**3GPP TSG RAN Meeting #101 RP-23xxxx**

**Bangalore, India, September 11-15, 2023**

## Status Report to TSG

**Agenda item:** 9.3.4.6

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **WI / SI Name** | Even Further RRM enhancement for NR and MR-DC | | | | |
| included in this status report | Study Item:  No | Core part:  Yes | Performance part:  Yes | | Testing part:  No |
| **Acronym** | NR\_RRM\_enh3 | | | | |
| **Unique ID** | 950078 | | | | |
| **TSG Tdoc of latest approved WI/SI description (if any)** | RP-221696 | | | | |
| **Target Completion Date**  **(indicate if changed)** | Study Item: | Core part: 12/2023 | Performance part: 06/2024 | Testing part: | |
| **Overall Completion level** | Study Item: | Core part:  Overall:100%  RAN4: 100% | Performance Part:  10% | Testing part: | |

Note: Overall completion level percentage numbers should use one of the colors below:

* xx%: Normal progress, no RAN plenary action needed
* xx%: Progress behind schedule, may need RAN plenary intervention. If so, SR should clearly define requested action
* xx%: Progress critically behind, RAN plenary shall intervene. SR should define requested action

**Source:**

|  |  |  |
| --- | --- | --- |
| **Leading WG** | | RAN4 |
| **Rapporteur** | **Name** | Jie Cui |
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| **Rapporteur** | **Name** | Roy Hu |
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## 1 Work plan related evaluation

|  |  |
| --- | --- |
| **Do you want to modify the time budget for this WI/SI compared to what was endorsed at the last RAN meeting?** | No |

*If you answered No: Then please remove the Excel file from the zip file of this status report.*

*If you answered Yes: Then please fill out the attached Excel template to request a modification of the time budgets for your WI /SI. The Excel table has to be filled out for all affected RAN WGs and up to the target date of the WI/SI. The basis are the endorsed time budgets of the last RAN meeting. Please highlight all changes of the values.  
 One time unit (TU) corresponds to ~ 2 hours in the meeting.  
 If this status report covers a WI with Core and Performance part, then please have one line for each in the attached Excel table.  
 Note: If no Excel table is attached, then this means no time budget change.*

**Additional explanations/motivations for the time budget changes in the attached Excel table:**

## 2. Detailed progress in RAN WGs since last TSG meeting (for all involved WGs)

NOTE: Agreements and Open issues impacted cross-TSG aspects shall be explicitly highlighted

## 2.1 RAN1

#### 2.1.1 Agreements

#### 2.1.2 Remaining Open issues

## 2.2 RAN2

#### 2.2.1 Agreements

**RAN2#123bis meeting**

Agreements:

1. If the network activates multiple Scells within same MAC CE the UE may send only one measurement report.

**RAN2#124 meeting**

[R2-2313937](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_124\Docs\R2-2313937.zip) Introduction of FR2 SCell enhancements Xiaomi, Apple, CATT, Ericsson, Qualcomm Incorporated, Huawei, HiSilicon, ZTE CR Rel-18 38.321 17.6.0 1697 2 B NR\_RRM\_enh3

=> Agreed

[R2-2313936](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_124\Docs\R2-2313936.zip) Introduction of FR2 SCell enhancements Apple, CATT, Ericsson, Xiaomi, Qualcomm Incorporated, Huawei, HiSilicon, ZTE CR Rel-18 38.331 17.6.0 4422 2 B NR\_RRM\_enh3

=> Agreed

#### 2.2.2 Remaining Open issues

## 2.3 RAN3

#### 2.3.1 Agreements

#### 2.3.2 Remaining Open issues

## 2.4 RAN4

#### 2.4.1 Agreements

**RAN4#108bis meeting**

The following tdocs have been approved/endorsed in RAN4#108bis meeting:

|  |  |  |
| --- | --- | --- |
| **Tdoc number** | **Title** | **Source** |
| R4-2317343 | Draft CR on Rel-18 SCell Activation Delay Requirement for Deactivated SCell (for enhancement excepts the L3 reporting) | MediaTek inc. |
| R4-2317350 | WF on NR eFeRRM (part1) | Apple |
| R4-2317360 | WF on NR eFeRRM (part2) | OPPO |
| R4-2317409 | Draft CR on multi-SCell activation with L3 reporting | ZTE Corporation |
| R4-2317410 | Draft CR on direct SCell activation delay enahcnements for FR2 Scell | Ericsson |
| R4-2317411 | draftCR on measurement reporting delay requirement for FR2 SCell activation delay reduction | vivo |
| R4-2317412 | Draft CR for Unknown Scell activation with L3 report | Qualcomm Incorporated |
| R4-2317432 | Draft Big CR to TS 38.133 on Even Further RRM enhancement for NR and MR-DC | Apple, OPPO |

**RRM core requirements for FR2 SCell activation delay reduction**

**Issue 1-1-1: delay requirement or time margin for “L3 measurement reporting after SCell activation command”?**

* Agreements:
  + UE is ready to report the L3 report after SCell activation command on *N +* *THARQ* + 3ms + 4 ms.
    - Note: The uncertainty of available UL resource for L3 report is not counted.
    - [4 ms is the processing time for preparing L3 report triggered by MAC CE.]
* Agreement:
  + *UE is not required to report L3-RSRP report after exceeding [Y]ms*
    - *Where Y= THARQ + 3ms + [M]ms,* 
      * *M = 4ms + X1\*Tssb+X2\*Tssb, if UE indicates capability of using SSB periodicity instead of SMTC periodicity*
      * *Otherwise, M = 4ms + X1\*Tsmtc+X2\*Tssb*

**Issue 1-1-2: Condition the UE shall trigger the L3 report when receiving SCell activation command**

* Agreements:
  + Setup testing environment in the test case for UE to get valid L3 measurement result to report. In the performance part, further discuss the test conditions under which the UE shall be able to trigger the L3 report.

**Issue 1-1-3: Tuncertainty\_MAC, Tuncertainty\_RRC and Tuncertainty\_SP for FR2 unknown SCell activation requirement**

* Agreement
  + Tuncertainty\_MAC, Tuncertainty\_RRC and Tuncertainty\_SP for FR2 unknown SCell activation requirement can be discussed in the CR draft directly.

**Issue 1-1-5: Enhancement based on A-TRS for fast SCell activation**

* Agreement:
  + No further discussion on this A-TRS based enhancement for fast SCell activation

**Issue 1-1-6: detailed delay requirement with reporting valid L3 measurement after SCell activation command (single SCell activation)**

* Agreement
  + Discuss in draft CR directly.

