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

**Electronic, Jun 1 – 10, 2020**

**Source: ZTE**

**Title: Summary of email discussion [AT110e][023][NR15] UE Cap Miscellaneous III**

**Document for: Decision**

**Agenda Item: 5.4.3.1**

# Introduction

This document summarizes the following email discussion.

* [AT110e][023][NR15] UE cap Miscellaneous III (ZTE)

Scope: Treat R2-2004560, R2-2004561, R2-2004972, R2-2004969, R2-2004970, R2-2004844, R2-2004845 (proponents are responsible to explain and drive)

Part 1: Decision whether to make corrections or not, identify agreeable corrections. Deadline: June 4, 0700 UTC.

Part 2: For agreeable parts, continuation to agree CRs. Deadline: June 10, 0700 UTC

# Discussion: Part 1 (by June 4 0700 UTC)

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

## Invalidating bandwidth class F for FR1(R2-2004560[1], R2-2004561[2])

These CRs try to add a clarification as below to the ***ca-BandwidthClassDL-NR/ca-BandwidthClassUL-NR.***

For FR1, the value ‘F’ shall not be used as it is invalidated in TS 38.101-1 [2].

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| **Company name** | **Support / Not support** | **Comments** |
| Lenovo | Tend to not support | To better understand the motivation: from the cover page we understand that non-standard-compliant UEs are to be addressed with the CRs. However, the problem may still exist due to Rel-15 UEs in the field which were implemented acc. to outdated RAN4 specs. For such UEs the clarification in the CRs will not solve the problem either. So, to solve the problem a NW solution might be needed. |
| Qualcomm Incorporated | Support |  |
| Huawei, HiSilicon | Support, but | We agree the intention. However, as it has been captured in RAN4 spec, we are not sure if the correction is really needed. |
| Nokia | Support | As proponent we think UE will inadvertently use this value F and since RAN4 table removed it we must mention that in RAN2 spec so that UE vendors may avoid using that value and stop signalling it. |
| ZTE | Support |  |
| OPPO | Support |  |
| CATT | No strong view | Seems ran4 has made this clear. no strong view whether ran2 has to change anything. |
| Samsung | Support | It is the clarification which already reflected in RAN4 specification, it would be helpful for UE implementation by adding clarification in RAN2 specification. |

## Further consideration on the Notes to the FeatureSetCombination ([R2-2004972](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002696.zip)[3])

In the current spec, there is a note to the *FeatureSetCombination* as below, which was introduced by [4] [5] to reduce the signalling overhead.

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| NOTE 2: The UE may advertise a *FeatureSetCombination* containing only fallback band combinations. That means, in a *FeatureSetCombination,* each group of *FeatureSets* across the bands may contain at least one pair of *FeatureSetUplinkId* and *FeatureSetDownlinkId* which is set to 0/0. |

As described in [4], with this note, if a UE supports only combinations of up to two bands (e.g. BC A+B, BC A+C, BC B+C), the UE can report a super BC with Band A+B+C and set the corresponding elements in the *FeatureSetCombination* to zero respectively for the BC A+B, BC A+C and BC B+C.

However, in the last meeting, the following RAN2 understanding [6] was added.

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| The UE should not report a super set band combination not supported or not defined in RAN4 only for the purpose to reduce the fallback band combination report, where the consequence is that the network will ignore the super set band combination and its fallback band combinations. |

Combined this understanding with the above example, there would be 2 different understandings:

*A: The UE shall not report a super set band combination with bands A+B+C if the UE only supports BC A+B, BC A+C and BC B+C.*

*B: The UE can report a BC with A+B+C even the UE only supports BC A+B, BC A+C and BC B+C, for that the UE/Network shall determine the indeed supported BCs (e.g. BC A+B, BC A+C and BC B+C) from both the Bandcombinaitonlist and the FeatureSetCombination.*

### **2.2.1 Which understanding do companies prefer?**

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| **Company name** | **Preference A or B** | **Comments** |
| Qualcomm Incorporated | B | The UE can use this method only when the band combination A+B+C is defined in RAN4 and hence a valid Bandwidth Combination Set is defined. |
| Huawei, HiSilicon | A | Based on the clarification in last meeting, it seems to align with understanding A. |
| Nokia | A & B  (A assuming the UE does not signal non zero FS for all the bands which would mean it supports the super set) | The current RAN2 signalling can be flexibly used and hence difficult to pin down one particular interpretation as the correct one. Network seems to have the requirement to check the overall BC + FS in order to conclude to configure the UE. |
| ZTE | A | We think A align with the clarification in last meeting. |
| OPPO |  | We have not identify the necessity/motivation to go for B. if we go for B, it has to at least satisfy the requirement of having RAN4 definition as commented by Qualcomm.  But considering the possible NBC change due to understanding-A, we understand there is no problem to allow B as long as “Network seems to have the requirement to check the overall BC + FS in order to conclude to configure the UE.” As commented by Nokia. |
| CATT | A |  |
| Samsung | B | Same understanding with Qualcomm. The intention of the agreements in the last meeting is that UE should not report the BCs not in the RAN4 specification. |

