**3GPP TSG-RAN** **WG2 Meeting #111-e R2-200xxxx**

**Electronic, 17th – 28th August 2020**

**Agenda Item: 5.4.3**

**Source: Huawei, HiSilicon**

**Title: Summary of offline 010 Rel-15 UE cap Clarifications**

**Document for: Discussion and decision**

# Introduction

This document summarizes the following offline discussion for Rel-15 UE capability corrections.

* [AT111-e][010][NR15] UE cap Clarifications (Huawei)

Scope: Treat [R2-2007209](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007209.zip), [R2-2007210](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007210.zip), [R2-2007211](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007211.zip), [R2-2007798](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007798.zip), [R2-2007799](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007799.zip), [R2-2007800](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007800.zip), [R2-2007796](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007796.zip), [R2-2007797](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007797.zip), [R2-2007885](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007885.zip), [R2-2007887](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007887.zip), [R2-2007850](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007850.zip) (proponents to drive)

Part 1: Decision whether to make corrections, identify agreeable parts. Identify Controversial issues for on-line treatment (if any).

Deadline: Aug 20, 0900 UTC.

Part 2: For agreeable parts, continuation to agree CRs.

Deadline: Aug 26, 0900 UTC.

# Discussion

## Part 1 discussion: to achieve agreeable principle

### 2.1.1 Clarification on band combination

Discussion and CRs are in [1][2][3].

**Proposal 1: Ran2 to confirm that the *BandCombinationList* and the *FreqBandList* also include the NR non-CA band combination.**

**Proposal 2: If the proposal 1 was agreed, agree the CR [1] for Rel15 and CR [2] for Rel 16.**

**Proposal 3: Ran2 to confirm whether the band in the *supportedBandListNR* shall always be included in the *supportedBandCombinationList.***

**Proposal 4: If the UE can indicate some bands only in the *supportedBandListNR*, for these bands, the network shall take the capabilities that only included in the *supportedBandCombinationList* as not reported.**

Please companies to provide feedback on the proposals listed in [1].

**Q1-1 Do companies agree with P1 and P2?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | Yes, but… | P1: Agree to intention, but a refinement is needed as follows:  **Proposal 1: Ran2 to confirm that the *BandCombinationList* and the *FreqBandList* also include the NR non-CA band combination, unless they are fallback band combinations.**  P2: Agree to the intention, but similar to above, is it clear that it does not contain the fallback band combinations? We suggest this wording instead:  **The IE BandCombinationList contains a list of (non-fallback) band combinations (NR non-CA, NR CA and/or MR-DC, also including DL only and/or UL only band).** |
| Nokia | Yes | Yes though editorial, P1 and P2 is okay. |
| ZTE | Yes (Proponent) |  |
| OPPO | Yes |  |
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**Q1-2 Do companies agree with P3 and P4?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | No | P3: Disagree. The supportedBandCombinationList is filtered as requested by the NW in the capability enquiry. The supportedBandListNR will hence contain all bands that the UE supports, while supportedBandCombinationList may not contain some of those bands. The reason why supportedBandListNR is not filtered is that the gNB would at least see which bands the UE supports. We note also that even if the filter asked for a certain band, it could happen that the UE has no space in the container to report combinations including that band. So it may happen that a band which the UE supports as per supportedBandListNR is not included in the supportedBandCombinationList.  P4: Disagree. The NW should not assume anything. If the UE does not report a BC with a certain band, the NW cannot configure that band. |
| Nokia | Yes, but | P3 understanding is that the UE must set the fields consistently? Is there a problem that prevents this from happening from current specification?  For P4 we have same view as P3 that the UE must set the fields consistently. I think this is already the intention of the specification and maybe no need to clarify anything on top. |
| ZTE | Proponent | For proposal 3, we don’t have strong view, we just want to RAN2 to confirm this issue. In the last meeting, it has been agreed that the band in the supportedBandCombinationList shall also been included in the supportedBandListNR, thus we want to further confirm whether the band in the supportedBandListNR shall also be included in the supportedBandCombinationList.  For the proposal 4, we are open, we just want to have a clear clarification on how to process the scenario that the band is only included in the supportedBandListNR. |
| OPPO | See comment | We tend to agree the band list and BC list should be set consistently.  If the case happens due to the reason outlined by Ericsson above, those bands are anyway not configurable so at least P4 is not needed. |
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### 2.1.2 Discussion on ambiguity for multi bands/cells

The discussion is seen in [4] and corresponding CRs are seen in [6] and [7].

