**3GPP TSG-RAN** **WG2 Meeting #109bis-e R2-200xxxx**

**Electronic, April 20 – 30, 2020**

**Source: Qualcomm Incorporated**

**Title: Summary of email discussion [AT109bis-e][014][NR15] UE Cap Miscellaneous I**

**Document for: Decision**

**Agenda Item: 6.19**

# Introduction

This document summarizes the following email discussion.

(The chairman notes listed Tdoc R2-2002679, which is unrelated to UE capability. It was corrected to R2-2002579 below.)

* [AT109bis-e][014][NR15] UE Cap Miscellaneous I (Qualcomm, ZTE, Mediatek, Huawei)

Scope: Treat [R2-2002571](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002571.zip), [R2-2002572](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002572.zip), [R2-2002696](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002696.zip), [R2-2002578](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002578.zip), [R2-2002579](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002579.zip), [R2-2002724](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002724.zip), [R2-2003463](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003463.zip), [R2-2003464](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003464.zip)

Part 1: Determine which issues that need resolution, find agreeable proposals. Deadline: April 23 0700 UTC

Part 2: For the parts that are agreeable, discussion will continue to agree on CRs.

# Discussion: Part 1 (by April 23 0700 UTC)

It is proposed to try to come to a set of agreeable proposals out of the documents listed above.

## Corrections on the number of DRBs ([R2-2002571](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002571.zip), [R2-2002572](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002572.zip))

These CRs try to clarify the UE minimum requirement for the number of DRBs.

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| **Company name** | **Support / Not support** | **Comments** |
| Qualcomm Incorporated | Support (proponent) |  |
| Intel | Support |  |
| Samsung | Support (proponent) | Instead of updating the existing definition, we could consider adding additional row for RLC bearers like below:   | Parameter | Description | Value | | --- | --- | --- | | #DRBs | The number of DRB IDs that a UE shall support. | 16 per UE.  ~~NOTE:       8 per MAC entity with duplication.~~ | | #RLC Bearers | The number of RLC bearers that a UE shall support. | 16 per UE.  NOTE:    8 per MAC entity with PDCP duplication. | |
| NTT DOCOMO | Support |  |
| CATT | Support |  |
| Huawei | Support |  |
| Ericsson | Support |  |
| OPPO | support |  |
| MediaTek | Support |  |
| ZTE | Support |  |
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**Rapporteur’s suggestion:**

Review CRs updated based on Samsung’s comment, in the part 2 of the email discussion.

## CR on unnecessary FRx differentiation ([R2-2002696](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002696.zip))

This CR tries to clarify that FRx differentiation is not necessary for those “per RF band” capabilities because frequency band itself indicates the frequency range.

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| **Company name** | **Support / Not support** | **Comments** |
| Qualcomm Incorporated | Not support | It is our understanding that xDD diff and FRx diff columns in 38.306 are meant to indicate if the UE is allowed to indicate different capabilities, i.e. to indicate UE requirement, as opposed to indicate whether the RRC signalling uses the “diff” format. Changing “yes” to “no” imposes new requirement for the UE to implement and test those features on par for FR1 and FR2. |
| Nokia | Not support | We had a different understanding than Qualcomm initially but would like to understand if the capabilities under discussion will create a inconsistency in UE requirements? If yes, then we do not support. |
| Intel | Neutral | In our view even if the UE is allowed to indicate diff capabilities, the corresponding IEs should be defined, and in that sense the CR is correct. We also have more such paramters in per-BC which do not have the IEs for the UE to provide differing XDD/FRX capabilities. We would like to see RAN2’s opinion in this and if corrections are needed, then the others have to be corrected as well. |
| Samsung | Not support | This column of FRx diffenciation (i.e. FR1-FR2 DIFF) is used to indicate the functional explanation, that is, this column is not related to the actual signaling where this parameter located. |
| NTT DOCOMO | Support but | It would be better to build the common understanding amongst everyone, what the column of xDD/FRx is meant for any other capabilities than per-UE. We understand that the need of xDD/FRx is defined for per-UE capabilities from the signalling structure viewpoint. For any other capabilities, e.g. per band per band combination, it is quite obvious (since R99?) that capabilities can be different per frequency band. |
| CATT | Support | We think the changes are in-line with current 331 spec. |
| Huawei | Not support | We share the same view with Qualcomm that xDD diff and FRx diff columns in 38.306 are meant to indicate if the UE is allowed to indicate different capabilities. E.g. the NOTE in the description of beamManagementSSB-CSI-RS explains clearly that it is FRx diff. |
| Ericsson | Support | In response to QC: Note that for most of the fields in BandNR the two columns are set to “No”. Following your suggested interpretation, a UE that sets such field for one BandNR would have to set it in all BandNRs... and set it to the same value. Then we should have made it a per-UE capability in the first place. |
| OPPO | Not support | We agree with the intention, but we disagree with CR.  xDD diff and FRX diff columns in 38.306 intends to indicat whether UE is allowed to signal different capability for that dimension. From online discussion it is common understanding that this is only applicable per UE capability. For the rest kinds of UE capability e.g. per band UE capability signalling itself can already enable to indicate different UE capability between different bands hence we should change the “yes” or “no” in Xdd diff and FRX diff column to be either “N/A” or “yes” for all UE capability except for per UE capability |
| MediaTek | Not support | These parameters are per band or per BC, therefore, not applicable for xxParametersFRX-Diff. |
| ZTE | Support | We think for per-band capabilities, the XDD-Diff,   FRx-Diff columns are meaningless. If “No” means the UE cannot indicate   different capabilities for FR1 and FR2, we are afraid this interpretation   also impact other existing features.  We proposed to change it to “No”, only because this is what we already   used for other features. But we agree that further discussion is needed.   Maybe it is better to use “N/A” or “NULL” instead. |
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**Rapporteur’s suggestion:**

