**3GPP T****SG-RAN WG2 Meeting #119-electronic R2-220xxxx**

**Online, August 17th - August 29th, 2022**

**Agenda item: 5.1.3.1.2**

**Source: vivo**

**Title: Report of [AT119-e][010][NR1516] RRC Other**

**Document for: Discussion and Decision**

# 1 Introduction

This contribution is aimed at reporting the discussion and results of the following offline discussion:

* [AT119-e][010][NR1516] RRC Other (vivo)

Scope: Treat R2-2207547, R2-2207548, R2-2207549, R2-2208265, R2-2207611, R2-2207612, R2-2208337, R2-2208338, R2-2207257, R2-2207615, R2-2207616, R2-2207617, R2-2207618, R2-2207560, R2-2207568, R2-2207574, R2-2208346, R2-2208347, R2-2208348. Determine agreeable parts, For agreeable parts, agree CRs.

Intended outcome: Report, Agreed CRs, LS out if applicable

Deadline: Schedule 1

The discussion scope is to gather companies’ views on the contributions [1]-[19].

# 2 Participants

To facilitate this offline discussion amongst the delegates, would you please fill in your name and the email address in the table below.

|  |  |
| --- | --- |
| Delegate name | E-mail address |
| Yitao Mo (Stephen) | yitao.mo@vivo.com |
| Nokia | amaanat.ali@nokia.com |
| NEC | hisashi.futaki @ nec.com |
| Apple | Zhibin\_wu@apple.com |
| Intel | [Sudeep.k.palat@intel.com](mailto:Sudeep.k.palat@intel.com)  Candy.yiu@intel.com |
| MediaTek | chun-fan.tsai@mediatek.com |
| Huawei, HiSilicon | zhenglili4@huawei.com |
| Ericsson | [antonino.orsino@ericsson.com](mailto:antonino.orsino@ericsson.com), [Ritesh.shreevastav@ericsson.com](mailto:Ritesh.shreevastav@ericsson.com)  ali.parichehreh@ericsson.com |
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# 3 Phase-1 Discussion

## 3.1 Correction on SIB1 repetition transmission period

In the RRC spec, it is stated that SIB1 repetition transmission period is 20 ms for SSB and CORESET multiplexing pattern 1. In the contributions [1]-[3], it is pointed out that the current RRC statement is not correct. This is because there is an achieved agreement that the UE assumes that the RMSI CORESET monitoring window corresponding to an SS/PBCH block in the radio frame satisfies the condition mod(SFN,2)=0. In other words, 20ms is just the minimum repetition period for SIB1 for CORESET multiplexing pattern 1. Other larger values (e.g. 40ms) are also feasible for this case. To get rid of the potential misunderstanding, the following text proposal is submitted in [1]-[3],

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| 5.2 System information5.2.1 Introduction - the *SIB1* is transmitted on the DL-SCH with a periodicity of 160 ms and variable transmission repetition periodicity within 160 ms as specified in TS 38.213 [13], clause 13. The default transmission repetition periodicity of *SIB1* is 20 ms but the actual transmission repetition periodicity is up to network implementation. For SSB and CORESET multiplexing pattern 1, *SIB1* minimum repetition transmission period is 20 ms. For SSB and CORESET multiplexing pattern 2/3, *SIB1* transmission repetition period is the same as the SSB period (TS 38.213 [13], clause 13). *SIB1* includes information regarding the availability and scheduling (e.g. mapping of SIBs to SI message, periodicity, SI-window size) of other SIBs with an indication whether one or more SIBs are only provided on-demand and, in that case, the configuration needed by the UE to perform the SI request. *SIB1* is cell-specific SIB; |

