3GPP TSG-RAN WG2 Meeting #119-e ***R2-22xxxxx***

Electronic Meeting, August 17 – 29, 2022

**Agenda item:** 5.3.3

**Source: Huawei, HiSilicon**

**Title:** Summary of [AT119-e][302][Sdata] UP open issues and CR to 38.321 (Huawei)

**Document for:**  Discussion

# 1. Introduction

This document summarizes the following email discussion:

* [AT119-e][302][Sdata] UP open issues and CR to 38.321 (Huawei)

UP open issues and CR capturing agreed corrections

Deadline: To be set by rapporteur aiming to have company inputs and proposals by Friday

##### References:

*2-stepRACH during CG-SDT*

[R2-2207004](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207004 .zip) Issues for RA during CG-SDT procedure Samsung Electronics Co., Ltd     discussion Rel-17    NR\_SmallData\_INACTIVE-Core

[R2-2207359](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207359 .zip) cg-SDT-TimeAlignmentTimer maintenance during 2-step RA   Langbo   CR  Rel-17 38.321    17.1.0     1311       -      F NR\_SmallData\_INACTIVE-Core

[R2-2208266](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2208266.zip) Correction on CG-SDT Transmisson vivo CR Rel-17 38.321 17.1.0 1377 - F NR\_SmallData\_INACTIVE-Core Late

*LCH-restriction for CG-SDT*

[R2-2207901](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207901 .zip) LCH restrictions at SDT mode selection Nokia, Nokia Shanghai Bell, Ericsson, Huawei, HiSilicon, LGE CR  Rel-17    38.321 17.1.0     1351       -      F NR\_SmallData\_INACTIVE-Core

[R2-2208117](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2208117 .zip) LCH restrictions for CG-SDT       Ericsson discussion     Rel-17 NR\_SmallData\_INACTIVE-Core

*cg-SDT-TAT maintenance after receiving TAC MAC CE*

[R2-2207930](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207930 .zip) TAT maintenance for CG-SDT when receiving TAC MAC CE Huawei, Ericsson, HiSilicon, Nokia, Nokia Shanghai Bell, ZTE corporation    discussion     Rel-17 NR\_SmallData\_INACTIVE-Core

*CG-SDT retransmission on different CG configuration*

[R2-2207902](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207902 .zip) MAC procedure issues Nokia, Nokia Shanghai Bell CR  Rel-17    38.321    17.1.0 1352       -      F NR\_SmallData\_INACTIVE-Core

[R2-2207571](file:///C:\Users\admin\docs\R2-2207571.zip) Correction on SSB selection for CG-SDT        LG Electronics Inc.      discussion          NR\_SmallData\_INACTIVE-Core

[R2-2207572](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207572.zip)       CR for correction on SSB selection for CG-SDT     LG Electronics Inc.             CR        Rel-17   38.321  17.1.0   1325     -            F           NR\_SmallData\_INACTIVE-Core

*HARQ-Offset*

[R2-2207416](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207416.zip) Analysis on remaining issues for SDT CATT discussion Rel-17 NR\_SmallData\_INACTIVE-Core

*RSRP-based TA validation*

[R2-2207929](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207929.zip) Text Proposal for RSRP-based TA validation Huawei, HiSilicon discussion Rel-17 NR\_SmallData\_INACTIVE-Core

*cg-SDT-Timer handling*

[R2-2207001](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207001.zip) cg-SDT-TimeAlignmentTimer Handling Samsung Electronics Co., Ltd discussion Rel-17 NR\_SmallData\_INACTIVE-Core

*Editorials*

[R2-2208356](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2208356.zip) Correction on SR delay timer ASUSTeK discussion Rel-16 NR\_SmallData\_INACTIVE-Core

[R2-2207360](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207360 .zip) cg-SDT-TimeAlignmentTimer handling for RA-SDT Langbo   CR  Rel-17    38.321 17.1.0     1312       -      F NR\_SmallData\_INACTIVE-Core

[R2-2207815](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207815.zip) Correction on the stored RSRP for TA validation Xiaomi draftCR Rel-17 38.321 17.1.0 F NR\_SmallData\_INACTIVE-Core

*Issues have been dicsused before*

[R2-2208660](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2208660.zip) Clarification on uci-onPUSCH for CG-SDT vivo CR Rel-17 38.331 17.1.0 3462 - F NR\_SmallData\_INACTIVE-Core

[R2-2207573](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207573.zip) Clarification of Bj increment LG Electronics Inc. discussion NR\_SmallData\_INACTIVE-Core

[R2-2207906](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207906.zip) User plane issues for SDT NEC discussion Rel-17 NR\_SmallData\_INACTIVE-Core

# 2. Discussion

## 2.1 LCH restriction

[R2-2207901](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207901 .zip) LCH restrictions at SDT mode selection Nokia, Nokia Shanghai Bell, Ericsson, Huawei, HiSilicon, LGE CR  Rel-17    38.321 17.1.0     1351       -      F NR\_SmallData\_INACTIVE-Core

[R2-2208117](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2208117 .zip) LCH restrictions for CG-SDT       Ericsson discussion     Rel-17 NR\_SmallData\_INACTIVE-Core

