3GPP TSG-RAN WG2 Meeting #109bis\_e R2-20xxxxx

Electronic meeting, 20th April to 24th April 2020

Agenda Item: x.x.x

Source: Ericsson (rapporteur)

Title: RRC Open issues for DCCA

Document for: Discussion, Decision

# Introduction

This document captures the following email discussion:

* [Post109e#37][DCCA] RRC open Issues (Ericsson)

Scope: WI RRC review Resolve FFSs that don’t require major technical discussion (like need codes). Ensure that all agreements are captured properly

Intended outcome: Agreeable CR (deadline as above)

Intended outcome 2: Open Issues list with RRC impact (April 1)

In Section 2, the known open issues already identified during previous meetings are discussed.

In Section 3, new open issues identified by the rapporteur are discussed.

In Section 4, companies are invited to provide input regarding any open issues not addressed by the rapporteur.

# Known Open issues

In RRC CRs [1] [2], the following editor notes are left:

38.331

*#1: 5.3.13.4 Reception of the RRCResume by the UE*

Editor’s note: FFS if the *idleModeMeasuremnetReq* indicates all results (EUTRA and NR), or can request only NR results. The procedure below assumes the former.

*#2: 5.7.z.3 Reception of the UEInformationRequest message*

Editor’s note: FFS if the *idleModeMeasurementReq* indicates all results (EUTRA and NR), or can request only E-UTRA or NR results. The procedure below assumes the former.

*#3: 5.7.x.2 Initiation*

Editor’s note: FFS if one IE (*idleModeMeasurements* with ENUMERATED {eutra, nr, both}) or two separate IEs (i.e. one for NR, one for EUTRA) is to be used to indicate to the UE to perform EUTRA and/or NR early measurements.

*#4: 6.3.2 MeasIdleConfig*

Editor’s note: FFS if *nrofSS-BlocksToAverage* and *absThreshSS-BlocksConsolidation* should be defined together with the *carrierFreqNR* (i.e. outside the *ssb-MeasConfig* structure)

36.331

*#5: 5.3.3.4a Reception of the RRCConnectionResume by the UE*

Editor’s note: FFS if the *idleModeMeasurementReq* indicates all results (EUTRA and NR), or can request only EUTRA or NR results. The procedure below assumes the former.

*#6: 5.6.5.3 Reception of the UEInformationRequest message*

Editor’s note: FFS if the *idleModeMeasurementsReq* indicates all results (EUTRA and NR), or can request only EUTRA or NR results. The procedure below assumes the former.

*#7: 6.2.2 RRCConnectionResumeComplete*

Editors Note: FFS whether to have a separate availability indicator for rel-16 idle/inactive measurements.

*#8: 6.2.2 RRCConnectionSetupComplete*

Editors Note: FFS whether to have a separate availability indicator for rel-16 idle/inactive measurements.

*#9: 6.2.2 UEInformationRequest*

Editors Note: FFS whether to have a separate rel-16 idle/inactive measurement request or the idleModeMeasurementReq-r15 can be reused for rel-16 as well.

*#10: 6.3.5 MeasIdleConfig*

Editors note: FFS if *maxRS-IndexCellQual* and *threshRS-Index* should be defined together with the carrierFreqNR (i.e. outside the *ssb-MeasConfig* structure)

Issues #1,#2, #5, #6, #7, #8, and #9 are related to the granular early measurement request/reporting that was discussed before/during RAN2-109e [3][4][5]. The proponents of the granular reporting proposed to have both granular request (where the network can explicitly request E-UTRA, NR, or both measurements) and granular availability indication (where the UE can explicitly indicate it has E-UTRA, NR, or both measurements), and this was captured in a TP in [6]. In [7], it is proposed that the indicator *idleModeMeasurements* (SIB2 in LTE, SIB1 in NR) is used to implicitly indicate to the UE whether it should report E-UTRA, NR, or both measurements (but no granular availability indication from the UE). The companies that didn’t support the granular request/reporting cited as their main reason that it will lead to unnecessary complexity [3].

**Question 1: For LTE/NR rel-16, which of the following options discussed above should be adopted for the network to request early measurements and for the UE to indicate early measurement availability:**

1. ***Granular (Explicit):* UE explicitly indicates the measurements it has (in *RRC(connection)SetupComplete, RRC(Connection)ResumeComplete*) and network explicitly indicates the measurements it wants (in *UEInformationRequest, RRC(Connection)Resume*) (as captured in the TP in [6])**
2. ***Granular (Implicit):* network explicitly indicates the measurements it wants to be reported in the** *idleModeMeasurements* in **SIB (SIB2 in LTE, SIB1 in NR), (as proposed in [7])**
3. ***Non-Granular:* UE has one indicator to indicate early measurements (be them for E-UTRA and/or NR carriers), and network has one indicator to request early measurements (upon which the UE sends all measurement results it has available)**