**Q1: Do companies agree with the intention of CR R2-2207547?**

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| **Company** | **Yes/No/Comments** | **Detailed comments** |
| OPPO | Not sure | Whether LS to RAN1 is needed? |
| Nokia | Yes | As proponent we think the RRC spec should be updated to not create a wrong understanding that only 20 msec SIB1 repetition transmission period is allowed. |
| NEC | Comments | It seems better to ask clarification for RAN1. |
| Apple | See comments | Need RAN1 to clarify first whether there is something wrong |
| Intel | May be | We would agree with the intention but confirmation from RAN1 could be useful |
| CATT | - | It is better to confirm with RAN1. |
| MediaTek | No | SIB1 periodicity is fundamental behavior from Rel-15 design. Changing 20ms definition is big NBC to all legacy UE. It is **NOT acceptable** to us.  We wonder is there any real issue to use 20ms periodicity? Or the intention is just to have more NW configuration flexibility. It does not look like a correction to us. |
| Huawei, HiSilicon | No | The change is not backward compatible. The previous description in that sentence is mainly from UE perspective and the UE would always monitor per 20 ms, therefore to make it as at least 20ms would be NBC for the UE. From the network perspective, the periodicity flexibility is already reflected in the sentence before this change “The default transmission repetition periodicity of *SIB1* is 20 ms but the actual transmission repetition periodicity is up to network implementation.” |
| Ericsson | - | We are fine to consult with RAN1 |
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## 3.2 Discussion on SI-request Period issues

In the contribution [4], two technical issues regarding RA resources configuration for Msg1-based SI request are raised. The first question is the exact starting point of SI-request period is not clear as the parameter *si-RequestPeriod* only indicates the value of SI-request period (i.e. time offset of SI-request period is unknown). To this end, it was proposed that the SI-request period is started from frame 0, considering that the associate period is started from frame 0 as well.

**Q2: Do companies agree that SI-request period is started from frame 0?**

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| **Company** | **Yes/No/Comments** | **Detailed comments** |
| OPPO | No | We think it’s clear that the RA resource association period is started from frame 0, and given that the SI request period is the integer times of the RA resource association period, it’s understood the starting frame is clear. |
| Nokia | No | We are not sure that it is possible that reference point is something else than 0. So to us the change does not seem to be necessary. |
| NEC | No | similar understanding as OPPO. |
| Apple | No strong view |  |
| Intel | No | Agree with Oppo |
| CATT | No | We do not think it needs clarification. Since the RA resource is calculated base on SFN index, the SI-request period based on RA occasion should only be calculated start from frame 0. |
| MediaTek |  | We understand it is started from frame 0 but no sotrng view on whether to clarify this. |
| Huawei, HiSilicon | Yes |  |
| Ericsson | No | We think existing text is clear; the NW and the UE should be aligned about the RA resources for different SI messages |
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The second question is related to 1024 SFN boundary-crossing. Specifically, taking the following Figure 1 as an example (assuming *si-RequestPeriod* = *n4*), SI-request period herein equals 120ms, by which cannot be divided by 1024SFN (i.e. 10240ms). As a result, if *ra-AssociationPeriodIndex* is configured to 3 for this case, it means the UE cannot initiate the RA procedure for Msg-1 based SI request as there is no next available ROs, when 1024 SFN boundary-crossing issue occurs within the SI-request period. To get rid of this issue, it is suggested that the network ensures the SI-request period is restricted to be a multiple of 10ms, where is a non-negative integer up to the maximum value 4 (i.e. the maximum length of SI-request period is not expected to be larger than the maximum value of RA associate pattern period (i.e. 160ms at most)).



Figure 1: 1024 SFN boundary-crossing issue for SI-request period

**Q3: Do companies agree that 1024 SFN boundary-crossing issue may occur within an SI-request period?**

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| **Company** | **Yes/No/Comments** | **Detailed comments** |
| OPPO | No | In the figure, it seems the association period is different, i.e., the RA associate period #0 is 40ms, the second is 20ms. It’s not clear how the si-RequestPeriod is determined in this case. Further, even if in the 1024 SFN boundary, why it’s said there is no available ROs? Thus, in all, we think it’s not clear what the issue is? |
| Nokia | No | Agree with Oppo |
| NEC | No | We could not identify the issue.. |
| Apple | No | It is unclear to us what is the problem. |
| Intel | No | Our understanding is that UE can still send SI request in next applicable PRACH occasion. There might be larger delay than normal case, but it is very rare (once per 10.24 s). Therefore no need to have restriction. |
| CATT | No | We think this problem can be avoid by smart and correct network configuration from R15 based on NW implementation. |
| MediaTek | No |  |
| Huawei, HiSilicon | Yes |  |
| Ericsson | No | We fail to see that this is a real issue. |
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**Q4: If Yes to Q3, do companies agree that the network ensures the SI-request period is restricted to be a multiple of 10ms (where is a non-negative integer)?**

