**3GPP TSG-RAN WG2 Meeting #110e R2-20xxxx**

**Online, 1st – 12th June 2020**

**Agenda item: X.X**

**Source: MediaTek Inc,**

**Title: [Post109bis-e][939][PowSav] RRC open issues (Mediatek)**

**Document for: Discussion and decision**

# 1 Introduction

This document is to capture open issues and identify solutions as part of the following email discussion:

* [Post109bis-e][939][PowSav] RRC open issues (Mediatek)

Address stage-3 remaining open issues. Capture identified NEW, if any, stage-3 corrections/issues from ASN.1 review.  Issues that have already been discussed and not pursued should not be brought up again.

      Intended outcome: Agreable proposals and CR for 38.331 addressing open issues

      Deadline: Next Meeting, ASN.1 review schedule

Companies are encouraged to raise new or open issues with the NR and LTE RRC CRs for power savings [1] [2] in this document. Please also note the ASN.1 review plan as outlined in [3]. Specifically, note that each new open issue must be associated with a RIL ID:

* *For any remaining WI specific issues that don’t have an associated RIL#, add a RIL comment to the ASN.1 file*

Issues are to be classified as below:

1. ***Trivial*** *e.g. editorials, commas, colon, misspelling, missing/ double spaces, italics etc.   
   See procedure for Class 0 and Class 1 issues below.*
2. ***Minor*** *e.g. quite straightforward changes e.g. correction/ addition of specification references or sub-clauses.  
   See procedure for Class 0 and Class 1 issues below.*
3. ***ASN.1 session******issue*** *e.g. ASN.1 issue e.g. related to need codes, extensibility, alternative encoding, ASN.1/ guidelines, general protocol (consistency) issue or issue affecting more than one WI*
4. ***WI session issue i****.e. an issue that is not purely ASN.1 but has some impact on functionality but only affecting a single WI.*

*Minor editorial issues (spelling error, italics, missing commas, spaces, etc.) are sent to the ASN.1 Review Rapporteur via email and need no RIL.*

