3GPP TSG-RAN WG2 #109bis-e R2-20xxxxx

Electronic Meeting, April 20th – 30th 2020

Agenda Item: 6.10.1

Source: Ericsson

Title: [AT109bis-e][032][DCCA] RRC (Ericsson)

Document for: Discussion, Decision

# 1 Introduction

This document is to kick off the following email discussion:

* [AT109bis-e][032][DCCA] RRC (Ericsson)

Scope: Treat topics in 6.10.1, based on R2-2003383, R2-2003789, R2-2003381, R2-2003382 and comments. Discussion on non-controversial issues/proposals that might not need to be treated on-line can start immediately.

Part 1: Determine which issues that need resolution, find agreeable proposals. Deadline: April 24 0700 UTC.

Part 2: CRs capturing agreements from this meeting (incl results from other discussions).

Since all the remaining proposals from [1] that were not agreed during the online session deal with early measurements, this email discussion has been merged with:

* [AT109bis-e][035][DCCA] Early Measurement Reporting (Ericsson)

Scope: Treat topics in 6.10.4, based on R2-2003790 and comments, and other papers if needed). Start non-controversial proposals immediately. Wait for on-line discussion for others. Can also have an immediate round of comments to clarify better the scope of on-line discussions.

Part 1: Determine which issues that need resolution, find agreeable proposals. Deadline: April 24 0700 UTC

# 2 Discussion

## 2.1 Summary of online discussion on [1] and [2]

During the online session, [1] and [2] were discussed and the following agreements have been made:

* Two IEs: idleModeMeasurementsNR and idleModeMeasurementsEUTRA to be used in NR SIB1 to indicate whether the UE performs EUTRA and NR early measurements
* The cell quality derivation parameters (NR: *nrofSS-BlocksToAverage-r16* and *absThreshSS-BlocksConsolidation-r16*; LTE: *maxRS-IndexCellQual* and *threshRS-Index*) will be kept under the ssb-MeasConfig.
* A maximum of 8 cells per carrier can be reported for early measurements in LTE/NR rel-16.
* In LTE, a need code of “Need OR” to be used for the following IEs inside ssb-MeasConfig of MeasIdleCarrierListNR: measTimingConfig-r15, maxRS-IndexCellQual-r15, threshRS-Index-r15 and ssb-ToMeasure-r15.
* To use a new rel-16 IE (in 36.331) to enable the reporting of up to 8 EUTRA carriers in early measurement results
* Confirm the use of the new rel-16 IE *SCellToAddModList* IE (included in latest 36.331 DCCA CR) for SCell addition/modification in *RRCConnectionResume.*
* The *sPCellCommonConfig* for the PSCell is saved as part of the UE AS Inactive AS context.
* Add *p-maxEUTRA, p-maxUE-FR1,* and *tdm-patternConfig* in the *RRCConnectionResume* message. We allow the network to release these configurations when the UE is resumed without SCG. TBD if need codes is “Need OR” etc
* Field descriptions of harq-ACK-SpatialBundlingPUCCH, harq-ACK-SpatialBundlingPUSCH, harq-ACK-SpatialBundlingPUCCH-secondaryPUCCHgroup, and harq-ACK-SpatialBundlingPUSCH-secondaryPUCCHgroup to be updated as shown above to clarify the spatial bundling for the primary and secondary PUCCH can be disabled/enabled independently.

## 2.2 Remaining issues

In [1], the following were proposed for further discussion:

*Proposal 1: RAN2 to decide which of the following options should be adopted for the network to request early measurements and for the UE to indicate early measurement availability:*

*1. UE indicates the measurements it has (in RRC(connection)SetupComplete, RRC(Connection)ResumeComplete) and network indicates the measurements it wants (in UEInformationRequest, RRC(Connection)Resume)*

*2. The idleModeMeasurements in SIB (SIB2 in LTE, SIB1 in NR) indicates what measurements the network wants to be reported*

*Proposal 6: In NR, the need codes for the following IEs in NR inside ssb-MeasConfig of MeasIdleCarrierListNR to be further discussed: nrofSS-BlocksToAverage, absThreshSS-BlocksConsolidation, smtc, and ssb-ToMeasure*

*Proposal 8b: RAN2 to discuss further enhancements to the cell quality derivation and beam result handling procedures (to clarify and if possible, reuse existing measurement procedures in 331 or 304 specs).*

*Proposal 9b: RAN2 to discuss the ASN.1 and procedural impact of supporting 8 E-UTRA carriers in rel-16 early measurements in LTE.*

The contributions regarding early measurement were summarized in [3], and the following were proposed (prefix “A” added to differentiate from the proposals from [1] listed above):

Proposals for easy agreement:

*Proposal A\_1 Granular request of early measurements (i.e. EUTRA, NR, or both) to be supported in RRC(Connection)Resume and UEInformation messages. TP proposed in [4] to be captured in 36/38.331.*

*Proposal A\_2 Granular availability indication of early measurements (i.e. EUTRA, NR, or both) to be supported in RRC(Connection)ResumeComplete and RRC(Connection)SetupComplete messages. TP proposed in [4] to be captured in 36/38.331.*

*Proposal A\_7 In LTE/NR rel-16, the measIdleConfig is included in the AS-Config IE to enable early measurement configuration available during UE context retrieval.*

*Proposal A\_8 Add SMTC2-LP in NR ssb-MeasConfig for early measurement configuration.*

*Proposal A\_9 No changes required regarding the qualityThreshold field description.*

Proposals for further discussion:

*Proposal A\_3 In NR, use “need S” for SSB related configurations in MeasIdleCarrierNR-r16 (including nrofSS-BlocksToAverage-r16, absThreshSS-BlocksConsolidation-r16, smtc-r16 and ssb-ToMeasure-r16).*