**Issue 1-1-7: detailed delay requirement with reporting valid L3 measurement after SCell activation command (multiple SCell activation)**

* Agreement
  + Discuss in draft CR directly.

**Issue 1-2-1: Extra clarifications for beam reduction in L1-RSRP measurement**

* + Proposal 1 (Nokia, ZTE):
    - The performance of L1-RSRP report shall be consistently guaranteed irrespective of the beam sweeping factors.
    - The reported L1-RSRP measurements shall meet the performance requirements as specified in in TS38.133 clauses 10.1.20 for FR2.
  + Proposal 2 (OPPO):
    - For the case when no valid L3 measurement result is reported after SCell activation command, if L3 measurement is performed without L3 part enhancement, whether UE report L1-RSRP based on L1 or L3 measurement is up to UE implementation.
  + Proposal 3 (ZTE):
    - An potential condition of reusing the L3 measurement results as L1 report is the L1 measurement resource relevant to the L1 report configuration should be a sub set or full set of the L3 measurement resource configured through ServingCellMO.
    - No matter whether valid L3 report after SCell activation command succeed to send to NW or not, once the above potential condition met, whether UE derives L1-RSRP report based on L1 or L3 measurement, which is up to UE implementation.
  + Proposal 4 (Ericsson):
    - When SSB is configured as RS for L1-RSRP and If UE reports X2 as 0, then UE can derive L1-RSRP from cell search results and skip L1-RSRP measurement.
* Agreement:
  + Directly discuss in the draft CR.

**Issue 2-1-1: expand the enhancement with L3 measurement report after SCell activation command to FR1 SCell unknown activation**

* Agreement:
  + the enhancement with L3 measurement report after SCell activation command can be used for FR1 SCell unknown activation delay
    - with L3 measurement report after SCell activation command, the L3 part (Trs) and L1 part (TL1-RSRP,measure + TL1-RSRP,report) can be removed from FR1 SCell activation delay requirements.
  + the enhancement of using SSB periodicity instead of SMTC periodicity when the SMTC is only configured in MO can be applied for FR1 SCell activation delay.

**Issue 3-1-1: UE capability of enhancement L3 report after SCell activation command**

* Agreement:
  + this feature shall be defined in one single feature group (FR) of feature list and it’s optional with capability signaling

**Issue 3-1-2: capability of beam sweeping factor reduction** **for L3 and L1 (X1 and X2)**

* Agreement:
  + this feature (X1/X2) shall be defined in one single feature group (FR) of feature list
  + define UE capability of beam sweeping factor reduction for L3 and L1 (X1 and X2)
    - It’s Optional with capability signaling.

**Issue 3-1-3: capability of “using SSB periodicity instead of SMTC” and “perform L1-RSRP measurement in non-DRX mode even DRX is configured”**

* Agreement:
  + “using SSB periodicity instead of SMTC” and “perform L1-RSRP measurement in non-DRX mode even DRX is configured” shall be defined in one single feature group (FR) of feature list
    - Define this feature as “optional with capability signaling”

**Issue 4-1-1: Performance requirement design**

* Proposal 1 (Nokia):
  + The L3 report after SCell activation command, if triggered, shall fulfil the accuracy requirements as specified in TS 38.133 clause 10, in particular clause 10.1.2.1 (for FR1) and 10.1.3.1 (for FR2).
  + When the UE indicates a smaller sweeping factor X2, the L1-RSRP report shall fulfil the accuracy requirements as specified in in TS38.133 clause 10.1.19.1 (for FR1) and clause 10.1.20.1 (for FR2), irrespective of the value of sweeping factor X2.
* Proposal 2 (QC):
  + RAN4 introduce performance requirement for L3 reporting based enhancement at least.
* Agreement:
  + Can be discussed directly in draft CR.

**Issue 4-2-1: work plan for test case design**

* Agreement:
  1. **3GPP RAN4 #108-bis meeting (Oct, 2023)**
     + Discuss to achieve consensus on the work plan [RAN4]
     + Discuss the test case list and work splitting for test case design [RAN4]
  2. **3GPP RAN4 #109 meeting (Nov, 2023)**
     + Discuss and agree on the test case list and work splitting for test case design [RAN4]
     + Discussion on configurations/parameters for test cases [RAN4]
  3. **3GPP RAN4 #110 meeting (Feb, 2024)**
     + Discuss and agree on configurations/parameters for test cases [RAN4]
     + Initial discussion on draft test cases [RAN4]
  + Draft CR for test cases are expected
  1. **3GPP RAN4 #110bis meeting (April, 2024)**
     + Finalize the configurations/parameters for test cases [RAN4]
     + Discuss and endorse on the CRs of test cases [RAN4]
  2. **3GPP RAN4 #111 meeting (May, 2024)**
     + Agree on the formal CRs of test cases [RAN4]

**RRM core requirements for FR1-FR1 NR-DC**

## **Issue 1-1: Side condition for RACH-less SCG activation/deactivation**

* Option 1: keep the legacy condition (OPPO, Apple)
* Option 2: remove the 5 s restriction in the legacy condition, and keep the other part. (E///, Nokia)
* Option 3: Agree option 1 for now. Further discuss the issue in R17 maintenance part, the agreement in R17 (if any) can be reused for R18.

**Agreements in Online session:**

No further discussion in this meeting. Moderator to re-submit the endorsed CR to the next meeting. The formal CR for NR\_RRM\_enh3\_part2 will be agreed in the next meeting.

## **Issue 2-1: Work plan for RRM performance part**

**Agreements:**

1. *3GPP RAN4 #108-bis meeting (Oct, 2023)*
   * + *Discuss to achieve consensus on the work plan [RAN4]*
     + *Discuss the test case list and work splitting for test case design [RAN4]*
2. *3GPP RAN4 #109 meeting (Nov, 2023)*
   * + *Discuss and agree on the test case list and work splitting for test case design [RAN4]*
     + *Discussion on configurations/parameters for test cases [RAN4]*
3. *3GPP RAN4 #110 meeting (Feb, 2024)*
   * + *Discuss and agree on configurations/parameters for test cases [RAN4]*
     + *Initial discussion on draft test cases [RAN4]*

-        *Draft CR for test cases are expected*

1. *3GPP RAN4 #110bis meeting (April, 2024)*
   * + *Finalize the configurations/parameters for test cases [RAN4]*
     + *Discuss and endorse on the CRs of test cases [RAN4]*
2. *3GPP RAN4 #111 meeting (May, 2024)*
   * + *Agree on the formal CRs of test cases [RAN4]*

## **Issue 2-2: General of test case design for requirements for FR1-FR1 NR-DC**

**Agreements:**

* Proposal 1: As there are no CPC tests cases from R16 and R17 in FR1-FR2 NR-DC, RAN4 not to define inter-frequency and intra-frequency CPC test cases for FR1-FR1 NR-DC in R18.

