**3GPP TSG RAN Meeting #102 RP-2xxxxx**

**Edinburgh, Scotland, December 11-15, 2023**

## Status Report to TSG

**Agenda item:** **9.3.1.3**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **WI / SI Name** | Further NR coverage enhancements | | | | |
| included in this status report | Study Item:  No | Core part:  Yes | Performance part:  Yes | | Testing part:  No |
| **Acronym** | NR\_cov\_enh2 | | | | |
| **Unique ID** | 940095 | | | | |
| **TSG Tdoc of latest approved WI/SI description (if any)** | RP-221858 | | | | |
| **Target Completion Date**  **(indicate if changed)** | Study Item:  NA | Core part: 12/2023 | Performance part: 06/2024 | Testing part:  NA | |
| **Overall Completion level** | Study Item:  NA | Core part:  100% | Performance Part:  60% | Testing part:  NA | |

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** | | RAN WG1 |
| **Rapporteur** | **Name** | Nanxi LI |
| **Company** | China Telecom |
| **Email** | linanxi@chinatelecom.cn |

## 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.*

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

## 2.1 RAN1

#### 2.1.1 Agreements

RAN1 #114bis

**PRACH enhancements:**

Agreement

* *TimeOffsetBetweenStartingRO-r18* is configured separately for each configured number of multiple PRACH.

Agreement

* Adopt the following revision on RRC parameter.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sub-feature group** | **Description** | **Value range** | **Default value aspect** | **Per (UE, cell, TRP, …)** |
| multiple PRACH transmissions | The number of preamble repetitions for a PRACH transmission | {2, 4, 8} |  |  |

Agreement

* Adopt the following TP to Section 8.1, TS 38.213

|  |
| --- |
| **8.1 Random access preamble**  Physical random access procedure for a UE is triggered upon request of a PRACH transmission by higher layers or by a PDCCH order for a cell. A configuration by higher layers for a PRACH transmission includes the following:  - A configuration for PRACH transmission on the cell [4, TS 38.211].  - A preamble index, a preamble SCS, , a corresponding RA-RNTI when applicable [11, TS 38.321], and a PRACH resource for the cell.  - A number of preamble repetitions for the PRACH transmission if the UE would transmit the PRACH with repetitions.  A UE transmits a PRACH on a cell using the selected PRACH format with transmission power ,as described in clause 7.4, on the indicated PRACH resource or on determined resources using the same Tx spatial filter in case of preamble repetitions.  **< Unchanged text omitted >** |

Agreement

Adopt the TP to Section 8.1, TS 38.213 exactly same as the FL proposal 1-6 proposed in [R1-2310304](file:///C:\Users\1\Docs\R1-2310304.zip) by adding parenthesis to the s of sets of “sets of valid PRACH”.

Agreement

* Adopt the following TP to Section 8.1, TS 38.213.

|  |
| --- |
| **8.1 Random access preamble**  **\*\*\* Unchanged parts are omitted \*\*\***  A PRACH is transmitted using the selected PRACH format with transmission power ,as described in clause 7.4, on the indicated PRACH resource or on determined set of resources in case of preamble repetitions.  **\*\*\* Unchanged parts are omitted \*\*\***  For a PRACH transmission with preamble repetitions, a set consists of valid PRACH occasions that are consecutive in time, use same frequency resources, and are associated with a same SS/PBCH block index.  **\*\*\* Unchanged parts are omitted \*\*\*** |

Agreement

The candidate value of *TimeOffsetBetweenStartingRO-r18* is proposed as below

* {16, [32]}, for RO groups for 8 repetitions
* {8, 16, [32]}, for RO groups for 4 repetitions
* {4, 8, [16, 32]}, for RO groups for 2 repetitions

Agreement

All ROs in one RO group are associated with the same SSB(s), which means:

* If each RO is associated with one SSB, all ROs in one RO group are associated with the same SSB index.
* If each RO is associated with multiple SSB, all ROs in one RO group are associated with the same SSB indexes and each same SSB index ~~of the SSB indexes~~ is associated with the same preambles.

Note: Potential spec. impact will be further investigated.

Agreement

* Adopt the following TP to Section 8.1, TS 38.213.

|  |
| --- |
| **8.1 Random access preamble**  **\*\*\* Unchanged parts are omitted \*\*\***  Within a time period, for set(s) of valid PRACH occasions associated with an SS/PBCH block for a PRACH transmission with preamble repetitions  - if *TimeOffsetBetweenStartingRO* is provided, for each frequency resource index for frequency multiplexed PRACH occasions,  - the first valid PRACH occasion of the first set is the first valid PRACH occasion  - the first valid PRACH occasion of subsequent sets, if any, is after *TimeOffsetBetweenStartingRO* consecutive valid PRACH occasions in time from the first valid PRACH occasion of the previous set  - otherwise,  - the first valid PRACH occasion of the first set is the first valid PRACH occasion  - the first valid PRACH occasion of subsequent sets, if any, is determined after the ROs determined for the previous set according to an ordering of valid PRACH occasions  - first, in increasing order of frequency resource indexes for frequency multiplexed PRACH occasions  - second, in increasing order of time resource indexes for time multiplexed PRACH occasions  **\*\*\* Unchanged parts are omitted \*\*\*** |

Note: the empty parts in the TP are deleted equations.

Conclusion

For multiple PRACH transmission with the same Tx beam, the equation of Rel-17 NR PRACH as follows is reused for calculating the transmission power of each PRACH transmission, where stands for the corresponding transmission occasion of each of the multiple PRACH transmissions.

For the editors:

The above endorsed text proposals to 38.213 are also collected in [R1-2310486](file:///C:\Users\1\Docs\R1-2310486.zip). Please consider them in the next specification revision.

**Power domain enhancements:**

Agreement

RAN1 to send a response LS to RAN4 taking the following conclusion as a starting point:

|  |
| --- |
| **Conclusion:**  No RAN1 specification impact to realize the inclusion of ΔPPowerClass in a report to network.  RAN1 further discuss potential RAN1 impact concerning support for uplink full power MIMO transmission dependency on ΔPPowerClass report. |

Conclusion

For potential RAN1 impacts on how UL full-power capability vary with ΔPPowerClass reporting, continue to discuss the following:

* Potential modifications to the scale factor ‘s’ in 38.213 subclause 7.1 to depend on ΔPPowerClass.
* Modifications related to TPMI e.g., modifications to avoid erroneous TPMI configuration and modifications to the TPMI table description
* Potential impact of ΔPPowerClass on maximal number of layers in MIMO

[**R1-2310489**](file:///D:\A_工作\%5bC%5d【1】3GPP%20RAN相关\RAN%201\Docs\R1-2310489.zip) **Draft reply LS on RAN1 impacts regarding enhancements to realize increasing UE power high limit for CA and DC Nokia**

**Decision:** Draft LS [R1-2310489](file:///D:\A_工作\%5bC%5d【1】3GPP%20RAN相关\RAN%201\Docs\R1-2310489.zip) is endorsed in principle. Final LS is approved in [R1-2310518](file:///D:\A_工作\%5bC%5d【1】3GPP%20RAN相关\RAN%201\Docs\R1-2310518.zip).

**Dynamic switching between DFT-S-OFDM and CP-OFDM:**

Agreement

* Adopt following changes to Section 7.3.1.1.2, TS 38.212 v18.0.0

7.3.1.1.2 Format 0\_1

<<< Start changes >>>

- Transform precoder indicator - 0 or 1 bit

- 1 bit if the higher layer parameter *dynamicTransformPrecoderIndicationDCI-0-1* is configured to 'enabled ' and if the UE is configured to monitor DCI format 0\_1 with CRC scrambled by C-RNTI or CS-RNTI or MCS-C-RNTI, where the bit value of 0 indicates that transform precoder is enabled and the bit value of 1 indicates that transform precoder is disabled. For a DCI format 0\_1 with CRC scrambled by CS-RNTI and the value indicated by new data indicator field is 0, or for a DCI format 0\_1 with CRC scrambled by SP-CSI-RNTI, the bit is reserved.

- 0 bit otherwise.

