3GPP TSG-RAN WG2 Meeting #121bis-e R2-230xxxx

Online, April 17 – 26, 2023

Source: CATT

Title: Report of [AT121bis-e][006][NR17] CP PowSav and DCCA Corrections (1st round)

Agenda Item: 7.5.2

Document for: Discussion and Decision

# Introduction

The contribution provides the report of the below email discussion:

* [AT121bis-e][006][NR17] CP PowSav and DCCA Corrections (CATT)

 Scope: Treat R2-2302541, R2-2302800, R2-2303617, R2-2303467, R2-2302553, R2-2302554, R2-2302658, R2-2303662, R2-2303616 (3rd change)
Ph1: Determine agreeable parts. Ph2: For agreeable parts, if any, reflect these in agreeable CRs.

 Intended outcome: Report, If applicable: In-Principle-Agreed CRs

 Deadline: Schedule 1

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# Discussion

# Power Saving documents

# RLM and BFD relaxation when SCG is deactivated [5][6]

Following the RAN4 LS [1] informing that RAN4 don’t assume any RLM/BFD relaxation when SCG is deactivated, the UE behavior when RLM and BFD relaxation are configured for the SCG and the SCG is deactivated was discussed and clarified in RAN2#121 as follows [2]:

|  |
| --- |
| * Go option 2: Keep the current situation for RLM/BFD relaxation for SCG deactivation, i.e. no change in RAN2, no change in RAN4.
* RAN2 clarify that in the case of SCG deactivation and *bfd-and-RLM* is set to true, UE will perform the RLM/BFD according to the requirements for SCG deactivation of *measCyclePSCell* as specified in TS 38.133 no matter whether *goodServingCellEvaluationBFD-r17* and *goodServingCellEvaluationRLM-r17* is configured for SCG.
 |

Essentially, RAN2 chose the solution along the lines of [3], i.e. based on *measCyclePSCell*: since the minimum value of this parameter is larger than the maximum allowed measurement cycle value for enabling RLM/BFD relaxation, then, whenever this parameter is configured, no RLM/BFD relaxation can take place (per RAN4 spec) when SCG is deactivated. Then if *measCyclePSCell* is made mandatory when SCG is deactivated, there is no problem. However companies requested more time to agree the associated CR in [4].

At this e-meeting, two contributions aim at closing the issue in different ways [5][6]:

[R2-2302658](file:///C%3A%5CUsers%5Cmtk65284%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CTSGR2_121bis-e%5CDocs%5CR2-2302658.zip) Correction on measCyclePSCell used during SCG deactivation vivo, Ericsson, Guangdong Genius draftCR Rel-17 38.331 17.4.0 F NR\_UE\_pow\_sav\_enh-Core, LTE\_NR\_DC\_enh2-Core

This RRC CR is the follow-up of [4], capturing that *measCyclePSCell* is made mandatory when SCG is deactivated:

<TEXT OMITTED>

 measCyclePSCell-r17 ENUMERATED {ms160, ms256, ms320, ms512, ms640, ms1024, ms1280, spare1}

 OPTIONAL, -- Cond SCG

<TEXT OMITTED>

|  |
| --- |
| ***MeasObjectNR* field descriptions** |
| <TEXT OMITTED> |
| ***measCyclePSCell***The parameter is used only when the PSCell is configured on the frequency indicated by the *measObjectNR* and the SCG is deactivated, see TS 38.133 [14]. The field may also be configured when the PSCell is not configured on that frequency. Value ms*160* corresponds to 160 ms, value *ms256* corresponds to 256 ms and so on. |
| <TEXT OMITTED> |

<TEXT OMITTED>

|  |  |
| --- | --- |
| **Conditional Presence** | **Explanation** |
| <TEXT OMITTED> |
| *SCG* | This field is optionally present, Need R, in the *measConfig* associated with the SCG. This field is mandatory present in the *measConfig* for the deactivated SCG when *bfd-and-RLM* is set. It is absent in the *measConfig* associated with the MCG.  |
| <TEXT OMITTED> |

[R2-2302541](file:///C%3A%5CUsers%5Cmtk65284%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CTSGR2_121bis-e%5CDocs%5CR2-2302541.zip) RRC correction on BFD/RLM relaxation OPPO CR Rel-17 38.331 17.4.0 3947 - F NR\_UE\_pow\_sav\_enh-Core

This CR captures explicitly the RAN2 agreement in RRC:

|  |
| --- |
| 5.7.13 RLM/BFD relaxationIn case both low mobility criterion and good serving cell criterion are configured for RLM/BFD relaxation, the UE is allowed to perform RLM and/or BFD relaxation according to requirements specified in TS 38.133 [14] when both relaxed measurement criterion for low mobility and relaxed measurement criterion for good serving cell quality are met.In case only the good serving cell quality criterion is configured for RLM/BFD relaxation, the UE is allowed to perform RLM and/or BFD relaxation according to requirements specified in TS 38.133 [14] when the relaxed measurement criterion for good serving cell quality is met.In case SCG is deactived and bfd-and-RLM is set to true, UE shall perform the RLM/BFD according to the requirements for SCG deactivation of *measCyclePSCell* as specified in TS 38.133 [14] no matter whether relaxed measurement criterion for good serving cell quality is configured for SCG. |

Companies are invited to provide their views on which option is most appropriate for capturing the UE behavior agreed in RAN2#121 when RLM and BFD relaxation are configured for the SCG and the SCG is deactivated (both options altogether is also a possibility):

- Option 1: Capture in RRC that *measCyclePSCell* is made mandatory when SCG is deactivated [5]

- Option 2: Capture explicitly the RAN2 agreement in RRC [6]

**Q1. Which of option 1 or 2 (or both) do you prefer?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option** | **Comment (incl. suggested CR adjustments)** |
| OPPO | Option 2 |  |
| Xiaomi | Both | Both CRs are acceptable.A question for option2:“no matter whether relaxed measurement criterion for good serving cell quality is configured for SCG.”Why only good serving cell criterion, not include low mobility criterion? |
| Ericsson | Both | The CRs address different issues:1. Requirement for NW to configure *measCyclePSCell* when SCG is deactivated
2. Clarification of the UE measurement requirements RLM/BFD measurements are configured and SCG is deactivated

