

**[101-bis-e][227] NR\_SmallData\_INACTIVE\_NWM - Version 0.0.8**  
**RAN4**

**3GPP TSG-RAN WG4 Meeting # 101-bis-e R4-2202744**

**Electronic Meeting, 17<sup>th</sup> – 25<sup>th</sup> January, 2022**

**Agenda item:** 6.25

**Source:** Moderator (ZTE)

**Title:** Email discussion summary for [101-bis-e][227] NR\_SmallData\_INACTIVE

**Document for:** Information

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## 1 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 1<sup>st</sup> round and 2<sup>nd</sup> round*

– 1<sup>st</sup> round:

- Reach consensus on Topic#1 RRM requirements for the SDT decision procedure
- Reach consensus on Issue 2-1 in Topic#2 for UE timing compensation requirements for CG-SDT
- Reach consensus on Topic#3 for UE sync requirements for CG-SDT
- Agree on formulars for TA validation for CG-SDT

– 2<sup>nd</sup> round:

- Focus on new issues 3-2/4-1-7/4-1-8/4-1-9/4-2-3/4-3-3
  - Discussion is conducted via NWM
  - The WF will capture the agreements and issues still open eventually in the end of this meeting
- Update draft CRs according to the discussion outcomes
- Discuss potential input to Rel-17 UE feature list on NR SDT at the request of Chair

*Below is the overview of all contributions to be discussed in this thread.*

**Table 1:**

<b>TDoc</b>	<b>Title</b>	<b>Source</b>	<b>Moderator's remarks</b>
<b>R4-2200300</b>	On RRM requirement for CG-SDT	Apple	<p>(1) Sync req: existing UE sync requirements + SSB availability within the latest 160ms</p> <p>(2) The two window sizes for TA validation share the same formulas for both FR1 and FR2 but with different parameters based on NR intra-frequency measurement periods.</p> <p>(3) For FR2, CG-SDT RRM requirements are only applicable to BC-capable UEs.</p>
<b>R4-2200417</b>	RRM requirements for NR-SDT	Qualcomm Incorporated	<p>(1) Introduce usage-wise TA validation requirements for CG-SDT, e.g., NR-RedCap etc. (For LTE PUR, two usages NB-IoT and eMTC).</p> <p>(2) Two window sizes are based on intra-frequency measurement period without gap, and DRX cycles, similar equation to LTE PUR.</p>
<b>R4-2200918</b>	On BS demodulation performance requirements for CG-SDT	Nokia, Nokia Shanghai Bell	<p>(1) Simulations showing that it is possible to reduce TO error by setting of a threshold, but than the number of UEs using CG-SDT is significantly reduced.</p> <p>(2) Requirements introduced for CG-SDT should guarantee the CG-SDT performance</p> <p>(3) Discuss to introduced UE timing compensation requirements and BS demodulation performance requirements</p>

<b>R4-2200919</b>	TA validation requirements for CG-SDT	Nokia, Nokia Shanghai Bell	<p>(1) Similar formulas to LTE PUR for CG-SDT TA validation.</p> <p>(2) Extend the second window from T2(i.e., the moment to perform TA validation) to T3(i.e., CG-SDT resource time)</p>
<b>R4-2201644</b>	Discussion on remaining issues for SDT RRM	Huawei, Hisilicon	<p>(1) Not to introduce RRM requirements for SDT decision procedure</p> <p>(2) Not to consider the impact of validity of the SDT decisions for subsequent transmission in RRM requirements</p> <p>(3) Re-using the existing UE sync requirements from LTE PUR for CG-SDT</p> <p>(4) The window size for the two RSRP measurements in TA validation is 1.28s</p> <p>(5) UE is not required to meet inter-frequency and inter-RAT measurement requirements during SDT session</p> <p>(6) Scheduling restriction applies to the SDT subsequent transmission during SSB occasions</p>

