**3GPP TSG-RAN WG4 Meeting #112 R4-2411814**

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

**Agenda item:** 8.15.4

**Source:** Moderator (CATT)

**Title:** Topic summary for [112][219] NR\_RRM\_Ph5\_Part2

**Document for:** Information

# Introduction

This topic summary for [112][219] NR\_RRM\_Ph5\_Part2 contains the discussions in agenda 8.15.3 which include the following topic:

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

*Recommendation of prioritized topics:*

* *Topic #1: Fast SCell activation for UE supporting Rel-18 EMR:*
  + *Sub topic 1-1: issue 1-1-1, 1-1-2, 1-1-3*
  + *Sub topic 1-2: issue 1-2-1, 1-2-1a*

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2411359**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411359.zip) | CATT | **Proposal 1: Do not change the Rel-18 eEMR definition in this fast SCell activation discussion.**  **Proposal 2: The fast SCell activation delay requirements are defined for the case when:**   * **The UE supports Rel-18 eEMR and is configured with validity duration,**    + **the UE supporting *measValidationReportEMR-r18* and configured with *measIdleValidityDuration-r18* by higher layers, or**   + **the UE supporting *measValidationReportReselectionMeasurements-r18* and configured with *measReselectionValidityDuration-r18* by higher layers.** * **And the UE has reported valid results on the SCell to be activated before SCell activation command.**   **Proposal 3: RAN4 to discuss the fast SCell activation delay with valid EMR reporting using Rel-15 SCell activation as baseline.**  **Proposal 4: For SCell activation with valid Rel-18 eEMR reporting, existing SCell activation delay requirements for known case can be used as baseline.**  **Proposal 5: RAN4 to update the known condition for SCell activation to include the case when UE has valid EMR reporting before SCell activation command.** |
| [**R4-2411455**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411455.zip) | Apple | ***Proposal 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.***  ***Proposal 2: 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.***  ***Observation: “a valid measurement report” in the current known/unknown condition of SCell activation can cover the EMR report case.***  ***Proposal 3: the current side condition and delay requirement for FR2 known SCell activation can cover the fast SCell activation with EMR. Potential clarification can only focus on the issue in proposal 1.***  ***Proposal 4: 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.*** |
| [**R4-2411977**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411977.zip) | CMCC | ***Observation 1: compared with known case, the exisiting SCell activation delay for unknown case is very long.***  ***Proposal 1: it is proposed to reduce SCell activation delay for unknown case in FR1 and FR2-1 .***  ***Proposal 2: if UE send valid EMR report during a period before the reception of the SCell activation command, the SCell to be activated can be considered as known, and the activation delay requirements for known SCell can be applied.***  ***Proposal 3: for the issue whether existing known SCell definition can cover the case of valid EMR report, it is proposed to discuss whether valid EMR reporting can be considered as a kind of measurement report (i.e. whether measurement report can cover valid EMR reporting).***  ***Observation 2: Valid EMR report and measurement report are in different message:***   * ***For EMR, the idle/inactive measurement results are reported either in UEInformationResponse message or in RRCResumeComplete message.*** * ***Measurement report are in MeasurementReport message, in detail, the measured results are covered by MeasResults which is associated with measId.***   ***Observation 3: Valid EMR report and measurement report have similar content, in detail, cell level measurement results, beam level results and beam index are covered.***  ***Proposal 4: If the common understanding is that existing definition of known SCell can not 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:**  SCell in FR1 is known if it has been meeting the following conditions:  - During the period equal to max(5\*measCycleSCell,  5\*DRX cycles) for FR1 before the reception of the SCell activation command:  - the UE has sent a valid measurement report/ valid EMR report for the SCell being activated and  - the SSB measured remains detectable according to the cell identification conditions specified in clause 9.2 and 9.3.  - the SSB measured during the period equal to max(5\*measCycleSCell, 5\*DRX cycles) also remains detectable during the SCell activation delay according to the cell identification conditions specified in clause 9.2 and 9.3.  