3GPP TSG-RAN WG2#129-bis R2-25XXXXX

Wuhan, China, April 7 – April 11, 2025

Agenda Item: 8.5.1

Source: Huawei, HiSilicon

Title: Report of [POST129][101][NES] (Huawei)

Document for: Discussion and decision

# 1 Introduction

This document is the report of the following discussion:

* [POST129][101][NES] (Huawei)

**Scope:** Capture all agreements in 38.300 running CR.

**Intended outcome:** Endorsed 38.300 running CR in R2-2501461.

**Deadline: Long email discussion (Mar. 21st 10:00 UTC)**

Please provide your comments by Thursday March 20th 10:00 UTC to allow 24h for the rapporteur to update the CR before the deadline.

Companies providing input to this email discussion are requested to leave contact information below.

|  |  |  |
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# 2 RRC CR for NES

The post-RAN2#129 draft running stage-2 CR for NES enhancements and a document for providing comments are provided in the discussion folder. Please don’t change the CR text or insert comments to the CR file. Please use the table below for comments and wording suggestions for clarity of the CR tdoc. If you want to highlight several issues, please use comment IDs e.g. HW001, HW002, etc. so it is easier for the rapporteur to respond.

|  |  |  |
| --- | --- | --- |
| **Company and comment ID (e.g. HW001)** | **Section and detailed comments/suggestions** | **Rapporteur response** |
| OPPO001 | **Paging adaptation for cell level energy saving**: in order to reduce gNB signalling, the value of N and Ns are extended to concentrate the POs in sparser PFs. The UE supporting paging adaptation shall monitor PDCCH in its NES specific PO.  [OPPO] The yellow terms is not rigorous, since PO for R19 NES UE can be shared with legacy UE, and also R19 UE may also monitor legacy PO if network does not configure R19 PO at all.  [vivo] Share the same view. Maybe we can append it with ‘, if configured’.  [Apple] Share similar view. On the change, we can either use the change proposed by vivo, or remove the last sentence (as 38.304 is captured as stage 3 spec). Either way is fine to us. |  |
| OPPO002 | On-demand SSB transmissions facilitated through serving cell indications enable UEs to perform at least SCell time/frequency synchronization, L1/L3 measurements and SCell activation, and are supported for FR1 and FR2 in non-shared spectrum.  [OPPO] Although it is from WID, but rigorously SCell activation include steps like t/f sync and L3 meas, so not a same level concept? |  |
| Xiaomi001 | Adaptation of PRACH in time domain is supported for 4-step RACH and CBRA.  [Xiaomi] should be 4-step CBRA as according to the agreement, there is no conclusion on 2-step CBRA.  Also suggest to add a editors’ note whether to support 2-step CBRA and/or CFRA depends on RAN1 |  |
| Xiaomi002 | This solution is supported in the following scenarios:   * + - The SCell is configured to a UE but before the UE receives SCell activation command     - When UE receives SCell activation command   [Xiaomi] according to the following RAN1 agreement, only 3A is excluded, whether to support 3B is still FFS. Suggest to add a note to wait for RAN1 conclusion on 3B.  Conclusion  The following combination of scenarios and cases for indicating OD-SSB are not supported in Rel-19   * Scenario #3A and Case #1 * Scenario #3A and Case #2   Above does not impact discussion on SSB periodicity adaptation in time domain |  |
| Xiaomi003 | RAN2 agreed that the UE in RRC\_CONNECTED can perform on-demand SIB1 procedure for RLD case.  The “RRC\_CONNECTE” should be captured.   1. Specify the following UE behavior to allow the UEs in RRC\_CONNECTED state to acquire OD-SIB1 when T311 is running:   - When T311 is running, the UE can trigger the OD-SIB1 acquisition procedure with stored UL WUS configuration in SIB-X, if it is still valid.  - The legacy cell selection criteria are reused as the trigger condition of OD-SIB1 acquisition.  - The OD-SIB1 acquisition behavior is same as that of RRC\_IDLE/IANCTIV UEs.  [Samsung] Agree with Xaomi.  [Apple] According to current agreement, maybe we can say “in RRC\_CONNECTED during the RRC connection re-establishment” |  |
| Xiaomi004 | It is too early to capture this sentence due to no agreements and this sentence is also not clear. |  |
| Samsung 001 | 5.2.5.5  We need to atleast add that “MIB on PBCH may indicate that SIB1 is not being broadcasted, in which case the UE may transmit SIB1 request if UE has valid SIB1 request configuration. |  |