@Xiaomi: the good cell criterion is always configured when relaxed RLM/BFD measurements are configured.  |
| Huawei, HiSilicon | Option 1 | Agree with the intention of the CR, but some updates are suggested due to:1. We don't want to mandate configuring measCyclePSCell for every SCG MO, only for the MO associated with the PSCell when the SCG is deactivated
2. There is no need to configure measCyclePSCell for the PSCell before the SCG is deactivated (the network can do it before or at the time of deactivation, up to network implementation)
3. A presence condition only applies when the parent field is included, otherwise it does not apply. So it is suggested to move the clarification from presence condition to field description

So we prefer a sentence like "the network always configures measCyclePSCell for the measObject associated with the PSCell if bfd-and-RLM is configured and the SCG is deactivated" in the field description. |
| Nokia | Option 2 |  |
| Samsung | Option 2 |  |
| Sharp | Both | Both of options make the spec clearer. |
| CATT | Both | We agree with Ericsson and others that both can be seen complementary and contribute to clarify the UE and network behaviours. |
| MediaTek | Option 1 | First, we agree these two CRs address different issue and could be discussed separately. We are fine to clarify the presenting condition of *measCyclePSCell* as this parameter is needed to define the UE requirement. We don’t see too much need to have the proposed text from [6]. The RLM/BFD requirement is already defined in RAN4 SPEC and UE shall RAN4 requirement. There is no need to repeat it in RAN2 SPEC. |
| vivo | Option 1 | We also think these two CRs address different issues, and they should be discussed separately.CR for option 1, which clarifies the configuration for *measCyclePSCell* when SCG deactivated while *bfd-and-RLM* is set, is essential. CR for option 2 clarifies the RLM/BFD requirements for SCG deactivation case. We assume this is already clear in RAN4 specification, otherwise, it is better to capture this in RAN4.  |
| NEC | Both | We see both are useful. For option 1, Huawei suggestion also looks good to us (but can follow majority) |
| Intel | Both | As mentioned by Ericsson, Option 1 is on updating the condition in the ASN.1 indicating the NW requirement while the Option 2 is on referencing the measurement requirement in RAN4 spec.  |
| LGE | Both | Option 2 is essential to define the UE behaviour. If the case that bfd-and-RLM is configured without measCyclePSCell for PSCell is not allowed, the NW requirement also should be captured.  |
| Qualcomm | Both |  |
| ZTE2 | Option 1  | We agree with the option 1 modified by following the Huawei’s suggestion.As for the option 2, we think the subclause is for the BFD/RLM relaxation which is an absolutely different mechanism with the configuration of the measCyclePSCell from RAN4 perspective. In RAN2 we can not mix them together. |
| Apple | Both | Same reason as Intel |

Summary:

16 companies provided inputs to this question with the following preferences:

Option 1: 4 companies

Option 2: 3 companies

Both: 9 companies

Majority of companies support Option 1 (ASN.1 fix), at least, while 4 companies think Option 2 CR overlaps with RAN4 specifications. On the other hand, the other companies think Option 2 CR defines the UE behavior, referencing the measurement requirement in RAN4 spec, hence is complementary to Option 1 CR. Rapporteur suggests following majority views.

Huawei agrees with the intention of the ASN.1 CR of Option 1, but suggests an alternate way of capturing it. Rapporteur suggests discussing it in the 2nd round of this email discussion.

**Proposal 1: Both CRs in R2-2302658 and R2-2302541 are pursued and exact wording is finalized in the 2nd round of this email discussion.**

# Relaxation state switch for other purpose but the relaxation criteria [7][8]

[R2-2303617](file:///C%3A%5CUsers%5Cmtk65284%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CTSGR2_121bis-e%5CDocs%5CR2-2303617.zip) RLM and BFD relaxation when SCG is deactivated Ericsson discussion Rel-17 NR\_UE\_pow\_sav\_enh-Core Late

This contribution aims at clarifying the UE behavior regarding the UAI RLM/BFD relaxation state report triggered by a state switch due to SCG deactivation, with the following observations:

**Observation 1**: When the SCG is deactivated and *bfd-and-RLM* is set true, the UE does not perform relaxed RLM/BFD measurements, even when the criterion is fulfilled.

**Observation 2**: When the RLM/BFD measurement state is relaxed and the SCG is deactivated the UE triggers UAI message to report that the RLM/BFD relaxation state is not relaxed.

From Rapporteur’s perspective, observation 1 is straightforward and directly derived from RAN4 LS and RAN2 agreement from RAN2#121. The main clarification in our view comes from observation 2 which we understand captures the following scenario: a UE is in RLM/BFD relaxation state on the (active) SCG and then the SCG is deactivated with *bfd-and-RLM* set to true. Per RAN4 LS and RAN2#121 agreement, the UE is no longer allowed to perform relaxed RLM/BFD measurements on the SCG, which triggers a UE’s RLM/BFD relaxation state switch from “relaxed” to “not relaxed”. And this triggers a UAI for updating the network of the state change.