**RAN4#109 meeting**

The following tdocs have been approved/endorsed in RAN4#108bis meeting:

|  |  |  |
| --- | --- | --- |
| **Tdoc number** | **Title** | **Source** |
| [R4-2321355](ftp://10.10.10.10/ftp/tsg_ran/WG4_Radio/TSGR4_109/Inbox/R4-2321355.zip) | draftCR on measurement reporting delay requirement for FR2 SCell activation delay reduction | vivo |
| [R4-2321356](ftp://10.10.10.10/ftp/tsg_ran/WG4_Radio/TSGR4_109/Inbox/R4-2321356.zip) | Draft CR on introduction on RRM requirements for multiple FR2 SCell activation | Huawei, HiSilicon |
| [R4-2321624](ftp://10.10.10.10/ftp/tsg_ran/WG4_Radio/TSGR4_109/Inbox/R4-2321624.zip) | [NR\_RRM\_enh3-Core] Draft CR on multi-SCell activation with L3 reporting | ZTE Corporation |
| [R4-2321358](ftp://10.10.10.10/ftp/tsg_ran/WG4_Radio/TSGR4_109/Inbox/R4-2321358.zip) | DraftCR update on L3 measurement reporting based enhancements. | Qualcomm Incorporated |
| [R4-2321359](ftp://10.10.10.10/ftp/tsg_ran/WG4_Radio/TSGR4_109/Inbox/R4-2321359.zip) | On FR2 SCell activation delay reduction | Ericsson |
| [R4-2321360](ftp://10.10.10.10/ftp/tsg_ran/WG4_Radio/TSGR4_109/Inbox/R4-2321360.zip) | draftCR on enhancement for PUCCH SCell activation | Nokia, Nokia Shanghai Bell |
| [R4-2321368](ftp://10.10.10.10/ftp/tsg_ran/WG4_Radio/TSGR4_109/Inbox/R4-2321368.zip) | Big CR for R18 RRM enhancement - FR1+FR1 NR-DC | OPPO |
| [R4-2321521](ftp://10.10.10.10/ftp/tsg_ran/WG4_Radio/TSGR4_109/Inbox/R4-2321521.zip) | WF for [109][208] NR\_RRM\_enh3\_part1 | Apple |
| [R4-2321586](ftp://10.10.10.10/ftp/tsg_ran/WG4_Radio/TSGR4_109/Inbox/R4-2321586.zip) | WF on NR eFeRRM (part2) | OPPO |

**RRM core requirements for FR2 SCell activation delay reduction**

**Issue 1-1: delay requirement or time margin for “L3 measurement reporting after SCell activation command”?**

Agreement:

* UE is ready to report the L3 results no later than 7ms + THARQ after receiving the SCell activation command
* The value of M is updated as the following:
  + For FR2,
    - *M = THARQ + 3ms X1\*Tssb+X2\*Tssb+[*TL1-RSRP,report*]*, if UE indicates capability of using SSB periodicity instead of SMTC periodicity
    - Otherwise, *M = THARQ + 3ms + X1\*Tsmtc+X2\*Tssb +[TL1-RSRP,report]*
  + For FR1,
    - *M = THARQ + 3ms + Tssb+ Tssb+ [TL1-RSRP,report]*, if UE indicates capability of using SSB periodicity instead of SMTC periodicity
    - Otherwise, *M = THARQ + 3ms + Tsmtc+ Tssb+ [TL1-RSRP,report]*

**Issue 1-2: Whether SCell activation triggered L3 report is on one serving cell in same band or on all serving cells**

* Proposals
  + Option 1 (Apple, ZTE, Ericsson, QC): RAN4 to not discuss the RAN2 signalling design of L3 measurement report upon SCell activation command, i.e., whether L3 report is on one serving cell in same band or on all serving cells.
  + Option 2 (Nokia):
    - UE does not need to report L3 measurement resulting if UE has no valid measurement results for any of the SCells on the same FR2 band.
    - The SCell activation triggered L3 report is considered when determining known/unknown state in the same way as legacy L3 measurement reporting.
  + Option 3 (HW): RAN4 to discuss the following case:
    - When more than one servingCellMOs are configured within the same band and UE report multiple report upon receiving SCell activation command, whether UE should report multiple report if the report beams are different and how to configure the TCI for SCell activation.
* Agreement:
  + According to the previous agreements, this issue can be left to RAN2 for decision. Further discussion in RAN4 in maintenance part is not precluded.

**Issue 1-3: FR2 unknown PUCCH SCell activation enhancement**

* Option 1 (Apple, QC):
  + PL-RS measurement sample number in R18 FR2 unknown PUCCH SCell activation enhancement is same as R17 PUCCH SCell activation, i.e., 3\*Ttarget\_PL-RS.
* Option 2 (Nokia):
  + R18 enhancement solutions are applicable to PUCCH SCell activation by referring to the enhanced SCell activation delay in the new clause 8.3.x for UE configured with *[reportOnactivation]*.
  + If the UE indicates X2=0, the PL-RS measurement shall be skipped during PUCCH SCell activation.
* Agreement
  + PL-RS measurement sample number in R18 FR2 unknown PUCCH SCell activation enhancement is same as R17 PUCCH SCell activation, i.e., [3]\*Ttarget\_PL-RS.

**Issue 1-4: detailed delay requirement with reporting valid L3 measurement after SCell activation command (multiple SCell activation)**

* Option 1 (Nokia):
  + If all the to-be-activated SCells belong to FR2 and on the same band, the activation delay for activating these multiple SCells is:
    - the same as the enhanced FR2 SCell activation delay in clause 8.3.x provided the UE triggers the L3 report for at least one of the SCells to be activated after SCell activation command, or
    - the same as the single SCell activation delay in clause 8.3.2, otherwise.
  + For multiple FR1 SCells, the adaptation of the "N1" definition is required to align with the advantages derived from sending an L3 report after SCell activation command.
  + N1 shall not count for the FR1 unknown to-be-activated SCells which have been reported or contiguous to the SCells reported in the L3 report after SCell activation command.
* Agreement
  + directly discuss in draft CR.