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| **Company** | **Yes/No/Comments** | **Detailed comments** |
| Huawei, HiSilicon | Yes |  |
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## 3.3 Correction on SI change notification due to *si-RequestConfig*

In the contributions [5]-[8], it is mentioned that the change of *si-RequestConfig* or *si-RequestConfigSUL* will result in SI change notifications, which is unnecessary (i.e. the UE which is about to initiate on-demand SI request firstly acquires the latest *si-RequestConfig* or *si-RequestConfigSUL*) and power-inefficient to the UE that does not need to request on-demand SI message. Thus, it is proposed that the change of *si-RequestConfig* or *si-RequestConfigSUL* should not result in system information change notifications.

**Q5: Do companies agree that the change of *si-RequestConfig* or *si-RequestConfigSUL* should not result in system information change notifications?**

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| **Company** | **Yes/No/Comments** | **Detailed comments** |
| OPPO | No | In my understanding, the change of *si-RequestConfig* or *si-RequestConfigSUL* will not be so often. So it is reasonable to send the change notification due to change. |
| Nokia | No | Agree with Oppo, the basic use case why network will change it often is not clear. Anyway the change will have to be informed and it is already possible for network to do so. So we are not sure why the CR is needed. |
| NEC | No | We do not see any need to change this introduced from Rel-15 frozen long time ago. |
| Apple | See comment | We have no strong view. But for a Rel-15 CR, the change has to be very critical and this seems not meeting that high bar. |
| Intel | No | We don’t see this as an essential correction. |
| CATT | Not sure | The intention is reasonable. But since it is not essential, should we change the network behaviour, especially from R15? |
| MediaTek | No | Similar view as OPPO |
| Huawei, HiSilicon | No | The change is not backward compatible. |
| Ericsson | No | We do not think that these kind of statements about NW behaviour should be included in 38.331 |
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## 3.4 Clarification to the expiry of IDLE mode measurements

In the contribution [9] Based on the current RRC spec, UE does not release stored IDLE mode measurements in *VarMeasIdleReport* (which is only cleared when *UEInformationResponse* is sent successfully) upon T331 expiration. As a result, a UE may retain the very “old” measurements across multiple RRC connections, even if T331 has expired.

However, from RAN5 perspective, this creates a problem in that it is difficult to test what happens after T331 expiry. Since UE stops measurements but doesn’t clear them, testing that UE no longer performs the measurements after T331 expiry is difficult since UE may report “old” measurements. Additionally, allowing UE to “continue” the IDLE mode measurements may even mask the behaviour, since it’s not clear when UE has done the measurements it reports, so the network has no way of differentiating those. To correct this problem, there are two main solution alternatives in the discussion contribution [9]:

* **Opt 1: Clear *VarMeasIdleReport* at T331 expiry** (simple but may cause UEs to drop some measurements unnecessarily, and may cause issues with legacy UEs)
* **Opt 2: Clear *VarMeasIdleReport* at *RRCRelease*** (to avoid old measurements persisting across multiple RRC connections)

