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

Post meeting email discussions

* [Post 115e][504][RACH Partitioning] Signalling Aspects (Ericsson)

Scope: Discuss signalling options/modelling related to RACH partitioning and whether we specify allowed feature combinations

Deadline: long email discussion

# 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](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-21xxxx.zip)

[R2-2109079](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2109079.zip) [AT115-e][501][SData] UP SDT open issues (LG)

For potential agreement:

*Proposal 1.2: At initiation of SDT procedure, the RRC indicates to the PDCP to disable the PDCP status report, e.g. by de-configuring statusReportRequired. (13/23)*

- CATT asks if we re-enable PDCP status report do we need to have another configuration. LG understands that PDCP autonomously disable the configuration and when enabled the PDCP would configure it again. CATT is concerned if there is an issue with synchronization with UE and NW side.

- Nokia would like PDCP to be agnostic. Intel thinks we should keep PDCP agnostic to SDT feature unless it is strictly required, therefore RRC takes the decision and informs PDCPRRC

- Apple supports the proposal and agree with LG’s explanation.

- Fujitsu also supports explicit signalling

- Ericsson asks if this is UE internal. LG explains that it is, similar to re-establishment.

*Proposal 2: For SDT, ROHC continuity is supported within a same cell. (15/33)*

- Huawei thinks that this is the least preferrable option, Ericsson and Samsung agree.

Proposal 12: The LCP priority of PHR MAC CE in SDT is same as in RRC\_CONNECTED, i.e. the PHR MAC CE in SDT is prioritized over SDT data. (17/27)

Proposal 14: During the SDT procedure, all the triggered PHRs are cancelled if all SDT data are included in the UL grant. (17/25)

- Nokia asks we would cancel the PHR if it fits into the grant. LG thinks that it is possible to still include it if there is room.

For further discussion:

*Proposal 7: RAN2 discuss whether LCH restrictions are applied or not for SDT. (applied 15 / not applied 11)*

- ZTE thinks that this is duplicating functionality, the RB mapping to SDT or non-SDT is sufficient. Huawei doesn’t see what the motivation is and even for multiple CG configurations there is no motivation as we can support only single service at the time. Samsung doesn’t see this is useful for SDT.

- Lenovo doesn’t agree with Huawei as when we discuss CG configuration we agreed that it is up to the network how it uses it. It can be up to gNB implementation and MAC follows what RRC configures just like today. Ericsson and Vivo agree. Ericsson also indicates that we support SRBs and large report and a CG config can be tailored to some DRBs/SRBs.

Proposal 10.2: Whether the BSR configuration used for SDT is configured by gNB or used from default configuration needs further discussion. (gNB 10 / default 11)

**Agreements**:

1. At initiation of SDT procedure, the PDCP status report is not triggered even if the RB is configured with statusReportRequired
2. If ROHC is configured, the area scope of ROHC continuity is specified in the specification, i.e. gNB configuration is not needed
3. For SDT procedure selection, Same data volume threshold is used for CG-SDT and RA-SDT
4. The BSR configuration used for SDT can be different from the BSR configuration used in RRC\_CONNECTED.
5. [CB] FFS Whether the BSR configuration used for SDT is configured by gNB or used from default configuration needs further discussion. (gNB 10 / default 11)
6. Legacy PHR triggers are applied for SDT
7. DL SPS is not supported for SDT
8. DataInactivityTimer is not supported for SDT.
9. RLC polling is supported for SDT.
10. The UE performs RLC re-establishment implicitly, i.e. without explicit indication for RLC re-establishment, when the UE initiates SDT procedure.
11. At initiation of SDT procedure, the RRC indicates to the PDCP to disable the PDCP status report, e.g. by de-configuring statusReportRequired (i.e. UE internally indicates). FFS how PDCP status reporting is enabled.
12. The LCP priority of PHR MAC CE in SDT is same as in RRC\_CONNECTED, i.e. the PHR MAC CE in SDT is prioritized over SDT data
13. During the SDT procedure, all the triggered PHRs are cancelled if all SDT data are included in the UL grant, if there is NO room in the MAC PDU to fit the PHR.
14. Working assumption: LCH restrictions can be applied, re-using existing signalling. It is up to gNB how restrictions are configured and MAC applies current specification rules. Revisit next meeting if we have technical issues.

For pending easy agreement:

Proposal 8: If Proposal 7 is decided that LCH restrictions are applied for SDT, the LCH restrictions used for SDT can be different from the LCH restrictions used in RRC\_CONNECTED. The gNB may configure LCH restrictions used for SDT via RRCRelease message. (22/24)

Proposal 11: If Proposal 10.2 is decided that BSR used for SDT is configured by gNB, it is signaled via RRCRelease message. (22/25)

Postpone or left for RAN1 decision:

Proposal 15: Postpone the TAT issue to the next meeting.