### **2.2.2 Related issues for the understanding A (Please go the 2.2.3 directly if understanding B is preferred)**

If we go to the understanding A that the UE shall not report a super set band combination (e.g. BC A+B+C) when the UE only supports the fallback BCs (e.g. BC A+B, BC A+C and BC B+C), it seems that we need to find some other use cases for the Note 2 to the *FeatureSetCombination.*

#### **Q1: If the understanding A is preferred, do companies agree that RAN2 shall re-evaluate whether the Note2 to the FeatureSetCombination is still needed.**

Note: If disagree, please also provide the existing use cases for the Note 2 (except the use case in the Q2, which is still under discussing and would be discussed in Q2/3 separately), and the Q4 can be ignored directly.

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| **Company name** | **Agree / Disagree** | **Comments/Use cases for the note 2** |
| Huawei, HiSilicon | Agree | Some update is needed. |
| ZTE | Agree | **If understanding A is preferred, we shall find some new cases for the Note 2 of FeatureSetCombination. If we can’t find such cases, the Note2 shall be deleted. Otherwise, some clarification to Note2 shall be added to avoid confusion for that the using /introducing case has changed.** |
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Meanwhile, another email discussion is undergoing as below.

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| **Miscellaneous I**   * [AT110e][021][NR15] UE cap Miscellaneous I (Qualcomm)   Scope: Treat R2-2005630, R2-2005631, R2-2005632, R2-2005633, R2-2004326, R2-2005577, R2-2005578, R2-2004436, R2-2004437 (proponents are responsible to explain and drive)  Part 1: Decision whether to make corrections or not, identify agreeable corrections. Deadline: June 4, 0700 UTC.  Part 2: For agreeable parts, continuation to agree CRs. Deadline: June 10, 0700 UTC  [R2-2004436](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2005_R2_110-e/Docs/R2-2004436.zip) Signalling of NR-DC only band combination Qualcomm Incorporated discussion Rel-15 NR\_newRAT-Core  [R2-2004437](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2005_R2_110-e/Docs/R2-2004437.zip) Clarification on supported NR-DC cell grouping Qualcomm Incorporated CR Rel-15 38.306 15.9.0 0264 1 F NR\_newRAT-Core R2-2002579 |

In [R2-2004436](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2005_R2_110-e/Docs/R2-2004436.zip)[7] and [R2-2004437](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2005_R2_110-e/Docs/R2-2004437.zip)[8], it wants to clarify that whether the UE is allowed to declare band combinations where NR-DC is supported but the NR-CA is not supported.

#### **Q2: Do companies agree that if the UE is allowed to declare band combinations where NR-DC is supported but the NR-CA is not supported, the Note 2 to the FeatureSetCombination can be reused for this case.**

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| **Company name** | **Agree / Disagree** | **Comments/Use cases for the note 2** |
| Huawei, HiSilicon |  | We are fine with the proposed way in R2-2004436 to declare BC where NR-DC is supported but NR-CA is not. And we understand that it does not conflict with understanding A, as the super BC is actually supported by the UE (even if it is only supported as NR-DC BC). |
| Nokia |  | Our understanding is that UE is allowed to declare band combinations where NR-DC is supported but the NR-CA is not supported.  [Rap] Then the question is whether the Note 2 can be reused for this case. According to your feedback in 2.2.1, I guess your understanding is B, thus there is no need to further discuss the issues on Note 2. |
| ZTE | Agree (proponent) | We also agree that “UE is allowed to declare band combinations where NR-DC is supported but the NR-CA is not supported” , and then the Note 2 to the FeatureSetCombination can be reused for this case. In other words, there is no need to delete Note 2, instead some clarification can be added to make the Note2 clear. |
| OPPO | Agree |  |
| CATT | Agree | But does this require any change? |