<<< End changes >>>

Agreement

* Adopt following changes to Section 7.3.1.1.3, TS 38.212 v18.0.0

7.3.1.1.3 Format 0\_2

<<< Start changes >>>

- Transform precoder indicator - 0 or 1 bit

- 1 bit if the higher layer parameter *dynamicTransformPrecoderIndicationDCI-0-2* is configured to 'enabled ' and if the UE is configured to monitor DCI format 0\_2 with CRC scrambled by C-RNTI or CS-RNTI or MCS-C-RNTI, where the bit value of 0 indicates that transform precoder is enabled and the bit value of 1 indicates that transform precoder is disabled. For a DCI format 0\_2 with CRC scrambled by CS-RNTI and the value indicated by new data indicator field is 0, or for a DCI format 0\_2 with CRC scrambled by SP-CSI-RNTI, the bit is reserved.

- 0 bit otherwise.

<<< End changes >>>

Agreement

The following changes to Section 7.3.1.1.2, TS 38.212 v18.0.0 is endorsed in principle.

* DMRS sequence initialization – 0 bit if transform precoder is enabled by higher layers and the Transform precoder indicator field is not present; 1 bit if transform precoder is disabled by higher layers or if the Transform precoder indicator field is present. If the Transform precoder indicator field is present and set to ‘0’, the bit is reserved.

Agreement

The following changes to Section 7.3.1.1.3, TS 38.212 v18.0.0 is endorsed in principle.

* DMRS sequence initialization – 0 or 1 bit
  + 0 bit if the higher layer parameter *dmrs-SequenceInitializationDCI-0-2* is not configured, or if transform precoder is enabled by higher layers and the Transform precoder indicator field is not present;
* 1 bit if transform precoder is disabled by higher layers and the higher layer parameter *dmrs-SequenceInitializationDCI-0-2* is configured, or if the Transform precoder indicator field is present and the higher layer parameter dmrs-SequenceInitializationDCI-0-2 is configured. If the Transform precoder indicator field is present and set to ‘0’, the bit is reserved.

For the editors:

The above endorsed text proposals to 38.212 are also collected in [R1-2310499](file:///C:\Users\1\Docs\R1-2310499.zip). Please consider them in the next specification revision.

Conclusion

In Rel-18, for msg3 PUSCH and msgA PUSCH, the UE considers the transform precoding 'enabled' or 'disabled' according to legacy.

Agreement

For PUSCH scheduled by DCI format 0\_1 (0\_2) in PDCCH with CRC scrambled with C-RNTI, MCS-C-RNTI, or CS-RNTI with NDI=1 and [*dynamicTransformPrecoderIndicationDCI-0-1*] ([*dynamicTransformPrecoderIndicationDCI-0-2*]) set to ‘enabled’:

* + - If higher layers and/or DCI set uplink resource allocation to type 0, UE does not expect that Transform precoder indicator field indicates that transform precoder is enabled.
    - Note: further investigate any specification change.

Agreement

For PUSCH scheduled by DCI format 0\_1 (0\_2) in PDCCH with CRC scrambled with C-RNTI, MCS-C-RNTI, or CS-RNTI with NDI=1 and [*dynamicTransformPrecoderIndicationDCI-0-1*] ([*dynamicTransformPrecoderIndicationDCI-0-2*]) set to ‘enabled’:

* If *dmrs-Type* corresponding to the PUSCH is set to type2, UE does not expect that Transform precoder indicator field indicates that transform precoder is enabled.
* Note: further investigate any specification change.

RAN1 #115

**PRACH enhancements:**

Agreement

The candidate values of *TimeOffsetBetweenStartingRO-r18* are updated as

* {16}, for RO groups for 8 repetitions
* {8, 16}, for RO groups for 4 repetitions
* {4, 8, ~~[~~16~~]~~}, for RO groups for 2 repetitions

Agreement

Proposed TP #1-1 in section 4 of R1-2312272 is endorsed.

~~Agreement~~

~~Draft TP #1-5 in section 5 of R1-2312273 is endorsed.~~

Note: this agreement is superceded by the next agreement below.

Agreement

The following agreement in RAN1 #115 is updated as: Draft TP #1-5-1 in Section 6 of R1-2312633 is endorsed with the following revision:

- for each frequency resource index for frequency multiplexed PRACH occasions

- the first valid PRACH occasion of the first set is the first valid PRACH occasion

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| --- |
| Agreement  Draft TP #1-5 in section 5 of R1-2312273 is endorsed. |

**Conclusion**

A set is not determined if the number of valid PRACH occasions after a first valid PRACH occasion is less than -1.

Agreement

The TP below is endorsed in principle for TS 38.213 and an additional new UE capability is introduced for the UE behaviour introduced by this TP.

**Note1**: editor can provide revisions for the TP below to avoid impacts on any feature other than Rel-18 PRACH repetitions.

|  |
| --- |
| 8.1 Random access preamble  \*\*\* Unchanged parts are omitted \*\*\*  For single cell operation or for operation with contiguous carrier aggregation in a same frequency band or for operation with non-contiguous carrier aggregation in a same frequency band if the UE is not provided with *intraBandNC-PRACH-simulTx-r17*, a UE does not transmit PRACH and PUSCH/PUCCH/SRS in a same slot with respect to the smallest SCS configuration between the SCS configuration for the UL BWP with the PRACH and the SCS configuration for the UL BWP with the PUSCH/PUCCH/SRS transmissions and a UE may not transmit PRACH and PUSCH/PUCCH/SRS/PRACH when a gap between the first or last symbol of a PRACH transmission in a first slot is separated by less than symbols from the last or first symbol, respectively, of a PUSCH/PUCCH/SRS/PRACH transmission in a second slot where for or 1, for or , for , for , and is the smallest SCS configuration between the SCS configuration for the UL BWP with the PRACH and the SCS configuration for the UL BWP with the PUSCH/PUCCH/SRS transmissions. For a PUSCH transmission with repetition Type B, this applies to each actual repetition for PUSCH transmission [6, TS 38.214]. For a PRACH transmission with preamble repetitions, this applies to each preamble repetition.  \*\*\* Unchanged parts are omitted \*\*\* |

**Reasons for changes**: Based on the existing agreement, the dropping rule of single PRACH transmission in existing spec. is reused for multiple PRACH transmissions. Further clarification is needed in the spec.

**Summary of change:** Dropping rule of single PRACH is extended to multiple PRACH transmissions.

**Consequences if not approved:** It may be not clear when applying existing dropping rule of single PRACH transmission to multiple PRACH transmissions.

**Conclusion**

Within a time period, the first valid PRACH occasion of the first set for a PRACH transmission with preamble repetitions, where each PRACH occasion within the set(s) is associated with the same one or multiple SSB index(es) and each same SSB index is associated with the same preambles, is the valid PRACH occasion at the earliest time instance, and with the lowest frequency resource index for frequency multiplexed PRACH occasions.

Agreement

For PRACH transmissions with preamble repetitions, a transmission occasion refers to a PRACH occasion.

Note: how to capture this in the spec. is up to the editor.

**Conclusion**

No further discussion of additional rule for the determination of number of PRACH transmissions in RAN1 in Rel-18.

Agreement

For multiple PRACH transmissions, down-select one of the following options at RAN1#116:

**Option 1:**

* Layer 1 notifies higher layers to suspend the corresponding power ramping counter when PRACH transmission in all of PRACH occasions are dropped or with reduced transmit power.
* Layer 1 may notify higher layers to suspend the corresponding power ramping counter when PRACH transmission in any of PRACH occasions are dropped or with reduced transmit power.

**Option 1a:**

* Layer 1 notifies higher layers to suspend the corresponding power ramping counter when PRACH transmission in all of PRACH occasions are dropped.
* Layer 1 may notify higher layers to suspend the corresponding power ramping counter when PRACH transmission on part of PRACH occasions are dropped or when PRACH transmission in any of PRACH occasions is with reduced transmit power.

**Option 2:**

* Layer 1 may notify higher layers to suspend the corresponding power ramping counter when PRACH transmission in at least one PRACH occasion is dropped or with reduced transmit power.

Note: this implies it’s up to UE implementation.

**Option 2a:**

* Layer 1 may notify higher layers to suspend the corresponding power ramping counter when PRACH transmission in at least one PRACH occasion is with reduced transmit power.
* Layer 1 notifies higher layers to suspend the corresponding power ramping counter when PRACH transmission in at least one PRACH occasion is dropped.