Proposal 16: Leave the BFD/BFR issue to RAN1 .

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.

[R2-2109065](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2109065.zip) Reply LS on Small Data transmission S3-213034; contact InterDigital

- Intel asks if we need to have a different I-RNTI and different Resume MAC-I. ZTE thinks that the resume MAC-I shouldn’t be re-used. The concerning part is that I-RNTI shouldn’t be re-used. Today we don’t reuse it because the release will give us a new I-RNTI. ZTE explains that the CCCH solutions don’t allow I-RNTI to be refreshed. Xiaomi, Samsung, QC and Oppo agrees.

- Interdigital doesn’t think that SA3 mention explicit concern with I-RNTI usage and only resume MAC-I needs to be changed, especially for replay attack. Ericsson also thinks that we are fine with MAC-I update only. Huawei agrees that the replay attack is the main concerns and it’s not true that CCCH solution doesn’t address this. Apple and LG shares the same view.

- ZTE thinks that the concern that at least MAC-I needs to be updated and the current CCCH mechanisms will not work and DCCH is advantageous. Samsung supports DCCH as there are no security issues.

- Intel agrees that there was a majority for DCCH.

- Intel thinks that there are additional issues that come with the NCC as well and DCCH doesn’t have these issues.

- Interdigital thinks that all we need to do is change the COUNT value and MAC-I will be changed without big specification changes. NCC is used for key derivation and if we don’t do key derivation it doesn’t matter if the UE uses same NCC or not. Intel thinks that NCC is an input in MACI derivation.

- APT asks if we need to pick one option between the two.

- ZTE asks if and then ask new procedure to be defined in RAN3 and define new CCCH message and we are not sure what is the advantage of this over DCCH.

- Huawei thinks we do not need a new message with CCCH approach. Also not sure what the additional security issues are other than that we need to change one of the input parameters for resumeMAC-I calculation

- LG thinks that the real issue is if we terminate the ongoing procedure. ZTE doesn’t think we should throw away a grant and wait for CB.

- Oppo thinks we can go for DCCH solution as one step toward since we do not need to discuss these security issues with DCCH solution

=> Noted

[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

[R2-2108916](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_115-e\Docs\R2-2108916.zip) Report of [AT115e][502][SData] Summary of RA aspects Oppo

*Proposal 7: For the RA-SDT preamble group selection, the UE should consider SDT data size plus MAC subheader in addition to CCCH SDU size plus MAC subheader and pathloss, same in legacy. FFS whether any additional things on top of legacy criteria is needed.*

- Ericsson thinks that we should re-use group legacy selection. ZTE agrees with Ericsson and the only thing they are not sure is the pathloss and for CCCH we don’t take pathloss into account. Huawei and Anil agree.

- CATT thinks that we may need a new threshold for msg3. Ericsson thinks that if SDT has a different configuration the msg3 size could be different and we don’t need to do anything special.

Proposal 14: Send an LS to RAN1 to check the PUCCH resources used for HARQ-ACK during SDT. (24/28)

- Sony thinks that we may need PUCCH resources for CG case as well. Lenovo agrees.

- Apple asks if we should ask RAN1 for other L1 parameters needed for subsequent transmission. Ericsson is good to ask and clarify the baseline of reusing legacy config etc.

Proposal 15: UE suspends all UL transmissions and triggers RACH if any UL transmission is needed (same as in connected mode) when TAT expires during RA-SDT procedure.

- LG wonders if TAT would expire. Lenovo agrees it shouldn’t but we should specify similar to connected. ZTE agrees but we need some UE behaviour in the specs. LG thinks this is different than in connected mode. Samsung, sony, vivo, ericsson, intel, interdigital, qualcomm agrees with Lenovo.

Proposals need to be further discussed:

*Proposal 1: RA-SDT can be configured on either initial BWP or non-initial BWP. (17/28)*

- Huawei asks how the dedicated configuration would be provided.

- LG supports proposal 1.

- Qualcomm doesn’t agree to configure on non-initial BWP. The UE should monitor the paging which is on Coreset 0. ZTE shares the concerns from Qualcomm and this is just an optimization, nice to have but not necessary and it has impact to RAN1. Apple, Lenovo, Samsung, vivo, Oppo shares the same view.

- Vivo thinks that RedCap has agreed to non-initial BWP and since we have partitioning maybe we can use that as well.

- Ericsson was initially supporting this but now understand that RAN1 has some issues and complexity on this. We can tell them that we think it is beneficial and let them decided.