#### **Q3: If Q2 was agreed, do companies agree to add a clarification to the Note2 as below to make it clearer.**

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| NOTE 2: The UE may advertise a *FeatureSetCombination* containing only fallback band combinations. That means, in a *FeatureSetCombination,* each group of *FeatureSets* across the bands may contain at least one pair of *FeatureSetUplinkId* and *FeatureSetDownlinkId* which is set to 0/0. The UE may use this method to declare band combinations where NR-DC is supported, but the NR-CA is not supported. |

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| **Company name** | **Agree / Disagree** | **Comments** |
| Huawei, HiSilicon |  | If some clarifications for the case in R2-2004436 are needed in the spec, we could clarify it but it can be independent with Note2. As discussed in Q1, some updates for Note2 may be needed so how to capture could be discussed further based on the update for Note2. |
| Nokia | Disagree | The RAN2 signalling allows the flexibility. It is not required to capture all the possibilities. |
| ZTE | Agree | We think if Q2 was agreed, the Note2 can be reused for the proposed case in R2-2004436. But we need add some clarification to the NOTE2 for that the use case has changed. |
| CATT | See comment | We do not see strong need to change. |
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#### **Q4: If RAN2 confirms that the UE shall not declare band combinations where NR-DC is supported, but NR CA is not supported, and there is no any other use cases for the Note 2 in the Q1, do companies agree that the Note 2 to the FeatureSetCombination shall be deleted.**

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| **Company name** | **Agree / Disagree** | **Comments** |
| ZTE |  | According to the current feedback, companies think that the “UE can declare band combinations where NR-DC is supported, but NR CA is not supported” (as proposed in R2-2004436). Thus there is no need to delete the Note 2 to the FeatureSetCombination, instead some clarification shall be added as Q3. |
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### **2.2.3 Related issues if the understanding B is preferred**

If the understanding B is preferred, a supper BC (e.g. BC A+B+C) would be adopted, according to the current BandCombination structure, the following parameters are defined per BC or per band per BC.

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| CA related Parameters | ca-ParametersEUTRA/ca-ParametersEUTRA-v1560/ca-ParametersEUTRA-v1570 |
| ca-ParametersNR/ca-ParametersNR-v1540 /ca-ParametersNR-v1550 |
| ca-ParametersNRDC |
| MR-DC parameters | mrdc-Parameters/mrdc-Parameters-v1580/ mrdc-Parameters-v1590 |
| BCS | SupportedBandwidthCombinationSet/ supportedBandwidthCombinationSetIntraENDC |
| Other | powerClass-v1530/ne-DC-BC |
| SRS(per Band per BC) | srs-CarrierSwitch/srs-TxSwitch/supportedSRS-TxPortSwitch-r16 |

#### **Q5: If the understanding B is preferred, do companies agree that only when the per BC parameters are consistent among the fallback BCs , the UE can put these fallback BCs (e.g. BC A+B, BC A+C and BC B+C) into a supper BC (e.g. BC A+B+C).**

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| **Company name** | **Agree / Disagree** | **Comments** |
| Qualcomm Incorporated | Agree | All the fallback BCs must be fallback of a RAN4-defined superset BC so that all BC level parameters make sense, and all the BC level parameters apply to fallbacks.  Applicability of CA power class though may have to be changed for fallback BCs and fallback single carrier based on the applicability tables in RAN4 specifications. |
| Nokia | Agree |  |
| OPPO | Agree | This issue is generally applicable, i.e., not limited to the selection of understanding A/B.  In fact, we see quite some risk that the parameters are not consistent, e.g., fallback BCs may not necessarily have a same BCS value, SRS switching capability may not align among fallback BCs and etc.. |
| Samsung | Agree |  |

Obviously, the UE shall keep very careful when adopting such super BC scheme, which may increase the unexpected complexity on the UE side. For example, the UE has to check the detail BCS related Info of each fall back BC. Once the UE reports the wrong UE capability, it will also cause some trouble to the network side, e.g. the reconfiguration always failed. To avoid such kind of issues, a note can be added to the 5.6.1.4 of 38.331 to reminder the UE vendor adopt the Super BC scheme carefully.

#### **Q6: If the understanding B is preferred, do companies agree that a note as below can be added to the 5.6.1.4 of 38.331 to reminder the UE vendor adopt the Super BC scheme carefully.**

Note: The UE shall be careful to use a super BC to indicate the fallback BCs on purpose of saving signalling, only when the per BC capabilities are consistent among the fallback BCs, the UE can put the fallback BCs (e.g. BC A+B, BC A+C and BC B+C) into a supper BC (e.g. BC A+B+C).

