3GPP TSG-RAN WG2 Meeting #115 electronic [R2-2108834](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108834.zip)

Online, August, 2021

Source: Session Chair (InterDigital)

Title: Report for Rel-17 Small data and URLLC/IIoT

**Email discussions:**

* [AT115e][500] Organizational Diana – URLLC/IIoT, Small data]

Scope:

* + - Share plans for the meetings and list of ongoing email discussions for the sessions related to URLLC/IIoT, Small data and NR-U, 2-step RACH, and power saving
    - Share meetings notes and agreements for review and endorsement
* [AT115e][501][Sdata] Summary of UP (LG)

Thursday night inputs by all companies, Friday proposals by rapporteur, Monday comments on final proposals

* [AT1145e][502][Sdata] Summary of RA aspects (Oppo)

Thursday night inputs by all companies, Friday proposals by rapporteur, Monday comments on final proposals

# 8 Rel-17 NR Work Items

## 8.5 NR IIoT URLLC

(NR\_IIOT\_URLLC\_enh-Core; leading WG: RAN2; REL-17; WID: RP-210854)

Time budget: 1 TU

Tdoc Limitation: 3 tdocs

Email max expectation: 4 threads

### 8.5.1 Organizational

Rapporteur input including [Post114-e][509][URLLC/IIoT] Running Stage 2 CR review (Nokia)

[R2-2108019](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108019.zip) Summary of Email Discussion [Post114-e][509][URLLC/IIoT] Running Stage 2 CR review (Nokia) Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_IIOT\_URLLC\_enh

[R2-2108020](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108020.zip) Stage-2 Running CR for Rel-17 IIoT/URLLC Nokia, Nokia Shanghai Bell CR Rel-17 38.300 16.6.0 0383 - B NR\_IIOT\_URLLC\_enh

=> The CR is endorsed and will continue over email

### 8.5.2 Enhancements for support of time synchronization

Including email discussion [Post114-e][512][URLLC/IIoT] T-synch open issues (Intel)

RAN1 progress if any should be taken into account. Contributions should aim to bring new issues not covered in email discussions already and should be clearly separated in the document from issues covered in email discussions.

[R2-2108296](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108296.zip) Report of email discussion [Post114-e][512][URLLC/IIoT] T-synch open issues (Intel) Intel Corporation discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

Proposal 1: Support of network pre-compensation can be left up to network implementation. RAN2 agrees to introduce signalling to enable/disable UE-side PDC.

- Ericsson thinks that UE side PDC should be supported

- Qualcomm doesn’t think TA based compensation is feasible at the NW as it doesn’t have enough information. Intel explain that gNB may not be able to track but it does have means to have accurate views.

- Samsung doesn’t think that there is a gain of network based pre-compensation

Proposal 3

- ZTE would also like to support SIB based signalling for some scenarios.

=> Noted

**Agreements**

1. RAN2 assumes that gNB can perform pre-compensation. RAN2 agrees to introduce signalling to enable/disable UE-side PDC.
2. The gNB can enable/disable UE-side PDC via unicast-RRC signalling for Rel-17
3. RAN2 shall wait for RAN1 to decide the measurement framework for RTT based PDC method and does not preclude UE-side PDC or gNB based pre-compensation at this point. RAN2 is expecting guidance from RAN1 on what is needed.
4. UE Assistance information from the UE which could for example be used by gNB to activate PDC is not supported
5. Implicit activation of UE-side PDC when a pre-configured threshold is met is not supported
6. UE-based trigger for TA update or RACH procedure for PDC are deprioritized for Release 17

Not treated

[R2-2107116](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107116.zip) Triggered Synchronization Activation CANON Research Centre France discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core Late

[R2-2107152](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107152.zip) Discussion about time synchronization enhancements Huawei, HiSilicon discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2107528](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107528.zip) RE: LS on Time Synchronization IEEE 1588 WG LS in To:RAN, SA Cc:RAN2

[R2-2107556](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107556.zip) Propagation Delay Compensation for TSN Qualcomm Incorporated discussion Rel-17

[R2-2107736](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107736.zip) Consideration on the support of time synchronization enhancement OPPO discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2107741](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107741.zip) Remaining issues on time synchronization and PDC ZTE Corporation, Sanechips, China Southern Power Grid Co., Ltd discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2107800](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107800.zip) Discussion on propagation delay compensation vivo discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2107897](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107897.zip) Left issues for propagation delay compensation Lenovo, Motorola Mobility discussion Rel-17

[R2-2108021](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108021.zip) Time Synchronization Signalling Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_IIOT\_URLLC\_enh

[R2-2108097](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108097.zip) Summary of PDC Issues Ericsson discussion

[R2-2108168](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108168.zip) Discussion on RAN enhancement to support propagation delay compensation China Telecommunications discussion Rel-17

[R2-2108258](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108258.zip) Issues on Propagation Delay Compensation Samsung discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2108436](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108436.zip) Leftover aspects on Timing Synchronization Intel Corporation discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2108547](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108547.zip) Support of time synchronization for TSN based on RAN1 progress CMCC discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2108553](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108553.zip) Discussion on enhancements for support of time synchronization LG Electronics Inc. discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core [R2-2106433](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2106433.zip)

[R2-2108793](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108793.zip) Discussion on the PDC support for IDLE or CONNECTED Xiaomi Communications discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2108803](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108803.zip) Timing synchronization for UE in RRC\_INACTIVE state and RRC\_IDLE state TCL Communication Ltd. discussion Rel-17 NR\_IIOT\_URLLC\_enh [R2-2106324](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2106324.zip)

[R2-2108815](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108815.zip) Discussion on uplink time synchronization for TSN NTT DOCOMO, INC. discussion Rel-17 [R2-2100781](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2100781.zip)

### 8.5.3 Uplink enhancements for URLLC in unlicensed controlled environments

Including [Post114-e][510][URLLC/IIoT] Open issues for UCE

Contributions should aim to bring new issues not covered in email discussions already and should be clearly separated in the document from issues covered in email discussions.

[R2-2108231](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108231.zip) Summary of [Post114-e][510][URLLC/IIoT] Open issues for UCE MediaTek Inc. discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core Late

=> Noted

**Proposals that are easily agreeable:**

*Proposal 4 (21/21): The same HARQ PID selection rule applies to all CGs when HARQ processes are shared between multiple CG configurations with overlapping CG occasions with the same TBS. No specification change is foreseen.*

- CATT doesn’t think we can agree to this right away as it depends on proposal 2 and 5 and we may end up with different rule.

**Proposal requiring further discussion:**

*Proposal 2 (14/22): When lch-basedPrioritization and cg-RetransmissionTimer are both configured, HARQ process ID selection behaviour for a single configured grant configuration is unchanged from Rel-16.*

- Huawei thinks that there are two split options, 1) keep unchanged 2) prioritize high priority data 3) give network freedom to chose between these two options (i.e. configure the UE).