# 2 Open issues/RIL for NR Power Saving RRC CR

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| --- | --- | --- | --- | --- | --- |
| **ID** | **Class** | **Section** | **Description** | **Proposed Change** | **Comments** |
| O802 | 3 | 5.7.4.2 | Accoding to RAN2#109e-bis agreement, the configuration of UAI for power saving and the reporting of UAI for power saving is CG-specific. In other word, UE reports UAI for power saving for a cell group only when the UE is configured to report the UAI for power saving for the cell group. In addition, the UAI reporting procedure for MCG and SCG are inpendently.  Take the UAI of UE’s preference on DRX parameters for power saving as an example., the following wording highlight yellow should be more clear that UE is configured to provide its preference on DRX parameters for power saving for the cell group.  1> if configured to provide its preference on DRX parameters of a cell group for power saving:  2> if the UE did not transmit a *UEAssistanceInformation* message with *drx-Preference* for the cell group since it was configured to provide its preference on DRX parameters for power saving; or  2> if the current preference on DRX parameters of the cell group is different from the one indicated in the last transmission of the *UEAssistanceInformation* message including *drx-Preference* for the cell group and timer T346a is not running:  3> start timer T346a with the timer value set to the *drx-PreferenceProhibitTimer*;  3> initiate transmission of the *UEAssistanceInformation* message in accordance with 5.7.4.3 to provide its preference on DRX parameters of the cell group for power saving; | 1. For UE’s preference on DRX parameters for power saving, change the following wording as below.   1> if configured to provide its preference on DRX parameters of a cell group for power saving:  2> if the UE did not transmit a *UEAssistanceInformation* message with *drx-Preference* for the cell group since it was configured to provide its preference on DRX parameters of the cell group for power saving; or  2> if the current preference on DRX parameters of the cell group is different from the one indicated in the last transmission of the *UEAssistanceInformation* message including *drx-Preference* for the cell group and timer T346a is not running:  3> start timer T346a with the timer value set to the *drx-PreferenceProhibitTimer*;  3> initiate transmission of the *UEAssistanceInformation* message in accordance with 5.7.4.3 to provide its preference on DRX parameters of the cell group for power saving;  2. For UE’s preference on the maximum aggregated bandwidth for power saving, the same change as above.  3. For UE’s preference on the maximum number of secondary component carriers for power saving, the same change as above.  4. For UE’s preference on the maximum number of MIMO layers for power saving, the same change as above.  5. For UE’s preference on the minimum scheduling offset for cross-slot scheduling for power saving, the same change as above. | [MTK] Agree. The suggested change makes cell-group UAI behaviour clearer.  [vivo] Agree. The change described here is OK for us. But we cannot find the corresponding RIL in ASN.1 document.  [CATT] Agree.  [Intel] We agree with MediaTek  [Samsung] Agree  [ERI] We do not think there is a strong reason for this correction, i.e. the same sentence already says “with *drx-Preference* for the cell group…” implying that this is about the preferences for that cell group. Furthermore if companies think that this sentence is unclear, what about the next one then, i..e this sentence is also not explicit that the timer of the cell group is started:  3> start timer T346a with the timer value set to the *drx-PreferenceProhibitTimer*;  i.e. you have to look in the timer table for that one:  Upon transmitting *UEAssistanceInformation* message with *drx-Preference*. The UE maintains one instance of this timer per cell group.  We find the level of corrections, in that sense a bit unblanced, but it is not incorrect, i.e. we go with majority view. |
| O803 | 3 | 5.7.4.3 | For the overheating UAI, the reported maximum number of MIMO layer is for each serving cell. We have not discussed this is for each DL BWP. | For UAI for overheating, remove “ and each DL BWP” as below.  3> if the UE prefers to temporarily reduce the number of maximum MIMO layers of each serving cell operating on FR1:  4> include reducedMaxMIMO-LayersFR1 in the OverheatingAssistance IE;  4> set reducedMIMO-LayersFR1-DL to the number of maximum MIMO layers of each serving cell ~~and each DL BWP~~ operating on FR1 the UE prefers to be temporarily configured in downlink;  4> set reducedMIMO-LayersFR1-UL to the number of maximum MIMO layers of each serving cell ~~and each DL BWP~~ operating on FR1 the UE prefers to be temporarily configured in uplink;  3> if the UE prefers to temporarily reduce the number of maximum MIMO layers of each serving cell operating on FR2:  4> include reducedMaxMIMO-LayersFR2 in the OverheatingAssistance IE;  4> set reducedMIMO-LayersFR2-DL to the number of maximum MIMO layers of each serving cell ~~and each DL BWP~~ operating on FR2 the UE prefers to be temporarily configured in downlink;  4> set reducedMIMO-LayersFR2-UL to the number of maximum MIMO layers of each serving cell ~~and each DL BWP~~ operating on FR2 the UE prefers to be temporarily configured in uplink; | [MTK] This was an error from my side. The text should have been introduced for power saving and not overheating. Suggest to move the text to power savings section on MIMO.  [vivo] Agree. The change described here is OK for us. But we cannot find the corresponding RIL in ASN.1 document.  [CATT] Sorry we can’t find why we needed to add “and each DL BWP” anywhere? Isn’t it sufficient to have “and each serving cell”? And why should it be different for overheating and power saving?  [Intel] We agree with MediaTek  [Samsung] It seems good with serving cell  [ERI] We agree with MDTK that this aspect only applies to REL-16 power saving, i.e. should be moved there. We agree with the intention, i.e. in our view this is trying to say that the UE prefers a configuration of max MIMO for all BWPs, and not only a switch to another BWP without an RRC reconfiguration, which may also resolve the issue. The AUI signalling is intended to lead to an RRC reconfiguration, not BWP switch. The NW may have different algorithms and triggering points for BWP swiching and RRC reconfiguration. |
