**3GPP TSG-RAN WG2 Meeting #113-e R2-210xxxx**

**Online, January 25th – February 5th 2021**

**Agenda Item: 8.17**

**Source: Huawei, HiSilicon**

**Title: Summary of [AT113-e][034][NR17 Other] NR17 other (Huawei)**

**Document for: Discussion and decision**

# Introduction

This document summarizes the following offline discussion.

* [AT113-e][034][NR17 Other] NR17 other (Huawei)

Scope: Treat R2-2100054, R2-2100896, R2-2100897, R2-2100950, R2-2100951, T2-2100952, R2-2100953, R2-21002259, R2-21001457, R2-21001458, R2-2100046, R2-2101415, R2-2100055, R2-21001612, R2-21001613

Phase 1, determine agreeable parts, Phase 2, for agreeable parts Work on CRs and LS out if applicable.

Intended outcome: Report, Agreed CRs, approved LS if any is agreeable.

Deadline: Prepare such that results can be available Feb 3 (for potential CB Feb 4).

# Contact from companies

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| --- | --- |
| Company | Email |
| Huawei, HiSilicon | Yiru Kuang (kuangyiru@huawei.com) |
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# Discussion

## FR2 FWA power class

FR2 FWA - Power Class Release Indep R15

[R2-2100054](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100054.zip) LS for FR2 FWA power class (R4-2016876; contact: Softbank) RAN4 LS in Rel-17 NR\_FR2\_FWA\_Bn257\_Bn258 To:RAN2

[R2-2100896](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100896.zip) Introducing UE capability for power class 5 for FR2 FWA SoftBank, Huawei draftCR Rel-17 38.331 16.3.1 C NR\_FR2\_FWA\_Bn257\_Bn258-Core

[R2-2100897](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100897.zip) Introducing UE capability for power class 5 for FR2 FWA SoftBank, Huawei draftCR Rel-17 38.306 16.3.0 C NR\_FR2\_FWA\_Bn257\_Bn258-Core

[R2-2100950](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100950.zip) Introduction of PC5 for FR2 Nokia, Nokia Shanghai Bell CR Rel-15 38.331 15.12.0 2368 - B NR\_FR2\_FWA\_Bn257\_Bn258-Core

[R2-2100951](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100951.zip) Introduction of PC5 for FR2 Nokia, Nokia Shanghai Bell CR Rel-16 38.331 16.3.0 2369 - A NR\_FR2\_FWA\_Bn257\_Bn258-Core

[R2-2100952](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100952.zip) Introduction of PC5 for FR2 Nokia, Nokia Shanghai Bell CR Rel-15 38.306 15.12.0 0495 - B NR\_FR2\_FWA\_Bn257\_Bn258-Core

[R2-2100953](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100953.zip) Introduction of PC5 for FR2 Nokia, Nokia Shanghai Bell CR Rel-16 38.306 16.3.0 0496 - A NR\_FR2\_FWA\_Bn257\_Bn258-Core

There are two options for introducing power class 5:

1. The power class 5 is introduced from Rel-17 with “Early implementation of this CR by Rel-15/16 UEs does not cause any inter-operability issues” in the cover sheet. (CRs R2-2100896/R2-2100897)
2. The power class 5 is introduced from Rel-15. (CRs R2-2100950~R2-2100953)

**Q1-1 Which option listed in above do companies support?**

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| **Company** | **Option** | **Comments** |
| Huawei, HiSilicon | (1) | A new power class 1.5 was introduced in Rel-16, it was added as an Rel-16 signalling with stating “implementation of the change from Rel-15” in the cover sheet of the CR. For this new power class 5, we understand the same operation can be applied, and it will be clearer. |
| Nokia | 2 | This was also what RAN4 indicated in the LS, i.e. " In RAN4#97-e meeting, RAN4 agreed to choose Option2, a new power class (power class 5 ) is defined with release independent from release 15". |
| Ericsson | (1), but | We understand this question is mainly from the signalling point of view on how to introduce such power class, hence the discussion seems to be about 38.331. For 38.331, we do not have a strong view, both can actually work, but slightly prefer (1). For 38.306, the simple change in R2-2100953 seems sufficient (marked as option (2) above). |
| Samsung | (1) | We are fine to go with Option 1 |
| Apple | 1 | Opt 1 is better since this is new signalling. |
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**Q1-2 If the option (1) is selected, do companies agree the CRs R2-2100896/R2-2100897? Please companies provide your comments on the CRs if any.**

