3GPP TSG RAN WG2 Meeting #116b-e R2-220xxxx

**Electronic meeting, 1st -12th November 2021**

**Agenda item:** 8.12.1

**Source:** Intel Corporation

**Title:** Report of email discussion [Post116bis-e][105][RedCap] 38.306 running CR and list of open issues (Intel)

**Document for:**  Discussion and decision

# Introduction

This is the report of following offline discussion:

**[Post116bis-e][105][RedCap] 38.306 running CR and list of open issues (Intel)**

Scope: Update the 38.306 running CR and define the list of open issues regarding UE capabilities

Intended outcome: Endorsed 38.306 running CR and list of open issues regarding UE capabilities

Deadline (for companies' feedback): Friday 2022-01-28 0800 UTC

Deadline (for updated running CR and list of open issues): Friday 2022-01-28 1600 UTC

Rapporteur would suggest to split the discussion into two phases:

**Phase 1: Deadline Wednesday 2022-01-26 08:00 UTC**

**CR review**: Companies provide comments/suggestions in this documents; Please do not add your comments/suggestions in the running CRs directly;

**Open issue list**: Companies check Rapporteur’s list and provide comments/suggestion if any;

Note: The open issue list may be updated based on the comments on running CRs;

**Phase 2: Deadline Friday 2022-01-28 08:00 UTC**

**CR review**: Rapporteur will update CRs, and provide feedback in this documents; Please do not add your comments/suggestions in the running CRs directly; Companies are invited to provide comments/suggestions on updated CRs in this documents.

**Open issue list**: Rapporteur will provide the updated open issues; Companies are invited to check and provide comments/suggestion if any;

# Annex: companies’ point of contact

|  |  |  |
| --- | --- | --- |
| **Company** | **Point of contact** | **Email address** |
| Intel Corporation | Yi Guo | Yi.guo@intel.com |
| Huawei, HiSilicon | Yulong | Shiyulong5@huawei.com |
| Futurewei | Yunsong Yang | yyang1@futurewei.com |
| Ericsson | Tuomas Tirronen | tuomas.tirronen@ericsson.com |
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# Discussion

## 3.1 Phase 1 discussion

### 3.1.1 Review of capability TS38.331 running CR

**Discussion point 3.1.1-1: Companies are invited to provide view on capability TS38.331 running CR ?**

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| **Company’s name** | **Section/Field/IE** | **Identified issues** | **Change suggestion** |
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### 3.1.2 Review of capability TS38.306 running CR

