**3GPP TSG-RAN WG4 Meeting # 104-e R4-2214280**

**Electronic Meeting, 15 – 26 August 2022**

**Agenda item:** 9.23

**Source:** Moderator (ZTE)

**Title:** Email discussion summary for [104-e][230] NR\_SmallData\_INACTIVE

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this email discussion (e.g. list of treated agenda items) and provide some guidelines for email discussion if necessary.*

*List of candidate target of email discussion for 1st round and 2nd round*

* 1st round: TBA
* 2nd round: TBA

|  |  |  |  |
| --- | --- | --- | --- |
| **TDoc** | **Title** | **Source** | **Moderator’s remarks** |
| [**R4-2211614**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2211614.zip) | Open issues in RRM requirements for CG-SDT | Qualcomm Incorporated | * EMR is for fast CA/DC activation, while SDT is intended for data transmission in RRC\_INACTIVE state, a UE does not require to meet EMR measurement requirements during subsequent SDT transmission
* UE’s behavior to select the largest RSRP value from multiple measurement samples from Rx beam sweeping for the same SSB to perform TA validation should be captured into specs, since Tx beam is fixed during Rx beam sweeping
 |
| [**R4-2211615**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2211615.zip) | RRM performance requirements for CG-SDT | Qualcomm Incorporated | If RAN4 agrees to define test cases for CG-SDT, the contribution proposes:* Test procedure with 5 steps:

(1) Measure reference RSRP1 (2) Increasing or decreasing RSRP from RSRP1(3) Application trigger UL data during RRC INACTIVE state.(4) RSRP2 should meet or not meet the RSRP threshold at TA validation time point. (5) Transmit PUSCH or not transmit PUSCH on CG-SDT occasion.* Test objective and config
 |
| [**R4-2211850**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2211850.zip) | On SDT RRM | Apple | * If RAN4 agrees to specify SDT requirements for NR-U, UE can transmit the same data with new measured RSRP2 for TA validation if it passes TA validation but fails to perform CG-SDT transmission due to LBT failure
* If RSRP filtering and Rx beam sweeping, UE needs to select the largest RSRP from each Rx beam sweeping set and then filter
* RSRP1/RSRP2 should be determined based on the strongest SSB (could be different for RSRP1 and RSRP2): one example where TA is unchanged, but SSB beam changes
* Confirm the bullet for T1 definition when no TAC command is received

RRC\_INACTIVE to RRC\_INACTIVE |
| [**R4-2212190**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212190.zip) | Clarification on RSRP measurement reference for TA validation | LG Electronics Inc. | * T1 definition update to include RRCRelease in both cases below (according to RAN2 specs, RRCRelease with CG-SDT configuration could be sent regardless of RRC state transition):
	+ RRC\_CONNECTED to RRC\_INACTIVE
	+ RRC\_INACTIVE to RRC\_INACTIVE
 |
| [**R4-2212192**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212192.zip) | CR on T1 definition of TA validation for Rel-17 NR SDT in INACTIVE sate | LG Electronics Inc. | * CR based on the discussion paper R4-2212190

Removing ‘when changing from RRC\_CONNECTED to RRC\_INACTIVE state’ from T1 definition |
| [**R4-2212684**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212684.zip) | On demodulation performance requirements for SDT | Nokia, Nokia Shanghai Bell | Calculation shows the TA error added by TA validation in the worst case: * 11% of CP for FR1 30kSCS
* 20% of CP for FR2 120kSCS
* moving velocity 10m/s

Moderator: No proposal (only observations). And further potential questions: (1) The worst-case consideration/impact? (2) Speed limit for CG-SDT? |
| [**R4-2212685**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212685.zip) | Discussion on performance requirements for SDT | Nokia, Nokia Shanghai Bell | * A full-scaled SDT decision tree illustrated
* Test cases with different decision points and parameter variations are associated with different path through the decision tree. 9 example paths illustrated
* Propose to cover all decision points when designing test cases
* In a test case where TA validation is supposed to fail, either RA-CGT is not configured, or RA-CGT is configured and the UE may transmit data using RA-CGT if supported
* Define TA test cases: if UE measures RSRP1/RSRP2 outside the specified windows, the test should fail
* Define TA test cases: if TA validation condition (i.e., Condition A or Condition B) is met, UE should pass the test when transmitting CG-SDT
* Define TA test cases where TE can trigger CG-SDT for UE in RRC\_INACTIVE
* Define TA test cases to verify the validity of TAT timer
* Define TA test cases where tests should fail if TAT timer has expired
 |
| [**R4-2213376**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213376.zip) | Remaining issues on RRM requirements for NR SDT | ZTE Wistron Telecom AB | * No need to capture the UE behavior into specs on selecting the largest RSRP from multiple measured samples from Rx beam sweeping for the same SSB
* The sub-bullet in T1 definition is redundant
 |
| [**R4-2213377**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213377.zip) | On RRM performance requirements for NR SDT | ZTE Wistron Telecom AB | * No additional RRM test case for verifying UE initial transmission timing requirements should be introduced for NR SDT.
* No additional RRM test case for verifying UE synchronization requirements should be introduced for NR SDT.
* Before obtaining feedback on the LS to RAN5, RAN4 holds on works on specifying RRM performance requirements on TA validation for CG-SDT
 |
| [**R4-2213403**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213403.zip) | Remaining discussions on RRM requirements for Small Data Transmissions | Ericsson | * Hold on the discussion until receiving RAN2’s reply feedback on the case where there is conflict between EMR measurement and SDT transmission
* No need to capture the UE behavior into specs on selecting the largest RSRP from multiple measured samples from Rx beam sweeping for the same SSB
* SDT for NR-U: (1) Take into account N and Nmax, if N>Nmax happens within 640ms from TA validation, the UE shall discard the CG-SDT transmission, (2) otherwise, the UE is allowed for CG-SDT transmission within 640ms from TA validation (3) After 640ms, a new TA validation should be conducted for CG-SDT
 |
| [**R4-2213404**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213404.zip) | Discussions on RRM performance requirements for SDT | Ericsson | * Hold on discussions on introducing test cases for RA-SDT and CG-SDT until receiving RAN5’s reply LS on the test feasibility

Moderator: It was agreed in RAN4#103-e that no new test cases are introduced for RA-SDT |
| [**R4-2213558**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213558.zip) | Discussion on remaining issues for SDT RRM | Huawei, HiSilicon | * Not to define the exact overlapping condition for allowing UE not to meet inter-frequency and inter-RAT requirements
* Not to specify UE behaviour related to Rx beam sweeping in RSRP measurement for CG-SDT TA validation
* T1 definition update:
	+ The sub-bullet is not needed
	+ T1 is corresponding to the first RRCRelease
	+ In addition to TAC command via MAC-CE, add also “RAR/MsgB for 2-step/4-step RA that is successfully completed””
 |
| [**R4-2213559**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213559.zip) | CR on SDT RRM requirements | Huawei, HiSilicon | * CR implementing proposals in R4-2213558
 |
| [**R4-2213560**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213560.zip) | Discussion on TCs for SDT | Huawei, HiSilicon | * In addition to the test feasibility to RAN5, a new question raised “When to transmit UL after data arrival? 🡪 UE implementation issue?
* If test feasibility confirmed, define test cases to cover both cases where UE shall or shall not transmit with CG-SDT
	+ Four test cases proposed
 |
| [**R4-2213746**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213746.zip) | Discussion on the remaining issues for SDT | MediaTek inc. | * For EMR measurement overlapping with SDT transmission, RAN4 follows RAN2 agreement (i.e., UE is not required to meet EMR requirement during subsequent SDT transmission), or wait for RAN2’s feedback
* Not to capture the UE behavior into specs on selecting the largest RSRP from multiple measured samples from Rx beam sweeping for the same SSB
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# Topic #1: Maintenance of RRM core requirements for NR SDT

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
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| [**R4-2211850**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2211850.zip) | On SDT RRM | Apple | * If RAN4 agrees to specify SDT requirements for NR-U, UE can transmit the same data with new measured RSRP2 for TA validation if it passes TA validation but fails to perform CG-SDT transmission due to LBT failure
* If RSRP filtering and Rx beam sweeping, UE needs to select the largest RSRP from each Rx beam sweeping set and then filter
* RSRP1/RSRP2 should be determined based on the strongest SSB (could be different for RSRP1 and RSRP2): one example where TA is unchanged, but SSB beam changes
* Confirm the bullet for T1 definition when no TAC command is received

RRC\_INACTIVE to RRC\_INACTIVE |
| [**R4-2212190**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212190.zip) | Clarification on RSRP measurement reference for TA validation | LG Electronics Inc. | * T1 definition update to include RRCRelease in both cases below (according to RAN2 specs, RRCRelease with CG-SDT configuration could be sent regardless of RRC state transition):
	+ RRC\_CONNECTED to RRC\_INACTIVE
	+ RRC\_INACTIVE to RRC\_INACTIVE
 |
| [**R4-2213376**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213376.zip) | Remaining issues on RRM requirements for NR SDT | ZTE Wistron Telecom AB | * No need to capture the UE behavior into specs on selecting the largest RSRP from multiple measured samples from Rx beam sweeping for the same SSB
* The sub-bullet in T1 definition is redundant
 |
| [**R4-2213403**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213403.zip) | Remaining discussions on RRM requirements for Small Data Transmissions | Ericsson | * Hold on the discussion until receiving RAN2’s reply feedback on the case where there is conflict between EMR measurement and SDT transmission
* No need to capture the UE behavior into specs on selecting the largest RSRP from multiple measured samples from Rx beam sweeping for the same SSB
* SDT for NR-U: (1) Take into account N and Nmax, if N>Nmax happens within 640ms from TA validation, the UE shall discard the CG-SDT transmission, (2) otherwise, the UE is allowed for CG-SDT transmission within 640ms from TA validation (3) After 640ms, a new TA validation should be conducted for CG-SDT
 |
| [**R4-2213558**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213558.zip) | Discussion on remaining issues for SDT RRM | Huawei, HiSilicon | * Not to define the exact overlapping condition for allowing UE not to meet inter-frequency and inter-RAT requirements
* Not to specify UE behaviour related to Rx beam sweeping in RSRP measurement for CG-SDT TA validation
* T1 definition update:
	+ The sub-bullet is not needed
	+ T1 is corresponding to the first RRCRelease
	+ In addition to TAC command via MAC-CE, add also “RAR/MsgB for 2-step/4-step RA that is successfully completed””
 |
| [**R4-2213746**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213746.zip) | Discussion on the remaining issues for SDT | MediaTek inc. | * For EMR measurement overlapping with SDT transmission, RAN4 follows RAN2 agreement (i.e., UE is not required to meet EMR requirement during subsequent SDT transmission), or wait for RAN2’s feedback
* Not to capture the UE behavior into specs on selecting the largest RSRP from multiple measured samples from Rx beam sweeping for the same SSB
 |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

*The remaining open issues on RRM requirements for NR SDT are discussed in this topic.*

### Sub-topic 1-1 Other measurement requirements and SDT

*Sub-topic description: This sub-topic is to address other measurement requirements, e.g, EMR measurement requirement, inter-frequency or inter-RAT requirements overlapping with SDT transmission.*

*An LS to RAN2 was sent in RAN4#103-e expecting the confirmation from RAN2.*

*Open issues and candidate options before e-meeting:*

**Issue 1-1-1 Regarding EMR measurement requirement overlapping with SDT transmission, how should RAN4 understand the related RAN2 agreement?**

* Proposals
	+ Option 1: EMR is for fast CA/DC activation, while SDT is intended for data transmission in RRC\_INACTIVE state, a UE does not require to meet EMR measurement requirements during subsequent SDT transmission
	+ Option 2: Hold on the discussion until receiving RAN2’s reply feedback on the case where there is conflict between EMR measurement and SDT transmission
* Recommended WF
	+ TBA

**Issue 1-1-2 Regarding inter-frequency or inter-RAT requirement overlapping with SDT transmission, should RAN4 define exact condition for allowing UE not to meet these requirement?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No need
* Recommended WF
	+ Option 2?

