**3GPP TSG RAN WG1 #114** **R1-230xxxx**

**Toulouse, France, August 21st – 25th, 2023**

**Agenda item:** 9.17

**Source:** Samsung

**Title:** Summary of email discussions [114-R18-38.213-NR\_FR1\_lessthan\_5MHz\_BW]

**Document for:** Discussion and decision

# Introduction

The purpose of this document is to collect inputs/comments on the draft CR for TS 38.213 [draftCR\_38213 Less than 5 MHz BW](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Inbox/drafts/9.17(Other)/%5B38.213%20draft%20CRs%5D/NR_FR1_lessthan_5MHz_BW/R1-230xxxx%20draftCR_38213%20Less%20than%205%20MHz%20BW.docx) on the introduction of NR support for dedicated spectrum less than 5MHz for FR1. If a comment on a particular aspect has been made by another company, please do not repeat it until, if needed, after a response.

The first checkpoint is on September 5, UTC 13:00.

# First Round Discussion

Please provide your comments on the draft CR for TS 38.213 [draftCR\_38213 Less than 5 MHz BW](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Inbox/drafts/9.17(Other)/%5B38.213%20draft%20CRs%5D/NR_FR1_lessthan_5MHz_BW/R1-230xxxx%20draftCR_38213%20Less%20than%205%20MHz%20BW.docx).

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| Company | Comments |
| Ericsson | Thanks for the draft CR, we have the following comments:   * Clause 13: The new text added as part of the first paragraph should also include the following statement “… in [8-1, TS 38.101 -1]. In Table 13-0, for configurations with indices 0, 1, 10 and 11, Table 5.4.3.1-3 in [8-1, TS 38.101-1] applies.”   [Aris]: Table 5.4.3.1-3 defines GSCN values 41637 and 41638, and Table 5.4.3.3-1 (NOTE 1) and Table 5.4.3.3-2 (NOTE 2) specify how to apply the two GSCN values. So, referring to Table 5.4.3.3-1 (NOTE 1) and Table 5.4.3.3-2 (NOTE 2) is sufficient.   * Clauses 12 and 13: The word “truncation” can be replaced by “puncturing” as to align the wording used in TS 38.213 and TS 38.211.   [Aris]: Yes. |
| FUTUREWEI | Thanks for the draft CR  1. For clause 13, the text “In Table 13-1, the associated SS/PBCH block is not located according to NOTE 12 of Table 5.4.3.3-1 in [8-1, TS 38.101-1].” seems unneeded.  [Aris]: The intention is to say that when an SS/PBCH block is located as in NOTE 12 of Table 5.4.3.3-1, a UE uses Table 13-0 instead of Table 13-1 (clarifies UE behavior - no UE blind detection on which Table to use).  2. For clauses 12/13, “if truncation, if any”. In this case, “puncturing” seems to be the appropriate work. The SS/PBCH and CORESET are punctured.  [Aris]: Yes. |
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# Second Round Discussion

Please provide your comments on the draft CR for TS 38.213 at [draftCR\_38213 Less than 5 MHz BW\_v1](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Inbox/drafts/9.17(Other)/%5B38.213%20draft%20CRs%5D/NR_FR1_lessthan_5MHz_BW/R1-230xxxx%20draftCR_38213%20Less%20than%205%20MHz%20BW_v1.docx).

The second checkpoint is on September 6, UTC 15:00.

