**3GPP TSG-RAN** **WG2 Meeting #110-e R2-200xxxx**

**Electronic, June 1 – 12, 2020**

**Source: Qualcomm Incorporated**

**Title: Summary of email discussion [AT110e][016][NR15] UE cap xDD FRx differentiation**

**Document for: Decision**

**Agenda Item: 5.4.3.1**

# Introduction

This document summarizes the following email discussion.

* [AT110e][016][NR15] UE cap xDD FRx differentiation (Qualcomm)

Part 1: May kick off email discussion to gather more comments, if any, awaiting on-line treatment.

Part 2: Agreed CRs. Deadline: June 10, 0700 UTC

Including outcome of email discussion [Post109bis-e][064][NR15] XDD FRX differentiation (Qualcomm)

[R2-2004439](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004439.zip) Summary of email discussion [Post109bis-e][064][NR15] XDD FRX differentiation Qualcomm Incorporated report Rel-15 NR\_newRAT-Core

To be treated on-line

[R2-2004440](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004440.zip) Correction on UE capabilities with xDD and FRx differentiation Qualcomm Incorporated CR Rel-15 38.306 15.9.0 0303 - F NR\_newRAT-Core

[R2-2005690](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005690.zip) Discussion on XDD-FRX differentiation in UE capability ZTE Corporation, Sanechips discussion Rel-15 NR\_newRAT-Core [R2-2003750](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2003750.zip) Late

[R2-2005691](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005691.zip) CR to 38.306 on XDD-FRX differentiation in UE capability ZTE Corporation, Sanechips CR Rel-15 38.306 15.9.0 0227 2 F NR\_newRAT-Core [R2-2003751](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2003751.zip) Late

[R2-2005692](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005692.zip) CR to 38.331 on XDD-FRX differentiation in UE capability ZTE Corporation, Sanechips CR Rel-15 38.331 15.9.0 1436 2 F NR\_newRAT-Core [R2-2003752](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2003752.zip) Late

[R2-2004574](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004574.zip) XDD/FRX additional Differentiation vivo discussion

[R2-2004575](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004575.zip) CR to XDD/FRX additional Differentiation vivo CR Rel-15 38.306 15.9.0 0313 - F NR\_newRAT-Core

New text were added after online discussion on Wednesday June 4.

# Discussion: Part 1 (by online treatment of email discussion [Post109bis-e][064][NR15])

This email discussion is built on top of the email discussion [Post109bis-e][064][NR15] “XDD FRX differentiation”, which was summarized by the rapporteur with the following suggestions ([R2-2004439](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004439.zip)).

**Proposal 1:** To allow the interpretation 1-a and 1-b in the specifications.

**Proposal 2:** To confirm that the UE includes the xDD / FRx capabilities based on the duplex mode(s) and frequency range(s) that the UE “supports”, as opposed to the ones that the UE “reports” according to the UE capability filters. No specification change is necessary to clarify this.

**Proposal 3:** To continue to discuss whether and how to address the problematic case where the UE supports a given feature as in the following combination.

• FR1 FDD: ‘supported’

• FR1 TDD: ‘not supported’

• FR2 TDD: ‘supported’

## Rapporteur’s suggestions in the summary of email discussion [Post109bis-e][064][NR15] XDD FRX differentiation ([R2-2004439](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004439.zip))

Companies are requested to comment if they agree to rapporteur’s suggestions as reproduced above. If not, please explain the reasons, and provide suggestions.

Proposal 1 and 2 were agreed in online discussion on Wednesday, June 4.

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| **Company name** | **Agree / Disagree** | **Comments** |
| Huawei | Agree, but | We agree with P1 and P2. For P3, we agree this is not supported by current signalling, but we actually do not see much value to decide a solution for this issue right now as there is no such cases in the RAN1/4 feature list. In case we find out such cases in the future, we could discuss then how to address this case. |
| **CATT** | See comments | On P1  We are not against this if majority supports this. But actually we feel it not a good way that we say in the spec ‘there are two possible ways to report’ given a single normatively specified procedure. Given that for case 3/8, the difference is mainly in first two value, i.e.,  Case 3  **01**0100 or **00**0100  Case 4  **10**0010 or **00**0010  Can we simply add a note somewhere to say that for these cases NW may ignore the first two fields (this I think was mentioned during email disc to some extend)…  Then given that there is no difference for all other cases, we do even need a whole table in 306 other than this note.  We would like to see if this kind of WF is possible for all companies.  On P2  OK.  On P3  We are OK to discuss further whether and how, but like HW said, first ‘whether’ for R15. |
| Nokia | Prefer 1-a interpretation as that is the original intention of the specification. | The following is clearly 1-a interpretation:   * Due to the sentence “set all fields of UE-NR/MRDC-Capability except fdd-Add-UE-NR/MRDC-Capabilities, tdd-Add-UE-NR/MRDC-Capabilities, fr1-Add-UE-NR/MRDC-Capabilities and fr2-Add-UE-NR/MRDC-Capabilities, to include the values applicable for all duplex mode(s) and frequency range(s) that the UE supports” in 38.306. * Again 1-a as our understanding is that irrespective of the UE supporting FR1/FR2 or both or FDD/TDD or both, the common bit has to be set. However, if the UE supports both FR1+FR2 and FDD+TDD and it has different capabilities for a given feature in FR1/FR2 and FDD/TDD it will use the specific parts.   So in sum:  P1: 1-a   * Question to Huawei: How do you propose to capture 1-b in the normative part of the specification?   P2: OK  P3: NOT OK.   * If there is a real problem on the field today, then open to discuss. But right now this seems to be a theoretical case. So no preference to really make a fix. |
| MediaTek | See comments | P1 – OK  P2 – OK  P3 – Not in Rel-15. We think that no UE in the field really has this kind of capability to report. Thus, we prefer to leave the R15 ASN.1 signaling as it is. |
| OPPO | Agree with P1 and P2 | For proposal3, we don’t think it is necessary for R15, but we can discuss solution for R16 |

## CRs to 38.306 ([R2-2004440](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004440.zip), [R2-2004575](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004575.zip))

Two CRs to 38.306 were submitted, essentially implementing the proposal 1 from the summary of email discussion [Post109bis-e][064][NR15] XDD FRX differentiation. Since the technical content of those two CRs are quite similar, the rapporteur suggests [R2-2004440](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004440.zip) (Qualcomm Incorporated) to be reviewed in this email discussion as the baseline.

