**3GPP TSG RAN WG1 #122 R1-250XXXX**

**Bengaluru, India, Aug 25th – 29th, 2025**

Agenda Item: 8.5

Source: Ad-Hoc Chair (Ericsson)

Title: Session notes for 8.5 Maintenance Enhancements of network energy savings for NR

Document for: Discussion, Decision



## Maintenance on Enhancements of network energy savings for NR

[122-R19-NES] Email discussion on NES– Ajit (Ericsson)

* To be used for sharing updates on online/offline schedule, details on what is to be discussed in online/offline sessions, tdoc number of the moderator summary for online session, etc

### On-demand SSB SCell operation

R1-2505136 On-demand SSB SCell Operation Nokia, Nokia Shanghai Bell

R1-2505257 On-demand SSB SCell Operation Google

R1-2505327 Maintenance on on-demand SSB SCell operation CATT

R1-2505355 Maintenance on on-demand SSB SCell operation for eNES Huawei, HiSilicon

R1-2505378 Maintenance on on-demand SSB Scell operation vivo

R1-2505542 Remaining issues on on-demand SSB SCell operation Samsung

R1-2505595 Discussion on on-demond SSB for NES ZTE Corporation, Sanechips

R1-2505663 Discussion on on-demand SSB SCell operation Ofinno

R1-2505704 Remaining issue for on demand SSB SCell operation OPPO

R1-2505843 Remaining issues on on-demand SSB SCell operation LG Electronics

R1-2505877 Remaining issues on on-demand SSB SCell operation Apple

R1-2505973 Remaining issues on on-demand SSB SCell operation Fujitsu

R1-2506009 Maintenance on the SSB indexes of SSB-RO mapping for NES Sharp

R1-2506033 On-demand SSB SCell operation MediaTek Inc.

R1-2506055 Remaining issues on on-demand SSB SCell operation ETRI

R1-2506079 Maintenance of on-demand SSB SCell operation CMCC

R1-2506181 On-demand SSB operation for Scell Qualcomm Incorporated

R1-2506318 Discussion on on-demand SSB SCell operation ITRI

R1-2506376 Maintenance on on-demand SSB SCell operation Ericsson

**R1-2506493**

Agreement

* Remove parameter to configure physical cell ID of on-demand SSB (i.e., *od-ssb-physCellId*) from OD-SSB configuration (i.e., *od-ssb-config*)

Agreement

Adopt the following TP for TS 38.214 Clause 5.2.1.4

**Reason for change:** To clarify that CSI report for an SCell configured with *od-ssb-config* cannot be configured with *eventType*

**Summary of change:** Add description that CSI report for an SCell configured with *od-ssb-config* cannot be configured with *eventType*

**Consequence if not approved:** Whether or not CSI report for an SCell configured with *od-ssb-config* can be configured with *eventType* is unclear

5.2.1.4 Reporting configurations

<omitted text>

For a UE configured with *od-ssb-config* on a SCell and for CSI report with *CSI-ReportConfig* with higher layer parameter *reportQuantity* set to 'ssb-Index-RSRP', 'ssb-Index-SINR', 'ssb-Index-RSRP- Index', or 'ssb-Index-SINR- Index ' and not configured with *eventType*

- if the UE is not provided *absoluteFrequencySSB* for the SCell, the CSI report configuration is associated with the SS/PBCH block configured by *od-ssb-config* and the UE reports SSBRI based on *SSB-index* corresponding to the currently transmitted SS/PBCH block.

- if the UE is provided *absoluteFrequencySSB* for the SCell, the CSI report configuration is associated with both the SS/PBCH block configured by *od-ssb-config* and the SS/PBCH block provided by *absoluteFrequencySSB* and the UE reports SSBRI based on *SSB-index* corresponding to the currently transmitted SS/PBCH block(s) that may be the one configured by *od-ssb-config* and/or provided by *absoluteFrequencySSB* based on measurement requirements defined in [11, TS 38.133].

- The UE reports SSBRI based on *SSB-index* corresponding to the currently transmitted SS/PBCH block, where the SSBRI *k* (*k* ≥ 0) corresponds to the configured (*k*+1)-th entry of the associated *csi-SSB-ResourceList* in the corresponding *CSI-SSB-ResourceSet.*

The *reportConfigType* of CSI reporting configuration based on SS/PBCH block configured with *od-ssb-config* may be aperiodic or semi-persistent.