|  |  |  |
| --- | --- | --- |
| **Company** | **Preferred option** | **Comments** |
| ZTE | b);  and a) in case idleModeMeasurements is set to ‘both’ | We think option a) and b) are not conflict.  idleModeMeasurement in SIB is cell specific configuration, in case idleModeMeasurements is set to “eutra or nr” (not both), it implies the network is only capable of processing idle/inactive measurement results of a specific RAT. Then it makes sense that UE indicates this measurement availability only if the UE has the results of corresponding RAT.  If idleModeMeasurement is SIB is set to both, it implies the network is able to process both eutra and nr results. However, based on UE’s service type and network policy, it is beneficial if network can ask the UE to only report the concerned results to network. |
| Huawei, HiSilicon | c) | Whether a cell wants the UE to measure LTE and/or NR results is already expressed in SIB and in most cases the UE will not have valid results other than that, so there is no need to add anything |
| MediaTek | a) or c) | We think early measurement on LTE and NR targets are different feature. Thus we are fine to have different availability indicator and request indicator for LTE and NR measurement. We could accept to have simple indicator if majority prefer single indicator.  However, we prefer NOT to use Implicit way. After going to CONNECTED mode, the content of response message (e.g. *UEInformationResponse*) should depends on the request in the request message (e.g. *UEInformationRequest*). We don’t think it is a good idea to use indicator in SIB at that time. |
| NEC | b) | Given the UE is moving and the network may have different policy or preference, the SIB indication is more suitable way. |
| CATT | b) | We prefer b) that network can explicitly indicate the measurements it wants to be reported in the idleModeMeasurements in SIB, the UE can acquire the SIB and perform measurement. The UE will report measurement results what it has measured according to the indicator in SIB. |
| Futurewei | b) | Slightly prefer b) since it provides network instruction while the scheme is still simple. |
| Samsung | c) | Similar view as expressed by Huawei.  Alike MTK we prefer option a) over option b, assuming that for option b) we will introduce statements in the specification that UE  1) Reports availability according to the bit in SIB and/ or  2) Includes results according to the bit in SIB? |
| Nokia | c) | Agree with Huawei |
| LG | a) or b) | It is possible that network configures LTE and NR early measurements to a UE but a cell in the validity area indicates only ‘NR’. In this case, reporting ‘LTE’ measurements may not be necessary.  b) implicit indication could be simple, but we agree with MTK that a) is enables more precise instruction by network. |
| OPPO | c) | Agree with Huawei. |

Issue #3 is related to the RAN2-109e agreement:

* In NR rel-16, the *idleModeMeasurements* can be used to specify whether the UE is required to perform early measurements on EUTRA, NR or both carriers. FFS if one IE (i.e. ENUMERATED {eutra, nr, both} or separate IEs (i.e. one for EUTRA, one for NR) is to be used.

In [8], it was proposed to define the *idleModeMeasurements* in SIB1 to be of type ENUMERATED {eutra, nr, both}, and the UE performing the early measurements accordingly. In [7], it was proposed to use separate IEs, *idleModeMeasurementsNR* and *idleModeMeasurementsEUTRA* instead. From both functionality and complexity point of view, there seems to be no significant difference between the two options.

**Question 2: For NR rel-16, which of the following options discussed above should be adopted for the network to indicate to the UE which RAT(s) to perform early measurements on:**

1. ***One IE:*** *idleModeMeasurements* in SIB1, with type ENUMERATED {eutra, nr, both} (as captured in the TP in [8])
2. ***Two IEs:*** *idleModeMeasurementsNR* and *idleModeMeasurementsEUTRA**(as proposed in [7])*

|  |  |  |
| --- | --- | --- |
| **Company** | **Preferred option** | **Comments** |
| ZTE | a) | We didn’t see extra benefit by defining two separate fields. |
| Huawei, HiSilicon | a) or b) | It makes no functional difference and ASN.1 coding has the same size. |
| MediaTek | b) | No strong view. Option b) seems more aligned with LTE. |
| NEC | a) | not strong opinion, but do not see specific benefit for b) |
| CATT | b) | We don’t see a significant difference in the two options. |
| Futurewei | a) | One IE is straight forward. |
| Samsung | b) | Although no strong view, prefer to align with LTE (procedure text is somewhat more straightforward) |
| Nokia | b) | No strong view but in order to just align with LTE it might be worthwhile to do separate IEs in order to be able to have as similar as possible procedural text. But anyway regardless of way to go functionality will be same. |
| LG | Slightly b) | There is no functional difference and size, but we slightly prefer to keep consistency with LTE spec. |
| OPPO | b) | No strong opinion. But it seems it is clear to set two separate configurations. |

Issues #4 and #10 is related to the issue raised in [9], and the reason cited there was:

In addition, *nrofSS-BlocksToAverage-r16* and *absThreshSS-BlocksConsolidation-r16* are also defined in ssb-MeasConfig-r16 for early measurement configurations. These are used for derivation of cell measurement results. But parameters related to cell level measurement results do not have to be updated from SIB during cell re-selection. For example, *qualityThreshold-r16* for each SSB measurement object, which defines the threshold of cell level quality for early measurement reporting, is defined out of *ssbMeasConfig-r16*. Therefore, we propose that *nrofSS-BlocksToAverage-r16* and *absThreshSS-BlocksConsolidation-r16* are defined out of ssb-MeasConfig-r16.