| O804 | 2 | 6.2.2 | Accoding to RAN2#109e-bis agreement, reporting a ‘feature’, the all parameters that the UE has a preference for are included. Parameters that are not included are interpreted as the UE having no preference for those parameters. So we think the following parameters should be defined as “optional” since UE may not have preference on a parameter for both DL and UL simultaneously.   * reducedBW-FR1-DL-r16 * reducedBW-FR1-UL-r16 * reducedBW-FR2-DL-r16 * reducedBW-FR2-UL-r16 * reducedMIMO-LayersFR1-DL-r16 * reducedMIMO-LayersFR1-UL-r16 * reducedMIMO-LayersFR2-DL-r16 * reducedMIMO-LayersFR2-UL-r16 | Define the following parameters as “optional”.  MaxBW-Preference-r16 ::= SEQUENCE {  reducedMaxBW-FR1-r16 SEQUENCE {  reducedBW-FR1-DL-r16 ReducedAggregatedBandwidth  OPTIONAL,  reducedBW-FR1-UL-r16 ReducedAggregatedBandwidth  OPTIONAL.  } OPTIONAL,  reducedMaxBW-FR2-r16 SEQUENCE {  reducedBW-FR2-DL-r16 ReducedAggregatedBandwidth  OPTIONAL,  reducedBW-FR2-UL-r16 ReducedAggregatedBandwidth  OPTIONAL,  } OPTIONAL  }  MaxMIMO-LayerPreference-r16 ::= SEQUENCE {  reducedMaxMIMO-LayersFR1-r16 SEQUENCE {  reducedMIMO-LayersFR1-DL-r16 INTEGER (1..8) OPTIONAL,  reducedMIMO-LayersFR1-UL-r16 INTEGER (1..4) OPTIONAL  } OPTIONAL,  reducedMaxMIMO-LayersFR2-r16 SEQUENCE {  reducedMIMO-LayersFR2-DL-r16 INTEGER (1..8) OPTIONAL,  reducedMIMO-LayersFR2-UL-r16 INTEGER (1..4) OPTIONAL  } OPTIONAL  } | [MTK] Do not see a need for further optional fields. Our agreements from R2#109bis-e relate to the behaviour of fields that are optional. That does not imply that all fields should become optional.  [vivo] The change described here is OK for us. I assume the updated ASN.1 with optional field is our intention.  But we cannot find the corresponding RIL in ASN.1 document.  [CATT] We agree with the rapporteur.  [Intel] We do not see this change essential but we are ok going with the majority view on this.  [Samsung] Agree with MTK. Not needed.  [ERI] Perhaps the rapporteur can confirm, i.e. I think we asked similar question before, and we intend to follow the overheating structure? We then had some discussion whether the overheating was the gold standards to match ☺. I agree there is some motivation to follow overheating structure, unless there is a reason not to. The logic seems to be that UL and DL preferences are always provided? Did principle is not followed for maxCC, or did I look into a wrong file?:  OverheatingAssistance ::= SEQUENCE {  reducedMaxCCs SEQUENCE {  reducedCCsDL INTEGER (0..31),  reducedCCsUL INTEGER (0..31)  } OPTIONAL,  reducedMaxBW-FR1 SEQUENCE {  reducedBW-FR1-DL ReducedAggregatedBandwid,  reducedBW-FR1-UL ReducedAggregatedBandwid  } OPTIONAL,  reducedMaxBW-FR2 SEQUENCE {  reducedBW-FR2-DL ReducedAggregatedBandwh,  reducedBW-FR2-UL ReducedAggregatedBandwih  } OPTIONAL,  reducedMaxMIMO-LayersFR1 SEQUENCE {  reducedMIMO-LayersFR1-DL MIMO-LayersDL,  reducedMIMO-LayersFR1-UL MIMO-LayersUL  } OPTIONAL,  reducedMaxMIMO-LayersFR2 SEQUENCE {  reducedMIMO-LayersFR2-DL MIMO-LayersDL,  reducedMIMO-LayersFR2-UL MIMO-LayersUL  } OPTIONAL  }  MaxBW-Preference-r16 ::= SEQUENCE {  reducedMaxBW-FR1-r16 SEQUENCE {  reducedBW-FR1-DL-r16 ReducedAggregatedBandw,  reducedBW-FR1-UL-r16 ReducedAggregatedBand  } OPTIONAL,  reducedMaxBW-FR2-r16 SEQUENCE {  reducedBW-FR2-DL-r16 ReducedAggregatedBandw,  reducedBW-FR2-UL-r16 ReducedAggregatedBandw  } OPTIONAL  }  MaxCC-Preference-r16 ::= SEQUENCE {  reducedCCsDL-r16 INTEGER (0..31) OPTIONAL,  reducedCCsUL-r16 INTEGER (0..31) OPTIONAL  }  MaxMIMO-LayerPreference-r16 ::= SEQUENCE {  reducedMaxMIMO-LayersFR1-r16 SEQUENCE {  reducedMIMO-LayersFR1-DL-r16 INTEGER (1..8),  reducedMIMO-LayersFR1-UL-r16 INTEGER (1..4)  } OPTIONAL,  reducedMaxMIMO-LayersFR2-r16 SEQUENCE {  reducedMIMO-LayersFR2-DL-r16 INTEGER (1..8),  reducedMIMO-LayersFR2-UL-r16 INTEGER (1..4)  } OPTIONAL  } |
| O805 | 3 | 6.2.2 | In the field description for the following fields, it states that the reported value can only range up to the current active configuration when indicated to address power savings.   * reducedBW-FR1-UL * reducedBW-FR1-DL * reducedBW-FR2-UL * reducedBW-FR2-DL * reducedCCsDL * reducedCCsUL * reducedMIMO-LayersFR1-DL * reducedMIMO-LayersFR1-UL * reducedMIMO-LayersFR2-DL * reducedMIMO-LayersFR2-UL   we have discussed the issue on whether UE can indicate any preferred value within its capability for maximum aggregated bandwidth, number of carriers, MIMO layers and minimum scheduling offset, but has not reach conclusion. | Remove the following field description.  The aggregated bandwidth can only range up to the current active configuration when indicated to address power savings.  The maximum number of downlink SCells can only range up to the current active configuration when indicated to address power savings.  The maximum number of uplink SCells can only range up to the current active configuration when indicated to address power savings.  The maximum number of downlink MIMO layers can only range up to the current active configuration when indicated to address power savings.  The maximum number of uplink MIMO layers can only range up to the current active configuration when indicated to address power savings. | [MTK] This was agreed in R2#109e  [vivo] In RAN2#109-e meeting, we agreed:  The reported values of UE assistance on reduced bandwidth, cells and MIMO layers for power savings can range up to at least the corresponding value in the current active configuration. FFS if it can be up to UE capability.  In RAN2#109bis-e meeting, we have more discussion on this issue, but there is no consensus.  Thus, we prefer to keep it as FFS by now. We also have similar comment in V207.  [CATT] Although we were strong supporter of this proposal, it is our understanding that it was discussed at length with all arguments presented in the offline(s) up to RAN2#109e, and the lack of agreement means that it will not be supported in Rel-16. So we have the same understanding as the rapporteur.  [Intel] We agree with MediaTek based on latest RAN2 agreements (even though our company preference is different too)  [Samsung] We support this change  [ERI] We have the same view as MDTK and CATT, i.e. this was disussed and not agreed in RAN2#109-e, i.e. there is no FFS:  ***Discussions***  *Proposal 1: UE can indicate any preferred value within its capability for maximum aggregated bandwidth, number of carriers, MIMO layers and minimum scheduling offset.* |
| C301 | 3 | 5.7.4.2 | According to the current UAI for power saving, the UE always initiate UAI for power saving upon being configured to provide its preference for power saving. And the UE may report an empty UAI for the first preference reporting for power saving. For example: the UE will report UAI with DRX-Preference IE without any parameter, if the UE receives the configuration to provide its preference on DRX parameters for power saving of a cell group but it has no preference on DRX parameters of the cell group.  The current UAI for power saving follows the same principle for delay budget report. However, the UE always reports a value for delay budget report. For overheating reporting, the UE initiates UAI upon detecting internal overheating after it is configured. Our understanding of the Power Saving UAI is that it is mainly UE-triggered, not network triggered, similar to overheating. In that sense, the first transmission will most likely be useless. Hence we suggest the UAI for power saving follows the same principle for overheating. | Take DRX preference of a cell group for power saving as an example as follows. The similar change need also to be applied to preference on the maximum aggregated bandwidth for power saving, preference on the maximum number of secondary component carriers for power saving, preference on the maximum number of MIMO layers for power saving, and preference on the minimum scheduling offset for cross-slot scheduling for power saving.  A UE capable of providing its preference on DRX parameters of a cell group for power saving in RRC\_CONNECTED may initiate the procedure in several cases if it was configured to do so, including upon ~~being configured to provide its~~ having a preference on DRX parameters for power saving and upon change of its preference on DRX parameters.  