<b>R4-2201793</b>	Further discussion on RRM requirements for SDT	ZTE Wistron Telecom AB	<p>(1) SDT decision procedure shall be specified in RAN2 specs, and decisions are totally up to scheduler's implementation. RAN4 does not need to introduce any RRM requirement for SDT decision procedure.</p> <p>(2) The validity of the SDT decisions for subsequent transmission has no impact on RAN4 specs.</p> <p>(3) RAN4 does not need to introduce additional sync requirements for the UE being allowed for CG-SDT transmission.</p> <p>(4) A good starting-point for the two windows sizes for TA validation is 480ms as in LTE PUR.</p>
<b>R4-2201853</b>	RRM requirements for SDT	MediaTek Inc.	<p>(1) The existing requirements for 4-step and 2-step RACH are also applicable to RA-SDT</p> <p>(2) No additional sync requirements to be introduced specifically for CG-SDT transmission</p> <p>(3) Similar formulars to LTE PUR for TA validation: The two window sizes related to intra-frequency SSB measurement periods (different for FR1 and FR2) and DRX cycles with different scaling factors</p>

<b>R4-2201869</b>	Discussions on RRM requirements for Small Data Transmissions	Ericsson	<p>(1) No RRM impact due to the SDT decision procedure using RSRP measurement.</p> <p>(2) No additional requirements are needed for subsequent SDT transmissions in RA-SDT and CG-SDT.</p> <p>(3) Reuse the requirements on UE synchronization (section 4.7.4.2 in TS 36.133) from LTE PUR for transmission using CG-SDT in NR</p> <p>(4) Similar formulars to LTE PUR with different parameters for FR1 and FR2, based on measurement periods, scaling factors, and DRX cycles.</p>
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## 2 Topic #1: RRM requirements for the SDT decision procedure

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

### 2.1 Companies' contributions summary

**Table 2:**

<b>TDoc</b>	<b>Title</b>	<b>Source</b>	<b>Moderator's remarks</b>
<b>R4-2201644</b>	Discussion on remaining issues for SDT RRM	Huawei, Hisilicon	<p>(1) Not to introduce RRM requirements for SDT decision procedure</p> <p>(2) Not to consider the impact of validity of the SDT decisions for subsequent transmission in RRM requirements</p>

<b>R4-2201793</b>	Further discussion on RRM requirements for SDT	ZTE Wistron Telecom AB	(1) SDT decision procedure shall be specified in RAN2 specs, and decisions are totally up to scheduler's implementation. RAN4 does not need to introduce any RRM requirement for SDT decision procedure. (2) The validity of the SDT decisions for subsequent transmission has no impact on RAN4 specs.
<b>R4-2201869</b>	Discussions on RRM requirements for Small Data Transmissions	Ericsson	(1) No RRM impact due to the SDT decision procedure using RSRP measurement. (2) No additional requirements are needed for subsequent SDT transmissions in RA-SDT and CG-SDT.

## 2.2 Open issues summary

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

### 2.2.1 Sub-topic 1-1

*Sub-topic description: This sub-topic addresses RRM requirements for the SDT decision procedure.*

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

#### **Issue 1-1: Whether or not to introduce any RRM requirements for SDT decision procedure**

– Proposals

- Option 1: No
- Option 2: Yes

- Recommended WF
  - o TBA

**Feedback Form 1: 1st round companies views on Issue 1-1**

<p><b>1 – Ericsson Hungary Ltd</b></p> <p>We support option 2.</p>
<p><b>2 – Ericsson Hungary Ltd</b></p> <p>Typo in our previous comment. It should be option 1.</p>
<p><b>3 – Apple Poland Sp. z.o.o.</b></p> <p>Option 1</p>
<p><b>4 – Qualcomm CDMA Technologies</b></p> <p>Option 1.</p>
<p><b>5 – MediaTek Inc.</b></p> <p>Option 1.</p>
<p><b>6 – HuaWei Technologies Co.</b></p> <p>option 1</p>
<p><b>7 – Intel</b></p> <p>OK with option 1.</p>
<p><b>8 – Nokia Belgium</b></p> <p>We are fine with Option 1.</p>

2.2.2 Sub-topic 1-2

*Sub-topic description: This sub-topic addresses the impact of validity of the SDT decision for the subsequent transmission in RRM requirements.*

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

**Issue 1-2: Whether or not to introduce any RRM requirements for the validity of the SDT decision for the subsequent transmissions?**