R2-2207901 proposes the following two options

**OptionA**

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| --- |
| 2> if CG-SDT is configured on the selected UL carrier, and TA of the configured grant Type 1 resource is valid according to clause 5.27.2; and  2> if, for each RB having data available for transmission, *configuredGrantType1Allowed* is configured with value *true* for the corresponding logical channel; and  2> if at least one SSB configured for CG-SDT with SS-RSRP above *cg-SDT-RSRP-ThresholdSSB* is available:  3> indicate to the upper layers that the conditions for initiating SDT procedure are fulfilled;  3> perform CG-SDT procedure on the selected UL carrier according to clause 5.8.2. |

**OptionB**

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| 2> if CG-SDT is configured on the selected UL carrier, and TA of the configured grant Type 1 resource is valid according to clause 5.27.2; and  2> if, for at least one RB having data available for transmission, *configuredGrantType1Allowed* is configured with value *true* for the corresponding logical channel; and  2> if at least one SSB configured for CG-SDT with SS-RSRP above *cg-SDT-RSRP-ThresholdSSB* is available:  3> indicate to the upper layers that the conditions for initiating SDT procedure are fulfilled;  3> perform CG-SDT procedure on the selected UL carrier according to clause 5.8.2. |

**Moderator's Comments:**

The change only considered the case when the field *configuredGrantType1Allowed* is configured while does not consider the case when the LCH restriction is not applied. It also needs to consider the case when the field is not configured or the UE does not have the UE capability for LCH restriction. These issues can be fine-tuned during the CR review if companies think the change is needed.

**Question 1:** Do you agree with the proposed changes in R2-2207901 for adding LCH restriction can condition for SDT type selection? If yes, which option do you prefer?

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| --- | --- | --- | --- |
| Company | Yes/No | Option A or B | Comments |
| LG | Yes | A > B | proponent |
| ZTE | No | - | It should be kept in mind that the CG-SDT resource is a dedicated resource. If the UE has any data and a valid dedicated resource, it should use it. This is the common principle that we use. Otherwise, the dedicated resources are are wasted.  Even if the LCH restrictions prevent that all UP data can be mapped to CG resource, the UE still has data in the CCCH message which can be mapped to the CG resource. If the UE does not use the CG resource, then not only the dedicated resource is wasted, but the UE also consumes RACH, RAR, MSG3 resources all of which are redundant (since it can directly send the CCCH message in the dedicated CG resource using the valid TA instead). So, we think that the proposed change results in suboptimal performance and wastes the system resources.  We also think that the CG resource should only be configured for applications that are reasonably guaranteed to generate periodic traffic at known intervals. If there are too many CG occasions where no traffic is generated, then CG-SDT is not suitable for such application anyway. |
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## 2.2 TAT for CG-SDT when receiving TAC MAC CE

[R2-2207930](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207930 .zip) TAT maintenance for CG-SDT when receiving TAC MAC CE Huawei, Ericsson, HiSilicon, Nokia, Nokia Shanghai Bell, ZTE corporation    discussion     Rel-17 NR\_SmallData\_INACTIVE-Core

**Reason for change:**

**Issue1:** In terms of configuration, there is no dedicated configuration for the UE in RRC\_INACTIVE for TimeAlignmentTimer. There is TAT configuration in SIB1 but it is generally targeted for the use of TAT during initial access. It thus should be further confirmed on the TAT configuration

 **Issue2**: When TAT expires, it is possible that the UE is still within the CG-SDT procedure with running cg-SDT-TimeAlignmentTimer. While, when the timer expires, the following will happen. All the HARQ buffers of the UE will be cleared and configured grant resource will be discarded. This is not the intended UE behavior.

**Summary of change:**

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| 5.2 Maintenance of Uplink Time Alignment  RRC configures the following parameters for the maintenance of UL time alignment:  - timeAlignmentTimer (per TAG) which controls how long the MAC entity considers the Serving Cells belonging to the associated TAG to be uplink time aligned;  - inactivePosSRS-TimeAlignmentTimer which controls how long the MAC entity considers the Positioning SRS transmission in RRC\_INACTIVE in clause 5.26 to be uplink time aligned;  - cg-SDT-TimeAlignmentTimer which controls how long the MAC entity considers the uplink transmission for CG-SDT to be uplink time aligned.  The MAC entity shall:  1> when a Timing Advance Command MAC CE is received, and if an NTA (as defined in TS 38.211 [8]) has been maintained with the indicated TAG:  2> apply the Timing Advance Command for the indicated TAG;  2> if inactivePosSRS-TimeAlignmentTimer is configured and there is ongoing Positioning SRS Transmission in RRC\_INACTIVE as in clause 5.25:  3> start or restart the inactivePosSRS-TimeAlignmentTimer associated with the indicated TAG.  2> if CG-SDT procedure triggered as in clause 5.27 is ongoing:  3> start or restart the cg-SDT-TimeAlignmentTimer associated with the indicated TAG.  2> else:  3> start or restart the *timeAlignmentTimer* associated with the indicated TAG. |

**Question 2:** Do you agree that Legacy TAT is not started/restarted when TAC MAC CE is received during CG-SDT procedure?