**Q6: Which option do companies prefer for the discard of *VarMeasIdleReport*?**

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| **Company** | **Opt 1/Opt 2 /Comments** | **Detailed comments** |
| OPPO | None  Or Opt2 if it is majority | I think it is corner case that UE has available measurement results and does not report after entering RRC\_CONNECTED.  Furthermore, the “out date” issue was discussed in R16 DCCA WI, but it was not addressed. |
| Nokia | - | Proponent: We think RAN2 should discuss which option to adopt to resolve the problem of VarMeasIdleReport being retained until queried by network. |
| NEC | Opt 2 | We tend to agree with the observations and prefer Opt 2 to use available and valid information as much as possible. |
| Intel | None | Agree with Oppo’s comments.  Option 2 if majority prefer to clarify this. |
| CATT | None  Or Opt2 if it is majority | In R16 DCCA WI, it had been discussed that how to prevent outdated early measurement reporting and achieved the following agreement:   |  | | --- | | Do not support a mechanism to prevent outdated early measurement reporting in Rel-16 |   We prefer to follow the agreement above, but Opt2 is acceptable for us if it is majority view or some serious problems were identified for outdated early measurement reporting. |
| MediaTek | None | This has been discussed before. The variable is not released because UE implementation could choose to continue early measurement even after valid timer timeout. If the UE choose not to do, any sensible implementation will release the old result. There is no benefit for UE to report this kind of old measurement result. We see no change needed in the SPEC. |
| Huawei, HiSilicon | None, or Option 1 | It could have been too late to adopt this modification as there may have already been different UE implementations. So we think it’s better not to specify this, if there is a strong desire to select the options, we can only accept Option 1. Option 2 did not solve any problem as the UE would still report very old measurements, if the UE goes to connected mode long time after T331 expiry. |
| Ericsson | See comment | This topic was discussed before and we agree with Nokia that there can still be ambiguity for the network to know the quality of the measurements provided in early measurement report. As we have suggested before, a timestamp could be added to the early measurement report. Of the solutions presented by Nokia, we agree with Huawei that option 2 does not really solve the issue. Option 1 could be better, but from a network point of view it does not help much either, since the network still does not know the age of the measurements if they are taken after T331 expired. So, if we want to make a change, we should do a proper solution. |
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Further, if either Opt 1 or Opt 2 is agreeable, then, at least for future UEs, a UE capability could also allow RAN5 to differentiate the test cases. Alternatively, a correction without a capability could be considered if no UEs supporting this functionality already exist in the field.

**Q7: If either Opt 1 or Opt 2 is agreeable, would companies agree that a new UE capability is needed?**

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| **Company** | **Yes/No/Comments** | **Detailed comments** |
| NEC | Comments | From RAN2 functionality point of view, we do not see need of new UE capability for this. However, we can follow majorty, if it is needed for test case purpose. |
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## 3.5 Measurement during RRC connection establishment/resume

Cell re-selection related measurements generally includes intra-frequency, inter-frequency, and inter-RAT frequency measurements. And those measurements shall be continued during the ongoing RRC connection establishment/resume procedure (i.e. the UE shall continue cell re-selection related measurements as well as cell re-selection evaluation), as specified in TS 38.331. However, in the contributions [10]-[13], concerns were raised as it is not feasible to manage inter-frequency or inter-RAT frequency measurements when the physical layer of UE is performing Tx/Rx (e.g. RA procedure with Msg1/3 transmission and Msg2/4 reception) with the serving cell. As a result, to facilitate the Tx/Rx during the RA procedure, the UE may not continue cell re-selection related measurements as well as cell re-selection evaluation during the RRC connection establishment/resume procedure, similar to the RedCap UE behavior (i.e. if the UE is a RedCap UE and the initial DL BWP for RedCap is not associated with CD-SSB, the UE may continue cell re-selection related measurements as well as cell re-selection evaluation).

So the following revision is proposed,

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| The UE ~~shall~~may continue cell re-selection related measurements as well as cell re-selection evaluation. If the conditions for cell re-selection are fulfilled, the UE shall perform cell re-selection as specified in 5.3.13.6. |

**Q8: Do companies agree with the intention of CR R2-2207616?**

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| **Company** | **Yes/No/Comments** | **Detailed comments** |
| OPPO | Not sure with comments | I wonder if it is true and whether LTE spec also needs to change?  I also wonder whther the yellow part is up to physical layer implementation and the UE shall continue cell re-selection related measurements from RRC point of view. |
| Nokia | No | UE performs measurements as much as possible in accordance with RAN4 requirements it can do more but if it can’t then it can’t. As long as RAN4 requirements are met we do not see any problem. Hence we think no proposal should be agreed. |
| NEC | Comments | The observation seems valid. However, the propoed change is not fine, because changing “shall” to “may” will remove necessary functionality. As Nokia pointed out, the UE shall continue considering its situation and related RAN4 requirements.  If majority agree to have some change, we can follow. |
| Apple | Yes | We think the intention is valid. |
| Ericsson (Felipe) | No | We see no need to change current legacy operation, that in our views is not broken. This would change functionality inherited from LTE for an scenario that seems to be a corner case. |
| Intel | No | Firstly, the change from “shall” to “may” leaves it very open on what the UE is required to do. We don’t think this is a problem as UE will only perform the measurements when it can. |
| CATT | Not sure with comments | Cell re-selection related measurements are UE internal implementation. We are not sure if it is a tough issue as the same text exists in LTE too but no problem arises in LTE. Open to hear more UE vendors’ view. |
| MediaTek | See comment | We agree that UE may not be able to do inter-freq or inter-RAT measurement during connection setup. However, the text is there for quite long time (since LTE). So, we don’t see strong need to change it although it is also fine to us. |
| Huawei, HiSIlicon | Yes | We agree with the proponent that UE may not be able to perform inter-frequency measurements when performing transmission/reception with the serving cell during establishment/resume, as the UE has not entered RRC\_CONNECTED and there is no gap configured. |
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## 3.6 Corrections on s-MeasureConfig in NR