- InterDigital thinks that the Rel-16 baseline was not considering URLCC traffic and with Rel-17 we have a new scenario and we shouldn’t just re-use rel-16. The comprise from HW can be acceptable

- Nokia thinks that if something can be resolved by gNB implementation we should rely on gNB and we shouldn’t enhance further. Can accept the compromise. Mediatek agrees with Nokia and we shouldn’t increase complexity on UE by adopting both.

- Apple thinks URLCC scenario should be addressed and option 2 would be preferable but can compromise.

- Ericsson thinks if we support option 2, then we can make it configurable.

- Lenovo supports option 2, but would be ok to have option 3 and it wouldn’t increase UE complexity.

- Qualcomm also supports option 3. Intel, CATT, also support

=> When lch-basedPrioritization and cg-RetransmissionTimer are both configured, the gNB can configure the UE whether it follows Rel-16 baseline or whether it prioritizes high priority data

Proposal 5: When HARQ processes are shared between multiple overlapping CG occasions with the same TBS, the UE follows the prioritization rules and which CG occasion actually transmits the data is not visible to the gNB. No specification change is foreseen

- CATT doesn’t see any difference between this case and the previous case. We should have the same rule. Lenovo agrees. Mediatek thinks that the UE should select based on the previous agreement but the network doesn’t know.

- Vivo asks if the same PID can be selected. Mediatek thinks that the UE can. Lenovo thinks that would be a bad implementation.

Proposal 6 (16/21): If cg-RetransmissionTimer is configured and autonomousTx is not configured, a deprioritized MAC PDU is not transmitted in a subsequent CG occasion using the Rel-16 URLLC autonomous transmission mechanism. However, autonomous retransmission based on Rel-16 NR-U behaviour can still take place.

Proposal 7 (9/21): If cg-RetransmissionTimer is configured and autonomousTx is not configured, the cg-RetransmissionTimer is not stopped when the associated CG is deprioritized.

**Agreements**

1. When cg-RetransmissionTimer is not configured, Rel-16 URLLC mechanism is used for HARQ process ID and RV selection
2. When cg-RetransmissionTimer and lch-basedPrioritization are configured, for overlapping CGs that do not share HARQ processes, the MAC entity prioritizes the initial transmission of higher priority data over autonomous retransmission of lower priority data. No specification change is foreseen
3. The same HARQ PID selection rule applies to all CGs when HARQ processes are shared between multiple CG configurations with non-overlapping CG occasions and with the same TBS. No specification change is foreseen
4. It is up to NW implementation to appropriately configure CGs that share HARQ processes with autonomousTx. No specification change is foreseen
5. When lch-basedPrioritization and cg-RetransmissionTimer are both configured, the gNB can configure the UE per MAC entity whether it follows Rel-16 baseline or whether it prioritizes high priority data when selecting HARQ PID for a CG (i.e. option 2 is configurable).
6. The same HARQ PID selection rule applies to all CGs when HARQ processes are shared between multiple CG configurations with overlapping CG occasions with the same TBS. No specification change is foreseen

Not treated

[R2-2107153](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107153.zip) Remaining issues about Uplink enhancements for URLLC in UCE Huawei, HiSilicon discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2107201](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107201.zip) Sequential processing of autonomous retransmission and lch-based prioritization CATT discussion NR\_IIOT\_URLLC\_enh-Core

[R2-2107202](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107202.zip) Time-based HPID for gNB-scheduled dynamic retransmissions CATT discussion NR\_IIOT\_URLLC\_enh-Core

[R2-2107557](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107557.zip) CG Harmonization for Unlicensed Controlled Environment Qualcomm Incorporated discussion Rel-17

[R2-2107737](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107737.zip) Consideration on URLLC over NR-U OPPO discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2107801](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107801.zip) Remaining issues about autonomous re-transmission vivo discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2107896](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107896.zip) Further details on enhancements for URLLC in UCE Lenovo, Motorola Mobility discussion Rel-17

[R2-2108022](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108022.zip) Remaining Issues of URLLC in NR-Unlicensed Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_IIOT\_URLLC\_enh

[R2-2108098](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108098.zip) Harmonizing UL CG enhancements in NR-U and URLLC Ericsson discussion

[R2-2108270](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108270.zip) Further Consideration On the URLLC transmission in UCE ZTE Corporation discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2108667](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108667.zip) IIoT operation in unlicensed controlled environment InterDigital discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2108674](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108674.zip) Uplink enhancements for URLLC in unlicensed controlled environments Intel Corporation discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2108748](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108748.zip) Remaining issues of harmonizing UL CG enhancements for IIoT in UCE III discussion NR\_IIOT\_URLLC\_enh-Core

[R2-2108758](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108758.zip) Issues on Prioritization in UCE Samsung discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2108794](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108794.zip) Remaining issues of CG harmonization Xiaomi Communications discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core [R2-2105724](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2105724.zip)

[R2-2108810](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108810.zip) Retransmission of UCI-only MAC PDU LG Electronics UK discussion NR\_IIOT\_URLLC\_enh-Core

### 8.5.4 RAN enhancements based on new QoS

Including [Post114-e][511][URLLC/IIoT] QoS Solutions (Samsung)

Contributions should aim to bring new issues not covered in email discussions already and should be clearly separated in the document from issues covered in the email discussion

RAN enhancements based on new QoS related parameters taken into account SA2 progress

[R2-2107173](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107173.zip) Report from email discussion [Post114-e][511][URLLC/IIoT] QoS Solutions (Samsung) Samsung Electronics GmbH report

=> Noted

**Agreements**

1. RAN2 does not assume that physical HARQ-NACK messages are always available, i.e. RAN2 will not mandate explicit HARQ-NACK feedback
2. Given the application message size range under study, RAN2 will not optimize the ST design based on case of segmentation of message into multiple TBs. (This does not preclude the use of RLC segmentation; instead, it rules out optimizations for the case with RLC segmentation)
3. Following entry into the Survival Time state, PDCP duplication for ST configuration is activated. The gNB pre-configures which RLC entities can be activated for duplication when entering ST state. FFS the number of supported RLC entities.
4. RAN2 will at least continue working and discussing the HARQ NACK solution. Details are FFS.

*Proposal 2*

*Given the application message size range under study, RAN2 will not optimize the ST design based on case of segmentation of message into multiple TBs. (This does not preclude the use of RLC segmentation; instead, it rules out optimizations for the case with RLC segmentation)*

- apple is concerned that there are cases where we will have to do segmentation. Samsung explains that we agreed to a TB size of 50bytes and this won’t happen so often so it’s not an eissue.