### Sub-topic 1-2 Capturing UE behavior into specs on RSRP value selection from Rx beam sweeping

*Sub-topic description: this sub-topic addresses whether or not /how to capture UE behavior into specs on* *selecting the largest RSRP value from multiple measured samples from Rx beam sweeping for the same SSB.*

*Open issues and candidate options before e-meeting:*

**Issue 1-2: Whether or not to capture UE behavior into specs on selecting the largest RSRP value from multiple measured samples from Rx beam sweeping for the same SSB?**

* Proposals
	+ Option 1: Yes, Tx beam is fixed during Rx beam sweeping, or the strongest SSB could be different for RSRP1 and RSRP2
	+ Option 2: No need
* Recommended WF
	+ Option 2?

### Sub-topic 1-3 T1 definition for TA validation

*Sub-topic description: This sub-topic addresses T1 definition update for TA validation.*

*Open issues and candidate options before e-meeting:*

**Issue 1-3-1: Should the sub-bullet for T1 definition, i.e., [If TAC command is not received while in RRC Innactive, T1 is the time when the latest RRCRelease is received] be confirmed?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

**Issue 1-3-2: In RAN4’s understanding, in which RRC state transition can an RRCRelease with CG-SDT configuration be issued?**

* Proposals
	+ Option 1: Only from RRC\_CONNECTED to RRC\_INACTIVE
	+ Option 2: Both RRC\_CONNECTED to RRC\_INACTIVE, and RRC\_INACTIVE to RRC\_INACTIVE
* Recommended WF
	+ TBA

**Issue 1-3-3: If the answer to Issue 1-3-2 is Option 2, then which RRCRelease with CG-SDT configuration should be the reference to T1 definition?**

* Proposals
	+ Option 1: The first
	+ Option 2: The latest
* Recommended WF
	+ TBA

**Issue 1-3-4: Should TAC command in successfully completed RAR/MsgB in 2-step/4-step RA be considered in T1 definition in addition to that in MAC-CE ?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

### Sub-topic 1-4 SDT for NR-U

*Sub-topic description: This sub-topic addresses SDT for NR-U.*

*Open issues and candidate options before e-meeting:*

**Issue 1-4-1: Should RAN4 specify SDT requirements for NR-U?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

**~~Issue 1-4-2: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE fail to perform CG-SDT transmission due to LBT failure?~~**

* ~~Proposals~~
	+ ~~Option 1: A new RSRP2 is measured, and if it passes TA validation, the UE can transmit the same data~~
	+ ~~Option 2: Take into account N and Nmax~~
		- ~~if N>Nmax happens within 640ms from TA validation, the UE shall discard the CG-SDT transmission~~
		- ~~otherwise, the UE is allowed for CG-SDT transmission within 640ms from TA validation~~
		- ~~After 640ms, a new TA validation should be conducted for CG-SDT~~
* ~~Recommended WF~~
	+ ~~TBA~~

**Issue 1-4-2: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE fail during CG-SDT session due to LBT failure?**

* Proposals
	+ Option 1: Take into account N and Nmax
		- if N>Nmax happens within 640ms from TA validation, the UE shall discard the CG-SDT transmission,

where N is the number of detected LBT failures and Nmax is the maximum allowed LBT failures.

* Recommended WF
	+ TBA

**Issue 1-4-3: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE has passed the TA validation but failed the CG-SDT transmission due to LBT failure?**

* Proposals
	+ Option 1: A new RSRP2 is measured, and if it passes TA validation, the UE can transmit the same data
	+ Option 2: If N<Nmax, If UE has passed the TA validation and LBT failure has occurred at CG-SDT transmission, then the UE can be allowed to transmit at the subsequent CG-SDT occasions (e.g. up to 640 ms) without performing the TA validation again. After this time (e.g. 640 ms), the UE shall re-evaluate the TA.
* Recommended WF
	+ TBA

## Companies views’ collection for 1st round

### Open issues

Sub topic 1-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | **Issue 1-1-1 Regarding EMR measurement requirement overlapping with SDT transmission, how should RAN4 understand the related RAN2 agreement?** **Issue 1-1-2 Regarding inter-frequency or inter-RAT requirement overlapping with SDT transmission, should RAN4 define exact condition for allowing UE not to meet these requirement?**  |
| Qualcomm | **Issue 1-1-1 : option 1. We think RAN2 agreement is appliable to EMR measurement as well.****Issue 1-1-2 : no**  |
| Apple | **Issue 1-1-1 Regarding EMR measurement requirement overlapping with SDT transmission, how should RAN4 understand the related RAN2 agreement?** Agree with Option 1, but also fine to wait RAN2 confirmation.**Issue 1-1-2 Regarding inter-frequency or inter-RAT requirement overlapping with SDT transmission, should RAN4 define exact condition for allowing UE not to meet these requirement?** Option 2. |
| Huawei | **Issue 1-1-1 Regarding EMR measurement requirement overlapping with SDT transmission, how should RAN4 understand the related RAN2 agreement?** Agree with Option 1, but also fine to wait RAN2 confirmation.**Issue 1-1-2 Regarding inter-frequency or inter-RAT requirement overlapping with SDT transmission, should RAN4 define exact condition for allowing UE not to meet these requirement?** Option 2. |
| Ericsson | **Issue 1-1-1 Regarding EMR measurement requirement overlapping with SDT transmission, how should RAN4 understand the related RAN2 agreement?** We support option 2. RAN4 has discussed and sent out an LS asking RAN2 to provide their feedback. Thus better to postpone the RAN4 discussions. **Issue 1-1-2 Regarding inter-frequency or inter-RAT requirement overlapping with SDT transmission, should RAN4 define exact condition for allowing UE not to meet these requirement?** We support option 1. Only when the SMTC of inter-frequency or inter-RAT overlaps with the SDT resources the UE should be allowed to skip the former measurements. Otherwise, the UE should still be able to measure inter-frequency and inter-RAT as per legacy requirements. These conditions need to be captured as well.  |
| ZTE | **Issue 1-1-1 Regarding EMR measurement requirement overlapping with SDT transmission, how should RAN4 understand the related RAN2 agreement?** Agree with Option 1, but keep square brackets for the corresponding specs texts until RAN2’s feedback. **Issue 1-1-2 Regarding inter-frequency or inter-RAT requirement overlapping with SDT transmission, should RAN4 define exact condition for allowing UE not to meet these requirement?** Option 2. |
| MTK | **Issue 1-1-1 Regarding EMR measurement requirement overlapping with SDT transmission, how should RAN4 understand the related RAN2 agreement?** Support Option 1, but also fine to wait for RAN2 reply.**Issue 1-1-2 Regarding inter-frequency or inter-RAT requirement overlapping with SDT transmission, should RAN4 define exact condition for allowing UE not to meet these requirement?** Support Option 2. |

Sub topic 1-2

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | **Issue 1-2: Whether or not to capture UE behavior into specs on selecting the largest RSRP value from multiple measured samples from Rx beam sweeping for the same SSB?** |
| Qualcomm | **Option1. How to use measured RSRP is the key of TA validation. Thus we think RAN4 should captured in Spec.**  |
| Apple | **Issue 1-2: Whether or not to capture UE behavior into specs on selecting the largest RSRP value from multiple measured samples from Rx beam sweeping for the same SSB?**We support option 1 but we can compromise to option 2. |
| Huawei | **Issue 1-2: Whether or not to capture UE behavior into specs on selecting the largest RSRP value from multiple measured samples from Rx beam sweeping for the same SSB?**Option 2.In our view, RSRP measurement for CG-SDT TA validation is no different than RSRP measurement for other purposes, e.g. cell reselection in INACITVE, or measurement reporting in CONNECTED. For measurement for other purposes, RAN4 has not specified such UE behaviour and we suggest to follow the same principle, otherwise it may cause the confusion that RSRP measurement for CG-SDT TA validation has a different UE behaviour. |
| Nokia | We prefer Option 1. Otherwise there would be uncertainty on the UE decisions regarding SDT if it chooses the wrong beam.  |
| Ericsson | Option 2 is fine. |
| ZTE | Option 2, but we could compromise to Option 1. |
| MTK | Support Option2, we share same view as Huawei. We should not differentiate between the RSRP measurements used for TA validation in CG-SDT and other purposes RSRP measurements. |

Sub topic 1-3

|  |  |
| --- | --- |
| **Company** | **Comments** |
| LGE | **Issue 1-3-1: Should the sub-bullet for T1 definition, i.e., [If TAC command is not received while in RRC Innactive, T1 is the time when the latest RRCRelease is received] be confirmed?**Option 1. While in RRC Inactive state, RRCRelease with CG-SDT is always configured to perform SDT, so T1 should be when RRCRelease with CG-SDT configuration is received while in RRC Inactive based on TS38.321. For this, we propose to remove “when changing from RRC\_CONNECTED to RRC\_INACTIVE sate” in current T1 definition in the spec.**Issue 1-3-2: In RAN4’s understanding, in which RRC state transition can an RRCRelease with CG-SDT configuration be issued?**Option 2. Following figure is our understanding to perform SDT.**Issue 1-3-3: If the answer to Issue 1-3-2 is Option 2, then which RRCRelease with CG-SDT configuration should be the reference to T1 definition?**We are fine with option 2. It is not clear for “the first” meaning.**Issue 1-3-4: Should TAC command in successfully completed RAR/MsgB in 2-step/4-step RA be considered in T1 definition in addition to that in MAC-CE ?**In our understanding, RAN2 has agreed not to support following behavior in the last RAN2 meeting.* *The pathloss reference for CG-SDT can be updated by any TAC received when CG-SDT is configured, even for the TAC received during RA-SDT procedure*.