**Proposal 1: the UE needs to indicate capabilities (*simultaneousTxSUL-NonSUL, dynamicSwitchSUL*) for both SUL band and the paired NUL band, and the network only enables this configuration for the bands pair where these capabilities are indicated for both SUL and NUL band.**

**Proposal 2: confirm that** **the network could only configure PUCCH on the bands where *twoPUCCH-Group*** **is indicated if two PUCCH groups are configured.**

**Proposal 3: for interpretation of FGs applicable to cross-carrier operation, RAN2 waits for RAN1 conclusion.**

It is worth mentioning that Proposal 3 has been updated after tdoc submission as RAN1 already started a similar discussion, and thus from the proponent RAN2 does not need to duplicate the discussion.

Please companies to provide feedback on the proposals listed in [4].

**Q2-1 Do companies agree with P1?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | Yes | This is the safer option. If we would go for the other option (Interpretation 2), a NW might configure something which some UEs do not support |
| Nokia | Yes | P1: **OK** - since this is per-FS capability, UE should indicate in which carriers it supports the simultaneous Tx |
| ZTE | Yes | It’s a Rel 15 UE capability, it can be up to the current UE vendors understanding. Anyway, from the network side, we agree with this proposal, which makes the clarification more clear. |
| OPPO | Yes |  |
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**Q2-2 Do companies agree with P2?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | Yes |  |
| Nokia | Yes | P2: We agree, though we think the other alternative could also be **OK**. |
| ZTE | Yes | See above |
| OPPO | Yes |  |
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**Q2-3 Do companies agree with P3?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | Yes |  |
| Nokia | No | P3: **Not OK** - We think for cross-carrier scheduling, it's still about the measured carrier: Otherwise we mix two features together. So UE supporting cross-carrier scheduling and aperiodicReport has to support them together - the capability is there for being able to measure quickly, not for the report generation. |
| ZTE | Yes | We think it just wants to say it’s under RAN1 discussion, we can wait for RAN1 response. |
| OPPO | Yes |  |
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### 2.1.3 Clarification on PDSCH rate matching

The CRs are in [7][8], and the main intention is to clarify support of *rateMatchingResrcSetDynamic* means only supporting dynamic rate matching for *bitmaps* in *patternType*.

**Q3 Do companies agree with the CR principle?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | Yes | We agree that this bit is for bitmap-based rate matching only (not for matching around CORESETs). But does it really require a clarification considering that there is another capability for “rateMatchingCtrlResrcSetDynamic” just above this one? If needed, it could be good to clarify in the next field “rateMatchingResrcSetSemi-Static” that it is for bitmaps and CORESET. |
| Nokia | Needs more checking and discussion | A bit detailed comments from our understanding of how RAN1 intended this.  1) The text you propose to delete is the 38.214 section heading for the behavior, and the RRC parameters are described there. Now the CR is a mix-up of stage 2 and stage 3. That said, we don’t think they are wrong, but we would not delete the RB symbol level granularity. These are now misaligning the dynamic and semi-static capability descriptions.  See 38.214 5.1.4.1 for additional information.  2) We have the following UE features on the topic:  5-26 Semi-static rate-matching resource set configuration for DL 1) Bitmap 1/2/3 2) controlResourceSet rateMatchingResrcSetSemi-Static 5-27 Dynamic rate-matching resource set configuration for DL Bitmap 1/2/3 rateMatchingResrcSetDynamic 5-27a Dynamic rate-matching control resource set for DL Dynamic rate-matching control resource set for DL rateMatchingCtrlResrcSetDynamic  For dynamic rate matching this is divided in two parts, and CR is addressing specifically 5-27. However, the same logic applies to 5-26, though the description would need to consider both bitmap and control resource set adaptation in the same parameter. The CR makes the dynamic and semi-static look different and that creates an inconsistency though we are essentially talking about the same thing.   3) No strong opinion here, but whatever is changed in rateMatchingResrcSetDynamic should apply to rateMatchingResrcSetSemi-Static. Perhaps the whole rateMatchingResrcSetSemi-Static should be updated to separate the control resource set and bitmap aspects. |
| ZTE | Yes |  |
| OPPO | Yes |  |
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### 2.1.4 Clarification on the simultaneousRxTxInterBandCA capability