**Question 3: In *MeasIdleConfig*, where should the IEs *nrofSS-BlocksToAverage-r16* and *absThreshSS-BlocksConsolidation-r16 (*NR*)* and *maxRS-IndexCellQual* and *threshRS-Index* (LTE) be defined:**

1. ***Within ssb-MeasConfig (as in the current CRs [1][2])***
2. ***Outside ssb-MeasConfig (directly under MeasIdleCarrierNR)***

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| --- | --- | --- |
| **Company** | **Preferred option** | **Comments** |
| ZTE | a) for nrofSS-BlocksToAverage and absThreshSS-BlocksConsolidation;  b) for maxRS-IndexCellQual and threshRS-Index | nrofSS-BlocksToAverage and absThreshSS-BlocksConsolidations parameters are used for cell quality derivation. In case a frequency is configured for both early measurement and cell-reselection (in SIB4). And the nrofSS-BlocksToAverage and absThreshSS-BlocksConsolidation fields received from RRCRelease are different from the ones received in SIB4. It will force the UE to calculate two sets of RSRP/RSRQ results.  So we think these two fields should be included in ssb-MeasConfig, thus the UE is not required to continue early measurement if it receives different values from RRCRelease and SIB4 (based on the NOTE in spec); However, if the fields are sent differently in SIBx, we think the UE can still use the dedicated configurations for measurement. This was not discussed in RAN2 before, if companies have the same view, it can be further clarified in specification (e.g. the NOTE).  For maxRS-IndexCellQual and threshRS-Index, these are only used for early measurement, there is no problem if it is configured differently in SIB and RRCRelease, so we think these can be put outside ssb-MeasConfig. |
| Huawei, HiSilicon | a) for nrofSS-BlocksToAverage and absThreshSS-BlocksConsolidation;  b) for maxRS-IndexCellQual and threshRS-Index | Same motivations like ZTE. |
| MediaTek | a) | If the NW only provide frequency and SCS in dedicate message and the UE has to get the SSB configuration from SI, we prefer to use the same cell quality derivation parameters as in cell reselection. In this case, as explained by ZTE, the UE could avoid calculating 2 different set of measurement result.  For LTE, we understand that *maxRS-IndexCellQual* and *threshRS-Index* are also used for inter-RAT cell reselection and thus same motivation applies. We don’t see the reason that LTE and NR should have different solution. |
| NEC | a) for nrofSS-BlocksToAverage and absThreshSS-BlocksConsolidation  b) for maxRS-IndexCellQual and threshRS-Index | For nrofSS-BlocksToAverage and absThreshSS-BlocksConsolidations, we agree with ZTE.  For maxRS-IndexCellQual and threshRS-Index, it seems reasonable to define together with carrierFreqNR rather than put these within ssb-MeasConfig. |
| CATT | b) | In our understanding, there will also be two sets of RSRP/RSRQ results which we consider it acceptable for LTE when maxRS-IndexCellQual and threshRS-Index fields received from RRCRelease are different from the ones received in SIBs if the two fields are defined outside ssb-MeasConfig. Hence, we propose to use the same principle for both NR and LTE. In addition, it seems simpler to define the two fields outside ssb-MeasConfig to let the UE can still use the dedicated configurations for measurement when the fields are sent differently in SIBs instead of adding or changing the notes in current spec. |
| Futurewei | a) | No strong opinion. Don’t see any show-stopper on simply adopt a) for all the parameters. |
| Samsung | a) | For same reasons as expressed by others i.e. should avoid that UE cannot re-use results of measurements performed for cell re-selection |
| Nokia | a) for both | Maybe there is some misunderstanding on our part regarding LTE part but isn’t it so that LTE UE also perfroms reselection evaluation of NR cells as well as early measurements thus argumentation for NR and LTE should be same? |
| LG | a) for nrofSS-BlocksToAverage and absThreshSS-BlocksConsolidation;  b) for maxRS-IndexCellQual and threshRS-Index | Also same understanding with ZTE. |
| OPPO | a) | Confused with the difference between a) and b). |

In both 36.331 and 38.331, there is an FFS regarding the maximum number of cells per carrier for idle/inactive measurements for rel-16

36.331

maxCellMeasIdle-r16 INTEGER ::= 8 -- Value FFS

38.331

maxCellMeasIdle-r16 INTEGER ::= 65535 -- Maximum number of cells per carrier for idle/inactive measurements is FFS

In LTE euCA, the *maxCellMeasIdle-r15* is defined to be 8. A simple approach in rel-16 could be to adopt the same limitation as in LTE euCA (i.e. up to 8 cells per carrier can be included in the idle/inactive measurement results).