So, we support option 2. |
| Qualcomm | **Issue 1-3-1: Should the sub-bullet for T1 definition, i.e., [If TAC command is not received while in RRC Innactive, T1 is the time when the latest RRCRelease is received] be confirmed?**We understand LGE’s comments. However, it is not clear what MO UE to measure RSRP. We are open to discuss this issue but need to wait RAN2 agreement.**Issue 1-3-2: In RAN4’s understanding, in which RRC state transition can an RRCRelease with CG-SDT configuration be issued?**Option 2. We have same view as LGE**Issue 1-3-3: If the answer to Issue 1-3-2 is Option 2, then which RRCRelease with CG-SDT configuration should be the reference to T1 definition?**We think it depends on how UE handle MO to measure RSRP as there is no MO in second RRCrelease with CG-SDT. We need to wait RAN2 agreement. **Issue 1-3-4: Should TAC command in successfully completed RAR/MsgB in 2-step/4-step RA be considered in T1 definition in addition to that in MAC-CE ?**We have same view as LGE.  |
| Apple | **Issue 1-3-1: Should the sub-bullet for T1 definition, i.e., [If TAC command is not received while in RRC Innactive, T1 is the time when the latest RRCRelease is received] be confirmed?**Option 1.**Issue 1-3-2: In RAN4’s understanding, in which RRC state transition can an RRCRelease with CG-SDT configuration be issued?**Option 2, based on RAN2 definition.**Issue 1-3-3: If the answer to Issue 1-3-2 is Option 2, then which RRCRelease with CG-SDT configuration should be the reference to T1 definition?**Our proposal is option 2 but can compromise to option 1. And the definition of ‘first’ shall be clarified, i.e., it’s the latest RRCRelease with CG-SDT configuration received for RRC\_CONNECTED to RRC\_INACTIVE. Both option 1 and 2 has the same problem: if UE moved after last TAC timing, the RSRP1 measured at RRC release cannot represent the actual TA, as shown in the following figures. An alternative way to address this issue is: make TAC update together with the RRC release with SDT configuration, either using a side condition of “send TAC together with RRC release” for SDT RRM requirement or introducing TAC inside RRC release message.**Issue 1-3-4: Should TAC command in successfully completed RAR/MsgB in 2-step/4-step RA be considered in T1 definition in addition to that in MAC-CE ?**Option 1. I think the RAN2 previous conclusion is before received RAN4 LS, and at that time they thought the T1 is associated with RRC release only. However, after RAN4 LS, now I think it shall still support following,The pathloss reference for CG-SDT can be updated by any TAC received when CG-SDT is configured, even for the TAC received during RA-SDT procedure.**Moderator:**Regarding the meaning of “the first” in Issue 1-3-3, it refers to the first RRCRelease with CG-SDT configuration when changing from RRC\_CONNECTED to RRC\_INACTIVE state. |
| Huawei | **Issue 1-3-1: Should the sub-bullet for T1 definition, i.e., [If TAC command is not received while in RRC Innactive, T1 is the time when the latest RRCRelease is received] be confirmed?**Option 2.When UE is in INACTIVE, TA can be only updated via TAC but not via RRCRelease. T1 is the time where UE obtains RSRP1, and it should be only the time when TA is updated, otherwise it cannot reflect the distance between the UE and BS when TA is updated. One exception case as discussed in issue 1-3-2 and 1-3-3 is that when UE is released from CONNECTED to INACTIVE, NW does not configure CG-SDT, but during UE is in INACTIVE NW sends an RRCRelease message with CG-SDT configuration. In this case, UE has no way but to store RSRP1 when receiving this RRCRelease message. **Issue 1-3-2: In RAN4’s understanding, in which RRC state transition can an RRCRelease with CG-SDT configuration be issued?**Option 2.As mentioned above, it could happen that when UE is released from CONNECTED to INACTIVE, NW does not configure CG-SDT, but during UE is in INACTIVE NW sends an RRCRelease message with CG-SDT configuration. Therefore, we should also consider RRC\_INACTIVE to RRC\_INACTIVE.**Issue 1-3-3: If the answer to Issue 1-3-2 is Option 2, then which RRCRelease with CG-SDT configuration should be the reference to T1 definition?**Option 1.As mentioned above, the only case where UE needs to store RSRP1 when receiving this RRCRelease message is when it is the first RRCRelease message with CG-SDT configuration, either from CONNECTED to INACTIVE, or from INACTIVE to INACTIVE. Otherwise, UE should store RSRP1 only when receiving TAC because RSRP1 needs to reflect the distance between the UE and BS when TA is updated.We agree with Apple that option 1 may also cause the mismatch between RSRP1 and the distance between the UE and BS when TA is updated. On the other hand, defining “send TAC together with RRC release” as side condition may impose unnecessary restriction to the NW, e.g. when UE is not moving, NW may have no motivation to send TAC together with RRCRelease. We understand this issue can be addressed by NW implementation, e.g. NW can send TAC together with the first RRCRelease message with CG-SDT configuration when it considers the previous TA may get invalid. We are also open to further discussions.**Issue 1-3-4: Should TAC command in successfully completed RAR/MsgB in 2-step/4-step RA be considered in T1 definition in addition to that in MAC-CE ?**Option 1.We understand the reason RAN2 did not agree on the bullet was that they assumed the issue will be discussed in RAN4. Technically, when UE is in INACTIVE, TA can be updated also with RA procedure, so we see no reason not to update RSRP1 for this case. |
| Nokia | **Issue 1-3-1: Should the sub-bullet for T1 definition, i.e., [If TAC command is not received while in RRC Innactive, T1 is the time when the latest RRCRelease is received] be confirmed?**We prefer Option 2, since the T1 basically means the time when the UE has the most accuracy TAC information. **Issue 1-3-2: In RAN4’s understanding, in which RRC state transition can an RRCRelease with CG-SDT configuration be issued?**Our preference is Option 1.**Issue 1-3-4: Should TAC command in successfully completed RAR/MsgB in 2-step/4-step RA be considered in T1 definition in addition to that in MAC-CE ?**Option 1: yes |
| Ericsson | **Issue 1-3-1: Should the sub-bullet for T1 definition, i.e., [If TAC command is not received while in RRC Innactive, T1 is the time when the latest RRCRelease is received] be confirmed?**We think more input is needed from RAN2 and more discussions in RAN4 is needed on the need to update the T1 definition. Thus we support option 2 based on current status. **Issue 1-3-2: In RAN4’s understanding, in which RRC state transition can an RRCRelease with CG-SDT configuration be issued?**Same comment as for 1-3-1, input from RAN2 is needed. **Issue 1-3-3: If the answer to Issue 1-3-2 is Option 2, then which RRCRelease with CG-SDT configuration should be the reference to T1 definition?**Same comment as for 1-3-1, input from RAN2 is needed. **Issue 1-3-4: Should TAC command in successfully completed RAR/MsgB in 2-step/4-step RA be considered in T1 definition in addition to that in MAC-CE ?**Similar view as LG and QC, and thus we support option 2. However, we are open to discuss it based on RAN2 input.  |
| ZTE | **Issue 1-3-1: Should the sub-bullet for T1 definition, i.e., [If TAC command is not received while in RRC Innactive, T1 is the time when the latest RRCRelease is received] be confirmed?**Option 2. In our understanding, the sub-bullet seems not necessary. However, we are fine with Option 2 as clarification texts in specs.**Issue 1-3-2: In RAN4’s understanding, in which RRC state transition can an RRCRelease with CG-SDT configuration be issued?**Option 2.**Issue 1-3-3: If the answer to Issue 1-3-2 is Option 2, then which RRCRelease with CG-SDT configuration should be the reference to T1 definition?**Option 2, the latest RRCRelease with CG-SDT configuration.**Issue 1-3-4: Should TAC command in successfully completed RAR/MsgB in 2-step/4-step RA be considered in T1 definition in addition to that in MAC-CE ?**Option 1, it should be considered. |
| LGE | **Issue 1-3-1: Should the sub-bullet for T1 definition, i.e., [If TAC command is not received while in RRC Innactive, T1 is the time when the latest RRCRelease is received] be confirmed?**In our understanding, RAN2 is preparing the reply LS to RAN4 including their agreement: T1 is the time when RRCRelease with CG-SDT configuration received for both from RRC\_CONNECTED to RRC\_INACTIVE state and while in RRC\_INACTIVE state. So, RAN4 should reflect the agreement.To QC, for MO issue, RAN2 is discussing in this meeting.**Issue 1-3-2: In RAN4’s understanding, in which RRC state transition can an RRCRelease with CG-SDT configuration be issued?**Based on above comments, option 2 is valid **Issue 1-3-3: If the answer to Issue 1-3-2 is Option 2, then which RRCRelease with CG-SDT configuration should be the reference to T1 definition?**To apple, Huawei,We think we need to distinguish the issue between TA update and RSRP1. For TA updating, if UE moves away from gNB, network will provide MAC CE TAC. It is normal procedure. And RAN4 has already defined RSRP1 is updated when MAC CE TAC is received. So, we think there is no issue about TA update. **Issue 1-3-4: Should TAC command in successfully completed RAR/MsgB in 2-step/4-step RA be considered in T1 definition in addition to that in MAC-CE ?**RAN4 should take RAN2 agreements. If we consider this in RAN4 specification, there would be inconsistency between RAN2 and RAN4. To Huawei,In our understanding, there was no any assumption and agreement that the following agreement of RAN2 would be discussed in RAN4. * *Not to support: The pathloss reference for CG-SDT can be updated by any TAC received when CG-SDT is configured, even for the TAC received during RA-SDT procedure*.
 |
| MTK | **Issue 1-3-1: Should the sub-bullet for T1 definition, i.e., [If TAC command is not received while in RRC Innactive, T1 is the time when the latest RRCRelease is received] be confirmed?**Support Option 2. In our understanding, this sub-bullet is redundant,**Issue 1-3-2: In RAN4’s understanding, in which RRC state transition can an RRCRelease with CG-SDT configuration be issued?**Support Option 2. But we also want to confirm whether CG-SDT configurations can be received when RRCRelease is received for transiting the UE from RRC\_INACTIVE back to RRC\_INACTIVE.**Issue 1-3-3: If the answer to Issue 1-3-2 is Option 2, then which RRCRelease with CG-SDT configuration should be the reference to T1 definition?**Option 2, same view as LGE, QC, ZTE.**Issue 1-3-4: Should TAC command in successfully completed RAR/MsgB in 2-step/4-step RA be considered in T1 definition in addition to that in MAC-CE ?**Option 2. We are also open to discuss option 1. |