| Samsung 002 | 7.3.1  “SIB1 can be broadcast on-demand upon request from UEs in RRC\_IDLE or RRC\_INACTIVE if a UE and gNB support NES OD-SIB1 as described in 15.4.2.x2.”  Suggest to remove “ if a UE and gNB support NES OD-SIB1’. It seems not needed. |  |
| Samsung 003 | 7.3.1  *“SIBxx* contains UL-WUS configurations of NES OD-SIB1 cells as defined in TS 38.331 [12].”  First we would like to use terminology which conveys the actual intent/behavior in specification.  What UE sends is a SIB1 request. Its not a UL wakeup signal. So, suggest to change ‘UL-WUS configurations’ to SIB1 request configurations.  It sufficient to say, *“SIBxx* contains SIB1 request configurations of one or more cells as defined in TS 38.331 [12].” |  |
| Samsung 004 | 7.3.1  Figure 7.3.1-1: System Information Provisioning needs to be updated to indicate ‘broadcast on-demand on DL-SCH’ for SIB1 |  |
| Samsung 005 | 7.3.2  “The scheduling of OD-SIB1 is determined by the WUS configuration and RAR.”  This text is not needed as we do not have corresponding text for SIB1 in legacy. |  |
| Samsung 006 | 7.3.2  We need to atleast include the following text:  For UEs in RRC\_IDLE, RRC\_INACTIVE and RRC\_CONNECTED (during the RRC connection re-establishment), a request for SIB1 triggers a random access procedure, in which case MSG1 is used for indicating SIB1 request and the gNB acknowledges the request in MSG2. |  |
| Samsung 007 | **9.2.5**  **“Paging adaptation for cell level energy saving**: in order to reduce gNB signalling, the value of N and Ns are extended to concentrate the POs in sparser PFs. The UE supporting paging adaptation shall monitor PDCCH in its NES specific PO.  “  In our view, paging adaptation does not reduce gNB signalling. It avoids network to keep waking up for paging in the entire DRX cycle by configuring PF/POs in the beginning of DRX cycle.  [Appe] Agree with Samsung. Suggest to modified as:  “in order to ~~reduce gNB signalling~~**increase gNB sleeping time**” |  |
| Samsung 008 | 15.4.2.5  “If a cell is activating or going to activate NES OD-SIB1, the cell can allow the access of UEs capable of NES OD-SIB1 but prevent the access of UEs not capable of NES OD-SIB1 based on no SIB1 indication in MIB using FFS as described in clause X.Y.”  Its not clear what activation of NES OD-SIB1 means. Prefer to reword as”   * + “If a cell provides SIB1 based on SIB1 request, the cell allows the access of UEs capable of OD-SIB1 but prevent the access of UEs not capable of OD-SIB1 based on ‘no SIB1 indication’ in MIB using FFS as described in clause X.Y.” |  |
| Samsung 008 | 15.4.2.x2 On-demand SIB1 Comment 1: Its not clear to use why we need to define “NES OD-SIB1 Cell”. In our view this is not needed.  Comment 2: We do not need to use term ‘UL-WUS’ in specification. We would like to use terminology which conveys the actual intent/behavior in specification. What UE sends is a SIB1 request. Its not a UL wakeup signal. So we prefer to use ‘SIB1 request’ instead of ‘UL WUS’ |  |
| Samsung 009 | 15.4.2.x2 On-demand SIB1 The text is not accurate (e.g. RRC connected is missing, applicability of SIB1 request configuration etc). Suggest to reword as follows:  To facilitate reduced gNB downlink transmissions, the gNB can provide SIB1 on-demand i.e. upon receiving SIB1 request from UE. On-demand SIB1 is supported for UEs in RRC\_IDLE, RRC\_INACTIVE and RRC\_CONNECTED (during RRC connection re-establishment). A request for SIB1 triggers a random access procedure, in which case MSG1 is used for indicating SIB1 request and the gNB acknowledges the request in MSG2. SIB1 request configuration of one or more cells are included in SIBxx, which can be broadcasted in any cell, including cell’s own SIB1 request configuration. While the UE is camped on a cell, it can use the SIB1 request configuration of another cell from SIBxx valid in the camped cell to acquire SIB1 of that cell for cell reselection or it can apply the SIB1 request configuration of the camped cell from SIBxx valid in the camped cell to acquire SIB1 of the camped cell. For the purpose of on-demand SIB1, the following terms are defined: |  |
