWP switching on multiple CCs RRM requirements | Incremental delay for BWP switch processing on additional SCells in DCI based simultaneous dormant BWP switching on multiple SCells |  |

* + Approach 2-2: Define prerequisite feature group as 49-9 and add “with DCI 0-3/1-3” in feature group.

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| **Features** | **Index** | **Feature group** | **Components** | **Prerequisite feature groups** |
| 38.  NR\_MC\_enh | 38-9 | Dormant BWP switching on multiple CCs RRM requirements with DCI 0-3/1-3 | Incremental delay for BWP switch processing on additional SCells in DCI based simultaneous dormant BWP switching on multiple SCells | 49-9 |

RAN4 would like to ask RAN2 to discuss the feasibilities of the approaches. and make final decision on the UE capability design, even if multiple approaches are feasible. RAN4 will update UE feature list later based on RAN2 decision.

Note: From RAN4 perspective, the order of preferences of all the approaches, if it is identified feasible, is Approach 1, Approach 2-1 and then Approach 2-2.

**2. Actions:**

**To: RAN WG2**

**ACTION:** RAN4 kindly asks RAN2 to take the above RAN4 agreements into account and make decision on the UE capability design.

**3. Reference:**

**4. Date of Next TSG RAN WG4 Meetings:**

TSG RAN WG4 Meeting #112 August 19 – August 23, 2024 Maastricht, Netherland