- Apple is fine to support RA-SDT on initial BWP.

- Xiaomi thinks it can be beneficial and it can be overlapping with initial BWP.

- Intel agrees with P1 and maybe paging monitoring maybe wouldn’t be needed.

- Fujistu support P1 and ask RAN1

- CATT doesn’t think that paging is a show stopper.

- LG thinks that the benefits is clear. Benefit: reduce collision between normal RA and RA-SDT, provide sufficiently large bandwidth for data transmission.

- ZTE indicates that one other issue is complexity that this might create some issues with BWP selection in case of selcting a feature combination for common RACH resource (seems more complex than it looks to us)

- Sony supports to check with RAN1

Proposal3: RA prioritization related parameters cannot be configured for RA-SDT, i.e., powerRampingStepHighPriority, scalingFactorBI. (17/26)

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**Agreements**

1. SDT related RACH resources are configured via system information, i.e., SIB1
2. Explicit indication (other than RA-SDT configuration) to enable/disable RA-SDT is not supported
3. At least the following parameters can be RA-SDT specific.
   * + SSB selection related parameters, i.e., rsrp-ThresholdSSB, msgA-RSRP-ThresholdSSB.
     + Power control related parameters, i.e., preambleReceivedTargetPower/gA-PreambleReceivedTargetPower, powerRampingStep/msgA-PreamblePowerRampingStep, msg3-DeltaPreamble/msgA-DeltaPreamble.
     + Preamble group related parameters, i.e., msg3-DeltaPreamble/msgA-DeltaPreamble, messagePowerOffsetGroupB for 2-step RA-SDT and 4-step RA-SDT.
4. For shared ROs case, all the following configurations can be allowed: (28/28)

* 4-step RA-SDT shares ROs with 4-step RA and/or 2-step RA
* 2-step RA-SDT shares ROs with 4-step RA and/or 2-step RA
* 2-step RA-SDT shares ROs with 4-step RA-SDT and/or 4-step RA and/or 2-step RA.

1. For the RA-SDT preamble group selection, the UE should consider SDT data size plus MAC subheader in addition to CCCH SDU size plus MAC subheader and pathloss, same in legacy. FFS whether any additional things on top of legacy criteria is needed.
2. The fallbackRAR reception as legacy 2-step RACH is supported in 2-step RA-SDT, i.e., fallback from 2-step RA-SDT to 4-step RA-SDT when fallbackRAR is received
3. As legacy, UE can be configured to switch from 2-step RA-SDT to 4-step RA-SDT after N times of MsgA transmission
4. Send an LS to RAN1 to provide overall relevant agreements. Check if the PUCCH resources used for HARQ-ACK during subsequent SDT transmissions (applicable for both RA and CG). Ask if other L1 PHY resources may be needed for subsequent SDT transmission, for example RAN2 thinks we can use the common resources (PDCCH and PUCCH) for RA and ask if we need others.
   * Add that RAN2 discussed RA-SDT configuration on non-initial BWP. There was a large number of companies supporting and other companies expressed concerns on complexity and paging monitoring. Ask RAN1 if they have any concerns from their side. NOTE that RAN2 agreed for CG-SDT we already agreed to dedicated BWP and why we decided to support it.
5. UE suspends all UL transmissions and triggers RACH if any UL transmission is needed (same as in connected mode) when TAT expires during RA-SDT procedure
6. RA-SDT can be configured on initial BWP. FFS for non-initial BWP
7. RA prioritization related parameters cannot be configured for RA-SDT, i.e., powerRampingStepHighPriority, scalingFactorBI
8. UE selects any SSBs if there is no qualified SSB for RA-SDT, like in legacy. No optimizations are considered.
9. Switching from SDT to non-SDT via RAR/fallbackRAR/DCI sent by network is not supported for RA-SDT
10. No new timer (other than the SDT failure detection timer) is introduced to control the PDCCH monitoring during subsequent transmissions in RA-SDT

Proposal 8: UE selects any SSB and continues with RA-SDT procedure for retransmission if there is no qualified SSB for RA-SDT. (17/28)

- CATT thinks that the UE should select the non-SDT procedure. LG thinks in this case the general failure should be followed. ZTE explains that today in RACH we don’t trigger RACH failure, we select any SSB. Apple agrees with ZTE. Huawei doesn’t think it’s worth optimizing for corner cases and switching can be problematic.

- Samsung doesn’t think we agree for initial RA transmission that we would fallback to legacy RA, only for CG. ZTE explains that in initial case you’d already select legacy RA.

- Xiaomi prefers the legacy procedure.

- Lenovo agrees that for initial transmission we just follow legacy. For retransmission what does it really mean, msg3 or msgA. ZTE agrees that in the msg3 case loss of data can be an issue but this is nothing new as we send data on msg3.