*Proposal A\_4 The NOTE regarding UE behaviour on SSB configuration differences between dedicated and broadcasted signalling to be updated as: The UE is not required to perform idle/inactive measurements on a given carrier if the SSB configuration of that carrier provided according to dedicated signaling is different from the SSB configuration according to broadcasted signalling in the serving cell, if any.*

*Proposal A\_5 When the UE is configured to measure more frequencies than it is configured to report, it is left up to UE implementation on which frequencies to include in the early measurement report.*

*Proposal A\_6 RAN2 to discuss if early measurements can be explicitly forwarded to the SN via new IEs in CG-ConfigInfo.*

*Proposal A\_10 The proposals in [*5*] to be considered during RAN2-109bis-e offline discussion (or subsequent RRC ASN.1 review)*

Consolidating the proposals from the two summaries and taking into consideration that the proposals in [3] take the contributions to this meeting into account ([4], [12], [13], [14]), the easy agreement proposals in [3] are also suggested here:

**Proposal 1   Granular request of early measurements (i.e. EUTRA, NR, or both) to be supported in *RRC(Connection)Resume* and *UEInformation* messages. TP proposed in [4] to be captured in 36/38.331.**

**Proposal 2   Granular availability indication of early measurements (i.e. EUTRA, NR, or both) to be supported in *RRC(Connection)ResumeComplete* and *RRC(Connection)SetupComplete* messages. TP proposed in [4] to be captured in 36/38.331.**

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| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Comments** |
| Nokia | Disagree | I guess commenting on these was missed in the document so we added it here.  This is not really anything that would be needed for early measurements to work. We would rather propose not to even discuss this as this is purely optimizing extremely small corner case. We should solve critical issues first. |
| Qualcomm | Disagree | As indicated in our contribution [6], we think these 2 proposals are non-essential optimization, especially considering RAN2 has introduced per-RAT indication (LTE or NR or both) in SIB. In our understanding, it can bring marginal benefit signaling reduction in corner case (i.e. gNB indicates ‘both’ in SIB, but only wants NR measurements for one particular UE for some reason).  Thus, we agree with Nokia that we should solve critical issue first and should avoid discussing optimization at this late Rel-16 stage. |
| OPPO | Disagree | Agree with Nokia and QC. |
| MediaTek | Agree |  |
| Telecom Italia | Agree | Our understanding is that the per-RAT indication in SIB is just for indicating the network support of early measurements and which RAT(s) have to be considered by UEs. Hence, we think that without these improvements there might be misbehaviors at UE side because it won’t be clear to the UE which RAT(s) (LTE, NR or both) have to be effectively included in the early measurement reporting |
| Huawei, HiSilicon | Disagree | As explained before, according to current procedures, if the network only indicates "LTE" in SI, then the UE will only measure LTE.  Then the only available results will be LTE results, so there is no use to repeat an indication. |
| ZTE | Agree | Considering NR and LTE measurement results are used for different scenarios, we think it is beneficial to allow network to require the one that really cares. We don’t think this is kind of optimization. |
| LG | Agree | Per-RAT indication in SIB just indicates which RAT to measure and it is cell-specific. In many cases NR and LTE frequencies are co-located, the network may configure the SIB indication ‘both’. Then, regarding each UE’s CA/DC capability, it is essential to enable the request/availability per-UE.  Furthermore, the UE may have measurement results of not-indicated RAT from previous serving cell. In this case, granular request is needed to avoid unnecessary reporting. |
| Samsung | Disagree | As indicated in R2-2003395, we think there is no need for additional signalling i.e. seems a small optimisation that is not needed, at least not in R16. |
| vivo | agree | It is a clear method. |
| NEC | Disagree | agree with Qualcomm that the SIB indication is sufficient. |
| Interdigital | Agree | We think this is a simple way of avoiding the reporting of measurements which are not required by the network. |
| Intel | Disagree | SIB indication is sufficient. |
| Futurewei | Disagree | The proposed changes are not really needed |
| CATT | Disagree | Agree with Nokia and QC. |

**Proposal 3   In LTE/NR rel-16, the *measIdleConfig* is included in the AS-Config IE to enable early measurement configuration available during UE context retrieval.**

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| **Company** | **Agree/Disagree** | **Comments** |
| Nokia | Disagree | I guess commenting on these was missed in the document so we added it here.  This is not really anything that would be needed for early measurements to work. We would rather propose not to even discuss this as this is purely optimizing extremely small corner case. We should solve critical issues first |
| Qualcomm | Agree | Unlike granular availability/request, we think this proposal applies to more useful scenario, i.e. the UE initializes 2-step resume in different cell. We think this scenario is quite likely to happen in real deployment. If w/o this proposal, the resume cell will not know whether previous cell has configured the UE early measurement, and thereby can only send a new measIdleConfig in new RRCrelease message, although UE’s old configuration and stored measurement result are still valid. |
| OPPO | Agree |  |
| MediaTek | No strong view | But we would like to suggest some compromised version and try to close this open issue. Maybe not entire *measIdleConfig* is needed to be exchange. Could companies accept to use just single indicator to indicate whether the early measurement is configured? |
| Telecom Italia | Agree | We think this enhancement is needed to reduce unnecessary signalling on the network after UE resumes in a different cell as pointed out by Qualcomm |
| Huawei, HiSilicon | Disagree | In the 2-step resume (unfrequent), the timer may be expired or about to expire, so if the new node does not provide the configuration, the UE will stop measuring. Then it is not good to rely on the existing configuration.  For grant allocation, the whole configuration is a total overkill. Besides, AS-Config is for handover, it is not suitable for resume.  If anything would be done to optimize the grant allocation, it could be 1 bit in X2/Xn signalling, nothing more. But we think it is very minor optimization. |
| ZTE | Disagree | As we commented before, we think this causes complexity without clear benefit. |
| LG | Agree | Same understanding with companies agree this proposal. |
| Samsung | Disagree | Similar view as indicated by Nokia |
| vivo | Disagree | Similar view as indicated by Nokia |
| NEC | Disagree | Similar view as indicated by Nokia |
| Interdigital | Agree | With smaller cells and UEs being placed frequently in INACTIVE, we see this as necessary so that the network can know/configure the early measurements for these UEs. |
| Intel | Agree | Apart from that it could be useful for target node to know what UE is being requested to measure, the default should be for source to provide the current UE configuration to the target. Excluding some specific UE configuration is not necessary. |
| Futurewei | Disagree | It is a non-essential optimization and may not work well in certain scenarios. |
| CATT | Agree | It is useful to the target gNB to know that if the UE has been configured early measurement by the previous cell in some scenario such as 2-step resume, which can use the info to decide if configure the early measurement for UE in RRCRelease message, or common resume scenario which can use the info to decide if get the early measurement results from UE and allocate corresponding UL resources in RRCResume message. |