- Proposals

- Option 1: No
- Option 2: Yes
- Recommended WF
  - TBA

**Feedback Form 2: 1st round companies views on Issue 1-2**

<p><b>1 – Ericsson Hungary Ltd</b></p> <p>Support option 1.</p>
<p><b>2 – Apple Poland Sp. z.o.o.</b></p> <p>Option 1. Based on our understanding, the TA validation is only required for first SDT transmission rather than subsequent ones from RAN2.</p>
<p><b>3 – Qualcomm CDMA Technologies</b></p> <p>Option1. Once SDT decision is made, subsequent transmission will follow the initial decision. If UE needs to reevaluate the logic should be defined by RAN2.</p>
<p><b>4 – MediaTek Inc.</b></p> <p>Option 1. The same RRM requirements of SDT are also applicable to the subsequent SDT transmission. The validity of the SDT decision for subsequent transmission is RAN2 responsibility.</p>
<p><b>5 – HuaWei Technologies Co.</b></p> <p>option 1</p> <p>In our view, the validity of SDT decision is a RAN2 issue, and there should be no impact to RAN4 requirements.</p>
<p><b>6 – Intel</b></p> <p>We agree with companies views on Option 1.</p>
<p><b>7 – Nokia Belgium</b></p> <p>We are fine with Option 1.</p>

## 2.3 Summary for 1st round

### 2.3.1 Open issues

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

**Table 3:**

	<b>Status summary</b>
<b>Sub-topic #1-1</b>	<p>Issue 1-1: Unanimous consensus on Option 1.  <i>Tentative agreements:</i>  <b><u>No RRM requirements for SDT decision procedure to be specified.</u></b>  <i>Candidate options:</i>  <i>Recommendations for 2<sup>nd</sup> round:</i>                      Closed. No further discussion needed for 2nd round.</p>
<b>Sub-topic #1-2</b>	<p>Issue 1-2: Unanimous consensus on Option 1.  <i>Tentative agreements:</i>  <b><u>No RRM requirements for the validity of the SDT decision for the subsequent transmissions to be introduced.</u></b>  <i>Candidate options:</i>  <i>Recommendations for 2<sup>nd</sup> round:</i>                      Closed. No further discussion needed for 2nd round.</p>

2.4 Discussion on 2nd round (if applicable)

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3 Topic #2: BS demodulation requirements for SDT

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

3.1 Companies' contributions summary

**Table 4:**

<b>TDoc</b>	<b>Title</b>	<b>Source</b>	<b>Moderator's remarks</b>

<b>R4-2200918</b>	On BS demodulation performance requirements for CG-SDT	Nokia, Nokia Shanghai Bell	<p>(1) Simulations showing that it is possible to reduce TO error by setting of a threshold, but than the number of UEs using CG-SDT is significantly reduced.</p> <p>(2) Requirements introduced for CG-SDT should guarantee the CG-SDT performance</p> <p>(3) Discuss to introduced UE timing compensation requirements and BS demodulation performance requirements</p>
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## 3.2 Open issues summary

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

### 3.2.1 Sub-topic 2-1

*Sub-topic description: This sub-topic addresses the need to introduce UE timing compensation requirements for CG-SDT*

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

#### **Issue 2-1: Whether or not to introduce UE timing compensation requirements for CG-SDT?**

- Proposals
  - Option 1: Yes
  - Option 2: No
- Recommended WF
  - TBA

### Feedback Form 3: 1st round companies views on Issue 2-1

#### 1 – Ericsson Hungary Ltd

It is not clear to us what this really means. Our view is to follow the approach used for defining the PUR requirements in cat-M/NB-IoT as it was earlier also agreed. No further work is needed.

#### 2 – Qualcomm CDMA Technologies

If this DL timing compensation related question, we think DL timing compensation should be done prior to TA validation.

#### 3 – HuaWei Technologies Co.

In our understanding, this is a procedure that has not been discussed in RAN1 or RAN2. The procedure should be first defined in RAN1 or RAN2 before RAN4 defines requirements (similar as TA validation).

#### 4 – Intel

We thank Nokia analysis in the paper but with the RANP agreements we should not conclude on anything before further guidance in RANP. *'Potential need to define BS demodulation requirements (and related conformance testing needs) for SDT will be re-addressed by RAN at a later point in time once RAN4 defined the UE RRM requirements'*

#### 5 – Nokia Belgium

This issue is related to the issue that is postponed on BS demod requirements.

We understand that RANP needs the WG feedback on the need for

We understand that the current approach that we are defining requirements for has a UL timing error requirement, but it does not take into account the timing offset variation that is not compensated when we use the TA validation. This introduces some additional uncertainty on the UL timing since the UE might have moved after the last TA command.