**Issue 1-5: “Performing L1-RSRP measurement in non-DRX mode even DRX is configured” for FR1 SCell activation**

* Option 1 (Apple, CMCC, CTC):
  + “Performing L1-RSRP measurement in non-DRX mode even DRX is configured” can also be applied for FR1 SCell activation
* Agreement
  + Agree on option 1.

**UE capability design**

Agreement:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Features** | **Index** | **Feature group** | **Components** | **Prerequisite feature groups** | **Need for the gNB to know if the feature is supported** | **Applicable to the capability signalling exchange between UEs (V2X WI only)”.** | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | **Need of FDD/TDD differentiation** | **Need of FR1/FR2 differentiation** | **Capability interpretation for mixture of FDD/TDD and/or FR1/FR2** | **Note** | **Mandatory/Optional** |
| 31. NR\_RRM\_enh3 | 31-1 | Enhanced L3 measurement reporting for unknown SCell activation if the valid L3 measurement results are available | Support of reporting valid L3 measurement results triggered by the SCell activation command |  | Yes | N/A | UE does not support reporting valid L3 measurement results triggered by SCell activation command | Per UE | No | No | N/A | UE is required to meet the shortened SCell activation delay requirement in TS38.133 [section 8.x.y] if the feature is supported, including single SCell activation, single PUCCH SCell activation, and multiple SCell activation with/without PUCCH SCell. | Optional with capability signaling |
| 31. NR\_RRM\_enh3 | 31-2 | Beam sweeping factor reduction for FR2 unknown SCell activation | Support of reducing beam sweeping factor for cell detection if UE has full set (N=8) of beam sweeping during AGC settling part during FR2-1 unknown SCell activation procedure  Support of reducing beam sweeping factor for SSB based L1-RSRP measurement if UE has full set (N=8) of beam sweeping during AGC settling part during FR2-1 unknown SCell activation procedure |  | Yes | N/A | UE does not support beam sweeping factor reduction for cell detection during FR2-1 unknown SCell activation.  UE does not support beam sweeping factor reduction for SSB based L1-RSRP measurement during FR2-1 unknown SCell activation. | Per Band | TDD only | FR2-1 only | N/A | UE is required to meet the shortened SCell activation delay requirement in TS38.133 [section 8.x.y] if the feature is supported.  Candidate values for beam sweeping reduction for cell detection during FR2-1 unknown SCell activation are 1,2,4, or 6. [Agreed in WF R4-2310081]  Candidate values for beam sweeping reduction for SSB based L1-RSRP measurement during FR2-1 unknown SCell activation are 0,1,2,3,4,5,6, or 7. [Agreed in WF R4-2310081] | Optional with capability signaling |
| 31. NR\_RRM\_enh3 | 31-3 | Shorter measurement interval for unknown SCell activation | (1) Support of using SSB periodicity instead of SMTC periodicity for the measurement interval during unknown SCell activation when the SMTC is only configured in measurement object for enhanced unknown SCell activation requirement.  (2) Support of performing L1-RSRP measurement in non-DRX mode even DRX is configured during unknown SCell activation |  | Yes | N/A | UE does not use SSB periodicity instead of SMTC periodicity for the measurement interval during unknown SCell activation when the SMTC is only configured in MO for enhanced unknown Scell activation requirement.  UE does not support performing L1-RSRP measurement in non-DRX mode even DRX is configured during unknown SCell activation | Per UE | No | No | N/A | UE is required to meet the shortened SCell activation delay requirement in TS38.133 [section 8.x.y] if the feature is supported. | Optional with capability signaling |

**Issue 3-1-1: Performance requirement design**

* Proposal (Nokia): RAN4 to confirm the L3 report and L1 report shall fulfill the existing accuracy requirements:
  + The L3 report after SCell activation command, if triggered, shall fulfil the accuracy requirements as specified in TS 38.133 clause 10, in particular clause 10.1.2.1 (for FR1) and 10.1.3.1 (for FR2).
  + When the UE indicates a smaller sweeping factor X2, the L1-RSRP report shall fulfil the accuracy requirements as specified in in TS38.133 clause 10.1.19.1 (for FR1) and clause 10.1.20.1 (for FR2), irrespective of the value of sweeping factor X2.
* Agreement
  + discuss in the draft CR for the corresponding activation delay requirement.

**RRM core requirements for FR1-FR1 NR-DC**

**Issue 1-1: Side condition for RACH-less SCG activation/deactivation**

**Agreement**:

* Keep the legacy side condition for Tsearch for R17.
* If any agreement is reached in R17 maintenance, it can be reused for R18.

#### **Issue 1-2: Tsearch requirement for RACH-less PSCell activation**

**Agreement**:

* For core requirements in R18

Keep previous agreement that RAN4 only define requirements for cases when Target PSCell is known and TCI is known.

|  |
| --- |
| *For RACH-less based PSCell activation, if [RLM and BFD are configured] and TCI state is known, Tsearch = 0 ms if the target cell is a known FR2 or FR1 PScell. [There are no requirements if PSCell is unknown, or TCI state is unknown].* |

**Way Forward:**

* For performance part in R18
  + Option 1: Further discuss the test case to verify the procedure to RACH-based and RACH-less SCG activation in RRM performance part.
    - Option 1a: Instead of changing the core requirement, verify UE behavior in certain test environment to avoid UE to fallback to RACH based activation.
    - Option 1b: Update the current FR1-FR2 NR-DC SCG activation test case A.7.5.15 to guarantee the UE performance of RACH-less PSCell activation.
  + Others solutions are not precluded.

#### **Issue 2-1: Tsearch for RACH-based PSCell activation**

**Agreement**:

* Not to change the RACH based PSCell activation requirement in agreed CR R4-2310080, i.e.,

*If the target cell is an unknown FR2 PSCell and Es/Iot ≥ -2 dB, then Tsearch = 24\* Trs ms. If the target cell is an unknown FR1 PSCell and Es/Iot ≥ -2 dB, then Tsearch =3\* Trs ms.*

**Issue 3-1: Whether to introduce UE capability to indicate supporting FR1+FR1 NR-DC RRM**

**Agreement**:

* No need to introduce additional UE feature for FR1-FR1 NRDC in R18.