Sub topic 1-4

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| **Company** | **Comments** |
| XXX | **Issue 1-4-1: Should RAN4 specify SDT requirements for NR-U?****Issue 1-4-2: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE fail during CG-SDT session due to LBT failure?****Issue 1-4-3: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE has passed the TA validation but failed the CG-SDT transmission due to LBT failure?** |
| Qualcomm | Issue 1-4-1 : Option1, Yes, we understood the timeline is tight. At least, RAN4 can define how UE behaviour with LBT failure and CG-SDT transmission.Issue1-4-2 : Option1. The maximum trial number should be defined.Issue1-4-3 : Option2. This will save UE power to avoid redundant re-transmission of CG-SDT  |
| Apple | **Issue 1-4-1: Should RAN4 specify SDT requirements for NR-U?**We slightly prefer Option 1 since in WID(RP-212594) it states that “Focus of the WID should be on licensed carriers and the solutions can be reused for NR-U if applicable. ” **Issue 1-4-2: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE fail during CG-SDT session due to LBT failure?**Fine with option 1.**Issue 1-4-3: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE has passed the TA validation but failed the CG-SDT transmission due to LBT failure?**Option 1. Our understanding is the TA validation is needed for initial transmission of SDT, and therefore the deferred SDT transmission after LBT failure shall also needs TA validation; otherwise, if UE encounters with the consistent LBT failures on initial SDT transmission, the TA for first valid SDT transmission will be wrongly used (original TA validation is out of data) without new TA validation. But UE only needs to perform RSRP2 at a new T2’ measurement to compare with the stored RSRP1 at T1’. Moreover, the time span between T2 and SDT occasion is up to 640ms, and T2 window length is also up to 640ms, so the time span between old T2’ to the deferred initial SDT occasion will be very likely much greater than 640ms (timing drifting is serious), and therefore we think it would be simpler to do RSRP2 measurement before the deferred initial SDT occasion. |
| Huawei | **Issue 1-4-1: Should RAN4 specify SDT requirements for NR-U?**Option 2.It should be noted that the core part of the WI is already closed. Also, based on the WID, no additional requirement should be discussed for NR-U. **Issue 1-4-2: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE fail during CG-SDT session due to LBT failure?**Pending on issue 1-4-1. We understand the proposals are to define additional requirements for NR-U, instead of re-using the solution for licensed.**Issue 1-4-3: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE has passed the TA validation but failed the CG-SDT transmission due to LBT failure?**Pending on issue 1-4-1. We understand the proposals are to define additional requirements for NR-U, instead of re-using the solution for licensed. |
| Nokia | **Issue 1-4-1: Should RAN4 specify SDT requirements for NR-U?**Option 2: NoThis is very late to introduce NRU in the maintenance phase of the WID. **Issue 1-4-2: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE fail during CG-SDT session due to LBT failure?**Pending on Issue 1-4-1**Issue 1-4-3: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE has passed the TA validation but failed the CG-SDT transmission due to LBT failure?**Pending on Issue 1-4-1 |
| Ericsson | **Issue 1-4-1: Should RAN4 specify SDT requirements for NR-U?**We are fine with option 1. Our understanding is that SDT+NR-U is already supported from RAN1/RAN2 specification point of view, however the RRM requirements are missing. We also share the view from Apple that *“Focus of the WID should be on licensed carriers and the solutions can be reused for NR-U if applicable. ” .* In our view, introducing these do not require any significant effort since the principle of defining NR-U requirements can be reused. **Issue 1-4-2: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE fail during CG-SDT session due to LBT failure?**We support option 1 which is following the same method used in the Rel-16 NR-U requirements. It does not require any extra effort. **Issue 1-4-3: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE has passed the TA validation but failed the CG-SDT transmission due to LBT failure?**We support option 2. Our view is that UE can transmit CG-SDT without re-evaluating the TA if it has already evaluated the TA to be valid but was unable to carry out the CG-SDT transmission due to LBT failure. This would be reasonable since CG-SDT is expected to be configured in low mobility scenarios. However, after certain time, e.g. 640 ms UE should re-evaluate the TA. We are open to keep the values in [ ] or discuss other values if needed. |
| ZTE | **Issue 1-4-1: Should RAN4 specify SDT requirements for NR-U?**Option 2 considering it is now very late in Rel-17 time-line.**Issue 1-4-2: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE fail during CG-SDT session due to LBT failure?**Option 1 pending on Issue 1-4-1.**Issue 1-4-3: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE has passed the TA validation but failed the CG-SDT transmission due to LBT failure?**Option 2, pending on Issue 1-4-1. |
| MTK | **Issue 1-4-1: Should RAN4 specify SDT requirements for NR-U?**Support Option 2, we agree with Huawei, Nokia, and ZTE. This issue was already closed in the last meeting, and we have already agreed not to discuss it, we should respect the previous agreement.**Issue 1-4-2: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE fail during CG-SDT session due to LBT failure?**Not to discuss based on Issue 1-4-1.**Issue 1-4-3: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE has passed the TA validation but failed the CG-SDT transmission due to LBT failure?**Not to discuss based on Issue 1-4-1. |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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|  | **Status summary**  |
| **Sub-topic #1-1** | *Tentative agreements:** *For Issue 1-1-1, Five companies go for Option 1, where 4 of them can also accept Option 2. One company goes for Option 2. Moderator suggests not to discuss this issue any more before RAN2’s feedback, and corresponding specs texts will be updated if necessary only after RAN2’s feedback.*
* *For Issue 1-1-2, an absolute majority view (5 to 1) is observed on Option 2. One case was brought out where the UE is still able to perform inter-freq/inter-RAT measurement when inter-frequency or inter-RAT requirement overlapping with SDT transmission, and if the SMTC of inter-frequency or inter-RAT does not overlap with the SDT resources. Moderator suggests to continue discuss this case. ~~conclude as Option 2, i.e., RAN4 does not define exact condition for allowing UE not to meet inter-frequency or inter-RAT requirement overlapping with SDT transmission.~~*

*Candidate options:**New issue 1-1-3:**Whether or not there is a case where the UE is still able to perform inter-freq/inter-RAT measurement when inter-frequency or inter-RAT requirement overlapping with SDT transmission, and if the SMTC of inter-frequency or inter-RAT does not overlap with the SDT resources?**Recommendations for 2nd round:*Issue 1-1-1: Closed in this meeting, no more discussion in the second round.Issue 1-1-2: ~~Option 2 agreed, no more discussion in the second round~~. Continue discuss the new issue 1-1-3. |
| **Sub-topic #1-2** | *Tentative agreements:** *For Issue 1-2, three votes for Option 1, out of which one can also compromise to Option 2, and four votes for Option 2, out of which can also accept Option 1. Moderator noticed one point that UE behavior with regards to RSRP measurement may be the same for different purposes e.g., CG-SDT, cell reselection in RRC\_INACTIVE state, and measurement report in RRC\_CONNECTED, and suggests to focus on this point in the second round.*

*Candidate options:**Further discuss the new issue 1-2-2: whether or not the UE behavior on RSRP measurement for TA validation should be the same as that for other purposes.**Option 1: yes, the same UE behavior on RSRP measurement for different purposes including TA validation**Option 2: No, please elaborate in which aspect the UE behavior on RSRP measurement for TA validation differs from that for other purposes.**Recommendations for 2nd round:****New issue 1-2-2: Should the UE behavior on RSRP measurement for TA validation be the same as that for other purposes?****Option 1: yes, the same UE behavior on RSRP measurement for different purposes including TA validation**Option 2: No, please elaborate in which aspect the UE behavior on RSRP measurement for TA validation should differ from that for other purposes.* |
| **Sub-topic #1-3** | * *Tentative agreements:For Issue 1-3-1, two votes for Option 1, five votes for Option 2, and one vote for the need of more input from RAN2 with one concern on what MO UE to measures RSRP. One case is raised that if the RRCRelease for the transition from RRC\_CONNECTED to RRC\_INACTIVE does not contain a CG-SDT configuration, then another RRCRelease with CG-SDT configuration should be issued in RRC\_INACTIVE, and moreover in this case, if there is no TAC received, then T1 is the moment when receiving the RRCRelease with CG-SDT configuration. In Moderator’s reading, this case is not covered even if we confirm the sub-bullet. Another RRCRelease with an updated CG-SDT configuration (e.g., BWP change) in RRC\_INACTIVE is possible as well. Therefore, Moderator suggests*
	+ *~~not~~ FFS to confirm the sub-bullet*
	+ *align understanding on RRCRelease with CG-SDT configuration issued in RRC\_INACTIVE state for CG-SDT transmission:*
		- *FFS for Case 1 and Case 2:*
			* *Case 1: No CG-SDT is configured in the RRCRelease when changing from RRC\_CONNECTED to RRC\_INACTIVE, therefore an RRCRelease with CG-SDT configuration is needed in RRC\_;*
			* *Case 2: A new CG-SDT can be configured via RRCRelease in RRC\_INACTIVE~~, e.g., the cause could be change of BWP etc~~.*
	+ *decouple the T1 definition from what MO UE to measure RSRP within the first window for TA validation.*

*And focus on T1 definition wording based on the above suggestions in the second round.** *For Issue 1-3-2, a majority view is observed on Option 2 (6 votes), and based on the wrap-up on Issue 1-3-1, Moderator suggests to ~~go for Option 2~~ close this issue and focus on T1 definition wording in the second round.*
* *For Issue 1-3-3, four votes for Option 2, one vote for Option 1, and two votes for requiring more inputs from RAN2. Moderator suggests to ~~go for Option 2 and~~ close this issue and focus on T1 definition wording in the second round.*
* *For Issue 1-3-4, sided view observed between Option 1 and Option 2 (4:4). Moderator suggests to close this issue in this meeting and come back in future meetings when there are more inputs from RAN2*

*Candidate options:**Recommendations for 2nd round:** *New issue 1-3-5: which case(s) are valid on RRCRelease with CG-SDT configuration issued in RRC\_INACTIVE state for CG-SDT transmission:*
	+ *Case 1: No CG-SDT is configured in the RRCRelease when changing from RRC\_CONNECTED to RRC\_INACTIVE, therefore an RRCRelease with CG-SDT configuration is needed in RRC\_;*
	+ *Case 2: A new CG-SDT can be configured via RRCRelease in RRC\_INACTIVE~~, e.g., the cause could be change of BWP etc~~.*
* *Continue discussion ~~Focus~~ on T1 definition wording based on the above aligned understanding if possible in the revised CR ~~suggestions in the tentative agreements on Issue 1-3-1.~~*
 |
| **Sub-topic #1-4** | *Tentative agreements:** *For Issue 1-4-1, a sided view observed between Option 1 and Option 2 (3 Vs 4).*
* *For Issue 1-4-2, four votes for Option 1 if NR-U support is agreed in Issue 1-4-1, three votes for waiting for the outcome of Issue 1-4-1*
* *For Issue 1-4-3, three votes for Option 2 and one vote for Option 1 if NR-U support is agreed in Issue 1-4-1, three votes for waiting for the outcome of Issue 1-4-1.*
* *In Moderator’s reading, if SDT for NR-U does not require much efforts and has no cross-group specs impacts, the door is still open in TEI-17, otherwise it is too late to introduce such support at this stage. Moderator suggests to continue to discuss these three issues in the second round. ~~Therefore, Moderator suggests to close these issues and focus on other issues in this meeting~~.*