**Q2. Do you agree with above observations 1 and 2?**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | **Obs 1 (Y/N)** | **Obs2 (Y/N)** | **Comment** |
| OPPO | Y | Y | Observation 2 has been discussed in RAN2#120.[R2-2211342](file:///C%3A%5CUsers%5Cjohan%5COneDrive%5CDokument%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CRAN2%5CDocs%5CR2-2211342.zip) RRC correction on BFD relaxation OPPO CR Rel-17 38.331 17.2.0 3585 - F NR\_UE\_pow\_sav\_enh-Core- CATT think this change has no consequence for the actual reporting. OPPO think this limits some reporting. - ZTE has same understanding as CATT. - vivo think there is an non-necessary report, but just one-shot, has been discussed before. - HW also think this is not needed. Apple also agree with CATT. * Not sufficient support, not pursued.
 |
| Xiaomi | Yes | Yes |  |
| Ericsson | Yes (proponent) | Yes (proponent) | If everybody says yes, then we were probably right that no clarification is needed. |
| Huawei, HiSilicon | Y | Y |  |
| Nokia | Yes | Yes |  |
| Samsung | Yes | Yes |  |
| Sharp | Yes | Yes |  |
| CATT | Yes | Yes |  |
| MediaTek | Not sure | No | We don’t know why NW want to configure RLM/BFD relaxation for deactivated SCG. Even if NW really want to have this kind of configuration, the UE will not follow this configuration to do RLM/BFD “relaxation” as indicate in O1. Then UE does NOT change the “relaxation state” of RLM/BFD, in this case, it won’t send UAI.  |
| vivo | Yes | Yes | We share the same understanding on these observations.  |
| NEC | Y | N | For observation 2, it is clear that the SCG is deactivated from network perspective in this situation and it is not considered relaxation state change, but rather relaxation is disabled (which is known by the network). Having said this, we can follow majority. |
| Intel | Yes | Yes |  |
| LGE | Yes | Yes | No clarification is needed. |
| Qualcomm | Yes | yes |  |
| ZTE2 | Yes | Yes |  |
| Apple | Yes | No | For observation 2, in our view the UAI is strictly not required. In the worst case UE will have to trigger a one time UAI to indicate the relaxation state change. But if majority companies agree for an Yes, we are fine. |

Summary:

16 companies provided inputs to this question with the following preferences:

Observation 1:

- Agree: 15

- Not sure: 1

No big surprise since, as mentioned above, this observation directly results from RAN4 LS and RAN2 agreement from RAN2#121.

MediaTek wonders why would network configure RLM/BFD relaxation for deactivated SCG. In Rapporteur’s understanding, this scenario is when the RLM/BFD relaxation was configured before the deactivation, but the network does not need to remove the configuration to the UEs so that the relaxation evaluation and activation in the UEs can resume when the SCG is activated again.

Observation 2:

Agree: 13 companies

Disagree: 3 companies

OPPO highlights that the issue was already discussed in RAN2#120 and that no agreement could be reached for preventing the UE to send UAI in this specific case. Considering a majority of companies agree and/or do not want to re-discuss the issue, Rapporteur suggests agreeing on observation 2 (see Q3 summary).

We understand another point of the contribution is to agree that observation 2 requires no specification change.

**Q3. If you agree with observation 2, do you also agree it requires no specification change?**

|  |  |  |
| --- | --- | --- |
| **Company** |  **Y/N** | **Comment** |
| OPPO | Y | This has been discussed in RAN2#120 and agreed not to pursue spec change.[R2-2211342](file:///C%3A%5CUsers%5Cjohan%5COneDrive%5CDokument%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CRAN2%5CDocs%5CR2-2211342.zip) RRC correction on BFD relaxation OPPO CR Rel-17 38.331 17.2.0 3585 - F NR\_UE\_pow\_sav\_enh-Core- CATT think this change has no consequence for the actual reporting. OPPO think this limits some reporting. - ZTE has same understanding as CATT. - vivo think there is an non-necessary report, but just one-shot, has been discussed before. - HW also think this is not needed. Apple also agree with CATT. * Not sufficient support, not pursued.
 |
| Xiaomi | Yes | No spec change. |
| Ericsson | Yes (proponent) |  |
| Huawei, HiSilicon | Y |  |
| Nokia | Yes |  |
| Samsung | Yes |  |
| Sharp | Yes |  |
| CATT | Yes |  |
| vivo | Yes |  |
| Intel | Yes |  |
| LGE  | Yes |  |
| Qualcomm | No | We understand that there is a prior discussion on the issue. But it is not a good requirement for UE, because network knows exactly what UE’s relaxation state is after UE’s SCG is deactivated. Hence there is no need for UE to send a status change report. |
| ZTE | Yes |  |
| Apple | No | Since the NW knows very well the UEs relaxation state after SCG is deactivated, is it still required for the UE to send a report ?  |

Summary:

14 companies provided inputs to this question with the following preferences:

Agree: 12 companies

Disagree: 2 companies

Majority of companies confirm the previous agreement that no specification change is needed regarding this UE behavior. Rapporteur suggest following majority views.

**Proposal 2: RAN2 confirms that when the RLM/BFD measurement state is relaxed, an SCG deactivation with *bfd-and-RLM* set to *true* triggers UAI message to report that the RLM/BFD relaxation state is not relaxed. No specification change is needed.**

[R2-2302800](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_121bis-e/Docs/R2-2302800.zip) Correction on RLM/BFD relaxation state reporting Nokia, Nokia Shanghai Bell CR Rel-17 38.331 17.4.0 3966 - F NR\_UE\_pow\_sav\_enh-Core

This CR observes that RAN4 specification TS38.133 disallows the UE to perform RLM/BFD relaxation while DRX timers are running (UE is in Active Time), and this result in the RLM/BFD relaxation state to toggle frequently. In such cases proponents suggest such state switches do not trigger a UAI report. The associated CR is as follows:

|  |
| --- |
| A UE capable of relaxing its RLM measurements of a cell group in RRC\_CONNECTED state shall initiate the procedure for providing an indication of its relaxation state for RLM measurements upon being configured to do so, and upon change of its relaxation state for RLM measurements in RRC\_CONNECTED state. The UE shall not initiate the procedure for providing an indication of its relaxation state for RLM measurements due to DRX state change according to TS 38.133 [14].A UE capable of relaxing its BFD measurements in serving cells of a cell group in RRC\_CONNECTED shall initiate the procedure for providing an indication of its relaxation state for BFD measurements upon being configured to do so, and upon change of its relaxation state for BFD measurements in RRC\_CONNECTED state. The UE shall not initiate the procedure for providing an indication of its relaxation state for BFD measurements due to DRX state change according to TS 38.133 [14]. |