As per section 5.5.2.1 of 38.331, the *s-MeasureConfig* Threshold (i.e. *ssb-RSRP* or *csi-RSRP*) would be set to the “lowest value” of the RSRP ranges indicated by the received value of *s-MeasureConfig* (e.g. if the IE value is 1, the lowest value of RSRP range is -156 dBm). However, this is not aligned with the description for *RSRP-Range*, where it’s mentioned that, for thresholds, actual value is derived as (IE value – 156).

Meanwhile, LTE has explicitly specified RSRP\_0 (which is invalid codepoint with no lower bound for RSRP measurement) to be used as an indication to disable s-Measure. NR has defined RSRP\_127 as threshold value of infinity. In effect, NR can achieve disabling of s-MeasureConfig with RSRP\_127, however, it is not clearly specified in 38.331. To solve these issues, the following changes are proposed,

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| 5.5.2 Measurement configuration5.5.2.1 General **…**  1> if the received *measConfig* includes the *s-MeasureConfig*:  2> if *s-MeasureConfig* is set to *ssb-RSRP*, set parameter *ssb-RSRP* of *s-MeasureConfig* within *VarMeasConfig* to the threshold value of the RSRP ranges indicated by the received value of *s-MeasureConfig* which is derived as specified in 6.3.2*;*  2> else, set parameter *csi-RSRP* of *s-MeasureConfig* within *VarMeasConfig* to the threshold value of the RSRP ranges indicated by the received value of *s-MeasureConfig* which is derived as specified in 6.3.2.  **…** |
| ***s-MeasureConfig***  Threshold for NR SpCell RSRP measurement controlling when the UE is required to perform measurements on non-serving cells. Choice of *ssb-RSRP* corresponds to cell RSRP based on SS/PBCH block and choice of *csi-RSRP* corresponds to cell RSRP of CSI-RS. Value “127” indicates to disable s-MeasureConfig. |

**Q9: Do companies agree with the intention of CR R2-2207560?**

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| **Company** | **Yes/No/Comments** | **Detailed comments** |
| OPPO | Yes/No with comments | For the frst change, it is still not clear. So the changes are proposed as below if it is majority view:  Furthermore, I wonder whether LTE Spec is also needed to change and the LTE spec is changed to “lowest” in CR ***R2-091696*** .    For the second change, we think it is not necessary. |
| Nokia | No | If we understand correctly this does not change UE behaviour. Thus we are not sure what is really broken and especially if we extend RSRP range at some point this could break the behaviour? We would like to know what is the real problem? |
| Ericsson (Tony) | Maybe no | Similar comment as Nokia. We think current specification is not really broken. We understand this is mainly to align the behavior on what we already have for LTE, but not sure if this is really needed. |
| NEC | Comments | We do not see strong need but can go with majority |
| Apple | No strong view | We are also fine with the current description |
| Intel | Yes/No | First change is correct. Or we can refer mapping table 10.1.6.1-1 in TS 38.133 [14] instead of section 6.3.2.  As for change 2, it is not necessary since the value 127 is already the lowest RSRP value meaning the UE will likely stop measurement is low. |
| CATT | Yes/No with comments | Ok with the first change.  If it is set to value “127” (infinite), according to current description, the UE always performs the concerned measurements as the NR SpCell RSRP is always lower than the threshold. Hence, for the second change, no need to further clarify. |
| MediaTek | Yes/No | Seems correct but indeed not essential |
| Huawei, HiSilicon | Yes with comments | We think the wording “ranges” as highlighted below should be removed:  1> if the received *measConfig* includes the *s-MeasureConfig*:  2> if *s-MeasureConfig* is set to *ssb-RSRP*, set parameter *ssb-RSRP* of *s-MeasureConfig* within *VarMeasConfig* to the threshold value of the RSRP ranges indicated by the received value of *s-MeasureConfig* which is derived as specified in 6.3.2*;*  2> else, set parameter *csi-RSRP* of *s-MeasureConfig* within *VarMeasConfig* to the threshold value of the RSRP ranges indicated by the received value of *s-MeasureConfig* which is derived as specified in 6.3.2. |
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## 3.7 Corrections on measurement report triggering

