**3GPP TSG RAN WG1 Meeting #103-e R1-** **200xxxx**

**e-Meeting, 26th October – 13th November 2020**

**Title: Summary of NR UE Power Saving**

**Agenda item: 7.2.7**

**Source: CATT**

**Document for: Discussion**

# Final Summary of Email Discussions and Agreements

# Email Discussion [103e-NR-Rel-16-PowSav-01]

## Issue 1:

Interference measurements are not part of L1-RSRP measurements when *drx-OnDurationTimer* does not start [5] in TS38.214

------------------------------------------------ Start of Text Proposal 1 ------------------------------------------------

#### 5.2.2.5 CSI reference resource definition

<Unchanged parts are omitted>

When DRX is configured, the UE reports a CSI report only if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement in DRX Active Time no later than CSI reference resource and drops the report otherwise. When the UE is configured to monitor DCI format 2\_6 and if the UE configured by higher layer parameter *ps-TransmitOtherPeriodicCSI* to report CSI with the higher layer parameter *reportConfigType* set to 'periodic' and *reportQuantity* set to quantities other than 'cri-RSRP' and 'ssb-Index-RSRP' when *drx-onDurationTimer* is not started, the UE shall report CSI during the time duration indicated by *drx-onDurationTimer* also outside active time according to the procedure described in Clause 5.2.1.4 if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement during the time duration indicated by drx-onDurationTimer outside DRX active time or in DRX Active Time no later than CSI reference resource and drops the report otherwise. When the UE is configured to monitor DCI format 2\_6 and if the UE configured by higher layer parameter *ps-TransmitPeriodicL1-RSRP* to report L1-RSRP with the higher layer parameter *reportConfigType* set to 'periodic' and *reportQuantity* set to 'cri-RSRP' or 'ssb-Index-RSRP' when *drx-onDurationTimer* is not started, the UE shall report L1-RSRP during the time duration indicated by *drx-onDurationTimer* also outside active time according to the procedure described in clause 5.2.1.4 and when reportQuantity set to 'cri-RSRP' if receiving at least one CSI-RS transmission occasion for channel measurement during the time duration indicated by drx-onDurationTimer outside DRX active time or in DRX Active Time no later than CSI reference resource and drops the report otherwise.

<Unchanged parts are omitted>

------------------------------------------------- End of Text Proposal 1 ------------------------------------------------

|  |  |  |
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| **Company** | **Support (Yes/No)** | **Comments** |
| Samsung | Yes |  |
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## Issue 2:

 Clarification on *minimumSchedulingOffsetK0-r16* is not configured for UL BWP.in Clause 5.2.1.5.1a of TS 38.214[5]

------------------------------------------------ Start of Text Proposal 2 ------------------------------------------------

##### 5.2.1.5.1a Aperiodic CSI Reporting/Aperiodic CSI-RS when the triggering PDCCH and the CSI-RS have different numerologies

<Unchanged parts are omitted>

Aperiodic CSI-RS timing:

- When the aperiodic CSI-RS is used with aperiodic CSI reporting, the CSI-RS triggering offset *X* is configured per resource set by the higher layer parameter *aperiodicTriggeringOffset* or *aperiodicTriggeringOffset-r16,* including the case that the UE is not configured with *minimumSchedulingOffsetK0-r16* for any DL BWP or *minimumSchedulingOffsetK2-r16* for anyUL BWP and all the associated trigger states do not have the higher layer parameter *qcl-Type* set to 'QCL-TypeD' in the corresponding TCI states. The CSI-RS triggering offset has the values of {0, 1, …, 31} slots when the µPDCCH < µCSIRS and {0, 1, 2, 3, 4, 5, 6, …, 15, 16, 24} when the µPDCCH > µCSIRS.. The aperiodic CSI-RS is transmitted in a slot , if UE is configured with ca-SlotOffset for at least one of the triggered and triggering cell, and *Ks* = , otherwise, and where

*- n* is the slot containing the triggering DCI, *X* is the CSI-RS triggering offset in the numerology of CSI-RS according to the higher layer parameter *aperiodicTriggeringOffset* or *aperiodicTriggeringOffset-r16*,

- $μ\_{CSIRS}$ and $μ\_{PDCCH}$ are the subcarrier spacing configurations for CSI-RS and PDCCH, respectively,

- $N\_{slot, offset, PDCCH}^{CA}$ and $μ\_{offset,PDCCH}$are the$ N\_{slot, offset}^{CA}$ and the, respectively, which are determined by higher-layer configured ca-SlotOffset for the cell receiving the PDCCH respectively, $N\_{slot, offset, CSIRS}^{CA} $and  $μ\_{offset,CSIRS}$ are the$ N\_{slot, offset}^{CA}$ and the, respectively, which are determined by higher-layer configured ca-SlotOffset for the cell transmitting the CSI-RS respectively, as defined in [4, TS 38.211] clause 4.5