III. The RLC entities which will be activated for duplication when entering ST state should be pre-configured. FFS the number of supported RLC entities. (16/17)

IV. Following entry into the Survival Time state, the pre-configured PDCP duplication configuration is activated. (16/18)

- Sequans points out that there may be packets already sent to RLC and we need to deal with duplication in that case. Vivo, Apple and LG agrees.

*Proposals for quick online discussion and confirmation:*

V. Reception of N>=1 consecutive DCI messages carrying a retransmission grant (i.e. containing NDI which is not toggled) is adopted as indication of a “HARQ NACK”, and triggers entry into ST state. (11/17)

VI. N is configurable and is not limited to N = 1. (14/18)

VII. UE-based reactive solution based on Tx-side timer are deprioritized in R17. (12/18)

- ZTE doesn’t think it is an issue of prioritization or de-prioritization. HARQ NACK option is not always reliable. ZTE would like to consider combing the two options, use the timer and HARQ NACK? InterDigital agrees with ZE, Vivo, and oppo agrees. Intel prefers a solution that looks at both.

- Ericsson points out that there is a technical issue with tx-side timer that it requires feedback for each message and thus resource inefficient.

- LG thinks that tx-side timer is not clear yet and different companies.

*Proposals for further discussion:*

VIII. RAN2 to discuss whether action(s) that a UE performs upon exiting the ST state are under network control, or include a normative aspect.

IX. RAN2 to discuss whether ST state exit should be gNB controlled or include a normative aspect (e.g. timer; counting successive successful transmissions).

X. RAN2 to discuss whether additional actions (other than duplication activation) should be supported for a UE in the ST state (e.g. relaxation of LCP restrictions; L1/L2 configuration adaptation), and whether any additional standardisation effort is needed for this.

XI. RAN2 to choose between following methods for activating the PDCP duplication:

- retransmission grant

- CG activation grant

- autonomous activation on the part of UE

Not treated

[R2-2107154](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107154.zip) Discussion on two-level PERs for survival time handling Huawei, HiSilicon discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2107174](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107174.zip) Entering, operating in, and exiting the Survival Time state Samsung Electronics GmbH discussion

[R2-2107203](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107203.zip) UE-based reactive solution for survival time CATT discussion NR\_IIOT\_URLLC\_enh-Core

[R2-2107558](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107558.zip) RAN Enhancement to support Survival Time QUALCOMM Europe Inc. - Italy discussion Rel-17

[R2-2107611](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107611.zip) Reliability enhancements for CG/SPS Apple discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2107612](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107612.zip) Further considerations on survival time for new QoS Apple discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2107658](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107658.zip) L1/L2 configuration adaptation Fujitsu discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2107738](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107738.zip) Consideration on RAN enhancement based on new QoS OPPO discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2107742](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107742.zip) Remaining issues on enhanced QoS ZTE Corporation, Sanechips, China Southern Power Grid Co., Ltd discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2107802](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107802.zip) Consideration on reactive solution for survival time vivo discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2107806](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107806.zip) Further discussions on RAN enhancements based on Survival Time III discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2107895](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107895.zip) Discuss on the mechanism to guarantee the survival time Lenovo, Motorola Mobility discussion Rel-17

[R2-2108023](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108023.zip) Analysis of Potential RAN Enhancements for Survival Time Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_IIOT\_URLLC\_enh

[R2-2108099](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108099.zip) RAN enhancements based on new QoS related parameters Ericsson discussion

[R2-2108169](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108169.zip) Discussion on RAN enhancement to support new QoS China Telecommunications discussion Rel-17

[R2-2108435](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108435.zip) UE-based Survival time handling Intel Corporation discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2108457](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108457.zip) ST handling with alternating CC allocations Sequans Communications discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2108459](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108459.zip) Discussion on avoiding prematurely entering Survival Time state Futurewei Technologies discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2108516](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108516.zip) Discussion on the RAN support for new QoS parameters CMCC discussion Rel-17 NR\_IIOT\_URLLC\_enh

[R2-2108666](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108666.zip) Enhancements based on new QoS requirements InterDigital discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core

[R2-2108786](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108786.zip) Progress of QoS LG Electronics UK discussion NR\_IIOT\_URLLC\_enh-Core

[R2-2108795](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108795.zip) Clarification on the survival time requirement Xiaomi Communications discussion Rel-17 NR\_IIOT\_URLLC\_enh-Core [R2-2105725](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2105725.zip)

## 8.6 Small Data enhancements

(NR\_SmallData\_INACTIVE-Core; leading WG: RAN2; REL-17; WID: RP-210870)

Time budget: 1.5 TU

Tdoc Limitation: 5 tdocs

Email max expectation: 5 threads

### 8.6.1 Organizational

In coming LSs, rapporteur input for email discussions summaires etc (tdocs in this don’t count towards tdoc limit).

Inputs expected for 38.321 CR (Huawei), 38.331 CR (ZTE), 38.300 CR (Nokia)

Including [Post114-e][504][SData] Running Stage 2 CR review (Nokia), [Post114-e][505][SData] RRC/MAC modeling and RRC running CR (ZTE), and [Post114-e][506][SData] Running MAC CR (Huawei)

[R2-2106923](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2106923.zip) LS on the physical layer aspects of small data transmission (R1-2106335; contact: ZTE) RAN1 LS in Rel-17 NR\_SmallData\_INACTIVE-Core To:RAN2

- ZTE points that we need to discuss what would be the mechanisms if we were to support NR-U

=> Companies are encouraged to think of unlicensed operations for next meetings

=> Noted

[R2-2106931](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2106931.zip) Reply LS on small data transmission (R3-212820; contact: Ericsson) RAN3 LS in Rel-17 NR\_SmallData\_INACTIVE-Core To:RAN2

=> Noted

[R2-2108242](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108242.zip) Stage-2 running CR Introduction of SDT Nokia, Nokia Shanghai Bell CR Rel-17 38.300 16.6.0 0357 2 B NR\_SmallData\_INACTIVE-Core [R2-2105877](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2105877.zip)

=> The CR is endorsed and will continue over email discussion

[R2-2107486](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107486.zip) Summary: [Post114-e][505][SData] RRC/MAC modeling and RRC running CR (ZTE) ZTE Corporation (Rapporteur) report

- ZTE explains that the CRs are implemented according to these models

- Intel will not have visibility on the data of suspended bearers and it won’t be able to identify the right bearers. One solution is to capture in RRC, not as if statements but rather as statements. ZTE acknowledges that there are some things that AS needs to be aware of this and if RRC is aware, why not MAC. Huawei agrees that if the RRC knows it then the MAC should know it by implementation.

- CATT, LG, Vivo, Xiaomi also thinks that this operation/check should be in the RRC and MAC doesn’t have visibility on the data volume. One option is to resume the DRB and then the MAC has visibility, but there are concerns to resume DRB. Other option is to calculate in the RRC.