**Proposal 4   Add *SMTC2-LP* in NR *ssb-MeasConfig* for early measurements.**

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| **Company** | **Agree/Disagree** | **Comments** |
| Nokia | Disagree | I guess commenting on these was missed in the document so we added it here.  this is related TEI16 addition where it was agreed that one can only indicate longer SMTC2 for idle mode and also indicate for which PCIs that longer SMTC2-LP applies. So only indicating SMTC2-LP as proposed in the paper does not make sense as UE does not know for which cells configuration applies. There is no need to impact specification as NW can only indicates longer SMTC used in the system for early measurement purposes or alternatively NW limits early measurement area to very small area. |
| Qualcomm | Disagree | We totally agree with Nokia that only indicating SMTC2-LP doesn’t make sense because the UE doesn’t know for which cells configuration applies.  Furthermore, the usage of SMTC2 is for operator to deploy some “sleeping” cells at the cost of UE complexity. However, early measurement is for fast setup of CA/DC. Shouldn’t NW try to avoid using these “sleeping” cells as potential SCells? |
| OPPO | Agree | This is agreed in cell selection/reselection measurement in TEI16. So it makes sense to include it also in early measurement configuration.  If NO, the note may be needed to clarify, the *SMTC2-LP* will be ignored when the UE get the SSB configuration from SIB2/4. |
| MediaTek | See comment | Simply add SMTC2-LP is not going to work. We also need to specify the cell list.  Not sure whether this is needed. I think we have to discuss the first on the intention of the sleeping cells. Would NW use the sleeping cells as candidate SCell ? |
| Telecom Italia | Agree | We supported the introduction of such additional SMTC with long periodicity for network energy saving purposes. However, it could be good to have early measurements reporting from cells configured with SMTC2-LP so to properly reconfigure such cells and use them as SCells in case more traffic needs to be handled |
| Huawei, HiSilicon | See comment | Agree with MediaTek |
| ZTE | Agree | We think the purpose of deploying “sleeping” cells is to reduce power consumption, but it does not mean it cannot be used for SCells.  If SMTC2-LP is not introduced, we are afraid the consequence is that, these kind of cells will really be excluded from early measurement, and cannot be used for fast SCell setup.  Regarding the comments on PCI list, we agree, PCI list should be provided together with SMTC2-LP. |
| LG | See comment | Our understanding on SMTC2-LP is to support “sleeping cells” which is for network power saving. As MediaTek mentioned, we need to clarify how the “sleeping cells” are used. If they are mainly used for data boosting as SCell in connected mode so that broadcast the beam less frequently for idle mode UEs, then it would be worth providing SMTC2-LP in early measurement configuration. |
| Samsung | Disagree | Same view as expressed by Nokia and QC |
| vivo | Disagree | Same view as expressed by Nokia and QC |
| NEC | Disagree | this is not essential for early measurement |
| Interdigital | Agree | Agree with ZTE. |
| Intel | Disagree | This is not essential and more discussion will be needed to complete the work. |
| Futurewei | Disagree | Similar view as Nokia and QC. |
| CATT | Disagree | A question is how useful are these “sleeping” cells for fast setup of CA/DC. In our view, these “sleeping” cells are more suitable for cell selection/reselection measurement than the early measurement, as these cells in CA/DC are really used for data transmission in connected mode. |

**Disagree**

**Proposal 5   No changes required regarding the *qualityThreshold* field description.**

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| **Company** | **Agree/Disagree** | **Comments** |
| Nokia | Agree | I guess commenting on these was missed in the document so we added it here. |
| Qualcomm | Agree | We have the same understanding with Rapporteur that up to 8 cells per freq only includes neigbor cells (i.e. not PCell). And the current running CR is already clear. |
| OPPO | Agree |  |
| MediaTek | Agree, but | I think the intention is to say RAN2 does not pursue R2-2003220. Simply looking the proposal is difficult to understand. |
| Huawei, HiSilicon | Not sure what is the question | In 38.331 v16.0.0, there is no field description.  In 36.331, v16.0.0, the field description is ok. |
| ZTE | Agree |  |
| LG |  | If it is clear that up to 8 cells only includes neighbor cells without PCell, we are okay not to change the *qualityThreshold* field description. |
| Samsung | Agree |  |
| vivo | Agree |  |
| NEC | Agree |  |
| Interdigital | Agree |  |
| Intel | Agree |  |
| Futurewei | Agree |  |
| CATT | Agree | Agree with the Rapporteur’s understanding. |

The other open issues are discussed below.