**Question 4: Do companies agree to adopt the LTE euCA limitation of a maximum of 8 cells per carrier for idle/inactive measurement results also for LTE/NR rel-16?**

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| --- | --- | --- |
| **Company** | **Preferred option** | **Comments** |
| ZTE | Agree |  |
| Huawei, HiSilicon | Ok |  |
| MediaTek | Agree | Reporting 8 cells per carrier seems enough |
| NEC | Agree |  |
| CATT | Agree |  |
| Futurewei | Agree |  |
| Samsung | Fine |  |
| Nokia | OK |  |
| LG | Agree |  |
| OPPO | Agree |  |

Another issue is related to the need codes of the IEs in *MeasIdleConfig*. Since the *MeasIdleCarrierListEUTRA* and *MeasIdleCarrierListNR* are utilized both in *MeasIdleConfigSIB* and *MeasIdleConfigDedicated*, it is not clear on how to specify the need code of the IEs within that. Also, the way the need codes for the corresponding IEs to specify the SSB configuration are defined in SIBs in LTE and NR differently. For example, in SIB24 of LTE, we have:

CarrierFreqNR-r15 ::= SEQUENCE {

carrierFreq-r15 ARFCN-ValueNR-r15,

multiBandInfoList-r15 MultiFrequencyBandListNR-r15 OPTIONAL, -- Need OR

multiBandInfoListSUL-r15 MultiFrequencyBandListNR-r15 OPTIONAL, -- Need OR

measTimingConfig-r15 MTC-SSB-NR-r15 OPTIONAL, -- Need OR

subcarrierSpacingSSB-r15 ENUMERATED {kHz15, kHz30, kHz120, kHz240},

ss-RSSI-Measurement-r15 SS-RSSI-Measurement-r15 OPTIONAL, -- Cond RSRQ2

cellReselectionPriority-r15 CellReselectionPriority OPTIONAL, -- Need OP

cellReselectionSubPriority-r15 CellReselectionSubPriority-r13 OPTIONAL, -- Need OR

threshX-High-r15 ReselectionThreshold,

threshX-Low-r15 ReselectionThreshold,

threshX-Q-r15 SEQUENCE {

threshX-HighQ-r15 ReselectionThresholdQ-r9,

threshX-LowQ-r15 ReselectionThresholdQ-r9

} OPTIONAL, -- Cond RSRQ

q-RxLevMin-r15 INTEGER (-70..-22),

q-RxLevMinSUL-r15 INTEGER (-70..-22) OPTIONAL, -- Need OR

p-MaxNR-r15 P-MaxNR-r15,

ns-PmaxListNR-r15 NS-PmaxListNR-r15 OPTIONAL, -- Need OR

q-QualMin-r15 INTEGER (-43..-12) OPTIONAL, -- Need OP

deriveSSB-IndexFromCell-r15 BOOLEAN,

maxRS-IndexCellQual-r15 MaxRS-IndexCellQualNR-r15 OPTIONAL, -- Need OR

threshRS-Index-r15 ThresholdListNR-r15 OPTIONAL, -- Need OR

...,

[[ multiBandNsPmaxListNR-v1550 MultiBandNsPmaxListNR-1-v1550 OPTIONAL, -- Need OR

multiBandNsPmaxListNR-SUL-v1550 MultiBandNsPmaxListNR-v1550 OPTIONAL, -- Need OR

ssb-ToMeasure-r15 SSB-ToMeasure-r15 OPTIONAL -- Need OR

]]

}

While in SIB4 of NR, we have:

InterFreqCarrierFreqInfo ::= SEQUENCE {

dl-CarrierFreq ARFCN-ValueNR,

frequencyBandList MultiFrequencyBandListNR-SIB OPTIONAL, -- Cond Mandatory

frequencyBandListSUL MultiFrequencyBandListNR-SIB OPTIONAL, -- Need R

nrofSS-BlocksToAverage INTEGER (2..maxNrofSS-BlocksToAverage) OPTIONAL, -- Need S

absThreshSS-BlocksConsolidation ThresholdNR OPTIONAL, -- Need S

smtc SSB-MTC OPTIONAL, -- Need S

ssbSubcarrierSpacing SubcarrierSpacing,

ssb-ToMeasure SSB-ToMeasure OPTIONAL, -- Need S

deriveSSB-IndexFromCell BOOLEAN,

ss-RSSI-Measurement SS-RSSI-Measurement OPTIONAL,

q-RxLevMin Q-RxLevMin,

q-RxLevMinSUL Q-RxLevMin OPTIONAL, -- Need R

q-QualMin Q-QualMin OPTIONAL, -- Need S

p-Max P-Max OPTIONAL, -- Need S

t-ReselectionNR T-Reselection,

t-ReselectionNR-SF SpeedStateScaleFactors OPTIONAL, -- Need S

threshX-HighP ReselectionThreshold,

threshX-LowP ReselectionThreshold,

threshX-Q SEQUENCE {

threshX-HighQ ReselectionThresholdQ,

threshX-LowQ ReselectionThresholdQ

} OPTIONAL, -- Cond RSRQ

cellReselectionPriority CellReselectionPriority OPTIONAL, -- Need R

cellReselectionSubPriority CellReselectionSubPriority OPTIONAL, -- Need R

q-OffsetFreq Q-OffsetRange DEFAULT dB0,

interFreqNeighCellList InterFreqNeighCellList OPTIONAL, -- Need R

interFreqBlackCellList InterFreqBlackCellList OPTIONAL, -- Need R

...