The key difference in [R2-2004575](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004575.zip) (Vivo) is that the proponent changed the procedural text in section 4.2.1.

Companies are requested to provide their comment on the CR in [R2-2004440](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004440.zip).

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| **Company name** | **Support / Not support** | **Comments** |
| Huawei | Support, but | We prefer QC’s change slightly. However after more thinking we want to understand better whether the change means the UE is not allowed to report any other value except those captured in the table. We asked this because if the UE reports other values, for instance (0,0,1,1,1,1), whether the network assumes this is a wrong reporting, or the network is supposed to interpret it as the same as (1,1,0,0,0,0)? If the current note means the UE is only allowed to report the listed values in the table, we are fine and the note needs to reword a bit to reflect this; otherwise we are wondering whether the network needs to provide some tolerant interpretation and which value settings need such tolerance. |
| **CATT** | See comments | Like we replied in previous question, we actually prefer an alternative way. It seems not very nice to capture different ‘possibilities’ in the spec given a single specified procedure. But as said, we are not objecting this if majority prefer to go this way. |
| Nokia | See comments | Agree with CATT, the interpretation is aligned with 1-a and 1-b is now something that is also on the table as alternative interpretation.  - CR should specifically for 1-b state why the Case 3/8 have different signalling and then why based on current normative specification 1-b should be valid? |
| MediaTek | Support | We also prefer QC’s version and are fine to list both 1-a and 1-b as a compromised approach. |
| OPPO | support |  |

## Problematic case

If rapporteur’s proposal 1 in the summary of email discussion [Post109bis-e][064][NR15] XDD FRX differentiation is agreed, the “problematic case” where the current UE capability signalling does not allow the UE to indicate its support for a feature becomes the following combination (the case 6).

• FR1 FDD: ‘supported’

• FR1 TDD: ‘not supported’

• FR2 TDD: ‘supported’

Companies are requested to comment if they agree a solution to the problematic case should be introduced or not, and if it should in which release.

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| **Company name** | **Agree / Disagree** | **Comments** |
| Huawei | Disagree | We agree this case cannot be supported in the current signalling. However we are a bit hesitated to introduce any solution for the time being as explained in Q1. We are a bit worried if a solution is introduced without any real use case, such signalling would remain untested and could create potential inter-operability issue in the future. |
| **CATT** | Seem comments | For R15 we are OK with not changing anything for this problematic case, considering  a) this is very late, and b) no much real field use case observed.  If something needs to be changed then we prefer it as simple as possible. |
| Nokia | Disagree | Agree with Huawei here. |
| MediaTek | Disagree | Agree with Huawei. |
| OPPO |  | Not for R15.we can discuss for R16 |

## Solution for “problematic case” ([R2-2005690](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005690.zip), [R2-2005691](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005691.zip), [R2-2005692](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005692.zip))

For companies who agree to introduce a solution for the “problematic case”, they are requested to provide their preferred solution.

One possible solution is outlined in [R2-2005690](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005690.zip), [R2-2005691](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005691.zip) and [R2-2005692](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005692.zip) (ZTE Corporation, et al.).

Another solution that was discussed online was to put all xDD&FRx-differentiated UE capabilities into per frequency band capability. This can be done only for new release-16 UE capabilities or also existing release-15 UE capabilities.

Please note that RAN2#109bis-e made the following baseline agreement for a solution that may be introduced. The intention is that RAN2 will introduce a new UE capability signalling, as opposed to changing the definition of current UE capability signalling, if a solution is deemed necessary.

* In R2 there is no consensus that new cases need to be supported right now. A majority of companies think the signaling could be changed when new specific cases has been identified.

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| **Company name** | **Comments** |
| **CATT** | Like said in previous question, we tend to think R15 change does not seem very necessary. For R16 and later, if needed, we can go with the previous conclusion that new signalling is used.  If for R15 something is considered necessary, we can consider simple fall back mechanism such that UE report case 7 or 4 instead, so that ‘partial’ capability is known by NW at least. This takes a simple note in the spec. Otherwise we feel specifying new signalling for R15 is a bit too late/much. |
| Nokia | See answer to 2.3 |
| OPPO | We don’t think a solution is necessary for R15. For R16 our view is that we need some improvement of the current wording to lead to either 1a or 1b interpretation and that’s it. And we slightly prefer option 1a |
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## Single interpretation in release-16?

The proposal 1 was agreed for release-15 in online discussion. Remaining issue is whether a single interpretation should be enforced in release-16.

Companies are requested to comment if they agree that a single interpretation should be enforced in release-16.

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| **Company name** | **Agree / Disagree** | **Comments** |
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# Discussion: Part 2 (by June 10, 0700 UTC)

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* *Agreeing on CRs.*
* *Response LS back to RAN1 on the “problematic case”.*

# Conclusion

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# Reference

[1]