**Option 3:**

* Layer 1 notifies higher layers to suspend the corresponding power ramping counter when PRACH transmission in all of PRACH occasions are dropped.
* Layer 1 may notify higher layers to suspend the corresponding power ramping counter when PRACH transmission in all of PRACH occasions are with reduced transmit power.

Note: whether any of the above options have specification impact is a separate discussion.

**Agreement**

For multiple PRACH transmissions with indication of PRACH mask index, down-select one of the following options at RAN1#116

* **Option 1:** UE applies PRACH mask prior to RO group determination. RO group is determined based on the ROs indicated by the PRACH mask index.
* **Option 2:** UE applies PRACH mask after RO group determination. UE transmits PRACH with preamble repetitions only on a RO group with all the ROs indicated by the mask.
* **Option 3:** UE applies PRACH mask after RO group determination. UE transmits PRACH with preamble repetitions only on a RO group where at least one ~~the first~~ RO of this RO group is indicated by the mask
* **Option 4:** UE applies PRACH mask after RO group determination. The PRACH mask index indicates one or multiple RO groups for multiple PRACH transmission.
  + Note: this implies the PRACH mask index indicates the RO group ~~index(es)~~ instead of RO ~~index(es)~~.

**Power domain enhancements:**

**Conclusion**

RAN1 concludes all discussions related to enhancements for increasing UE power high limit for CA and DC in Rel-18. No further discussion on any aspect of this enhancement during any future Rel-18 maintenance phase is planned in RAN1, unless further RAN1 discussion is requested by other working groups.

**Dynamic switching between DFT-S-OFDM and CP-OFDM:**

Agreement

Update value range of RRC parameters for presence of TPI field to Enumerated {enabled}.

Agreement

Send Reply LS to RAN2 LS in R1-2311005 stating:

*RAN1 would like to thank RAN2 for the LS on PHR reporting.*

*RAN2 asked if a UE reporting PCMAX for actual and assumed PUSCH to support the DC/CA scenario has any impact to RAN1’s design in addition to that of the single carrier case. RAN1 would like to inform RAN2 that UE reporting PCMAX for actual and assumed PUSCH to support the DC/CA scenario has no additional impact to RAN1 design compared to the single carrier scenario.*

*Action: RAN1 respectfully asks RAN2 to take the above information into consideration for their work*

Agreement

The draft LS in R1-2312338 is endorsed. Final LS is agreed in R1-2312339.

#### 2.1.2 Remaining Open issues

## 2.2 RAN2

#### 2.2.1 Agreements

RAN2 #123-bis

**Agreements**

* Reply to RAN4 and ask for more information on what exact information needs to be included and its granularity (per cell/per UE etc) when this is to be triggered and whether RAN4 will specify these triggering conditions. Indicate that next meeting is the last meeting for RAN2.
* From RAN2 CE perspective, MSG1-based SI request can be applicable to SUL, RedCap and Positioning
* CSI-RS resource for CFRA with MSG1 repetition is not supported in RAN2
* From RAN2 CE perspective, deltaPreamble IE in FeatureCombinationPreambles are common for repetition number 2, 4 and 8 - FFS for groupBconfigured, rsrp-ThresholdSSB
* RAN2 assumes that a separate UE capability for CFRA with MSG1 repetition is not needed
* Separate SI-RequestResources is configured for different repetition number (2,4,8), under a common SI-RequestConfig which is different from legacy SI-RequestConfig
* For a given feature combination, RAN2 assumes the same value of preambleReceiveTargetPower and powerRampingStep parameters can be applied for different Msg1 repetition numbers.
* Reuse the existing UE counter (PREAMBLE\_TRANSMISSION\_COUNTER) to trigger fallback from lower number to higher number
* Upon fallback from CFRA with repetition to CBRA with repetition, the UE only selects the RACH resources that associated the same repetition number that indicated for CFRA.
* Depending on the complexity we can support fallback in the above case or not (try without the fallback first). Can be decided during the CR implementation phase.
* For Rel-18 CE-only BWP, RAN2 confirms:

Use featureCombinationPreamblesList-r17 in addiitonalRACH-ConfigList-r17 to configure Rel-18 CE-only BWP, and the legacy RACH-ConfigCommon is absent in such case

CFRA w/wo Msg1 repetition are not supported in Rel-18 CE-only BWP

* Rel-18 CE-only BWP includes the following types:

Type 1: A dedicated BWP in which all the RACH resources are only associated with Msg3 repetition;

Type 2: A dedicated BWP in which all the RACH resources are only associated with Msg1 repetition;

Type 3: A dedicated BWP in which all the RACH resources are associated with both Msg1 repetition and Msg3 repetition

* For Rel-18 CE-only BWP for Msg1 repetition, whether to use Alt1.1 or Alt.1.2 is up to network implementation.:

Alt 1.1: If the selected dedicated BWP is configured with set of RACH resources that are all associated with Msg1 repetition and a specific repetition number, when RACH is triggered, the UE applies the Msg1 repetition number without evaluating the Msg1 repetition RSRP threshold.

Alt 1.2: If the selected dedicated BWP is configured with sets of RACH resources that are all associated with Msg1 repetition but with different repetition numbers, when RACH is triggered, the UE selects the applicable repetition number and corresponding RACH resource based on the evaluation of Msg1 repetition RSRP threshold.

* Adopt Alt 2.3 for Msg1 repetition framework
* Separate RO for different number is supported;

For sharedRO and separateRO case, different repetition numbers are configured via separate featureCombinationPreamble IEs only for CE.

RACH resources of RACH partitions that are configured with the same “featureCombination” are considered to be within the same set of RACH resources;

Fallback from lower number to higher number is performed within the selected set of RACH resources.

Alt1: Fallback is only supported for sharedRO case

* DL RSRP threshold is not checked when determining whether to trigger fallback from lower number to higher number
* After UE fallsback from repetition number 2 to repetition number 4, the UE can then fallback to repetition number 8 when the fallback condition is met.
* Introduce new DWS MAC CE for reporting PHR for assumed and non-assumed PUSCH transmissions (we will not introduce a separate MAC CE just containing the assumed PHR) – We will design this to support DC/CA scenario (can indicate this to RAN1 and let us know if this has any impact to their design)
* No new PHR triggers will be defined in RAN2

RAN2 #124

**Agreements**

* Use one Octet eLCID for this new PHR MAC CE and the same priority as the legacy PHR MAC CE will apply for this new PHR MAC CE
* For the specification of triggering of the new PHR MAC CE, the MAC CR can use twoPHRMode type of implementation from MAC spec as base line, details FFS.
* For the selection of set of RACH resources associated with highest repetition number when more than one set of RACH resources available, convert the note into normative text – Details FFS and can be worked offline during the CR finalisation.
* Separate MSG3 repetition parameter (e.g. numberOfMsg3-RepetitionsList and mcs-Msg3-Repetitions) when MSG1 repetition is applicable is not supported as implemented in the current running CR
* The values of preambleTransMax-Msg1Repetition are { n1, n2, n4, n6, n8, n10, n20, n50, n100, n200}
* CFRA configured with one MSG1 repetition number can be applied to CHO. No further optimization of CFRA is needed in this case (and in this case the same repetition will be used upon fallback to CBRA as already agreed in the past)
* numberOfRA-PreamblesGroupA can be configured separately for different repetition number.
* From CE perspective, the maximum number of RACH configurations that the network is allowed to configure may need to be extended to 32. Can be revisited if other features need other number
* Delete si-RequestResourcesRepetition-r18
* Add si-RequestResourcesRepetitionTwo-r18, si-RequestResourcesRepetitionFour-r18 and si-RequestResourcesRepetitionEight-r18, optionally, where each is SEQUENCE (SIZE (1..maxSI-Message)) OF SI-RequestResources
* SI request period is not applicable for Msg-1 based SI request with Msg1 repetition (can comeback if there is a critical issue with this agreement)
* From CE perspective, Msg1 repetition is feasible for both CBRA and CFRA based LTM cell switch assuming the MSG1 repetition configuration is in the RACHConfigDedicated.
* Fallback from lower to higher number of multiple PRACH Transmissions is not supported if UE has performed fallback from CFRA to CBRA
* Fallback from lower number to higher number is not supported for Msg1-based SI request with Msg1 repetition.
* introduce Ei field for each serving cell to indicate the existence of PH information for assumed PUSCH in multiple entry PHR with assumed PUSCH MAC CE (can double check the implementation in MAC offline and comeback on Thursday if needed)
* If DWS is configured for the MAC entity transmitting PHR, the UE uses the new PHR format for PHR reporting (details on how to implement this in MAC CR is FFS can be discussed as part of 851 offline)
* The new PHR format for assumed PUSCH is not reported if twoPHRmode is configured unless RAN1 indicates us otherwise
* As a baseline ΔPPowerClass is reported in a PHR MAC CE upon a trigger to report ΔPPowerClass.
* RAN2 assumes that 2 bit MPE field can be reused for indicating the ΔPPowerClass. Can be revisited if RAN4 design needs some updates for this assumption.
* RAN2 preference is that triggering of PHR for ΔPPowerClass reporting is based on the power class change conditions specified by RAN4 and we will add a reference to RAN4 specs in the MAC spec.
* RAN2 assumes that any ΔPPowerClass reporting is provided per Serving Cell and this can also be revisited if the RAN4 design is not compatible with this assumption.