| Nokia 001 | Generally OD-SIB1 – Likely we would need a place where general behaviour is described and not distriuted in various locations. So under 7.3 (system information) maybe we could have sub section describing basic OD-SIB1 procedure?. And then in 7.3.x we describe OD-SIB1 procedure and UE behaviour. Likely we would need also in section 5.2.5.5 reference to this 7.3.x Currently 5.2.5.5 looks like there is no possibility for NW to omit SIB1 sending. And if we do this then I guess we could have add missing RRC\_CONNECTED handling as well there and most of above comments could be treated in one section.And we agree with some comments above e.g. Saumsung 008 that we should not add new definitions of NES cell/CellA/WUS but just describe UE behaviour. |  |
| Nokia 002 | 7.3.1 – Minimum SI should not be changed with OD-SIB1- It stays same. Better locations for this this kind of text would be in 5.2.5.5/7.3.2 or in new section 7.3.x where we desdribe whole procedure, |  |
| Nokia 003 | In 7.3.2 the added sentence seems quite out of place and does not bring anything to stage-2 – it should be removed. |  |
| Nokia 004 | 9.2.5 – Change is in wrong place all together. First sentence after the change mentions “thse subgroups”. Those have nothing to do with paging adaptation. So better to move before “UE power saving for paging monitoring” paragraph.Additionally PEI is not mentioned at all – Maybe you could add editor’s note to that to be seen if PEI configuration/handling has any stage-2 impacts. So far we agreed separate Pei configuration –I’m not sure if that needs anything in stage-2 but better to check once we have more complete stage-3 text in place. [Appe] Agree with Nokia that PEI part can also be captured in stage 2. |  |
| Nokia 005 | On-demand SSB and SSB adapatation texts in 15.4.2.x1 could be likely aligned in the end to same section. From stage-2 point of view those features seem pretty much same.So maybe editor’s note should be added/modified to indicate |  |
| ER01 | SIB1 can be broadcast on-demand upon request from UEs in RRC\_IDLE or RRC\_INACTIVE if a UE and gNB support NES OD-SIB1 as described in 15.4.2.x2.  *- SIBxx* contains UL-WUS configurations of NES OD-SIB1 cells as defined in TS 38.331 [12].  **Paging adaptation for cell level energy saving**: in order to reduce gNB signalling, the value of N and Ns are extended to concentrate the POs in sparser PFs. The UE supporting paging adaptation shall monitor PDCCH in its NES specific PO.  If a cell is activating or going to activate NES OD-SIB1, the cell can allow the access of UEs capable of NES OD-SIB1 but prevent the access of UEs not capable of NES OD-SIB1 based on no SIB1 indication in MIB using FFS as described in clause X.Y. It would be good to try to avoid the term “NES” in any specification since it is a collection of features that are very different from each other, like cell DTX in Rel-18 to this OD-SIB1. Here (and other similar places) it can be simply deleted and here one could say something like “POs separately signalled for these paging adaptations” [Appe] Agree with Ericsson. |  |
| ER02 | . The scheduling of OD-SIB1 is determined by the WUS configuration and RAR.We would prefer to add replace “the WUS” with “UL-WUS” for consistency and “random access response reception” with “RAR reception”. [Appe] Agree with Ericsson. |  |
| ER03 | If a cell is activating or going to activate NES OD-SIB1, the cell can allow the access of UEs capable of NES OD-SIB1 but prevent the access of UEs not capable of NES OD-SIB1 based on no SIB1 indication in MIB using FFS as described in clause X.Y.  Please refrase the beginning, e.g. to what Samsung08 proposes. |  |
| ER04 | To facilitate reducing gNB downlink transmissions, the gNB can stop periodically broadcasting SIB1 and start providing it in an on-demand manner. On-demand SIB1 is supported for UEs in idle/inactive mode. A UE can obtain UL WUS configuration from any cell, then after an intra-/inter-frequency cell re-selection procedure UE transmits UL WUS on an NES OD-SIB1 Cell and receives on-demand SIB1 from the NES OD-SIB1 Cell. UL WUS transmission is triggered via a PRACH procedure. UL WUS configurations are included in SIBxx, which can be broadcasted in any cell, including cells own UL-WUS configuration. For the purpose of on-demand SIB1, the following terms are defined:  The any cell seems a bit vague. Perhaps could be said via system information or SIBxx. Somehwere could say SIBxx has serving and neighbor cel UL WUS configs. |  |
| ER05 | For adaptation of paging occasions in time domain, the values of N are extended to have increased interval between PFs. The Ns, which is the number of paging occasions within one paging frame, is increased compensating the decrease in number of PFs. Paging adaptations are configured semi-statically and updated via system information update notification.  The red text could be deleted |  |