**Q4. Do you agree with the intention of the CR?**

|  |  |  |
| --- | --- | --- |
| **Company** |  **Y/N** | **Comment (incl. CR suggested adjustments)** |
| OPPO | Y |  |
| Xiaomi | No  | RAN4 only says for such case, UE is not allowed to perform RLM/BFD relaxation:The UE is no longer allowed to relax RLM measurements and apply the relaxed radio link monitoring provided that at least one of the following conditions is met: - The UE sends out-of sync indications to the higher layers,- The timer T310 is running.- No DRX is used or DRX cycle is longer than 80msDRX state change will not always mean relaxation state change.For example:when from none-DRX to DRX (timer running out), UE still need to perform the RLM/BFD evaluation. Only if the criteria is fulfilled, UE will perform relaxation.when from DRX to none-DRX (timer running), relaxation state change only changes for a UE who is already in relaxation state.It does not mean RLM/BFD relaxation state can toggle multiple times due to DRX state change. @NokiaThe CR seems like a signalling optimization. And we also think the prohibit timer can work.  |
| Ericsson | No | Thanks to Nokia for pointing out this issue. But the NW always configures a prohibit timer, to prevent reporting of too frequent state changes:RLM-RelaxationReportingConfig-r17 ::= SEQUENCE { rlm-RelaxtionReportingProhibitTimer ENUMERATED {s0, s0dot5, s1, s2, s5, s10, s20, s30, s60, s90, s120, s300, s600, infinity, spare2, spare1}BFD-RelaxationReportingConfig-r17 ::= SEQUENCE { bfd-RelaxtionReportingProhibitTimer ENUMERATED {s0, s0dot5, s1, s2, s5, s10, s20, s30, s60, s90, s120, s300, s600, infinity, spare2, spare1}We think that the prohibit timer can and should be used for that.@Nokia:* Thanks for the feedback
* It seems there is a fundamental problem e.g. when the UE is outside Active Time and the relaxation criterion is met, then the UE will send a “relaxed” report, but that will trigger the UE to start the *drx-InactivityTimer*, which causes the UE to enter “not relaxed” immediately, i.e. invalidate the report that is just sent, and causing the UE to sent an update when the prohibit timers expires, etc…
* If the above is a correct understanding, then it is perhaps better and clearer to specify that the UE sends the report when the criterion is fulfilled or not fulfilled (similar as with RRM relaxation):

***rrm-MeasRelaxationFulfilment***Indicates whether the UE fulfils the relaxed measurement criterion for stationary UE in 5.7.4.4.***bfd-MeasRelaxationState***Indicates whether the UE fulfils the relaxed measurement criterion for BFD measurements in 5.7.13.***rlm-MeasRelaxationState***Indicates whether the UE fulfils the relaxed measurement criterion for RLM measurements in 5.7.13.Perhaps the Nokia or other wording is also fine. But we thought that “DRX state change” was not clear.  |
| Huawei, HiSilicon | No | We understand the “no DRX” in RAN4 is about “no DRX is configured”, but not the DRX state change, so the RLM/BFD relaxation state won’t change frequently. |
| Nokia | Yes (proponent) | Thanks to Ericsson for the comments about using prohibit timer. Unfortunately, it seems that prohibit timer does not work in this case, because RLM/BFD relaxation state can toggle multiple times due to DRX state change when prohibit timer is running. When prohibit timer expires RLM/BFD relaxation state report can be then triggered due to DRX state change which is not the intention. NW would not know if the report is due to DRX state change or actually based on relaxing condition(s).Thanks to Huawei for the comments on “no DRX” in RAN4 specifications. According to RAN4 specification definition for “no DRX” is that DRX timers are running. This is specified in TS 38.133 clause 3.6.1 as explained in the cover sheet. This is causing RLM/BFD relaxation state to change frequently. |
| Samsung | See comments | Agree that UAI can be triggered due to DRX state changes. However, prohibit timer can minimise the reports. |
| Sharp | No | Prohibit timer can be used to avoid frequent status report.  |
| CATT | No | We understand Nokia’s intention to somehow “mask” the state change reports which are unrelated to the relaxation criteria, but this might increase the complexity of this feature. For example, a UE that was forced to switch to “no-relaxation” state due to DRX Active Time, may come back to relaxation state right after the DRX Active Time ends. In such case, the trigger is due to the relaxation criteria (still met) but also indirectly to DRX state change. So the CR is unclear and ambiguous about that. So considering the prohibit timer is targeted for avoiding the frequent reports, we prefer to stick to this tool for the UAI, as for other UAIs. |
| MediaTek | No | Same view as Huawei. “No DRX” implies no DRX configuration in this context (e.g. 38.133 8.1.1.1). Changing relaxation state due to *drx-InactivityTimer* is never the intention. We don’t really think 38.133 clause 3.6.1 intend to define the terminology “No DRX”. RAN4 SPEC may need some clarification.  |
| vivo | No | Same view as Huawei and MediaTek.Besides, we think the prohibit timer could solve the issue on frequent UAI report for RLM/BFD relaxation already.  |
| NEC | Y, and comments | Firstly, thanks for clarification on the meaning of “no DRX” in RAN4 spec TS 38.133. This is useful clarification (to us).Given the observation looks correct and the original intention was not about DRX state changes but e.g. cell quality, it seems good to make this restriction. Otherwise, we want to capture this in the Chair notes like “RAN2 understands the DRX state change results in the relaxation state change, while the prohibit timer can save frequent reporting of relaxation state change due to DRX state change.”  |
| Intel | No | Agree with the others that prohibit timer can be used to mask such frequent change. |
| LGE | No | NW doesn’t need to know whether the status reporting is triggered due to DRX state change or relaxing condition. No reason to preclude the status report from being triggered by DRX state change if the prohibit timer is not running.  |
| Qualcomm | Yes | We support the CR. |
| ZTE | No | Same view with HW and MTK |
| Apple | No | As other companies have indicated, we feel the role of prohibit timer is specifically meant for such purpose. |

Summary:

16 companies provided inputs to this question with the following preferences:

Agree: 4 companies

Disagree: 11 companies

Four companies have a different understanding on what “no DRX” means in the RAN4 specification and think it is only related to the configuration of DRX. Hence they think there is no issue.