<Unchanged parts are omitted>

------------------------------------------------- End of Text Proposal 2 ------------------------------------------------

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| **Company** | **Support (Yes/No)** | **Comments** |
| Samsung | Yes |  |
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## Issue 3:

Align the Clause 10.3 of TS38.213 related to the minimum time gap with the corresponding minimum time gap capability parameter described in RAN2 specifications [6]

## 10.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells

<omitted unchanged text>

If a UE reports ~~for an active DL BWP~~ a *MinTimeGap-r16* value ~~requirement of X slots prior to the beginning of a slot where the UE would start the~~ *~~drx-onDurationTimer~~*, the UE is not required to monitor PDCCH for detection of DCI format 2\_6 during the X slots prior to the beginning of a slot where the UE would start the *drx-onDurationTimer*, where X corresponds to the reported *MinTimeGap-r16* value for the ~~requirement of the~~ SCS of the active DL BWP in Table 10.3-1.

Table 10.3-1 Minimum time gap value X

|  |  |
| --- | --- |
| SCS (kHz) | Minimum Time Gap X (slots)  |
| Value 1 | Value 2 |
| 15 | 1 | 3 |
| 30 | 1 | 6 |
| 60 | 1 | 12 |
| 120 | 2 | 24 |

<omitted unchanged text>

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| **Company** | **Support (Yes/No)** | **Comments** |
| Samsung | Yes |  |
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## Issue 5:

Clarify the source of the parameter *drx-onDurationTimer* [8] in TS38.213 and TS38.214.

* + **Note:**
		- In 38.213 the parameter *drx-onDurationTimer* is referred in context of DCP/DCI format 2\_6 triggered behaviour or monitoring, and DCP/DCI format 2\_6 cannot be configured together with *DRX-ConfigSecondaryGroup* thus source for the parameter *drx-onDurationTimer* should be clear from the context.
		- In 38.214 the parameter *drx-onDurationTimer* is referred in context of DCP/DCI format 2\_6 triggered start of timer but also used to define absolute time duration, thus it could be considered to clarify the source of the parameter.

Draft TP to 38.214:

|  |
| --- |
| 5.1.6.1 CSI-RS reception procedure[unneccesary text omitted]If the UE is configured with DRX, - if the UE is configured to monitor DCI format 2\_6 and configured by higher layer parameter *ps-TransmitOtherPeriodicCSI* to report CSI with the higher layer parameter *reportConfigType* set to 'periodic' and *reportQuantity* set to quantities other than 'cri-RSRP' and 'ssb-Index-RSRP' when *drx-onDurationTimer* is not started, the most recent CSI measurement occasion occurs in DRX active time or during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside DRX active time for CSI to be reported;- if the UE is configured to monitor DCI format 2\_6 and configured by higher layer parameter *ps-TransmitPeriodicL1-RSRP* to report L1-RSRP with the higher layer parameter *reportConfigType* set to 'periodic' and *reportQuantity* set to cri-RSRP when *drx-onDurationTimer* is not started, the most recent CSI measurement occasion occurs in DRX active time or during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside DRX active time for CSI to be reported;- otherwise, the most recent CSI measurement occasion occurs in DRX active time for CSI to be reported.[unneccesary text omitted]5.1.6.1.3 CSI-RS for mobility[unneccesary text omitted]If the UE is configured with DRX, the UE is not required to perform measurement of CSI-RS resources other than during the active time for measurements based on *CSI-RS-Resource-Mobility*. When the UE is configured to monitor DCI format 2\_6, the UE is not required to perform measurements other than during the active time and during the timer duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside active time based on *CSI-RS-Resource-Mobility*. If the UE is configured with DRX and DRX cycle in use is larger than 80 ms, the UE may not expect CSI-RS resources are available other than during the active time for measurements based on *CSI-RS-Resource-Mobility*. If the UE is configured with DRX and configured to monitor DCI format 2\_6 and DRX cycle in use is larger than 80ms, the UE may not expect that the CSI-RS resources are available other than during the active time and during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside active time for measurements based on *CSI-RS-Resource-Mobility.* Otherwise, the UE may assume CSI-RS are available for measurements based on *CSI-RS-Resource-Mobility*.[unneccesary text omitted]5.2.2.5 CSI reference resource definition[unneccesary text omitted]When DRX is configured, the UE reports a CSI report only if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement in DRX Active Time no later than CSI reference resource and drops the report otherwise. When the UE is configured to monitor DCI format 2\_6 and if the UE configured by higher layer parameter *ps-TransmitOtherPeriodicCSI* to report CSI with the higher layer parameter *reportConfigType* set to 'periodic' and *reportQuantity* set to quantities other than 'cri-RSRP' and 'ssb-Index-RSRP' when *drx-onDurationTimer* is not started, the UE shall report CSI during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside active time according to the procedure described in Clause 5.2.1.4 if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* outside DRX active time or in DRX Active Time no later than CSI reference resource and drops the report otherwise. When the UE is configured to monitor DCI format 2\_6 and if the UE configured by higher layer parameter *ps-TransmitPeriodicL1-RSRP* to report L1-RSRP with the higher layer parameter *reportConfigType* set to 'periodic' and *reportQuantity* set to 'cri-RSRP' or 'ssb-Index-RSRP' when *drx-onDurationTimer* is not started, the UE shall report L1-RSRP during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside active time according to the procedure described in clause 5.2.1.4 and when *reportQuantity* set to '*cri-RSRP'* if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* outside DRX active time or in DRX Active Time no later than CSI reference resource and drops the report otherwise. |