#### ***2.2.1 Need codes for ssb-MeasConfig IEs in NR (Issue #DCCA\_5)***

In the RRC open issues email discussion [1], the need code for *ssb-MeasConfig* IEs in LTE and NR was discussed (issue #DCCA\_5). There was a consensus for the LTE case, but for NR (nrofSS-BlocksToAverage-r16, absThreshSS-BlocksConsolidation-r16, smtc-r16 and ssb-ToMeasure-r16), it was not clear whether to use “Need R” or “Need S”, and it was proposed to discuss this further in this meeting.

In [6], it is pointed out that if “need S” is used for ss-MeasConfig IEs, there will be a need to consider the cases that one IE is configured in only SIB but not in RRC release, or only in RRC release but not in SIB, resulting in complex UE behaviour and specification complexity. It was thus proposed to define the simplest UE behaviour: all these IEs use “Need R”, i.e. when these IEs are not provided in both RRC release and SIB, the UE doesn’t perform early measurements on the concerned frequency.

In [7], it is pointed out that using “need R” may create confusion regarding UE’s behaviour in case of absence in dedicated signaling while there is a value in SIBx or SIB4. Specifically, in case where the SSB measurement is configured via SIB and all other parameters are provided by dedicated signaling, the UE will acquire SSB measurement configuration from either SIB4 or SIBx. Since these IEs are specified as Need S in SIB4, it looks incompatible to use Need R in SIBx. And thus, it was proposed to use “Need S” instead.

In [8], it is proposed to use “Need R” for IEs in *ssb-MeasConfig* in NR SIB11. However, the discussion/reasoning therein was only considering the whole IE *ssb-MeasConfig* and not the individual IEs within that IE. That is already captured in the updated running CR [10].

The rapporteur has the same understanding as in [7] and that defining the need codes in alignment with the SIB4/x is the most reasonable way. And no extra specification work, as implied in [6], is required because the early measurement procedure already ensures that if the ssb-MeasConfig is provided in RRC Release, the UE will not try to perform delta configuration between the broadcasted and SIB values (as shown below).

1> for each entry in the *measIdleCarrierListNR* within *VarMeasIdleConfig* that does not contain an *ssb-MeasConfig* received from the *RRCRelease* message:

2> if there is an entry in *measIdleCarrierListNR* in *measIdleConfigSIB* of *SIB11* that has the same carrier frequency and subcarrier spacing as the entry in the *measIdleCarrierListNR* within *VarMeasIdleConfig* and that contains *ssb-MeasConfig*:

3> store or replace the SSB measurement configuration from *SIB11* into *ssb-MeasConfig* of the corresponding entry in the *measIdleCarrierListNR* within *VarMeasIdleConfig*;

2> else if there is an entry in *carrierFreqListNR* of *SIB4* with the same carrier frequency and subcarrier spacing as the entry in *measIdleCarrierListNR* within *VarMeasIdleConfig*:

3> store or replace the SSB measurement configuration from *SIB4* into *ssb-MeasConfig* of the corresponding entry in the *measIdleCarrierListNR* within *VarMeasIdleConfig*;

2> else:

3> remove the *ssb-MeasConfig* of the corresponding entry in the *measIdleCarrierListNR* within *VarMeasIdleConfig*, if stored;

Thus, it is proposed:

**Proposal 6   In NR, use “need S” for SSB related configurations in *MeasIdleCarrierNR-r16* (including *nrofSS-BlocksToAverage-r16, absThreshSS-BlocksConsolidation-r16, smtc-r16* and *ssb-ToMeasure-r16*).**

**Question 1: For NR, do companies agree the usage of “need S” for SSB related configuration in *MeasIdleCarrierNR-r16?***