One company (Samsung) does not take position although comments, as other companies, that prohibit timer can minimise the reports.

Regarding the CR itself, both CATT and Ericsson find the proposed CR (“DRX state change”) unclear and ambiguous. Therefore Rapporteur suggests following majority:

**Proposal 3: The CR in R2-2302800 is not pursued.**

As part of the comments, Ericsson raises the following scenario as being potentially problematic:

* the UE is outside Active Time and the relaxation criterion is met, then the UE will send a “relaxed” report, but that will trigger the UE to start the *drx-InactivityTimer*, which causes the UE to enter “not relaxed” immediately, i.e. invalidate the report that is just sent, and causing the UE to sent an update when the prohibit timers expires, etc…

Thus, they propose to align the UAI report trigger of RLM/BFD relaxation with the RRM report trigger from RedCap WI, which is based on fulfilment of the relaxation condition rather than on the state change itself:

***rrm-MeasRelaxationFulfilment***

Indicates whether the UE fulfils the relaxed measurement criterion for stationary UE in 5.7.4.4.

***bfd-MeasRelaxationState***

Indicates whether the UE fulfils the relaxed measurement criterion for BFD measurements in 5.7.13.

***rlm-MeasRelaxationState***

Indicates whether the UE fulfils the relaxed measurement criterion for RLM measurements in 5.7.13.

Regarding the above proposal, Rapporteur note that UE relaxation of RRM measurements in Connected State (RedCap) is controlled (activated/deactivated) by the network based on UE UAI reports of its fulfilment status of the relaxation criteria, which is the primary reason why UE reports such fulfilments. Differently, UE relaxation of RLM/BFD measurements in Connected State (ePowSav) is controlled (activated/deactivated) by the UE itself based on the fulfilment status of the relaxation criteria. And in such case, both RAN2 and RAN4 specifications capture that the UE is *allowed* to relax, which is left to UE implementation. Therefore, it is Rapporteur’s understanding that from network perspective, what matters most is to know when the UE actually changes its relaxation state.

Finally, the agreement that UE reports its relaxation state comes from the very early stages of this feature, i.e. RAN#95, RP-220894 “[95e-34-R17-PowerSaving-WA] Report after two rounds”. It should be noted that during this offline, Huawei and Ericsson already proposed that the fulfilment status of the relaxation criteria is used as UAI trigger, same as RedCap, without success.

That being said, in order to be exhaustive, Rapporteur suggests discussing the Ericsson’s proposal in the 2nd round of this email discussion.

**Proposal 4: Discuss in the 2nd round whether the UAI report trigger of RLM/BFD relaxation should be changed to be based on the fulfilment of the relaxation condition rather than on the relaxation state change.**

# ePowSav + RedCap [9][11]

Both CRs [9] and 3rd change of [11] address the same issue.

[R2-2303467](file:///C%3A%5CUsers%5Cmtk65284%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CTSGR2_121bis-e%5CDocs%5CR2-2303467.zip) Clarification on SubgroupID for UE\_ID based subgrouping in RRC\_INACTIVE state Huawei, HiSilicon CR Rel-17 38.304 17.4.0 0332 - F NR\_UE\_pow\_sav\_enh-Core

[R2-2303616](file:///C%3A%5CUsers%5Cmtk65284%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CTSGR2_121bis-e%5CDocs%5CR2-2303616.zip) Corrections for eDRX in RRC\_INACTIVE Ericsson CR Rel-17 38.304 17.4.0 0334 - F NR\_UE\_pow\_sav\_enh-Core, NR\_redcap-Core Late

The CRs are an update of [10] which discussed similar issue without conclusion in RAN2#121 [2]:

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| R2-2300792 Clarification on the DRX cycle for the misalignment issue in RRC\_INACTIVE state Huawei, HiSilicon CR Rel-17 38.304 17.3.0 0320 - F NR\_UE\_pow\_sav\_enh-Core, NR\_redcap-CoreDISCUSSION- QC agress with the issue but poit out to be careful about the difference between Operating in eDRX and configured for eDRX. - Ericsson are not sure of the issue.- Apple think we need to resolve the other issues on operating in vs configured for first. Think this is not urgent- vivo think that the note is correct, and we need this correction. The other part is related to other discussions.- Chair: can give companies more time * Postponed
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They address the issue that RRC\_INACTIVE eDRX UEs need to monitor paging outside the CN PTW, and when using the DRX cycle of RRC\_IDLE state to calculate the corresponding UE\_ID based subgroup ID, it is not clear what DRX cycle T should be. The CRs [9] and 3rd change of [11] have slightly different wording as follows:

R2-2303467 CR [9]:

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| If the UE is not configured with a CN assigned subgroup ID, or if the UE configured with a CN assigned subgroup ID is in a cell supporting only UE\_ID based subgrouping, the subgroup ID of the UE is determined by the formula below:SubgroupID = (floor(UE\_ID/(N\*Ns)) mod subgroupsNumForUEID) + (subgroupsNumPerPO - subgroupsNumForUEID),where:N: number of total paging frames in T, which is the DRX cycle of RRC\_IDLE state as specified in clause 7.1. For RRC\_INACTIVE UEs operating in eDRX configured by upper layers which is longer than 1024 radio frames, the T used outside CN configured PTW is the same as the T specified during the CN configured PTW |

R2-2303616 CR [11]:

|  |
| --- |
| If the UE is not configured with a CN assigned subgroup ID, or if the UE configured with a CN assigned subgroup ID is in a cell supporting only UE\_ID based subgrouping, the subgroup ID of the UE is determined by the formula below:SubgroupID = (floor(UE\_ID/(N\*Ns)) mod subgroupsNumForUEID) + (subgroupsNumPerPO - subgroupsNumForUEID),where:N: number of total paging frames in T, which is the DRX cycle of RRC\_IDLE state as specified in clause 7.1. In RRC\_INACTIVE state with CN configured PTW the SubgroupID used outside CN PTW is the same as the SubgroupID used inside CN PTW. |