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| **Company** | **Support (Yes/No)** | **Comments** |
| Samsung | No | This is not essential. WUS cannot be configured together with secondary DRX group. Without clarification, the UE behavior is already clear enough. |
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# Email Discussion during Preparation[103e-Prep\_NR-NR-UE\_Pow\_Sav]

## Summary of Preparation Email discussion

All 5 issues are supported by most companies. For issue 4, RRC parameter alignments had been captured in R1-2008124 Alignment CR for TS 38.213 except the typo “*drx-onDuarationTimer”* Clause 10.3 of TS38.213. Thus, Issues 1, 2, 3, and 5 would be discussed during RAN1#103-e together with proposed draft CR.

## Inputs from Preparation Email discussion

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| --- | --- | --- |
| **Company** | **Supporting Issues** | **Comments** |
| Nokia | #1,#2,#3,#5 | Issue #1, #2 and issue #3 appear relatively straight forward, albeit I would expect some wording discussion.I think issue #4 could be covered under Editors CR, if not already.Issue#5, relates also to the RRC parameter name aligment, but adding a source parameter reference would in my view require agreement from RAN1. I also took the liberty of adding the draft TP from the Annex of R1-2008732 at the end to Section 5 as a reference. |
| Ericsson | #1,#2,#3,#4,#5 | Regarding issue#4, we understand it is simply to help the editor as per chairman’s guidance. 1. *For all Rel-16 “****editorial” CRs/updates****, we will use the editors’ alignment CRs as a start to collect and incorporate these updates. There will be dedicated editors’ alignment CR email threads.*
	1. *Please especially FLs help the editors collect any essential editorial-like CRs (per spec)*
 |
| MediaTek | #1, #2, #3, #4 | No strong view for Issue #5. If the majority view is the clarification for the source of DRX paramteter is needed, we are also OK to discuss it. |
| Huawei, HiSilicon | #1, #2, #3, #5 and suggest to discuss proposal#1 in [4] | Before the comments on Issue#1~5, we suggest the group to consider our proposal#1 in our contribution [4] to make a conclusion on clarifying the relationship between maxMIMO-Layers and antenna ports. In Rel-16 study, for the power saving gain evaluation, UE is assumed to reduce the number of Rx antennas when the maximum number of MIMO layers is reduced. Otherwise, UE cannot get the benefit of power saving gain as shown in Rel-16 evaluation. Therefore, we would like to suggest the group to make a conclusion/note in Chairman notes to avoid any confusion:* Proposal 1: Make a conclusion in RAN1 that UE may use N Rx antennas for the reception of PDSCH on a DL active BWP when the per-BWP configured maxMIMO-Layers for the DL BWP is N.

Issue #1, Issue#2 and Issue#5: we are fine to discuss them in this meeting.Issue#3: We are open to have further discussion in this meeting. But we are thinking we could just reflect the higher layer parameter *MinTimeGap-r16* in the paragraph, and there is no need to modify the whole paragraph. Issue #4: agree with Nokia that it can be covered under Editors CR.  |
| ZTE | Issue #1,#2;Issue 3 with RRC parameter | The issue #1 and #2 are straightforward.Regarding the issue #3, we think it is okay to include the RRC parameter to make it clear across spec, but we don’t see any need of the wording refinement.The RRC parameter alignment in issue #4 can be handle by editor, if it has not been fixed in the latest spec draft in AI 7.2.For issue#5, we think the current RRC spec is clear. But okay to discuss it if the majority view is to clarify the resource of DRX onduration timerBesides, as it was pointed out in reference [2], “outside active Time of a next long DRX cycle” and “outside active Time prior to a next long DRX cycle” are different. For the former one, the “outside Active Time” may long to the current long DRX cycle, instead of the next one. We think it should be clarified. |
| Intel | Issue #1,#2, # 3, # 5 | Regarding Issue # 3, we don’t see a strong need to modify the whole paragraph, as other companies mentioned.Issue# 4 can be handled by editor. |
| Vivo | Issue #1,2, 3,5 | Issue# 4 can be handled by editor. |
| Samsung | Issue #1, #2, #3, #4, #5  | We are okay to discussed all the issues listed up by FL. On top of it, we want to further discuss TP suggested in our contribution [3] to clarify UE behavior operated with Long/Short DRX cycle although it has been concluded in RAN1#102-e meeting. If there is no further clarification on Long/Short DRX cycle in the spec, the UE will identify DCI format 2\_6 monitoring occasions for both Long and Short DRX cycle as below figure. We woule like to request to discuss for checking whether companies share the same understanding or not. |
| OPPO | #1, #2, #3, #4, #5 | The #4 is ok but we need to check if the editor CRs will duplicate the effort.The #3 is also more or less that way. But it seems Editor will less likely change it, since it need more content change. We suggest principle agree and pending them until Editor CR. |