The CRs are in [9][10], and the main intention is to apply this capability to NR-DC case.

**Q4 Do companies agree with the CR principle?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | No | We think for NR-DC the UE should always support simultaneous RX-TX beyond MN and SN, since simultaneousRxTxInterBandCA tells the NW whether it supports TX on an NR carrier while it also RX on another NR carrier, but it is not tight to NR-DC. |
| Nokia | No | We think Ericsson is correct but should we check this with RAN1/4? |
| ZTE | FFS | We need further check it with RAN1/4 internally. |
| OPPO | Yes | We do not think the TDD interference issues can be solved simply due to a DC being configured, so the CR is correct to us. In fact in the LS reply from RAN4 in R4-1808093, it has been clarified clearly |
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### 2.1.5 xDD and FRx differentiation on UE capabilities which are not signalled by ENUMERATED {supported}

The discussion is in [11]. The main intention is to discuss the case if the UE capabilities have XDD and FRX differentiation but the value is not simply ENUBERATED {supported}.

**Proposal 1: RAN2 clarify that Table B-1 is not applied for the the xDD/FRx differentiation of capabilities which are not signalled by ENUMERATED {supported}.**

**Q4 Do companies agree with the proposal?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | No | We are not sure if there is any misinterpretation for such fields. The table seems to be clear in the sense that the UE shall include the field. One may wonder whether any unclarity may come from the exact values that the UE reports in that case, which should then be consistent. However, there seems to be no Rel-15 parameter defined with values other than ENUMERATED {supported} with both FDD/XDD diff, and for Rel-16 henceforth we would add them per-band, therefore it seems there is no issue currently. |
| Nokia | No | Which use case requires anything other than ENUMERATED {supported} as that is the binary value? |
| ZTE | No | Share the same view as E/// |
| OPPO | No | As commented above, there is no case for that yet. |
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## Part 2 discussion: TBD

To be updated after Phase I discussion

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# Reference

1. [R2-2007209](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007209.zip) Clarification on the BandCombination ZTE Corporation, Sanechips
2. [R2-2007210](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007210.zip) CR on the BandCombination (R15) ZTE Corporation, Sanechips
3. [R2-2007211](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007211.zip) CR on the BandCombination (R16) ZTE Corporation, Sanechips CR
4. R2-2008368 Discussion on the ambiguity for the capabilities associated with multiple bands/Cells Huawei, HiSilicon
5. R2-2008369 Corrections on the capabilities associated with multiple bands/Cells Huawei, HiSilicon
6. R2-2008370 Corrections on the capabilities associated with multiple bands/Cells Huawei, HiSilicon
7. [R2-2007796](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007796.zip) Clarification on PDSCH rate-matching capabilities Huawei, HiSilicon
8. [R2-2007797](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007797.zip) Clarification on PDSCH rate-matching capabilities Huawei, HiSilicon
9. [R2-2007885](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007885.zip) Clarification on the simultaneousRxTxInterBandCA capability in NR-DC MediaTek Inc.
10. [R2-2007887](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007887.zip) Clarification on the simultaneousRxTxInterBandCA capability in NR-DC MediaTek Inc.
11. [R2-2007850](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_111-e\Docs\R2-2007850.zip) xDD and FRx differentiation on UE capabilities which are not signalled by ENUMERATED {supported} Samsung