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| Company | Yes/No | Comments |
| LG | No | This issue was discussed several times before, and RAN2 agreed to start/restart the legacy TAT when TAC MAC CE is received. We don’t see critical reason to revert the previous agreement.  Moreover, if the legacy TAT is not started/restarted, we are wondering how the UE behaves after receiving RRCResume message. Note that the network can send RRCResume message anytime during the CG-SDT procedure. As the UE stops CG-SDT-TAT at the reception of RRCResume message, and the legacy TAT is not running, the UE cannot transmit the RRCResumeComplete message. |
| ZTE | Yes |  |
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## 2.3 2-step RACH during CG-SDT

[R2-2207004](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207004 .zip) Issues for RA during CG-SDT procedure Samsung Electronics Co., Ltd     discussion Rel-17    NR\_SmallData\_INACTIVE-Core

[R2-2207359](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207359 .zip) cg-SDT-TimeAlignmentTimer maintenance during 2-step RA   Langbo   CR  Rel-17 38.321    17.1.0     1311       -      F NR\_SmallData\_INACTIVE-Core

[R2-2208266](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2208266.zip) Correction on CG-SDT Transmisson vivo CR Rel-17 38.321 17.1.0 1377 - F NR\_SmallData\_INACTIVE-Core Late

The issue with the current spec is that SR can sent with 2-step RACH during CG-SDT procedure, while the current RACH procedure has not considered this scenario. The following text proposal has been given in both 7004 and 7359.

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| 2> if the C-RNTI MAC CE was included in MSGA:  3> if the Random Access procedure was initiated for SpCell beam failure recovery or for beam failure recovery of both BFD-RS sets of SpCell (as specified in clause 5.17) and the PDCCH transmission is addressed to the C-RNTI:  4> consider this Random Access Response reception successful;  4> stop the *msgB-ResponseWindow*;  4> consider this Random Access procedure successfully completed.  3> else if the *timeAlignmentTimer* associated with the PTAG is running; or  3> if CG-SDT procedure is ongoing and *cg-SDT-TimeAlignmentTimer* is running:  4> if the PDCCH transmission is addressed to the C-RNTI and contains a UL grant for a new transmission:  5> consider this Random Access Response reception successful;  5> stop the *msgB-ResponseWindow*;  5> consider this Random Access procedure successfully completed. |

**Moderators Comments:**

* The TP is correct since the previous condition with legacy *TAT* is running cannot be satisfied during 2-step RACH procedure, although for 4-step RACH, it is possible that the legacy TAT is running between msg2 repcetion and msg4.

**Question 3:** Do companies agree that for msgB reception, if the C-RNTI MAC CE was included in MSGA and if the *cg-SDT-TimeAlignmentTimer* is running and if the PDCCH transmission is addressed to the C-RNTI and contains a UL grant for a new transmission, UE considers Random Access Response reception and random access procedure successfully completed?

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| Company | Yes/No | Comments |
| LG | Yes |  |
| ZTE | Yes |  |
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Another issue is how to start the *cg-SDT-TAT* when the 2-step RACH procedure is successful. For this issue, two options have been given

**OptionA in 7004 and 8266:**

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| 1> when an Absolute Timing Advance Command is received in response to a MSGA transmission including C-RNTI MAC CE as specified in clause 5.1.4a:  2> apply the Timing Advance Command for PTAG;  2> start or restart the *timeAlignmentTimer* associated with PTAG.  2> if CG-SDT procedure triggered as in clause 5.27 is ongoing:  3> start or restart the *cg-SDT-TimeAlignmentTimer* associated with PTAG. |

**OptionB in 7359:**

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| 1> when an Absolute Timing Advance Command is received in response to a MSGA transmission including C-RNTI MAC CE as specified in clause 5.1.4a:  2> apply the Timing Advance Command for PTAG;  2> if the CG-SDT procedure is ongoing:  3> start or restart the *cg-SDT-TimeAlignmentTimer* associated with PTAG.  2> else  3> start or restart the *timeAlignmentTimer* associated with PTAG. |

**Moderator's Comments:**

- Within the two proposals, the TP from 7001 proposes to start both the legacy TAT and cg-SDT-TAT when 2-step RACH is successful. While the TP from 7359 proposes to start only the cg-SDT-TAT.

- For the current spec, for 4-step RACH, when contention resolution is successful, the *cg-SDT-TAT* is started/restarted while the legacy TAT is stopped.

- Hence, if we want to be consistent with the current spec with 4-step RACH, the legacy TAT should not be started when 2-step RACH is successful

**Question 4:** Do you agree that *cg-SDT-TimeAlignmentTimer* should be restarted at successful completion of 2-step RACH? If yes, which option do you prefer?

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| Company | Yes/No | OptionA or B | Comments |
| LG | Yes | A | But selection between two options depends on the outcome of Q2. It’s better to align the behavior between 2-step and 4-step RACH. |
| ZTE | Yes | Option B | Prefer to have consistent behaviour with 4-step RACH. |
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## 2.4 CG-SDT timer handling

[R2-2207001](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207001.zip) cg-SDT-TimeAlignmentTimer Handling Samsung Electronics Co., Ltd discussion Rel-17 NR\_SmallData\_INACTIVE-Core

As shown in the following figure, *cg-SDT-TimeAlignmentTimer* can expire even before the UE has transmitted the initial UL transmission including CCCH message. This can happen due to longer CG periodicity and the longer interval between the time RRC Release message is received and CG-SDT procedure initiation.