# Summary from contributions reviews

## Summary of Open Issues

* **Issue 1: Interference measurements are not part of L1-RSRP measurements when *drx-OnDurationTimer* does not start [5] in TS38.214**

------------------------------------------------ Start of Text Proposal 1 ------------------------------------------------

#### 5.2.2.5 CSI reference resource definition

<Unchanged parts are omitted>

When DRX is configured, the UE reports a CSI report only if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement in DRX Active Time no later than CSI reference resource and drops the report otherwise. When the UE is configured to monitor DCI format 2\_6 and if the UE configured by higher layer parameter *ps-TransmitOtherPeriodicCSI* to report CSI with the higher layer parameter *reportConfigType* set to 'periodic' and *reportQuantity* set to quantities other than 'cri-RSRP' and 'ssb-Index-RSRP' when *drx-onDurationTimer* is not started, the UE shall report CSI during the time duration indicated by *drx-onDurationTimer* also outside active time according to the procedure described in Clause 5.2.1.4 if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement during the time duration indicated by drx-onDurationTimer outside DRX active time or in DRX Active Time no later than CSI reference resource and drops the report otherwise. When the UE is configured to monitor DCI format 2\_6 and if the UE configured by higher layer parameter *ps-TransmitPeriodicL1-RSRP* to report L1-RSRP with the higher layer parameter *reportConfigType* set to 'periodic' and *reportQuantity* set to 'cri-RSRP' or 'ssb-Index-RSRP' when *drx-onDurationTimer* is not started, the UE shall report L1-RSRP during the time duration indicated by *drx-onDurationTimer* also outside active time according to the procedure described in clause 5.2.1.4 and when reportQuantity set to 'cri-RSRP' if receiving at least one CSI-RS transmission occasion for channel measurement during the time duration indicated by drx-onDurationTimer outside DRX active time or in DRX Active Time no later than CSI reference resource and drops the report otherwise.

<Unchanged parts are omitted>

------------------------------------------------- End of Text Proposal 1 ------------------------------------------------

* **Issue 2:** Clarification on *minimumSchedulingOffsetK0-r16* is not configured for UL BWP.in Clause 5.2.1.5.1a of TS 38.214[5]

------------------------------------------------ Start of Text Proposal 2 ------------------------------------------------

##### 5.2.1.5.1a Aperiodic CSI Reporting/Aperiodic CSI-RS when the triggering PDCCH and the CSI-RS have different numerologies

<Unchanged parts are omitted>

Aperiodic CSI-RS timing:

- When the aperiodic CSI-RS is used with aperiodic CSI reporting, the CSI-RS triggering offset *X* is configured per resource set by the higher layer parameter *aperiodicTriggeringOffset* or *aperiodicTriggeringOffset-r16,* including the case that the UE is not configured with *minimumSchedulingOffsetK0-r16* for any DL BWP or *minimumSchedulingOffsetK2-r16* for anyUL BWP and all the associated trigger states do not have the higher layer parameter *qcl-Type* set to 'QCL-TypeD' in the corresponding TCI states. The CSI-RS triggering offset has the values of {0, 1, …, 31} slots when the µPDCCH < µCSIRS and {0, 1, 2, 3, 4, 5, 6, …, 15, 16, 24} when the µPDCCH > µCSIRS.. The aperiodic CSI-RS is transmitted in a slot , if UE is configured with ca-SlotOffset for at least one of the triggered and triggering cell, and *Ks* = , otherwise, and where

*- n* is the slot containing the triggering DCI, *X* is the CSI-RS triggering offset in the numerology of CSI-RS according to the higher layer parameter *aperiodicTriggeringOffset* or *aperiodicTriggeringOffset-r16*,

- $μ\_{CSIRS}$ and $μ\_{PDCCH}$ are the subcarrier spacing configurations for CSI-RS and PDCCH, respectively,

