**3GPP TSG-RAN4 Meeting #111 R4-2408003**

**Fukuoka, Japan, May 20 - 24, 2024**

**Agenda item:**  7.4.5

**Source:** Moderator (OPPO)

**Title:** Topic summary for [111][206] NR\_RRM\_enh3\_part2

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this summary (e.g. list of treated agenda items).*

This summary includes RRM Core requirements and performance requirements for FR1-FR1 NR-DC (7.4.2 and 7.4.4).

* *Topic #1: RRM Core requirements for FR1-FR1 NR-DC*
	+ *Sub-topic 1: SCG activation requirements for FR1-FR1 NR-DC*
* *Topic #2: RRM performance requirements for FR1-FR1 NR-DC(test cases)*

# Topic #1: RRM Core requirements for FR1-FR1 NR-DC

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2408161 | Nokia | Tsearch for RACH-less and RACH-based PSCell activation:1. When ‘*bdf-and-RLM*’ with value ‘*true*’ is configured for the deactivated PSCell the UE shall perform BFD and RLM on the deactivated PSCell.
2. Evaluation of RLM and BFD on a deactivated PSCell requires the UE to measure the deactivated PSCell regularly to evaluate the downlink radio link quality.
3. If no link problems have been detected, the link is currently regarded good enough for continuing the operation in a cell.
4. When UE is configured with *bfd-and-RLM* on the deactivated PSCell, and the UE no link problems (beam failure or RLF) have been detected on the deactivated PSCell, link is regarded good enough for continuing operation.
5. When UE is configured with *bfd-and-RLM = true* and UE has not detected link problems, there is no need for additional measurements at PSCell activation.
6. In general, a UE which has not detected neither BFD nor RLF on the deactivated PSCell while deactivated, need no additional search time at PSCell activation (Tsearch = 0ms).
7. A UE which has detected either BFD or RLF on the deactivated PSCell is allowed search time at PSCell activation (Tsearch = [TBD]ms).

RACH-based PSCell activation delay:1. For RACH based PSCell activation, for an unknown PSCell with ‘*bdf-and-RLM*’ with value ‘*true*’, RAN4 need to reconsider *Tsearch = 24/3\* Trs ms*, accounting for the RLM or BFD status upon activation.

RACH-less based PSCell activation delay:1. For RACH-less based PSCell activation, the UE behavior when the PSCell is unknown would need to be clarified.

Tsearch in RACH-less based PSCell activation delay:1. Ask RAN2 the UE behaviour if RACH-less is triggered while UE has experienced beam failure or RLF.

Tsearch in RACH-based PSCell activation delay:1. For RACH based PSCell activation for unknown PSCell, discuss conditions for reduced Tsearch at PSCell activation, when the UE is configured with bfd-and-RLM.
2. For RACH based PSCell activation, if the FR1 or FR2 PSCell is known, Tsearch = 0 ms. If the PSCell is an unknown FR1 or FR2 PSCell configured with bfd-and-RLM with value true, provided no RLM has occurred, if Es/Iot ≥ -2 dB then for FR2 Tsearch = [12]\* Trs ms and Tsearch = [1]\* Trs ms for FR1. Otherwise, if the FR2 PSCell is unknown and Es/Iot ≥ -2 dB, then Tsearch = 24\* Trs ms, and if the target cell is an unknown FR1 PSCell and Es/Iot ≥ -2 dB, then Tsearch =3\* Trs ms.

PSCell activation delay and PSCell DRX:1. UE PDCCH monitoring requirement in the newly activated PSCell is ambiguous.
2. UE shall start monitoring PDCCH on the activated PSCell immediately after the SCG activation delay.
3. Send LS to RAN2 clarifying PDCCH monitoring assumption with RAN2.

We have captured the proposed changes in our DraftCR [19] and provided draft LS in Appendix. |
| R4-2408162 | Nokia | CR on FR1-FR1 SCG activation |

## Open issues summary

### Sub-topic 1: SCG activation requirements for FR1-FR1 NR-DC

#### **Issue 1-1: Tsearch for RACH-less and RACH-based PSCell activation**

Proposal:

* Option 1(Nokia):
	+ In general, a UE which has not detected neither BFD nor RLF on the deactivated PSCell while deactivated, need no additional search time at PSCell activation (Tsearch = 0ms).
	+ A UE which has detected either BFD or RLF on the deactivated PSCell is allowed search time at PSCell activation (Tsearch = [TBD]ms).

Recommended WF:

* Need discussion.

#### **Issue 1-2: RACH-less PSCell activation delay**

Proposals:

* Option 1(Nokia):
	+ For RACH-less based PSCell activation, the UE behavior when the PSCell is unknown would need to be clarified.

Recommended WF:

* Depending on issue 1-1. Need discussion.

**Issue 1-3: LS to RAN2 on RACH-less based PSCell activation**

Proposals:

* Option 1 (Nokia): Ask RAN2 the UE behaviour if RACH-less is triggered while UE has experienced beam failure or RLF.

Recommended WF

* Need discussion.

#### **Issue 1-4: RACH-based PSCell activation delay**

Proposals:

* From Nokia:
	+ P1: For RACH based PSCell activation, for an unknown PSCell with ‘*bdf-and-RLM*’ with value ‘*true*’, RAN4 need to reconsider *Tsearch = 24/3\* Trs ms*, accounting for the RLM or BFD status upon activation.
	+ P2: For RACH based PSCell activation for unknown PSCell, discuss conditions for reduced Tsearch at PSCell activation, when the UE is configured with bfd-and-RLM.
	+ P3: For RACH based PSCell activation, if the FR1 or FR2 PSCell is known, Tsearch = 0 ms. If the PSCell is an unknown FR1 or FR2 PSCell configured with bfd-and-RLM with value true, provided no RLM has occurred, if Es/Iot ≥ -2 dB then for FR2 Tsearch = [12]\* Trs ms and Tsearch = [1]\* Trs ms for FR1. Otherwise, if the FR2 PSCell is unknown and Es/Iot ≥ -2 dB, then Tsearch = 24\* Trs ms, and if the target cell is an unknown FR1 PSCell and Es/Iot ≥ -2 dB, then Tsearch =3\* Trs ms.

Recommended WF

* There exists some conflict between the proposals. Need clarification and discussion.

#### **Issue 1-5: PSCell activation delay and PSCell DRX:**

For the RAN4 requirements this would mean:

TIU: When RACH based PSCell activation is configured, it is the delay uncertainty in acquiring the first available PRACH occasion in the PSCell. TIU is up to the summation of SSB to PRACH occasion association period and 10 ms. SSB to PRACH occasion associated period is defined in Table 8.1-1 of TS 38.213 [3].

When RACH-less based PSCell activation is configured, it is the uncertainty in acquiring the first PUSCH transmission occasion [or SR on PUCCH]. The UE shall apply no DRX immediately after Tactivation\_time.

Proposals:

* Option 1 (Nokia):
	+ UE PDCCH monitoring requirement in the newly activated PSCell is ambiguous.
	+ UE shall start monitoring PDCCH on the activated PSCell immediately after the SCG activation delay.
	+ Send LS to RAN2 clarifying PDCCH monitoring assumption with RAN2.

Recommended WF

* Need discussion.

Moderator: Discuss the CRs directly

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| R4-2408162 | Nokia | CR on FR1-FR1 SCG activation |

# Topic #2: RRM performance requirements for FR1-FR1 NR-DC

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

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| R4-2408528 | Ericsson | Draft CR to TS 38.133 for NR-DC FR1-FR1 scg activation and deactivation test case |

Moderator: Discuss the CRs directly