**Discussion point 3.1.2-1: Companies are invited to provide view on capability TS38.306 running CR ?**

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| **Company’s name** | **Section/Field/IE** | **Identified issues** | **Change suggestion** |
| Huawei, HiSilicon | For FR1 RedCap UE, the bit which indicates 20MHz shall be set to 1 unless the 20Mhz channel bandwidth is not supported for the operating band as specified in TS38.101 [2]. For FR2 RedCap UE, the bit which indicates 100MHz shall be set to 1. | We don’t think the added wording is needed.  Even if there is one band not supporting 20Mhz, RedCap UE will not consider that band as supported band. Then, RedCap UE will not report the filed at all, e.g. channelBWs-DL and others. If the field is not included for that band, there is no need to clarify “unless xxx”.  [Rapp] We did not agree that the RedCap UE cannot support the band if 20Mhz is not available on that band. Therefore we still need to address the FFS.  Editor's Note: FFS on how to handle the case that the UE cannot support 20MHz BW as specified in TS38.101.  Any good suggestions on this?  [Huawei]: We cannot converge on this in two days. Let’s remove the added text and put the text and the EN into open issue. | [Huawei]: We cannot converge on this in two days. Let’s remove the added text and put the text and the EN into open issue.  [Rapp1] removed the changes in v02. |
| Huawei, HiSilicon | reportAddNeighMeasForPeriodic-r16 | This seems R16 feature, it should be optional already in R16. Is the “Yes” in M column is one R16 error?  [Rapp] Yes, this is a R16 feature. The M was there. If any issue is identified, that should be discussed in Rel-16. |  |
| Huawei, HiSilicon | ***supportOf16DRB-r17*** | Maybe it should be put into the “4.2.xx.2 PDCP parameters”  [Rapp] DRB is considered above PDCP instead of PDCP functionality. Therefore it should be put as general part. |  |
| Huawei, HiSilicon | ***supportOfRedCap-r17*** | “indicates that the UE is a RedCap UE with comprised of at least the following functional components:”  “A RedCap UE shall always indicate the capability.”  We’d better to say “A RedCap UE shall always set to “1”.” [Rapp] Updated in v01. |  |
| Huawei, HiSilicon | Annex TP for TS38.822 | RedCap is a special R17 feature. It is a new type of UE. So, it is not clear whether we should capture in 38.822 with all the capability, regardless optional or mandatory.  I guess, based on the R1 feature list given, we are now only listing the new R17 optional features in 38.822. No strong view. Just for clarification.  [Rapp] We only indicate new added capability as what RAN1 did in RAN2 feature lists. |  |
| Futurewei | 4.2.4 PDCP Parameters  ***shortSN***  Indicates whether the UE supports 12 bit length of PDCP sequence number. RedCap UE should always report "1". | Understood that the RAN2 agreement uses the word “should”, but “shall” may be the right word for stage-3.  [Rapp] Updated in v01. | Change “should” to “shall”. |
| Futurewei | 4.2.5 RLC parameters  ***am-WithShortSN***  Indicates whether the UE supports AM DRB with 12 bit length of RLC sequence number. RedCap UE should always report "1". | Understood that the RAN2 agreement uses the word “should”, but “shall” may be the right word for stage-3.  [Rapp] Updated in v01. | Change “should” to “shall”. |
| Ericsson | ***shortSN***  Indicates whether the UE supports 12 bit length of PDCP sequence number. RedCap UE should always report "1". | The feature is Mandatory for all UEs, therefore all UEs shall support this. ‘Should’ seems to make it somewhat optional. Absence of this bit would make the UE unususable in any case. | We prefer to remove the addition completely as it is unnecessary. Agree with rapporteur comment.  [Rapp] Added it in open issue list. |
| Ericsson | ***am-WithShortSN***  Indicates whether the UE supports AM DRB with 12 bit length of RLC sequence number. RedCap UE should always report "1". | The feature is Mandatory for all UEs, therefore all UEs shall support this. ‘Should’ seems to make it somewhat optional. Absence of this bit would make the UE unususable in any case. | We prefer to remove the addition completely as it is unnecessary. Agree with rapporteur comment.  [Rapp] Added it in open issue list. |
| Ericsson | channelBWs-DL  RedCap UEs shall support the maximum channel bandwidth defined for the respective band up to 20 MHz for FR1 and up to 100 Mhz for FR2. *channelBWs-DL-v1590* is not applicable to RedCap UEs. For FR1 RedCap UE, the bit which indicates 20MHz shall be set to 1 unless the 20Mhz channel bandwidth is not supported for the operating band as specified in TS38.101 [2]. For FR2 RedCap UE, the bit which indicates 100MHz shall be set to 1. | The two sentences started with “For FR1…” are difficult to digest and don’t add anything to what the first sentence about RedCap already states.  [Rapp] Let’s avoid the discussion on the wording generated in previous meeting in such short period. Companies are invited to polish the wording in next cycle. I have capture it as open issue;  [Huawei]: We should not change the previous endorse text for now. Let’s discuss this as open issue. | Remove “For FR1 RedCap UE, the bit which indicates 20MHz shall be set to 1 unless the 20Mhz channel bandwidth is not supported for the operating band as specified in TS38.101 [2 ]. For FR2 RedCap UE, the bit which indicates 100MHz shall be set to 1.”  Consider adding to the first sentence: “and set the corresponding bits in channelBWs-DL” |