In the current approach, the gNB may set the RSRP threshold for TA validation, but it implies in a balance between small variations in propagation delay against how many UEs are actually able to use the feature. Therefore, if the threshold is too small the propagation delay will be small most UEs will not pass the TA validation test and CG-SDT use will be very limited.

From our understanding, CG-SDT either has to have additional UE timing compensation requirements to guarantee accurate absolute timing, or there will be impact on BS demodulation performance that should be verified with demod requirements.

#### 3.2.2 Sub-topic 2-2

*Sub-topic description: This sub-topic addresses BS demodulation performance requirements for CG-SDT*

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

**Issue 2-2: Whether or not to introduce BS demodulation performance requirements for CG-SDT?**

- Proposals
  - o Option 1: Yes
  - o Option 2: No, focused on defining UE RRM requirements for CG-SDT by following RAN plenary’s agreements at this stage.
- Recommended WF
  - o Postponed

**Moderator’s remarks: According to Session Chair’s guidelines, Issue 2-2 is postponed.**

**3.3 Summary for 1st round**

**3.3.1 Open issues**

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

**Table 5:**

	<b>Status summary</b>
<b>Sub-topic#2-1</b>	Issue 2-1: The question seems not clear enough for 2 companies, 1 company advises this should be discussed in RAN1 at first before RAN4 defines any requirement for it, and 2 companies including Proponent understand that this is related to BS demodulation. <i>Tentative agreements:</i> With the clarification from Proponent, the issue is related to BS demodulation, therefore it is suspended according to RAN plenary’s agreements. <i>Candidate options:</i> <i>Recommendations for 2<sup>nd</sup> round:</i> Suspended until the RRM requirements are completed according to RAN Plenary’s agreements. No further discussion required for 2nd round.

**3.4 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".*

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## 4 Topic #3: UE sync requirements for CG-SDT

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

### 4.1 Companies' contributions summary

**Table 6:**

<b>TDoc</b>	<b>Title</b>	<b>Source</b>	<b>Moderator's remarks</b>
<b>R4-2200300</b>	On RRM requirement for CG-SDT	Apple	(1) Sync req: existing UE sync requirements + SSB availability within the latest 160ms
<b>R4-2201644</b>	Discussion on remaining issues for SDT RRM	Huawei, Hisilicon	(3) Re-using the existing UE sync requirements from LTE PUR for CG-SDT
<b>R4-2201793</b>	Further discussion on RRM requirements for SDT	ZTE Wistron Telecom AB	(3) RAN4 does not need to introduce additional sync requirements for the UE being allowed for CG-SDT transmission.
<b>R4-2201853</b>	RRM requirements for SDT	MediaTek Inc.	(1) The existing requirements for 4-step and 2-step RACH are also applicable to RA-SDT (2) No additional sync requirements to be introduced specifically for CG-SDT transmission

R4-2201869	Discussions on RRM requirements for Small Data Transmissions	Ericsson	(3) Reuse the requirements on UE synchronization (section 4.7.4.2 in TS 36.133) from LTE PUR for transmission using CG-SDT in NR
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## 4.2 Open issues summary

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

### 4.2.1 Sub-topic 3-1

*Sub-topic description: This sub-topic addresses UE sync requirements for CG-SDT*

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

#### **Issue 3-1: Whether or not to introduce additional UE sync requirements for CG-SDT?**

- Proposals
  - Option 1: No, using the existing UE sync requirements
  - Option 2: Yes
- Recommended WF
  - TBA

#### **Feedback Form 4: 1st round companies views on Issue 3-1**

##### **1 – Ericsson Hungary Ltd**

Options need to be clarified. Option 1 means that the existing UE sync requirements from LTE PUR is reused. Based on this understanding, option 1 is agreeable.

##### **2 – Apple Poland Sp. z.o.o.**

The option 1 is unclear, e.g., does this existing UE sync requirement mean LTE PUR requirement or NR sync requirement? we prefer to use NR sync requirement here (i.e., option 1 with NR UE sync requirement)

rather than LTE PUR since LTE PSS/SSS and CRS exists every 5ms and every subframe respectively but NR has SSB periodicity. In order to guarantee that UE could have chance to synchronize with SSB for uplink transmission timing deriving, the existing NR serving cell availability requirement could be used for CG-SDT transmission as well, i.e., if no SSB is available at the UE during the last 160 ms then the UE shall drop the CG-SDT transmission (e.g., if SSB is colliding with paging occasion, and UE may not be able to receive SSB and paging simultaneously due to mixed numerology or beam sweeping).