- $N\_{slot, offset, PDCCH}^{CA}$ and $μ\_{offset,PDCCH}$are the$ N\_{slot, offset}^{CA}$ and the, respectively, which are determined by higher-layer configured ca-SlotOffset for the cell receiving the PDCCH respectively, $N\_{slot, offset, CSIRS}^{CA} $and  $μ\_{offset,CSIRS}$ are the$ N\_{slot, offset}^{CA}$ and the, respectively, which are determined by higher-layer configured ca-SlotOffset for the cell transmitting the CSI-RS respectively, as defined in [4, TS 38.211] clause 4.5

<Unchanged parts are omitted>

------------------------------------------------- End of Text Proposal 2 ------------------------------------------------

* **Issue 3:** **Align the Clause 10.3 of TS38.213 related to the minimum time gap with the corresponding minimum time gap capability parameter described in RAN2 specifications [6]**

## 10.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells

<omitted unchanged text>

If a UE reports ~~for an active DL BWP~~ a *MinTimeGap-r16* value ~~requirement of X slots prior to the beginning of a slot where the UE would start the~~ *~~drx-onDurationTimer~~*, the UE is not required to monitor PDCCH for detection of DCI format 2\_6 during the X slots prior to the beginning of a slot where the UE would start the *drx-onDurationTimer*, where X corresponds to the reported *MinTimeGap-r16* value for the ~~requirement of the~~ SCS of the active DL BWP in Table 10.3-1.

Table 10.3-1 Minimum time gap value X

|  |  |
| --- | --- |
| SCS (kHz) | Minimum Time Gap X (slots)  |
| Value 1 | Value 2 |
| 15 | 1 | 3 |
| 30 | 1 | 6 |
| 60 | 1 | 12 |
| 120 | 2 | 24 |

<omitted unchanged text>

* **Issue 4: RRC parameter alignments [6]**

38.213 subclause 10.3

* *sizeDCI\_2-6  → sizeDCI-2-6*
* *psPositionDCI-2-6  → ps-PositionDCI-2-6*
* *drx-onDuarationTimer → drx-onDurationTimer*
* **Issue 5**: **Clarify the source of the parameter *drx-onDurationTimer* [8] in TS38.213 and TS38.214.**
	+ **Note:**
		- In 38.213 the parameter *drx-onDurationTimer* is referred in context of DCP/DCI format 2\_6 triggered behaviour or monitoring, and DCP/DCI format 2\_6 cannot be configured together with *DRX-ConfigSecondaryGroup* thus source for the parameter *drx-onDurationTimer* should be clear from the context.
		- In 38.214 the parameter *drx-onDurationTimer* is referred in context of DCP/DCI format 2\_6 triggered start of timer but also used to define absolute time duration, thus it could be considered to clarify the source of the parameter.

# Contributions summary and proposals

|  |  |
| --- | --- |
| CATT [1] | * Observation 1: The number of aggregation levels for DCI format 2\_6 should be restricted to reduce the number of PDCCH blind decoding and the additional power saving gain.
* Observation2: DCI size alignment will degrade miss detection performance of DCI format 2\_6 more than 2dB in AWGN channel for 12bits DCI size.
 |
| ZTE [2] | * **Proposal 1**: Adopt the following TP on TS 38.213.

|  |
| --- |
| **----------------------------------------------- Start of TP of TS 38.213 --------------------------------------------------------****10.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells****\*\*\* Unchanged text is omitted \*\*\***If a UE is provided search space sets to monitor PDCCH for detection of DCI format 2\_6 in the active DL BWP of the PCell or of the SpCell and the UE - is not required to monitor PDCCH for detection of DCI format 2\_6, as described in Clauses 10, 11.1, 12, and in Clause 5.7 of [11, TS 38.321] for all corresponding PDCCH monitoring occasions outside Active Time prior to a next long DRX cycle, or - does not have any PDCCH monitoring occasions for detection of DCI format 2\_6 outside Active Time prior to a next long DRX cyclethe physical layer of the UE reports a value of 1 for the Wake-up indication bit to higher layers for the next long DRX cycle.**\*\*\* Unchanged text is omitted \*\*\*****----------------------------------------------- End of TP of TS 38.213 --------------------------------------------------------** |

<Moderator comment> The proposed change has same meaning as that in the specification. This is not an essential correction or editorial change.  |
| Samsung [3] | **Proposed TP1 for TS 38.213 in Section 10.3**

|  |
| --- |
| 10.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells[…]The UE does not monitor PDCCH for detecting DCI format 2\_6 during Active Time [11, TS 38.321].The UE does not monitor PDCCH for detecting DCI format 2\_6 while short DRX cycle is used [11, TS 38.321].[…] |