}

**Question 5: In LTE, do companies agree to use the same need codes for the IEs within *ssb-MeasConfig* of *MeasIdleCarrierNR* as in the corresponding IEs in SIB24?**

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| --- | --- | --- |
| **Company** | **Preferred option** | **Comments** |
| ZTE | Agree |  |
| Huawei, HiSilicon | Need OR | See explanations in question 6. |
| MediaTek | Need OR | We understand the configuration is either from RRC Release or from SI. There is no delta configuration for this thus “Need OR” is more suitable. |
| NEC | Agree |  |
| CATT | Agree |  |
| Samsung | Need OR | As also for dedicated there is no delta signalling as expressed by MTK |
| Nokia | Agree |  |
| LG | Agree |  |
| OPPO | Agree |  |

**Question 6: In NR, do companies agree to use the same need codes for the IEs within *ssb-MeasConfig* of *MeasIdleCarrierNR* as in the corresponding IEs in SIB4?**

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| --- | --- | --- |
| **Company** | **Preferred option** | **Comments** |
| ZTE | Agree | For fields defined as “Need S”, the UE applies default value/behaviour if the field is absent. For instance, for smtc, the UE applies 5ms periodicity if the field is absent. Then we need to discuss how UE determines the configuration mismatch when dedicated signalling does not include smtc, while UE moves to another cell whose SIB includes smtc with 5ms (or vice versa).  In our view, this may happen in inter-vendor scenario. Although the values indicated by RRCRelease and SIB are different, the UE’s behaviours are the same, so we would prefer the UE to continue idle/inactive measurement in this case. |
| Huawei, HiSilicon | Need R | because:  - the only UE action specified for these parameters is "store or replace" so there is no UE action specified upon absence and need S in not suitable  - this makes is clear that there is no delta signalling for the "store or replace" operation in VarMeasIdleConfig  - "need S" would give the impression that UE takes the "default action" in case of absence in dedicated signalling while there is a value in SIBx or SIB4 (or in case of absence in SIBx while there is a value in SIB4).  This is the same situation like for connected RRM measurements where the UE acts upon a variable and in MeasObjectNR and ReportConfigNR, all fields are Need M or Need R depending whether there is delta signalling or not. |
| MediaTek | Need R | Same view as Huawei |
| NEC | Agree | agree with ZTE to clarify the default behaviour, when the field is absent.  Regarding “absent in dedicated and present in SIB” (or vice versa) commented by Huawei, it would be good to clarify that. To our understanding (maybe incorrect), the ssb-MeasConfig itself can be Optional with Need R (as commented by ZTE to running CR) which is currently Need N in MeasIdleCarrierNR. We also assume there is no mix of dedicated and SIB for IEs within the ssb-MeasConfig. |
| CATT | Agree |  |
| Futurewei | Need R | Agree with Huawei’s view. |
| Samsung | Not sure | Maybe best to conclude with updated procedure text that clarifies UE behaviour when certain fields are *not configured*. In principle this is a different aspect than what to do upon absence, so need R seems appropriate. However, in several similar cases need S is used  (resolving need codes is maybe also more something for ASN.1 review session) |
| Nokia | Need R |  |
| LG | Need R | Same understanding with Huawei. |
| OPPO | Agree |  |

# Other Open issues

The idle/inactive measurement procedures in the endorsed CRs [1][2] have been checked by the rapporteur and the following open issues have been identified:

1. The idle/inactive measurement procedure (5.7.x.2 in 38.331 and 5.6.20.2 in 36.331) contains the procedure for handling both the early measurement configuration as well as the early measurement performance. This seems to make the procedure hard to comprehend and different from the way connected mode measurements were handled, where we have separate clauses for measurement configuration and performing measurements.
2. The current procedures do not capture the cell quality derivation from beams.
3. The current procedures do not properly capture how the beam index and beam results are included in the early measurements.

The rapporteur has updated the running CRs (attached with this email discussion document) to address the above aspects.

**Question 7: Do companies agree with splitting the idle/inactive measurement procedures into the handling of measurement configurations and performing measurements, as captured in the updated running CRs?**

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| --- | --- | --- |
| **Company** | **Preferred option** | **Comments** |
| ZTE | Agree |  |
| Huawei, HiSilicon | No strong preference | But in 36.331, the numbering is wrong (2a normally comes after 2) |
| MediaTek | Agree |  |
| NEC | Agree |  |
| CATT | Agree | It is clearer. |
| Futurewei | Agree | Slightly prefer specifying separately. |
| Samsung | Agree | We agree with the general intention to restructure. In principle there we see the following parts: (may provide further detailed suggestions later)  Handling of configuration in SI  Measurements to perform  Storing of measurement results  Actions upon reselection |
| Nokia | No strong prefernce | Proposal as such is OK (but also agree with Huawei comment about numbering) but also this is not required as such so we are OK with original structure as well. |
| LG | Agree | More readable |
| OPPO | No strong opinion |  |

**Question 8: Do companies agree with the way the cell quality derivation from beams is handled in the updated running CRs?**