| ER06 | We suggest the following update when we compare the proposed text with the other abbreviations in the specification:  “UL-WUS Uplink wake-up signal” => “UL-WUS Uplink Wake-Up Signal” |  |
| ER07 | We suggest the following change below:  “SIB1 can be broadcast on-demand upon request from UEs in RRC\_IDLE or RRC\_INACTIVE if a UE and gNB support NES OD-SIB1 as described in 15.4.2.x2.”  =>  “SIB1 can be broadcast on-demand upon request from a UE in RRC\_IDLE or RRC\_INACTIVE if the UE and the cell support OD-SIB1 as described in 15.4.2.x2.”  The term gNB does not seem to be used in the specification in that context. No need to have the term “NES” before “OD-SIB1” |  |
| ER08 | Similar to the suggestion above, the term NES can be dropped in the text below:  “SIBxx contains UL-WUS configurations of ~~NES~~ OD-SIB1 cells as defined in TS 38.331 [12].” |  |
| ER09 | We suggest the following updates:  “**Paging adaptation for cell level energy saving**: in order to reduce gNB signalling, the value of N and Ns are extended to concentrate the POs in sparser PFs. The UE supporting paging adaptation shall monitor PDCCH in its NES specific PO.”  =>  **“Paging adaptation for UEs in CM\_IDLE and RRC\_INACTIVE**: the value range for N and Ns parameters are extended to consolidate POs and/or configure PFs sparser.”  The following text does not need to be captured in Stage 2: "The UE supporting paging adaptation shall monitor PDCCH in its NES specific PO." |  |
| ER10 | In the proposed text below:  “If a cell is activating or going to activate NES OD-SIB1, the cell can allow the access of UEs capable of NES OD-SIB1 but prevent the access of UEs not capable of NES OD-SIB1 based on no SIB1 indication in MIB using FFS as described in clause X.Y.”  => remove the term NES before OD-SIB1 for consistency in the specification text. |  |
| ER11 | We suggest the following updates:  15.4.2.x2 On-demand SIB1  To facilitate reducing gNB downlink transmissions, the gNB can stop periodically broadcasting SIB1 and start providing it in an on-demand manner. On-demand SIB1 is supported for UEs in idle/inactive mode. A UE can obtain UL WUS configuration from any cell, then after an intra-/inter-frequency cell re-selection procedure UE transmits UL WUS on an NES OD-SIB1 Cell and receives on-demand SIB1 from the NES OD-SIB1 Cell. UL WUS transmission is triggered via a PRACH procedure. UL WUS configurations are included in SIBxx, which can be broadcasted in any cell, including cells own UL-WUS configuration. For the purpose of on-demand SIB1, the following terms are defined:  - UL-WUS: Uplink wake-up signal used to trigger OD-SIB1 transmission  - NES OD-SIB1 Cell: A cell that may transmit SIB1 on-demand in response to UL WUS from a UE  =>  “15.4.2.x2 On-demand SIB1  To facilitate gNB transmitting SIB1 on demand rather than broadcasting periodically. On-demand SIB1 is supported for UEs in RRC\_IDLE and RRC\_INACTIVE modes. A UE may obtain UL WUS configuration to request SIB1 from any cell. UE transmits UL WUS in an OD-SIB1 cell to acquire on-demand SIB1. UL WUS transmission is triggered using the PRACH procedure. UL WUS configurations for OD-SIB1 cells are included in SIBxx, which can be broadcasted in any cell, including cells own UL-WUS configuration.”  Considering that the text below is already captured in the draft CR, “For the purpose of on-demand SIB1, the following terms are defined:  - UL-WUS: Uplink wake-up signal used to trigger OD-SIB1 transmission  - NES OD-SIB1 Cell: A cell that may transmit SIB1 on-demand in response to UL WUS from a UE”  We wonder if there is a need to repeat those here? |  |