**Agreement:**

* Confirm the value range of *od-ssb-nrofBurst* for both FR1 and FR2
  + For FR1, the value range of od-ssb-nrofBurst is {5, 10, 15, 20, 25, 30, 40, 50}.
  + For FR2, the value range of od-ssb-nrofBurst is {25, 30, 40, 50, 75, 100, 150, 200}.
* Note: It is upto RAN4 whether to include smaller value than 25 for FR2.

**Agreement:**

Adopt the following TP for TS 38.213 Clause 7.

**Reason for change:** The *od-ss-PBCH-BlockPower* is not provided for Case #2. For Case #2, if a UE obtains a downlink pathloss estimation based on reception of second SS/PBCH blocks (i.e., on-demand SSB), downlink transmit power of on-demand SSB is the same as the *ss-PBCH-BlockPower* for always-on SSB and there is no *od-ss-PBCH-BlockPower* in higher layer parameters

**Summary of change:** Add description for the case when *od-ss-PBCH-Block power* is absent in Case #2 to align the UE behaviour with RAN1 agreement.

**Consequence if not approved:** When *od-ss-PBCH-BlockPower* is not configured, UE cannot obtain a downlink pathloss estimation based on reception of second SS/PBCH blocks.

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| --- |
| 7 Uplink power control  -----------------------omitted text-----------------------  In the remaining of this clause, if a UE obtains a downlink pathloss estimate based on reception of second SS/PBCH blocks, as described in Clause 4.4, *ss-PBCH-BlockPower* is replaced by *od-ss-PBCH-BlockPower* if provided. |
|  |

Agreement:

Adopt the following TP for TS 38.214 Clause 4.1

**Reason for change**

* The SSS EPRE for OD-SSB in Case #1 is undefined
* The CSI-RS EPRE for CSI-RS that is QCLed to the OD-SSB in Case #1 is undefined

**Summary of change**

* The downlink SS/PBCH SSS EPRE can be derived from the SS/PBCH downlink transmit power given by the parameter *od-ss-PBCH-BlockPower* provided in *od-ssb-config* for SS/PBCH block transmitted according to Clause 4.4 of [6, TS 38.213].
* The downlink CSI-RS EPRE can be derived from the SS/PBCH block downlink transmit power given by the parameter *od-ss-PBCH-BlockPower* provided in *od-ssb-config* for SS/PBCH block transmitted according to Clause 4.4 of [6, TS 38.213]

**Consequence if not approved:**

* Undefined EPRE of SSS and CSI-RS for OD-SSB in Case #1

4.1 Power allocation for downlink

The gNB determines the downlink transmit EPRE.

For the purpose of SS-RSRP, SS-RSRQ and SS-SINR measurements, the UE may assume downlink EPRE is constant across the bandwidth. For the purpose of SS-RSRP, SS-RSRQ and SS-SINR measurements, the UE may assume downlink EPRE is constant over SSS carried in different SS/PBCH blocks. For the purpose of SS-RSRP, SS-RSRQ and SS-SINR measurements, the UE may assume that the ratio of SSS EPRE to PBCH DM-RS EPRE is 0 dB.

For the purpose of CSI-RSRP, CSI-RSRQ and CSI-SINR measurements, the UE may assume downlink EPRE of a port of CSI-RS resource configuration is constant across the configured downlink bandwidth and constant across all configured OFDM symbols.

The downlink SS/PBCH SSS EPRE can be derived from the SS/PBCH downlink transmit power given by the parameter *ss-PBCH-BlockPower* provided by higher layers or *od-ss-PBCH-BlockPower* provided in *od-ssb-config* for SS/PBCH block transmitted according to Clause 4.4 of [6, TS 38.213]. The downlink SSS transmit power is defined as the linear average over the power contributions (in [W]) of all resource elements that carry the SSS within the operating system bandwidth.

The downlink CSI-RS EPRE can be derived from the SS/PBCH block downlink transmit power given by the parameter *ss-PBCH-BlockPower* or *od-ss-PBCH-BlockPower* provided in *od-ssb-config* for SS/PBCH block transmitted according to Clause 4.4 of [6, TS 38.213] and CSI-RS power offset given by the parameter *powerControlOffsetSS* provided by higher layers if the SS/PBCH block is associated with serving cell PCI, or derived from *ss-PBCH-BlockPower-r17* in *SSB-MTC-AdditionalPCI-r17* and *powerControlOffsetSS* provided by higher layersif the SS/PBCH block is associated with additional PCI different from serving cell PCI, where the CSI-RS is QCLed with the SS/PBCH block. The downlink reference-signal transmit power is defined as the linear average over the power contributions (in [W]) of the resource elements that carry the configured CSI-RS within the operating system bandwidth.