#### **Issue 3-1: Whether to define the test case for conditional PSCell addition/release in FR1-FR1 NR-DC**

Proposals:

* Option 1(vivo, OPPO, Qualcomm): No
  + Option 1a (Qualcomm): Since RAN4 already introduced TC for conditional PSCell addition/release or PSCell activation in EN-DC, and the requirements are applicable for both EN-DC and NR-DC. Therefore, it is verified in existing test case and RAN4 does not need to introduce same test for FR1-FR1 NR-DC.
* Option 2: YES
  + Option 2a (vivo): TC1: Conditional PSCell addition and release delay of NR PSCell in FR1(without SSB index measurement)
  + Option 2b (Nokia): Define test case for a detectable target PSCell for conditional PSCell addition requirements in FR1-FR1 NR-DC

**Agreement**:

* Agree on Option 2

#### **Issue 3-2: Whether to define the test case for PSCell addition/release in FR1-FR1 NR-DC**

Proposals:

* Option 1: Two TCs, TC1 for PSCell addition and release delay of **known** FR1 PSCell, and TC2 for PSCell addition and release delay of **unknown** FR1 PSCell.
* Option 2: one TC for PSCell addition and release delay of **unknown** NR PSCell in FR1

**Agreement**:

* Agree on Option 2

#### **Issue 3-3: How to define the test case for Handover with PSCell change in FR1-FR1 NR-DC**

Proposals:

* Option 1 (OPPO, vivo, Ericsson): Define 3 test cases
  + TC1: Handover with PSCell change with parallel processing from FR1-FR1 NR-DC to FR1-FR1 NR-DC
  + TC2: Handover with PSCell change with sequential processing in FR1-FR1 NR-DC to FR1-FR2 NR-DC
  + TC3: Handover with PSCell change with parallel processing in FR1-FR2 NR-DC to FR1-FR1 NR-DC
  + Option 1a (vivo): add the TC2 and TC3 to list of tests in TS 38.133 clause A.3.13A if there are still testability issues after assessment.
  + Option 1b (OPPO): RAN4 to define either parallel processing or sequential processing for each case of HO with PSCell.
* Option 2 (Nokia): Define 2 test cases
  + TC1 (FR1-FR1 NR-DC to FR1-FR1 NR-DC) and
  + TC3 (FR1-FR2 NR-DC to FR1-FR1 NR-DC)

as TC2 (FR1-FR1 NR-DC to FR1-FR2 NR-DC) has the testability issue of FR1+FR2 test, and TC2 and TC3 are similar.

* Option 3 (Qualcomm): Define 1 test case
  + TC1: HO with PSCell from FR1-FR1 NR-DC to FR1-FR1 NR-DC with parallel processing

**Agreement**:

* Agree on Option 1

#### **Issue 3-4: How to define the test case for PSCell activation and deactivation delay in FR1-FR1 NR-DC**

Proposals:

* Option 1(vivo): The test configuration on RACH-less based SCG activation in R17 can be the baseline. RAN4 not to define test case on RACH-based PSCell activation for FR1-FR1 NR-DC in R18
* Option 2 (Nokia, OPPO): one TC to cover both RACH-based and RACH-less based PSCell activation/deactivation in FR1-FR1 NR-DC
  + Option 2a (Ericsson): Update the current FR1-FR2 NR-DC SCG activation test case A.7.5.15 to guarantee both RACH based and RACH-less SCG activation performance

**Agreement:**

* Agree on Option 2

#### **Issue 3-5: Work splitting for RRM performance part of FR1-FR1 NR-DC**

Background: Encourage companies to agree on the TC list and volunteer to CR slitting in RAN4#109 meeting.

(based on the test list in WF of last meeting)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| TC# | The RRM requirement for test case | This TC is needed | Support to define | Detailed Scope | Volunteer Company |
| TC1 | HO with PSCell from FR1-FR1 NR-DC to FR1-FR1 NR-DC | Huawei, vivo, Ericsson, OPPO, Nokia |  | FFS: only consider one of parallel processing and sequential processing for test cases of HO with PSCell to reduce the number of test cases.  FFS: for TC2, considering the testability issue discussed in maintenance part, this test case may not be tested | Qualcomm |
| TC2 | HO with PSCell from FR1-FR1 NR-DC to FR1-FR2 NR-DC | Huawei, vivo, Ericsson, OPPO, Nokia |  | Huawei |
| TC3 | HO with PSCell from FR1-FR2 NR-DC to FR1-FR1 NR-DC | Huawei, vivo, Ericsson, OPPO, Nokia |  | OPPO |
| TC4 | PSCell addition and release delay of known FR1 PSCell | Huawei, vivo, Ericsson, OPPO |  | FFS: Whether to only define the case of unknown FR1 PSCell  FFS: Regarding FR1 known PSCell addition TC in EN-DC, only consider on unknown FR1 PSCell addition for FR1-FR1 NR-DC |  |
| TC5 | PSCell addition and release delay of unknown FR1 PSCell | Huawei, vivo, Ericsson, OPPO, Nokia |  | Nokia |
| TC6 | PSCell activation and deactivation for FR1+FR1 NR-DC | Huawei, vivo, Ericsson, OPPO, Nokia |  | FFS: define both RACH-based and RACH-less based PSCell activation/deactivation in one TC | Ericsson |
| [TC7] | Conditional PSCell addition and release delay of NR PSCell in FR1 | Vivo, Nokia |  | FFS: Conditional PSCell addition and release delay of NR PSCell in FR1(without SSB index measurement) | Vivo |

**Agreement**:

Agree on the TC list and CR slitting as below.

|  |  |  |  |
| --- | --- | --- | --- |
| TC# | The RRM requirement for test case | Detailed Scope | Volunteer Company |
| TC1 | HO with PSCell from FR1-FR1 NR-DC to FR1-FR1 NR-DC | FFS: Only consider one of parallel processing and sequential processing for test cases of HO with PSCell to reduce the number of test cases.  FFS: for TC2, considering the testability issue discussed in maintenance part, this test case may not be tested | Qualcomm |
| TC2 | HO with PSCell from FR1-FR1 NR-DC to FR1-FR2 NR-DC | Huawei |
| TC3 | HO with PSCell from FR1-FR2 NR-DC to FR1-FR1 NR-DC | OPPO |
| TC5 | PSCell addition and release delay of unknown FR1 PSCell |  | Nokia |
| TC6 | PSCell activation and deactivation for FR1+FR1 NR-DC | Define both RACH-based and RACH-less based PSCell activation/deactivation in one TC | Ericsson |
| [TC7] | Conditional PSCell addition and release delay of NR PSCell in FR1 | Conditional PSCell addition and release delay of NR PSCell in FR1(without SSB index measurement) | Vivo |

#### 2.4.2 Remaining Open issues

## 2.5 RAN5

#### 2.5.1 Agreements

#### 2.5.2 Remaining Open issues

#### 2.5.3 Remaining Open issues with cross-WG dependencies

## 2.6 RAN6

#### 2.6.1 Agreements

#### 2.6.2 Remaining Open issues

## 3. Detailed progress in SA/CT WGs since last TSG meeting (for all involved WGs)

NOTE: This section only needs to be filled in for WI/SIs where there is a corresponding relevant WI/SI in SA/CT.