| Ericsson | channelBWs-DL | Same issue as above | Same issue as above |
| Ericsson | channelBW-90MHz | We don’t think this kind of additions do ourselves any favour. It should be clear that RedCap UE shall not indicate such capability, as stated in the definition.  Is this (or such additions in general) important for UE or NW implementation?  [Rapp] We discussed this in previous meeting but no conclusion to remove it. Mark it as open issue. | Remove the statement about RedCap. |
| Ericsson | ***supportedBandwidthDL***  RedCap UEs shall support the maximum channel bandwidth defined for the respective band up to 20 MHz for FR1 and up to 100 Mhz for FR2. For FR1 RedCap UE, the bit which indicates 20MHz shall be set to 1 unless the 20Mhz channel bandwidth is not supported for the operating band as specified in TS38.101 [2]. For FR2 RedCap UE, the bit which indicates 100MHz shall be set to 1. | The two sentences starting at “For FR1…” are not needed (since covered by the first sentence about RedCap UEs) and are actually wrong since this field is not a bitmap.  [Rapp] Tend to agree with Ericsson. But the sentence was introduced before. Let’s check companies view on this. Has added in open issue. | Remove “For FR1 RedCap UE, the bit which indicates 20MHz shall be set to 1 unless the 20Mhz channel bandwidth is not supported for the operating band as specified in TS38.101 [2]. For FR2 RedCap UE, the bit which indicates 100MHz shall be set to 1” |
| Ericsson | ***supportedBandwidthUL*** | Same comment as above | Same comment as above |
| Ericsson | ***supportOf16DRB-r17*** | For legacy devices support of 16 DRBs is mandatory without capability signaling – the current wording does not explain this. | Amend the description by: “ since support fo 16 DRBs is mandatory without capability signalling for other UEs”  The field name could include “RedCap” for easy searching through capability names.  [Rapp] updated in RRC v01, 306 v02.  [Huawei]: There is no need to add “since xxx” to explain the reason in specification. It is clear this is only for RedCap UE.  [Rapp] Added it as open issue,  discuss whether need to add “since xxx” for ***supportOf16DRB-r17, longSN-RedCap-r17 and am-WithLongSN-RedCap-r17*** |
| Ericsson | ***longSN-RedCap-r17*** | Similar as previous, seems to hint that long SN would not be supported by other UEs, which is not the case. | Amend the description by: “ since support for the long sequence number is mandatory without capability signalling for other UEs”  [Rapp] updated in 306 v02. |
| Ericsson | ***am-WithLongSN-RedCap-r17*** | Similar as previous, seems to hint that long SN would not be supported by other UEs, which is not the case. | Amend the description by: “ since support for the long sequence number is mandatory without capability signalling for other UEs”  [Rapp] updated in 306 v02. |
| Ericsson | 4.2.xx  Location of RedCap general statements and the field descriptions | Now looking at the structure, we think it would be better to capture all the field descriptions in the correct locations (e.g. PDPC parameters, RLC parameters, etc) instead of in a new section to keep the existing structure intact and not to spread out the descriptions. If all RedCap-specific parameters can be identified through the name (i.e. by including “RedCap” in the name) it woul be easy to find such RedCap-specific parameters.  With such update, it could actually be reasonable to have the description of RedCap then as a subsection of 4.1. instead of 4.2 as well  [Rapp] We discussed this in previous meeting and finally agreed current structure. Has added it as open issue.  [Huawei] Reverting previous agreement does not count as open issue. We should stick to the agreement and can discuss it in running CR, if any consensus.  [Rapp1] ok, remove it from open issue list. | Move the field descriptions to their usual places in the existing structure. (Also consider moving RedCap description under 4.1 in such case). |
| Rapp | ANR capabilities that are for DC scenarios  ***nr-CGI-Reporting-ENDC***  ***nr-CGI-Reporting-NEDC***  ***nr-CGI-Reporting-NRDC*** | ANR capabilities that are for DC scenarios should not be optional for RedCap UEs, but be not applicable instead. | Received offline comments on this. Rapp agree the comments, and has removed changes for ANR on DC case in 306 v02. |