- Apple is concerned that we have separate data checks for CG and RA. LG points out that we still need to discuss whether we have different thresholds. Samsung explain that we have discussed in the past and we agreed to only one but if there was a big support we could revisit.

- Samsung thinks it should be in the RRC.

- Qualcomm thinks that it should be done in the MAC layer. Lenovo agrees.

- Ericsson thinks that some indication has to come from the RRC as the resumes and initiates and MAC evaluates the criteria.

=> FFS whether to move the SDT or/non-SDT data volume threshold to RRC

=> Handling of CG-TAT is moved into MAC spec

[R2-2107496](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107496.zip) Summary of [Post114-e][506][SData] Running MAC CR (Huawei) Huawei, HiSilicon discussion Rel-17 NR\_SmallData\_INACTIVE-Core Late

=> Noted

[R2-2107478](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107478.zip) RRC Running CR for SDT ZTE Corporation (rapporteur) draftCR Rel-17 38.331 16.5.0 B NR\_SmallData\_INACTIVE-Core [R2-2105927](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2105927.zip)

=> The CR is endorsed and will continue to be discussed over email discussion

[R2-2107494](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107494.zip) Running MAC CR for small data Huawei, HiSilicon draftCR Rel-17 38.321 16.5.0 B NR\_SmallData\_INACTIVE-Core Late

=> The CR is endorsed and will continue to be discussed over email discussion

[R2-2107495](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107495.zip) Remaining issue for MAC spec Huawei, HiSilicon discussion Rel-17 NR\_SmallData\_INACTIVE-Core Late

=> Noted

### 8.6.2 User plane common aspects

Overall user plane procedure for SDT (including triggering and thresholds, HARQ, and MAC CEs), data volume computation,. suppression of PDCP status report, RSRP threshold for SDT selection, switching between CG/RA

[R2-2108729](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108729.zip) Remaining untreated proposals from [AT113bis-e][501] UP SDT open issues LG Electronics Inc. (Rapporteur) report Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2106310](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2106310.zip)

*Proposal 6: Data volume used for SDT selection criteria is calculated as the total sum of Buffer Size across SDT RBs (i.e. PDCP data volume + RLC data volume, without considering RLC and MAC headers)*

- NEC is concerned about suspended data bearers as they can’t be counted as PDCP PDUs

- Intel supports proposal 6 and is not sure why companies want to change. Ericsson is good with option 1 or 3.

- QC, Apple, CMCC, Samsung, Lenovo are good with option 1

- Apple agrees it’s a model issues. RRC awareness of the BS amount can be up to UE implementation.

*Proposal 2: RAN2 discuss further whether the UE can implicitly disable PDCP status report when the UE initiates SDT procedure. (13/14)*

*Proposal 5: RAN2 discuss further whether the RLC failure handling should be supported for SDT. (11/13)*

- The question is whether we have it for RLC will trigger it or not

*Proposal 8: RAN2 discuss further whether and how the LCH restriction is used for SDT (12/12/12).*

*Proposal 11: Whether to support BFD and BFR for SDT is up to RAN1 decision.*

- Samsung thinks that RAN1 should resolve but we need to inform RAN1. LG thinks that RAN2 should discuss BFR before we send something to RAN. Vivo asks if we should consider RLM. Lenovo doesn’t think that need to discuss it in RAN2 and just inform RAN1. Intel, Oppo, and Ericsson agree with Lenovo.

- Apple thinks that we should discuss RRM/RLM together. Qualcomm agrees with Apple.

- Huawei thinks that this is linked to PDCCH monitoring.

- ZTE thinks that the system works without BFD, RLM, RRM but RAN1 can discuss

=> Noted

**Agreements**

- Data volume used for SDT selection criteria is calculated as the total sum of Buffer Size across SDT RBs (i.e. same approach as BSR)

[R2-2109039](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2109039.zip) Summary of 8.6.2 SDT UP open issues LG

=> Moved to email discussion and revised in R2-21xxxx

Not treated

[R2-2107002](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107002.zip) User Plane Common Aspects of RACH and CG based SDT Samsung Electronics Co., Ltd discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107053](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107053.zip) Further Discussion on User Plane Aspect for Small Data Transmission vivo discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2104760](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2104760.zip)

[R2-2107055](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107055.zip) Handling of non-SDT Data Arrival vivo discussion NR\_SmallData\_INACTIVE-Core

[R2-2107245](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107245.zip) Discussion on the remianing issues of SDT modelling OPPO discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107246](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107246.zip) Discussion on user plane issues of SDT OPPO discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107295](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107295.zip) User Plane leftover issues on SDT mechanism Intel Corporation discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107464](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107464.zip) Switching during a SDT procedure FGI, Asia Pacific Telecom discussion

[R2-2107487](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107487.zip) Common aspects for UP for SDT ZTE Corporation, Sanechips discussion

[R2-2107778](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107778.zip) User plane aspects of SDT NEC discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107844](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107844.zip) User plane aspects of small data transmission InterDigital, Europe, Ltd. discussion Rel-17

[R2-2107898](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107898.zip) The UP common issues for small data transmissions Lenovo, Motorola Mobility discussion Rel-17

[R2-2107991](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107991.zip) UP common aspects of SDT Qualcomm Incorporated discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108055](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108055.zip) User Plane aspects of SDT in NR Sony discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2105690](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2105690.zip)

[R2-2108087](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108087.zip) Common aspects for SDT Ericsson discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108200](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108200.zip) User plane common aspects for SDT Huawei, HiSilicon discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108508](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108508.zip) UP common issues of SDT CMCC discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108680](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108680.zip) Consideration on PDCP protocol in SDT CATT discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108681](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108681.zip) Consideration on UP common aspects of SDT CATT discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108710](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108710.zip) BSR and PHR for SDT procedure ASUSTeK discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108730](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108730.zip) Remaining UP issues in SDT LG Electronics Inc. discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2106311](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2106311.zip)

[R2-2108788](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108788.zip) Discussion on the data volume computation Xiaomi Communications discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108789](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108789.zip) Handling of MAC CE Xiaomi Communications discussion Rel-17 NR\_SmallData\_INACTIVE-Core

### 8.6.3 Control plane common aspects

NOTE: expected input: paper containing the remaining proposals not discussed as part of [Post113-e][503] from rapporteur to be treated.