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| **Company name** | **Agree / Disagree** | **Comments** |
| Qualcomm Incorporated | Disagree | It is sufficiently clear from how the UE capability signalling is structured today. |
| Nokia | Disagree | It is sufficiently clear from how the UE capability signalling is structured today. |
| OPPO | Disagree | Same view as Qualcomm. |
| Samsung | Disagree | No further clarification is needed in the specification, if needed we can capture the RAN2 understanding in the chairman note. |

## Clarifications on the BandList of the BandCombination (R2-2004969[9], R2-2004970[10])

These CRs try to add a clarification as below to BandList-v1540/BandList-v16xy as the LTE has done.

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| ***BandList-v1540/BandList-v16xy***  The UE shall include the same number of entries, and listed in the same order, as in *BandList* (without suffix). |

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| **Company name** | **Agree / Disagree** | **Comments** |
| Lenovo |  | This was confirmed at last RAN2#109bis-e as result of offline discussion [016] and minuted in the official RAN2 report. Therefore, we wonder why a CR is needed. |
| Qualcomm Incorporated | Disagree | The clarification text is not good enough. The two band lists are included in each band combination in the band combination list. So the requirement "the UE shall include the same number of entries, and listed in the same order" is for the band lists included for the same band combination. |
| Huawei, HiSilicon | Disagree | It was discussed in last meeting, intention is ok but no clear majority on supporting the CR. |
| Nokia | Disagree | Yes, no need for CR maybe. |
| ZTE | Proponent | Anyway, we can accept the majorities’ views. |
| OPPO | Proponent |  |
| CATT | Disagree | Intention is not wrong, but nothing is broken w/o this change. |
| Samsung | Agree | We are fine to add clarification. |

## Missing UE capability requirements (R2-2004844[11], R2-2004845[12])

The ROHC profiles that an IMS voice capable UE shall support are missing, these CRs try to fix this issue.

### **2.4.1 Do companies agree with the motivation of these CRs?**

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| **Company name** | **Agree / Disagree** | **Comments** |
| Lenovo | Tend to disagree | Is there an IMS profile for VoNR similar like from GSMA for VoLTE in IR.92? If not then there is no need to add the requirements for supporting the RoHC profiles. |
| Qualcomm Incorporated | Tend to disagree | Almost no information in the CR cover page and no justifications are provided. We should try to limit the number of entries in the conditionally mandatory features. |
| Huawei, HiSilicon | Tend to disagree | Same view that no justifications are provided. |
| Nokia | Disagree | Agree with the above. |
| ZTE |  | Maybe more information should be provided in the cover page |
| OPPO | Disagree | As commented above, there is no enough justification in the cover page to introduce the bunch of conditionally mandatory capabilities. |

### **2.4.2 Do companies agree with the proposed changes to the field description of the “supportedROHC-Profiles”?**

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| **Company name** | **Agree / Disagree** | **Comments** |
| Lenovo | Tend to disagree | See comment to 2.4.1. |
| Qualcomm Incorporated | Agree | This is already our understanding. The same requirement in LTE standard. |
| Huawei, HiSilicon | Agree |  |
| Nokia | Agree |  |
| ZTE | Agree |  |
| OPPO | Agree | We are OK since the intention seems to copy the requirement from LTE. |

### **2.4.3 Do companies agree with the proposed changes to the conditionally mandatory features in clause 6 of 38.306?**

#### **2.4.3.1 IMS emergency calls**

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| **Company name** | **Agree / Disagree** | **Comments** |
| Lenovo | Agree | Minor issue to fix: feature name “IMS emergency calls” should be in singular. |
| Qualcomm Incorporated | Agree |  |
| Huawei, HiSilicon | Agree |  |
| Nokia | Agree |  |
| ZTE | Agree |  |
| OPPO | Agree | We are OK since the intention seems to copy the requirement from LTE. |

#### **2.4.3.2 OTDOA Inter-frequency RSTD measurement indication**

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| **Company name** | **Agree / Disagree** | **Comments** |
| Lenovo | Disagree | Name and description of the feature does not reflect what has been specified in TS 38.331, 5.5.6, namely   1. location related measurements eutra-RSTD, i.e. RSTD measurements towards E-UTRA, and 2. subframe and slot timing detection towards E-UTRA (eutra-FineTimingDetection), i.e. offset between the NR serving cell and the LTE assistance data reference cell. |
| Qualcomm Incorporated | Disagree | This is UE initiated procedure, so the added requirement is only for UE implementation guidance, as opposed to ensuring inter-operability. |
| Huawei, HiSilicon | Disagree | At least the feature is not “OTDOA Inter-frequency RSTD measurement indication”, the condition is “UEs indicating support for inter-frequency RSTD measurements for OTDOA”. |
| Nokia | Disagree |  |
| ZTE | Disagree | We share the same view as Lenovo. |
| OPPO | Disagree | Although the intention seems to copy the LTE requirement, it is not good enough:   * it is not about inter-frequency measurement but inter-RAT measurement; * The consequence of missing this requirement should be clarified considering this is for a UE-initiated procedure |