**Proposed TP2 for TS 38.213 in Section 10.3**

|  |
| --- |
| 10.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells[…]- an offset by *ps-Offset* indicating a time, where the UE starts monitoring PDCCH for detection of DCI format 2\_6 according to the number of search space sets, prior to a slot where the *drx-onDuarationTimer* for long DRX cycle would start on the PCell or on the SpCell [11, TS 38.321]- for each search space set, the PDCCH monitoring occasions are the ones in the first $T\_{s}$ slots indicated by *duration*, or $T\_{s}=1$ slot if *duration* is not provided, starting from the first slot of the first $T\_{s}$ slots and ending prior to the start of *drx-onDurationTimer* for long DRX cycle. On PDCCH monitoring occasions associated with a same long DRX Cycle, a UE does not expect to detect more than one DCI format 2\_6 with different values of the Wake-up indication bit for the UE or with different values of the bitmap for the UE.The UE does not monitor PDCCH for detecting DCI format 2\_6 during Active Time [11, TS 38.321].If a UE reports for an active DL BWP a requirement of X slots prior to the beginning of a slot where the UE would start the *drx-onDurationTimer* for long DRX cycle, the UE is not required to monitor PDCCH for detection of DCI format 2\_6 during the X slots, where X corresponds to the requirement of the SCS of the active DL BWP in Table 10.3-1.[…] |

<Moderator comments> This issue was discussed in email discussion in issue 5-5 of RAN1#102-e **[102-e\_NR\_NR\_UE\_Pow\_Sav\_02]** email discussion. The conclusion was no consensus in additional specification change to capture “for long DRX cycle”.  |
| Huawei, HiSilicon [4] | * Proposal 1: Make a conclusion in RAN1 that UE may use N Rx antennas for the reception of PDSCH on a DL active BWP when the per-BWP configured maxMIMO-Layers for the DL BWP is N.
* Proposal 2: Suggest Editor to change ‘*minimum scheduling offset restriction*’ to ‘minimum scheduling offset restriction’ in TS 38.214.

<Moderator’s comments> These are not essential correction.  |
| MediaTeck[5] | * Proposal 1: Adopt TP1 in Section 5.2.2.5 of TS 38.214 to clarify interference measurement is unnecessary if the UE is configured by higher layer parameter *ps-TransmitPeriodicL1-RSRP* *to* report L1-RSRP during the time duration indicated by *drx-onDurationTimer* outside DRX active time.

------------------------------------------------ Start of Text Proposal 1 ------------------------------------------------5.2.2.5 CSI reference resource definition<Unchanged parts are omitted>When DRX is configured, the UE reports a CSI report only if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement in DRX Active Time no later than CSI reference resource and drops the report otherwise. When the UE is configured to monitor DCI format 2\_6 and if the UE configured by higher layer parameter *ps-TransmitOtherPeriodicCSI* to report CSI with the higher layer parameter *reportConfigType* set to 'periodic' and *reportQuantity* set to quantities other than 'cri-RSRP' and 'ssb-Index-RSRP' when *drx-onDurationTimer* is not started, the UE shall report CSI during the time duration indicated by *drx-onDurationTimer* also outside active time according to the procedure described in Clause 5.2.1.4 if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement during the time duration indicated by drx-onDurationTimer outside DRX active time or in DRX Active Time no later than CSI reference resource and drops the report otherwise. When the UE is configured to monitor DCI format 2\_6 and if the UE configured by higher layer parameter *ps-TransmitPeriodicL1-RSRP* to report L1-RSRP with the higher layer parameter *reportConfigType* set to 'periodic' and *reportQuantity* set to 'cri-RSRP' or 'ssb-Index-RSRP' when *drx-onDurationTimer* is not started, the UE shall report L1-RSRP during the time duration indicated by *drx-onDurationTimer* also outside active time according to the procedure described in clause 5.2.1.4 and when reportQuantity set to 'cri-RSRP' if receiving at least one CSI-RS transmission occasion for channel measurement during the time duration indicated by drx-onDurationTimer outside DRX active time or in DRX Active Time no later than CSI reference resource and drops the report otherwise.<Unchanged parts are omitted>------------------------------------------------- End of Text Proposal 1 ------------------------------------------------* Proposal 2: Adopt TP2 in Section 5.2.1.5.1a of TS 38.214 to clarify that *minimumSchedulingOffsetK0-r16* is not configured for UL BWP.