### 3.1.3 Open issue lists for capability discussion

As indicated by Johan: "Open Issues should be defined for aspects that need to be closed, important to make already agreed functionality work in a reasonable way. Not yet agreed optimizations that may not be needed shall not be listed as Open Issues." Rapporteur considered following issues need to be closed for capability discussion:

**Table: open issue lists for capability discussion**

|  |  |  |
| --- | --- | --- |
| **Topic** | **Open issues**  **Note:** Open Issues should be defined for aspects that need to be closed, important to make already agreed functionality work in a reasonable way. Not yet agreed optimizations that may not be needed shall not be listed as Open Issues. | **Remark** |
| RAN1 led feature | To capture “introduce capability bit on Half-duplex FDD operation type A for RedCap UEs; ” | To be captured in Mega CR. (need to check latest RAN1 feature list after Jan meeting) |
| To capture “introduce explicit bit to indicate the support of RedCap; ;” | RAN2 WA is per UE capability. (need to check latest RAN1 feature list after Jan meeting) |
| Support of NCD-SSB, it is unclear what capabilities are needed, e.g.  [R2-2201753]  *Proposal 15 Discuss whether a RedCap UE, which does not support CSI-RS, should be able to report “Not need NCD-SSB” as an optional UE capability.*  *Proposal 17 Discuss whether a non-RedCap UE should be able to use NCD-SSB instead of CD-SSB with an optional capability in this meeting.* | Wait for RAN1 and RAN4.  P15/P17 may still be discussed in RAN2 |
| Handover UE to non-RedCap cell | For the LTE to NR handover, in case the target NR cell is a legacy cell, the RedCap UE should trigger RRC re-establishment procedure. FFS any specification impact or purely leave to implementation | Need to be resolved in RAN2;  Note: Companies’ view and potential solutions can be found in R2-2201750. |
| RRM relaxation | Is it applied for non-RedCap UE or not? | Need to be resolved in RAN2;  Note: Companies’ view can be found in R2-2201752.  *Proposal 5. [Discussion] (16/20) Rel-17 RRM relaxation can apply to any Rel-17 UE.* |
| For IDLE/INACTIVE:   * whether to capture it as optional without capability feature? * To add additional descriptions in section 5.6 *Relaxed measurement or new section?* | Need to be resolved in RAN2; |
|  | For RRC\_CONNECTED,   * Is single bit sufficient? * Granularity of RRM capability, e.g. per UE? * FDD/TDD diff? * FR1/FR2 diff? * Any others? | Need to be resolved in RAN2; |
| eDRX | For RRC\_INACTIVE,   * What additional eDRX capability for RRC\_INACTIVE? E.g. long DRX cycle? * Granularity of eDRX capability, .e.g.per UE? (legacy is per UE) * FDD/TDD diff? (legacy yes) * FR1/FR2 diff? (Legacy no) * Any others? | Need to be resolved in RAN2;  Note: RAN2 agreements:  1. eDRX feature can be supported by non RedCap UEs.  2. A UE in idle mode requests eDRX configuration via NAS signalling. FFS if capability signalling in RAN, as part of the UE capability message, is also needed.  3. eDRX support is optional for the RedCap UE. |
| For RRC\_IDLE:   * A UE in idle mode requests eDRX configuration via NAS signalling. FFS if capability signalling in RAN, as part of the UE capability message, is also needed. | Need to be resolved in RAN2;  Whether to capture it as optional features without UE capability under section 5 or capability signalling in RAN or nothing? |
| CR implementation | channelBWs-DL/channelBWs-UL | Ericsson commented “The two sentences started with “For FR1…” are difficult to digest and don’t add anything to what the first sentence about RedCap already states.  ” And suggest to change it as  Remove “For FR1 RedCap UE, the bit which indicates 20MHz shall be set to 1 unless the 20Mhz channel bandwidth is not supported for the operating band as specified in TS38.101 [2 ]. For FR2 RedCap UE, the bit which indicates 100MHz shall be set to 1.”  Consider adding to the first sentence: “and set the corresponding bits in channelBWs-DL”  Regarding how to handle EN  Editor's Note: FFS on how to handle the case that the UE cannot support 20MHz BW as specified in TS38.101.  Rapp added “1 unless the 20Mhz channel bandwidth is not supported for the operating band as specified in TS38.101 [2”, Huawei think it is not needed since Even if there is one band not supporting 20Mhz, RedCap UE will not consider that band as supported band. Then, RedCap UE will not report the filed at all, e.g. channelBWs-DL and others.  Rapp: Would be good to check companies’ view.  [Huawei]: In this version of CR, we change nothing compared to the last endorsed version. Add the open issue as “**FFS on how to handle the case that the UE cannot support 20MHz BW as specified in TS38.101. FFS if anything to be added in the field description**”.  [Rapp1] This is the open issue table. |
|  | channelBW-90MHz | Ericsson commented We don’t think this kind of additions do ourselves any favour. It should be clear that RedCap UE shall not indicate such capability, as stated in the definition.  And suggest Remove the statement about RedCap.  Rapp: This has been discussed before and no conclusion to remove it. Would be good to check companies’ view. |
|  | ***supportedBandwidthDL/supportedBandwidthUL*** | Ericsson commented “The two sentences starting at “For FR1…” are not needed (since covered by the first sentence about RedCap UEs) and are actually wrong since this field is not a bitmap. “  And suggest  Remove “For FR1 RedCap UE, the bit which indicates 20MHz shall be set to 1 unless the 20Mhz channel bandwidth is not supported for the operating band as specified in TS38.101 [2]. For FR2 RedCap UE, the bit which indicates 100MHz shall be set to 1”  Rapp: Tend to agree with Ericsson. But the sentence was introduced before. Let’s check companies view on this.  [Huawei]: Not agree to remove the sentence. This one has been endorsed after long discussion. See our comment/suggestion to above channelBWs-DL/channelBWs-UL |
|  | ~~4.2.xx~~  ~~Location of RedCap general statements and the field descriptions~~ | ~~Ericsson commented~~  ~~Now looking at the structure, we think it would be better to capture all the field descriptions in the correct locations (e.g. PDPC parameters, RLC parameters, etc) instead of in a new section to keep the existing structure intact and not to spread out the descriptions. If all RedCap-specific parameters can be identified through the name (i.e. by including “RedCap” in the name) it woul be easy to find such RedCap-specific parameters.~~  ~~With such update, it could actually be reasonable to have the description of RedCap then as a subsection of 4.1. instead of 4.2 as well~~  ~~And suggest~~  ~~Move the field descriptions to their usual places in the existing structure. (Also consider moving RedCap description under 4.1 in such case).~~  ~~[Rapp] We discussed this in previous meeting and finally agreed current structure. Would be good to hear companies’ view.~~  ~~[Huawei]: Not OK to add this as open issue. But we are fine to discuss this in the next round of running CR discussion.~~ |
|  | ***shortSN***  Indicates whether the UE supports 12 bit length of PDCP sequence number. RedCap UE should always report "1".  ***am-WithShortSN***  Indicates whether the UE supports AM DRB with 12 bit length of RLC sequence number. RedCap UE should always report "1". | Ericsson and Rapporteur comments  The feature is Mandatory for all UEs, therefore all UEs shall support this. ‘Should’ seems to make it somewhat optional. Absence of this bit would make the UE unususable in any case.  Suggest  We prefer to remove the addition completely as it is unnecessary. Agree with rapporteur comment.  [Rapp] Agree with Ericsson. But Would be good to hear companies’ view.  [FW] The signaling of these capabilities is mandatory, but the actually support of them is optional for non-RedCap UEs today. For RedCap UEs, we make the support of short SNs mandatory. Therefore, adding these text is necessary to highlight the difference for RedCap UEs.  [Huawei]: Normally we use “This field shall be set to *supported*.” In 306 for mandatory feature. The debating on “shall” and “should” does not count as open issue. We prefer not to include this as open issue.  [Rapp1] the debate is not “shall” or “should”. The discussion is whether we need to change anything since so far shortSN is mandatory feature. It is strange to say “it shall be set to 1” again for RedCap UE. |
|  | ***supportOf16DRB-r17***  For legacy devices support of 16 DRBs is mandatory without capability signaling – the current wording does not explain this. Amend the description by: “ since support fo 16 DRBs is mandatory without capability signalling for other UEs”  The field name could include “RedCap” for easy searching through capability names.  [Rapp] updated in RRC v01, 306 v02.  [Huawei]: There is no need to add “since xxx” to explain the reason in specification. It is clear this is only for RedCap UE. | [Rapp] discuss whether need to add “since xxx” for ***supportOf16DRB-r17, longSN-RedCap-r17 and am-WithLongSN-RedCap-r17***  ***.***  ***,*** |
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**Discussion point 3.1.3-1: Companies are invited to provide view on open issue lists summarized in table 1 ?**

