**3GPP TSG-RAN WG4 Meeting #112 R4-2414041**

**Maastricht, Netherlands, 19th – 23rd August, 2024**

**Title:** WF on NR\_RRM\_Ph5\_Part2 - fast SCell activation

**Agenda item:** 8.15.4

**Source:** CATT

**Document for:** Approval

# Introduction

This WF includes the agreements and open issues discussed in topic summary for [112][219] NR\_RRM\_Ph5\_Part2.

# Topic #1: Fast SCell activation for UE supporting Rel-18 EMR

## Sub-topic 1-1 General

#### Issue 1-1-1: Clarification on Rel-18 eEMR

*Agreements:*

* Do not change the Rel-18 eEMR definition in this fast SCell activation discussion.

#### Issue 1-1-2: Applicability of fast SCell activation delay requirements

*Agreement:*

* The fast SCell activation delay requirements are defined for the case when
  + the UE supports Rel-18 eEMR:
    - Including both EMR and cell reselection measurement,
    - Including the case when measIdleValidityDuration-r18 and / or measReselectionValidityDuration-r18 are configured
    - FFS Including the case when measIdleValidityDuration-r18 and / or measReselectionValidityDuration-r18 are not configured
  + and the UE has reported valid results on the SCell to be activated before SCell activation command.

#### Issue 1-1-3: Scope of fast SCell activation for UE supporting Rel-18 eEMR

*Agreement:*

* Start from the following scope of fast SCell activation for UE supporting Rel-18 EMR:
  + Direct SCell Activation at SCell addition
  + FFS: Single MAC CE based DL SCell Activation
  + FFS: Single MAC CE based PUCCH SCell Activation
* RAN4 to discuss whether and how to apply the solutions to other SCell activation procedures after RAN4 has conclusions for the above cases.

#### Issue 1-1-4: Target scenarios of fast SCell activation

Proposals

* Proposal 1:
  + RAN4 shall specify scenarios where the delay is less than 100 ms, even close to 20 ms (RRC setup/resume delay).
  + Fast SCell activation for UE supporting Rel-18 EMR should aim to achieve less than 100ms activation delay. RAN4 to discuss the options how this is achieved.
* Proposal 2:
  + Suggest to focus on the following scenario for fast SCell activation for UE supporting Rel-18 EMR: The SCell being activated belongs to FR2 and there is no active serving cell on that FR2 band provided that PCell or PSCell is FR1.
* Proposal 3:
  + it is proposed to reduce SCell activation delay for unknown case in FR1 and FR2-1.

## Sub-topic 1-2 SCell activation delay requirements

#### Issue 1-2-1: How to define the fast SCell activation delay requirements with valid eEMR reporting

*Agreement:*

* RAN4 to update the known condition for SCell activation to include the case when UE has valid EMR reporting before SCell activation command.
  + FFS how to update the known condition (issue 1-2-1a).
  + FFS the applicability of valid EMR reporting for the Rel-19 fast SCell activation

#### Issue 1-2-1a: How to update the known condition with consideration of valid eEMR reporting

Proposals

* Option 1:
  + the current side condition and delay requirement for FR1 known SCell activation shall be updated to cover the fast SCell activation with EMR, as following:
    - The side condition that “the SSB measured during the period equal to max(5\*measCycleSCell, 5\*DRX cycles) also remains detectable during the SCell activation delay” shall be changed to “the SSB measured during the period equal to measurement period in IDLE/Inactive mode for EMR report also remains detectable during the SCell activation delay”, and the “measurement period in IDLE/Inactive mode” refers to:
      * measurement period in section 4.4.2.2, if a UE supporting measValidationReportEMR-r18 and configured with measIdleCarrierListNR-r16 by higher layers.
      * measurement period in section 4.2.2.4, if UE supporting measValidationReportReselectionMeasurements-r18 and idleInactiveNR-MeasReport-r16.
    - The update of FR1 known SCell activation delay requirement shall be based on the solution for issue in proposal 2 (issue 1-2-3).
* Option 2:
  + If the common understanding is that existing definition of known SCell cannot cover the case of valid EMR report, it is necessary to update the definition of known SCell to cover it. And the known cell definition can be updated as following:
    - **For FR1:**
      * - the UE has sent a valid measurement report/ valid EMR report for the SCell being activated and …
    - **For FR2:**
      * - the UE has sent a valid L3-RSRP measurement report with SSB index / valid EMR report with SSB index, and …
* Option 3:
  + RAN4 to discuss how to define known condition with consideration of valid EMR reporting, the following Options can be considered:
    - Option 3a: The SCell to-be-activated can be regarded as known cell when the UE has sent a valid measurement report of the SCell being activated during IDLE/INACTIVE state for fast CA/DC setup
    - Option 3b: The SCell to-be-activated can be regarded as known cell when valid measurement report is sent within [Z] seconds before SCell activation command reception
* Option 4:
  + Based existing known conditions, the condition that “UE has sent a valid L3-RSRP measurement report” shall include the report from EMR. RAN4 to define the conditions/definition of “valid L3-RSRP measurement report via EMR”.
  + RAN4 to discuss whether and how to define conditions for valid L3-RSRP EMR report for known SCell activation consider following options:
    - Option 4a: UE support Rel-19 EMR based known SCell activation, it means all EMR report shall also guarantee known SCell activation.
    - Option 4b: RAN4 to define a condition/limit that measurement performed X seconds before SCell activation is considered as valid for known SCell activation conditions.
    - Option 4c: Introduce new dedicated EMR based SCell activation indication
* Option 5:
  + The applicability of Rel-18 EMR reporting for SCell activation delay reduction can be based on the following conditions:
    - Rel-18 EMR of the SCell-to-be-activated is sent within [Y] time window before the reception of the SCell activation command.
    - The SSB measured of the SCell-to-be-activated remains detectable during [Y]
    - FFS [Y]

#### Issue 1-2-2: Consideration on SINR condition during the whole procedure for known SCell activation

Proposals

* Option 1:
  + RAN4 to discuss whether it’s necessary to define a consistent SINR condition during the whole procedure for known SCell activation requirement (including EMR measurement in IDLE/Inactive and known SCell activation in RRC connected mode), e.g., SINR>=-2dB

#### Issue 1-2-3: Consideration on measurement period condition of FR1 known SCell activation

Proposals

* Option 1:
  + RAN4 to discuss whether and how to change the measurement period condition of FR1 known SCell activation (i.e., 2400ms in current requirement) for fast SCell activation with EMR.

#### Issue 1-2-4: Whether the indication to network is needed

Proposals

* Option 1:
  + The Rel-19 RRM enhancement in fast scell activation for UE support Rel-18 EMR shall not only be RAN4 side condition update, certain activation fast or slow indication to the network is needed.

# Reference

1. R4-2411814 Topic summary for [112][219] NR\_RRM\_Ph5\_Part2, CATT, RAN4#112