The consequence of this is that UE will enter RRC\_IDLE.

If UE has checked whether there is sufficient time available to transmit the initial UL transmission using CG resource before the cg-SDT-TimeAlignmentTimer expires, the problem could have been avoided as UE could have initiated RA-SDT instead of CG-SDT.



**Potential Solution:**

* Before initiating CG-SDT UE can check for the availability of CG occasion corresponding to a SSB with SS-RSRP above *cg-SDT-RSRP-ThresholdSSB* during the remaining time of cg-SDT-TimeAlignmentTimer. If CG occasion is not available during the remaining time of cg-SDT-TimeAlignmentTimer, UE does not initiate CG-SDT.

**Moderator's Comments:**

- it seems impossible to predict whether there is any SSB above the RSRP threshold during the remaining time of *cg-SDT-TimealignmentTimer*, unless the UE stops the transmission and wait for the timer to expire.

**Question 5:** Do you agree that before initiating CG-SDT UE checks for the availability of CG occasion corresponding to a SSB with SS-RSRP above cg-SDT-RSRP-ThresholdSSB during the remaining time of cg-SDT-TimeAlignmentTimer. If CG occasion is not available, UE does not initiate CG-SDT?

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| Company | Yes/No | Comments |
| LG | Comments | We think this issue can be solved by UE implementation. However, if companies want to clarify, we are ok to have a note something like “the UE may not initiate CG-SDT procedure if the CG occasion is not available during the remaining time of cg-SDT-TimeAlignmentTimer”. |
| ZTE | May be No | The intention is fine. However, it can be covered in the highlighted sentence (i.e. “TA of the configured grant Type 1 resource is valid” refers to the TA is valid in the occasion of the CG type 1 resource).  If majoritiy companies think clarification is needed, then maybe we can try the clarification as follow  2> if CG-SDT is configured on the selected UL carrier, and TA of the configured grant Type 1 resource is valid in the corresponding CG occasion according to clause 5.27.2; and |
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## 2.5 TA validation for CG-SDT

[R2-2207929](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207929.zip) Text Proposal for RSRP-based TA validation Huawei, HiSilicon discussion Rel-17 NR\_SmallData\_INACTIVE-Core

This contribution discusses two issues related to TA validation for CG-SDT:

Issue1: currently the MAC spec captures the TA validation condition as follows:

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| 5.27.2 TA Validation for CG-SDT  RRC configures the following parameters for validation for CG-SDT:  *- cg-SDT-RSRP-ChangeThreshold*: RSRP threshold for the increase/decrease of RSRP for time alignment validation.  The MAC entity shall, upon the reception of CG-SDT configuration:  1> store the RSRP of the downlink pathloss reference derived based on the *measObject* configured for the Serving Cell as in TS 38.331 [5].  The MAC entity shall consider the TA of the initial CG-SDT transmission with CCCH message to be valid when the following conditions are fulfilled:  1> The RSRP values for the stored downlink pathloss reference and the current downlink pathloss reference are valid according to TS 38.133 [11]; and  1> Compared to the stored downlink pathloss reference RSRP value, the current RSRP value of the downlink pathloss reference calculated as specified in TS 38.133 [11] has not increased/decreased by more than *cg-SDT-RSRP-ChangeThreshold*, if configured; and  1> *cg-SDT-TimeAlignmentTimer* is running. |

This means that whenever the UE receives the CG-SDT configuration in RRCRelease message, the UE shall derive the pathloss reference based on the measObject. However, for the current RRC spec, only when the UE is released from RRC\_CONNECTED to RRC\_INACTIVE, the UE has the measObject configuration.

The proponent thinks that measObject configuration can be restored from the UE AS context when the CG-SDT configuration is received. The following text proposal has been given:

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| 1> if the RRCRelease includes suspendConfig:  2> reset MAC and release the default MAC Cell Group configuration, if any;  2> apply the received suspendConfig except the received nextHopChainingCount;  2> if the sdt-Config is configured:  3> for each of the DRB in the sdt-DRB-List:  4> consider the DRB to be configured for SDT;  3> if sdt-SRB2-Indication is configured:  4> consider the SRB2 to be configured for SDT;  3> for each RLC bearer that is not suspended:  4> re-establish the RLC entity as specified in TS 38.322 [4];  3> for SRB2 (if it is resumed) and for SRB1:  4> trigger the PDCP entity to perform SDU discard as specified in TS 38.323 [5];  3> if sdt-MAC-PHY-CG-Config is configured:  4> restore the *measObject* configuration for the serving cell within the UE's Inactive AS context;  4> if *sdt-MAC-PHY-CG-Config* was not configured before the reception of the RRCRelease message:  5> configure the PCell with the configured grant resources for SDT and instruct the MAC entity to start the cg-SDT-TimeAlignmentTimer; |

**Question 6:** Do you agree that the measObject configuration should be restored when the UE derives the pathloss reference upon receiving CG-SDT configuration?

