3GPP TSG-RAN WG2 #116-e R2-211xxxx

Electronic Meeting, 1–12 Nov 2021

Source: NTT DOCOMO, INC.

Title: Report for [AT116-e][037][NR15] Simultaneous Rx/Tx UE capability per band pair (NTT DOCOMO)

Agenda Item: 5.4.3

Document for: Discussion and decision

# Introduction

This document is for the following email discussion.

* [AT116-e][037][NR15] Simultaneous Rx/Tx UE capability per band pair (NTT DOCOMO)

 Scope: Based on R2-2110565 and on-line agreements, progress discussion on MR-DC, CR approval, LS out

 Intended outcome: Report, Agreed CRs, Approved LS

 Finish Deadline: Thursday Week2 (intermediate deadlines by Rapporteur) Online CB not expected but possible if Needed

Moderator would like to organize this email discussion in two phases:

**Phase 1**: Companies are invited to provide comments to the questions by Thu Nov 4 1200 UTC.

**Phase 2**: Review the draft CRs and the draft LS.

NOTE: As their intention was agreed in the GTW, the draft LS and the UE capability part of the draft CRs are open to company comments also during Phase 1. Companies are encouraged to provide comments in Phase 1 if possible, for the sake of early stabilization.

# Contact points

|  |  |
| --- | --- |
| **Company** | **Email** |
| Docomo | masato.taniguchi.mf@nttdocomo.com |
| Qualcomm Incorporated | mkitazoe@qti.qualcomm.com |
| Intel Corporation | seau.s.lim@intel.com |
| Ericsson | lian.araujo@ericsson.com |
| Huawei, HiSilicon | shatong3@hisilicon.com |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

# References

Email discussion summary

[1] R2-2109162, Summary of [AT115-e][016][NR15] UE Capabilities II, Huawei, HiSilicon.

[2] R2-2110565 Report for [Post115-e][087][NR15] Simultaneous Rx/Tx cap finer granularity (NTT DOCOMO) NTT DOCOMO, INC.

Draft CRs/Ls

[3] R2-2110566 draft CR for 38.331, Rel-15

[4] R2-2110567 draft CR for 38.331, Rel-16

[5] R2-2110568 draft CR for 38.306, Rel-15

[6] R2-2110569 draft CR for 38.306, Rel-16

[7] R2-2110570 draft LS

Company contribution to this meeting

[8] R2-2110571 Remaining issues on simultaneous Rx/Tx capability per band pair NTT DOCOMO, INC.

# Phase 1 Discussion

## Inter-node signalling to help validate per-band-pair capability

Band information: During the RAN2 115-e email discussion ([1] and reflector) there seems to be a consensus on the necessity of the information at the SN on the frequency bands used by the MN, which enables the SN to determine for which band pair it should check the simultaneous Rx/Tx UE capability.

UL/DL information: In addition, in the post-115e email discussion [2] Ericsson brought up the potential need for UL/DL information. The moderator’s understanding is that the network does not need to validate the simultaneous Rx/Tx capability between DL-only bands, and we could further optimize the network behaviour with the aid of the UL/DL information. On the other hand, in Docomo contribution [8], the authors wonder if there might be few cases where the UL/DL information could be beneficial in terms of UE capabilities.

INM direction: One could think about sending the above information from MN to SN, and/or from SN to MN. This topic was discussed in the post-115e email discussion, but the participating companies could not find a direction. In the contribution [8], the authors propose NOT to add the band information to the SN-to-MN direction, as the SN can validate the simultaneous Rx/Tx capability considering the bands used by both nodes.

Taking the above into account, companies are invited to provide feedback on the need for the information below:

1. Band information from MN to SN: Baseline is to clarify the description of *selectedBandEntriesMNList* to allow usage in MR-DC scenario, as discussed earlier.
2. UL/DL information from MN to SN: Baseline would be a new field indicating whether UL and/or DL is configured, as in (2) in Annex A.
3. Band information from SN to MN: Baseline would be a new field indicating selected band entries at the SN, as in (3) in Annex A.
4. UL/DL information from SN to MN: Baseline would be a new field indicating whether UL and/or DL is configured, as in (4) in Annex A.