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| **Company** | **Agree/Disagree** | **Comments** |
| Nokia | Agree |  |
| Qualcomm | Disagree | In our understanding, the main justification for “need S” is: “*Since these IEs are specified as Need S in SIB4, it looks incompatible to use Need R in SIBx.”*  However, we already have agreed different handlings for SSB configuration in SIB4 and SIBx as stated below.   * Case 1: SSB configuration in SIB4 is for camping frequency and can’t be included in dedicated RRCRelease message. * Case 2: SSB configuration in SIBx is for non-camping frequency and can be included in RRCRelease message   Then we are not sure why “incompatible to use different Need Code” can be an issue? For case 1, there is no ambiguity case since SSB config is always absent in RRCRelease, and UE follows the same behavior in 38.304. But for case 2, if we use “need S”, the UE will be confused in below scenarios:   1. SSB config is in RRCrelease but not in SIBx: will UE use default config according to absence in SIBx or explicit config in RRCRelease? 2. SSB config is not in RRCrelease but is in SIBx: will UE use default config according to absence in RRCRelease or explicit config in SIBx?   In our understanding, the NR SIB4 uses “need S” for these IEs because the cell selection / reselection is quite important for NR performance. But the intention of early measurement on non-camping frequency (i.e. case 2) is just to speed up DC / CA setup, which is not as essential as cell selection / reselection. Therefore, we think that such complex UE behavior is not necessary, which will finally restrict the deployment of early measurement.  Instead, we prefer to define the simplest UE behavior: all these IEs use “Need R”, i.e. when these IEs are not provided in both RRC release and SIB, the UE doesn’t perform early measurements on the concerned frequency. |
| OPPO | Agree |  |
| MediaTek | Disagree | We discuss in ASN.1 section confirm that   * Use of Need S to configure a specific value when the field is absent should be minimised. There are scenarios where Need S is useful and hence this requires careful evaluation on a case by case basis.   In this case, we think that Need R is enough. |
| Huawei, HiSilicon | Need N ? | Both in 36.331 and in 38.331, the only UE actions upon reception is "store" or "store or replace". Besides this, the UE does not take any action upon reception of the parameters.  From this perspective, all the fields are one-shot fields so any optional field would be Need N.  That said: it may be better in procedure text to clarify "store or replace X", e.g. first step "delete X in VarMeasIdleConfig", second step "store X from SI in X in VarMeasIdleConfig " |
| ZTE | Agree | Regarding the comments from Qualcomm, our understanding is that “case1” principle only applies to the cell which sends the RRCRelease message. If the UE moves to another cell, it is possible the frequency appears in SIB4 (e.g. from non-camping to camping). And RAN2 has discussed this scenario in the previous meetings.  So it is better to align the need code of SSB configuration in all places in one spec, and define a unified principle for how to determine the mismatch (as discussed in next question).  Regarding the agreements indicated by MTK, we think it only applies to newly “designed” fields, for SSB configuration, we reuse the ones in SIB/MeasObject, so it is better to keep consistency. |
| LG | Disagree | Same understanding with MediaTek and Need R is the simplest way and enough to express UE behaviour. |
| Samsung | Disagree | We think Need S applies for ssb-MeasConfig (as for this we have procedural specification) but for sub-fields this is not the case so need R seems appropriate |
| vivo | disagree | We prefer using need OR code. |
| NEC | Agree | we prefer to avoid inconsistency for the same IE which can used for same/similar purpose. |
| Interdigital | Agree | The specification text is already quite clear, so need S can avoid different need codes across SIBs. |
| Intel | Disagree | Need R shouldn’t in itself cause confusion. The issue seems to be that the IE is used both in SIBx and dedicated signalling and the same parameters are also present as Need S in SIB4 (in a different IE). Even so, the only consequence of Need R is that network has to provide a value – that is, there is no potential signalling optimisation (if the value happens to be the same as elsewhere).  If such signalling optimisation is considered really useful for SIBx, it is better to define different IEs for SIBx and dedicated signalling, and use Need S for SIBx and Need R for dedicated signalling. Further, given that ssb-MeasConfig-r16 is now already using Need R, the need codes for the sub-fields shoudn’t be that important anymore. |
| Futurewei | Disagree |  |
| CATT | Agree | No strong view, but “need S” seems more reasonable. |

In [7], the issue is discussed further, addressing the following NOTE in the early measurement procedure

*The UE is not required to perform idle/inactive measurements on a given carrier if the SSB configuration of that carrier provided via dedicated signaling is different from the SSB configuration broadcasted in the serving cell, if any.*

Specifically, how the UE determines the difference between SIB and dedicated signalling, in case the values are absent (either in SIB/dedicated) and default values are to be assumed. For example, if the SMTC is absent in SIB, it is specified that the value of 5ms is to be assumed. Thus, if the UE was given an SMTC of 5ms in Release for a certain carrier, but the SMTC value for that carrier is absent in the SIB4/11, can the UE still assume the values to be the same and continue the early measurement?

The rapporteur’s understanding is that what matters is the value that ends up being used for a specific parameter (i.e. it doesn’t matter if SIB4 includes an SMTC value of 5ms or that field is absent and the default value of 5ms is used). Thus, it is proposed a simple modification of the NOTE as below will be sufficient to clarify that:

*The UE is not required to perform idle/inactive measurements on a given carrier if the SSB configuration of that carrier according to dedicated signaling is different from the SSB configuration according to broadcasted signalling in the serving cell, if any.*

**Proposal 7   The NOTE regarding UE behavior on SSB configuration differences between dedicated and broadcasted signaling to be updated as above to avoid any confusion of the handling when some of the parameters are absent and default values are used.**

**Question 2: Do companies agree to the proposed changes to the NOTE about UE behavior on handling differences between dedicated and broadcasted SSB configurations for early measurement?**

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| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Comments** |
| Nokia |  | no strong view. We do not sees strong need to modify |
| Qualcomm |  | We prefer to keep the current NOTE because the meaning of “according to” is not clear to us.  As indicated in our comment in Q1, we prefer to use “Need R” i.e., when these IEs are not provided in both RRC release and SIB, the UE doesn’t perform early measurements on the concerned frequency. Then no need to modify the NOTE |
| OPPO | No strong opinion | But it seems the original wording seems fine. |
| MediaTek |  | We think that original text is fine |
| Huawei, HiSilicon |  | The revised note is as bad as the original note.  As commented before, it is wrong to have next to each other:  1) a precise condition in procedure text to say when the UE is required to measure a carrier  2) a vague condition for the same thing in a NOTE inside the same procedure  We think the rapporteur should find a way to cover precisely the contents of the note in procedure text. |
| ZTE | Agree | We agree with the rapporteur that what matters is the value that ends up being used, so the original wording is not appropriate to capture this.  We are fine to use “according to”, but if companies think this is not clear, we are open to further discuss the wording (so far, we don’t have a better one in mind). |
| LG |  | We also think original sentence is fine. |
| Samsung |  | See no real need to modify and not sure if the new wording really improves |
| vivo | No strong view. |  |
| NEC |  | original wording looks fine |
| Interdigital | Agree | We agree with the rapporteur that the value is what is important. |
| Intel | No change needed | The current wording is fine |
| Futurewei |  | Current note text is fine. |
| CATT | No strong view |  |

#### ***2.2.2 Beam results and cell quality derivation (Issue #DCCA\_7)***

This issue was discussed in [1] and there seems to be a common understanding that some improvements could be made to reuse the already existing measurement procedures in the 331 (or 304) specifications, and prevent unnecessary duplication. However, there was no concrete proposals. On top of that, some of the comments were on top of v16.0.0 of the RRC spec, while other comments were on top of the updated WI CRs [9][10], which have some major differences from that of v16.0.0, specifically regarding early measurement handling.