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| Company | Yes/No | Comments |
| LG | No | We think the linkage to “measObject” should be removed. This is aligned with the last meeting agreement.   1. For RSRP-based TA validation that there is no need for a condition for “if measObject is configured”   Please note that positioning SRS transmission case 5.26.2 does not have such linkage to “measObject”.  The MAC entity shall:  1> if the UE receives configuration for SRS transmission in RRC\_INACTIVE:  2> store the RSRP of the downlink pathloss reference with the current RSRP value of the downlink pathloss reference as in TS 38.331 [5]. |
| ZTE | No | For the CG SDT without cell change, we can assume the measurement object is always here.  However, if RRC release is sent after cell reselection and RA-SDT, then it is possible that there is no measurement object for current serving cell since UE has never enter connected mode in current serving cell. |
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Another issue, according to the current RRC spec, whenever *sdt-MAC-PHY-CG-Config* is received, the UE shall trigger the lower layer to start or restart the *cg-SDT-TimeAlignmentTimer*. This is needed for two cases: (a) when the UE is released from RRC\_CONNECTED to RRC\_INACTIVE; (b) when the UE is in RRC\_INACTIVE and it receives CG-SDT configuration by RRCRelease message. Hence, the UE should start the CG-SDT TAT when the CG-SDT configuration is initially received

For this issue, the following text proposal has been given:

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| 1> if the RRCRelease includes suspendConfig:  2> reset MAC and release the default MAC Cell Group configuration, if any;  2> apply the received suspendConfig except the received nextHopChainingCount;  2> if the sdt-Config is configured:  3> for each of the DRB in the sdt-DRB-List:  4> consider the DRB to be configured for SDT;  3> if sdt-SRB2-Indication is configured:  4> consider the SRB2 to be configured for SDT;  3> for each RLC bearer that is not suspended:  4> re-establish the RLC entity as specified in TS 38.322 [4];  3> for SRB2 (if it is resumed) and for SRB1:  4> trigger the PDCP entity to perform SDU discard as specified in TS 38.323 [5];  3> if sdt-MAC-PHY-CG-Config is configured:  4> restore the *measObject* configuration for the serving cell within the UE's Inactive AS context;  4> if *sdt-MAC-PHY-CG-Config* was not configured before the reception of the *RRCRelease* message:  5> configure the PCell with the configured grant resources for SDT and instruct the MAC entity to start the cg-SDT-TimeAlignmentTimer; |

**Question 7:** Do you agree to Start/Restart the CG-SDT TAT from RRC’s perspective only when the UE initially receives the CG-SDT configuration in *RRCRelease* message?

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| --- | --- | --- |
| Company | Yes/No | Comments |
| LG | No | RAN2 already agreed to start/restart the CG-SDT-TAT whenever RRCRelease including CG-SDT configuration is received. We don’t see the reason to revert the RAN2 agreement and limit it to only initial transition case. |
| ZTE | No | CG-SDT TAT should be started whenever CG-SDT is configured in RRC release message, even in case delta configuration is used. |
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## 2.6 CG-SDT retransmission on different CG configuration

[R2-2207902](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207902 .zip) MAC procedure issues Nokia, Nokia Shanghai Bell CR  Rel-17    38.321    17.1.0 1352       -      F NR\_SmallData\_INACTIVE-Core

The following issue has been mentioned: In section 5.8.2: Since the NW can configure multiple CG configurations for CG-SDT, the NW can utilize different TBS in those different CG configurations and allow, e.g., different sets of LCHs access through certain configurations.

Currently, UE autonomous re-tx is allowed for initial CG-SDT transmission, however, the UE should select only the CG configuration used in the initial transmission to ensure the TBS size for the re-tx is the same as used for the initial transmission.

Based on the above, the following text proposal has been provided:

|  |
| --- |
| For an uplink grant configured for configured grant Type 1 for CG-SDT on the selected uplink carrier as in clause 5.27, when CG-SDT is triggered and not terminated, for each configured uplink grant valid according to TS 38.214 [7] for which the above formula is satisfied, the MAC entity shall:  1> if, after initial transmission for CG-SDT with CCCH message has been performed according to clause 5.4.1, PDCCH addressed to the MAC entity's C-RNTI has not been received, and the SSB corresponding to the configured UL grant has the same SSB index as the SSB selected for initial transmission for CG-SDT with CCCH message (i.e., retransmission of initial transmission of CG-SDT); and  1> if the configured uplink grant is the same as used for the initial transmission:  2> indicate the SSB index corresponding to the configured uplink grant to the lower layer;  2> consider this configured uplink grant as valid. |

**Moderator's Comments:**

* If retransmission is allowed on CG resources, it is for sure that the transmission must be performed on the resource with the same transport format. Indeed, this has not been well reflected in the current spec.
* But the current text already has similar part of spec to capture this. In section 5.4.2.2, we have the following spec originally captured for NRU. Hence from the moderator’s point of view it is better to be captured in this part of spec.