Otherwise SCell in FR1 is unknown.  **For FR2:**  For the first SCell activation in FR2 bands, the SCell is known if it has been meeting the following conditions:  - During the period equal to 4s for UE supporting power class 1/5 and 3s for UE supporting power class 2/3/4 before UE receives the last activation command for PDCCH TCI, PDSCH TCI (when applicable) and semi-persistent CSI-RS for CQI reporting (when applicable):  - the UE has sent a valid L3-RSRP measurement report with SSB index / valid EMR report with SSB index, and  - SCell activation command is received after L3-RSRP reporting and no later than the time when UE receives MAC-CE command for TCI activation  - During the period from L3-RSRP reporting to the valid CQI reporting, the reported SSBs with indexes remain detectable according to the cell identification conditions specified in clauses 9.2 and 9.3, and the TCI state is selected based on one of the latest reported SSB indexes.  Otherwise, the first SCell in FR2 band is unknown. | |
| [**R4-2412038**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412038.zip) | LG Electronics Inc. | ***Proposal 1***: RAN4 to discuss how to get valid EMR measurement results for fast Scell activation.  ***Proposal 2***: For fast SCell activation with valid EMR reporting, the continuous EMR measurements are necessary after T331 is expired, and the EMR measurement relaxation should be considered to reduce the measurement burden. |
| [**R4-****2412119**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412119.zip) | China Telecom | **Proposal 1: The delay requirements with L3 reporting during activation can be the baseline for the definition of fast SCell activation delay requirements with valid EMR reporting.**  **Proposal 2: The EMR reporting need to be valid for fast SCell activation, and the validity check can be discussed.**  **Proposal 3: When UE reports valid EMR during SCell activation, probably the processes of AGC setting, cell detection, T/F tracking are not needed.** |
| [**R4-2412203**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412203.zip) | Huawei, HiSilicon | **Observation 1: Whether EMR report can enable known SCell activation is not explicitly specified in specifications. The baseline solution (i.e with minimum spec impact/workload) is to extend the known condition for SCell activation considering the valid L3-RSRP measurement report via EMR report.**  **Observation 2: In Rel-16 EMR, the availability of EMR results is supported. In Rel-18 EMR, the validation of EMR results is supported.**  **Proposal 1: For the fast SCell activation for UE supporting Rel-18 EMR, the baseline solution to be defined is to extend the known condition for SCell activation considering the valid L3-RSRP measurement report via EMR report.**  **Proposal 2: 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”.**  **Observation 3: The intention to define conditions/definition of “valid L3-RSRP measurement report via EMR” is to:**   * **tell NW that these EMR reports are reliable for known SCell activation** * **let UE know whether these results can be reported since UE shall meet known SCell activation based on them.**   **Observation 4: The validity check condition (the time span between the measurement instance and msg1) for Rel-18 EMR may not fully guarantee that the EMR report can enable known SCell activation.**  **Proposal 3: RAN4 to discuss whether and how to define conditions for valid L3-RSRP EMR report for known SCell activation consider following options:**   * **Option 1: UE support Rel-19 EMR based known SCell activation, it means all EMR report shall also guarantee known SCell activation.** * **Option 2: RAN4 to define a condition/limit that measurement performed X seconds before SCell activation is considered as valid for known SCell activation conditions.** * **Option 3: Introduce new dedicated EMR based SCell activation indication** |