Thus, companies are welcome to provide their view on the changes required to the idle/inactive measurement procedures on top the current WI CRs. Only comments regarding 38.331 are sufficient as they can be directly applied to 36.331 as well.

**Question 3: Companies are encouraged to provide the required changes to streamline the idle/inactive measurement procedures, specifically, the handling of beam measurements and cell quality derivation. Whenever possible, please include the required procedural text additions/modification on top of the current WI CR [10].**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MediaTek | We think the suggestion from Samsung paper (R2-2003395) could be started point on how to capture beam result. |
| Huawei, HiSilicon | We have a proposal for 36.331 in R2-2003718 which is very clear:  Add at the begining:  When performing measurements on NR carriers according to this clause, the UE shall derive the cell quality as specified in 5.5.3.3 and consider the beam quality to be the value of the measurement results of the concerned beam, where each result is averaged as described in TS 38.215 [89].  Then in the text:  5> for all cells applicable for idle/inactive measurement reporting, derive the cell measurement results of the quantities indicated by *reportQuantitiesNR*  In R2-2003395, suitable modification of 5.5.3.3 are proposed. |
| Samsung | We think beam procedures are not exactly specified in the same manner in LTE and NR. Anyhow, in R2-2003395 [5] we showed that for LTE it seems easy to avoid duplicate procedures by a slight change of the existing beam procedure to cover both RRM and early measurements. |

#### ***2.2.3 Support of the reporting of 8 EUTRA carriers in LTE early measurement results (Issue #DCCA\_8)***

It has been agreed (in [1] and also confirmed in the online meeting) to introduce a new IE in LTE to enable the reporting of up to 8 EUTRA carriers, as compared to the 3 that the UE can report in rel-15 euCA. However, there was one open issue regarding on how to capture this: *whether the new IE should contain the result of all the 8 carriers, or just the additional 5.* Many companies have indicated their preference to have it contain only the additional carriers. In [5], the way to capture that is provided as shown below:

MeasResultListIdle-r15 ::= SEQUENCE (SIZE (1..maxIdleMeasCarriers-r15)) OF MeasResultIdle-r15

MeasResultIdle-r15 ::= SEQUENCE {

measResultServingCell-r15 SEQUENCE {

rsrpResult-r15 RSRP-Range,

rsrqResult-r15 RSRQ-Range-r13

},

measResultNeighCells-r15 CHOICE {

measResultIdleListEUTRA-r15 MeasResultIdleListEUTRA-r15,

...

} OPTIONAL,

...

}

MeasResultListIdle-r16 ::= SEQUENCE (SIZE (1..maxIdleMeasCarriers-v16xy)) OF MeasResultIdleListEUTRA-r15

maxIdleMeasCarriers-r15 INTEGER ::= 3 -- Maximum number of neighbouring inter-

-- frequency carriers measured in RRC\_IDLE and RRC\_INACTIVE

maxIdleMeasCarriers-v16xy INTEGER ::= 5 -- Additional number of neighbouring inter-

-- frequency carriers measured in RRC\_IDLE and RRC\_INACTIVE

maxIdleMeasCarriers-r16 INTEGER ::= 8 -- Maximum number of neighbouring inter-

-- frequency/inter-RAT carriers measured in RRC\_IDLE and RRC\_INACTIVE

Another issue related to this that was discussed via company contributions is on how to handle the scenario when there is a difference between the number of carriers the UE is configured to measure and those that the UE can report. In [6], it is pointed out that this problem already existed in rel-15 euCA, where the UE can be configured to be measure up to 8 carriers, but can report only up to 3. Corrections were proposed in RAN2\_108 for euCA (*R2-1915668),* but it was agreed to leave it to UE implementation on which carriers to select to report. Thus, it was proposed to keep the same approach for LTE rel-16 as well.

In [7], on the other hand, it was proposed to introduce the priority of each measured frequency, where the priority indicator is used to select the measured target frequency and rank the measurement results.

The rapporteur’s understanding is the same as in [6], specifically regarding that even if a frequency priority is to be included, it may differ from cell to cell and the UE behavior will become complicated regarding how to handle dedicated vs broadcasted frequency priorities.

**Proposal 8  The new rel-16 IE (in 36.331) to enable the reporting of up to 8 EUTRA carriers in early measurement results, will be used to include only the additional 5 carriers that can be reported in rel-16 (as captured in [5])**

**Question 4: Do companies agree to the proposal above to use the new rel-16 IE to report only the additional 5 E-UTRA carriers?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Comments** |
| Nokia | Agree | Isn’t this regualr ASN.1 field extension? So probably not even needed to be discussed? |
| Qualcomm | Conditionally agree with comments | New Rel-16 MeasResultListIdle-r16 (up to 5 additional LTE carriers) should be only supported by LTE UE which supports the agreed capabiity *endc-IdleInactiveMeasurements-r16.* |
| OPPO | Agree |  |
| MediaTek | Agree | And we also agree that this reporting should have capability. One way to do is that we bind this to ***ca-****IdleInactiveMeasurements-r16*. We could further discuss on this. |
| ZTE | Agree |  |
| Samsung | Agree | As indicated by Nokia, this indeed is the normal way to do such extension |
| vivo | agree |  |
| NEC | Agree |  |
| Interdigital | Agree |  |
| Intel | Agree |  |
| Futurewei | Agree |  |
| CATT | Agree |  |