|  |
| --- |
| 5.4.2.2 HARQ process Each HARQ process is associated with a HARQ buffer.  New transmissions are performed on the resource and with the MCS indicated on PDCCH or indicated in the Random Access Response (i.e. MAC RAR or fallbackRAR), or signalled in RRC or determined as specified in clause 5.1.2a for MSGA payload. Retransmissions are performed on the resource and, if provided, with the MCS indicated on PDCCH, or on the same resource and with the same MCS as was used for last made transmission attempt within a bundle, or on stored configured uplink grant resources and stored MCS when *cg-RetransmissionTimer* or *cg-SDT-RetransmissionTimer* is configured. If *cg-RetransmissionTimer* is configured, retransmissions with the same HARQ process may be performed on any configured grant configuration if the configured grant configurations have the same TBS. |

* Another issues that is worth to be discussed is the definition of “same uplink grant as used for initial transmission”. It can be open to a lot of different interpretations. From the moderator’s point of view, as long as the transport format is the same with the initial transmission and the HARQ process ID are the same, it should be allowed for the UE to transmit on this CG occasion.

**Question 8:** Do you agree that any configured uplink grant with the same transport format and the HARQ process ID as the initial CG-SDT transmission can be used for CG retransmission?

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| --- | --- | --- |
| Company | Yes/No | Comments |
| LG | No | We are wondering why the network configures multiple CG configurations having same TBS with different periodicity using the same HARQ process.  Thus, we are ok with Nokia proposal. However, Nokia proposal does not solve the problem where the CG has different SSB index from SSB index for initial CG-SDT, as explained in R2-2207571. Actual change should be discussed together with Q9. |
| ZTE | Yes | It is clear that HARQ retransmission can be performed on any configured grant configuration if the configured grant configurations have the same TBS.  However, since we don’t have HARQ ID indicator in UCI, additional restriction may be required that the configured uplink grant is mapped to the same HARQ process as used for the initial CG transmission.  For example:  1> if, after initial transmission for CG-SDT with CCCH message has been performed according to clause 5.4.1, PDCCH addressed to the MAC entity's C-RNTI has not been received, and the SSB corresponding to the configured UL grant has the same SSB index as the SSB selected for initial transmission for CG-SDT with CCCH message (i.e., retransmission of initial transmission of CG-SDT); and  1> if the configured uplink grant is mapped to the same HARQ process as used for the initial transmission: |
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[R2-2207571](file:///C:\Users\admin\docs\R2-2207571.zip) Correction on SSB selection for CG-SDT        LG Electronics Inc.      discussion          NR\_SmallData\_INACTIVE-Core

[R2-2207572](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207572.zip)       CR for correction on SSB selection for CG-SDT     LG Electronics Inc.             CR        Rel-17   38.321  17.1.0   1325     -            F           NR\_SmallData\_INACTIVE-Core

It is mentioend that for retransmission of initial CG-SDT, the intended behaviour is as followings

* If initial CG-SDT has not been Acked and if the SSB corresponding to the CG grant has the same SSB index as the SSB selected for initial CG-SDT, the MAC entity shall indicate the SSB index to lower layer and consider the configured grant as valid.
* If initial CG-SDT has not been Acked and if the SSB corresponding to the CG grant does not have the same SSB index as the SSB selected for initial CG-SDT, the MAC entity does not perform anything.

Currently, however, as long as SS-RSRP of any SSB of CG is above *cg-SDT-RSRP-ThresholdSSB*, the MAC entity always indicates the SSB index of CG and considers the CG is valid.

In RAN2#116-e, RAN2 agreed that the UE is allowed to initiate subsequent UL data transmission only after the reception of confirmation of initial transmission from the gNB. Thus, if the UE has not been received the Ack for initial CG-SDT at CG#1, this behaviour is not reasonable and we don’t think this is the intended behaviour.

Based on the above, the following TP has been provided:

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| --- |
| 1> if, after initial transmission for CG-SDT with CCCH message has been performed according to clause 5.4.1, PDCCH addressed to the MAC entity's C-RNTI has not been received:  2> if the SSB corresponding to the configured UL grant has the same SSB index as the SSB selected for initial transmission for CG-SDT with CCCH message (i.e., retransmission of initial transmission of CG-SDT):  3> indicate the SSB index corresponding to the configured uplink grant to the lower layer;  3> consider this configured uplink grant as valid. |

**Question 9:** Do you agree to separate conditions checking Ack of initial CG-SDT and checking SSB index as initial CG-SDT’s.