### **3 – Qualcomm CDMA Technologies**

In my understanding option1 is referring NR UE sync requirements. but we need to clarify the statement.

### **4 – MediaTek Inc.**

Our view is that since UE can validate the TA and fulfil the UL Tx timing requirements as in 7.1.2, UE should already be able to synchronize to the network to a certain level. Therefore, there is no need to introduce new sync requirements.

If the intention of option 1 is not to introduce additional UE sync requirements and to reuse the existing NR sync requirements, then we can support option1.

### **5 – HuaWei Technologies Co.**

No strong view, and slightly prefer option 1 assuming it means that the existing UE sync requirements from LTE PUR is reused.

### **6 – Nokia Belgium**

We prefer option 2.

We have a different understanding of the question in comparison to Ericsson. We understood that "Yes" meant having or the sync requirements as in the LTE PUR spec.

If we decide to include these requirements, I recommend taking the proposal from Apple's paper:

*Proposal 1: The UE is allowed to transmit CG-SDT provided that the UE meets the existing sync requirements towards the serving cell prior to transmission, and if no SSB is available at the UE during the last 160 ms then the UE shall drop the CG-SDT transmission.*

*So I have a suggestion for*

***Option 3: Specify UE sync requirements, where the following clarification is made:***

- The UE is allowed to transmit CG-SDT provided that the UE meets the existing sync requirements towards the serving cell prior to transmission, and if no SSB is available at the UE during the last 160 ms then the UE shall drop the CG-SDT transmission.***

## 4.3 Summary for 1st round

### 4.3.1 Open issues

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

**Table 7:**

	Status summary
<b>Sub-topic#3-1</b>	<p>Issue 3-1: Two companies ok to reuse LTE PUR sync requirements. Two companies ok to reuse NR sync requirements. Two companies suggest to reuse NR serving cell availability requirements in addition to NR sync requirements.</p> <p><i>Tentative agreements:</i> No new UE sync requirements to be introduced for CG-SDT transmission.</p> <p><i>Candidate options:</i> UE sync requirements to be re-used for CG-SDT transmission:</p> <ul style="list-style-type: none"><li>(1) LTE PUR sync requirements;</li><li>(2) NR sync requirements;</li><li>(3) NR sync requirements + NR serving cell availability requirement</li></ul> <p><i>Recommendations for 2<sup>nd</sup> round:</i> Issue 3-2: Which requirements to be re-used for UE sync requirements for CG-SDT transmission?</p> <ul style="list-style-type: none"><li>Option 1: LTE PUR sync requirements</li><li>Option 2: NR sync requirements</li><li>Option 3: NR sync requirements + NR serving cell availability requirements</li></ul>

## 4.4 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".

### Issue 3-2: Which requirements to be re-used for UE sync requirements for CG-SDT transmission?

- Option 1: LTE PUR sync requirements
- Option 2: NR sync requirements
- Option 3: NR sync requirements + NR serving cell availability requirements

**Feedback Form 5: Issue 3-2 (New issue for 2nd round) for UE sync requirements for CG-SDT**

**1 – MediaTek Inc.**

Option 2. Our view is that since UE can validate the TA and fulfil the UL Tx timing requirements as in 7.1.2 (i.e., NR sync requirements), UE should be able to synchronize to the network. Therefore, we support option 2. Our understanding for option 3, NR sync requirements also cover the NR serving cell availability requirements in 7.1.2.

**2 – Nokia Belgium**

Option 3

The intention of our comment in this issue was that we wanted to include the sync requirements like in the CR that was brought by Ericsson, including the proposal that SSB has to be available in the last 160 ms before transmission, otherwise the UE is not allowed to transmit.

In reply to Mediatek: The requirements on 7.1.2 don't mention that the UE is not allowed to transmit if a SSB is not found in 160 ms, it only states that Te requirements apply in that case.

*Specify UE sync requirements, where the following clarification is made:*

- *The UE is allowed to transmit CG-SDT provided that the UE meets the existing sync requirements towards the serving cell prior to transmission, and if no SSB is available at the UE during the last 160 ms then the UE shall drop the CG-SDT transmission.*

**3 – MediaTek Inc.**

@Nokia, if UE cannot meet the requirement of Te, UE cannot transmit anyway (they are linked to each other). It is just redundant from our point of view.