*Candidate options:**Recommendations for 2nd round:**~~No further discussion in the second round.~~ Continue discussion on the three issues.* |

## Discussion on 2nd round (if applicable)

*New issue 1-1-3:*

*Whether or not there is a case where the UE is still able to perform inter-freq/inter-RAT measurement when inter-frequency or inter-RAT requirement overlapping with SDT transmission, and if the SMTC of inter-frequency or inter-RAT does not overlap with the SDT resources?*

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| **Company** | **Comments** |
| Qualcomm | **RAN4 already had agreement that UE does not require to perform inter/inter-RAT frequency measurement.**  |
| ZTE | It does not matter since RAN4 has already had agreement. |
| Apple | Same as QC and ZTE. |
| Huawei  | Same comment as QC, ZTE and Apple, and suggest to follow the existing agreement.Technically, it will take quite some spec efforts to define the exact overlapping conditions, and it will also increase the UE implementation complexity as UE has to check the conditions. Considering the timeline of the WI, we suggest to not define the exact overlapping condition for allowing UE not to meet inter-frequency and inter-RAT requirements. |
| MTK | Agree with QC, we already have an agreement on this issue. |

***New issue 1-2-2: Should the UE behavior on RSRP measurement for TA validation be the same as that for other purposes?***

* *Option 1: yes, the same UE behavior on RSRP measurement for different purposes including TA validation*
* *Option 2: No, please elaborate in which aspect the UE behavior on RSRP measurement for TA validation should differ from that for other purposes.*

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| **Company** | **Comments** |
| Qualcomm | We can compromise to option 1.  |
| ZTE | Option 1, yes. |
| Apple | Can compromise to option 1. |
| Huawei  | Option 1. |
| Ericsson | The meaning of this new issue is not clear. Can the moderator explain what it meant by same UE behaviour as for other purposes? What is “UE behavoiur on RSRP measurement”? Since the issue and intention is not clear, we cannot agree to any of the options.  |
| Moderator | Reply to Ericsson on the question on the meaning of this new issue:In the first round discussion on Issue 1-2, there is one comment (Huawei) that the UE behavior on RSRP measurement, e.g. cell reselection in INACITVE, or measurement reporting in CONNECTED, has no difference from TA validation. If we agree on this, then the answer to Issue 1-2 is clear, that is, no need to capture UE behavior into specs on selecting the largest RSRP value from multiple measured samples from Rx beam sweeping for the same SSB.Hope this clarifies. |
| MTK | Support option 1. |

* *~~Focus on T1 definition wording based on the suggestions in the tentative agreements on Issue 1-3-1.~~*

***New issue 1-3-5: which case(s) are valid on RRCRelease with CG-SDT configuration issued in RRC\_INACTIVE state for CG-SDT transmission****?*

* + *Case 1: No CG-SDT is configured in the RRCRelease when changing from RRC\_CONNECTED to RRC\_INACTIVE, therefore an RRCRelease with CG-SDT configuration is needed in RRC\_;*
	+ *Case 2: A new CG-SDT can be configured via RRCRelease in RRC\_INACTIVE~~, e.g., the cause could be change of BWP etc~~.*

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| **Company** | **Comments** |
| LGE | We think the case 1 and 2 are not valid scenario. If CG-SDT is not configured in the RRCRelease when changing from CONNCECTE to INACITVE state, RRCRelease with CG-SDT can no longer be configured while in INACTIVE state. For case 2, it is not clear what new CG-SDT is. We are fine to send LS to RNA2 in order to confirm if case 1 and case 2 are valid scenario. For further information, RAN2 agreed to send reply LS to RAN4 with capturing revised T1 definition, and the draft LS is below. The reply LS is not approved yet, but there were no comments for the draft LS, so we think it seems stable and almost final version in RAN2. We’d like to ask companies double-check RAN2 status to finalize T1 definition in 2nd round.

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| In addition, RAN2 also noticed that RAN4 agreement below about T1 definition only considers the transition from RRC\_CONNECTED to RRC\_INACTIVE:* When changing from RRC\_CONNECTED to RRC\_INACTIVE state, T1 is the time when RRCRelease with CG-SDT configuration is received

For the above agreement, RAN2 would like to point out that RRCRelease message with CG-SDT configuration can also be received by the UE when the UE initiates SDT procedure from INACTIVE state (i.e. without moving into connected state). Hence, the definition of T1 should also consider this transition. One option could be to change T1 definition as below: * If RRCRelease message is received by the UE with CG-SDT configuration, T1 is the time when the RRCRelease with CG-SDT configuration is received
* If TA command is received while in RRC\_INACTIVE state, T1 is the time when the latest MAC CE TA command is received
 |

We think T1 definition could be * If RRCRelease message is received by the UE with CG-SDT configuration, T1 is the time when the RRCRelease with CG-SDT configuration is received
* If TA command is received while in RRC\_INACTIVE state, T1 is the time when the latest MAC CE TA command is received
 |
| ZTE | RAN2 has agreed a reply LS to RAN4, and according to this reply LS,

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| For the above agreement, RAN2 would like to point out that RRCRelease message with CG-SDT configuration can also be received by the UE when the UE initiates SDT procedure from INACTIVE state (i.e. without moving into connected state) |

CG-SDT configuration can be issued to the UE when the UE initiates SDT procedure, still in INACTIVE state, therefore, at least Case 2 is a valid case.Furthermore, RAN2 also suggests an option to update the T1 definition which is the same as LGE suggested:

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| * If RRCRelease message is received by the UE with CG-SDT configuration, T1 is the time when the RRCRelease with CG-SDT configuration is received
* If TA command is received while in RRC\_INACTIVE state, T1 is the time when the latest MAC CE TA command is received
 |

Unless RAN4 identifies other aspects, we suggests to go for this definition in order to save our efforts. |
| Qualcomm | As LGE and ZTE mentioned, the agreed LS from RAN2 define clear T1 definition. We think removing [from CONNECTED to INACTIVE state] is sufficient to define T1. Thus, RAN4 does not need to differentiate each cases (Case1, Case2) for defining T1. |
| Apple | Fine to follow RAN2 agreement as in reply LS. But we are wondering why TA updating in RAR is precluded for the T1 definition during Inactive state |
| Huawei  | We are also fine to follow the RAN2 LS to update T1 definition as suggested by LGE and ZTE. It is noted that the consequence is that UE will update RSRP1 every time it receives RRCRelease with CG-SDT configuration (no matter in CONNECTED or INACTIVE), so the NW has to make sure to provide TAC together with the RRCRelease when it finds the existing TA is not proper for the UE. This will put more responsibility to the NW but maybe still manageable, so we are also fine to go with this way given RAN2 already reached agreement.We agree with QC that if RAN4 agrees to update T1 definition following RAN2 LS, there is then no need to differentiate each cases (Case1, Case2), so perhaps we can conclude the issue in this meeting and do not need to send another LS to RAN2 to clarify (Case1, Case2).We also agree with Apple that the TAC from RAR should be also accounted, otherwise there will be a mismatch between TA and the RSRP1. |
| Qualcomm | To Apple and Huawei: we think the current T1 definition when UE receive RRC release message with CG-config also cover RA-SDT cases. Anyhow UE will update TA during RAR and then UE will measure reference RSRP when UE receive RRC\_release with CG-SDT config. So, UE still have latest TA and latest measured reference RSRP. There is no corner case from revised T1 definition by removing [CONNECTED to INACTVE]. |
| Nokia | We thinkwhether CG-SDT configuration is present in the RRCRelease is not really relevant. THe important part is that the UE needs to have a valid CG-Sdt configuration. For example, if RRCRelease after a SDT transmition does not contain CG-SDT config, than this message would be potentially relevant for T1If CG-SDT is not configured, and the UE receives a RRCRelease while ininnactive without the CG-SDT configuration than the UE would not be expected to use this for measurement of RSRP1.  |
| Ericsson | Similar view as QC. RAN4 can simploy remove the cases and keep a high-level definition of T1 by removing the “from CONNECTED to INACTIVE state” in the T1 defintion.  |
| ZTE | Regarding TAC from RAR, we have the same understanding as Qualcomm.  |
| MTK | We also think the reply LS from RAN2 should be sufficient to define T1. We can use the same wording from RAN2 for T1 definition. |

* *Continue discussion ~~Focus~~ on T1 definition wording based on the above aligned understanding if possible in the revised CR ~~suggestions in the tentative agreements on Issue 1-3-1.~~*
	+ *A revised CR from R4-2212192 on T1 definition is suggested.*

Continue discussion on issues for SDT for NR-U:

**Issue 1-4-1: Should RAN4 specify SDT requirements for NR-U?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | **We are okay with option 1. We think workload require minimum efforts. The following issues (1-4-2, 1-4-3) are only requirements to reuse the existing requirements for SDT in NR-U. Furthermore, this topic was introduced from RAN4 103-e and closed for further study purpose.**  |
| ZTE | If we introduce such support at this stage, even if the efforts to specify the core requirements are minimum, the corresponding performance test cases would require more efforts. We are open to include such support in a future release. |
| Apple  | Fine with option 1. |
| Huawei  | Prefer option 2.In our understanding, based on the WID no additional requirement should be discussed for NR-U. |
| Nokia | Prefer Option 1. We can consider that for Rel 18.  |
| Ericsson | We also support option 1. Regarding the test cases, even the test cases for standalone SDT is not settled yet. So we think this is a minor issue. As pointed out by companies, WID allows to apply SDT for unlicensed band. Also option 1 can be done without any impact other WGs. |
| MTK | We support option 2. We have same concern as ZTE. Given the core part is already closed we don’t want to introduce new requirements. |

**Issue 1-4-2: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE fail during CG-SDT session due to LBT failure?**

* Proposals
	+ Option 1: Take into account N and Nmax
		- if N>Nmax happens within 640ms from TA validation, the UE shall discard the CG-SDT transmission,

where N is the number of detected LBT failures and Nmax is the maximum allowed LBT failures.