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| Company | Comments |
| Ericsson v05 | Editor thanks for the response. The tables and notes cited in your comment do not encompass CORESET 0, because the notes state “punctured PBCH,” and “DCH transmission”. Thus, stating that indices 0, 1, 10 and 11 in Table 13-0 apply for Table 5.4.3.1-3, creates a link between the usage of those CORESET 0 entries and the sync-raster points described in Table 5.4.3.3-1. Having said that, the following still holds:   * Clause 13: The new text added as part of the first paragraph should also include the following statement “… in [8-1, TS 38.101 -1]. In Table 13-0, for configurations with indices 0, 1, 10 and 11, Table 5.4.3.1-3 in [8-1, TS 38.101-1] applies.”   [Aris]: The current wording reflects the following agreement. RAN1 did not agree on having specification impact. I also checked the UE features discussion, as the suggestion above relates to UE features rather than to specification (and association between configuration and sync raster points is a gNB implementation issue). There is no conclusion even in UE features.  Agreement  For 3MHz channel BW, Table 13-0 is used by the UE for CORESET#0 configuration only when the detected SSB is from a new synch raster point in RAN4.  FFS: any specification impact.  Again, the text in the draft CR provides a link between CORESET#0 and sync raster. The Table is for CORESET#0 and the “when an associated SS/PBCH block is located according to XXX” is the link to the sync raster defined in RAN4. As previously stated, Tables 5.4.3.3-1 and 5.4.3.3-2 include the sync raster points in Table 5.4.3.1-3 and there is no need for repetitions. Basically, the comment above is not incorrect, but it does not need to have specification impact to 38.213 and the RAN1 agreement from RAN1#114 does not enable such impact.  The wording in the green text is also confusing for the “applies” as configurations are about CORESET#0 while Table 5.4.3.1-3 is about the sync raster.  Basically, the suggestion is neither agreed in RAN1 nor does it need to be reflected in 38.213. Obviously, the text will be updated to reflect any subsequent RAN1 agreement. |
| Qualcomm | We agree with Ericsson’s suggestion to associate the CORESET0 entries and sync raster points.   * The index 0,1 are applied to GSCN value 41637, i.e., either referring to Table 5.4.3.1-3 or Note2 of Table 5.4.3.3-2. * The index 10,11 are applied to GSCN value 41638, i.e., either referring to Table 5.4.3.1-3 or Note12 of Table 5.4.3.3-1.   [Aris]: Please see response to Ericsson. |
| Huawei, HiSilicon | Regarding Ericsson and Qualcomm’s proposal for index 0 and 1, there is no agreement to restrict 12-PRB CORESET#0 only to the single sync raster point (920.73 MHz). It seems unnecessary restriction for gNB configuration. Therefore, we are afraid that the proposal is not correct. |
| Ericsson v08 | To Huawei:  Please note that the usability of indices 0, 1, 10, and 11 in Table 13-0 are meant to be used for the sync-raster points described in Table 5.4.3.3-1. That was not debatable (see my technical comment below), the only thing under discussion with the Editor was whether that can be implicitly understood or if an explicit statement about it is needed (Based on the reasons explained in our previous comment, an explicit statement is needed).  Two technical comments on why indices 0, 1, 10, and 11 in Table 13-0 are meant to be used for the sync-raster points described in Table 5.4.3.3-1:   1. Using a 12-PRB CORESET0 when there are 15-PRBs available will bring a performance loss for no reason. The 12-PRB CORESET0 is used when all transmission are confined up to 12-PRBs (i.e., when the available transmission bandwidth is 12-PRBs). 2. Please note that the 12-PRB CORESET0 only has one “Offset (RB)” defined which is equal to 0. Having said that, how will the 12-PRB CORESET0 structure be used within a 15-PRBs available transmission bandwidth? In an over-restricted manner? The reason why the 12-PRB CORESET 0 has an “Offset (RB) = 0” is because it was designed for a specific sync-raster point. |