**Proposal 9  When the UE is configured to measure more frequencies than it is configured to report, it is left up to UE implementation on which frequencies to include in the early measurement report.**

**Question 5: Do companies agree to the proposal above to leave it up to UE implementation to handle the differences between number of carriers the UE is configured to measure and report?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Comments** |
| Nokia | Agree | This is the way we have done for reselection measurements and we do not see any need to differ here |
| Qualcomm | Agree | Two justifications as indicated in our contribution [6]:   * The same issue has been discussed in LTE euCA (RAN2#108), and RAN2 agreed to leave it to UE implementation. NR should align to LTE unless a strong argument for the misalignment * The frequency priority for early measurements may not be valid after cell reselection. One extreme example is that one NR frequency is indicated as high priority by RRC release from cell A. After the UE is reselected to LTE cell B without support EN-DC, such NR early measurement is not useful for cell B although it is indicated as high priority by Cell A. |
| OPPO | Agree |  |
| MediaTek | Agree |  |
| Huawei, HiSilicon | Disagree | We think the UE should prioritize the carriers in the order of the list |
| ZTE | Disagree | We disagree with the comment from Nokia, for cell reselection, the network can provide common or dedicated cell reselection priorities to UE. And for legacy RRC\_Connected mode measurement, there is proposal from company in Rel-16 TEI to also introduce frequency priority.  We see the benefit to have this, because the maximum number of measured frequencies defined in RAN4 might be quite small (e.g. 1 or 3). Although network can configure up to 8 frequencies to UE, but NW is not sure during moving which frequency will be really executed, similar to cell reselection, NW would expect UE to first consider some high priority frequencies, and then consider others only if there is no satisfied higher priority frequencies.  Regarding the comments from Qualcomm, we think the priority only works in frequencies which already fulfill the “supported BCs” condition. |
| LG | Agree | We do not see necessity to specify further for this case. |
| Samsung | Agree |  |
| vivo | Agree | We agree with ZTE. |
| NEC | Agree |  |
| Interdigital | Agree |  |
| Intel | Agree |  |
| Futurewei | Agree |  |
| CATT | Agree | We have the same view with QC, considering that the frequency priority has limitation such as cell reselection mentioned above, we prefer to leave it to UE implementation which align to LTE. |

#### ***2.2.4 Forwarding early measurements to SN in INM (Issue #DCCA\_14)***

In [11], it is pointed out that the early measurements can be useful for the SN in selecting SCells for the SCG. Current specification does not prevent the forwarding the early measurements to the SN during, but since different format/IEs are used for connected measurements and early measurements, the network has to convert the early measurement results to the IEs used in CG-ConfigInfo (i.e. *MeasResult2EUTRA/MeasResult2NR*). Such a conversion will be transparent to the SN (i.e. the SN will not be able to know if the measurements are regular connected mode measurements or early measurements). Thus, it is proposed to explicitly include the early measurement results in the *CG-Configinfo*, so that the SN can differentiate between regular and connected mode measurements and make a more informed decision (as the accuracy of early measurements and connected mode measurements is different).

**Question 6: Do companies agree that the early measurement report can be forwarded to the SN?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Comments** |
| Nokia | Disagree | We dont see need for this |
| Qualcomm | No strong view |  |
| OPPO | No strong view | It seems it can aid the SN to configure CA in SCG. |
| MediaTek | Disagree maybe | No strong view. It seems a minor signalling optimization? |
| Huawei, HiSilicon | Disagree |  |
| ZTE | Disagree | We already have the legacy field in INM message to transmit the results to target node, and we think converting the results into another structure is not a big problem. |
| LG | Slightly disagree. | We don’t see strong necessity for this. Whether the provided results to SN is from connected measurement or early measurement, it seems not important for SN. |
| Samsung | Agree | Forwarding such measurements is needed to support fast SCG addition as SN decides which cells to configure based upon measurement results |
| vivo | disagree |  |
| NEC | Disagree | we do not see sufficient reason to introduce this so far |
| Interdigital | Disagree | Perhaps this optimization is not critical at this stage. |
| Intel | May be | It could be useful at SN for early configuration. |
| Futurewei | Disagree |  |
| CATT | Disagree | We don’t see need for this as SCG CA is not supported currently. |

**Question 7: If answering yes to question 6, will the early measurement report be forwarded to the SN explicitly or implicitly (i.e. *implicit*: the existing measurement IEs in CG-ConfigInfo reused also for early measurement results, *explicit*: new IE(s) introduced for the sake of early measurements)**

|  |  |  |
| --- | --- | --- |
| **Company** | **Implicit/Explicit** | **Comments** |
| Samsung | Not sure | We think some indication may be beneficial as accuracy would be different. We assume that results forwarded by MN are either based on early or regular measurements. Not sure if this can be inferred from existing signalling |
| Intel | No strong preference | Agree with Samsung that the main requirement is for target to be aware this is early measurement. |

#### ***2.2.5 Any other issues***

Besides the issues discussed in previous sections, companies are invited to list other open issues related to the DCCA RRC.