* Recommended WF
	+ TBA

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| --- | --- |
| **Company** | **Comments** |
| Qualcomm | We are okay with option 1 to handle LBT failure. The maximum trial should be defined to drop CG-SDT. The exact number of Nmax can be discussed later similar to other LBT failure related topics.  |
| ZTE | In addition to comments on Issue 1-4-1, we are not sure if the support of SDT for NR-U may have impact on signaling design. |
| Apple | Fine with option 1 |
| Huawei  | Pending on issue 1-4-1. |
| Ericsson | We support option 1. Option 1 does not require any signaling. Option 1 follows the approach used in Rel-16 NR-U for defining the requirements, thus no RAN2 impact.  |
| MTK | Pending on issue 1-4-1. |

**Issue 1-4-3: If the answer to Issue 1-4-1 is Yes, what UE should do if the UE has passed the TA validation but failed the CG-SDT transmission due to LBT failure?**

* Proposals
	+ Option 1: A new RSRP2 is measured, and if it passes TA validation, the UE can transmit the same data
	+ Option 2: If N<Nmax, If UE has passed the TA validation and LBT failure has occurred at CG-SDT transmission, then the UE can be allowed to transmit at the subsequent CG-SDT occasions (e.g. up to 640 ms) without performing the TA validation again. After this time (e.g. 640 ms), the UE shall re-evaluate the TA.
* Recommended WF
	+ TBA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | We are okay with Option2. This way to save UE power due to LBT failure. When UE pass TA validation but LBT failure, the next trial should perform within max CG-SDT period (640ms). Within this period, the timing drift is still valid in terms of Te limit requirements because TA validation window was designed based on 640ms period. |
| ZTE | In addition to comments on Issue 1-4-1, we are not sure if the support of SDT for NR-U may have impact on signaling design. |
| Apple | Option 1 but fine to FFS.Our understanding is the TA validation is needed for initial transmission of SDT, and therefore the deferred SDT transmission after LBT failure shall also needs TA validation; otherwise, if UE encounters with the consistent LBT failures on initial SDT transmission, the TA for first valid SDT transmission will be wrongly used (original TA validation is out of data) without new TA validation. But UE only needs to perform RSRP2 at a new T2’ measurement to compare with the stored RSRP1 at T1’. Moreover, the time span between T2 and SDT occasion is up to 640ms, and T2 window length is also up to 640ms, so the time span between old T2’ to the deferred initial SDT occasion will be very likely much greater than 640ms (timing drifting is serious), and therefore we think it would be simpler to do RSRP2 measurement before the deferred initial SDT occasion. |
| Huawei  | Pending on issue 1-4-1. |
| Ericsson | We also support option 2 which is good form a power consumption perspective. But we are fine to keep it FFS to allow companies to check.  |
| MTK | Pending on issue 1-4-1. |

### Second-round wrapup

|  |  |
| --- | --- |
|  | **Status summary and Moderator’s recommendation** |
| New issue 1-1-3 | Summary: * Unaimously agree to follow RAN4 existing agreements.

Recommendation:* Follow the RAN4 existing agreements.
* Close the issue.
 |
| New issue 1-2-2 | Summary: Option 1 is acceptable to most of companies, and one company raised a concern on the meaning of this issue. Moderator replied and clarified the link between this issue and Issue 1-2. With the clarification, Moderator suggests to go for Option 1 and conclude Issue 1-2 that not need to capture UE behavior into specs on selecting the largest RSRP value from multiple measured samples from Rx beam sweeping for the same SSBRecommendation:* The same UE behavior on RSRP measurement for different purposes including TA validation
* Do not capture UE behavior into specs on selecting the largest RSRP value from multiple measured samples from Rx beam sweeping for the same SSB
 |
| New Issue 1-3-5 | Summary:* Different views on validity of case 1 and 2, and some companies think no need to differentiate these two cases in RAN4, which means the new LS from RAN4 to RAN2 seems not necessary
* T1 definition update in RAN2 reply LS is acceptable,
* Regarding whether or not to consider TAC from RAR, there are different views or understandings, however, according to the latest RAN2 agreement, TAC from RAR should be considered, and the T1 definition update suggested by RAN2 already covered this case.

Recommendation:* TAC from RAR should be considered
* RAN4 accept T1 definition update in RAN2 reply LS and do not differentiate these two cases
* Close the issue and do not send a new LS to RAN2
 |
| SDT for NR-U (Issue 1-4-1/2/3) | Summary:Issue 1-4-1: Sided views on whether or not to specify SDT requirements for NR-U (4 vs 3). Issue 1-4-2/3: Pending on Issue 1-4-1.Moderator suggest to continue discussion in GTW session. |

# Topic #2: Performance requirements for NR SDT

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **TDoc** | **Title** | **Source** | **Moderator’s remarks** |
| [**R4-2211615**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2211615.zip) | RRM performance requirements for CG-SDT | Qualcomm Incorporated | If RAN4 agrees to define test cases for CG-SDT, the contribution proposes:* Test procedure with 5 steps:

(1) Measure reference RSRP1 (2) Increasing or decreasing RSRP from RSRP1(3) Application trigger UL data during RRC INACTIVE state.(4) RSRP2 should meet or not meet the RSRP threshold at TA validation time point. (5) Transmit PUSCH or not transmit PUSCH on CG-SDT occasion.* Test objective and config
 |
| [**R4-2212684**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212684.zip) | On demodulation performance requirements for SDT | Nokia, Nokia Shanghai Bell | Calculation shows the TA error added by TA validation in the worst case: * 11% of CP for FR1 30kSCS
* 20% of CP for FR2 120kSCS
* moving velocity 10m/s

Moderator: No proposal (only observations). And further potential questions: (1) The worst-case consideration/impact? (2) Speed limit for CG-SDT? |
| [**R4-2212685**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212685.zip) | Discussion on performance requirements for SDT | Nokia, Nokia Shanghai Bell | * A full-scaled SDT decision tree illustrated
* Test cases with different decision points and parameter variations are associated with different path through the decision tree. 9 example paths illustrated
* Propose to cover all decision points when designing test cases
* In a test case where TA validation is supposed to fail, either RA-CGT is not configured, or RA-CGT is configured and the UE may transmit data using RA-CGT if supported
* Define TA test cases: if UE measures RSRP1/RSRP2 outside the specified windows, the test should fail
* Define TA test cases: if TA validation condition (i.e., Condition A or Condition B) is met, UE should pass the test when transmitting CG-SDT
* Define TA test cases where TE can trigger CG-SDT for UE in RRC\_INACTIVE
* Define TA test cases to verify the validity of TAT timer
* Define TA test cases where tests should fail if TAT timer has expired
 |
| [**R4-2213377**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213377.zip) | On RRM performance requirements for NR SDT | ZTE Wistron Telecom AB | * No additional RRM test case for verifying UE initial transmission timing requirements should be introduced for NR SDT.
* No additional RRM test case for verifying UE synchronization requirements should be introduced for NR SDT.
* Before obtaining feedback on the LS to RAN5, RAN4 holds on works on specifying RRM performance requirements on TA validation for CG-SDT
 |
| [**R4-2213404**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213404.zip) | Discussions on RRM performance requirements for SDT | Ericsson | * Hold on discussions on introducing test cases for RA-SDT and CG-SDT until receiving RAN5’s reply LS on the test feasibility

Moderator: It was agreed in RAN4#103-e that no new test cases are introduced for RA-SDT |
| [**R4-2213560**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213560.zip) | Discussion on TCs for SDT | Huawei, HiSilicon | * In addition to the test feasibility to RAN5, a new question raised “When to transmit UL after data arrival? 🡪 UE implementation issue?
* If test feasibility confirmed, define test cases to cover both cases where UE shall or shall not transmit with CG-SDT
	+ Four test cases proposed
 |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

*In this topic, RRM performance requirements and test cases for NR SDT are discussed.*

*Moderator: For R4-2212684, calculation shows the TA error added by TA validation in the worst case:*

*• 11% of CP for FR1 30kSCS*

*• 20% of CP for FR2 120kSCS*

*• moving velocity 10m/s*

*Further potential questions could be raised, e.g., (1) The worst-case consideration/impact? (2) Speed limit for CG-SDT?*

*However, there are only observations, and no proposal. In this case, Moderator suggest to focus on other issues in this meeting, thus the following discussion does not capture R4-2212684.*

### Sub-topic 2-1 Defining RRM test cases and RAN5 reply LS

*Sub-topic description:*

*RAN4 has sent an LS to RAN5 on feasibility of testing UE initiated SDT data transmission in RRC\_INACTIVE state.*

 *In the sub-topic, the discussion point is: should RAN4 hold on the discussion on defining RRM test cases for SDT until receiving RAN5 reply LS? Or Should RAN4 discuss defining these RRM test cases by assuming positive feedback from RAN5?*

*Open issues and candidate options before e-meeting:*

**Issue 2-1: What should RAN4 do before the RAN5 reply LS arrives on test feasibility on defining RRM test cases for NR SDT?**

* Proposals
	+ Option 1: Hold on the discussion until the reply LS arrives
	+ Option 2: Continue discussion on defining these RRM test cases by assuming positive feedback from RAN5
	+ Others: please elaborate
* Recommended WF
	+ TBA

### Sub-topic 2-2 General principles to define RRM test cases for CG-SDT

*Sub-topic description:*

*If RAN4 agrees to define RRM test cases for CG-SDT, general principles are discussed in this sub-topic. However, if the answer to Issue 2-1 is to hold on the discussion, then both sub-topic 2-2 and 2-3 will be suspended.*

*Open issues and candidate options before e-meeting:*

**Issue 2-2-1: In addition to the LS to RAN5 on the test feasibility, should RAN4 consider when to transmit UL after data arrival if defining RRM test cases for CG-SDT?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No, leave it up to UE implementation
	+ Option 3 (new): SDT transmission timing should be controllable be TE
		- Leave for RAN5 discussion on how to implement interface
		- RAN4 assumes that TE knows when the UE will attempt to transmit SDT
* Recommended WF
	+ TBA

**Issue 2-2-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what should be covered in test cases?**

* Proposals
	+ Option 1: both cases where UE shall or shall not transmit with CG-SDT
	+ Option 2: Base test cases for SDT on path through the decision tree and adding parameter variation Option 3: Test cases for SDT should cover all decision points in the SDT decision tree
	+ Others: please elaborate
* Recommended WF
	+ TBA

### Sub-topic 2-3 RRM test cases and procedures for CG-SDT

*Sub-topic description:*

*If RAN4 agrees to define RRM test cases for CG-SDT, detailed test procedures and cases are discussed in this sub-topic. However, if the answer to Issue 2-1 is to hold on the discussion, then both sub-topic 2-2 and 2-3 will be suspended.*

*Open issues and candidate options before e-meeting:*

**Issue 2-3-1: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what could be the test procedures?**

* Proposals
	+ Option 1: Five steps as proposed in R4-2211615
		- (1) Measure reference RSRP1
		- (2) Increasing or decreasing RSRP from RSRP1
		- (3) Application trigger UL data during RRC INACTIVE state.
		- (4) RSRP2 should meet or not meet the RSRP threshold at TA validation time point.
		- (5) Transmit PUSCH or not transmit PUSCH on CG-SDT occasion.
	+ Others: please elaborate
* Recommended WF
	+ TBA