#### 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

The progress in RAN4 #108bis meeting is summarized below:

RAN4 UE RF part:

* The draft CR to TS38.101-3\_ Introduction of higherPowerLimit-r17 into EN-DC of PC3+PC5 including UL Intra band CA was endorsed in R4-2315148
* The draft CR to TS38.101-1\_ Introducing new scenarios for increase higher power limit for CA was endorsed in R4-2315848
* The draft CR to TS38.101-1\_ Introducing new scenarios for increase higher power limit for ENDC was endorsed in R4-2316336
* The topic summary for [108-bis][139] NR\_cov\_enh2\_part1 was provided in R4-2317262
* The topic summary for [108-bis][140] NR\_cov\_enh2\_part2 was provided in R4-2317263
* The WF on UL power enhancement was provided in R4-2317769
* The WF on enhancement for MPR reduction was provided in R4-2317652
* The LS to RAN1/RAN2 on further clarifications on enhancements to realize increasing UE power high limit for CA and DC was approved in R4-2317768.

RAN4 BS demodulation part:

* The topic summary for [108bis] [323] NR\_cov\_enh2\_demod was provided in R4-2317954
* The WF on WF on NR\_cov\_enh2\_demod was approved in R4-2316922

The progress in RAN4 #109 meeting is summarized below:

RAN4 UE RF part:

* The CR to 38.101-1\_ Introduction of higherPowerLimit-r17 into NR CA of PC3+PC5 including UL Intra band CA was agreed in R4-2318030
* The CR to 38.101-3\_ Introduction of higherPowerLimit-r17 into EN-DC of PC3+PC5 including UL Intra band CA was agreed in R4-2318031
* The CR to 38.101-3\_ Introduction of delta PPowerClass report was agreed in R4-2318100
* The CR to 38.101-3\_ Introduction of delta PPowerClass report was agreed in R4-2318101
* The CR to 38.101-3 for Introducing new scenarios for increase higher power limit for ENDC was agreed in R4-2320094
* The CR to 38.101 for introduction of MPR reduction was agreed in R4-2321826
* The topic summary for [109][140] NR\_cov\_enh2\_part1 was provided in R4-2318146
* The topic summary for [109][141] NR\_cov\_enh2\_part2 was provided in R4-2318147
* The ad hoc minutes for NR\_cov\_enh2\_part1 was provided in R4-2321738
* The WF on NR\_cov\_enh2\_part2 was provided in R4-2321827
* The reply LS to RAN2 on further clarifications on enhancements to realize increasing UE power high limit for CA and DC was approved in R4-2321998
* The LS to RAN1/RAN2 on UE capabilities for MPR reduction was approved in R4-2321960

RAN4 BS demodulation part:

* The topic summary for [109][325] NR\_cov\_enh2\_demod was provided in R4-2318217
* The Offline meeting minutes for [109][325] NR\_cov\_enh2\_demod was provided in R4-2321055
* The WF on [109][325] NR\_cov\_enh2\_demod was approved in R4-2321061

#### 2.4.2 Remaining Open issues

Finalization on the BS demodulation requirements of the performance part.

## 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)

## 3.1 SAx/CTs

#### 3.1.1 Agreements with cross-TSG impacts

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

## 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.

RAN1 #114bis:

1. R1-2308899 Maintenance of PRACH coverage enhancements Huawei, HiSilicon
2. R1-2308900 Discussion on coverage enhancement in power domain Huawei, HiSilicon
3. R1-2308901 Maintenance of dynamic waveform switching for coverage enhancement Huawei, HiSilicon
4. R1-2308953 Discussions on the remaining issue on PRACH coverage enhancements New H3C Technologies Co., Ltd.
5. R1-2308995 Remaining issues on PRACH coverage enhancements Spreadtrum Communications
6. R1-2308996 Remaining issues on dynamic switching between DFT-S-OFDM and CP-OFDM Spreadtrum Communications
7. R1-2309085 Discussions on remaining issues of PRACH coverage enhancements vivo
8. R1-2309086 Discussions on remaining issues of power domain enhancements vivo
9. R1-2309087 Discussions on remaining issues of dynamic waveform switching vivo
10. R1-2309132 Discussion on PRACH coverage enhancements ZTE
11. R1-2309133 Discussion on dynamic waveform switching ZTE
12. R1-2309187 Remaining issues on PRACH coverage enhancement Intel Coporation
13. R1-2309188 Remaining issues on power domain enhancement Intel Coporation
14. R1-2309189 Remaining issues on dynamic waveform switching Intel Coporation
15. R1-2309278 Maintenance on PRACH coverage enhancement NEC
16. R1-2309279 Maintenance on dynamic switching between DFT-S-OFDM and CP-OFDM NEC
17. R1-2309329 Remaining issues on PRACH coverage enhancements LG Electronics
18. R1-2309330 Remaining issues on dynamic waveform switching for NR coverage enhancement LG Electronics
19. R1-2309385 PRACH coverage enhancements Samsung
20. R1-2309386 Power domain enhancements Samsung
21. R1-2309387 Dynamic switching between DFT-S-OFDM and CP-OFDM Samsung
22. R1-2309465 Discussion on PRACH coverage enhancements xiaomi
23. R1-2309466 Maintenance on power domain enhancements xiaomi
24. R1-2309467 Maintenance on dynamic switching between DFT-s-OFDM and CP-OFDM xiaomi
25. R1-2309536 Remaining issues on PRACH coverage enhancements CATT
26. R1-2309537 RAN1 impact for power domain enhancement CATT
27. R1-2309538 Remaining issues on dynamic switching between DFT-S-OFDM and CP-OFDM CATT
28. R1-2309554 Remaining issues on PRACH coverage enhancement China Telecom
29. R1-2309555 Remaining issues on power domain enhancements China Telecom
30. R1-2309556 Remaining issues on dynamic waveform switching between DFT-s-OFDM and CP-OFDM China Telecom
31. R1-2309612 Remaining issues on PRACH coverage enhancements OPPO
32. R1-2309613 Remaining issues on of power domain enhancements OPPO
33. R1-2309614 Issues on dynamic switching between DFT-S-OFDM and CP-OFDM OPPO
34. R1-2309630 Discussion on the remaining issues for dynamic waveform switching Panasonic
35. R1-2309633 Discussion on PRACH coverage enhancements Panasonic
36. R1-2309650 Remaining issues on PRACH coverage enhancement Fujitsu
37. R1-2309681 Remaining issues on PRACH coverage enhancements CMCC
38. R1-2309682 Remaining issues on power domain enhancements CMCC
39. R1-2309683 Remaining issues on dynamic switching between DFT-S-OFDM and CP-OFDM CMCC
40. R1-2309706 PRACH coverage enhancements ETRI
41. R1-2309707 Dynamic switching between DFT-S-OFDM and CP-OFDM ETRI
42. R1-2309722 Remaining issues of dynamic switching between DFT-S-OFDM and CP-OFDM Transsion Holdings
43. R1-2309729 Remaining issues on dynamic switching between DFT-S-OFDM and CP-OFDM Lenovo
44. R1-2309731 PRACH coverage enhancements TCL
45. R1-2309772 Discussions on PRACH coverage enhancements Ruijie Network Co. Ltd
46. R1-2309783 Dynamic switching between DFT-S-OFDM and CP-OFDM InterDigital, Inc.
47. R1-2309804 Remaining issues of PRACH coverage enhancements Lenovo
48. R1-2309843 Discussion on PRACH coverage enhancements Apple
49. R1-2309844 Discussion on dynamic switching between DFT-S-OFDM and CP-OFDM Apple
50. R1-2309909 Remaining issues on multiple PRACH transmissions for PRACH coverage enhancement Sony
51. R1-2309910 Maintenance Issues on DWS Configuration and PHR reporting Sony
52. R1-2309914 Discussion on power domain enhancements ZTE
53. R1-2309924 Remaining issues on PRACH coverage enhancements Nokia, Nokia Shanghai Bell
54. R1-2309925 Remaining issues on power domain enhancements Nokia, Nokia Shanghai Bell
55. R1-2309926 Remaining issues on dynamic switching between DFT-s-OFDM and CP-OFDM Nokia, Nokia Shanghai Bell
56. R1-2309958 Remaining issues on PRACH coverage enhancements InterDigital, Inc.
57. R1-2309967 Discussion on PRACH Coverage Enhancement Ericsson
58. R1-2309968 Power Domain Enhancement Maintenance Ericsson
59. R1-2309969 Discussion on Dynamic UL Waveform Switching Ericsson
60. R1-2310001 Remaining issues on PRACH coverage enhancements MediaTek Inc.
61. R1-2310042 Remaining issues on PRACH coverage enhancements NTT DOCOMO, INC.
62. R1-2310043 Remaining issues on dynamic switching between DFT-S-OFDM and CP-OFDM NTT DOCOMO, INC.
63. R1-2310071 Remaining issues on PRACH coverage enhancements Quectel
64. R1-2310106 Remaining issues on multiple PRACH transmissions for Rel-18 CovEnh Sharp
65. R1-2310107 Remaining issues on dynamic waveform switching for Rel-18 CovEnh Sharp
66. R1-2310151 PRACH Coverage Enhancements Qualcomm Incorporated
67. R1-2310152 Power-domain enhancements Qualcomm Incorporated
68. R1-2310153 Dynamic switching between DFT-S-OFDM and CP-OFDM Qualcomm Incorporated
69. R1-2310248 Summary #1 on dynamic switching between DFT-S-OFDM and CP-OFDM Moderator (InterDigital, Inc.)
70. R1-2310249 Summary #2 on dynamic switching between DFT-S-OFDM and CP-OFDM Moderator (InterDigital, Inc.)
71. R1-2310300 FL summary of power domain enhancements (AI 8.8.2) Moderator (Nokia)
72. R1-2310301 FL summary #2 of power domain enhancements (AI 8.8.2) Moderator (Nokia)
73. R1-2310302 Final FL summary of power domain enhancements (AI 8.8.2) Moderator (Nokia)
74. R1-2310303 FL Summary #1 on remaining issues for PRACH coverage enhancements Moderator (China Telecom)
75. R1-2310304 FL Summary #2 on remaining issues for PRACH coverage enhancements Moderator (China Telecom)
76. R1-2310305 FL Summary #3 on remaining issues for PRACH coverage enhancements Moderator (China Telecom)
77. R1-2310456 Summary #3 on dynamic switching between DFT-S-OFDM and CP-OFDM Moderator (InterDigital, Inc.)
78. R1-2310457 Summary #4 on dynamic switching between DFT-S-OFDM and CP-OFDM Moderator (InterDigital, Inc.)
79. R1-2310486 Collection of endorsed TPs in AI 8.8.1 PRACH coverage enhancements Moderator (China Telecom)
80. R1-2310489 Draft reply LS on RAN1 impacts regarding enhancements to realize increasing UE power high limit for CA and DC Nokia
81. R1-2310499 Collection of endorsed TPs in AI 8.8.3 Dynamic switching between DFT-S-OFDM and CP-OFDM Moderator (InterDigital, Inc.)
82. R1-2310518 Reply LS on RAN1 impacts regarding enhancements to realize increasing UE power high limit for CA and DC RAN1, Nokia
83. R1-2310546 Session notes for 8.8 (Maintenance on further NR coverage enhancements) Ad-Hoc Chair (CMCC)
84. R1-2310579 FL Summary #4 on remaining issues for PRACH coverage enhancements Moderator (China Telecom)

RAN1 #115:

1. R1-2310882 Maintenance of PRACH coverage enhancements Huawei, HiSilicon
2. R1-2310883 Discussion on coverage enhancement in power domain Huawei, HiSilicon
3. R1-2310884 Maintenance of dynamic waveform switching for coverage enhancement Huawei, HiSilicon
4. R1-2310930 Discussions on the remaining issue on PRACH coverage enhancements New H3C Technologies Co., Ltd.
5. R1-2311019 Maintenance of PRACH coverage enhancements ZTE
6. R1-2311020 Maintenance of power domain enhancements ZTE
7. R1-2311021 Maintenance of dynamic waveform switching ZTE
8. R1-2311054 Remaining issues on PRACH coverage enhancements Fujitsu
9. R1-2311107 Discussions on remaining issues of PRACH coverage enhancements vivo
10. R1-2311108 Discussions on remaining issues of power domain enhancements vivo
11. R1-2311109 Discussions on remaining issues of dynamic waveform switching vivo
12. R1-2311134 Remaining issues on PRACH coverage enhancement Intel Corporation
13. R1-2311135 Remaining issues on dynamic waveform switching Intel Corporation
14. R1-2311174 Remaining issues on PRACH coverage enhancements Spreadtrum Communications
15. R1-2311175 Remaining issues on power domain enhancement Spreadtrum Communications
16. R1-2311263 Remaining issues on PRACH coverage enhancements OPPO
17. R1-2311264 Remaining issues on of power domain enhancements OPPO
18. R1-2311265 Issues on dynamic switching between DFT-S-OFDM and CP-OFDM OPPO
19. R1-2311352 Remaining issues on PRACH coverage enhancements CATT
20. R1-2311353 Remaining issue on power domain enhancements CATT
21. R1-2311354 Remaining issue on dynamic waveform switching CATT
22. R1-2311410 Discussion on PRACH coverage enhancements xiaomi
23. R1-2311411 Maintenance on power domain enhancements xiaomi
24. R1-2311412 Maintenance on dynamic switching between DFT-s-OFDM and CP-OFDM xiaomi
25. R1-2311426 Maintenance on PRACH coverage enhancement NEC
26. R1-2311427 Maintenance on dynamic switching between DFT-S-OFDM and CP-OFDM NEC
27. R1-2311444 Discussion on PRACH coverage enhancements Panasonic
28. R1-2311445 Discussion on the remaining issues for dynamic waveform switching Panasonic
29. R1-2311492 Remaining issues on PRACH coverage enhancements CMCC
30. R1-2311493 Remaining issues on power domain enhancements CMCC
31. R1-2311494 Remaining issues on dynamic switching between DFT-S-OFDM and CP-OFDM CMCC
32. R1-2311526 Remaining issues on multiple PRACH transmissions for PRACH coverage enhancement Sony
33. R1-2311532 Dynamic switching between DFT-S-OFDM and CP-OFDM InterDigital, Inc.
34. R1-2311548 Remaining issues on PRACH coverage enhancement China Telecom
35. R1-2311549 Remaining issues on Power domain enhancements China Telecom
36. R1-2311550 Remaining issues on DWS between CP-OFDM and DFT-s-OFDM China Telecom
37. R1-2311631 Remaining issues on PRACH coverage enhancements NTT DOCOMO, INC.
38. R1-2311632 Remaining issues on dynamic switching between DFT-S-OFDM and CP-OFDM NTT DOCOMO, INC.
39. R1-2311694 Remaining issues on PRACH coverage enhancements Apple
40. R1-2311695 Remaining issues on dynamic switching between DFT-S-OFDM and CP-OFDM Apple
41. R1-2311717 Remaining issues on PRACH coverage enhancements Quectel
42. R1-2311723 Remaining issues on PRACH coverage enhancements Lenovo
43. R1-2311724 Remaining issues on dynamic switching between DFT-S-OFDM and CP-OFDM Lenono
44. R1-2311755 PRACH coverage enhancements ETRI
45. R1-2311756 Dynamic switching between DFT-S-OFDM and CP-OFDM ETRI
46. R1-2311770 Remaining issues on multiple PRACH transmissions for Rel-18 CovEnh Sharp
47. R1-2311771 Remaining issues on dynamic waveform switching for Rel-18 CovEnh Sharp
48. R1-2311854 PRACH coverage enhancements Samsung
49. R1-2311855 Power domain enhancements Samsung
50. R1-2311856 Dynamic switching between DFT-S-OFDM and CP-OFDM Samsung
51. R1-2311915 Remaining issues on PRACH coverage enhancements LG Electronics
52. R1-2311916 Remaining issues on dynamic waveform switching for NR coverage enhancement LG Electronics
53. R1-2311920 Remaining issues on PRACH coverage enhancements Nokia, Nokia Shanghai Bell
54. R1-2311921 Remaining issues on power domain enhancements Nokia, Nokia Shanghai Bell
55. R1-2311922 Remaining issues on dynamic switching between DFT-s-OFDM and CP-OFDM Nokia, Nokia Shanghai Bell
56. R1-2311935 Maintenance on PRACH coverage enhancements Ruijie Network Co. Ltd
57. R1-2311945 Discussion on PRACH Coverage Enhancement Ericsson
58. R1-2311946 Power Domain Enhancement Maintenance Ericsson
59. R1-2311947 Discussion on Dynamic UL Waveform Switching Ericsson
60. R1-2311986 Maintenance for PRACH coverage enhancements MediaTek Inc.
61. R1-2312046 Power-domain enhancements Qualcomm Incorporated
62. R1-2312047 Dynamic switching between DFT-S-OFDM and CP-OFDM Qualcomm Incorporated
63. R1-2312109 Summary #1 on dynamic switching between DFT-S-OFDM and CP-OFDM Moderator (InterDigital, Inc.)
64. R1-2312111 Summary #2 on dynamic switching between DFT-S-OFDM and CP-OFDM Moderator (InterDigital, Inc.)
65. R1-2312132 Remaining issues on PRACH coverage enhancements Google Inc.
66. R1-2312158 Maintenance issues on DWS Configuration Sony
67. R1-2312205 Remaining issues on dynamic switching between DFT-S-OFDM and CP-OFDM Google Inc.
68. R1-2312272 FL Summary #1 on remaining issues for PRACH coverage enhancements Moderator (China Telecom)
69. R1-2312273 FL Summary #2 on remaining issues for PRACH coverage enhancements Moderator (China Telecom)
70. R1-2312274 FL Summary #3 on remaining issues for PRACH coverage enhancements Moderator (China Telecom)
71. R1-2312304 FL summary of power domain enhancements (AI 8.8.2) Moderator (Nokia)
72. R1-2312305 FL summary #2 of power domain enhancements (AI 8.8.2) Moderator (Nokia)
73. R1-2312306 Final FL summary of power domain enhancements (AI 8.8.2) Moderator (Nokia)
74. R1-2312338 Draft reply LS on PHR reporting Moderator (InterDigital, Inc.)
75. R1-2312339 Reply LS on PHR reporting RAN1, InterDigital, Inc.
76. R1-2312507 Session notes for 8.8 (Maintenance on further NR coverage enhancements) Ad-Hoc Chair (Huawei)
77. R1-2312622 Summary #3 on dynamic switching between DFT-S-OFDM and CP-OFDM Moderator (InterDigital, Inc.)
78. R1-2312623 Summary #4 on dynamic switching between DFT-S-OFDM and CP-OFDM Moderator (InterDigital, Inc.)
79. R1-2312633 FL Summary #4 on remaining issues for PRACH coverage enhancements Moderator (China Telecom)
80. R1-2312677 FL Summary #5 on remaining issues for PRACH coverage enhancements Moderator (China Telecom)