Focus contributions on FFS and topics that are not relying on inputs from RAN3/SA3/CT1

Cell reselection and failure handling, handling of subsequent data transmissins (including, how to indicate presence of subsequent data, etc) handling of non-SDT DRBs (including whether to resume or not non-SDT), CP data over SDT, SDT termination and data loss prevention

Including [Post114-e][507][SData] Non-SDT data arrival handling (Intel)

[R2-2107292](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107292.zip) Report of email discussion [Post114-e][507][SData] Non-SDT data arrival handling Intel Corporation discussion Rel-17 NR\_SmallData\_INACTIVE-Core Late

=> Noted

**General topics on the switch from SDT to CONNECTED**

*Proposal 1. [To agree] [14/16] No new solution is defined to prevent data loss or duplication for the scenario where the anchor relocation is required in the middle of an SDT session, i.e. network can rely on releasing the UE back into RRC\_INACTIVE.*

*Proposal 3. [To agree] [13/16] [option 2.c)] The PDCP entities of only the non-SDT RBs are re-established (i.e. not for the SDT RBs) unless any new security keys are derived during the switch from SDT to CONNECTED (i.e. when UE receives RRCResume message during an SDT session). Current signalling (e.g. resume) can be used by the network to re-establish these PDCP entities as required.*

- ZTE it means SDT RBs are reestablished during the RRCResume procedure for SDT, and non-sDT bearers are restablished after moving to connected (same as today)

- Huawei thinks We agree the key point is that PDCP entities are not re-established for SDT RBs in case keys were not changed (e.g. Resume is received after anchor relocation and we can continue to use the same keys for SDT RBs)

**Failure handling during ongoing SDT session**

*Proposal 16. [To agree] Events that trigger a termination or failure of an ongoing SDT session: [12/16] [event 1)] cell reselection, [12/16] [event 2)] expiry of the SDT failure detection timer and [10/16] [event 4)] Maximum number of retransmissions is reached in RLC*

- CATT and Samsung think that event 4 is not essential and other events can cover event 4. LG thinks that this is not needed.

- ZTE thinks that if we support RLC AM we shouldn’t change the operation just for SDT. Maybe we don’t need to do anything with the trigger is another point. Ericsson agrees and it is simpler to reuse RLC functionality. Huawei has same view. InterDigital, Apple, Lenovo also agrees and we shouldn’t have spec impacts.

*Proposal 17. [To agree] [13/16] The aim is to define a common UE behaviour, if possible, when any of the agreed trigger events from Proposal 16 lead to an abrupt termination/failure of an SDT session.*

*Proposal 21. [To agree] [15/16] [Approach 1)] When a UE detects a failure of an ongoing SDT session, UE transitions autonomously into RRC\_IDLE (as baseline solution).*

- Sony and Apple doesn’t like this option. Intel explains that there was a majority view to go with proposal 21. ZTE also thinks that we don’t have time to further optimize.

- Samsung, QC, Xiaomi, Oppo, supports proposal 21

- Nokia doesn’t think going to Idle is good if this happens often.

**Non-SDT data handling during ongoing SDT session**

*Proposal 19. [To discuss] The mechanism to switch UE into CONNECTED when non-SDT data is detected during an ongoing SDT session meets the following principles:*

*Proposal 19.1. [Principle 1] PDCP COUNT is not reset. Note: Principle 1 is applicable to DCCH-based approach and related to the topics discussed in Proposal 6 / Proposal 8 for CCCH-based approach.*

*Proposal 19.2. [Principle 2] No new security key is derivated i.e. UE continues to use the security keys generated after the 1st RRCResumeRequest. Note: Principle 2 is applicable to DCCH-based approach and related to the topics discussed in Proposal 7 / Proposal 8 for CCCH-based approach.*

- LG indicates that what’s important is whether the UE terminates the ongoing SDT or not and what UE behaviour we can allow.

Proposal 20. [To discuss] Discuss preferred approach to switch into CONNECTED upon non-SDT is detected during an ongoing SDT session considering [7/16] via CCCH-based approach (with related technical details summarized in Proposal 4 to Proposal 11’) or [10/16] via DCCH-based approach (with related technical details summarized in Proposal 11 to Proposal 15).

**Agreements**

1. No new solution is defined to prevent data loss or duplication for the scenario where the anchor relocation is required in the middle of an SDT session, i.e. network can release UE back into RRC\_INACTIVE
2. PDCP entities of only the non-SDT RBs are re-established (i.e. not for the SDT RBs) when the UE moves from RRC\_INACTIVE with SDT session ongoing to RRC CONNECTED.
3. Events that trigger a termination or failure of an ongoing SDT session 1) cell reselection, 2) expiry of the SDT failure detection timer, 3) when Max retx is reached in RLC. RLC AM max retransmission functionality remains unchanged.
4. When a UE detects a failure of an ongoing SDT session, UE transitions autonomously into RRC\_IDLE (as baseline solution). If time allows or have a ready solution we can consider further optimizations.

[R2-2108665](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108665.zip) Untreated proposal from [Post113-e][503] InterDigital discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2106051](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2106051.zip)

Not treated

[R2-2107003](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107003.zip) Control Plane Common Aspects of RACH and CG based SDT Samsung Electronics Co., Ltd discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107054](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107054.zip) Discussion on RRC-Controlled Small Data Transmission vivo discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2104761](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2104761.zip)

[R2-2107247](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107247.zip) Discussion on control plane issues of SDT OPPO discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107293](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107293.zip) Control Plane leftover issues on SDT mechanism Intel Corporation discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107294](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107294.zip) Expected duration and applicable features for SDT procedure Intel Corporation discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107463](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107463.zip) Issues of the Subsequent Data Transmission FGI, Asia Pacific Telecom discussion

[R2-2107488](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107488.zip) Common aspects for CP for SDT ZTE Corporation, Sanechips discussion

[R2-2107491](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107491.zip) Control plane common aspects for SDT Huawei, HiSilicon discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107493](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107493.zip) Discussion on the NAS aspects of Small Data Huawei, HiSilicon discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107580](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107580.zip) Power Saving for SDT Apple discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107581](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107581.zip) Non-SDT handling during the SDT procedure Apple discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107582](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107582.zip) Control plane aspects on the SDT procedure Apple discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107659](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107659.zip) Handling of SDTF detection timer Fujitsu discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2104981](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2104981.zip)

[R2-2107660](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107660.zip) RAN paging reception and response during SDT Fujitsu discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2104982](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2104982.zip)

[R2-2107779](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107779.zip) Control plane aspects of SDT NEC discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107866](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107866.zip) Consideration on switching to non-SDT procedure LG Electronics Inc. discussion NR\_SmallData\_INACTIVE-Core

[R2-2107868](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107868.zip) Consideration on security issue on CCCH-based approach LG Electronics Inc. discussion NR\_SmallData\_INACTIVE-Core

[R2-2107899](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107899.zip) Discussion on CP data transmission over SDT Lenovo, Motorola Mobility discussion Rel-17

[R2-2107992](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107992.zip) CP common aspects of SDT Qualcomm Incorporated discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2105885](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2105885.zip)