R1-2506494

**Agreement:**

* Adopt the following TP for TS 38.213 Clause 10

**Reason for change**: Puncturing of SSB bandwidth can be applicable for OD-SSB.

**Summary of changes**: Add “after puncturing if applicable”.

**Consequence if not approved**: Specification is confusing for puncturing of SSB.

**10 UE procedure for receiving control information**

\*\*\* Unchanged parts are omitted \*\*\*

For monitoring of a PDCCH candidate by a UE, if the UE

- has received *ssb-PositionsInBurst* in *SIB1* and has not received *ssb-PositionsInBurst* in *ServingCellConfigCommon* for a serving cell, and

- does not monitor PDCCH candidates in a Type0-PDCCH CSS set, and

- at least one RE for a PDCCH candidate overlaps with at least one RE of a candidate SS/PBCH block, after puncturing if applicable, corresponding to a SS/PBCH block index provided by *ssb-PositionsInBurst* in *SIB1*,

the UE is not required to monitor the PDCCH candidate.

For monitoring of a PDCCH candidate by a UE, if the UE

- has received *ssb-PositionsInBurst* in *ServingCellConfigCommon* for a serving cell, and

- does not monitor PDCCH candidates in a Type0-PDCCH CSS set, and

- at least one RE for a PDCCH candidate overlaps with at least one RE of a candidate SS/PBCH block, after puncturing if applicable, corresponding to a SS/PBCH block index provided by *ssb-PositionsInBurst* in *ServingCellConfigCommon*,

the UE is not required to monitor the PDCCH candidate.

For monitoring of a PDCCH candidate by a UE, if the UE

- has received an indication for transmission of second SS/PBCH blocks on a serving cell as described in Clause 4.4, and

- at least one RE for a PDCCH candidate overlaps with at least one RE of a candidate SS/PBCH block, after puncturing if applicable, from the second SS/PBCH blocks, corresponding to a SS/PBCH block index provided as described in Clause 4.4,

the UE is not required to monitor the PDCCH candidate.

For monitoring of a PDCCH candidate by a UE, if the UE

- has received *ssb-PositionsInBurst* in *SSB-MTCAdditionalPCI* for a serving cell, and

- at least one RE for a PDCCH candidate overlaps with at least one RE of a candidate SS/PBCH block, after puncturing if applicable, corresponding to a SS/PBCH block index provided by *ssb-PositionsInBurst* in *SSB-MTCAdditionalPCI* with same physical cell identity as the one associated with a RS having same quasi-collocation properties as a CORESET for the PDCCH candidate,

the UE is not required to monitor the PDCCH candidate.

A UE is not required to monitor PDCCH candidates for a Type0/0A/0B/1/1A /2/2A -PDCCH CSS set when the active TCI state for a corresponding CORESET is not associated with *physCellId* in *ServingCellConfigCommon*.

\*\*\* Unchanged parts are omitted \*\*\*

**Agreement:**

Adopt the following TP for TS 38.213 Clause 11.1.1.

--------------------------------------------------- Start of Text Proposal for TS 38.213 ---------------------------------------------

**11.1.1 UE procedure for determining slot format**

< Unchanged parts are omitted >

For a set of symbols of a slot corresponding to SS/PBCH blocks with candidate SS/PBCH block indices corresponding to the SS/PBCH block indexes indicated to a UE by *ssb-PositionsInBurst* in *SIB1,* or by *ssb-PositionsInBurst* in *ServingCellConfigCommon*, as described in clause 4.1, or as described in Clause 4.4, or by *NonCellDefiningSSB* or, if the UE is not provided *dl-OrJointTCI-StateList*, by *ssb-PositionsInBurst* in *SSB-MTCAdditionalPCI* associated to physical cell ID with active TCI states for PDCCH or PDSCH, or for a set of symbols of a slot corresponding to SS/PBCH blocks configured for L1 beam measurement/reporting, the UE does not expect to detect a DCI format 2\_0 with an SFI-index field value indicating the set of symbols of the slotas uplink.

< Unchanged parts are omitted >

------------------------------------------------------- End of Text Proposal --------------------------------------------------------

**Agreement:**

Adopt the following TP for TS 38.213 Clause 4.4.

**Reason for change:** Corrections on clause title of activation/deactivation of SS/PBCH block transmissions on a secondary cell.

**Summary of change:** In the title of clause 4.4 of TS 38.213, adaptation of SS/PBCH block transmissions on a secondary cell is captured.