1> if configured to provide its preference on DRX parameters of a cell group for power saving:  2> if the UE has a preference on DRX parameters of the cell group and the UE did not transmit a *UEAssistanceInformation* message with *drx-Preference* for the cell group since it was configured to provide its preference on DRX parameters for power saving; or  2> if the current preference on DRX parameters of the cell group is different from the one indicated in the last transmission of the *UEAssistanceInformation* message including *drx-Preference* for the cell group and timer T346a is not running:  3> start timer T346a with the timer value set to the *drx-PreferenceProhibitTimer*;  3> initiate transmission of the *UEAssistanceInformation* message in accordance with 5.7.4.3 to provide its preference on DRX parameters of the cell group for power saving; | [MTK] This needs further discussion. In principle, we are ok with such a change. However we would like to understand NW vendors views on this, i.e. when UAI in configured for power savings (except release assistance), what should the UE behaviour be:   1. [Current]: UE provides UAI right away with current preferences (or lack thereof). 2. [Proposed]: UE does not provide a UAI right away, unless it has a preference.   [vivo] This has not been agreed. From our side, we agree with CATT. The first transmission for the UE assistance information should be similar as overheating. Thus, we agree this change.  [Intel] We agree with the intention and suggested change on C301 that calrifies the behavior.  [Samsung] It seems reasonable to be in line with overheating.  [ERI] Thanks for spotting!  For release assistance the UE cannot signal “connected” upon configuration.  We agree, i.e. UE should not send useless signalling message that it does not have a preference. The NW already knew that before the procedure was configured. |
| C302 | 3 | 6.2.2 | To align with text descriptions, add ‘of a cell group’ to the field descriptions of preference on *minimumSchedulingOffset* of cross-slot scheduling, preference on DRX parameters, preference on K0/K2, and preference on the maximum number of MIMO layers | Take filed descriptions of *minSchedulingOffsetPreference*, *preferredDRX-InactivityTimer*, *preferredK0*, *reducedMIMO-LayersFR1-DL* as examples:  ***minSchedulingOffsetPreference***  Indicates the UE's preferences on *minimumSchedulingOffset* of cross-slot scheduling for power saving of a cell group.  ***preferredDRX-InactivityTimer***  Indicates the UE's preferred DRX inactivity timer length for power saving of a cell group. Value in ms (milliSecond). *ms0* corresponds to 0, *ms1* corresponds to 1 ms, *ms2* corresponds to 2 ms, and so on.  ***preferredK0***  Indicates the UE's preferred value of *k0* (slot offset between DCI and its scheduled PDSCH - see TS 38.214 [19], clause 5.1.2.1) for cross-slot scheduling for power saving of a cell group. Value is defined for each subcarrier spacing (numerology) in units of slots. *sl1* corresponds to 1 slot, *sl2* corresponds to 2 slots, *sl4* corresponds to 4 slots, and so on.  ***reducedMIMO-LayersFR1-DL***  Indicates the UE's preference on reduced configuration corresponding to the maximum number of downlink MIMO layers of each serving cell operating on FR1 indicated by the field, to address overheating or power saving of a cell group. This field is allowed to be reported only when UE is configured with serving cells operating on FR1. The maximum number of downlink MIMO layers can only range up to the current active configuration when indicated to address power savings. | [MTK]: This is already clarified in the behavioural text in section 5.7.4. We do not see a need to duplicate this text in the field description as well.  [vivo] we agree with rapporteur. It is already clear in the procedure part.  [CATT] OK.  [Intel] For consistency of the description, we have slightly preference to include the change suggested by C302.  [Samsung] It’s no strong need  [ERI] We do not see a strong need for this, i.e. the semantics description should not copy or substitute the procedure text, i.e. can be kept shorter. |
| E265 | 3 | 6.2.2.2 | 1. The UE typically does not have the opportynity to cancel a release request, because it is typically released immediately, which is the whole point of this feature 2. The UE sending a cancellation after prohibit timer expiry creates unnessary signalling, i.e. the UE can assume that UE will be released based on NW inactivity timer in such case. 3. The UE waiting for the prohibit timer to expire to send a cancellation may be released by the NW because the NW inactivity timer expires 4. It is unclear what cancellation means and how the NW should act on it | Remove “connected”:  preferredRRC-State-r16 ENUMERATED {idle, inactive, ~~connected,~~ outOfConnected} | [MTK] Regardless of whether we go with this change or not, we would like clear UE behaviour.  [vivo] This has been discussed extensivlely. We prefer to respect our conclusion.  [CATT] We agree with the rapporteur. The current scheme is well defined while the E265 proposal, at this late stage, still remains unclear. Indeed, the proposal reduces to removing the “connected” value from preferredRRC-State. But we also understand from the supporting contribution R2-2004860 that the equivalent mechanism for cancelling an earlier UE release preference to exit from connected now becomes implicit based on “more DL data”. That would require discussion on how this is exactly defined and captured (in MAC?). From the same contribution, it is mentioned that the UE can send again a release preference even if the current preference is not different from the one indicated in the last transmission, which contradicts agreements on power saving UAI reporting principles so far.  Etc…  [Intel] We share vivo’s view.  [Samsung] We prefer to keep the current agreement made across several meetings.  If any change is really needed, we can allow UE to send ‘connected’, regardless that the prohibit timer is running, rather than removing ‘connected’.  [ERI]  PS: we never had a substantial discussion, i.e. many times the comment is just that we want it (i.e. we figure it out later if we need or want it in the UE implementation, i.e. there is no drawback to have this from UE side) or we think like company x.  PS2: cancellation is not supported in NB-IoT/LTE, i.e. it is strange that we need to motivate and explain how legacy release assistance works. This is supported in products, and we do not want a new scheme. And we want to avoid and be able to control uncessary signalling from the UE.  PS3: the release assistance uses the UAI framework but it is different of nature, i.e. normal UAI leads to receonfiguration, but release assistance leads to a release. If the UE indicates a preference to be released, then this preference applies NOW, i.e. this preference does not remain valid after some time. When the UE is not released, then it does not mean that the UE also wants to be released NOW, but 5 min later. Other UAI preferences remain valid, until signaled otherwise.  