RAN2 #123-bis:

1. R2-2309420 LS on further clarifications on enhancements to realize increasing UE power high limit for CA and DC (R1-2308561; contact: Nokia) RAN1
2. R2-2309468 LS on enhancements to realize increasing UE power high limit for CA and DC (R4-2314728; contact: Nokia) RAN4
3. R2-2309570 Discussion on RAN2 Impacts of DWS and DPC Reporting vivo
4. R2-2309571 Discussion on Remaining Issues for PRACH Repetition vivo
5. R2-2309591 Discussion on Coverage Enhancements CP Ericsson
6. R2-2309592 Discussion on Coverage Enhancements UP Ericsson
7. R2-2309698 Discussion on PHR for assumed PUSCH CATT
8. R2-2309699 Remaining CP issues for Msg1 repetition CATT
9. R2-2309760 Discussion on PHR for dynamic waveform switching Xiaomi
10. R2-2309776 Remaining control plane issues of further NR Coverage Enhancements Samsung Electronics Co., Ltd
11. R2-2309777 Remaining user plane issues of further NR Coverage Enhancements Samsung Electronics Co., Ltd
12. R2-2310196 Summary of [Post123][802][R18CEenh-CP] CP open issues (HW) Huawei, HiSilicon
13. R2-2310197 RRC Running CR for R18 NR coverage enhancements Huawei, HiSilicon
14. R2-2310198 Remaining issues of CP aspects for CE Huawei, HiSilicon
15. R2-2310199 Remaining issues of UP aspects for CE Huawei, HiSilicon
16. R2-2310228 Discussion on power domain enhancements for coverage enhancement China Telecom
17. R2-2310232 DWS L2 impacts InterDigital
18. R2-2310284 Discussion on the remaining CP issues for CE NEC Corporation.
19. R2-2310285 Discussion on the remaining UP issues for CE NEC Corporation.
20. R2-2310475 Running CR to 38.300 for Rel-18 coverage enhancements China Telecom
21. R2-2310605 Discussion on Signalling aspects for Msg1 repetition LG Electronics Inc.
22. R2-2310606 RA procedure for Msg1 repetition LG Electronics Inc.
23. R2-2310669 Report of [Post123][801][CE\_enh] UP running CR and open issue discussion (ZTE) ZTE Corporation, Sanechips
24. R2-2310670 Draft running CR to 38.321 for Rel-18 coverage enhancement ZTE Corporation, Sanechips
25. R2-2310671 Consideration on RRC signalling design for CE ZTE Corporation, Sanechips
26. R2-2310672 Remaining UP issues for CE ZTE Corporation, Sanechips
27. R2-2310974 Open Issues in Coverage Enhancements UP Qualcomm Incorporated
28. R2-2310975 PHR enhancements for Coverage Enhancement Qualcomm Incorporated
29. R2-2311189 Considerations on PRACH repetition Nokia, Nokia Shanghai Bell
30. R2-2311190 Impacts from waveform switching Nokia, Nokia Shanghai Bell

RAN2 #124:

1. R2-2311710 Reply LS on RAN1 impacts regarding enhancements to realize increasing UE power high limit for CA and DC (R1-2310518; contact: Nokia) RAN1
2. R2-2311757 LS reply on further clarifications on enhancements to realize increasing UE power high limit for CA and DC (R4-2317768; contact: Huawei) RAN4
3. R2-2311816 Discussion on Remaining Issues for PRACH Repetition vivo
4. R2-2311817 Discussion on RAN2 Impacts of DWS and DPC Reporting vivo
5. R2-2311829 Fallback from lower repetition number to higher repetition number Samsung Electronics Co., Ltd
6. R2-2311830 SI request and CFRA Aspects Samsung Electronics Co., Ltd
7. R2-2311993 Open issues of power domain enhancements for CE China Telecom
8. R2-2312511 Discussion on the remaining CP issues NEC Corporation.
9. R2-2312572 Summary of [POST123bis][851][CE\_enh] CP running CR and open issues (Huawei) Huawei, HiSilicon
10. R2-2312573 Introduction of Further NR coverage enhancements in RRC Huawei, HiSilicon
11. R2-2312574 Remaining issues of CP aspects for CE Huawei, HiSilicon
12. R2-2312575 Remaining issues of UP aspects for CE Huawei, HiSilicon
13. R2-2312725 Discussion on PHR for dynamic waveform switching Xiaomi
14. R2-2312732 Introduction of Further NR coverage enhancements to 38.300 China Telecom
15. R2-2312750 Discussion on numberOfRA-PreamblesGroupA for Msg1 repetition CATT
16. R2-2312751 Discussion on remaining UP issues for Msg1 repetition CATT
17. R2-2312771 UP open issue list for R18 CE ZTE Corporation, Sanechips
18. R2-2312772 Introduction of Further NR Coverage Enhancements in MAC spec ZTE Corporation, Sanechips
19. R2-2312773 Remaining CP issues for CE ZTE Corporation, Sanechips
20. R2-2312774 Remaining UP issues for CE ZTE Corporation, Sanechips
21. R2-2312954 Open Issues in PRACH Repetition Qualcomm Incorporated
22. R2-2312956 DPC and DWS UE reporting Qualcomm Incorporated
23. R2-2313018 PHR for assumed PUSCH InterDigital
24. R2-2313163 Discussion on Coverage Enhancements CP Ericsson
25. R2-2313164 Discussion on Coverage Enhancements UP Ericsson
26. R2-2313430 Miscellaneous issues with PRACH repetition Nokia, Nokia Shanghai Bell
27. R2-2313431 Delta Power Class and assumed PUSCH reporting Nokia, Nokia Shanghai Bell
28. R2-2313462 Remaining CP issues on Msg1 repetition LG Electronics Inc.
29. R2-2313463 Remaining issues on Coverage Enhancement in UP aspects LG Electronics Inc.
30. R2-2313628 Introduction of Further NR coverage enhancements in RRC Huawei, HiSilicon
31. R2-2313761 Report of [AT124][851][CE\_enh] MAC CR updates (ZTE) ZTE Corporation