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| --- | --- | --- |
| **Company** | **Preferred option** | **Comments** |
| ZTE | No strong view. |  |
| Huawei, HiSilicon | Partially | The text for cell quality derivation from beams is generally ok (see one suggestion below) but it is rather strange to have a requirement to derive beam results after the requirement to derive cell results, while the beam results needs to be derived first. We would suggest to either:  - (36.331 style) keep in "performing measurements" only the setting of cell and beam results in the variable (no "derive" statement) and put a sentence e.g. at the beginning saying that NR cell and beam results are derived according to section xxx (new or refer to 38.304 section 5.2.1)  - (38.331 style) have the "derive" statements for beam results (according to beam and cell quantities), then for cell results, then the rest of the text is ok  (Note: the suggestion is not to have a different approach for the 36.331 CR and for the 38.331 CR, it is just to state that the requirements to derive NR cell/beam results are worded in two different flavours in these two specifications and either could be reused).  In the text (supposing it is kept) for cell quality derivation from beams, "derive each cell measurement quantity" should be changed "derive the cell measurement quantity" because there is "for each cell measurement quantity" above. |
| MediaTek | Agree the principle | We agree to follow the same principle for cell quality derivation as in CONNECTED mode. To avoid similar text in several spec section, we prefer to follow the 36.331 style mentioned by Huawei (refer to a new section or 38.304 section 5.2.1). |
| CATT | Agree | Seems ok |
| Futurewei | Agree |  |
| Samsung | Agree the principle | We agree to follow the same principle for cell quality derivation as in CONNECTED mode. For 36.331 it seems possible to actually refer to 5.5.3.3 (just needs to be generalised a bit).  Also, isn’t convention that procedures used in both connected and idle and connected are normally specified in .331. |
| Nokia | Partially | Agree with Huawei |
| LG | No strong view |  |
| OPPO | Agree |  |

**Question 9: Do companies agree with the way the beam index/results are included in the early measurements in the updated running CRs?**

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| --- | --- | --- |
| **Company** | **Preferred option** | **Comments** |
| ZTE | No strong view |  |
| Huawei, HiSilicon | Partially | See question above. |
| MediaTek | Agree the principle |  |
| CATT | Agree |  |
| Futurewei | Agree |  |
| Nokia | No strong view |  |
| LG | No strong view |  |
| OPPO | Agree |  |

Another open issue related to early measurements in LTE is regarding how to capture the RAN2-109e agreements on the number of carriers that can be reported, i.e.

* *For early measurement configuration and reporting, ASN.1 signalling to allow the configuration of*
  + *up to 8 E-UTRA and 8 NR carries to be measured*
  + *up to 8 E-UTRA and 8 NR carriers to be reported*
  + *up to 32 beams to be included in the NR results*

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

and

maxIdleMeasCarriers-r15 INTEGER ::= 3 -- Maximum number of neighbouring inter-frequency carriers measured in RRC\_IDLE and RRC\_INACTIVE

One way of capturing this could be to define a rel-16 IE for E-UTRA measurements, for example:

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

VarMeasIdleReport-r16 ::= SEQUENCE {

measReportIdle-r16 MeasResultListIdle-r16,

measReportIdleNR-r16 MeasResultListIdleNR-r16 OPTIONAL

}

If such an approach is to be employed, the idle/inactive measurement procedure text has to be checked to see if any corresponding updates are necessary.

**Question 10: What are companies views regarding on how to capture the agreement from RAN2-109e in 36.331 to enable up to 8 EUTRA and 8 NR carriers to be reported for early measurements?**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | We are ok to define a rel-16 IE, but since we reuse legacy idleModeMeasurement field for EUTRAN early measurement, we are wondering whether a Rel-16 UE knows the eNB is in Rel-15 version or Rel-16 version? Is there a problem that the UE uses Rel-16 IE for reporting but an old eNB cannot decode it? |
| MediaTek | In R15 LTE euCA, the UE could report up to 3 LTE carriers according to the ASN.1 define in *MeasResultListIdle-r15*. We do not see strong need to extend the number of reporting carrier for now. But if we want to do this, we have to consider the backward compatible issue. A new UE capability saying that it could include more than 3 carrier for LTE early measurement reporting and a new NW control to indicate whether the UE should using the R16 IE to report LTE early measurement results may be needed. |
| NEC | Prefer to define new Rel-16 IE. |
| CATT | For ZTE’s question, we think the UE can implicitly know the version of eNB based on eNB’s IE version in broadcast. |
| Futurewei | The rapporteur suggested approach of new Rel-16 IE is OK. |
| Samsung | For LTE carriers, we prefer to extend the list in the normal way i.e. using ListExt rather than using a critical extension (replacement) |
| Nokia | No strong view |
| LG | New Rel-16 IE seems simple, but no strong view. |
| OPPO | Agree with rapporteur’s suggestion. |

It has been agreed to support the SCell addition/modification in RRCConnectionResume, as well as be able to set the SCell state. However, it was not clear on how to capture the SCell configuration from the way it was used in the *RRCConnectionReconfiguration* as there were several extensions of the *SCellToAddModList* IEs:

SCellToAddModList-r10 ::= SEQUENCE (SIZE (1..maxSCell-r10)) OF SCellToAddMod-r10

SCellToAddModList-v10l0 ::= SEQUENCE (SIZE (1..maxSCell-r10)) OF SCellToAddMod-v10l0

SCellToAddModList-v13c0 ::= SEQUENCE (SIZE (1..maxSCell-r10)) OF SCellToAddMod-v13c0

SCellToAddModListExt-r13 ::= SEQUENCE (SIZE (1..maxSCell-r13)) OF SCellToAddModExt-r13

SCellToAddModListExt-v1370 ::= SEQUENCE (SIZE (1..maxSCell-r13)) OF SCellToAddModExt-v1370

SCellToAddModListExt-v13c0 ::= SEQUENCE (SIZE (1..maxSCell-r13)) OF SCellToAddMod-v13c0

SCellToAddModListExt-v1430 ::= SEQUENCE (SIZE (1..maxSCell-r13)) OF SCellToAddModExt-v1430

SCellGroupToAddModList-r15 ::= SEQUENCE (SIZE (1..maxSCellGroups-r15)) OF SCellGroupToAddMod-r15

Most of these IEs are building on top of each other, as explained in the field description:

***sCellToAddModList, sCellToAddModListExt***

Indicates the SCell to be added or modified. E-UTRAN uses field *sCellToAddModList-r10* to add or modify SCells (with *sCellIndex-r10*) for a UE that does not support carrier aggregation with more than 5 component carriers. If E-UTRAN includes *sCellToAddModListExt-v1430* it includes the same number of entries, and listed in the same order, as in *sCellToAddModListExt-r13*. If E-UTRAN includes *sCellToAddModList-v10l0* it includes the same number of entries, and listed in the same order, as in *sCellToAddModList-r10*. If E-UTRAN includes *sCellToAddModListExt-v1370* it includes the same number of entries, and listed in the same order, as in *sCellToAddModListExt-r13*. If E-UTRAN includes *sCellToAddModListExt-v13c0* it includes the same number of entries, and listed in the same order, as in *sCellToAddModListExt-r13.*

In order to enable the proper SCell addition/modification during connection resume in LTE, several of the above IEs have to be included in the *RRCConnectionResume* message or a new IE has to be introduced that includes all the relevant rel-15 SCell configuration (including the SCell state).

**Question 11: What are companies views regarding the ASN.1 signalling for SCell addition/modification in *RRCConnectionResume* message?**

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| --- | --- |
| **Company** | **Comments** |
| ZTE | To make spec clean, we prefer to define a new sCellToAddModList field for RRCConnectionResume message. |
| MediaTek | We also prefer to add a new IE to include all the relevant rel-15 SCell configuration. |
| CATT | No strong view. Slightly prefer a new IE. |
| Samsung | We prefer to create a new IE SCellToAddMod-r16 in which all fields including previous extensions are merged (according to general principles) |
| Nokia | Just define new -r16 version |
| OPPO | Define new -R16 version IE. |

Another open issue is related to SCell dormancy (38.331):

*6.3.2 BWP-DownlinkDedicated* (*radioLinkMonitoringConfig*)

FFS: the implicit BFD-RS configuration for dormant BWP is supported or not.

This was raised in [10], and the reason cited there was:

RAN2 agreed that the *PDCCH-Config* IE will not be configured in the dormant DL BWP. So it is impossible to configure the BFD-RS for dormant BWP implicitly due to no TCI state configuration for PDCCH.

**Question 12: Which option is preferred regarding implicit configuration of BFD-RS for dormant BWP:**

1. ***Do not support the implicit configuration of BFD-RS for an SCell in dormancy.***
2. ***Revise the prior agreement so that the PDCCH-config IE can be configured for the dormant BWP in order to support the implicit BFD-RS configuration for dormant BWP***
   1. ***Only tci-StatesPDCCH-ToAddList is applied for the dormant BWP and other configurations in PDCCH-config are ignored (not applied).***
   2. ***No search space is configured in PDCCH-Config of dormant BWP, so that the UE does not monitor PDCCH in dormant BWP but can apply tci-StatesPDCCH-ToAddList included in ControlResourceSet.***
3. ***If MAC-CE is used to activate TCI of PDCCH in the associated non-dormant BWP (i.e. firstWithinActiveTimeBWP-Id configured in RRC), UE will use such TCI state to perform BFD in the dormant BWP*.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Preferred option** | **Comments** |
| ZTE | b-1 | We think it is more flexible to configure different tci-statesPDCCH-ToAddList configuration for dormant BWP, thus option c) seems too restrictive. |
| MediaTek | b-1 | We think that b-1 is more straightforward, wherein the BFD-RS will be the RS in the active TCI based on the *tci-StatesPDCCH-ToAddList*. Option c is looks confusing, it is strange to “activate” the TCI on a “non-active” BWP. We prefer not to use this option. |
| NEC | b-1 | Our preference is either b-1 or b-2. b-1 seems simpler.  By the way, RAN2 is asking the related question below to RAN1 (R2-2002381). Is there any impact by possible RAN1 response?  **Q 1: Are there any issues due to RAN2 agreements on TCI state configuration, i.e. *tci-StatesToAddModListat* in PDSCH-Config is configured for dormant BWP?** |
| CATT | a) | The RS for BFD needs to be configured for all BWPs at each beam for channel tracking and CSI measurements anyway. There is no additional overhead on RRC signalling for explicit RS configuration for BFD in the dormant BWP. |
| Futurewei | b-1 | The option “c)” may introduce delay in when action is needed right-way which is not desirable in activated state in RRCConnected. |
| Samsung | b-2 | We think b-2 seems the most reasonable approach that also avoids significant specification impact. Perhaps we could have a line in the field description of searchSpacesToAddModList in PDCCH-Config e.g. UE is not configured with Search Space for the dormant BWP |
| Nokia | not a) | One should understand that in most of situations TCI states configured would be exactly same as for non-dormant BWP.  c seems to be quite easy to achieve implicit configuration.  Regarding option b) – We consider that it would be easier to define new IE for this purpose than defining rules which parameters are not used i.e. just a IE with required parameter(s) and as said in most (probably all) of cases anyway one would be using same TCI states as for non-dormant BWP then it might be more reasonable to allow this kind of configuration as well |
| LG | a) | If necessary, it is sufficient for network to signal explicit resources for BFD. No other solution that introduces some hanging parameters is not needed. |
| OPPO | a | In last RAN2 meeting, RAN2 LS is sent out to RAN1 to confirm the issues for the dormant BWP, I think RAN1 will discuss it in next RAN1 meeting. |