PS4: Perhaps companies can clarify if “connected” implies that a previous release request is no longer valid? Or does it means that the UE wants to say in connected, but then for how long? Or does it mean that the UE is expecting more data to send or receive in the near future?  PS5: There is no need to specify the NW behavior, i.e. when the NW does not follow up on the UE request to be released. As usual we only need to specify the UE behavior, i.e. when the UE can request to be released.  [VZ] We were only able to follow the discussion afterwards, not in real time, so we are not in a position to cite histortical reasons ☺ We just want to share a bit of our view on UE asistence. In general we are very supportive of having them (and will continue to be in Rel-17) but it is not that they are always free without any potential harm. Reducent information not only causes extra signaling but also complicates our planning effort and our dealing with the vendors. We like the release assistence info very much (and are requesting it) but the feature of cancelling it after seems a bit too “advanced” for Rel-16 life span. We always try to keep a delicate balance between the integrity of NW control and more liberal information flow. This one seems a bit off to the left. But this is just our own feeling, fwiw. |
| H390 | 3 | 6.3.2 | In RAN1#96bis meeting, there was an agreement:  Agreements:   * For PDCCH-based power saving signal/channel,   + The set of AL(s) is configured   + The number of PDCCH candidate(s) for each AL is configured   But in current signalling design, the aggregation level and the number of PDCCH candidate(s) are not configurable for DCP (dci-Format2-6).  },  dci-Format2-6-r16 SEQUENCE {  ...  } OPTIONAL, -- Need R  ... | The aggregation level and the number of PDCCH candidate(s) should be configurable for DCP (dci-Format2-6).  HW3: A possible change could be (the valid values for the number of PDCCH candidate(s) needs further discussion):  SearchSpace-v16xy ::= SEQUENCE {  searchSpaceId SearchSpaceId,  controlResourceSetId-r16 ControlResourceSetId-r16 OPTIONAL, -- Cond SetupOnly  searchSpaceType-r16 CHOICE {  common-r16 SEQUENCE {  dci-Format2-4-r16 SEQUENCE {  nrofCandidates-CI-r16 SEQUENCE {  aggregationLevel1 ENUMERATED {n1, n2} OPTIONAL, -- Need R  aggregationLevel2 ENUMERATED {n1, n2} OPTIONAL, -- Need R  aggregationLevel4 ENUMERATED {n1, n2} OPTIONAL, -- Need R  aggregationLevel8 ENUMERATED {n1, n2} OPTIONAL, -- Need R  aggregationLevel16 ENUMERATED {n1, n2} OPTIONAL -- Need R  },  ...  },  dci-Format2-5-v16xy SEQUENCE {  nrofCandidates-IAB-r16 SEQUENCE {  aggregationLevel1-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R  aggregationLevel2-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R  aggregationLevel4-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R  aggregationLevel8-r16 ENUMERATED {n1, n2} OPTIONAL, -- Need R  aggregationLevel16-r16 ENUMERATED {n1, n2} OPTIONAL -- Need R  },  ...  },  dci-Format2-6-r16 SEQUENCE {  nrofCandidates-DCP-r16 SEQUENCE {  aggregationLevel1-r16 ENUMERATED {[n1, n2,...]} OPTIONAL, -- Need R  aggregationLevel2-r16 ENUMERATED {[n1, n2,...]} OPTIONAL, -- Need R  aggregationLevel4-r16 ENUMERATED {[n1, n2,...]} OPTIONAL, -- Need R  aggregationLevel8-r16 ENUMERATED {[n1, n2,...]} OPTIONAL, -- Need R  aggregationLevel16-r16 ENUMERATED {[n1, n2,...]} OPTIONAL -- Need R  },  ...  } OPTIONAL, -- Need R  ...  }, | [MTK] This should be raised in RAN1 and an updated parameter list needs to be provided by RAN1. From the LS from R1 (R2-2004380), no such information is provided and the following note is present: ‘*FFS: The restriction in the supported periodicity, the aggregation level and the number of blind decoding for the new DCI with CRC scrambled by PS-RNTI*’  [vivo] We agree with rapporteur. This should be first agreed in RAN1. We need to follow the conclusion in formal LS.  [CATT] We agree with the rapporteur.  [Intel] We agree with MediaTek  [Samsung] Agree with MTK  [ERI] Agree to wait for RAN1 input |
| I200 | 3 | 5.3.5.3 | The *UEAssistanceInformation* (UAI) msg is re-sent when it was sent during the last 1 second before receiving RRCReconfiguration msg  (with *reconfigurationWithSync* included in *masterCellGroup*). We wonder whether some clarification is needed now that UAI can go to MCG and/or SCG considering as UAI can also be configured in (NG)EN-DC and NR-DC. | A possible change could be the following in section 5.3.5.3 “Reception of RRCReconfiguration by the UE”:  2> if *reconfigurationWithSync* was included in *masterCellGroup* or *secondaryCellGroup*; and  2> if the UE transmitted a *UEAssistanceInformation* message during the last 1 second, and the UE is still configured to provide UE assistance information for the applicable cell group:  3> initiate transmission of a *UEAssistanceInformation* message to re-send the UE assistance information for the applicable cell group that UE is still configured to provide with the same contents; | [MTK] Agree that such a clarification is required as we’ve introduced CG specific UAI  [vivo] We agree with this change to make it more clear.  [CATT] Agree.  [Samsung] It’s fine with the change  [ERI] Agree. PS: There is also QC contribution ([R2-2005636](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_110-e/Docs/R2-2005636.zip)) on “provide with the same contents”. I think the UE should sent the same UAI message again, but the content can be updated. |
| I201 | 3 | 11.2.2 | The *ueAssistanceInformation* (included in HandoverPreparationInformation as part of the inter-node RRC message) does not include the information for other cell groups (as it refers to MCG). | A possible change could be the following in section 11.2.2. Message definitions for HandoverPreparationInformation:  AS-Context ::=                          SEQUENCE {      reestablishmentInfo                     ReestablishmentInfo                             OPTIONAL,      configRestrictInfo                      ConfigRestrictInfoSCG                           OPTIONAL,      ...,      [[  ran-NotificationAreaInfo            RAN-NotificationAreaInfo                        OPTIONAL      ]],      [[  ueAssistanceInformation             OCTET STRING (CONTAINING UEAssistanceInformation)  OPTIONAL   -- Cond HO2      ]],      [[      selectedBandCombinationSN               BandCombinationInfoSN                           OPTIONAL      ]],      [[      configRestrictInfoDAPS-r16              ConfigRestrictInfoDAPS-r16                      OPTIONAL,      sidelinkUEInformationNR-r16             OCTET STRING                                    OPTIONAL,      sidelinkUEInformationEUTRA-r16          OCTET STRING                                    OPTIONAL,      ueAssistanceInformationEUTRA-r16        OCTET STRING                                    OPTIONAL,     ueAssistanceInformationSCG-r16         OCTET STRING (CONTAINING UEAssistanceInformation)  OPTIONAL   -- Cond HO2      ]]  } | [MTK] This comes down to whether the MCG keeps track of the SCG UE assistance information or not. Such a clarification could be useful, but we would like to understand NW vendors’ views on this.  [vivo] We would like to firstly understand the motivation for this update.  [CATT] Agree. We also see the need to include the SCG UAI.  [Intel] Clarification on the motivation: UE cannot repeat a previously provided preference for any specific cell/parameter, therefore after handover, target cells need to know which is its corresponding UE’s preference provided before handover (understanding that UE can only repeat its UAI preference when provided in the last 1 sec prior handover). In response to MediaTek’s comment: The new container would be prepared by the SCG and transfer transparently by/via MCG to the target MCG (which would forward it again to the target SCG transparently).  [Samsung] Currently no strong opinion. At least, it’s a valid issue on how to treat the SCG specific UAI during handover  [ERI] This makes perhaps sense, but does the UE repeat UAI within 1 sec also for the SCG cell group? |