------------------------------------------------ Start of Text Proposal 2 ------------------------------------------------5.2.1.5.1a Aperiodic CSI Reporting/Aperiodic CSI-RS when the triggering PDCCH and the CSI-RS have different numerologies<Unchanged parts are omitted>Aperiodic CSI-RS timing:- When the aperiodic CSI-RS is used with aperiodic CSI reporting, the CSI-RS triggering offset *X* is configured per resource set by the higher layer parameter *aperiodicTriggeringOffset* or *aperiodicTriggeringOffset-r16,* including the case that the UE is not configured with *minimumSchedulingOffsetK0-r16* for any DL BWP or *minimumSchedulingOffsetK2-r16* for anyUL BWP and all the associated trigger states do not have the higher layer parameter *qcl-Type* set to 'QCL-TypeD' in the corresponding TCI states. The CSI-RS triggering offset has the values of {0, 1, …, 31} slots when the µPDCCH < µCSIRS and {0, 1, 2, 3, 4, 5, 6, …, 15, 16, 24} when the µPDCCH > µCSIRS.. The aperiodic CSI-RS is transmitted in a slot , if UE is configured with ca-SlotOffset for at least one of the triggered and triggering cell, and *Ks* = , otherwise, and where*- n* is the slot containing the triggering DCI, *X* is the CSI-RS triggering offset in the numerology of CSI-RS according to the higher layer parameter *aperiodicTriggeringOffset* or *aperiodicTriggeringOffset-r16*,- $μ\_{CSIRS}$ and $μ\_{PDCCH}$ are the subcarrier spacing configurations for CSI-RS and PDCCH, respectively,- $N\_{slot, offset, PDCCH}^{CA}$ and $μ\_{offset,PDCCH}$are the$ N\_{slot, offset}^{CA}$ and the, respectively, which are determined by higher-layer configured ca-SlotOffset for the cell receiving the PDCCH respectively, $N\_{slot, offset, CSIRS}^{CA} $and  $μ\_{offset,CSIRS}$ are the$ N\_{slot, offset}^{CA}$ and the, respectively, which are determined by higher-layer configured ca-SlotOffset for the cell transmitting the CSI-RS respectively, as defined in [4, TS 38.211] clause 4.5<Unchanged parts are omitted>------------------------------------------------- End of Text Proposal 2 ------------------------------------------------ |
| Ericsson [6] | Following TP is proposed to align the RAN1 specification related to the minimum time gap with the corresponding minimum time gap capability parameter described in RAN2 specifications.TP for 38.213-g30, subclause 10.310.3 PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells<omitted unchanged text>If a UE reports ~~for an active DL BWP~~ a *MinTimeGap-r16* value ~~requirement of X slots prior to the beginning of a slot where the UE would start the~~ *~~drx-onDurationTimer~~*, the UE is not required to monitor PDCCH for detection of DCI format 2\_6 during the X slots prior to the beginning of a slot where the UE would start the *drx-onDurationTimer*, where X corresponds to the reported *MinTimeGap-r16* value for the ~~requirement of the~~ SCS of the active DL BWP in Table 10.3-1.Table 10.3-1 Minimum time gap value X

|  |  |
| --- | --- |
| SCS (kHz) | Minimum Time Gap X (slots)  |
| Value 1 | Value 2 |
| 15 | 1 | 3 |
| 30 | 1 | 6 |
| 60 | 1 | 12 |
| 120 | 2 | 24 |

<omitted unchanged text>**2.2 RRC parameter alignment**Following RRC parameter name alignment/corrections are needed in some places. These are mentioned here for editors’ convenience. 38.213 subclause 10.3* *sizeDCI\_2-6  → sizeDCI-2-6*
* *psPositionDCI-2-6  → ps-PositionDCI-2-6*
* *drx-onDuarationTimer → drx-onDurationTimer*

38.214 subclauses 5.1.6.1 and 5.2.2.5* *ps-TransmitOtherPeriodicCSI → ps-TransmitPeriodicCSI*

<Moderator’s comments> *ps-TransmitOtherPeriodicCSI* is in the *DCI-config-R16* in *PhysicalCellGroupConfig IE* |
| vivo[7] | **Proposal 1: Further clarification is needed for minimum time gap. Capture TP in Appendix 1 in R1-2008677 for TS38.213****10.3** PDCCH monitoring indication and dormancy/non-dormancy behaviour for SCells==============================Unchanged part omitted================================If a UE reports for an active DL BWP a requirement of X slots prior to the beginning of a slot where the UE would start the drx-onDurationTimer, the UE is not required to monitor PDCCH for detection of DCI format 2\_6 during the X slots, where X corresponds to the requirement of the SCS of the ~~active DL BWP~~ smallest SCS among all SCS values of all configured CCs in Table 10.3-1.Table 10.3-1 Minimum time gap value X

|  |  |
| --- | --- |
| SCS (kHz) | Minimum Time Gap X (slots)  |
| Value 1 | Value 2 |
| 15 | 1 | 3 |
| 30 | 1 | 6 |
| 60 | 1 | 12 |
| 120 | 2 | 24 |

==============================Unchanged part omitted================================<Moderator comments> minimum time gap value X is associated with DCP in PCell in CA or SpCell in DC. It is not count any associated SCell SCS in CA.  |
| Nokia, NSB [8] | * **Proposal:** In light of parameter name duplication, discuss whether there is a need to clarify the source of the parameter *drx-onDurationTimer*.
* **Observation 1:** In 38.213 the parameter *drx-onDurationTimer* is referred in context of DCP/DCI format 2\_6 triggered behaviour or monitoring, and DCP/DCI format 2\_6 cannot be configured together with *DRX-ConfigSecondaryGroup* thus source for the parameter *drx-onDurationTimer* should be clear from the context.
* **Observation 2:** In 38.214 the parameter *drx-onDurationTimer* is referred in context of DCP/DCI format 2\_6 triggered start of timer but also used to define absolute time duration, thus it could be considered to clarify the source of the parameter.