| [**R4-2412280**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412280.zip) | Ericsson | [**Observation 1: Fast Scell activation from the WID objective can be interpreted as Rel-17 Fast Scell activation or Rel-18 Scell activation delay reduction enhancement.**](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$4\R4-2412280.docx#_Toc174089727)  [**Observation 2: Valid EMR reporting can be interpreted as based on two sets of different measurements.**](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$4\R4-2412280.docx#_Toc174089728)  [**Observation 3: Valid EMR reporting can be interpreted as only have UE behavior that UE reports measurement results during Idle/Inactive mode. However, the scenario where UE stays too short in Idle/Inactive mode and do not report cannot be fully ruled out for the scope.**](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$4\R4-2412280.docx#_Toc174089729)  [**Observation 4: From timing wise, the EMR report timeline can be within the Scell activation L3 measurement report timeline for the target cell to be considered as known based on current legacy specification.**](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$4\R4-2412280.docx#_Toc174089730)  [**Observation 5: The RAN4 known and unknown condition is only UE knowledge while the network is not even aware during the activation.**](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$4\R4-2412280.docx#_Toc174089731)  [**Observation 6:The measurement accuracy defined for Rel-18 EMR is different in comparing with normal L3 measurement report. However, measurement accuracy will only impact the activation success rate, not the activation delay.**](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$4\R4-2412280.docx#_Toc174089732)  [**Proposal 1: Both Rel-17 fast Scell activation and Rel-18 Scell activation delay reduction shall be considered as the baseline scenario for this Rel-19 RRM enhancement.**](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$4\R4-2412280.docx#_Toc174101727)  [**Proposal 2: The Rel-19 RRM enhancement in fast scell activation for UE support Rel-18 EMR shall not only be RAN4 side condition update, certain activation fast or slow indication to the network is needed.**](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$4\R4-2412280.docx#_Toc174101728) |
| [**R4-2412389**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412389.zip) | ZTE Corporation, Sanechips | **Observation1：If there is valid EMR report for the SCell being activated, it can be consider as UE has sent a valid measurement report with SSB index.**  **Observation 2: Tactivation\_time for unknown SCell is longer than known SCell due to measurement and report. SCell activation delay could be reduced if valid EMR can be considered into known SCell condition.**  **Proposal 1: To reduce the SCell activation delay, RAN4 should consider valid EMR into fast SCell activation.**  **Observation 3: In R18 Mobility, IDLE/INACTIVE mode measurement results including EMR and cell reselection measurement are used to improve SCell/SCG setup delay.**  **Proposal 2: Similar as R18, both EMR and cell reselection measurement should be considered for fast SCell activation.** |
| [**R4-2412604**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412604.zip) | vivo | **Proposal 1: RAN4 to clarify if valid cell reselection reporting can be used for fast SCell activation in Rel-19**  **Proposal 2: RAN4 to discuss the applicable scenarios for fast SCell activation improvement, which potentially including:**   * **SCell Activation Delay Requirement for Deactivated SCell** * **Direct SCell Activation at SCell addition** * **Direct SCell Activation at Handover** * **Direct SCell Activation at RRCResume** * **SCell Activation Delay Requirement for Deactivated SCell with Multiple Downlink Scells** * **Direct SCell Activation of Multiple Downlink SCells at SCell addition** * **Direct SCell Activation of Multiple Downlink SCells at Handover** * **Direct SCell Activation of Multiple Downlink SCells at RRC Resume** * **SCell Activation Delay Requirement for Deactivated PUCCH SCell** * **SCell Deactivation Delay Requirement for Activated PUCCH SCell with Multiple Downlink SCells** * **Fast SCell Activation Delay Requirement for Deactivated SCell**   **Proposal 3: RAN4 to discuss how to define known condition with consideration of valid EMR reporting, the following Options can be considered:**   * + **Option 1 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 2 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** |
| [**R4-2412800**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412800.zip) | Nokia | [**Observation 1:** Fast DC/CA resume/setup enables data DC/CA usage with lower latency, higher throughput, enhances load balancing and enables lower UE energy consumption.](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$7\R4-2412800.docx#_Toc174115197)  [Proposal 1: RAN4 system-level simulation results show that low SCell setup delays have significant, positive, impact on UEs with different radio link conditions and network load. RAN4 shall specify scenarios where the delay is less than 100 ms, even close to 20 ms (RRC setup/resume delay).](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$7\R4-2412800.docx#_Toc174115198)  [Proposal 2: Fast SCell activation for UE supporting Rel-18 EMR should aim to achieve less than 100ms activation delay. RAN4 to discuss the options how this is achieved.](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$7\R4-2412800.docx#_Toc174115199)  [**Observation 2:** Validity check is only performed for configured corresponding carriers if the *measIdleValidityDuration-r18* or *measReselectionValidityDuration-r18* is configured.](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$7\R4-2412800.docx#_Toc174115200)  [**Observation 3:** If the UE has not been configured with *measReselectionValidityDuration-r18,* the UE may still have valid measurement results that will result in successful SCell establishment, and which meet the measurement reporting requirements.](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$7\R4-2412800.docx#_Toc174115201)  [Proposal 3: Rel-19 Fast SCell WI supports the case where *measIdleValidityDuration-r18 and / or measReselectionValidityDuration-r18 are configured and are not configured*](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$7\R4-2412800.docx#_Toc174115202)  [Proposal 4: RAN4 to discuss how to enable Fast SCell activation when the validity duration is configured with high values.](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$7\R4-2412800.docx#_Toc174115203)  [Proposal 5: Discuss if improvements to idle/inactive-mode reporting framework are needed, and possibly send LS to RAN2.](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$7\R4-2412800.docx#_Toc174115204)  [**Observation 4:** Due to limited time, RAN4 agreed CR **R4-2321635** was removed in RAN plenary.](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$7\R4-2412800.docx#_Toc174115205)  [Proposal 6: RAN4 to discuss if the UE may perform additional measurement starting from RRC connection setup/resume procedure](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$7\R4-2412800.docx#_Toc174115206)  [**Observation 5:** There are significant differences in Scell activation delay between known and unknown conditions.](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$7\R4-2412800.docx#_Toc174115207)  [Proposal 7: RAN4 study and if needed, specify known and unknown conditions for Scell activation based on Rel-18 eEMR measurement report.](file:///C:\Users\guoqiuge\AppData\Local\Temp\360zip$Temp\360$7\R4-2412800.docx#_Toc174115208) |
| [**R4-2412853**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412853.zip) | Samsung | **Observation 1: At current stage, it is expected UE to send the validated measurement report before MO configuration for IDLE/INACTIVE**  **Observation 2: For FR2 intra-band scenario, if the SCell being activated belongs to FR2 and if there is at least one active serving cell on that FR2 band, there is no extra room to reduce the SCell activation delay even the UE supports Rel-18 EMR**  **Proposal 1: RAN4 to discuss the possibility of reducing the SCell activation delay with the valid measurement results/prior informations on eEMR under certain scenarios/conditions**  **Proposal 2: The scope of fast SCell activation for UE supporting Rel-18 EMR can contain normal SCell activation and direct SCell activation, the impact on the following RRM requirements can be studied as the highest priority:**   * **8.3.2 SCell Activation Delay Requirement for Deactivated SCell** * **8.3.4 Direct SCell Activation at SCell addition**   **Proposal 3: 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 4: For direct SCell activation at SCell addition, if the to-be-activated SCell is the first cell on that FR2 band and is unknown, it is feasible to fast SCell activation for UE supporting Rel-18 EMR**   * **RAN4 to discuss how to define the conditions**   Proposal 5: If the UE supporting Rel-18 EMR can report the validated measurement results after MO configuration, RAN4 to discuss the feasibility of fast normal SCell activation |
| [**R4-2413327**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413327.zip) | MediaTek inc. | **Proposal 1: RAN4 to discuss the conditions required to ensure the applicability of using R18 EMR reporting to achieve fast SCell activation.**  **Proposal 2: 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]**   **Proposal 3: If the introduced conditions in RAN4 for fast SCell activation using R18 EMR are met, then the unknow SCell can be activated by applying the activation delay used for the known SCell scenario.**  Proposal 4: Fast SCell activation using Rel-18 EMR is applicable to normal SCell activation (triggered by MAC CE command) and direct SCell activation (triggered by RRC command). |