| I202 | 3 | 5.3.13.2 | The release of the applicable UAI PowSav features and the stop of the timers do not indicate that this is applicable to all the instances for the different cell groups when initiating resume procedure | A possible change could be the following in the initiation of section 5.3.13 “RRC Connection Resume”:  1> release *drx-PreferenceConfig* for any configured cell group from the UE Inactive AS context, if stored;  1> stop all instances of the timer T346a, if running;  1> release *maxBW-PreferenceConfig* for any configured cell group from the UE Inactive AS context, if stored;  1> stop all instances of the timer T346b, if running;  1> release *maxCC-PreferenceConfig* for any configured cell group from the UE Inactive AS context, if stored;  1> stop all instances of the timer T346c, if running;  1> release *maxMIMO-LayerPreferenceConfig* for any configured cell group from the UE Inactive AS context, if stored;  1> stop all instances of the timer T346d, if running;  1> release *minSchedulingOffsetPreferenceConfig* for any configured cell group from the UE Inactive AS context, if stored;  1> stop all instances of the timer T346e, if running; | [MTK] Assume that this change relates to 5.3.13.2 (and not 5.3.7 as indicated). Agree that this change makes the text clearer.  [vivo] since we already clearly capture the CG specific assistance information in the procedure, the proposed change here is not needed.  [CATT] Agree.  [Intel] The impacted section is updated as indicated by MediaTek (thank you!).  [Samsung] It’s no strong need.  [ERI] Agree |
| I203 | 3 | 5.3.5.4 (related to 5.3.5.10 MR-DC release, 5.3.7.2 Initiation of connection re-establishment and 5.3.5.3 RRCReconfiguration) | In section 5.3.5.4 “secondary cell group release”, there is a general statement indicating “release the SCG configuration”, and we wanted to check with companies whether there is a need or not to add explicit reference to the release of the applicable UAI PowSav features and the stop of the corresponding timers (this mechanism would be applicable e.g. during reestablishment (NOTE-1) or reconfiguration (NOTE-2)).  NOTE-1 During the initialization of the re-establihsment procedure (in section 5.3.4.5), it is state to “*perform MR-DC release, as specified in clause 5.3.5.10*;” and within section 5.3.5.10 on “MR-DC release”, it stated the “release the SCG configuration as specified in clause 5.3.5.4” previously mentioned.  NOTE-2 During the Reception of an *RRCReconfiguration* by the UE procedure (in section 5.3.5.3), it is also state the same as explained in NOTE-1 | If the update were desirable (i.e. if “release the SCG configuration” did not include the release of the PWS feature and stop of corresponding timer), section 5.3.5.4 would need to also include explicit release of *drx-PreferenceConfig, maxBW-PreferenceConfig, maxCC-PreferenceConfig, maxMIMO-LayerPreferenceConfig* and *minSchedulingOffsetPreferenceConfig*, as well as, the stop of T346a/b/c/d/e | [MTK] It seems more appropriate to have text related to SCG-specific UAI release in section 5.3.5.10 (MR-DC release) instead of section 5.3.5.4 (which deals specifically with IE *secondaryCellGroup*). If M301 is acceptable, the change could be along the lines of ‘release *otherConfigSCG* and stop T346a-e’  [vivo] We agree with Rapporteur some clarification in 5.3.5.10 is needed. We can further discuss the text proposal in CR phase.  [Intel] We can also be ok with MediaTek’s suggestion.  [ERI] We are not sure why the general statement “release the SCG configuration” should be clarified for PowSav only. Clarifying it for one specific use case makes it perhaps less clear.  PS: 5.3.5.10 refers to back to 5.3.5.4:  3> release the SCG configuration as specified in clause 5.3.5.4; |
| H391 | 3 | 5.7.4.2 | UE reports UAI for power saving for a cell group only when the UE is configured to report the UAI for power saving for the cell group or the preference for the cell group changes. To align with the other texts, the “for the cell group” should be added as the texts in red to make it clearer. | A possible change could be：  A UE capable of providing its preference on DRX parameters of a cell group for power saving in RRC\_CONNECTED may initiate the procedure in several cases, including upon being configured to provide its preference on DRX parameters for the cell group and upon change of its preference on DRX parameters for the cell group.  A UE capable of providing its preference on the maximum aggregated bandwidth of a cell group for power saving in RRC\_CONNECTED may initiate the procedure in several cases, including upon being configured to provide its maximum aggregated bandwidth preference for the cell group and upon change of its maximum aggregated bandwidth preference for the cell group.  A UE capable of providing its preference on the maximum number of secondary component carriers of a cell group for power saving in RRC\_CONNECTED may initiate the procedure in several cases, including upon being configured to provide its maximum number of secondary component carriers preference for the cell group and upon change of its maximum number of secondary component carriers preference for the cell group.  A UE capable of providing its preference on the maximum number of MIMO layers of a cell group for power saving in RRC\_CONNECTED may initiate the procedure in several cases, including upon being configured to provide its maximum number of MIMO layers preference for the cell group and upon change of its maximum number of MIMO layers preference for the cell group.  A UE capable of providing its preference on the minimum scheduling offset for cross-slot scheduling of a cell group for power saving in RRC\_CONNECTED may initiate the procedure in several cases, including upon being configured to provide its minimum scheduling offset preference for the cell group and upon change of its minimum scheduling offset preference for the cell group. | [MTK] Since the text already states that the preference is for the cell group (as highlighted below), the suggested clarification seems redundant.  *A UE capable of providing its preference on DRX parameters of a cell group for power saving in RRC\_CONNECTED may initiate the procedure in several cases, including upon being configured to provide its preference on DRX parameters for the cell group and upon change of its preference on DRX parameters for the cell group.*  [vivo] Agree with rapporteur the current text is clear enough.  [CATT] Agree with the rapporteur.  [Intel] For consistency of the description, we have slightly preference to include the suggested changes.  [ERI] Agree, but similar can be argued for O802? |
