**3GPP TSG RAN WG1 #100bis-e R1-2002892**

e-Meeting, April 20th – 30th, 2020

Source: NTT DOCOMO, INC.

Title: Summary on Email discussion [100b-e-NR-UEFeatures-Others-02]

Agenda Item: 7.2.11.13

**Document for:** **Discussion and Decision**

# **Introduction**

This contribution summarizes the following email discussion in AI 7.2.11.13 regarding NR UE features for others.

[100b-e-NR-UEFeatures-Others-02]: Email discussion/approval on general issues having capability signaling impact (dates TBD) – Hiroki (DCM)

* Whether to convert most per-UE capability to per-band capability

# **Discussion**

During the preparation phase email discussion [100b-e-Prep-NR-UEFeatures-Others], following input was provided. The proposal is to convert most “per-UE” capability to “per-band” capability considering the unlicensed operation and IODT concern.

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| Qualcomm | In general, we agree with the categorization. We have some proposed additions / clarifications as follows:  An important additional 1st priority issue is to discuss the applicability of all Rel-15 and Rel-16 features to NR-U. For example, whether mTRP is supported in NR-U, etc. In order to avoid an extended debate, we suggest agreeing that all features should be applicable to NR-U as a default, and possibly discuss only some exception cases.  At the same time, this does give rise to IODT concern, since all the Rel-15 and Rel-16 features will not be introduced at the same time in licensed and unlicensed. Therefore, even though as default all features should apply to unlicensed, a UE capability differentiation is still needed.  In order to introduce the capability differentiation with the smallest possible change in the structure of the capability signaling, we propose to convert most per-UE capability to per-band capability. It would need further discussion how to do the same for Rel-15 features.  Regarding XDD/FRX differentiation, we think that a description will be need for each impacted FG that has some cross-carrier element. This is not to explain the rationale for the differentiation but rather to explain whether the differentiation is from the perspective of the cell delivering the control or the cell to which the control is applied, or some other interpretation.  We don’t think that the topic of how to signal capability in FR1 TDD and incapability in both FR1 FDD and FR2 TDD at the same time needs further discussion in RAN1.  As an additional topic, we would like to clarify whether or not FR1 and FR2 serving cells can be in the same TAG in UL CA. This clarification may impact Rel-15. |

**Companies are encouraged to provide views on the above proposal.**

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| Company | Comment |
| Ericsson | According to our understanding a proposal to convert most UE feature from per UE to per band would have large implications to the UE capability signaling since it would allow not only different UE capabilities signaling for unlicensed bands, but also different signaling for different licensed bands. There are also RAN2 implications since the signaling per band is already very large. In addition, backwards compatibility in the signaling must be ensured which means that this is not moving Rel-15 UE capabilities, but copying. Any discussion should therefore be on a per FG basis based on technical issues with supporting a certain feature in the unlicensed case. |
| Huawei, HiSi | We’d like to focus on the discussion to be for Rel-16 UE features.  About converting FGs from per-UE to per-band, such differentiated reporting may only matter for a UE that reports supporting both licensed and unlicensed bands. If the technologies and UE implementation complexity for a per-UE reported feature is not differentiated by shared or non-shared spectrum or by the number of supported bands, the IODT does not seem to be a concern and the feature can be supported on all bands supported by the UE. If the market motivates a different timing between licensed and unlicensed band for implementing a feature for a particular type of UE, i.e. the UE is designed only for one or the other such as a standalone unlicensed UE that only supports one unlicensed band, then UE reporting support or not support of the feature can still be reported per-UE. It would be good to discuss case-by-case see which FG(s), if raised, may not be able to apply to NR-U. |
| Qualcomm | We are open to discussing other options, but so far band dependent capability seemed to be the best available. Yes, it could be discussed if exceptions are needed.  Regarding Rel-15, we cannot change the Rel-15 signaling, so yes, a Rel-16 version should be created for the applicable cases.  Regarding the UE that supports only standalone unlicensed in a single band, we agree that the proposal is not needed. However, some solution should be found for the other UEs. |
| Intel | In our view, converting all per-UE features to per-band is too much by increasing signaling overhead. Per-UE capability explains baseband capability and there is no need to consider unlicensed operation.  If there is any need to be distinguished, we can discuss other option (still not preferred though) – e.g. introducing licensed/unlicensed differentiation bit from Rel-16. |
| FUTUREWEI | The proposal appears to have a lot of implications. Since it wasn’t in any of the contributions for this meeting and also was proposed after the end of the Prep discussion, our preference is to focus the rest of the April meeting on the other Rel-16 UE features discussions that are ongoing. For the May meeting, companies can take more time to analyze any issues for continuing to report “per UE” for a UE that adds support for unlicensed bands. Given the comments above on overhead with a “blanket” conversion from pre-UE to per-band, it would be better to look at these on a FG-by-FG basis. If there are some FGs that there could be a technical issue, it may be better to just note that those features are not expected to be supported in an unlicensed band. |
| Nokia, NSB | We agree with the statements above that the proposal has far reaching implications that have not been fully analyzed yet and which would demand substantial attention before they can be further considered. Moreover, this impacts RAN2 significantly and it is not a decision that should be taken by RAN1 alone in our view. The potential impact to Rel-15 signaling is yet another level of complication, with potential to lead to non-negligible overhead in the capability signaling in general, which sounds like an overkill for the purpose stated by the proponents. Hence it is our recommendation we do not pursue further this topic in this meeting. |
| ZTE, Sanechips | It might be ok if the reporting only matters for a UE that supporting both licensed and unlicensed bands. We also think that a case-by-case analysis (on which features could be different for NR and NR-U) should be conducted before we rush to the conclusion.  To avoid any confusion and implications, at least we should say "UE that supports only standalone unlicensed in a single band, or UE that supports only licensed band, the proposal is not needed". |

# **Conclusion**

TBD

# **References**

[1] R1-2001484 RAN1 UE features list for Rel-16 NR after RAN1#100-E Moderator (AT&T, NTT DOCOMO, INC.)

[2] R1-2001634 Remaining issues on Rel-16 NR UE features ZTE

[3] R1-2001742 Discussion on the support of SRS transmission in all symbols of a slot OPPO

[4] R1-2002026 On UE feature list Intel Corporation

[5] R1-2002159 UE features for other aspects Samsung

[6] R1-2002281 Potential change/update on existing UE features for Rel-16 UE Ericsson

[7] R1-2002656 High-level discussion on Rel-16 UE features Futurewei

[8] R1-2002674 Other aspects of Rel-16 UE features Huawei, HiSilicon

[9] R1-2002687 Discussion on UE features Qualcomm Incorporated

[10] RP-200502 Informational summary on email discussion: [Rel16\_UE\_capabilities] Exchange of views NTT DOCOMO, INC.