**Q1: Do companies agree to clarify/introduce each of the above information? How the clarification/change should be?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree to (1)-(4)** | **Comments** |
| Docomo | (1) | While we were in favor of (1) and (3), we have changed our view through additional considerations[8] and to minimize the spec impact, e.g. the new fields. We think we should clarify *selectedBandEntriesMNList,* which was supported by many companies in previous discussions.We are not objecting to have the UL/DL information (2), but our current thinking is that it may have very limited use case.We hope (1) would be the common ground for avoiding IOT problems, and we invite companies to resolve this issue, observed in EN-DC, in this quarter. |
| Qualcomm Incorporated | No strong view | We wonder though, for example with the lack of (3), i.e. the lack of MN knowledge on SN’s bands, whether it makes sense to have inter-node coordination for dynamic resource coordination, which RAN2 plans to send an LS to RAN3 for. We can avoid sending such an LS if RAN2 design anyway does not allow sufficient MN knowledge to trigger dynamic resource coordination with SN. |
| Intel | (1) seems sufficient | Agree with [8] that once SN find a suitable band combination that also respects the UE capabilities which include the simultaneous RX/TX capability, there is no need for MN to check.  |
| Ericsson | (2) but | (1) can be clarified in meeting notes, no need to include in the field description. As long as the field description of *selectedBandEntriesMNList* does not prevent its use in EN-DC we don’t need to include a particular use therein.Note that (2) is something we understand we could ask RAN3 to include rather than including in inter-node message, currently the LS to RAN3 seems to not have a clear message? So we could rather inform them about the need on 2. Otherwise, we agree with Qualcomm that there may be no need to send this LS. |
| Huawei, HiSilicon | (1) | We agree that the *selectedbandEntriesMNList* IE could be extended for MR-DC scenario to provide the frequency band information used by MN as clarified in the current CR. It could be the baseline to solve the issue with the minimum spec impact. For (2)(3)(4), we understand it as a further optimization and the benefit is limited as the baseline mechanism works in most cases. Besides, if it is agreed, the signaling would be complicated and the current CR should be updated. So we do not think such optimization is needed. |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

# Annex A: Example ASN.1 for the potential new fields

The content is the same as in Q6 of post-115e SoD[2].

-- ===== CG-ConfigInfo =====

ConfigRestrictInfoSCG ::= SEQUENCE {

 -- snip

 ...,

 [[

 selectedBandEntriesMNList SEQUENCE (SIZE(1..maxBandComb)) OF SelectedBandEntriesMN OPTIONAL, --(1)

 pdcch-BlindDetectionSCG INTEGER (1..15) OPTIONAL,

 maxNumberROHC-ContextSessionsSN INTEGER(0.. 16384) OPTIONAL

 ]],

 -- snip

 [[

 dl-UL-UsageMNList SEQUENCE (SIZE (1..maxBandComb)) OF DL-UL-UsageEntriesMN OPTIONAL -- (2)

 ]]

}

SelectedBandEntriesMN ::= SEQUENCE (SIZE (1..maxSimultaneousBands)) OF BandEntryIndex

BandEntryIndex ::= INTEGER (0.. maxNrofServingCells)

DL-UL-UsageEntriesMN ::= SEQUENCE (SIZE (1..maxSimultaneousBands)) OF DL-UL-Usage

DL-UL-Usage ::= SEQUENCE {

 dl-Configured ENUMERATED {true} OPTIONAL,

 ul-Configured ENUMERATED {true} OPTIONAL

}

-- ===== CG-Config =====

CG-Config-v16xy-IEs ::= SEQUENCE {

 selectedBandEntriesSN SEQUENCE (SIZE (1..maxSimultaneousBands)) OF SelectedBandEntrySN OPTIONAL,

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

SelectedBandEntrySN ::= SEQUENCE {

 bandEntryIndex BandEntryIndex, -- (3)

 dl-UL-Usage DL-UL-Usage -- (4)

}