## 3.1 SAx/CTs

#### 3.1.1 Agreements with cross-TSG impacts

#### 3.1.2 Remaining Open issues with cross-TSG impacts

NOTE: This section should also flag any critical dependencies that need TSG attention.

## 4. References

NOTE: This can be e.g. a list of all related Tdocs in the affected WGs since last TSG, references to LSs, produced TRs/TSs, the work/study item description or status reports of previous TSGs.

**RAN4 #108bis meeting**

|  |  |  |
| --- | --- | --- |
| **TDoc** | **Title** | **Source** |
| [**R4-2315276**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315276.zip) | Discussion on L3 and L1 parts enhancement for FR2 SCell activation | MediaTek inc. |
| [**R4-2315277**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315277.zip) | Discussion on other enhancements for FR2 SCell activation | MediaTek inc. |
| [**R4-2315278**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315278.zip) | Draft CR on Rel-18 SCell Activation Delay Requirement for Deactivated SCell (for enhancement excepts the L3 reporting) | MediaTek inc. |
| [**R4-2315336**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315336.zip) | Discussion on enhancement for FR1 SCell activation | CMCC |
| [**R4-2315337**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315337.zip) | Discussion on UE capability for enhancement for FR2 SCell activation | CMCC |
| [**R4-2315338**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315338.zip) | Discussion on performance requirements for FR2 SCell activation delay reduction | CMCC |
| [**R4-2315516**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315516.zip) | Enhancement for FR2 SCell activation | Nokia, Nokia Shanghai Bell |
| [**R4-2315517**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315517.zip) | R18 enhancements for other SCell activation scenarios | Nokia, Nokia Shanghai Bell |
| [**R4-2315518**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315518.zip) | draftCR on enhancement for PUCCH SCell activation | Nokia, Nokia Shanghai Bell |
| [**R4-2315519**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315519.zip) | Performance aspects for FR2 SCell activation delay reduction | Nokia, Nokia Shanghai Bell |
| [**R4-2315633**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315633.zip) | Discussion on FR2 SCell activation delay reduction | Huawei, HiSilicon |
| [**R4-2315634**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315634.zip) | Draft CR on introduction on RRM requirements for multiple FR2 SCell activation | Huawei, HiSilicon |
| [**R4-2315635**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315635.zip) | Discussion on other enhancement for FR2 SCell activation delay reduction | Huawei, HiSilicon |
| [**R4-2315636**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315636.zip) | Discussion on performance requirements for FR2 SCell activation delay reduction | Huawei, HiSilicon |
| [**R4-2315637**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315637.zip) | Discussion on performance requirements for FR1-FR1 NR-DC | Huawei, HiSilicon |
| [**R4-2315736**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315736.zip) | Discussion on RRM core requirements for FR1-FR1 NR-DC | vivo |
| [**R4-2315739**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315739.zip) | Discussion on test cases for RRM requirements for FR1+FR1 NR-DC | vivo |
| [**R4-2316138**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316138.zip) | Discussion on enhancement for FR2 SCell activation | China Telecom |
| [**R4-2316139**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316139.zip) | Discussion on other enhancements for FR2 SCell activation | China Telecom |
| [**R4-2316161**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316161.zip) | On enhancement for FR2 Scell activation delay reduction | OPPO |
| [**R4-2316162**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316162.zip) | On other enhancement for FR2 Scell activation delay reduction | OPPO |
| [**R4-2316163**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316163.zip) | On remaining issues of RRM requirements for FR1+FR1 NR-DC | OPPO |
| [**R4-2316164**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316164.zip) | Work plan for RRM performance requirements of FR1+FR1 NR-DC | OPPO |
| [**R4-2316285**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316285.zip) | Discussion on remaining issues of FR2 SCell activation delay reduction | vivo |
| [**R4-2316286**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316286.zip) | draftCR on measurement reporting delay requirement for FR2 SCell activation delay reduction | vivo |
| [**R4-2316402**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316402.zip) | Discussion on eFeRRM on FR1-FR1 NR-DC performance test | Ericsson |
| [**R4-2316403**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316403.zip) | Discussion on eFeRRM on FR1-FR1 NR-DC RRM core requirement | Ericsson |
| [**R4-2316440**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316440.zip) | Discussion on enhancement of RRM requirements for FR2 SCell activation delay reduction | ZTE Corporation |
| [**R4-2316441**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316441.zip) | Discussion on the enhancement of multiple SCell activation | ZTE Corporation |
| [**R4-2316442**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316442.zip) | Discussion on the relevant UE capability for FR2 SCell activation delay reduction | ZTE Corporation |
| [**R4-2316455**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316455.zip) | Draft CR on multi-SCell activation with L3 reporting | ZTE Corporation |
| [**R4-2316577**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316577.zip) | On enhancement for FR2 SCell activation | Apple |
| [**R4-2316578**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316578.zip) | On other enhancement for FR2 SCell activation | Apple |
| [**R4-2316579**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316579.zip) | On RRM requirements for FR1-FR1 NR-DC | Apple |
| [**R4-2316580**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316580.zip) | Work plan for FR2 SCell activation performance part | Apple |
| [**R4-2316706**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316706.zip) | Discussion on remaining issues for enhancements for FR2 Unknown SCell activation | Qualcomm Incorporated |
| [**R4-2316707**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316707.zip) | Draft CR for Unknown Scell activation with L3 report | Qualcomm Incorporated |
| [**R4-2316708**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316708.zip) | Discussion on the scope of perfomrnace requirement FR2 Unknown SCell activation | Qualcomm Incorporated |
| [**R4-2316756**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316756.zip) | discussion on SCG activation for FR1+FR1 NR-DC | Nokia, Nokia Shanghai Bell |
| [**R4-2316757**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316757.zip) | draftCR on SCG activation for FR1+FR1 NR-DC | Nokia, Nokia Shanghai Bell |
| [**R4-2316758**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316758.zip) | discussion on test cases for FR1+FR1 NR-DC | Nokia, Nokia Shanghai Bell |
| [**R4-2316815**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316815.zip) | Discussion on FR2 SCell activation enhancements | Ericsson |
| [**R4-2316816**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316816.zip) | Discussion on general aspects of the FR2 SCell activation enhancement | Ericsson |
| [**R4-2316817**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316817.zip) | Draft CR on direct SCell activation delay enahcnements for FR2 SCell | Ericsson |
| [**R4-2316818**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316818.zip) | RRM performance requirements for FR2 SCell activation delay reduction | Ericsson |
| R4-2317196 | Topic summary for [108-bis][204] NR\_RRM\_enh3\_part1 | Moderator (Apple) |
| R4-2317197 | Topic summary for [108-bis][205] NR\_RRM\_enh3\_part2 | Moderator (OPPO) |
| R4-2317343 | Draft CR on Rel-18 SCell Activation Delay Requirement for Deactivated SCell (for enhancement excepts the L3 reporting) | MediaTek inc. |
| R4-2317344 | Draft CR on introduction on RRM requirements for multiple FR2 SCell activation | Huawei, HiSilicon |
| R4-2317345 | draftCR on measurement reporting delay requirement for FR2 SCell activation delay reduction | vivo |
| R4-2317346 | Draft CR on multi-SCell activation with L3 reporting | ZTE Corporation |
| R4-2317347 | Draft CR for Unknown Scell activation with L3 report | Qualcomm Incorporated |
| R4-2317348 | Draft CR on direct SCell activation delay enahcnements for FR2 SCell | Ericsson |
| R4-2317349 | draftCR on enhancement for PUCCH SCell activation | Nokia, Nokia Shanghai Bell |
| R4-2317350 | WF on NR eFeRRM (part1) | Apple |
| R4-2317360 | WF on NR eFeRRM (part2) | OPPO |
| R4-2317408 | Draft CR for Unknown Scell activation with L3 report | Qualcomm Incorporated |
| R4-2317409 | Draft CR on multi-SCell activation with L3 reporting | ZTE Corporation |
| R4-2317410 | Draft CR on direct SCell activation delay enahcnements for FR2 Scell | Ericsson |
| R4-2317411 | draftCR on measurement reporting delay requirement for FR2 SCell activation delay reduction | vivo |
| R4-2317412 | Draft CR for Unknown Scell activation with L3 report | Qualcomm Incorporated |