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| **Company** | **Yes/No** | **Comments** |
| Huawei, HiSilicon | Yes, but | We agree with the signalling change in 38.331, however we have some concerns on the inter-operability issue, if the new UE reports the new field PC5 but the legacy cannot understand it, which power class should be applied? |
| Nokia | No | If we go with Rel-17 CR, it cannot be agreed now as we have no Rel-17 specifications. We can endorse the CR but it needs to be re-submitted once the Rel-17 specifications are available.  **38.331 CR:** On the CR cover page, normally we don't have inter-operability analysis for Cat C CRs unless they are done for legacy releases.  **38.306 CR:** The added sentence seems to be duplicating text from 38.101-2: Is there a reason why the current FR2 text (which already does refer to 38.101-2) is not sufficient here? Anyway UE should set both the new and the old fields according to 38.101-2 requirements for legacy node compatibility. |
| Ericsson |  | Agree with the intention of 38.331 – but as Nokia suggested, one would probably have to at most endorse them for now. For the updates to 38.306, we may need to further discuss it, but we think the CR on R2-2100953 is the baseline until we find that any additional change is really needed. |
| Samsung | Yes but | This should also be listed in the Annex C (i.e. List of CRs Containing Early Implementable Features and Corrections). |
| Apple | Not yet | Same view as Nokia |
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**Q1-3 If the option (2) is selected, do companies agree the CRs R2-2100950~R2-2100953? Please companies provide your comments on the CRs if any.**

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| **Company** | **Yes/No** | **Comments** |
| Nokia | Yes | Proponent. |
| Ericsson |  | As said above, for 38.306, a simple change as R2-2100953 is preferred as baseline. We can then further discuss whether there is anything on top that we need to clarify later. |
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## 35 and 45 MHz channel Bandwidths

FR1\_35MHz\_45MHz\_BW - Release Indep R15

All Moved from 5.4.3:

[R2-2102259](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2102259.zip) LS to RAN2 on 35 and 45 MHz channel Bandwidths (R4-2017846; contact: T-Mobile) RAN4 LS in Rel-15 NR\_FR1\_35MHz\_45MHz\_BW-Core To:RAN2

[R2-2101457](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101457.zip) Support of 35 MHz and 45 MHz channel bandwidth for FR1 Apple Inc, T-Mobile CR Rel-15 38.306 15.12.0 0511 - F NR\_FR1\_35MHz\_45MHz\_BW-Core

[R2-2101458](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101458.zip) Support of 35 MHz and 45 MHz channel bandwidth for FR1 Apple Inc, T-Mobile CR Rel-16 38.306 16.3.0 0512 - A NR\_FR1\_35MHz\_45MHz\_BW-Core

The changes in the CRs are given as below:

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| ***channelBWs-DL***  Indicates for each subcarrier spacing the UE supported channel bandwidths. Absence of the *channelBWs-DL* (without suffix) for a band or absence of specific scs-XXkHz entry for a supported subcarrier spacing means that the UE supports the channel bandwidths among [5, 10, 15, 20, 25, 30, 40, 50, 60, 80, 100] and [50, 100, 200] that were defined in clause 5.3.5 of TS 38.101-1 version 15.7.0 [2] and TS 38.101-2 version 15.7.0 [3] for the given band or the specific SCS entry.  For FR1, the bits in *channelBWs-DL* (without suffix) starting from the leading / leftmost bit indicate 5, 10, 15, 20, 25, 30, 40, 50, 60 and 80MHz. For FR2, the bits in *channelBWs-DL* (without suffix) starting from the leading / leftmost bit indicate 50, 100 and 200MHz. The third / rightmost bit (for 200MHz) shall be set to 1.  For FR1, the leading/leftmost bit in *channelBWs-DL-v1590* indicates 70MHz, the second leftmost bit indicates 45MHz, the third leftmost bit indicates 35MHz and all the remaining bits in *channelBWs-DL-v1590* shall be set to 0.  NOTE: To determine whether the UE supports a specific SCS for a given band, the network validates the *supportedSubCarrierSpacingDL* and the *scs-60kHz*. To determine whether the UE supports a channel bandwidth of 90 MHz, the network may ignore this capability for and validate instead the *channelBW-90mhz* and the *supportedBandwidthCombinationSet*. For serving cells with other channel bandwidths the network validates the *channelBWs-DL*, the *supportedBandwidthCombinationSet*, the *asymmetricBandwidthCombinationSet* (for a band supporting asymmetric channel bandwidth as defined in clause 5.3.6 of TS 38.101-1 [2]) and *supportedBandwidthDL*. For each of the channel bandwidths indicated in *channelBWs-DL-v1590,* for the network to use the relevant *FeatureSetDownlinkPerCC*, the UE shall include at least one *FeatureSetDownlinkPerCC* with *supportedBandwidthDL* where the supported bandwidth value is greater than the channel bandwidth indicated in *channelBWs-DL-v1590*. |
| ***channelBWs-UL***  Indicates for each subcarrier spacing the UE supported channel bandwidths.  Absence of the *channelBWs-UL* (without suffix) for a band or absence of specific scs-XXkHz entry for a supported subcarrier spacing means that the UE supports the channel bandwidths among [5, 10, 15, 20, 25, 30, 40, 50, 60, 80, 100] and [50, 100, 200] that were defined in clause 5.3.5 of TS 38.101-1 version 15.7.0 [2] and TS 38.101-2 version 15.7.0 [3] for the given band or the specific SCS entry.  For FR1, the bits in *channelBWs-UL* (without suffix) starting from the leading / leftmost bit indicate 5, 10, 15, 20, 25, 30, 40, 50, 60 and 80MHz. For FR2, the bits in *channelBWs-UL* (without suffix) starting from the leading / leftmost bit indicate 50, 100 and 200MHz. The third / rightmost bit (for 200MHz) shall be set to 1.  For FR1, the leading/leftmost bit in *channelBWs-UL-v1590* indicates 70 MHz, the second leftmost bit indicates 45MHz, the third leftmost bit indicates 35MHz and all the remaining bits in *channelBWs-UL-v1590* shall be set to 0.  NOTE: To determine whether the UE supports a specific SCS for a given band, the network validates the *supportedSubCarrierSpacingUL* and the *scs-60kHz*. To determine whether the UE supports a channel bandwidth of 90 MHz the network may ignore this capability for and validate instead the *channelBW-90mhz* and the *supportedBandwidthCombinationSet*. For serving cells with other channel bandwidths the network validates the *channelBWs-UL*, the *supportedBandwidthCombinationSet*, the *asymmetricBandwidthCombinationSet* (for a band supporting asymmetric channel bandwidth as defined in clause 5.3.6 of TS 38.101-1 [2]) and *supportedBandwidthUL*. . For each of the channel bandwidths indicated in *channelBWs-UL-v1590,* for the network to use the relevant *FeatureSetUplinkPerCC*, the UE shall include at least one *FeatureSetUplinkPerCC* with *supportedBandwidthUL* where the supported bandwidth value is greater than the channel bandwidth indicated in *channelBWs-UL-v1590*. |

**Q2-1 Do companies agree the CRs R2-2101457/R2-2101458? Please companies provide your comments on the CRs if any.**

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| **Company** | **Yes/No** | **Comments** |
| Huawei, HiSilicon | Yes, but | We are fine with the first change, but not sure about the second change for NOTE, why we need such restrict for per CC BW and per band BW? |
| Nokia | Not as such | Intention is fine but "*value is greater than the channel bandwidth indicated in channelBWs-DL-v1590*" seems not correct formulation as this already contains a value of 70 MHz, so a UE will be mandated to report something that is larger than each of the ones in this field. |
| Ericsson | Yes, but | We are also fine with the first change.  We assume the added text in the NOTE is supposed to specify in more detail what is already covered by the sentence before.  So not essential but looks as a good clarification, this is pretty complex.  Should be “…greater than or equal to…”? Are the words “…for the network to use the relevant  FeatureSetUplinkPerCC…” needed? Those can be deleted. |
| T-Mobile USA | Yes | The clarification on max supported BW is needed, this clarifies the case when the maximum channel BW supported by a band is increased. |
| Samsung | Yes but | We share the view with Huawei that the change in NOTE seems not needed. |
| Apple | Yes (proponent) | Without the note, the NW does not know which featureSetPerCC to use when configuring the UE with any of the v1590 BWs. The UE only says support of new BWs, but featureSetPerCC does not have a BW enumerated that matches v1590. 70MHz is a slight exception where the featureSetPerCC has a Boolean for 70 MHz, but even here the BW parameter does not have an enumerated 70 MHz value to go with SCS/MCS… So with NOTE, the UE is expected to have atleast one featureSetPerCC with higher BW than v1590 that the NW can use. We already agreed that support of a particular BW implies support of lower BWs (except of the special ones from v1590 which need explicit signalling). |
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## UL MIMO restrictions for SUL

FR1 enh - UL MIMO restrictions for SUL

[R2-2100055](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100055.zip) LS on removing restriction on configuring UL MIMO for SUL band (R4-2016909; contact: CMCC) RAN4 LS in Rel-17 NR\_RF\_FR1\_enh-Core To:RAN2 Cc:RAN1