**Q5a. Do you agree with the intention of the CRs?**

|  |  |  |
| --- | --- | --- |
| **Company** |  **Y/N** | **Comment** |
| OPPO | Y |  |
| Xiaomi | No | In RRC\_INACTIVE state with CN configured PTW, during CN configured PTW, T is determined by the shortest of the UE specific DRX value (s), if configured by RRC and/or upper layers, and a default DRX value broadcast in system information. Outside the CN configured PTW, T is determined by the UE specific DRX value configured by RRC.Since the T (within PTW or outside of PTW) would be different from the T in idle mode. So we use the T from idle mode for calculation the UE\_ID based subgroupID. That do not need to differentiate within PTW or outside PTW. And we also do not need to differentiate none eDRX case and eDRX case.I think that also applies to R18 eRedcap when a RAN PTW is introduced.So the original text is OK.@Huawei, @Ericsson, the original text is N: number of total paging frames in T, which is the DRX cycle of RRC\_IDLE state as specified in clause 7.1. There is only one T defined even it is used for monitoring within PTW.In RRC\_IDLE state, if eDRX is configured by upper layers, i.e., TeDRX, CN, according to clause 7.4:- If TeDRX, CN is no longer than 1024 radio frames:- T = TeDRX, CN;- else:- During CN configured PTW, T is determined by the shortest of UE specific DRX value, if configured by upper layers, and the default DRX value broadcast in system information.Seems no ambiguity. |
| Ericsson | Yes (proponent) |  |
| Huawei, HiSilicon | Yes (proponent) | @xiaomi, I agree “**In RRC\_INACTIVE state**”, there is T during CN PTW and outside CN PTW, but in current spec, it says “…which is the DRX cycle **of RRC\_IDLE state** as specified in clause 7.1”. T outside CN PTW **of RRC\_IDLE state** is undefined, that’s why the correction is needed. |
| Samsung | Y |  |
| Sharp | Y |  |
| CATT | Y |  |
| MediaTek | Yes |  |
| ZTE | Y |  |
| vivo | Yes |  |
| NEC | Y | Although there seems to be no other choice technically from UE perspective, it is good to clearly capture this in the spec. |
| Intel | Yes |  |
| LGE  | Yes |  |
| Qualcomm | yes |  |
| Apple | Yes |  |

**Q5b. If you answered yes to Q5a, which CR do you prefer (3467/3616)?**

|  |  |  |
| --- | --- | --- |
| **Company** |  **3467/3616** | **Comment (incl. suggested adjustments)** |
| OPPO | 3616 | Slightly preferred. |
| Ericsson | 3616 (proponent) | Obviously, but we also think it is better to avoid talking about the “T used” and say “T used outside CN configured PTW is the same as the T specified during the CN configured PTW”. Because the UE does not use the same T outside and inside PTW, i.e. the UE uses the same SubgroupID outside and inside PTW. |
| Huawei, HiSilicon | 3467(proponent) | The reason for explain which T to use, is that in previous sentence, it says “N: number of total paging frames in T, which is…”, so we explain what “T” is, then N is derived from T. |
| Samsung | 3616 |  |
| Sharp | 3616 | But the change words could be in a separate paragraph instead of following the description of “N”. |
| CATT | 3616 | And agree with Sharp, as the new text is no longer related to the description of “N”, but is an independent statement.  |
| MediaTek | 3467 | 3616 has additional changes that are incorrect. The wording needs to be updated since ‘DRX cycle of RRC\_IDLE state’ is not specified in section 7.1. To have an unambiguous value of T used for subgroup ID determination, regardless of UE state or whether the UE is inside or outside the PTW, we propose:‘T as specified in section 7.1 for the UE in RRC\_IDLE state. If eDRX longer than 1024 radio frames is configured by upper layers, T is the value specified within the CN configured PTW, and the same value is used outside the CN configured PTW.’ |
| ZTE | 3616 |  |
| vivo | 3616 | But we think it is better to capture the wording in a new paragraph, not in the definition of N. |
| NEC | 3467 | Slightly prefer 3467, which is more aligned with what this part is explaining.  |
| Intel | 3616 | Since it is on the determination of the subgroup ID, we have a slight preference to go with 3616. Agree with Sharp on a separate sentence. |
| LGE | 3616 |  |
| Qualcomm | 3616 |  |
| Apple | 3616 |  |

Summary:

14 companies provided inputs to the above questions where all companies but one agreed with the intention of the CRs, and the following preferences were given among the two CRs:

3616: 11 companies

3467: 3 companies

Moreover, 4 companies supporting 3616 suggest moving the new text to a new paragraph since it is no longer related to the description of “N”, but is an independent statement. Rapporteur suggests following the majority views.

**Proposal 5: Agree the change in Section 7.3.2 in R2-2303616 with following change: move the new text outside the description of N, to a new paragraph.**

# DCCA documents

# MN handover when SCG is deactivated [11][12][13]

[R2-2302553](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_121bis-e/Docs/R2-2302553.zip) Discussion on MN Handover While the SCG is Deactivated CATT discussion Rel-17 LTE\_NR\_DC\_enh2-Core R2-2300859

[R2-2303662](file:///C%3A%5C%5CUsers%5C%5Cmtk65284%5C%5CDocuments%5C%5C3GPP%5C%5Ctsg_ran%5C%5CWG2_RL2%5C%5CTSGR2_121bis-e%5C%5CDocs%5C%5CR2-2303662.zip%22%20%5Co%20%22C%3AUsersmtk65284Documents3GPPtsg_ranWG2_RL2TSGR2_121bis-eDocsR2-2303662.zip) MN Handover with deactivated SCG Ericsson discussion

These two contributions intend to discuss on whether to support the MN handover without SCG reconfiguration with sync for (NG)EN-DC case while SCG is deactivated. This is an leftover issue which was originaly proposed in offline discussion [AT120][202][DCCA], and also discussed in RAN2#121, but it is postponed.