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| --- | --- | --- |
| Company | Yes/No | Comments |
| LGE | Yes | (We put “if” in front of the separated bullet)  If initial CG-SDT has not been Acked and the SSB corresponding to the CG grant does not have the same SSB index as the SSB selected for initial CG-SDT, i.e., yellow condition is met but green condition is not met, the procedure enter into cyan condition. Then, if cyan condition is met, the UE performs magenta procedure.  The consequence is that the MAC entity uses wrong CG grant to perform retransmission of the initial transmission.    Therefore, the yellow condition and green condition should be checked separately  Additionally, above Nokia’s text in Q8 can be considered together with our proposal. |
| ZTE | Yes |  |
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R2-2207571 also thinks that the conditions for checking availability of the SSB with SS-RSRP above cg-SDT-RSRP-ThresholdSSB are redundant, and the following TP has been given:

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| 1> else if at least one SSB corresponding to the configured uplink grant with SS-RSRP above the *cg-SDT-RSRP-ThresholdSSB* is available:  2> if this is the initial transmission of CG-SDT with CCCH message after the CG-SDT procedure is initiated as in clause 5.27 (i.e., initial transmission for CG-SDT):  3> select an SSB with SS-RSRP above *cg-SDT-RSRP-ThresholdSSB* amongst the SSB(s) associated with the configured grant.  2> else if PDCCH addressed to C-RNTI has been received after the initial transmission of CG-SDT with CCCH message (i.e., subsequent new transmission for CG-SDT):  3> if SS-RSRP of the SSB selected for the previous transmission for CG-SDT is above *cg-SDT-RSRP-ThresholdSSB* and this SSB is associated with this configured grant:  4> select this SSB.  3> else:  4> select an SSB with SS-RSRP above *cg-SDT-RSRP-ThresholdSSB* amongst the SSB(s) associated with the configured grant.  2> indicate the SSB index to the lower layer;  2> consider this configured uplink grant as valid.  1> else if PDCCH addressed to C-RNTI after the initial transmission of the CG-SDT with CCCH message has been received:  2> initiate Random Access procedure in clause 5.1. |

**Question10:** Do you agree the conditions for checking availability of the SSB with SS-RSRP above cg-SDT-RSRP-ThresholdSSB are redundant?

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| --- | --- | --- |
| Company | Yes/No | Comments |
| LGE | Yes | We think same conditions are checked redundantly. |
| ZTE | Yes |  |
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## 2.7 HARQ offsets

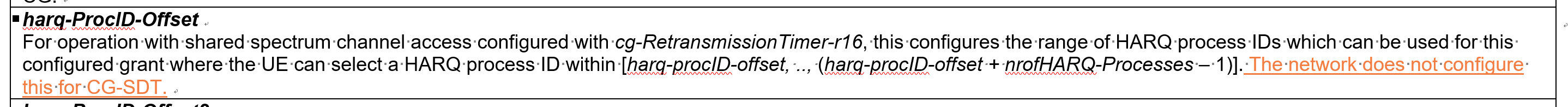
[R2-2207416](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207416.zip) Analysis on remaining issues for SDT CATT discussion Rel-17 NR\_SmallData\_INACTIVE-Core

The above contribution mentioned that in RAN2#116e-meeting [3], it was agreed that:

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| --- |
| 8. The Rel-16 calculation on the HARQ process ID of the CG type-1 for licensed band is reused as the baseline for CG-SDT |

According to the agreement, the HARQ process ID for licensed band is applied for CG-SDT. Then, it should be clarified that *harq-ProcID-Offset* which is used for HARQ process ID calculation in NR-U can’t be used in CG-SDT. Otherwise, it may cause confusion especially.

For the above argument, the following text proposal has been given:



**Moderator's Comments:**

* In R16, *harq-ProcID-Offset* and *harq-ProcID-Offset2* was introduced for NRU and URLLC, respectrively, but with different purposes
* *Harq-ProcID-Offset* was introduced for NRU mainly for the purpose of configuring the CG resources with the same transport format for a certain range of HARQ process id that it allows retransmission on CG resources on these HARQ process id. While from the field description, it seems already clear that the field can only work with CGRT, which already excludes its use in SD.
* *Harq-ProcID-Offset2* was introduced for IIOT for transporting different types of services on different CG resources.

**Question 11:** Do you agree that the field *harq-ProcID-Offset* can be configured for SDT?

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| --- | --- | --- |
| Company | Yes/No | Comments |
| LG | No | It seems that the question is written in opposite way. We think the field harq-ProcID-Offset CANNOT be configured for SDT, as proposed by CATT. |
| ZTE | Yes | Since we allow to configure multiple CG grant (e.g. to allow the configuration of multiple CG occasion within one CG period), the configuration of harq-ProcID-Offset should be allowed. |
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## 2.8 Issues have been discussed before

[R2-2207906](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207906.zip) User plane issues for SDT NEC discussion Rel-17 NR\_SmallData\_INACTIVE-Core

At RAN2 #118e, to avoid unnecessary triggering of RA when none of the SSB is above the RSRP threshold for CG-SDT SSB selection, it was agreed that when none of the SSB is above the RSRP threshold for CG-SDT SSB selection, UE triggers legacy SR/RACH only when there is UL data available:

**Agreement of RAN2 #118e**

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| --- |
| 1. When none of the SSB is above the RSRP threshold for CG-SDT SSB selection, UE triggers legacy SR/RACH when there is UL data available |

However, the behaviour of checking whether there is UL data available is not captured in the spec:

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| --- |
| 1> else if PDCCH addressed to C-RNTI after the initial transmission of the CG-SDT with CCCH message has been received:  2> initiate Random Access procedure in clause 5.1. |

Based on the above, 7906 has provided the following text proposal:

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| --- |
| 1> else if PDCCH addressed to C-RNTI after the initial transmission of the CG-SDT with CCCH message has been received:  2> if at least one RB configured for SDT having data available for transmission:  3> initiate Random Access procedure in clause 5.1. |

**Question 12:** Do you agree that the proposed changes in R2-2207906 is needed to add “at least one RB configured for SDT having data available for transmission as condition to initiate RACH?