## Open issues summary

### Sub-topic 1-1 General

*Background:*

|  |  |  |
| --- | --- | --- |
| ***Rel-18 eEMR capabilities and applied requirements:***   | ***measValidationReportEMR-r18***  *Indicates whether the UE supports measurement validation and report based on EMR measurement during connection setup/resume for fast CA/DC setup. UE shall set the capability value consistently for all FDD-FR1 bands, all TDD-FR1 bands, all TDD-FR2-1 bands and all TDD-FR2-2 bands respectively.*  *A UE supporting this feature shall also indicate support of idleInactiveNR-MeasReport-r16 or idleInactiveEUTRA-MeasReport-r16.* | | --- | | ***measValidationReportReselectionMeasurements-r18***  *Indicates whether the UE supports measurement validation based on reselection measurements during IDLE/INACTIVE state and reporting for fast CA/DC setup. UE shall set the capability value consistently for all FDD-FR1 bands, all TDD-FR1 bands, all TDD-FR2-1 bands and all TDD-FR2-2 bands respectively.* |   *A UE supporting measValidationReportEMR-r18 and idleInactiveNR-MeasReport-r16 or idleInactiveEUTRA-MeasReport-r16 shall report based on the idle mode measurement which is specified in clause 4.4, and according to the measurement reporting requirements specified in clause 4.7.3.*  *A UE supporting measValidationReportReselectionMeasurements-r18 shall report based on the idle mode measurement specified in the clause 4.2.2, and according to the measurement reporting requirements specified in the clause 4.7.3.*  ***Rel-18 validity check and reporting requirements:***  *The measurement results are considered valid if the following conditions are met for the validity check:*   * + *the measurements are performed before msg1 transmission for RRC resume/setup request within the last:*     - *measIdleValidityDuration-r18 seconds for carriers configured in measIdleCarrierListNR-r16 or measIdleCarrierListEUTRA-r16, and/or*     - *measReselectionValidityDuration-r18 seconds for carriers configured in measReselectionCarrierListNR-r18,*   + *the measurement results satisfy measurement accuracy requirement at the measurement instance.*   *Otherwise, the measurement results are considered invalid. The UE shall not report invalid measurement results when measIdleValidityDuration-r18 and/or measReselectionValidityDuration-r18 is configured.*  *If the measIdleValidityDuration-r18 is not configured, the UE is not required to perform validity check for carriers in measIdleCarrierListNR-r16 and measIdleCarrierListEUTRA-r16, and the UE may report measurement results given the measurement results satisfy measurement accuracy requirement at the measurement instance.*  *If the measReselectionValidityDuration-r18 is not configured, the UE is not required to perform validity check for carriers configured in measReselectionCarrierListNR-r18, and the UE may report measurement results given the measurement results satisfy measurement accuracy requirement at the measurement instance.* |

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

* Proposals
  + Option 1: (CATT)
    - Do not change the Rel-18 eEMR definition in this fast SCell activation discussion
  + Option 2: (Nokia)
    - Discuss if improvements to idle/inactive-mode reporting framework are needed, and possibly send LS to RAN2
    - RAN4 to discuss if the UE may perform additional measurement starting from RRC connection setup/resume procedure
  + Option 3: (LGE)
    - For fast SCell activation with valid EMR reporting, the continuous EMR measurements are necessary after T331 is expired, and the EMR measurement relaxation should be considered to reduce the measurement burden
* Recommended WF
  + Discuss the option(s) to clarify whether further improvements on Rel-18 eEMR can be considered:
    - e.g., reporting framework improvement, additional measurements after RRC resume/setup request
* *Moderator note: to facilitate the discussion, Rel-18 eEMR is used in the title to differentiate from Rel-16 EMR:* 
  + *Rel-16 EMR: for the UE supports idleInactiveNR-MeasReport-r16 or idleInactiveEUTRA-MeasReport-r16*
  + *Rel-18 eEMR: for the UE supports measValidationReportEMR-r18 or measValidationReportReselectionMeasurements-r18*

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

* Proposals
  + Option 1: (CATT)
    - The fast SCell activation delay requirements are defined for the case when:
      * The UE supports Rel-18 eEMR and is configured with validity duration,
        + the UE supporting measValidationReportEMR-r18 and configured with measIdleValidityDuration-r18 by higher layers, or
        + the UE supporting measValidationReportReselectionMeasurements-r18 and configured with measReselectionValidityDuration-r18 by higher layers.
      * And the UE has reported valid results on the SCell to be activated before SCell activation command.
  + Option 2a: (ZTE)
    - Similar as R18, both EMR and cell reselection measurement should be considered for fast SCell activation.
  + Option 2b: (vivo)
    - RAN4 to clarify if valid cell reselection reporting can be used for fast SCell activation in Rel-19
  + Option 3: (Nokia)
    - Rel-19 Fast SCell WI supports the case where measIdleValidityDuration-r18 and / or measReselectionValidityDuration-r18 are configured and are not configured
  + Option 4a: (CT)
    - The EMR reporting need to be valid for fast SCell activation, and the validity check can be discussed.
  + Option 4b: (Nokia)
    - RAN4 to discuss how to enable Fast SCell activation when the validity duration is configured with high values.
* Recommended WF
  + Discuss the following requirements applicability:
    - 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 both cases when *measIdleValidityDuration-r18* and / or *measReselectionValidityDuration-r18* are configured and are not configured
      * and the UE has reported valid results on the SCell to be activated before SCell activation command.
    - FFS: how to enable Fast SCell activation when the validity duration is configured with high values.