| H392 | 3 | 5.7.4.2 | For prohibit timers T346a, T346b, T346c, T346d, T346e, the UE maintains one instance of this timer per cell group. The “associated with the cell group” should be added as the texts in red to make it clearer. | A possible change could be：  1> if configured to provide its preference on DRX parameters of a cell group for power saving:  2> if the UE did not transmit a *UEAssistanceInformation* message with *drx-Preference* for the cell group since it was configured to provide its preference on DRX parameters for power saving; or  2> if the current preference on DRX parameters of the cell group is different from the one indicated in the last transmission of the *UEAssistanceInformation* message including *drx-Preference* for the cell group and timer T346a associated with the cell group the is not running:  3> start the timer T346a with the timer value set to the *drx-PreferenceProhibitTimer*;  3> initiate transmission of the *UEAssistanceInformation* message in accordance with 5.7.4.3 to provide its preference on DRX parameters of the cell group for power saving;  Same changes need to be applied to T346b, T346c, T346d, T346e in the following similar texts. | [MTK] Agree that the change makes the text clearer.  [vivo] We agree the proposed change.  [CATT] Agree.  [Intel] We agree with MediaTek.  [Samsung] Agree  [ERI] Agree |
| H393 | 3 | 5.3.5.9 | For prohibit timers T346a, T346b, T346c, T346d, T346e, the UE maintains one instance of this timer per cell group. The “associated with the cell group” should be added as the texts in red to make it clearer. | A possible change could be：  1> if the received *otherConfig* includes the *drx-PreferenceConfig*:  2> if *drx-PreferenceConfig* is set to *setup*:  3> consider itself to be configured to provide its preference on DRX parameters for power saving for the cell group in accordance with 5.7.4;  2> else:  3> consider itself not to be configured to provide its preference on DRX parameters for power saving for the cell group and stop timer T346a associated with the cell group, if running;  Same changes need to be applied to T346b, T346c, T346d, T346e in the following similar texts. | [MTK] Agree that the change makes the text clearer.  [vivo] We agree the proposed change.  [CATT] Agree.  [Intel] We agree with MediaTek.  [Samsung] Agree  [ERI] Agree |
| H394 | 3 | 5.3.7.2 | Similar comment as I202 but for RRC connection re-establishment. The release of the applicable UAI PowSav features and the stop of the timers do not indicate that this is applicable to all the instances for the different cell groups when initiating RRC connection re-establishment procedure. | A possible change could be：  1> release *drx-PreferenceConfig* for any configured cell group, if configured, and stop all instances of the timer T346a, if running;  1> release *maxBW-PreferenceConfig* for any configured cell group, if configured, and stop all instances of the timer T346b, if running;  1> release *maxCC-PreferenceConfig* for any configured cell group, if configured, and stop all instances of the timer T346c, if running;  1> release *maxMIMO-LayerPreferenceConfig* for any configured cell group, if configured, and stop all instances of the timer T346d, if running;  1> release *minSchedulingOffsetPreferenceConfig* for any configured cell group, if configured, and stop all instances of the timer T346e, if running; | [Intel] We did not suggest the same approach as in I202 for the scenario of re-establishment as the handling of the SCG is done differently as we explained in our comment I203 (added further clarification on this part).  [Huawei] Thank Intel for spotting this issue, if I understand the comment correctly, it means during the re-establishment procedure, UE first performs MR-DC release, and the SCG configuration for powsav UAI has been released (related to I203). Thus, in the procedural text for re-establishment, UE only need to release configuration for powsav UAI **for MCG** in NR-DC.  If the understanding above is correct, there is similar issue for resume procedure. UE first performs:  2> if the UE does not support maintaining SCG configuration upon connection resumption:  3> release the MR-DC related configurations (i.e., as specified in 5.3.5.10) from the UE Inactive AS context, if stored;   * If the UE supports maintaining SCG configuration, then MR-DC release is not performed, so in the procedural text for re-establishment, UE only needs to release configuration for powsav UAI **for any configured CG (MCG +SCG)**. * If the UE does not support maintaining SCG configuration, then MR-DC release is performed, so in the procedural text for re-establishment, UE only needs to release configuration for powsav UAI **for MCG**. (same situation as re-establishment)   In our view, it describes “for any configured cell group, if configured”. If MR-DC release is performed and SCG configuration is released, then the configuration for powsav UAI for SCG is not configured anymore, so it is not needed to be released again. UE only need to release configuration for powsav UAI for MCG (as only it is configured)  1> release *drx-PreferenceConfig* for any configured cell group, if configured, and stop all instances of the timer T346a, if running;  [MTK] Please see response to I203  [vivo] Same comment to I203  [Intel] see discussion on I203  [ERI] We are not sure what companies are saying when referring to I203? Companies are keen to clarify “cell group” everywhere except for re-establishment? In our understanding I203 refers to the SCG release, not MCG release. |
| M301 | 3 | 5.3.5.9 | We’ve agreed to configure CG specific UAI for power savings. However the current SCG configuration for UE assistance re-uses the *otherConfig* IE which can also be used to configure non power-savings related UAI. This could lead to some confusion on the SCG configuration of UE assistance for non power-savings parameters, i.e. whether overheating, and SL and IDC assistance are to be configured using this IE for the SCG. | Introduce a new IE such as *otherConfigSCG* that only includes those parameters that are to be used for SCG specific UAI. | [MTK] This would clarify that SCG specific UAI is only for configured for power savings.  [vivo] we have no strong preference. But SCG specific UAI would be more clear.  [Intel] No strong view on whether this change is essential.  [Samsung] We made the following agreement:  *In NR-DC, SCG specific UAI for power saving can be configured by the network via SRB1 (using mrdc-SecondaryCellGroup) or SRB3 (using RRCReconfiguration).*  We are not sure why the new IE is needed, i.e. we could reuse just the existing otherConfig.  We also assume it’s similar to SCG-initiated measurement.  [ERI] We do not see the need for a new IE. This is clarified in the procedure text in 5.3.5.9, i.e. that the power saving UAI can be per cell group. Perhaps it can be further clarified in the field description of otherconfig that some parameters can be per cell group? |