|  |  |  |
| --- | --- | --- |
| Huawei, HiSilicon | Change 1: prefer noChange 2: prefer no | Change 1: The text from 38.331 saying " the network always includes this field upon MN handover to initiate an NR SCG reconfiguration with sync and key change." is because reconfiguration with sync is needed to flush SCG RLC bearers and change the SN key if configured.However:- when the SCG is deactivated, there is nothing to flush in SCG RLC bearers- there may not be any SN terminated bearer, i.e. no SN keyTherefore, we wonder whether the text from 38.331 is accurate for the case where the SCG was deactivated when the MN handover is received and remains deactivated.Change 2: It would give the impression that the UE continues RLF and BFD if the SCG is not deactivated, which is not the case. |

According to the contributions [11][13], supporting the MN handover without SCG reconfiguration with sync for (NG)EN-DC while SCG is deactivated is a small optimization, with limited benefits. And introducing such optimization at this stage will cause some NBC issue, i.e., for a legacy UE not supporting the optimization, and the NW supporting it, the legacy UE will consider the received handover command is invalid, and lead to handover failure. Further, the contribution [11] also points out that some additional spec impact in the 36.331 and 38.331. i.e., to change the presence condition of *reconfigWithSync* in *nr-SecondaryCellGroupConfig* upon MN handover in (NG) EN-DC from mandatory present to be optionally present for SCG deactivation case.

From rapporteur’s perspective, supporting the MN handover without SCG reconfiguration with sync for (NG)EN-DC while SCG is deactivated at this stage will lead to NBC issues, and this is just small optimization. So to be safer and minimize the spec impacts, it is proposed to keep the legacy principle “The field *nr-SecondaryCellGroupConfig* is mandatory present in case of MN handover in (NG)EN-DC regardless whether the SCG is deactivated”.

**Q6. Do you agree that “the reconfiguration with sync for SCG will always be configured upon MN handover occurs in (NG) EN-DC, regardless whether SCG is deactivated or not.”?**

|  |  |  |
| --- | --- | --- |
| **Company** |  **Y/N** | **Comment**  |
| Huawei, HiSilicon | Y |  |
| Nokia, Nokia Shanghai Bell | N | This reverts the original WI intent that SCG can be deactivated in HO, since doing RACH would also activate the SCG. Therefore we would rather fix the condition accordingly and not require UE to perform RACH towards deactivated PSCell at HO.**[CATT]**: I guess this does not go against any previous agreements. Because according to the agreement (RAN2#116e) and the latest spec, in case the SCG state is configured as deactivated in HO, UE shall not perform RACH, even the reconfiguration with sync for SCG is configured within MN handover command.* **3: At PSCell addition/change/HO/RRC resume, in case the SCG state is configured as deactivated, the UE does not perform random access. If the network wants the UE to perform random access, it can indicate the SCG as activated and deactivate it after the random access by RRC or MAC CE if supported.**

---------------------------Extracted from TS38.331 clause 5.3.5.3---------------3> if the *scg-State* is not included in the E-UTRA message (*RRCConnectionReconfiguration* or *RRCConnectionResume*) containing the *RRCReconfiguration* message:4> perform SCG activation as specified in 5.3.5.13a;4> if *reconfigurationWithSync* was included in *spCellConfig* of an SCG:5> initiate the Random Access procedure on the PSCell, as specified in TS 38.321 [3];4> else if the SCG was deactivated before the reception of the E-UTRA RRC message containing the *RRCReconfiguration* message:5> if *bfd-and-RLM* was not configured to *true* before the reception of the E-UTRA *RRCConnectionReconfiguration* or *RRCConnectionResume* message containing the *RRCReconfiguration* message or if lower layers indicate that a Random Access procedure is needed for SCG activation:6> initiate the Random Access procedure on the SpCell, as specified in TS 38.321 [3];5> else the procedure ends;4> else the procedure ends;3> else:4> perform SCG deactivation as specified in 5.3.5.13b;4> the procedure ends;---------------------------------------------------------------------------------------------- |
| CATT (proponent) | Yes | We do not see any problem for reusing the legacy rule, i.e., the reconfiguration with sync for SCG will always be configured upon MN handover occurs in (NG) EN-DC. Instead, supporting the MN handover without SCG reconfiguration with sync for (NG)EN-DC while SCG is deactivated at this stage will lead to non-backward compatible issue.  |
| MediaTek | Yes | Prefer to keep this principle for simplicity. |
| ZTE | Yes | Same view as CATT, regarding the comment from Nokia, it does not revert the original intention. Based on the text procedure in TS 38.331, if scg-State is included (SCG deactivation), the UE will not check the *reconfigurationWithSync* configuration, the UE will directly preform SCG deactivation. See the ‘else’ branch. 3> if the *scg-State* is not included in the *RRCConnectionReconfiguration*:4> if *reconfigurationWithSync* was included in *spCellConfig* of an SCG:5> initiate the Random Access procedure on the SpCell, as specified in TS 38.321 [3];4> else the procedure ends;3> else:4> perform SCG deactivation as specified in 5.3.5.13b;4> the procedure ends; |
| vivo | Yes |  |
| NEC | Y | Although we understand the concern from Nokia, this case unfortunately is not aligned with the other principle.. We prefer to make it consistent for (NG)EN-DC. |
| Intel | Yes | Share the same view with moderator. |
| LGE  | Yes |  |
| Samsung | Y |  |
| Qualcomm | Y | This seems to be a simpler way to fix the issue.To address Nokia’s concern, after the UE performs RACH on the SN upon MN handover in (NG)EN-DC, if the network wants to, it can send an RRC reconfiguration message to the UE to deactivate the SCG. |
| Apple | Yes |  Yes, we prefer the easier way of fixing this with the current proposed change. We agree to the CR. |

Summary:

12 companies provided inputs to this question with the following preferences:

- Agree: 11 companies

- Disagree: 1 company

There is a clear majority to support “the reconfiguration with sync for SCG will always be configured upon MN handover occurs in (NG) EN-DC, regardless whether SCG is deactivated or not”. And as for the concern proposed by the opponent, the rapporteur thinks this is not a real issue, since if the SCG state is configured as deactivated in HO, UE shall not perform RACH, even the reconfiguration with sync for SCG is configured within MN handover command. So it is suggested to follow the majority views.