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

* Proposals
  + Option 1: (CATT)
    - RAN4 to discuss the fast SCell activation delay with valid EMR reporting using Rel-15 SCell activation as baseline.
  + Option 2: (Samsung)
    - The scope of fast SCell activation for UE supporting Rel-18 EMR can contain normal SCell activation and direct SCell activation, the impact on the following RRM requirements can be studied as the highest priority:
      * 8.3.2 SCell Activation Delay Requirement for Deactivated SCell
      * 8.3.4 Direct SCell Activation at SCell addition
  + Option 3: (MTK)
    - Fast SCell activation using Rel-18 EMR is applicable to normal SCell activation (triggered by MAC CE command) and direct SCell activation (triggered by RRC command).
  + Option 4: (Ericsson)
    - Both Rel-17 fast Scell activation and Rel-18 Scell activation delay reduction shall be considered as the baseline scenario for this Rel-19 RRM enhancement.
* Recommended WF
  + The scope of fast SCell activation for UE supporting Rel-18 EMR includes:
    - Normal SCell Activation
    - Direct SCell Activation
  + FFS other SCell activation procedures

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

* Proposals
  + Proposal 1: (Nokia)
    - 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: (Samsung)
    - 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: (CMCC)
    - it is proposed to reduce SCell activation delay for unknown case in FR1 and FR2-1.
* Recommended WF
  + Discuss the proposal(s).

### 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

* Proposals
  + Option 1: (CATT, CMCC)
    - if UE send valid EMR report during a period before the reception of the SCell activation command, the SCell to be activated can be considered as known, and the activation delay requirements for known SCell can be applied.
    - RAN4 to update the known condition for SCell activation to include the case when UE has valid EMR reporting before SCell activation command.
  + Option 2: (Apple)
    - the current side condition and delay requirement for FR1 known SCell activation shall be updated to cover the fast SCell activation with EMR.
    - the current side condition and delay requirement for FR2 known SCell activation can cover the fast SCell activation with EMR. Potential clarification can only focus on the issue in proposal 1(issue 1-2-2).
  + Option 3: (MTK)
    - If the introduced conditions in RAN4 for fast SCell activation using R18 EMR are met, then the unknow SCell can be activated by applying the activation delay used for the known SCell scenario.
  + Option 4: (Huawei)
    - For the fast SCell activation for UE supporting Rel-18 EMR, the baseline solution to be defined is to extend the known condition for SCell activation considering the valid L3-RSRP measurement report via EMR report.
* Recommended WF
  + Discuss the option(s) and try to converge the baseline solution, e.g.,
    - the activation delay requirements for known SCell can be applied if UE send valid eEMR report during a period before the reception of the SCell activation command.
    - FFS how to update the known condition for SCell activation to include the case when UE has valid eEMR reporting before SCell activation command.

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

* Proposals
  + Option 1: (Apple)
    - 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: (CMCC)
    - 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: (vivo)
    - 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: (Huawei)
    - 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: (MTK)
    - 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]
* Recommended WF
  + Discuss the option(s).

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

* Proposals
  + Option 1: (Apple)
    - 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
* Recommended WF
  + Discuss the option(s).

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

* Proposals
  + Option 1: (Apple)
    - 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.
* Recommended WF
  + Discuss the option(s).

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

* Proposals
  + Option 1: (Ericsson)
    - 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.
* Recommended WF
  + Discuss the option(s).