[R2-2108006](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108006.zip) Discussion on some FFSes Potevio Company Limited discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108009](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108009.zip) Paging reception during SDT Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_SmallData\_INACTIVE-Core Revised

[R2-2108056](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108056.zip) Discussion on subsequent SDT in NR Sony discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108088](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108088.zip) SDT Faliure Handling Ericsson discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108089](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108089.zip) CP aspects for SDT Ericsson discussion

[R2-2108261](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108261.zip) SDT control plane aspects Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_SmallData\_INACTIVE

[R2-2108262](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108262.zip) RRC procedure for SDT Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_SmallData\_INACTIVE

[R2-2108327](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108327.zip) SDT cell re-selection Convida Wireless other Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2106040](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2106040.zip)

[R2-2108506](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108506.zip) Consideration on control plane issues CMCC discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108591](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108591.zip) Paging reception during SDT Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2108009](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108009.zip)

[R2-2108682](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108682.zip) Consideration on CP issues CATT discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108731](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108731.zip) Non-SDT data arrival handling LG Electronics Inc. discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108790](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108790.zip) Paging reception during SDT Xiaomi Communications discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108816](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108816.zip) Handling of abrupt termination for SDT ZTE Wistron Telecom AB discussion Rel-17

### 8.6.4 Aspects specific to RACH based schemes

RA resource configuration and selection, PDCCH monitoring after successful SDT RA completion, RAN2 specific details of context fetch/data forwarding with and without anchor relocation

**To be treated second week of meeting**

[R2-2107004](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107004.zip) RACH configuration for Small Data Transmission. Samsung Electronics Co., Ltd discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107005](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107005.zip) Further Details of RACH bsaed Small Data Transmission Samsung Electronics Co., Ltd discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107056](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107056.zip) Supporting Small Data Transmission via RA Procedure vivo discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2104763](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2104763.zip)

[R2-2107248](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107248.zip) Discussion on RACH-based SDT OPPO discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107296](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107296.zip) RACH leftover issues on SDT mechanism Intel Corporation discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107354](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107354.zip) Discussion on RACH-based SDT Spreadtrum Communications discussion Rel-17

[R2-2107465](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107465.zip) PDCCH monitoring in RA-SDT FGI, Asia Pacific Telecom discussion

[R2-2107489](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107489.zip) Open issues for RA-SDT ZTE Corporation, Sanechips discussion

[R2-2107583](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107583.zip) RACH specific SDT procedure Apple discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107780](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107780.zip) Aspects specific to RACH based schemes NEC discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107993](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107993.zip) Open issues for RACH based SDT Qualcomm Incorporated discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2105886](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2105886.zip)

[R2-2108057](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108057.zip) Discussion on context fetch and anchor relocation Sony discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2105692](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2105692.zip)

[R2-2108058](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108058.zip) RACH-based SDT in NR Sony discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2105693](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2105693.zip)

[R2-2108085](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108085.zip) RACH based small data transmission Ericsson discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108199](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108199.zip) Small data transmission with RA-based schemes Huawei, HiSilicon discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108243](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108243.zip) Details of RACH specific schemes Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108507](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108507.zip) Discussion on RA-SDT CMCC discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108683](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108683.zip) Transition from SDT to RRC\_CONNECTED CATT discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108702](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108702.zip) Discussion on RA-based small data transmission Google Inc. discussion Rel-17 NR\_SmallData\_INACTIVE-Core Late

[R2-2108711](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108711.zip) Discussion on fallback to non-SDT ASUSTeK discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108712](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108712.zip) Discussion on PDCCH monitoring for RA-SDT ASUSTeK discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108713](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108713.zip) Discussion on RA configuration reception ASUSTeK discussion Rel-17 NR\_SmallData\_INACTIVE-Core

### 8.6.5 Aspects specific to CG based schemes

Including [Post114-e][508][SData] Open issues for CG-SDT (Qualcomm)

Contributions should aim to bring new issues not covered in email discussions already and should be clearly separated in the document from issues covered in the email discussion.

CG resources, configuration and selection, validity of CG resources, multiple CG configurations, handling of beam selection for CG (including association between CGs and SSBs) etc.

[R2-2107930](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107930.zip) Report of [Post114-e][508][SData] Open issues for CG-SDT Qualcomm Incorporated discussion Rel-17 NR\_SmallData\_INACTIVE-Core

*Proposal 5: MAC PDU rebuilding (if required) can be left to UE implementation when RACH procedure is initiated during the subsequent CG transmission phase. (25/25)*

- Nokia thinks that we should avoid rebuilding and if we do rebuild we shouldn’t leave it up to implementation. Ericsson has a similar comment to Nokia and some of the failure cases depend on whether we rebuild or not. We should discuss when and if the MAC PDU can be rebuilt.

- LG indicates that if we allow switch from CG to RA for initial transmission then we can allow but we don’t think it should be allowed. ZTE also thinks that rebuilding is not needed. Samsung, Nokia, Xiaomi, agree with ZTE. Sony also thinks that we should discuss proposal 3.

- Intel thinks that there may be a case where the UE should be allowed to send the CCCH transmission over RA-SDT and we shouldn’t prohibit

Proposal 3: During subsequent CG transmission phase, UE can initiate RACH procedure. (22/25) FFS on what conditions.

- Sony and LG don’t think the UE should switch to RA. InterDigital thinks that it may be inevitable that the CG grant is not valid (e.g. TA not valid) and in that case the UE should switch to RA.

- ZTE thinks that this is not for initial and there is no re-building.

*Proposal 9: UE should release CG-SDT resource (if stored) when UE initiates RRC resume procedure from another cell which is different from the cell in which the RRCRelease is received. (25/25)*

- LG asks what happens when the UE just does reselection and doesn’t initial Resume. Intel and ZTE thinks that the UE keeps it in case it ping pongs between cells. LG is also good to keep it

**Agreements:**

1. If none of the SSBs’ RSRP is above the RSRP threshold of CG-SDT criteria in the type selection phase, UE should select RA-SDT if RA-SDT criteria is met
2. MAC PDU rebuilding is not required (unless we find a case that is needed)
3. During subsequent CG transmission phase (i.e. after the UE has received response from NW) UE can initiate at least legacy RACH procedure (e.g. trigger due to no UL resources). No MAC PDU rebuilding is required. FFS if the RA-SDT RA resources can be used for subsequent data.
   1. At least the following conditions are agreed: (1) no qualified SSB when the evaluation is performed; (2) when TA is invalid; (3) when SR is triggered due to lack of UL resource
4. UE should release CG-SDT resource (if stored) when UE initiates RRC resume procedure from another cell which is different from the cell in which the RRCRelease is received.
5. The C-RNTI previously configured in RRC\_CONNECTED state is used for UE to monitor PDCCH in CG-SDT.
6. CS-RNTI based dynamic retransmission mechanism can be reused for CG-SDT. FFS whether CS-RNTI is the same one as the one previously configured in RRC\_CONNECTED or a new CS-RNTI one is provided to the UE
7. During the subsequent new CG transmission phase, for the purpose of CG resource selection, UE re-evaluates the SSB for subsequent CG transmission. FFS what happens if no SSBs are valid or if no sample is available
8. From RAN2 perspective, at least the following parameters should be included in the CG-SDT configuration. FFS whether these parameters are common for multiple CG-SDT configurations or per CG-SDT configuration.