**Consequence if not approved:** The adaptation of SS/PBCH block transmissions on a secondary cell is omitted in the title of clause 4.4 of TS 38.213.

---------------------------------------- Start of text proposal to TS 38.213 v19.0.0 ---------------------------------------

4.4 Activation/adaptation/deactivation of SS/PBCH block transmissions on a secondary cell

---------------------------------------- End of text proposal to TS 38.213 v19.0.0 ---------------------------------------

### On-demand SIB1 for idle/inactive mode Ues

R1-2505137 On-demand SIB1 for Idle/Inactive mode UEs Nokia, Nokia Shanghai Bell

R1-2505258 On-demand SIB1 for Idle/Inactive Mode UE Google

R1-2505328 Maintenance on on-demand SIB1 CATT

R1-2505356 Maintenance on on-demand SIB1 for eNES Huawei, HiSilicon

R1-2505379 Maintenance on on-demand SIB1 for idle/inactive Ues vivo

R1-2505543 Remaining issues on on-demand SIB1 for idle/inactive mode UEs Samsung

R1-2505596 Discussion on on-demand SIB1 for NES ZTE Corporation, Sanechips

R1-2505705 Remaining issue for on demand SIB1 for idle/inactive mode UE OPPO

R1-2505826 Maintenance on on-demand SIB1 for idle and inactive mode UEs Ericsson

R1-2505878 Remaining issues on on-demand SIB1 for IDLE/INACTIVE mode UEs Apple

R1-2506034 On-demand SIB1 for idle or inactive mode UEs MediaTek Inc.

**R1-2506399**

Agreement

**The following is supported for the value range of *od-sib1-windowStartOffset***

* **{sl0, sl1, sl2, sl4, sl8, sl10, sl20, sl40, sl80}**

R1-2506400

**Agreement:**

Adopt the following TP for Clause 5.3.2 and 6.3.3.1 in TS38.211 to clarify the PRACH transmission for SIB1 request.

--------------------------------- start of TP for 38.211-------------------------------------

**5.3.2 OFDM baseband signal generation for PRACH**

<omitted text>

- is the subcarrier spacing of the initial uplink bandwidth part during initial access. If the PRACH transmission is for a candidate cell is provided by *ltm-PRACH-SubcarrierSpacing* in *EarlyUL-SyncConfig*. If the PRACH transmission is for SIB1 request, is provided by *msg1-SubcarrierSpacing* in *SIB1-RequestConfig*. Otherwise,  is the subcarrier spacing of the active uplink bandwidth part;



- is the largest value among the subcarrier spacing configurations by the higher-layer parameter *scs-SpecificCarrierList*;



- is the lowest numbered resource block of the initial uplink bandwidth part and is derived by the higher-layer parameter *initialUplinkBWP* or *initialUplinkBWP-RedCap* during initial access and from the higher-layer parameters *bwp-GenericParameters* in *EarlyUL-SyncConfig* if the PRACH transmission is for a candidate cell, and from the higher-layer parameter *locationAndBandwidth* in *SIB1-RequestConfig,* if the PRACH transmission is for SIB1 request. Otherwise, is the lowest numbered resource block of the active uplink bandwidth part and is derived by the higher-layer parameter *BWP-Uplink*;



<omitted text>

**6.3.3.1 Sequence generation**

<omitted text>

There are 64 preambles defined in each time-frequency PRACH occasion, enumerated in increasing order of first increasing cyclic shift  of a logical root sequence, and then in increasing order of the logical root sequence index, starting with the index obtained from the higher-layer parameter *prach-RootSequenceIndex* or *rootSequenceIndex-BFR* or by *msgA-PRACH-RootSequenceIndex* if configured and a type-2 random-access procedure is initiated as described in clause 8.1 of [5, TS 38.213] or by *prach-RootSequenceIndex* in *EarlyUL-SyncConfig* if the PRACH transmission is for a candidate cell or by *prach-RootSequenceIndex* in *SIB1-RequestConfig* if the PRACH transmission is for SIB1 request. Additional preamble sequences, in case 64 preambles cannot be generated from a single root Zadoff-Chu sequence, are obtained from the root sequences with the consecutive logical indexes until all the 64 sequences are found. The logical root sequence order is cyclic; the logical index 0 is consecutive to . The sequence number  is obtained from the logical root sequence index according to Tables 6.3.3.1-3 to 6.3.3.1-4B.