| Ericsson v10 | To Editor:  You said:  “the text in the draft CR provides a link between CORESET#0 and sync raster.  “As previously stated, Tables 5.4.3.3-1 and 5.4.3.3-2 include the sync raster points in Table 5.4.3.1-3 and there is no need for repetitions.”  The interrelations of those tables do not mention anywhere CORESET 0, as I explained earlier, the tables and notes in the “draft CR” do not encompass CORESET 0, because the notes state “punctured PBCH,” and “DCH transmission”, thus the “link between CORESET#0 and sync raster” is missing in the “draft CR”. This needs to be clarified because of the technical reasons I explained in my response to HW. The suggestion is as follows:   * Clause 13: The new text added as part of the first paragraph should also include the following statement “… in [8-1, TS 38.101 -1]. In Table 13-0, configurations with indices 0, 1, 10, and 11 are only applicable for the SS/PBCH block frequency positions defined in Table 5.4.3.1-3 in [8-1, TS 38.101-1].   [Aris]: Let’s reset. Below is what is currently stated in the draft CR. The sync raster is in 38.101, the text below links CORESET#0 to the sync raster. Nothing is missing, couldn’t be any simpler really. The text you are suggesting is along the same lines but there is no agreement for the specific suggestions and it should be more than clear that they cannot be captured.  In Table 13-0, configurations with index 0 to 9 are applicable when an associated SS/PBCH block is located according to Table 5.4.3.3-2 in [8-1, TS 38.101-1], configurations with index 10 to 11 are applicable when an associated SS/PBCH block is located according to NOTE 12 of Table 5.4.3.3-1 in [8-1, TS 38.101-1], and non-interleaved CCE-to-REG mapping applies for configurations with index 6 to 9. In Table 13-1, the associated SS/PBCH block is not located according to NOTE 12 of Table 5.4.3.3-1 in [8-1, TS 38.101-1].    Further, one thing to clarify in your response to the comment by Huawei (and I agree with that comment) is that I never said that the issue with your suggestion is “whether that can be implicitly understood or if an explicit statement about it is needed”. But I did mention that there is no agreement to support your suggestion. |
| Huawei, HiSilicon | Thank editor and Ericsson for your follow-ups. We are OK with the latest version of draft CR.  @Ericsson, Your suggested text is a restriction of gNB configuration on CORESET#0 and is not supported by any RAN1 agreement. Its motivation and justification is not clear for us. Our responses to your replies are provided inline with yours below.  “   1. Using a 12-PRB CORESET0 when there are 15-PRBs available will bring a performance loss for no reason. The 12-PRB CORESET0 is used when all transmission are confined up to 12-PRBs (i.e., when the available transmission bandwidth is 12-PRBs).   [HW] We prefer to make more room for gNB configuration so that gNB can always be free to pick the CORESET#0 that has the best performance and fits in deployment. In other words, which CORESET#0 is the best is up to gNB implementation.   1. Please note that the 12-PRB CORESET0 only has one “Offset (RB)” defined which is equal to 0. Having said that, how will the 12-PRB CORESET0 structure be used within a 15-PRBs available transmission bandwidth? In an over-restricted manner? The reason why the 12-PRB CORESET 0 has an “Offset (RB) = 0” is because it was designed for a specific sync-raster point.   [HW] In our understanding, as long as the bandwidth is the same for both SSB and CORESET#0, there is only one deployment pattern with respect to the relative frequency location between SSB and CORESET#0, irrespective of sync-raster point. Therefore, no offset (i.e. parameter Offset=0) is needed. It is technically feasible to configure 12PRB CORESET#0 within a 15-PRB BWP and 15-PRB carrier bandwidth, similar to the legacy configuration of 24 PRB CORESET#0 within 106-PRB carrier bandwidth.  ” |
| Ericsson v013 | To the Editor:  Thanks, but your responses are a bit confusing, on one hand you said “the text in the draft CR provides a link between CORESET#0 and sync raster”.  On the other hand you said “there is no agreement to support your suggestion”.  So, is it one or the other?  From your very first response you claim that the RAN4 tables you cited “in the draft CR provides a link between CORESET#0 and sync raster,” and we are saying that strictly speaking the interrelations between those RAN4 tables do not mention CORESET0 anywhere, thus we would like to make it clear.  To HW:  “[HW] We prefer to make more room for gNB configuration so that gNB can always be free to pick the CORESET#0 that has the best performance and fits in deployment. In other words, which CORESET#0 is the best is up to gNB implementation.”  The 12-PRB CORESET0 was introduced in view of a very specific scenario where it is not possible to use the 15-PRBs composing the maximum transmission bandwidth. About “which CORESET#0 is the best is up to gNB implementation,” when there are 15-PRBs available to be used, using a 12-PRB CORESET0 won’t be “the best” as compared to the performance that can be obtained from the 15-PRB CORESET0 structure. Having said that, it is difficult to see to the benefit “to pick the CORESET#0 that has the best performance and fits in deployment,” since in terms of performance and fitting the deployment no advantage is foreseen. The sub-cases were very special supported scenarios, and our intention is to reflect the RAN1 design intention on what was meant to be supported for them. |