#### **2.4.3.3 Different UL/ DL configuration for TDD inter-band carrier aggregation**

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| **Company name** | **Agree / Disagree** | **Comments** |
| Qualcomm Incorporated |  | It is unfortunate that no justification is given in the CR cover page, given this is RAN4 centric item. |
| Huawei, HiSilicon |  | Not sure what’s the relation between this capability and simultaneousRxTxInterBandCA, if UE supports Different UL/ DL configuration for TDD inter-band carrier aggregation, does it mean UE support simultaneousRxTxInterBandCA? |
| Nokia |  | Intention should be clear to all of us. |
| ZTE |  | We share the same view as Qualcomm |
| OPPO | Disagree | Same view as Qualcomm. |

#### **2.4.3.4 Simultaneous transmission of PUCCH and PUSCH across PUCCH groups**

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| **Company name** | **Agree / Disagree** | **Comments** |
| Qualcomm Incorporated |  | It is unfortunate that no justification is given in the CR cover page, given this is RAN1 centric item. |
| Huawei, HiSilicon |  | Not sure why this capability is needed, it seems to be the same as the twoPUCCH-Group. For twoPUCCH-Group, it describes “For NR CA, two PUCCH group is supported with the same numerology across NR carriers for data and control channel at a given time.” |
| Nokia |  | Intention should be clear to all of us. |
| ZTE | Agree | We prefer to add this parameter to make it clear. |
| OPPO |  | Same view as Qualcomm. |

**Proposal 1: xxxx**

# Discussion: Part 2

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# Conclusion

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# Reference

1. [R2-2004560](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2005_R2_110-e/Docs/R2-2004560.zip) Invalidating bandwidth class F for FR1 Nokia, Nokia Shanghai Bell CR Rel-15 38.306 15.9.0 0311 - F NR\_newRAT-Core
2. [R2-2004561](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2005_R2_110-e/Docs/R2-2004561.zip) Invalidating bandwidth class F for FR1 Nokia, Nokia Shanghai Bell CR Rel-16 38.306 16.0.0 0312 - A NR\_newRAT-Core
3. [R2-2004972](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_110-e\Docs\R2-2004972.zip) Further consideration on the Notes to the FeatureSetCombination ZTE Corporation, Sanechips discussion Rel-15 NR\_newRAT-Core
4. R2-1812243 E534 Signaling of fallback Band Combinations Ericsson discussion Rel-15 NR\_newRAT-Core
5. R2-1813309 Variants for signalling explicit fallback BCs Ericsson draftCR 3Rel-15 38.331 15.2.0 F NR\_newRAT-Core
6. Draft\_RAN2-109bis-e\_MeetingReport\_v2.docx
7. [R2-2004436](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2005_R2_110-e/Docs/R2-2004436.zip) Signalling of NR-DC only band combination Qualcomm Incorporated discussion Rel-15 NR\_newRAT-Core
8. [R2-2004437](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2005_R2_110-e/Docs/R2-2004437.zip) Clarification on supported NR-DC cell grouping Qualcomm Incorporated CR Rel-15 38.306 15.9.0 0264 1 F NR\_newRAT-Core R2-2002579
9. [R2-2004969](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2005_R2_110-e/Docs/R2-2004969.zip) Clarifications on the BandList of the BandCombination ZTE Corporation, Sanechips, OPPO CR Rel-15 38.331 15.9.0 1517 1 F NR\_newRAT-Core R2-2002695
10. [R2-2004970](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2005_R2_110-e/Docs/R2-2004970.zip) Clarifications on the BandList of the BandCombination ZTE Corporation, Sanechips, OPPO CR Rel-16 38.331 16.0.0 1512 1 F NR\_newRAT-Core R2-2002637
11. [R2-2004844](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2005_R2_110-e/Docs/R2-2004844.zip) Missing UE capability requirements Ericsson CR Rel-15 38.306 15.9.0 0319 - F NR\_newRAT-Core
12. [R2-2004845](file:///D:/Documents/3GPP/tsg_ran/WG2/RAN2/2005_R2_110-e/Docs/R2-2004845.zip) Missing UE capability requirements Ericsson CR Rel-16 38.306 16.0.0 0320 - A NR\_newRAT-Core