• The new TA timer in RRC\_INACTIVE;

• The RSRP change threshold for TA validation mechanism in SDT (details dependent on RAN1);

• The SSB RSRP threshold for beam selection (i.e. UE selects the beam and associated CG resource for data transmission).

**The following proposals need further discussion:**

Proposal 2: During the subsequent CG transmission phase, for the purpose of CG resource selection, UE re-evaluates the SSB for subsequent CG transmission. (18/25) FFS the case that UE cannot finish SSB evaluation before next CG occasion.

- Nokia thinks it doesn’t need to be for every CG transmission and RAN4 will specify the requirements.

- ZTE asks what happens if there are no SSB. If none of them then the UE considers that no UL grant will be delivered to the HARQ processs. Qualcomm thinks that the UE should use the latest SSB. Vivo agrees with Qualcomm

- ZTE thinks that the option is to select any SSB or to trigger RACH based SR.

- Huawei thinks that we should align with proposal 1 and Lenovo agrees with Huawei. If there is no sample available we use the current CG resource.

- Samsung thinks that the UE should use the latest measurement.

Proposal 6: A new timer is introduced for UE PDCCH monitoring after CG/DG transmission for CG-SDT. FFS on the detailed behavior of new timer. (18/24)

- Nokia asks what the timer is for. Oppo agrees with Nokia. ZTE also thinks we should first discuss what the timer is for.

Proposal 7: If proposal 6 is not agreed, RAN2 further discusses whether to reuse the existing timer from one of the following two options.

(1) drx-RetransmissionTimerUL;

(2) cg-RetransmissionTimer.

Proposal 8: RAN2 should further discuss whether the PDCCH monitoring timer should start after each transmission scheduled by CG or DG. (19/23)

Proposal 12: The parameters in Rel-15 ConfiguredGrantConfig and rrc-ConfiguredUplinkGrant can be reused in the CG-SDT configuration as baseline. (19/24) FFS on whether the parameters of srs-ResourceIndicator, pathlossReferenceIndex and repK are needed or not. FFS on whether NR-U related parameters are need or not. RAN2 can send an LS to check with RAN1 for further input.

Proposal 13: From RAN2 perspective, at least the following parameters should be included in the CG-SDT configuration. (21/24) FFS whether these parameters are common for multiple CG-SDT configurations or per CG-SDT configuration.

• The new TA timer in RRC\_INACTIVE;

• The RSRP change threshold for TA validation mechanism in SDT;

• The SSB RSRP threshold for beam selection (i.e. UE selects the beam and associated CG resource for data transmission).

Proposal 14: RAN2 can send an LS to ask RAN1 for further input on the CG parameters for CG-SDT.

[R2-2107006](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107006.zip) Details of Configured Grant based Small Data Transmission Samsung Electronics Co., Ltd discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107057](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107057.zip) Supporting Small Data Transmission via CG PUSCH vivo discussion NR\_SmallData\_INACTIVE-Core

[R2-2107249](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107249.zip) Discussion on CG-based SDT OPPO discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107297](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107297.zip) CG-SDT leftover aspects Intel Corporation discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107440](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107440.zip) Discussion on CG-SDT Request by UE NEC Telecom MODUS Ltd. discussion [R2-2106012](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2106012.zip)

[R2-2107490](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107490.zip) Open issues for CG-SDT ZTE Corporation, Sanechips discussion

[R2-2107492](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107492.zip) CG-based schemes for SDT Huawei, HiSilicon discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107584](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107584.zip) CG specific SDT procedure Apple discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2107661](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107661.zip) PDCCH monitoring and SDT-TAT Fujitsu discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2004983](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2004983.zip)

[R2-2107788](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107788.zip) Discussion on beam selection aspect for CG-SDT PANASONIC R&D Center Germany discussion

[R2-2107850](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107850.zip) CG-based SDT selection and configuration InterDigital, Europe, Ltd. discussion Rel-17

[R2-2107867](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107867.zip) Consideration on open issues of CG-SDT LG Electronics Inc. discussion NR\_SmallData\_INACTIVE-Core

[R2-2107900](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107900.zip) Consideration on CG based small data transmission Lenovo, Motorola Mobility discussion Rel-17

[R2-2107994](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107994.zip) Open issues for CG based SDT Qualcomm Incorporated discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108010](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108010.zip) Aspects specific to CG based SDT Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_SmallData\_INACTIVE

[R2-2108059](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108059.zip) CG-based SDT in NR Sony discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2105694](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2105694.zip)

[R2-2108086](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108086.zip) Details of CG based SDT Ericsson discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108509](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108509.zip) Consideration on CG-SDT CMCC discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108630](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108630.zip) Discussion on CG small data transmission Google Inc. discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108684](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108684.zip) Analysis and views on CG-SDT CATT discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108714](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108714.zip) Discussion on CS-RNTI for CG-SDT ASUSTeK discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108791](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108791.zip) RACH failure in subsequent data transmission phase Xiaomi Communications discussion Rel-17 NR\_SmallData\_INACTIVE-Core

[R2-2108792](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108792.zip) Remaining issues of CG SDT in RAN2 Xiaomi Communications discussion Rel-17 NR\_SmallData\_INACTIVE-Core [R2-2104223](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2104223.zip)

## 8.18 RACH indication and partitioning

Time budget: Equivalent to 0.5-1 TU

Tdoc Limitation: 1 tdocs

Expected to cover WIs SDT, CovEnh, RedCap, RAN slicing .. Initial discussion on what should be treated in common and what design could be common.