| ER12 | We suggest the following updates:  15.4.2.x3 Common signal/channel transmissions adaptation  For adaptation of paging occasions in time domain, the values of N are extended to have increased interval between PFs. The Ns, which is the number of paging occasions within one paging frame, is increased compensating the decrease in number of PFs. Paging adaptations are configured semi-statically and updated via system information update notification.  Adaptation of SSB in time domain is supported for SCells of UEs in RRC\_CONNECTED configured with carrier aggregation (CA).  Adaptation of PRACH in time domain is supported for 4-step RACH and CBRA.  =>  15.4.2.x3 Common signal/channel transmissions adaptation  For adaptation of paging occasions in time domain, the value range for parameter N is extended to make it possible to have sparse PFs. The value range for Ns, which is the number of paging occasions within one paging frame, is increased to compensate the decrease in the number of PFs. Paging occasion adaptations are configured semi-statically and updated via system information update notification.  Adaptation of SSB transmissions in time domain is supported for SCells for UEs in RRC\_CONNECTED mode configured with carrier aggregation (CA).  Adaptation of random access configurations in time domain is supported for 4-step RACH and CBRA. |  |
| Apple 001 | 15.4.2.x3 Common signal/channel transmissions adaptation We suggest to capture “The network can configure the legacy UEs and the UEs supporting paging adaptation in the same PF/PO” for below agreement:   1. Allowing legacy and R19 UEs to co-ex in the same PF/PO is possible, based on NW configuration.   If it is OK, I will remove corresponding part in running 38.304 CR |  |
| Apple 002 | The following signals can be used to indicate the activation/deactivation state of OD-SSB configuration:   * + - RRC based OD-SSB transmission indication     - MAC-CE for OD-SSB transmission indication   Suggest to simplify as below:  RRC and MAC-CE can indicate activation/deactivation state of OD-SSB transmission. |  |
| Apple 003 | 15.4.2.x2 On-demand SIB1 A UE can obtain UL WUS configuration from any cell  Suggest to modify as below:  A UE can obtain UL WUS configuration from current serving cell or another cell ~~any cell~~  Or “another cell” can be replaced with Cell A and definition of Cell A in Section 3.1 |  |
| Apple 004 | 15.4.2.x2 On-demand SIB1 For the purpose of on-demand SIB1, the following terms are defined:   * + - UL-WUS: Uplink wake-up signal used to trigger OD-SIB1 transmission     - NES OD-SIB1 Cell: A cell that may transmit SIB1 on-demand in response to UL WUS from a UE   Above terms should be defined in Section 3.2 (not in this section), and it is not necessary to have “NES” before OD-SIB1 Cell. |  |
| Apple 005 | 15.4.2.x3 Common signal/channel transmissions adaptation Adaptation of PRACH in time domain is supported for 4-step RACH and CBRA.  RAN1#120 has agreed to support CFRA (PDCCH-order):  **Agreement**  For adaption of PRACH in time-domain, for a connected mode UE, support a 1-bit field in DCI 1\_0 with C-RNTI used to trigger PRACH (i.e. PDCCH order) to indicate whether the additional PRACH resource(s) is available for the triggered PRACH.   * FFS: UE behaviour (e.g. applicable resources for PRACH mask index) when it is indicated of additional PRACH resource(s) * FFS: Details on how to reuse existing bit for the 1-bit indication |  |
| QC 01 | Suggest adding Cell-A and NES cell definition in section 3.2 Definitions |  |
| QC 02 | 7.3.2 Scheduling  The MIB is mapped on the BCCH and carried on BCH while all other SI messages are mapped on the BCCH, where they are dynamically carried on DL-SCH. The scheduling of SI messages part of Other SI is indicated by *SIB1*. The scheduling of OD-SIB1 is determined by the WUS configuration and RAR.  Suggest: UL WUS |  |
| QC 03 | 15.4.2.x1 On-demand SSB SCell  * + - The SCell is configured to a UE but before the UE receives SCell activation command     - When UE receives SCell activation command   The following signals can be used to indicate the activation/deactivation state of OD-SSB configuration:   * + - RRC based OD-SSB transmission indication     - MAC-CE for OD-SSB transmission indication   Suggest:  - Prior to or when UE receives SCell activation command  The following signals can be used to indicate the activation/deactivation state of OD-SSB configuration:  - *~~RRC based OD-SSB transmission indication~~ [Comment: not sure about this due to the timing between RRC and MAC CE activation]*  - MAC-CE for OD-SSB transmission indication |  |
| QC 04 | 15.4.2.x2 On-demand SIB1 A UE can obtain UL WUS configuration from any cell, then after an intra-/inter-frequency cell re-selection procedure UE transmits UL WUS on an NES OD-SIB1 Cell and receives on-demand SIB1 from the NES OD-SIB1 Cell. UL WUS transmission is triggered via a PRACH procedure.  Suggest/Comment:   1. May not be any cell. 2. It’s part of the cell reselection: obtain SIB1 3. “using” instead of “triggered”…? |  |