**RAN4 #109 meeting**

|  |  |  |
| --- | --- | --- |
| **TDoc** | **Title** | **Source** |
| R4-2318164 | Topic summary for [109][208] NR\_RRM\_enh3\_part1 | Moderator (Apple) |
| R4-2318165 | Topic summary for [109][209] NR\_RRM\_enh3\_part2 | Moderator (OPPO) |
| [**R4-2318646**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318646.zip) | On enhancement for FR2 SCell activation | Apple |
| [**R4-2318647**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318647.zip) | On UE capability for FR2 SCell activation | Apple |
| [**R4-2318648**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318648.zip) | Draft Big CR to TS 38.133 on R18 SCell activation enhancement | Apple, OPPO |
| R4-2318649 | Feature list comments summary for SCell activation enhancement | Apple |
| [**R4-2318650**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318650.zip) | On RRM requirements for FR1-FR1 NR-DC | Apple |
| [**R4-2318651**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318651.zip) | On FR2 SCell activation performance part | Apple |
| [**R4-2319004**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319004.zip) | Enhancement for FR2 SCell activation | Nokia, Nokia Shanghai Bell |
| [**R4-2319005**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319005.zip) | R18 enhancements for other SCell activation scenarios | Nokia, Nokia Shanghai Bell |
| [**R4-2319006**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319006.zip) | corrections to draft BigCR on FR2 SCell activation enhancement | Nokia, Nokia Shanghai Bell |
| [**R4-2319007**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319007.zip) | draftCR on enhancement for PUCCH SCell activation | Nokia, Nokia Shanghai Bell |
| [**R4-2319008**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319008.zip) | Performance aspects for FR2 SCell activation delay reduction | Nokia, Nokia Shanghai Bell |
| [**R4-2319049**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319049.zip) | Discussion on remaining issues of FR2 SCell activation delay reduction | vivo |
| [**R4-2319050**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319050.zip) | draftCR on measurement reporting delay requirement for FR2 SCell activation delay reduction | vivo |
| [**R4-2319066**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319066.zip) | Discussion on test cases for RRM requirements for FR1+FR1 NR-DC | vivo |
| [**R4-2319099**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319099.zip) | Discussion on UE capability for enhancement for FR2 SCell activation | CMCC |
| [**R4-2319100**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319100.zip) | Discussion on performance requirements for FR2 SCell activation delay reduction | CMCC |
| [**R4-2319355**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319355.zip) | Discussion on FR2 SCell activation delay reduction | Huawei, HiSilicon |
| [**R4-2319356**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319356.zip) | Draft CR on introduction on RRM requirements for multiple FR2 SCell activation | Huawei, HiSilicon |
| [**R4-2319357**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319357.zip) | Discussion on performance requirements for FR2 SCell activation delay reduction | Huawei, HiSilicon |
| [**R4-2319469**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319469.zip) | On general for R18 eFeRRM | OPPO |
| [**R4-2319470**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319470.zip) | On remaining issues of RRM requirements for FR1+FR1 NR-DC | OPPO |
| [**R4-2319471**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319471.zip) | Big CR for R18 RRM enhancement - FR1+FR1 NR-DC | OPPO |
| [**R4-2319472**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319472.zip) | Discussion on test cases for FR2 SCell activation | OPPO |
| [**R4-2319473**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319473.zip) | Discussion on RRM test case design and work splitting for FR1+FR1 NR-DC | OPPO |
| [**R4-2319518**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319518.zip) | Discussion on other enhancements for FR2 SCell activation | China Telecom |
| [**R4-2319519**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319519.zip) | Discussion on RRM performance requirements for FR2 SCell activation delay reduction | China Telecom |
| [**R4-2320419**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320419.zip) | Remaining discussion on the enhancement of FR2 SCell activation | ZTE Corporation |
| [**R4-2320430**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320430.zip) | Discussion on the performance requirements for FR2 SCell activation enhancements | ZTE Corporation |
| [**R4-2320435**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320435.zip) | [NR\_RRM\_enh3-Core] Draft CR on multi-SCell activation with L3 reporting | ZTE Corporation |
| [**R4-2320472**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320472.zip) | discussion on SCG activation for FR1+FR1 NR-DC | Nokia, Nokia Shanghai Bell |
| [**R4-2320473**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320473.zip) | draftCR on SCG activation for FR1+FR1 NR-DC | Nokia, Nokia Shanghai Bell |
| [**R4-2320474**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320474.zip) | discussion on test cases for FR1+FR1 NR-DC | Nokia, Nokia Shanghai Bell |
| [**R4-2320483**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320483.zip) | Discussion on remaining issues on enhancements for FR2 Unknown SCell activation | Qualcomm Incorporated |
| [**R4-2320484**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320484.zip) | DraftCR update on L3 measurement reporting based enhancements. | Qualcomm Incorporated |
| [**R4-2320485**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320485.zip) | DraftCR update on L3 reporting requirement for unknown FR2 Scell activaiton | Qualcomm Incorporated |
| [**R4-2320486**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320486.zip) | View on RRM performance requirements for FR2 Scell activaiton delay reduction | Qualcomm Incorporated |
| R4-2320519 | Remaining discussion on the enhancement of FR2 SCell activation | ZTE Corporation |
| [**R4-2320624**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320624.zip) | Discussion for eFeRRM performance test | Ericsson |
| [**R4-2320625**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320625.zip) | Discussion on eFeRRM core part | Ericsson |
| [**R4-2320764**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320764.zip) | On FR2 SCell activation delay reduction | Ericsson |
| [**R4-2320765**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320765.zip) | On FR2 SCell activation delay reduction | Ericsson |
| [**R4-2320766**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320766.zip) | On UE capabilities of FR2 Scell activation delay | Ericsson |
| [**R4-2320767**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320767.zip) | RRM performance requirements for FR2 SCell activation delay reduction | Ericsson |
| [**R4-2320879**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320879.zip) | View on RRM performance requirements FR1+FR1 | Qualcomm Incorporated |
| [**R4-2321004**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2321004.zip) | Discussion on FR2 SCell activation enhancement | MediaTek inc. |
| [**R4-2321005**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2321005.zip) | Discussion on the UE capability for FR2 SCell activation enhancement | MediaTek inc. |
| [**R4-2321006**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2321006.zip) | Discussion on the performance requirements for FR2 SCell activation enhancement | MediaTek inc. |