| V201-V205 | 3 | 5.7.4.3 | In RAN2#109bis-e meeting, we agreed that “An empty ‘feature’ IE can be signalled to indicate that the UE has no preference for all parameters in the ‘feature’ (i.e. similar to overheating)”. Here, “else” can means: 1. No preference; 2. UE’s preference is not changed. Thus, we prefer to make it more clear. | change the “else” to “else (UE has no preference on the maximum aggregated bandwidth for the cell group)”.  Similar to other RIL 202/203/204/205 | [vivo] it is better to make it more clear.  [CATT] No support because there is no ambiguity whether it could be the same preference as previous because in that case it would not enter this procedure, per 5.7.4.2:  if the current preference on DRX parameters of the cell group is different from the one indicated in the last transmission of the *UEAssistanceInformation* message including *drx-Preference* for the cell group and timer T346a is not running…  [Intel] OK for consistency on how this similar behaviour was captured for overheating.  [Samsung] It’s same approach with overheating. Can support  [ERI] agree to clarify this |
| V206 | 3 | 6.2.2 | In RAN2#109bis-e meeting, we agreed that “When reporting a ‘feature’, the all parameters that the UE has a preference for are included. Parameters that are not included are interpreted as the UE having no preference for those parameters.”. we think it is better to have some description to reflect this agreement in the field description. Similar to all other UE assistance information for power saving. | Add the clarification in the filed description for UEAssistanceInformation: “Parameters that are not included are interpreted as the UE having no preference for those parameters.” | [vivo] It is better to make it more clear.  [CATT] No support because it is already clear from 5.7.4.3 that a parameter is only included if UE has a preference for it.  [Intel] we are OK if this points wants to be further clarified for future usage. We are open if this were done within the field description of within the procedural text e.g. as a NOTE.  [Samsung] Agree with the update of the field description  [ERI] Agree. For optional parameters the absence should be specified in the field descriptions. |
| V207 | 3 | 6.2.2 | There is no conclusion on whether the UE can indicate any preferred value within its capability or the configured values for maximum aggregated bandwidth, number of carriers, MIMO layers and minimum scheduling offset. Thus, we prefer to keep this as FFS. Similar to all other UE assistance information for power saving. | Change this to FFS in the filed description for UEAssistanceInformation by now. | [vivo] We can fix this after we have conclusion on this issue.  [CATT] Same comment as for O805.  [Intel] Same comment as for O805  [Samsung] Same comment as for O805  [ERI] Same comment as for O805 |
| V208 | 3 | 6.3.1 | There will be some new conclusion to update the field description for this parameter in [Post109bis-e][940][PowSav] email discussion. We can further update this after we conclude it. | Change the field description according to the latest conclusion for [Post109bis-e][940][PowSav] email discussion. | [vivo] We can fix this after we have conclusion on this issue.  [CATT] Agree with the intention but this is not a real RIL but the potential consequence of future agreements.  [Intel] We assume that all PWS agreed in principle CRs will be updated to include the agreements from R2#110 e-meeting (we also agree with CATT that there is no need of a RIL for this).  [ERI] If there are further agreements for RRM relaxation, then this may imply 38.331 changes, but there is nothing to correct right now. |
| V209 | 3 | 6.3.1 | There will be some new conclusion to update the field description for this parameter in [Post109bis-e][940][PowSav] email discussion. We can further update this after we conclude it. But current description still have some confuse on “shall not relax measurements on high priority frequencies”, since in legacy we have the requirements of Thigher\_priority\_search, which is also some kind of relaxation. Thus, we prefer to make it more clear. | As the behavior is clearly defined in TS 38.304, we prefer to remove this sentence. | [vivo] In order to avoid any confusion, we can remove this sentence in the field description in RRC specification.  [CATT] Same as above.  [Intel] Same as for V208.  [ERI] Do not agree. 38.331 should describe the meaning when an optinal IE is absent. Agree, that for the details 38.331 should refer to 38.304. |
| V210  [R2-2004643] | 3 | 5.7.4 | As we agreed delta signalling applies at a ‘feature’ level (i.e. drx-Preference, maxBW-Preference, maxCC-Preference, maxMIMO-LayerPreference, minSchedulingOffsetPreference and releasePreference) in power saving, maxBW-Preference and maxCC-Preference can be reported with delta signalling. For example, in T1, UE reports a preferred maxBW-Preference. In T2, the UE reports zero value for maxCC-Preference. But at this time point, the previous preferred maxBW-Preference is still valid. In this case, NW and UE should align the understanding that the latest zero value of maxCC-Preference should override the previous preferred maxBW-Preference. | Add some description in the note or clarify this understanding in Chair’s note.  e.g.  NOTE 3: The UE can implicitly indicate a preference for NR SCG release by reporting the maximum aggregated bandwidth preference for power saving of the cell group as zero for both FR1 and FR2, or by reporting the maximum number of secondary component carriers for power saving of the cell group as zero for both uplink and downlink. The latest preferred zero value of maxCC-Preference (or maxBW-Preference) should override the previous preferred non-zero maxBW-Preference (or maxCC-Preference). | [vivo] This should be clarified.  [CATT] Not sure if there is a problem. Reporting zero value for maxCC-Preference only without updating an earlier non-zero value for maxBW-Preference (or vice-versa) is not consistent anyways. In any case network interprets it as the UE expects an SCG release. If network does not follow UE’s preference and keeps scheduling the UE, it means the zero value for for maxCC-Preference indicated by the UE is not considered by network, so the latest non-zero preference of maxBW-Preference could still apply?  [Intel] The motivation/concern is not clear.  [ERI] The delta-signalling is not the problem, but the problem is that BW and CC indicate the same parameter in a different metric. This problem not only exist when the value 0 is signaled, but can also happen when UE prefers more BW then can be provided by the number of CCs that is preferred, etc.  We have been wondering if a simple solution for the explicit release preference could be simply resolved by changing “or” ot “and”?:  maximum aggregated bandwidth preference for power saving of the cell group as zero for both FR1 and FR2, and by reporting the maximum number of secondary component carriers for power saving of the cell group as zero for both uplink and downlink.  Simple and unambiguous. |

# 3 Open issues/RIL for LTE Power Saving RRC CR

| **ID** | **Class** | **Section** | **Description** | **Proposed Change** | **Comments** |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |

# 3 Conclusion

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# 4 References

1. R2-2003125 - CR for 38.331 for Power Savings
2. R2-2003126 - CR for 36.331 for Power Savings
3. R2-2003869 - Rel-16 ASN.1 review plan, phase 2