# Other issues

Besides the issues discussed in previous sections, companies are invited to list other open issues related to the DCCA RRC CRs (including the additional aspects/agreements captured in the updated CRs).

**Question 13: Any other open issues related to the DCCA RRC CRs?**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MediaTek | For SCell Dormancy, we have define first non-dormant DL BWP while BWP is switching from dormant to dormant.  firstWithinActiveTimeBWP-Id-r16 BWP-Id OPTIONAL, -- Cond MultipleNonDormantBWP  firstOutsideActiveTimeBWP-Id-r16 BWP-Id OPTIONAL -- Cond MultipleNonDormantBWP-WUS  We think that similar define for first non-dormant UL BWP is required (for FDD case). Otherwise, there will be ambiguity for the current active UL BWP between UE and NW. Other companies’ view on this is welcome. |
| Nokia | As we commented during RAN2#109, the newly added instances of “the procedure ends” in 38.331 section “5.3.5.3 Reception of an RRCReconfiguration by the UE” erroneously prevent execution of the last level-1> bullet within that procedure: “if *reconfigurationWithSync* was included in *spCellConfig* of an MCG or SCG, and when MAC of an NR cell group successfully completes a Random Access procedure triggered above …”  This problem needs to be solved. And we provide a proposal in the CRs. |
| OPPO | For RRC\_INACTIVE or RRC\_IDLE UE UE, the the idle measurement results are included in UEInformationResponse message.  If the idle measurement results are big enough and they cannot be included completely in the first report, then the UE can indicate the available measurement results in UEInformationResponse message.  However, there is no “idleMeasAvailable” in UEInformationResponse message.  We propose to add “idleMeasAvailable” in UEInformationResponse message. |

# Summary

# References

1. R2-2002392, CR for 38.331 for CA\_DC\_enhancements, Ericsson (Rapporteur), RAN2#109-e, Electronic Meeting, Feb 24th – March 6th 2020
2. R2-2002391, CR for 36.331 for CA\_DC\_enhancements, Ericsson (Rapporteur), RAN2#109-e, Electronic Meeting, Feb 24th – March 6th 2020
3. R2-2001252**,** Report on Email Discussion [108#54][DCCA] Early measurements Ericsson, RAN2#109-e, Electronic Meeting, Feb 24th – March 6th 2020
4. R2-2002131, Report on offline discussion [AT109e][045][DCCA] Early measurement reporting – Phase 1, Ericsson, RAN2#109-e, Electronic Meeting, Feb 24th – March 6th 2020
5. R2-2002289, Report on Email Discussion [108#54][DCCA] Early measurements – part 2, Ericsson, RAN2#109-e, Electronic Meeting, Feb 24th – March 6th 2020
6. R2-2001251, Granular reporting of early measurement results, Ericsson, MediaTek Inc., ZTE Corporation, LG Electronics Inc., RAN2#109-e, Electronic Meeting, Feb 24th – March 6th 2020
7. R2-2000298,Granularity of early measurement and reporting, vivo, RAN2#109-e, Electronic Meeting, Feb 24th – March 6th 2020
8. R2-2001124, Early measurement indication in NR SIB1, ZTE Corporation, Sanechips, Ericsson, MediaTek Inc, RAN2#109-e, Electronic Meeting, Feb 24th – March 6th 2020
9. R2-2000252, Remaining issues for SSB measurement configuration, CATT, RAN2#109-e, Electronic Meeting, Feb 24th – March 6th 2020
10. R2-2002224, Email discussion [AT109e#46][DCCA] Scell Dormancy Open Issues, OPPO, RAN2#109-e, Electronic Meeting, Feb 24th – March 6th 2020