**Proposal 6: RAN2 agrees that the reconfiguration with sync for SCG will always be configured upon MN handover occurs in (NG) EN-DC, regardless whether SCG is deactivated or not.**

If answer to Q6 is yes, 36.331 specifications should be updated based on the input of the contributions [11][13]. And the corresponding CR is proposed in [12] with the following change.

[R2-2302554](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_121bis-e/Docs/R2-2302554.zip) Correction on scg-State in RRCConnectionReconfiguration including the mobilityControlInfo CATT CR Rel-17 36.331 17.4.0 4920 - F LTE\_NR\_DC\_enh2-Core

|  |
| --- |
| 5.3.5.4 Reception of an *RRCConnectionReconfiguration* including the *mobilityControlInfo* by the UE (handover)If the *RRCConnectionReconfiguration* message includes the *mobilityControlInfo* and theUE is able to comply with the configuration included in this message, the UE shall:1> if the *RRCConnectionReconfiguration* is applied due to a conditional reconfiguration execution upon cell selection performed while timer T311 was running, as defined in 5.3.7.3:2> remove all the entries within *VarConditionalReconfiguration*, if any; |

**Q7. Do you agree with the above change from the CR R2-2302554?**

|  |  |  |
| --- | --- | --- |
| **Company** |  **Y/N** | **Comment**  |
| Huawei, HiSilicon | Y |  |
| Nokia, Nokia Shanghai Bell | N | As the CR shows, this is removing a functionality, which is against the earlier agreements.  |
| CATT | Y |  |
| MediaTek | N | If NW follow the restriction to always trigger the reconfiguration with sync, there is no issue to keep current text. It is just some useless procedure text. The procedure text could be kept for future proof. |
| ZTE | Y |  |
| vivo | Y |  |
| Intel | Y | The scg-state function is still specified in non-handover case. |
| LGE | Y |  |
| Samsung | Y |  |
| Qualcomm | Y |  |
| Apple | Y | Agree to the CR |
|  |  |  |

Summary:

11 companies provided inputs to this question with the following preferences:

- Agree: 9 companies

- Disagree: 2 companies

Majority of companies agree the change from the CR R2-2302554, i.e., remove description about *scg-state* under the condition of “if the *RRCConnectionReconfiguration* does not include the *nr-SecondaryCellGroupConfig*” in the section of 5.3.5.4 in 36.331 spec. And also based on P6, it is straightforward to remove the description from the spec. So, rapporteur suggests following the majority views.

**Proposal 7: Agree the change from the CR R2-2302554:** **remove description about *scg-stat*e under the condition of “if the *RRCConnectionReconfiguration* does not include the *nr-SecondaryCellGroupConfig*” in the section of 5.3.5.4 in 36.331 spec.**

# Conclusion

The outcome of the first round of this email discussion can be summarized with the below proposals:

ePowSav

**Proposal 1: Both CRs in R2-2302658 and R2-2302541 are pursued and exact wording is finalized in the 2nd round of this email discussion.**

**Proposal 2: RAN2 confirms that when the RLM/BFD measurement state is relaxed, an SCG deactivation with *bfd-and-RLM* set to *true* triggers UAI message to report that the RLM/BFD relaxation state is not relaxed. No specification change is needed.**

**Proposal 3: The CR in R2-2302800 is not pursued.**

**Proposal 4: Discuss in the 2nd round whether the UAI report trigger of RLM/BFD relaxation should be changed to be based on the fulfilment of the relaxation condition rather than on the relaxation state change.**

**Proposal 5: Agree the change in Section 7.3.2in R2-2303616 with following change: move the new text outside the description of N, to a new paragraph.**

DCCA

**Proposal 6: RAN2 agrees that the reconfiguration with sync for SCG will always be configured upon MN handover occurs in (NG) EN-DC, regardless whether SCG is deactivated or not.**

**Proposal 7: Agree the change from the CR R2-2302554:** **remove description about *scg-stat*e under the condition of “if the *RRCConnectionReconfiguration* does not include the *nr-SecondaryCellGroupConfig*” in the section of 5.3.5.4 in 36.331 spec.**

# References

1. R2-2300055 Reply LS to RAN2 on RLM/BFD relaxation for ePowSav, RAN4
2. R2-2301401 RAN2#121 Meeting Report, MCC
3. R2-2301201 RLM and BFD relaxation when SCG is deactivated, Ericsson
4. R2-2302294 Correction on RLM/BFD relaxation for SCG deactivation; vivo, Ericsson
5. R2-2302658 Correction on measCyclePSCell used during SCG deactivation vivo, Ericsson, Guangdong Genius
6. R2-2302541 RRC correction on BFD/RLM relaxation OPPO
7. R2-2303617 RLM and BFD relaxation when SCG is deactivated Ericsson
8. R2-2302800 Correction on RLM/BFD relaxation state reporting Nokia, Nokia Shanghai Bell
9. R2-2303467 Clarification on SubgroupID for UE\_ID based subgrouping in RRC\_INACTIVE state; Huawei, HiSilicon
10. R2-2300792 Clarification on the DRX cycle for the misalignment issue in RRC\_INACTIVE state Huawei, HiSilicon
11. R2-2303616 Corrections for eDRX in RRC\_INACTIVE Ericsson
12. R2-2302553 Discussion on MN Handover While the SCG is Deactivated CATT discussion Rel-17 LTE\_NR\_DC\_enh2-Core R2-2300859
13. R2-2302554 Correction on scg-State in RRCConnectionReconfiguration including the mobilityControlInfo CATT CR Rel-17 36.331 17.4.0 4920 - F LTE\_NR\_DC\_enh2-Core
14. R2-2303662 MN Handover with deactivated SCG Ericsson discussion