**Issue 2-3-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, should these test cases be considered?**

* Proposals
	+ Option 1: four TCs as proposed in R4-2213560
		- TC1: Test case for CG-SDT in FR1 with invalid TA
		- TC2: Test case for CG-SDT in FR2 with invalid TA
		- TC3: Test case for CG-SDT in FR1 with valid TA
		- TC4: Test case for CG-SDT in FR2 with valid TA
	+ Option 1a: TA test case where TE configure two CG-SDT configurations. UE transmit CG-SDT with valid TA verification at first CG-SDT occasion and then not transmit CG-SDT with invalid TA verification at second CG-SDT occasion in a single iteration by changing RSRP level from TE.
	+ Option 2: TA test cases if UE measures RSRP1/RSRP2 outside the specified windows, the test should fail
	+ Option 3: TA test cases if TA validation condition (i.e., Condition A or Condition B) is met, UE should pass the test when transmitting CG-SDT
		- Condition A with |Pin1 – Pout2| > cg-SDT-ChangeThreshold and |Pout1 – Pin2| ≤ cg-SDT-ChangeThreshold where the UE passes the test if CG-SDT is transmitted
		- Condition B with |Pin1 – Pout2| < cg-SDT-ChangeThreshold |Pin1 – Pout2|< cg-SDT-ChangeThreshold where the UE passes the test if CG-SDT is transmitted
* Where
	+ Pin1 is the transmitted power at the test equipment while the UE is in RRC connected mode inside the RSRP1 measurement window
	+ Pin2 is the transmitted power at the test equipment while the UE is in RRC inactive mode inside the RSRP2 measurement window
	+ Pout1 is the transmitted power at the test equipment while the UE is in RRC connected mode prior to the RSRP1 measurement window
	+ Pout2 is the transmitted power at the test equipment while the UE is in RRC inactive mode just after the RSRP1 measurement window
	+ Pout3 is the transmitted power at the test equipment while the UE is in RRC inactive mode prior to the RSRP2 measurement window
	+ Option 4: TA test cases where TE can trigger CG-SDT for UE in RRC\_INACTIVE at certain CG-SDT ccasions
	+ Option 5: TA test cases to verify the validity of TAT timer
	+ Option 6: TA test cases where tests should fail if TAT timer has expired
	+ Others: please elaborate
* Recommended WF
	+ TBA

**Issue 2-3-3: Test case behaviour in case TA validation does not pass**

* In test cases where TA validation is not supposed to pass, discuss among the options in:
	+ Option 1: RA-SDT is not configured in CG-SDT test cases
	+ Option 2: RA-SDT is configured in CG-SDT test cases, and the UE may transmit data using RA-SDT resources if it supports that feature
* Recommended WF
	+ TBA

## Companies views’ collection for 1st round

### Open issues

Sub topic 2-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | **Issue 2-1: What should RAN4 do before the RAN5 reply LS arrives on test feasibility on defining RRM test cases for NR SDT?** |
| Qualcomm | **Option2**  |
| Huawei  | **Option 2** |
| Nokia | **Option 2.**  |
| Ericsson | **We support option 1, but it is also OK to continue the discussions in as stated in option 2.**  |
| ZTE | Option 1, but can compromise to Option 2 if it is a majority view. |
| MTK | Support Option 1, we also fine to discuss the performance part. |

Sub topic 2-2

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | **Issue 2-2-1: In addition to the LS to RAN5 on the test feasibility, should RAN4 consider when to transmit UL after data arrival if defining RRM test cases for CG-SDT?****Issue 2-2-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what should be covered in test cases?**  |
| Qualcomm | **Issue 2-2-1 : option2 but RAN5 should define how UL data is triggered****Issue 2-2-2 : Option1 based on RSRP variation model.**  |
| Apple | **Issue 2-2-1: In addition to the LS to RAN5 on the test feasibility, should RAN4 consider when to transmit UL after data arrival if defining RRM test cases for CG-SDT?**Technically it’s up to UE implementation (option 2). But we also think RAN4 need to discuss: if this SDT transmission timing is not deterministic in testing, what’s the impact? E.g., testing time is uncontrollable?**Issue 2-2-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what should be covered in test cases?** We think the successful SDT transmission case shall be tested as baseline. And we have concern on testing for the case of not transmit with CG-SDT, because if UE has wrong implementation or inaccurate RSRP measurement result or bad synchronization performance, UE can also choose to not transmit anything (error case can also result into no transmission).  |
| Huawei | **Issue 2-2-1: In addition to the LS to RAN5 on the test feasibility, should RAN4 consider when to transmit UL after data arrival if defining RRM test cases for CG-SDT?**Same view as Apple that when to transmit UL after data arrival is up to UE implementation. If this is the case, we are not sure if we can define meaningful test requirements, i.e. the timeline when UE should transmit UL after data arrival cannot be defined.**Issue 2-2-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what should be covered in test cases?** Option 1.RRM requirements are defined only for TA validation, so other SDT decision points should not be in the scope of the test. |
| Nokia | **Issue 2-2-1: In addition to the LS to RAN5 on the test feasibility, should RAN4 consider when to transmit UL after data arrival if defining RRM test cases for CG-SDT?**We thin the exact delay between data arrival should be UE implementation. But I see that we need to control on the test environment when to do it. So I would propose Option 3* Option 3: SDT transmission timing should be controllable be TE
	+ leave for RAN5 discussion on how to implement interface
	+ RAN4 assumes that TE knows when the UE will attempt to transmit SDT

**Issue 2-2-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what should be covered in test cases?** Ideally we think that all options should be covered. Highest priodity if for Option 1.  |
| Ericsson | **Issue 2-2-1: In addition to the LS to RAN5 on the test feasibility, should RAN4 consider when to transmit UL after data arrival if defining RRM test cases for CG-SDT?**The transmission should take place at the next CG-SDT occasions. There is no reason to postpone it if the UE has a valid TA. **Issue 2-2-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what should be covered in test cases?** Options 1,2 and 3 are fine.  |
| ZTE | **Issue 2-2-1: In addition to the LS to RAN5 on the test feasibility, should RAN4 consider when to transmit UL after data arrival if defining RRM test cases for CG-SDT?**Option 2. But RAN4 should assume that data to be transmitted is always ready when conducting CG-SDT transmission.**Issue 2-2-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what should be covered in test cases?** Option 1 for test coverage consideration. |
| MTK | **Issue 2-2-1: In addition to the LS to RAN5 on the test feasibility, should RAN4 consider when to transmit UL after data arrival if defining RRM test cases for CG-SDT?**Option 2. It is up to UE implementation. But for the test case maybe UE can try to transmit on the next available CG-SDT occasion.**Issue 2-2-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what should be covered in test cases?** Fine with Option 1, which tests the defined RRM requirements for TA validation for CG-SDT. |

Sub topic 2-3

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| --- | --- |
| **Company** | **Comments** |
| XXX | **Issue 2-3-1: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what could be the test procedures?****Issue 2-3-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, should these test cases be considered?** |
| Qualcomm | **Issue 2-3-1: option1 (application trigger UL data can be removed if RAN5 define how TE trigger UL data)****Issue 2-3-2:****We support option1, 1a, 3,4. Test CG-SDT transmission w/ valid TA is common in these options.**  |
| Apple | **Issue 2-3-1: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what could be the test procedures?**Fine with option 1 in general, but details also up to the issue 2-2-2**Issue 2-3-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, should these test cases be considered?**Needs FFS and up to issue 2-2-2**Issue 2-3-3: Test case behaviour in case TA validation does not pass** Option 1. |
| Huawei | **Issue 2-3-1: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what could be the test procedures?**Fine with option 1 **Issue 2-3-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, should these test cases be considered?**Support option 1.On option 1a, we are not sure if we should test valid TA and invalid TA in the same test case. The test procedure can be complex, since there needs to be two SDT sessions. On option 2 and 3, in our view compared to RSRP2, RSRP1 measurement window requirements are easier to meet because UE is likely to perform RSRP measurement when obtaining the TA via PDSCH. In order to minimize the number of test cases, we suggest to focus on testing RSRP2 measurement window.Option 4 is fine.Option 5 and 6 may not be needed, and we assume TAT should valid across the tests.**Issue 2-3-3: Test case behaviour in case TA validation does not pass** Option 1. |
| Nokia | **Issue 2-3-1: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what could be the test procedures?**Fine with option 1. Details on steps 3 to 5 may depend on other issues discussing how TE control timing of the CG-SDT transmission**Issue 2-3-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, should these test cases be considered?**For Option 1, we would need to clarify if each test condition is a different test as in Option 3We agree with all other options as a set. We think Option 3 has good coverage of the TA validation procedure. Our intention was to bring a detailed description on pass/fail conditions that are important to verify * The TA validation
* The measurements during correct time windows

**Issue 2-3-3: Test case behaviour in case TA validation does not pass** We support Option 2. The intention of this option is to provide a faster test in case of a single test run that considers multiple SDT transmissions. With Option 2 we would avoid the UE to go back to RRC connected and the test would be faster. So, we would like the group to consider Option 2 for that reason. Otherwise, we don’t have big problems with Option 1.  |
| Ericsson | **Issue 2-3-1: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what could be the test procedures?**Fine with option 1. **Issue 2-3-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, should these test cases be considered?**Fine with option 1.  |
| ZTE | **Issue 2-3-1: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what could be the test procedures?**Option 1 is fine.**Issue 2-3-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, should these test cases be considered?**Option 1, 1a, 3, 4 could be considered for further discussion. |
| MTK | **Issue 2-3-1: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, what could be the test procedures?**Fine with option 1.**Issue 2-3-2: If RAN4 agrees to define RRM test cases for CG-SDT with the positive feedback from RAN5, should these test cases be considered?**Fine with option 1,3,4.**Issue 2-3-3: Test case behaviour in case TA validation does not pass** Option 1. |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic#2-1** | *Tentative agreements:** *For Issue 2-1, three votes for Option 2, three votes for Option 1 but can accept Option 2. Moderator suggests to go for Option 2, i.e., continue works on defining RRM test cases by assuming a positive feedback from RAN5.*

*Candidate options:**Recommendations for 2nd round:*Issue closed. No further discussion in the second round. |
| **Sub-topic#2-2** | *Tentative agreements:** *For Issue 2-2-1, a majority view observed for Option 2 (five votes), one vote for Option 3, and a concern is raised on testing time control. Moderator suggests to go for Option 2, i.e., do not consider when to transmit UL after data arrival in RRM test cases for CG-SDT, but further discuss how to control testing time in the second round.*
* *For Issue 2-2-2, an absolute majority view observed for Option 1, but a concern is raised out on the test cases where UE should not transmit, and it might be caused by other imperfections. Moderator suggests to agree on that tests should cover the case where UE shall transmit with CG-SDT, and further discuss the case in the second round ~~on Option 1 but consider the concern afterwards when designing the test~~ ~~cases~~ where UE shall not transmit with CG-SDT.*

*Candidate options:**Recommendations for 2nd round:**New Issue 2-2-3:*1. *How to control testing time if RAN4 does not consider when to transmit UL after data arrival in the RRM test cases for CG-SDT?*