- Qualcomm support any SSB.

For initial RA resource selection the UE can fallback to non-SDT, but for retransmissions switching is not supported.

*Proposal 13: No new timer (other than the SDT failure detection timer) is introduced to control the PDCCH monitoring during subsequent transmissions in RA-SDT. (19/28)*

­- Huawei is concerned that this timer is a RRC timer. Lenovo explains that the UE is always monitoring PDCCH since it is in DRX so we don’t need any new timers.

[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.  a. 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

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

- ZTE shares the desire to keep the slices at a minimum but we can’t assign priority yet and multiple slices can be required. Oppo, Huawei and QC agrees with ZTE.

=> RAN2 should aim at keeping the partitioning at a minimum but we’ll discuss this after

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

­- ZTE and Qualcomm agrees. Oppo asks if it can include a single feature. Ericsson agrees.

- Oppo asks if there is a good motivation to have redcap and slicing.

- Huawei agrees in general but we’d need to clarify what preamble set is.

=> Partitioning is defined on a feature combination basis. FFS on what combination is allowed.

*Discussion on excluded combination :*

*SDT with coverage ext*

- Vivo thinks that it still useful to do STD with coverage ext. Xiaomi agrees

- Apple is not ready to exclude anything. Qualcomm agrees and we can allow all combinations and the network can configure. Huawei thinks that some of these discussions can take place in individual sessions.

*2-step RA with coverage ext*

- ZTE explains that 2sRA with CE is already excluded by RAN1.

*Slicing and coverage ext?*

- Nokia asks if the intention is to prevent the network to configure or have UE behaviour.

- Nokia asks how the NW knows what the UE is doing within the combination. Can there be an indication in msg3 what the UE is using. Ericsson thinks that within the preamble itself we should have the indication. Nokia is concerned that we would have too many preambles.

*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*

- Huawei agrees. Oppo thinks a and b is sufficient. ZTE thinks b is definitely needed.

- Lenovo asks if the network has to chose one of them or it can do all three of them. Ericsson explains that I could be any three of them and they can combined.

- Samsung thinks that we can use b like we did for 2s vs. 4s RA. Not sure how c will work. Intel thinks the same as Samsung.

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

*1. Legacy UEs cannot be mapped to Rel-17 RACH resources/ or occasions?*

- Qualcomm thinks that legacy UEs cannot be mapped to Rel-17 configuration. Interdigital thinks that the second agreement alone is sufficient and it shouldn’t preclude the configuration of reserved preambles in legacy RO.

=> Noted

[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

*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.*

*=> Noted*

*Discussion*

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

- ZTE agrees with the general desire to discuss this here and there is concerns that there are a lot of fallback discussions. And if every feature discusses it individually it will be a mess.

- Vivo asks if it is possible to switch.

- Huawei agrees with proposal 6 from ZTE in general, but proposal 6b should also account for a case that the UE supports both features but not configured. Once you select the resource you continue with the resource. Apple agrees with proposal 6 and we should introduce RACH selection feature. But for the fallback case we have some concerns on the combination of features.

- Qualcomm thinks that the fallback should be discussed on a case by case basis and we shouldn’t restrict things.

- Apple thinks that there are cases where carrier selection may not supported, for example for coverage enhancement. Samsung agrees.

*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.*

- Lenovo asks if each WI will create it’s own CR and then we merge. ZTE thinks we should have one CR since the beginning.

- Samsung supports

*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.*

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| **Agreements:**  1. Preamble partitioning is defined on a feature and/or feature combination basis. FFS on signalling. 2step RA and CE is excluded, if RAN1 decided to exclude  2. Preambles associated with a Rel-17 feature should never be chosen by legacy UEs in the case of RO sharing.  3. New feature and/ feature combination specific preambles can be defined in a) Separate time-frequency resources, not defined through legacy RRC signalling, b) Within the Contention free preamble resources (i.e. within the preambles not used for contention based) defined through legacy RRC signalling. FFS on c) Within the “not available” preambles defined at the end of a RO through the legacy totalNumberOfRA-Preambles  4. 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. Each WI is expected to provide the necessary parameters to include in the signalling.  5. 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.  6. As a baseline, the RA procedure design for Rel-17 should adhere to the following general principles:  a: Carrier selection (between NUL/SUL) should happen ahead of the initial RACH resource selection (i.e. feature combination is not considered in carrier selection).  b: 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 and/or feature combination of current RACH procedure will be considered as available in the RACH resource selection.  c: 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. However, we can discuss fallback on a case by case basis if there is a strong motivation and discuss them together in this AI. |

Not treated

[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