**Question 8: Any other open issues related to the DCCA RRC CRs?**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MediaTek | We will provide more comment on the CR later. |
| Huawei, HiSilicon | See in R2-2003718:  **1) 5.2.2.3 is missing acquisition of SIB24 in RRC\_INACTIVE**  **2) Triggers for configuration of early measurements are wrong** (e.g. in 5.3.8 reception of the RRCRelease, should be removed) and unclear, we propose to update as follows in 5.6.20  When T331is running, the UE shall initiate this procedure:  - upon camping on a suitable cell in accordance with TS 36.304 clause 5.2.7;  - upon cell selection/reselection while in RRC\_IDLE or RRC\_INACTIVE;  - upon update of SI.  When the procedure is initiated, the UE shall:  1> ensure having acquired the available SIBs among SIB2, SIB5 and SIB24, if required according to 5.2.2.3;  Same thing in 38.331.  **3) It is unclear when the new 5.6.20.2 is to be executed**  We think it is only after the new 5.6.20.1a, so there is no point to have 2 separate procedures.  Same for 38.331.  **4) 5.6.20.2, it is wrong that serving cell measurement inclusion is subject to qualityThreshold**  Can change as below  4> if the *measCellList* is included:  5> consider cells on the measured carrier identified by each entry within the *measCellList* to be applicable for idle /inactive measurement reporting;  4> else:  5> consider the up to *maxCellMeasIdle* identified cells on the measured carrier with the highest sorting quantity to be applicable for idle/inactive measurement reporting;  4> for all cells applicable for idle/inactive measurement reporting and for the serving cell, derive measurement results for the measurement quantities indicated by *reportQuantities*  Same problem for serving cell in 38.331.  **5) 5.6.20, serving cell is not NR**  5> if the *measCellListNR* is included:  6> consider cells on the measured carrier identified by each entry within the *measCellListNR* to be applicable for idle/inactive measurement reporting;  5> else:  6> consider the up to *maxCellMeasIdle* identified cells to be applicable for idle/inactive measurement reporting;  Same problem for LTE in 38.331.  **6) 5.6.20 There are 2 sorting quantities for NR, unclear which is which**  Proposal: distinguish the "cell sorting quantity" and the "beam sorting quantity"  **7) We did not agree to require the UE to sort beams and cells in the report and it brings nothing**  **8) The network must include in SI one LTE carrier even if the network only wants UEs to measure NR**  Propose to fix this as below:  SystemInformationBlockType5 ::= SEQUENCE {  interFreqCarrierFreqList InterFreqCarrierFreqList,  ...,  lateNonCriticalExtension OCTET STRING (CONTAINING SystemInformationBlockType5-v8h0-IEs) OPTIONAL,  [[ interFreqCarrierFreqList-v1250 InterFreqCarrierFreqList-v1250 OPTIONAL, -- Need OR  interFreqCarrierFreqListExt-r12 InterFreqCarrierFreqListExt-r12 OPTIONAL -- Need OR  ]],  [[ interFreqCarrierFreqListExt-v1280 InterFreqCarrierFreqListExt-v1280 OPTIONAL -- Need OR  ]],  [[ interFreqCarrierFreqList-v1310 InterFreqCarrierFreqList-v1310 OPTIONAL, -- Need OR  interFreqCarrierFreqListExt-v1310 InterFreqCarrierFreqListExt-v1310 OPTIONAL -- Need OR  ]],  [[ interFreqCarrierFreqList-v1350 InterFreqCarrierFreqList-v1350 OPTIONAL, -- Need OR  interFreqCarrierFreqListExt-v1350 InterFreqCarrierFreqListExt-v1350 OPTIONAL -- Need OR  ]],  [[ interFreqCarrierFreqListExt-v1360 InterFreqCarrierFreqListExt-v1360 OPTIONAL -- Need OR  ]],  [[ scptm-FreqOffset-r14 INTEGER (1..8) OPTIONAL -- Need OP  ]],  [[ interFreqCarrierFreqList-v1530 InterFreqCarrierFreqList-v1530 OPTIONAL, -- Need OR  interFreqCarrierFreqListExt-v1530 InterFreqCarrierFreqListExt-v1530 OPTIONAL, -- Need OR  measIdleConfigSIB-r15 MeasIdleConfigSIB-r15 OPTIONAL -- Need OR  ]],  [[  measIdleConfigSIB-NR-r16 MeasIdleConfigSIB-NR-r16 OPTIONAL -- Need OR,  ]]  }  MeasIdleConfigSIB-r15 ::= SEQUENCE {  measIdleCarrierListEUTRA-r15 EUTRA-CarrierList-r15,  ...  }  MeasIdleConfigSIB-NR-r16 ::= SEQUENCE {  measIdleCarrierListNR-r16 NR-CarrierList-r16 OPTIONAL -- Need OR  ...  } |
| Samsung | We prop0se to modify the structure of the procedural specification to align more with RRM   1. Update title of 5.6.20.1a to clarify it concerns handling of measurement configuration received on broadcast 2. Remove intra-RAT cell (re-) selection from the section defining handling of broadcast configuration i.e. move to/ merge with inter-RAT(re-) selection 3. Create a separate section to cover the reporting aspects i.e. aspects related to the setting of results (including ordering)   See R2-2003395, proposal 2 (and TP in section 7 of the TDoc) |
| Samsung | Capture the missing agreement previous agreement regarding selection of the frequency list (i.e. that if UE receives a frequency list in Release, regardless which RAT it concerns, it will not use a frequency list from broadcast) by one of the options shown:  Option 1: general/ descriptive statement in the procedural specification  1> if the list of frequencies to measure is not configured or was received from system information i.e. the RRCRelease message included neither measIdleCarrierListEUTRA nor measIdleCarrierListNR:  Option 2: more precise approach using a field in the UE variable  I.e. upon receiving a frequency list in Release UE set a field freqListdedicated which it evaluates when handling the SIB (TP shown)  See R2-2003395, proposal 4 |

# 3. Summary

Based on the discussion in the previous sections the following are proposed:

Proposals for easy agreement:

Proposals for further discussion:

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