*New issue 2-2-4:**Should tests cover the case where UE shall not transmit with CG-SDT?* |
| **Sub-topic#2-3** | *Tentative agreements:** *For Issue 2-3-1, Unanimous consensus on Option 1 on five steps.*
* *For Issue 2-3-2, Option 1 gets most supports. Moderator suggests to start to work on the four TCs, and consider all other options if possible.*
* *For Issue 2-3-3, a majority view on Option 1 ( 3 out of 4 votes). Moderator suggests to go for Option 1.*

*Candidate options:**Recommendations for 2nd round:**Discuss candidate drat CRs work split on 4 test cases. (Note: the final CRs is subject to RAN5’s formal feedback).* |
|  |  |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

* *New* ***issue 2-2-3****: How to control testing time if RAN4 does not consider when to transmit UL after data arrival in the RRM test cases for CG-SDT?*

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | We think TE should predefine UL timing for UE and this should be done by RAN5. The method how to trigger UL and when UE to transmit PUSCH are being discussed in RAN5. We think the most important part in RAN4 is how to design test scenario to test whether UE pass/fail TA validation with given channel condition.  |
| ZTE | RAN5 seems to consider some new test interface for this purpose. We suggest it to be left to RAN5. |
| Apple | Same view as ZTE |
| Huawei | We think this issue should be addressed, otherwise the test timeline cannot be controlled and correct UE behavior (no matter UE should transmit CG-SDT or not) cannot be verified.We are fine to leave it to RAN5 which has better expertise for this issue. |
| Nokia | We think RAN4 should define test cases assuming the TE knows the time of the CG-SDT transmissions. If RAN5 figures that there are large delays in the testing interface, we can adapt the time of the expected CG-SDT in the test. |
| Moderator | RAN5 has agreed a simple solution: re-using test loop-back mode B and introducing a new timer T\_delay\_ModeB. With such a solution, testing time is fully controllable. |
| MTK | We are also fine to leave it to RAN5 since they have reached a solution. |

* *New issue 2-2-4: Should tests cover the case where UE shall not transmit with CG-SDT?*

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Yes. The test case should cover UE shall not transmit with CG-SDT.Our concern is test reliability when we have single scenario (pass or fail) in a test. Defining a single scenario already provides 50% of success rate. Therefore, we propose to combine two scenarios (pass and fail) in a one test. We think it would better to combine TC1+TC3 in one test and TC2+TC4 in one test. About two SDT configuration it is not critical as long as RAN5 provide solution for UL trigger timing. The example is as follow |
| ZTE | Yes, the test case where UE shall not transmit with CG-SDT should be covered, e.g., TA validation fails. |
| Apple | Can compromise to QC’s approach |
| Huawei  | We support to cover the case where UE shall not transmit with CG-SDT.We are also fine to combine TC1 and TC3 as QC suggested, but we have some question about QC’s figure above, e.g. when is the UL data triggered at the UE, how the time point of RSRP2 is defined (should we define time point for T2 but not RSRP2)?We suggest to leave the detailed setup FFS. |
| Qualcomm | To Huawei: UL data trigger point is just example to help understand. This part should be done by RAN5. We are considering similar methodology to RLM test cases. We agree with detail setup is FFS. If we agree to make test case combining TC1+TC3, we can volunteer.  |
| Nokia | We support test cases where CG-SDT is not allowed. Otherwise we cannot verify correct behavior of the TA validation. As for the reliability concern of Qualcomm we may also declare the test as of statistical nature, in this case the UE will be tested multiple times.  |
| Moderator | Combining TC1 and TC3 requires a forced TA validation, and it seems not compatible with RAN5’s solution on SDT test. Therefore, we suggest not to combine. |
| MTK | Both TA validation success and fail should be tested. We are fine with QC suggestion and details can be FFS. |
| Qualcomm | Question to Moderator: testing TA validation is one of the requirements of CG-SDT performance test. we are not sure what is the concern of it. Since we don’t know about RAN5’s solution yet, all of the scenarios discussed by assuming RAN5 support. In the same manner, we support combining TC1 and TC3 test case.  |

* *Discuss candidate draft CRs work split on 4 test cases. (Note: the final CRs is subject to RAN5’s formal feedback).*

|  |  |
| --- | --- |
| **Test case** | **Company responsible** |
| TC1 | Huawei  |
| TC2 | **Nokia** |
| TC3 |  |
| TC4 |  |

### Second-round wrapup

|  |  |
| --- | --- |
|  | **Status summary and Moderator’s recommendation** |
| New issue 2-2-3 | Summary: * Unanimously fine to leave it to RAN5 and RAN5 has agreed a simple solution for NR SDT tests.

Recommendation:* Close the issue and leave it to RAN5
 |
| New issue 2-2-4 | Summary: * Unanimously agree to cover the case where UE shall not transmit with CG-SDT
* Proposal to combine TC1 +TC3 into one new TC, and TC2+TC4 into another new TC, though there are questions raised on the detailed setup, e.g., UL data triggering, RSRP2, and forced TA validation for a combined test

Recommendation:* The case where UE shall not transmit with CG-SDT should be covered
* combine TC1 +TC3 into one new TC, and TC2+TC4 into another new TC
	+ FFS on detailed setup addressing concerns on UL data triggering, RSRP2, and forced TA validation
 |
| Draft CRs work split | Since 4 test cases are combined into 2 test cases during the second-round discussion, and detailed setup requires further study, we do not decide in this meeting.  |
|  |  |

# Topic #3: CR updates for NR SDT

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **TDoc** | **Title** | **Source** | **Moderator’s remarks** |
| [**R4-2212192**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212192.zip) | CR on T1 definition of TA validation for Rel-17 NR SDT in INACTIVE sate | LG Electronics Inc. | * CR based on the discussion paper R4-2212190

Removing ‘when changing from RRC\_CONNECTED to RRC\_INACTIVE state’ from T1 definition |
| [**R4-2213559**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213559.zip) | CR on SDT RRM requirements | Huawei, HiSilicon | * T1 definition update overlaps with R4-2212192
* CR implementing proposals in R4-2213558
 |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

*Moderator: T1 definition update overlaps between R4-2212192 and R4-2213559.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2212192**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_103-e/Docs/R4-2208307.zip) | Qualcomm: need to wait RAN2 agreement about MO during RRC INACTIVE state.  |
| Apple: up to issue 1-3-1 |
| Nokia: Depends on outcome of 1-3-1If approved, can you fix the word RRC\_INACITVE -> RRC\_INACTIVE in the definition of T1? |
| [**R4-2213559**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_103-e/Docs/R4-2209240.zip) | LGE: the same comments in Issue 1-3-4. |
| Apple: up to issue 1-3-3. |
| Nokia: Depends on outcome of 1-3-1If approved, can you fix the word RRC\_INACITVE -> RRC\_INACTIVE in the definition of T1?Ericsson: Ericsson: Based on the outcome of related discussions above. |

## Summary for 1st round

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| [**R4-2212192**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_103-e/Docs/R4-2208307.zip) | *Revised with a focus on T1 definition update.* |
| [**R4-2213559**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_103-e/Docs/R4-2209240.zip) | *Revised. Merge T1 definition update into the revision of R4-2212192.* |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

*Focus on CR revisions.*

### Second-round wrapup

* Revision of R4-2212192:
	+ Align T1 definition with RAN2’s recommendation
	+ Further update if necessary in future meetings

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **New Tdoc number** | **Title** | **Source** | **Comments** |
|  | WF on … | YYY |  |
|  | LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
| *R4-2214341* | *Wayforward on RRM requirements and test cases for NR SDT* | *ZTE* | *Capture agreements reached in this meeting.* |
| *R4-2214342* | *LS on CG-SDT (re)configuration in RRC\_INACTIVE state for NR SDT* | *Ericsson* | *In case for the need to consult RAN2*  |

**Existing tdocs**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| [**R4-2211614**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2211614.zip) |  | Open issues in RRM requirements for CG-SDT | Qualcomm Incorporated | Noted |  |
| [**R4-2211615**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2211615.zip) |  | RRM performance requirements for CG-SDT | Qualcomm Incorporated | Noted |  |
| [**R4-2211850**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2211850.zip) |  | On SDT RRM | Apple | Noted |  |
| [**R4-2212190**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212190.zip) |  | Clarification on RSRP measurement reference for TA validation | LG Electronics Inc. | Noted |  |
| [**R4-2212192**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212192.zip) | *R4-2214515* | CR on T1 definition of TA validation for Rel-17 NR SDT in INACTIVE sate | LG Electronics Inc. | Revised | *Focus on T1 definition update* |
| [**R4-2212684**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212684.zip) |  | On demodulation performance requirements for SDT | Nokia, Nokia Shanghai Bell | Noted |  |
| [**R4-2212685**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212685.zip) |  | Discussion on performance requirements for SDT | Nokia, Nokia Shanghai Bell | Noted |  |
| [**R4-2213376**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213376.zip) |  | Remaining issues on RRM requirements for NR SDT | ZTE Wistron Telecom AB | Noted |  |
| [**R4-2213377**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213377.zip) |  | On RRM performance requirements for NR SDT | ZTE Wistron Telecom AB | Noted |  |
| [**R4-2213403**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213403.zip) |  | Remaining discussions on RRM requirements for Small Data Transmissions | Ericsson | Noted |  |
| [**R4-2213404**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213404.zip) |  | Discussions on RRM performance requirements for SDT | Ericsson | Noted |  |
| [**R4-2213558**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213558.zip) |  | Discussion on remaining issues for SDT RRM | Huawei, HiSilicon | Noted |  |
| [**R4-2213559**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213559.zip) | *R4-2214525* | CR on SDT RRM requirements | Huawei, HiSilicon | Revised | *T1 definition update merged into Revision of R4-2212192.* |
| [**R4-2213560**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213560.zip) |  | Discussion on TCs for SDT | Huawei, HiSilicon | Noted |  |
| [**R4-2213746**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213746.zip) |  | Discussion on the remaining issues for SDT | MediaTek inc. | Noted |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
	1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
	2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-22xxxxx |  | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-22xxxxx |  | LS on … | ZZZ | Agreeable, Revised, Noted |  |
| *R4-2214341* |  | *Way forward on RRM requirements and test cases for NR SDT* | *ZTE* | Agreeable |  |
| *R4-2214342* |  | *LS on CG-SDT (re)configuration in RRC\_INACTIVE state for NR SDT* | *Ericsson* | Withdrawn |  |
| *R4-2214515* |  | CR on T1 definition of TA validation for Rel-17 NR SDT in INACTIVE sate | LG Electronics Inc. | Agreeable | *Update T1 definition according to RAN2’s recommendation* |
| *R4-2214525* |  | CR on SDT RRM requirements | Huawei, HiSilicon | Agreeable |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
	1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
	2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents

# Annex

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|  |  |  |
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Note:

1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)