Based on the current RRC spec, if there is a cell in *cellsTriggeredList* also meets the leaving condition, this cell will not be removed from *cellsTriggeredList*. However, this is not correct. The corresponding change should be as follows,

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| 5.5.4 Measurement report triggering5.5.4.1 General …  2> if the *reportType* is set to *eventTriggered* and if the entry condition applicable for this event, i.e. the event corresponding with the *eventId* of the corresponding *reportConfig* within *VarMeasConfig*, is fulfilled for one or more applicable cells for all measurements after layer 3 filtering taken during *timeToTrigger* defined for this event within the *VarMeasConfig*, while the *VarMeasReportList* does not include a measurement reporting entry for this *measId* (a first cell triggers the event):  3> include a measurement reporting entry within the *VarMeasReportList* for this *measId*;  3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;  3> include the concerned cell(s) in the *cellsTriggeredList* defined within the *VarMeasReportList* for this *measId*;  3> initiate the measurement reporting procedure, as specified in 5.5.5;  2> else if the *reportType* is set to *eventTriggered* and if the entry condition applicable for this event, i.e. the event corresponding with the *eventId* of the corresponding *reportConfig* within *VarMeasConfig*, is fulfilled for one or more applicable cells not included in the *cellsTriggeredList* for all measurements after layer 3 filtering taken during *timeToTrigger* defined for this event within the *VarMeasConfig* (a subsequent cell triggers the event):  3> set the *numberOfReportsSent* defined within the *VarMeasReportList* for this *measId* to 0;  3> include the concerned cell(s) in the *cellsTriggeredList* defined within the *VarMeasReportList* for this *measId*;  3> initiate the measurement reporting procedure, as specified in 5.5.5;  2> if the *reportType* is set to *eventTriggered* and if the leaving condition applicable for this event is fulfilled for one or more of the cells included in the *cellsTriggeredList* defined within the *VarMeasReportList* for this *measId* for all measurements after layer 3 filtering taken during *timeToTrigger* defined within the *VarMeasConfig* for this event:  3> remove the concerned cell(s) in the *cellsTriggeredList* defined within the *VarMeasReportList* for this *measId*;  3> if *reportOnLeave* is set to *true* for the corresponding reporting configuration:  4> initiate the measurement reporting procedure, as specified in 5.5.5;  3> if the *cellsTriggeredList* defined within the *VarMeasReportList* for this *measId* is empty:  4> remove the measurement reporting entry within the *VarMeasReportList* for this *measId*;  4> stop the periodical reporting timer for this *measId*, if running  … |

**Q10: Do companies agree with the intention of CR R2-2208346?**

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| **Company** | **Yes/No/Comments** | **Detailed comments** |
| OPPO | Yes | Based on the current RRC spec, if one new cell meets the entry condtion and there is another cell in *cellsTriggeredList* also meet the leaving condition, this cell will not be removed from cellsTriggeredList becaue the corresponding text is skiped due to “if….else if…else if….”.  We also noted that the text for this part is different from LTE and there is no issue in LTE Spec. |
| Nokia | Yes | Maybe OK but on the other hand if we understand correctly this occurs only if same instant (very dependant on UE implementation) both entering and leaving conditions are fulfilled for some cells. Probably not really essential to correct but for completeness we are okay to have CR if other companies agree. |
| NEC | Yes |  |
| Apple | Yes |  |
| Intel | Yes | Agree with the intention and change as stated in the document. |
| CATT | Yes |  |
| MeidaTek | Yes |  |
| Huawe, HiSilicon | Yes | The branches are not mutualy exclusive, e.g., it is possible that one neighbour cell satisfies the entering condition and another neighbour cell satisfies the leaving condition at the same time. So the change is correct. |
| Ericsson | Yes |  |
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# 4 Conclusion

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