Continue discussion and try to come to a common understanding, via an email discussion until the next meeting.

It is rapporteur’s understanding that no one is really trying to change the UE requirement, i.e. changing “Yes” to “No” does not mean that the UE cannot signal different capabilities for different bands. With that understanding, the discussion is mostly about formality of the specification, and is not very urgent.

Checking the corresponding capability parameters in TR38.822, the current “FDD-TDD DIFF” and “FR1-FR2 DIFF” columns in TS38.300 seem to be direct implementation of what RAN1 has indicated.

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| **TS38.822**  (RAN1 feature list) | **TS38.306** |
| Yes | Yes |
| No | No |
| N/A | No |

It is probably unclear what RAN1 meant by “N/A”, and what was the rationale for putting “No” in 38.300. It is also important to look into UE capabilities with non-binary indication as Huawei commented.

## Signalling of NR-DC only band combination ([R2-2002578](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002578.zip))

This document tries to obtain RAN2’s confirmation that the current UE capability signalling allows the UE to indicate band combinations supported with NR-DC, but not with NR CA.

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| **Company name** | **Agree / Disagree** | **Comments** |
| Qualcomm Incorporated | Agree (proponent) |  |
| Nokia | Agree |  |
| Intel | Agree, but | We wonder if there are any network implementations that might be impacted by this. |
| Samsung | Agree |  |
| NTT DOCOMO | Agree | Better to describe somewhere in the spec how an NR-DC band combination without support of (FR1-FR2) CA is reported, even as a note. |
| CATT | Agree | We agree the principle. But not sure if any change is needed in the spec. |
| Huawei |  | So far we don’t see such band combination supported with only NR-DC but not with NR CA defined in RAN4. And we have concern that it may lead to NBC issue. |
| Ericsson | Agree |  |
| OPPO | Agree |  |
| ZTE | Agree |  |
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**Rapporteur’s suggestion:**

Allow more time for companies (infra-vendors) to check if the suggested approach causes any inter-operability issue.

## Clarification on supported NR-DC cell grouping ([R2-2002579](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002579.zip))

This CR tries to clarify the supported cell grouping for NR-DC in release-15.

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| **Company name** | **Support / Not support** | **Comments** |
| Qualcomm Incorporated | Support (proponent) |  |
| Nokia | Support, but… | This is correct but is this clarification really required if that was obvious from RAN4 specifications as we understand it. |
| Intel | Ok | If RAN2 wants the clarification. |
| Samsung | Support, but | We have same view with Nokia. |
| NTT DOCOMO | Support | Not sure if RAN4 spec explicitly describes the scenario supported by Rel-15. We agree that it should be stated in the UE capability spec (38.306). |
| CATT | OK | Ok for clarification. |
| Huawei | Support, but… | We agree the intention but not sure if the CR is really needed. |
| Ericsson | Support | The wording could be improved, e.g. “In this version of the standard, a UE indicating support for NR-DC supports only configurations where all serving cells of the MCG are in FR1 CC(s) and where all serving cells of the SCG are in FR2 CC(s).” |
| OPPO | support |  |
| MediaTek | Support, but | Agree with Nokia. We agree with the intention but are not sure that the CR is needed. |
| ZTE | Support | We are ok with the clarification |
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**Rapporteur’s suggestion:**

Review CRs updated based on Ericsson’s comment, in the part 2 of the email discussion. In the meanwhile, the companies are also encouraged to check whether it is already clear in the specifications of other WGs.