Draft TP to 38.214:

|  |
| --- |
| 5.1.6.1 CSI-RS reception procedure[unneccesary text omitted]If the UE is configured with DRX, - if the UE is configured to monitor DCI format 2\_6 and configured by higher layer parameter *ps-TransmitOtherPeriodicCSI* to report CSI with the higher layer parameter *reportConfigType* set to 'periodic' and *reportQuantity* set to quantities other than 'cri-RSRP' and 'ssb-Index-RSRP' when *drx-onDurationTimer* is not started, the most recent CSI measurement occasion occurs in DRX active time or during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside DRX active time for CSI to be reported;- if the UE is configured to monitor DCI format 2\_6 and configured by higher layer parameter *ps-TransmitPeriodicL1-RSRP* to report L1-RSRP with the higher layer parameter *reportConfigType* set to 'periodic' and *reportQuantity* set to cri-RSRP when *drx-onDurationTimer* is not started, the most recent CSI measurement occasion occurs in DRX active time or during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside DRX active time for CSI to be reported;- otherwise, the most recent CSI measurement occasion occurs in DRX active time for CSI to be reported.[unneccesary text omitted]5.1.6.1.3 CSI-RS for mobility[unneccesary text omitted]If the UE is configured with DRX, the UE is not required to perform measurement of CSI-RS resources other than during the active time for measurements based on *CSI-RS-Resource-Mobility*. When the UE is configured to monitor DCI format 2\_6, the UE is not required to perform measurements other than during the active time and during the timer duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside active time based on *CSI-RS-Resource-Mobility*. If the UE is configured with DRX and DRX cycle in use is larger than 80 ms, the UE may not expect CSI-RS resources are available other than during the active time for measurements based on *CSI-RS-Resource-Mobility*. If the UE is configured with DRX and configured to monitor DCI format 2\_6 and DRX cycle in use is larger than 80ms, the UE may not expect that the CSI-RS resources are available other than during the active time and during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside active time for measurements based on *CSI-RS-Resource-Mobility.* Otherwise, the UE may assume CSI-RS are available for measurements based on *CSI-RS-Resource-Mobility*.[unneccesary text omitted]5.2.2.5 CSI reference resource definition[unneccesary text omitted]When DRX is configured, the UE reports a CSI report only if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement in DRX Active Time no later than CSI reference resource and drops the report otherwise. When the UE is configured to monitor DCI format 2\_6 and if the UE configured by higher layer parameter *ps-TransmitOtherPeriodicCSI* to report CSI with the higher layer parameter *reportConfigType* set to 'periodic' and *reportQuantity* set to quantities other than 'cri-RSRP' and 'ssb-Index-RSRP' when *drx-onDurationTimer* is not started, the UE shall report CSI during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside active time according to the procedure described in Clause 5.2.1.4 if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* outside DRX active time or in DRX Active Time no later than CSI reference resource and drops the report otherwise. When the UE is configured to monitor DCI format 2\_6 and if the UE configured by higher layer parameter *ps-TransmitPeriodicL1-RSRP* to report L1-RSRP with the higher layer parameter *reportConfigType* set to 'periodic' and *reportQuantity* set to 'cri-RSRP' or 'ssb-Index-RSRP' when *drx-onDurationTimer* is not started, the UE shall report L1-RSRP during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* also outside active time according to the procedure described in clause 5.2.1.4 and when *reportQuantity* set to '*cri-RSRP'* if receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement during the time duration indicated by *drx-onDurationTimer* in *DRX-Config* outside DRX active time or in DRX Active Time no later than CSI reference resource and drops the report otherwise. |

 |

# Reference

1. R1-2007821 Remaining issues on UE Power Saving CATT

1. R1-2007970 Remaining issues of Rel-16 power saving ZTE

1. R1-2008143 Remaining issues for Rel-16 UE power saving Samsung

1. R1-2008331 Remaining issues for Rel-16 UE power saving Huawei, HiSilicon

1. R1-2008509 Remaining issues on UE power saving MediaTek Inc.

1. R1-2008565 Maintenance for UE power saving Ericsson

1. R1-2008677 Remaining issues on UE power saving vivo

1. R1-2008732 On open issues related to Rel-16 UE power saving Nokia, Nokia Shanghai Bell