[R2-2101612](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101612.zip) Draft CR: Remove the maximum number of MIMO layers configuration restrictions for SUL CMCC, Huawei, HiSilicon, CATT draftCR Rel-17 38.331 16.3.1 B NR\_RF\_FR1\_enh

[R2-2101613](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101613.zip) Draft CR: Remove the maximum number of MIMO layers restrictions for SUL CMCC, Huawei, HiSilicon, CATT draftCR Rel-17 38.306 16.3.0 B NR\_RF\_FR1\_enh

The changes in the 38.331 CRs are given as below:

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| ***maxMIMO-Layers***  Indicates the maximum MIMO layer to be used for PUSCH in all BWPs of the normal UL of this serving cell (see TS 38.212 [17], clause 5.4.2.1). If present, the network sets *maxRank* to the same value. The field *maxMIMO-Layers* refers to DCI format 0\_1. |
| ***maxMIMO-LayersForDCI-Format0-2***  Indicates the maximum MIMO layer to be used for PUSCH for DCI format 0\_2 in all BWPs of the normal UL of this serving cell (see TS 38.212 [17], clause 5.4.2.1). If present, the network sets *maxRankForDCI-Format0-2* to the same value. |

The changes in the 38.306 CRs are given as below:

| ***maxNumberMIMO-LayersCB-PUSCH***  Defines supported maximum number of MIMO layers at the UE for PUSCH transmission with codebook precoding. UE indicating support of this feature shall also indicate support of PUSCH codebook coherency subset. | FSPC | No | N/A | N/A |
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| ***maxNumberMIMO-LayersNonCB-PUSCH***  Defines supported maximum number of MIMO layers at the UE for PUSCH transmission using non-codebook precoding.  UE supporting non-codebook based PUSCH transmission shall indicate support of *maxNumberMIMO-LayersNonCB-PUSCH, maxNumberSRS-ResourcePerSet* and *maxNumberSimultaneousSRS-ResourceTx* together. | FSPC | No | N/A | N/A |
| ***maxNumberSimultaneousSRS-ResourceTx***  Defines the maximum number of simultaneous transmitted SRS resources at one symbol for non-codebook based transmission to the UE. | FSPC | No | N/A | N/A |
| ***maxNumberSRS-ResourcePerSet***  Defines the maximum number of SRS resources per SRS resource set configured for codebook or non-codebook based transmission to the UE. | FSPC | No | N/A | N/A |

**Q3-1 Do companies agree the CRs R2-2101612/R2-2101613? Please companies provide your comments on the CRs if any.**

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| **Company** | **Yes/No** | **Comments** |
| Huawei, HiSilicon | Yes |  |
| Nokia | Yes but | We cannot agree to Rel-17 CRs now - they can only be endorsed. Otherwise these seem OK for now.  However, we assume there may be need to be further update the capability descriptions once RAN4 decides on capabilities for SUL with MIMO. |
| Samsung | Yes with comments | Regarding the changes in the 38.331 CR, we think the following changes are also needed to apply UL MIMO configuration on normal UL and SUL of the serving cell independently.  ***maxMIMO-Layers***  Indicates the maximum MIMO layer to be used for PUSCH in all BWPs of the ~~normal~~ corresponding UL of this serving cell (see TS 38.212 [17], clause 5.4.2.1). If present, the network sets *maxRank* to the same value  ***maxMIMO-LayersForDCI-Format0-2***  Indicates the maximum MIMO layer to be used for PUSCH for DCI format 0\_2 in all BWPs of the ~~normal~~ corresponding UL of this serving cell (see TS 38.212 [17], clause 5.4.2.1). |
| Ericsson | Yes | Just some question for clarification regarding Rel-15. For Rel-15 is the UE supposed to omit completely the fields maxNumberMIMO-LayersCB-PUSCH/maxNumberMIMO-LayersNonCB-PUSCH? Maybe not, otherwise the UE could not indicate that it supports only e.g. maxNumberMIMO-LayersNonCB-PUSCH with 1 layer but no maxNumberMIMO-LayersCB-PUSCH. So for Rel-15, even though the value of 1 layer is always considered, the UE should report this 1 layer within the fields maxNumberMIMO-LayersCB-PUSCH and/or maxNumberMIMO-LayersNonCB-PUSCH, is that correct understanding? |
| Apple | Agree but | Same views as Huawei and Samsung. We also agree with Ericsson’s interpretation. |
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## Broadcast of gNB ID length

R3 TEI17 - Broadcast of gNB ID length

[R2-2100046](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2100046.zip) LS on broadcasting gNB ID length in system information block (R3-207226; contact: Ericsson) RAN3 LS in Rel-17 TEI17 To:RAN2 Cc:SA3

[R2-2101415](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113-e\Docs\R2-2101415.zip) On broadcasting gNB ID length in SIB1 (reply LS to R3-207226) Ericsson discussion

According to the LS in R2-2100046, RAN2 is supposed to answer RAN3, which asked:

RAN3 WG respectfully asks RAN2 WG to check the feasibility of broadcasting the gNB ID’s length in system information blocks and related UE behaviour including reporting for ANR purposes.