## Correction to need code for *capabilityRequestFilterCommon* ([R2-2002724](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002724.zip))

This CR tries to clarify the UE behaviour when the UE capability filter *capabilityRequestFilterCommon* absent.

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| **Company name** | **Support / Not support** | **Comments** |
| Qualcomm Incorporated | Support |  |
| Nokia | Support, but… | The problem makes sense but 3 immediate questions:  Q1: Why is standalone impacted? The filter is for MR DC only  Q2: Why would a network not send it? Isn't it bad network implementation?  Q3: If Q2 is yes, then is a clarification really needed or maybe we just clarify that the network is expected to set that otherwise UE behavior is unspecified? |
| Intel | Support |  |
| Samsung | Neutral | We are not sure this change is really needed. From our understanding, filters are not applied if this *capabilityRequestFilterCommon* field is absent. |
| NTT DOCOMO | Not support | We think that the current need code (N) anyway results in the same consequence that there is no action. Namely, the UE does not apply these “late drop” filters. We also understand that the UE capability enquiry message is one shot configuration and does not require to store it. On Nokia’s question, Q2, the capabilityRequestFilterCommon was introduced for late drops and so the NW does not always include this filter, e.g. EN-DC or SA only deployment. |
| CATT | Support |  |
| Huawei | Neutral |  |
| Ericsson | Not Support | The intention is correct, but includeNR-DC and includeNE-DC already state “only if this field is included” to prevent that NR-DC and/or NE-DC capabilities are reported in any other case. There are many other field descriptions that state how/which capabilities should be included so there would be no need to clarify it in this case. |
| OPPO | Not support | Absent of Need N IE means UE will not take any action. To us it means UE will behave without taking this IE into account. |
| MediaTek | Support (proponent) | To Nokia’s questions:   1. The UE in NR standalone can be interrogated for its capabilities (of whatever RAT) with the NR UECapabilityEnquiry, so we understand that the signalling change affects standalone even though the reported capabilities are for MR-DC. 2. We have a need code for handling absence of the field today and the procedural text says it is obeyed “if included”, so there doesn’t seem to be any guidance that a good network implementation will necessarily send this field. 3. The parsimonious way to do this would be to replace Need N with a condition that says “the network always includes this field”. It seems like this could be a valid alternative solution, but then we should also touch the procedural text to remove the “if included” condition.   Sorry, we forgot to include a shadow CR. |
| ZTE | Neutral |  |
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**Rapporteur’s suggestion:**

The CR is not pursued in this meeting. The proponent can continue discussion with interested companies.

## Correction to *RequestedCapabilityCommon* ([R2-2003463](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003463.zip), [R2-2003464](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003464.zip))

This CR tries to clarify that the requirement that the UE capability filters are set consistently also applies to the following UE capability filters as well, *UE-CapabilityRequestFilterCommon* in 38.331 and *requestedCapabilityCommon* in 36.331.

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| **Company name** | **Support / Not support** | **Comments** |
| Qualcomm Incorporated | Support |  |
| Nokia | Support |  |
| Intel | Support |  |
| Samsung | Support |  |
| NTT DOCOMO | Support but | The impacted 5G architecture options in the cover sheet require the update, since the proposed change does not affect EN-DC (only) deployoment. |
| CATT | Support |  |
| Huawei | Our CR | To reply DCM’s comments, the *UE-CapabilityRequestFilterCommon* includes *omitEN-DC*, so in our understanding the EN-DC is impacted.  “UE-CapabilityRequestFilterCommon ::= SEQUENCE {  mrdc-Request SEQUENCE {  omitEN-DC ENUMERATED {true} OPTIONAL, -- Need N  includeNR-DC ENUMERATED {true} OPTIONAL, -- Need N  includeNE-DC ENUMERATED {true} OPTIONAL -- Need N  }” |
| Ericsson | Support | We should indeed include requestedCapabilityCommon in the feature set ID generation description. Hopefully we will not need to handle similar cases in the future, since from now on any new filters should be under the branches mentioned in this CR. |
| OPPO | Support |  |
| MediaTek | Support |  |
| ZTE | Support |  |
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**Rapporteur’s suggestion:**

Agree on the CRs.

**Proposal 1: xxxx**

# Discussion: Part 2

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# Conclusion

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# Reference

[1]