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| **Company’s name** | **Comments, if any** |
| Huawei, HiSilicon | On channelBWs-DL/channelBWs-UL related changes: In this version of CR, we change nothing compared to the last endorsed version (i.e. not adding and not removing anything). Add the open issue as “FFS on how to handle the case that the UE cannot support 20MHz BW as specified in TS38.101. FFS if anything to be added in the field description”. |
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**Discussion point 3.1.3-2: Companies are invited to provide view on whether any open issue is missing in table 1 ? Note: only essential issues need to be listed;**

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| **Company’s name** | **Comments, if any** |
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## 3.2 Phase 2 discussion

### 3.2.1 Review of capability TS38.331 running CR

### 3.2.2 Review of capability TS38.306 running CR

### 3.2.3 Open issue lists for capability discussion

# Summary report and proposals

# References

[1] R2-2201737 [offline-105] RedCap capabilities Intel

[2] R2-2201750 [offline-105] RedCap capabilities - second round Intel

[3] R2-2201732 [Pre116bis-e][103][RedCap] Summary of NCD-SSB / Initial BWP aspects Ericsson

[4] R2-2201738 [offline-106] NCD-SSB and Initial BWP aspects Ericsson

[5] R2-2201753 [offline-106] NCD-SSB and Initial BWP aspects - second round Ericsson

[6] R2-2201734 [offline-103] identification and access restriction aspects Huawei

[7] R2-2201751 [offline-103] identification and access restriction aspects - second round Huawei

[8] R2-2201735 [offline-104] RRM relaxations Samsung

[9] R2-2201752 [offline-104] RRM relaxations - second round Samsung