--------------------------------- end of TP for 38.211-------------------------------------

**Agreement:**

Adopt the following 38.211 TP1 to clarify the reference point of DMRS for PDCCH scheduling OD-SIB1 and PDSCH carrying OD-SIB1 should be based on the *controlResourceSetZero* provided by UL WUS configuration from cell A instead of the one configured by the PBCH or by the *controlResourceSetZero* field in the *PDCCH-ConfigCommon* IE.

* **Reason for change:** 
  + UE behavious of OD-SIB1 reception are different from legacy SIB1 reception.
  + The reference point for DMRS for PDCCH is different when SIB1 is periodically transmitted or when SIB1 is on-demand triggered.
* **Summary of change:**
  + The reference point for DMRS for Type 0 PDCCH scheduling OD-SIB1 is subcarrier 0 of the lowest-numbered resource block in the CORESET0.
* **Consequences if not approved:**
  + The reference point for PDCCH scheduling OD-SIB1 and PDSCH carrying OD-SIB1 is different, which is different from legacy UE behaviours.
  + The reference point for PDCCH will change frequently with the change of NES state, which may bring more UE complexity.

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| **<TP 1>**  **3GPP TS 38.211 V18.6.0 (2025-03)**  7.4.1.3.2 Mapping to physical resources  The UE shall assume the sequence is mapped to resource elements according to    where the following conditions are fulfilled  - they are within the resource element groups constituting the PDCCH the UE attempts to decode if the higher-layer parameter *precoderGranularity* equals *sameAsREG-bundle*,  - all resource-element groups within the set of contiguous resource blocks in the CORESET where the UE attempts to decode the PDCCH if the higher-layer parameter *precoderGranularity* equals *allContiguousRBs*.  The reference point for is  - subcarrier 0 of the lowest-numbered resource block in the CORESET if the CORESET is configured by the PBCH or by the *controlResourceSetZero* field in the *PDCCH-ConfigCommon* IE or by the *controlResourceSetZero* field in the *SIB1-RequestConfig*.  - subcarrier 0 in common resource block 0 otherwise  The quantity is the OFDM symbol number within the slot.  The antenna port .  A UE not attempting to detect a PDCCH in a CORESET shall not make any assumptions on the presence or absence of DM-RS in the CORESET. |

**Agreement:**

Adopt the following TP1 to clarify the *k-ssb* provided by UL WUS configuration from cell A should be used to determine CORESET0 offset referenced in Clause 13.

***---------------------------------------Start of TP#1 for section 23 of TS 38.213--------------------------------------***

**23 UE procedure to request SIB1 reception**

Unless otherwise mentioned, the higher layer parameters in this clause and in referenced clauses are provided by *SIB1-RequestConfig* on a first cell.

**<Unchanged text omitted>**

where for determining the common resource block [4, TS 38.211] and frequency offset for the CORESET referenced in Clause 13 is provided by *k-ssb*.



***---------------------------------------End of TP#1 for section 23 of TS 38.213--------------------------------------***

### Adaptation of common signal/channel transmissions

R1-2505138 Adaptation of common signal/channel transmissions Nokia, Nokia Shanghai Bell

R1-2505259 Adaptation of Common Signals Google

R1-2505329 Maintenance on adaptation of common signal/channel transmissions CATT

R1-2505357 Maintenance on common channel/signal adaptation for eNES Huawei, HiSilicon

R1-2505380 Maintenance on adaptation of common signal/channel transmissions vivo

R1-2505544 Remaining issues on adaptation of common signal/channel transmissions Samsung

R1-2505597 Discussion on common signal channel for NES ZTE Corporation, Sanechips

R1-2505706 Remaining issue for common signal/channel transmission OPPO

R1-2505844 Remaining issues on adaptation of common signal/channel transmissions LG Electronics

R1-2505879 Remaining issues on adaptation of common signal/channel for NES enhancements Apple

R1-2505993 Maintenance for R19 NES adaptation of common signal/channel transmissions Ericsson

R1-2506035 Adaptation of common signal/channel transmissions MediaTek Inc.

R1-2506056 Remaining issues on SSB and PRACH time domain adaptations ETRI

R1-2506080 Maintenance of adaptation of common signal/channel transmission CMCC

R1-2506182 Adaptation of common channel transmissions Qualcomm Incorporated

R1-2506251 Maintenance on adaptation of common signal/channel transmissions Sharp

**R1-2506521**

**R1-2506545**

**Agreement:**

The Draft LS in R1-2506586 in endorsed. The final LS in R1-2506587.

**Conclusion**

With respect to LS R1-2505118, there is no change in RAN1 specifications, e.g., no change to calculation in 38.211.