**RAN2#123bis meeting**

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| --- | --- | --- |
| Tdoc | Title | Source |
| R2-2309450 | LS on FR2 SCell activation enhancements (R4-2314338; contact: Apple) | RAN4 |
| R2-2309522 | Introduction of FR2 SCell enhancements | Xiaomi |
| R2-2310316 | FR2 SCell Enhancement | Apple |
| R2-2310489 | Remaining issues on FR2 SCell activation enhancement | Huawei, HiSilicon |
| R2-2310676 | Discussion on FR2 unknown SCell activation | ZTE Corporation, Sanechips |
| R2-2310799 | Scell activation and L3 reporting | Nokia, Nokia Shanghai Bell |
| R2-2310900 | Introduction of FR2 SCell enhancements | Ericsson |
| R2-2311156 | Introduction of FR2 SCell enhancements | Apple |

**RAN2#124 meeting**

|  |  |  |
| --- | --- | --- |
| Tdoc | Title | Source |
| R2-2312065 | Further consideration on FR2 SCell Activation | CATT |
| R2-2312200 | Introduction of FR2 SCell enhancements | Xiaomi, Apple |
| R2-2312299 | Introduction of FR2 SCell enhancements | Apple |
| R2-2312300 | Summary of open issue discussion for SCell FR2 Enhancement (Apple) | Apple |
| R2-2312301 | Introduction of FR2 SCell enhancements (Option 1 – SCell specific configuration) | Apple |
| R2-2312302 | Introduction of FR2 SCell enhancements (Option 2 – CG specific configuration) | Apple |
| R2-2312991 | MAC behaviour for FR2 unknown SCell activation enhancements | Ericsson |
| R2-2313498 | Scell activation and L3 reporting | Nokia, Nokia Shanghai Bell |
| R2-2313828 | Introduction of FR2 SCell enhancements (Option 2 – CG specific configuration) | Apple |
| R2-2313829 | Introduction of FR2 SCell enhancements | Xiaomi, Apple |
| R2-2313905 | Summary of open issue discussion for SCell FR2 Enhancement (Apple) | Apple |
| R2-2313936 | Introduction of FR2 SCell enhancements | Apple, CATT, Ericsson, Xiaomi, Qualcomm Incorporated, Huawei, HiSilicon, ZTE |
| R2-2313937 | Introduction of FR2 SCell enhancements | Xiaomi, Apple |

01.08.2022 minor adaptations for RAN #97e

21.05.2022 minor adaptations for RAN #96

10.01.2022 minor adaptations for RAN #95e

04.10.2021 minor adaptations for RAN #94e

08.08.2021 minor adaptations for RAN #93e

17.05.2021 minor adaptations for RAN #92e

28.01.2021 minor adaptations for RAN #91e

09.11.2020 minor adaptations for RAN #90e

31.08.2020 minor adaptations for RAN #89e

20.04.2020 minor adaptations for RAN #88e

18.02.2020 minor adaptations for RAN #87e

14.11.2019 minor adaptations for RAN #86

18.08.2019 minor adaptations for RAN #85

12.05.2019 minor adaptations for RAN #84

27.02.2019 minor adaptations for RAN #83

21.11.2018 completion levels with colours added (for RAN #82)

v04.81 31.07.2018 simplification of template and addition of cross-TSG aspects (for RAN #81)

v04.80 21.05.2018 minor adaptations for RAN #80

v04.79 26.02.2018 minor adaptations for RAN #79

v04.78 18.11.2017 minor adaptations for RAN #78

v04.77 06.08.2017 minor adaptations for RAN #77

v04.76 15.05.2017 minor adaptations for RAN #76

v04.75 31.01.2017 minor adaptations for RAN #75

v04.74 28.10.2016 minor adaptations for RAN #74

v04.73 01.09.2016 adaptations for RAN #73 (time units in extra Excel table, RAN6 reporting included)

v04.72 26.05.2016 adaptations for RAN #72 (introduction of NR & GERAN TUs)

v04.71 10.02.2016 minor adaptations for RAN #71

v04.70 30.10.2015 minor adaptations for RAN #70

v04.69 12.08.2015 minor adaptations for RAN #69

v04.68 21.05.2015 minor adaptations for RAN #68

v04.67 01.02.2015 minor adaptations for RAN #67

v04.66 16.11.2014 minor adaptations for RAN #66

v04.65 16.08.2014 minor adaptations for RAN #65

v04.64 22.05.2014 minor adaptations for RAN #64

v04.63 24.01.2014 restructuring for RAN #63 to cover Core & Perf. in one doc file

v03.62 11.11.2013 section 1.2.3 adapted for RAN #62

v03 11.08.2013 section 1.2.3 added on time budget

v02 07.05.2010 history added, some spelling corrections

v01 13.11.2009 First version of the template