Based on the above and the proposals in R2-2101415 (copied below), the moderator ask companies to reply the questions below.

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| [Observation 1 The current TNL address discovery is not well prepared for the RAN node ID’s flexible length.](#_Toc61531882)  [Proposal 1 Include gNB ID length in *PLMN-IdentityInfo* IE in SIB1 for each cell that is served by that gNB.](#_Toc61531880)  [Proposal 2 Include gNB ID length in reportCGI measurement report.](#_Toc61531881) |

**Q4-1 Do companies agree that Proposal 1 is feasible from RAN2 point of view? Which pros and cons do you see in the proposal?**

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| **Company** | **Yes/No** | **Comments** |
| Huawei, HiSilicon |  | This would be too costly to broadcast.  It will not work for legacy UEs. |
| Nokia |  | From network side we are not aware of any particular issue with the current OAM based solution. In general, we ought to be very careful about SIB1 overhead. |
| Ericsson | Yes | This is required. Of course it will not work for legacy UEs but if one UE supports the new CGI reporting procedure which includes the gNB ID length, then the neighbour relations can be established and this neighbour relation can be used for legacy UEs as well (i.e., there is no need for asking the legacy UEs for CGI reporting in that case).  RAN3 has realized that the network based solution is too complex and that is the reason for LS. We believe this is not a very large overhead as this will add just 4 bits to the SIB1. |
| Samsung | Yes, but | We think it is feasible to broadcast gNB ID length in SIB1 but we can discuss actual signalling details further. |
| Apple | Yes but | Same view as Samsung |
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**Q4-2 Do companies agree that Proposal 2 is feasible from RAN2 point of view? Which pros and cons do you see in the proposal?**

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| **Company** | **Yes/No** | **Comments** |
| Huawei, HiSilicon |  | It will not work for legacy UEs. |
| Nokia |  | Agree with Huawei. |
| Ericsson | Yes | Same reasoning as previous question. |
| Samsung | Yes, but | We think it is feasible but we can discuss details further. |
| Apple | Yes but | Same view as Samsung |
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# 4 Conclusions

*To be added…*

# 5 References

1. R2-2100054 LS for FR2 FWA power class (R4-2016876; contact: Softbank) RAN4
2. R2-2100896 Introducing UE capability for power class 5 for FR2 FWA SoftBank, Huawei
3. R2-2100897 Introducing UE capability for power class 5 for FR2 FWA SoftBank, Huawei
4. R2-2100950 Introduction of PC5 for FR2 Nokia, Nokia Shanghai Bell
5. R2-2100951 Introduction of PC5 for FR2 Nokia, Nokia Shanghai Bell
6. R2-2100952 Introduction of PC5 for FR2 Nokia, Nokia Shanghai Bell
7. R2-2100953 Introduction of PC5 for FR2 Nokia, Nokia Shanghai Bell
8. FR1\_35MHz\_45MHz\_BW - Release Indep R15
9. R2-2102259 LS to RAN2 on 35 and 45 MHz channel Bandwidths (R4-2017846; contact: T-Mobile) RAN4
10. R2-2101457 Support of 35 MHz and 45 MHz channel bandwidth for FR1 Apple Inc, T-Mobile
11. R2-2101458 Support of 35 MHz and 45 MHz channel bandwidth for FR1 Apple Inc, T-Mobile
12. R2-2100055 LS on removing restriction on configuring UL MIMO for SUL band (R4-2016909; contact: CMCC) RAN4
13. R2-2101612 Draft CR: Remove the maximum number of MIMO layers configuration restrictions for SUL CMCC, Huawei, HiSilicon, CATT
14. R2-2101613 Draft CR: Remove the maximum number of MIMO layers restrictions for SUL CMCC, Huawei, HiSilicon, CATT
15. R2-2100046 LS on broadcasting gNB ID length in system information block (R3-207226; contact: Ericsson) RAN3
16. R2-2101415 On broadcasting gNB ID length in SIB1 (reply LS to R3-207226) Ericsson