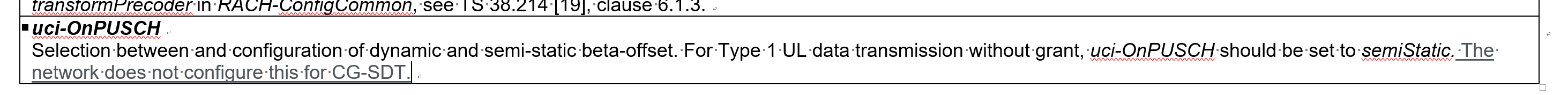
|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comments |
| LG | Yes | But, not essential. |
| ZTE | Yes | The intention seems fine. Wording can be improved (e.g. “if at least one RB configured for SDT has data available for transmission”) |
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[R2-2208660](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2208660.zip) Clarification on uci-onPUSCH for CG-SDT vivo CR Rel-17 38.331 17.1.0 3462 - F NR\_SmallData\_INACTIVE-Core

This discussion points out that, in the previous RAN2 agreement, it was agreed that,

* Do not support uci-onPUSCH for SDT. Inform RAN1 this and any other agreements

However, this agreement is not captured in the RRC spec. Hence, the following chagne is proposed



**Question 13:** Do you agree that we need to capture in the RRC spec in the field description of *uci-OnPUSCH* that it cannot be configured for CG-SDT?

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| Company | Yes/No | Comments |
| LG | Yes |  |
| ZTE | Yes |  |
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[R2-2207573](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207573.zip) Clarification of Bj increment LG Electronics Inc. discussion NR\_SmallData\_INACTIVE-Core

This issue has been discussed in the last R2 meeting on whether a note is needed. Previously, the moderator thinks that the current note has already covered the previous issue mentioned for unnecessary Bj increment. And there is no difference for the issue mentioned here for SDT and the case of RRC\_CONNECTED.

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| NOTE: The exact moment(s) when the UE updates *Bj* between LCP procedures is up to UE implementation, as long as *Bj* is up to date at the time when a grant is processed by LCP. |

**Question 14:** Do you agree that we need to add the note for Bj increment?

* **NOTE: UE doesn’t update Bj in RRC\_INACTIVE when there is no SDT procedure ongoing.**

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| --- | --- | --- |
| Company | Yes/No | Comments |
| LG | Yes | Proponent. |
| ZTE | Yes |  |
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## 2.9 Editorials

[R2-2208356](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2208356.zip) Correction on SR delay timer ASUSTeK discussion Rel-16 NR\_SmallData\_INACTIVE-Core

[R2-2207360](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207360 .zip) cg-SDT-TimeAlignmentTimer handling for RA-SDT Langbo   CR  Rel-17    38.321 17.1.0     1312       -      F NR\_SmallData\_INACTIVE-Core

[R2-2207815](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207815.zip) Correction on the stored RSRP for TA validation Xiaomi draftCR Rel-17 38.321 17.1.0 F NR\_SmallData\_INACTIVE-Core

[R2-2207902](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207902 .zip) MAC procedure issues Nokia, Nokia Shanghai Bell CR  Rel-17    38.321    17.1.0 1352       -      F NR\_SmallData\_INACTIVE-Core

[R2-2207416](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_119-e\Docs\R2-2207416.zip) Analysis on remaining issues for SDT CATT discussion Rel-17 NR\_SmallData\_INACTIVE-Core

**Moderator's Comments:**

The following tdocs mainly contain editorial issues. The moderator would recommend these issues to be covered by the CR review.

If companies think any issue needs to have more formal discussion, comments and suggestions are welcomed.

**Question 15**: Do companies agree that we can review the editorial issues in R2-2208356, R2-2207571, R2-2207572, R2-2207360, R2-2207815, R2-2207902, and R2-2207416 in the CR review?

|  |  |  |
| --- | --- | --- |
| Company | Essential Correction Yes/No | Comments |
| LG | Comments | **8356 AsusTek**  We support the CR, but we think “if configured” is not needed.  **7360 Langbo**  Not needed.  **7815 Xiaomi**  Not needed. In RAN2#118e, RAN2 agreed following:  *(b)  The pathloss reference for CG-SDT can be updated by any TAC received when CG-SDT is configured, even for the TAC received during RA-SDT procedure. (5/20 supports it)*  =>  Not support it  **8902 Nokia**  The change for “logicalChannelSR-DelayTimer” is not needed, because the logicalChannelSR-DelayTimer itself is a timer.  The SSB related issues are discussed in 2.6.  The issues of triggering legacy RA procedure during RA-SDT procedure, we think it is not needed, because dynamic UL grant will be provided after RA completion.  **7416 CATT**  P1: Should be discussed in 2.6.  P2: Ok  P3/P4: Ok.  P5: Ok. (as in 2.7)  P6: Ok. |
| ZTE | Yes |  |
|  |  |  |

# 3. Summary

TBD