RAN4 #108bis:

1. R4-2315059 On power class fallback signaling Qualcomm Incorporated
2. R4-2315354 Further discussion on R-18 coverage enhancement China Telecom
3. R4-2315392 On Delta PPowerClass clarifications Apple
4. R4-2315452 Views on the combination of ULFPTx and deltaPpowerclass reporting Samsung
5. R4-2315837 Further Discussion of Delta\_powerclass reporting vivo
6. R4-2315027 On reply LS to R1-2308561 on UL power enhancements for CA and DC Nokia, Nokia Shanghai Bell
7. R4-2315787 Draft Reply LS on further clarifications on enhancements to realize increasing UE power high limit for CA and DC Ericsson
8. R4-2315971 R18 delta Ppowerclass LS reply OPPO
9. R4-2316369 LS reply on further clarifications on enhancements to realize increasing UE power high limit for CA and DC Huawei, HiSilicon
10. R4-2317651 LS reply on further clarifications on enhancements to realize increasing UE power high limit for CA and DC Huawei, HiSilicon
11. R4-2317768 LS reply on further clarifications on enhancements to realize increasing UE power high limit for CA and DC Huawei, HiSilicon
12. R4-2316667 draft reply LS on further clarifications on enhancements to realize increasing UE power high limit for CA and DC MediaTek Inc.
13. R4-2315148 Introduction of higherPowerLimit-r17 into EN-DC of PC3+PC5 including UL Intra band CA Nokia, Nokia Shanghai Bell
14. R4-2315149 Introduction of higherPowerLimit-r17 into NR CA of PC3+PC5 including UL Intra band CA Nokia, Nokia Shanghai Bell
15. R4-2315848 draft CR to TS 38.101-1 for Introducing new scenarios for increase higher power limit for CA vivo, ZTE, Huawei, CHTTL, Samsung, Xiaomi
16. R4-2316336 draft CR to TS38.101-3 for Introducing new scenarios for increase higher power limit for ENDC ZTE Corporation, vivo, Huawei, CHTTL, Xiaomi, Samsung
17. R4-2315025 Introduction of higherPowerLimit-r17 into NR CA of PC3+PC5 including UL Intra band CA Nokia, Nokia Shanghai Bell, Samsung
18. R4-2315026 Introduction of higherPowerLimit-r17 into EN-DC of PC3+PC5 including UL Intra band CA Nokia, Nokia Shanghai Bell
19. R4-2315058 An approach to specify transparent UL enhancements for Rel-18 Qualcomm Incorporated
20. R4-2315372 On coverage enhancement using transparent schemes Apple
21. R4-2315818 Discussion on transparent schemes for coverage enhancement vivo
22. R4-2316093 Next steps for MPR/PAR – objective Nokia, Nokia Shanghai Bell
23. R4-2316277 RF spec impact for transparent MPR reduction scheme Ericsson
24. R4-2316370 On further enhancements to reduce MPR&PAR Huawei, HiSilicon
25. R4-2316666 Further discussion on MPR reduction MediaTek Inc.
26. R4-2315060 dCR on coverage enhancements using legacy waveform (no modification) Qualcomm Incorporated
27. R4-2315061 dCR on coverage enhancements using legacy waveform as well as FDSS Qualcomm Incorporated
28. R4-2315820 Draft CR for TS 38.101-1 on coverage enhancement vivo
29. R4-2316094 OPTION 1 - draftCR to 38.101 for MPR reduction Nokia, Nokia Shanghai Bell
30. R4-2316095 OPTION 2 - draftCR to 38.101 for MPR reduction Nokia, Nokia Shanghai Bell
31. R4-2316278 CR for NR coverage enhancement Rel-18 Ericsson
32. R4-2316371 Draft CR for 38.101-1 MPR reduction Huawei, HiSilicon
33. R4-2317262 Topic summary for [108-bis][139] NR\_cov\_enh2\_part1 Moderator (Huawei)
34. R4-2317769 WF on UL power enhancement Huawei
35. R4-2317263 Topic summary for [108-bis][140] NR\_cov\_enh2\_part2 Moderator (Nokia)
36. R4-2317652 WF on enhancement for MPR reduction Nokia
37. R4-2315048 Discussion on Coverage Enhancement BS Demodulation Nokia, Nokia Shanghai Bell
38. R4-2315049 Simulations for Coverage Enhancement BS Demodulation Nokia, Nokia Shanghai Bell
39. R4-2315085 Discussion on the BS performance part for Rel-18 coverage enhancement WI China Telecom
40. R4-2315593 Discussion on NR further coverage enhancement Ericsson
41. R4-2315702 Discussion on NR\_cov\_enh2 demodulation requirements ZTE
42. R4-2315997 Discussion on BS demodulation requirements for further coverage enhancements Huawei,HiSilicon
43. R4-2316150 View on BS demodulation requirements for further coverage enhancement Samsung
44. R4-2317954 Topic summary for [108bis][323] NR\_cov\_enh2\_demod Moderator (China Telecom)
45. R4-2316922 WF on NR\_cov\_enh2\_demod China Telecom

RAN4 #109:

1. [R4-2318892](file:///D:\RAN4%23109\Docs\R4-2318892.zip) Discussion on reply LS on delta power class Xiaomi
2. [R4-2320542](file:///D:\RAN4%23109\Docs\R4-2320542.zip) LS to RAN1\_2 on UE capability signalling Ericsson
3. [R4-2318268](file:///D:\RAN4%23109\Docs\R4-2318268.zip) Further discussion on delta\_Ppowerclass E-surfing Digital
4. [R4-2318437](file:///D:\RAN4%23109\Docs\R4-2318437.zip) On ULFPTx dependency on Delta\_PPowerClass report Apple
5. [R4-2318773](file:///D:\RAN4%23109\Docs\R4-2318773.zip) On power class fallback signalling Qualcomm Incorporated
6. [R4-2318957](file:///D:\RAN4%23109\Docs\R4-2318957.zip) Further Discussion of Delta\_powerclass reporting vivo
7. [R4-2319406](file:///D:\RAN4%23109\Docs\R4-2319406.zip) Views on ?PPowerClass and ?PPowerClass,CA/?PPowerClass,EN-DC reporting Samsung
8. [R4-2319911](file:///D:\RAN4%23109\Docs\R4-2319911.zip) R18 delta Ppowerclass reporting LS reply OPPO
9. [R4-2320079](file:///D:\RAN4%23109\Docs\R4-2320079.zip) On remaining issue for enhancements to increasing UE power high limit for CA and DC Huawei, HiSilicon
10. [R4-2320093](file:///D:\RAN4%23109\Docs\R4-2320093.zip) Discussion and reply LS on ?PPowerClass reporting ZTE Corporation
11. [R4-2318030](file:///D:\RAN4%23109\Docs\R4-2318030.zip) Introduction of higherPowerLimit-r17 into NR CA of PC3+PC5 including UL Intra band CA Nokia, Nokia Shanghai Bell, vivo, ZTE, Huawei, CHTTL, Samusng,Xiaomi
12. [R4-2318031](file:///D:\RAN4%23109\Docs\R4-2318031.zip) Introduction of higherPowerLimit-r17 into EN-DC of PC3+PC5 including UL Intra band CA Nokia, Nokia Shanghai Bell, Samsung
13. [R4-2318100](file:///D:\RAN4%23109\Docs\R4-2318100.zip) Introduction of delta PPowerClass report Nokia, Nokia Shanghai Bell
14. [R4-2318101](file:///D:\RAN4%23109\Docs\R4-2318101.zip) Introduction of delta PPowerClass report Nokia, Nokia Shanghai Bell
15. [R4-2318959](file:///D:\RAN4%23109\Docs\R4-2318959.zip) CR of TS38.101-1 for Introducing new scenarios for increase higher power limit for CA vivo, ZTE, Huawei, CHTTL, Samusng,Xiaomi
16. [R4-2320094](file:///D:\RAN4%23109\Docs\R4-2320094.zip) CR to TS38.101-3 for Introducing new scenarios for increase higher power limit for ENDC ZTE Corporation, vivo, Nokia, Nokia Shanghai Bell, Huawei, CHTTL, Xiaomi,
17. [R4-2318032](file:///D:\RAN4%23109\Docs\R4-2318032.zip) Draft LS to R2-2311611 on UL power enhancements for CA and DC Nokia, Nokia Shanghai Bell
18. [R4-2318718](file:///D:\RAN4%23109\Docs\R4-2318718.zip) Draft reply LS on delta power class MediaTek Inc.
19. [R4-2318958](file:///D:\RAN4%23109\Docs\R4-2318958.zip) [Draft] Reply LS on the Reply of delta power class vivo
20. [R4-2319437](file:///D:\RAN4%23109\Docs\R4-2319437.zip) DRAFT Reply LS on delta power class Ericsson
21. [R4-2320080](file:///D:\RAN4%23109\Docs\R4-2320080.zip) LS reply on further clarifications on enhancements to realize increasing UE power high limit for CA and DC Huawei, HiSilicon

1. [R4-2321821](D:\\RAN4#109\\Docs\\R4-2321821.zip) LS reply on further clarifications on enhancements to realize increasing UE power high limit for CA and DC Huawei, HiSilicon
2. [R4-2321825](http://10.10.10.10/ftp/RAN/RAN4/Inbox/R4-2321825.zip) LS reply on further clarifications on enhancements to realize increasing UE power high limit for CA and DC Huawei, HiSilicon
3. [R4-2321998](http://10.10.10.10/ftp/RAN/RAN4/Inbox/R4-2321998.zip) LS reply on further clarifications on enhancements to realize increasing UE power high limit for CA and DC Huawei, HiSilicon
4. [R4-2318715](file:///D:\\RAN4%23109\\Docs\\R4-2318715.zip) Further discussion on MPR reduction MediaTek Inc.
5. [R4-2318760](file:///D:\RAN4%23109\Docs\R4-2318760.zip) On coverage enhancement using transparent schemes Apple
6. [R4-2318772](file:///D:\RAN4%23109\Docs\R4-2318772.zip) An approach to specify transparent UL enhancements for Rel-18 Qualcomm Incorporated
7. [R4-2318805](file:///D:\RAN4%23109\Docs\R4-2318805.zip) Scope of transparent UL enhancements for Rel-18 Qualcomm, Verizon, Ericsson, AT&T, T-Mobile, ZTE, Fujitsu, KDDI, NTT-Docomo
8. [R4-2318962](file:///D:\RAN4%23109\Docs\R4-2318962.zip) Discussion on transparent schemes for coverage enhancement vivo
9. [R4-2320031](file:///D:\RAN4%23109\Docs\R4-2320031.zip) On completion of Rel-18 MPR-PAR objective Nokia, Nokia Shanghai Bell
10. [R4-2320081](file:///D:\RAN4%23109\Docs\R4-2320081.zip) On further enhancements to reduce MPR&PAR Huawei, HiSilicon, SmarterMicro
11. [R4-2320457](file:///D:\RAN4%23109\Docs\R4-2320457.zip) Proposal on power boosting regions for QPSK w/wo shaping Skyworks Solutions Inc.
12. [R4-2320543](file:///D:\RAN4%23109\Docs\R4-2320543.zip) RF spec impact for transparent MPR reduction scheme Ericsson
13. [R4-2318761](file:///D:\RAN4%23109\Docs\R4-2318761.zip) CR on Introducing Rel-18 Power Boost for QPSK and Pi/2 BPSK Apple
14. [R4-2318774](file:///D:\RAN4%23109\Docs\R4-2318774.zip) dCR on coverage enhancements using FDSS Qualcomm Incorporated
15. [R4-2318963](file:///D:\RAN4%23109\Docs\R4-2318963.zip) Draft CR1 for TS38.101-1 on coverage enhancement vivo
16. [R4-2318964](file:///D:\RAN4%23109\Docs\R4-2318964.zip) Draft CR2 for TS38.101-1 on coverage enhancement vivo
17. [R4-2320032](file:///D:\RAN4%23109\Docs\R4-2320032.zip) CR to 38.101 for introduction of MPR reduction Nokia, Nokia Shanghai Bell
18. [R4-2321826](http://10.10.10.10/ftp/RAN/RAN4/Inbox/R4-2321826.zip) CR to 38.101 for introduction of MPR reduction Nokia, Nokia Shanghai Bell, Qualcomm, Huawei, Ericsson, Apple, Vivo, Oppo, MediaTek
19. [R4-2320082](file:///D:\RAN4%23109\Docs\R4-2320082.zip) Draft CR for TS 38.101-1 PC3 power boosting Huawei, HiSilicon
20. [R4-2320356](file:///D:\RAN4%23109\Docs\R4-2320356.zip) Draft CR for TS 38.101-1 PC3 power boosting Spreadtrum Communications
21. [R4-2320544](file:///D:\RAN4%23109\Docs\R4-2320544.zip) CR for NR coverage enhancement Rel-18 Ericsson
22. [R4-2318146](file:///D:\RAN4%23109\Docs\R4-2318146.zip) Topic summary for [109][140] NR\_cov\_enh2\_part1 Moderator (Huawei)
23. [R4-2321738](file:///D:\RAN4%23109\Docs\R4-2321738.zip) Ad hoc minutes for NR\_cov\_enh2\_part1 Huawei
24. [R4-2318147](file:///D:\RAN4%23109\Docs\R4-2318147.zip) Topic summary for [109][141] NR\_cov\_enh2\_part2 Moderator (Nokia)
25. [R4-2321827](http://10.10.10.10/ftp/RAN/RAN4/Inbox/R4-2321827.zip) WF on NR\_cov\_enh2\_part2 Nokia
26. [R4-2321960](http://10.10.10.10/ftp/RAN/RAN4/Inbox/R4-2321960.zip) LS on UE capabilities for MPR reduction Nokia
27. R4-2318056 Discussion on Coverage Enhancement BS Demodulation Nokia, Nokia Shanghai Bell
28. R4-2318057 Simulations for Coverage Enhancement BS Demodulation Nokia, Nokia Shanghai Bell
29. R4-2319310 Discussion on NR further coverage enhancement demodulation requirements Ericsson
30. R4-2319311 Simulation results for NR PRACH repetition Ericsson
31. R4-2319391 Discussion on the BS performance part for Rel-18 coverage enhancement WI China Telecom
32. R4-2319533 Discussion on NR\_cov\_enh2 demodulation requirements ZTE
33. R4-2319843 View on BS demodulation requirements for further coverage enhancement Samsung
34. R4-2320223 Discussion on BS demodulation requirements for further coverage enhancements Huawei,HiSilicon
35. R4-2318217 Topic summary for [109][325] NR\_cov\_enh2\_demod Moderator (CTC)
36. R4-2321055 Offline meeting minutes for [109][325] NR\_cov\_enh2\_demod Nokia, CTC
37. R4-2321061 WF on [109][325] NR\_cov\_enh2\_demod China Telecom, Nokia