[R2-2108253](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108253.zip) RACH partitioning for Rel-17 features Ericsson discussion Rel-17

*Observation 5 In real deployment it is expected that only a subset of the features and feature combinations will be enabled.*

*Table 1 Rel-17 feature compatibility (“-” denotes “not applicable or duplicate”, “Legacy” denotes “already supported in Rel-16”, “X” denotes “should be supported in Rel-17”)*

*Group B 2-step RA RedCap SmallData CovEnh Slicing*

*Group B - Legacy X X FFS X*

*2-step RA - - FSS X X*

*RedCap - - - X X X*

*SmallData - - - - X*

*CovEnh - - - - - X*

*Slicing - - - - - -*

*To further reduce the number of preamble sets it would be good to only consider binary features. In particular, this would imply that:*

*• For RedCap we only differentiate between RedCap and non-RedCap UE and not between different types of RedCap UEs (e.g. with 1 Rx branch pr 2 Rx branches)*

*• For slicing we only differentiate between prioritized and non-prioritized slices; we do not signal the identity of the slice in RACH or introduce some form of multi-level slice priority.*

*Proposal 1 Only considering binary (on/off) features will reduce the number of preamble sets.*

*Proposal 2 Each new preamble set should be defined on a feature combination basis*

*Proposal 3 Preambles associated with a Rel-17 feature should never be randomly chosen by legacy UEs*

*Proposal 4 New feature specific preambles should be defined in*

*a. Separate time-frequency resources, not defined through legacy RRC signalling*

*b. Within the CFPRs defined through legacy RRC signalling*

*c. Within the “not available” preambles defined at the end of a RO through the legacy totalNumberOfRA-Preambles*

*Proposal 6 ROs in the legacy RACH configuration cannot be mapped to a Rel-17 feature combination*

*Proposal 7 RAN2 should discuss which aspects related to the procedure should be discussed and agreed jointly for all the interested features*

[R2-2107484](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107484.zip) RRC and MAC related aspects of common RACH configuration ZTE Corporation, Sanechips discussion

***Feature combinations discussion***

*Proposal 1: On a given RO, only the following combination of Rel-17 features will be supported (i.e., signalling can support these combinations in addition to the Rel-16 features)*

*- SDT with: REDCAP and/or Slice Indication (for some slices – up to network implementation)*

*- REDCAP with: Coverage extension and/or Slice Indication (for some slices – up to network implementation)*

*- Coverage extension with: Slice indication*

*Note 1: combination of SDT with coverage extension is not supported*

*Note 2: combination of coverage extension with 2-step RACH is also not supported*

*Note 3: All features may be configured with preamble group A/B*

*Proposal 2: RO-Mask can be defined for Rel-17 features to enable configuring a subset of ROs for a given feature*

*Proposal 4: Within a given RO, the allowed combination of Rel-17 features (see proposal 1) should be accommodated within the preamble space reserved for other purpose for each SSB.*

*Proposal 6: The RA procedure design for Rel-17 should adhere to the following general principles:*

*- Proposal 6a: Carrier selection (between NUL/SUL) should happen ahead of the initial RACH resource selection The RSRP threshold for carrier selection may be configured per each feature (decision on this is up to individual WI)*

*- Proposal 6b: Initial RACH resource should be selected based on the selected carrier for the selected feature combination (i.e., selected slice, SDT or not, REDCAP or not etc). Only the RACH resource matching the feature combination of current RACH procedure will be considered as available in the RACH resource selection.*

*- Proposal 6c: As a general rule, all RACH retransmissions (if any are needed, until RACH failure happens) shall be performed over the same RACH resources (and same carrier – NUL/SUL) as the one selected for initial RACH resource*

*o The only exception to the above is the already allowed fallbacks until Rel-16 (i.e., fallback from CFRA to CBRA and fallback from 2-step RA to 4-step RA) and network implementation should ensure that the feature is supported on the new RA resources after such fallback*

*Proposal 7: A common RRC CR capturing the signalling framework for RACH resource configuration across all the WIs should be used and this CR should be maintained as part of the common RACH agenda item.*

*Proposal 8: A common MAC CR capturing the changes to sections 5.1.1 and section 5.1.1a of the MAC spec can also be considered and if agreeable, this CR should also be maintained as part of the common RACH agenda item.*

[R2-2107009](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107009.zip) Common aspects of RACH Samsung Electronics Co., Ltd discussion Rel-17 NR\_cov\_enh-Core, NR\_SmallData\_INACTIVE-Core, NR\_slice-Core

*Proposal 1: Starting preamble index can be configured for each of SDT, UL coverage enhancement and RAN slicing in RA configuration for preamble partitioning.*

*Proposal 3: RAN2 to discuss whether*

*- to introduce new IEs such as RACH-ConfigCommonFeatureX and RACH-ConfigCommonTwoStepRAFeatureX for each of the feature*

*OR*

*- to signal one or more RACH-ConfigCommon and RACH-ConfigCommonTwoStepRA IEs where the features to which a particular RACH-ConfigCommon or RACH-ConfigCommonTwoStepRA is applicable is indicated*

[R2-2107219](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107219.zip) Unified RACH indication and partitioning Qualcomm Incorporated discussion Rel-17

*Proposal 1. Joint configuration between multiple (≥2) RACH features over a single RACH partition is supported.*

*Proposal 3. Network can choose to configure RACH partitions for only a subset of all possible combination of RACH features.*

[R2-2107058](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107058.zip) Discussion on RACH Partitioning in Rel-17 vivo discussion NR\_SmallData\_INACTIVE-Core, NR\_cov\_enh, NR\_redcap-Core, NR\_slice-Core

[R2-2107244](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107244.zip) RACH partitioning common design for Rel-17 features Beijing Xiaomi Software Tech discussion Rel-17

[R2-2107256](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107256.zip) Discussion on PRACH partitioning OPPO discussion Rel-17

[R2-2107552](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107552.zip) Common aspects of RACH partitioning Intel Corporation discussion Rel-17 NR\_cov\_enh-Core, NR\_slice-Core, NR\_SmallData\_INACTIVE-Core

[R2-2107575](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107575.zip) Cross-WI RACH Design Apple discussion Rel-17 NR\_cov\_enh-Core, NR\_slice-Core, NR\_SmallData\_INACTIVE-Core, NR\_redcap-Core

[R2-2107835](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2107835.zip) RACH indication and partitioning InterDigital, Europe, Ltd. discussion Rel-17

[R2-2108004](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108004.zip) On RACH indication and partitioning CATT discussion Rel-17 NR\_cov\_enh-Core, NR\_slice-Core, NR\_SmallData\_INACTIVE-Core, NR\_redcap-Core

[R2-2108138](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108138.zip) General aspects of RACH indication and partitioning NEC discussion Rel-17 NR\_redcap-Core, NR\_cov\_enh-Core, NR\_SmallData\_INACTIVE-Core, NR\_slice-Core

[R2-2108210](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108210.zip) RACH indication and partitioning Huawei, HiSilicon discussion Rel-17 NR\_SmallData\_INACTIVE-Core, NR\_slice-Core, NR\_redcap-Core, NR\_cov\_enh-Core

[R2-2108760](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108760.zip) Discussion on RACH partitioning in Rel-17 LG electronics Inc. discussion Rel-17 NR\_SmallData\_INACTIVE-Core, NR\_slice-Core, NR\_redcap-Core, NR\_cov\_enh-Core