**4 – Nokia Belgium**

@Mediatek this was also how I thought the spec should work. But after checking, the timing clause states the following:

”The UE shall meet the Te requirement for an initial transmission provided that at least one SSB is available at the UE during the last 160 ms.”

From that I understand that if the SSB is not available within 160 nms the Te requirement doesn't hold, or the UE may transmit with a larger UL error. But it is not stating that the UE cannot transmit.

**5 – Qualcomm CDMA Technologies**

Option2 and suggest higher layer agreements such as Dropping CG-SDT transmission when UE is not able to obtain the synchronization in serving cell at this meeting. The detail can be FFS.

**6 – ZTE Wistron Telecom AB**

Option 2. As MediaTek commented, we also agree that NR sync requirements in section 7.1.2 already covers the condition of serving cell availability.

And the spec texts identified by Nokia are exactly in the same section 7.1.2:

”The UE shall meet the Te requirement for an initial transmission provided that at least one SSB is available at the UE during the last 160 ms”.

Therefore we don’t need to explicitly specify this condition again.

**7 – HuaWei Technologies Co.**

option 2, and also fine with option 1 (in LTE PUR we have both)

**8 – ZTE Wistron Telecom AB**

Moderator: With clarification on the specs texts on NR sync requirements which capture the serving cell availability, Moderator sees the concern is addressed, therefore suggests to agree on Option 2.

**9 – ZTE Wistron Telecom AB**

Moderator: In Section 7.1.2 on NR sync requirements, the condition to satisfy the sync requirements is explicitly specified: “The UE shall meet the Te requirement for an initial transmission provided that at least one SSB is available at the UE during the last 160 ms”, therefore, Moderator proposes to agree on Option 2 and close this open issue.

Recommended WF: Option 2.

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## 5 Topic #4: RRM requirements for TA validation for CG-SDT

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

### 5.1 Companies’ contributions summary

**Table 8:**

TDoc	Title	Source	Moderator’s remarks
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<b>R4-2200300</b>	On RRM requirement for CG-SDT	Apple	<p>(2) The two window sizes for TA validation share the same formulas for both FR1 and FR2 but with different parameters based on NR intra-frequency measurement periods.</p> <p>(3) For FR2, CG-SDT RRM requirements are only applicable to BC-capable UEs.</p>
<b>R4-2200417</b>	RRM requirements for NR-SDT	Qualcomm Incorporated	<p>(1) Introduce usage-wise TA validation requirements for CG-SDT, e.g., NR-RedCap etc. (For LTE PUR, two usages NB-IoT and eMTC).</p> <p>(2) Two window sizes are based on intra-frequency measurement period without gap, and DRX cycles, similar equation to LTE PUR.</p>
<b>R4-2200919</b>	TA validation requirements for CG-SDT	Nokia, Nokia Shanghai Bell	<p>(1) Similar formulas to LTE PUR for CG-SDT TA validation.</p> <p>(2) Extend the second window from T2(i.e., the moment to perform TA validation) to T3(i.e., CG-SDT resource time)</p>
<b>R4-2201644</b>	Discussion on remaining issues for SDT RRM	Huawei, Hisilicon	<p>(4) The window size for the two RSRP measurements in TA validation is 1.28s</p> <p>(5) UE is not required to meet inter-frequency and inter-RAT measurement requirements during SDT session</p> <p>(6) Scheduling restriction applies to the SDT subsequent transmission during SSB occasions</p>

<b>R4-2201793</b>	Further discussion on RRM requirements for SDT	ZTE Wistron Telecom AB	(4) A good starting-point for the two windows sizes for TA validation is 480ms as in LTE PUR.
<b>R4-2201853</b>	RRM requirements for SDT	MediaTek Inc.	(3) Similar formulars to LTE PUR for TA validation: The two window sizes related to intra-frequency SSB measurement periods (different for FR1 and FR2) and DRX cycles with different scaling factors
<b>R4-2201869</b>	Discussions on RRM requirements for Small Data Transmissions	Ericsson	(4) Similar formulars to LTE PUR with different parameters for FR1 and FR2, based on measurement periods, scaling factors, and DRX cycles.

## 5.2 Open issues summary

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

*One example diagram for the two windows in TA validation.*

### 5.2.1 Sub-topic 4-1

*Sub-topic description: This sub-topic addresses general issues for TA validation*

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

#### **Issue 4-1-1: Whether or not to introduce per-usage TA validation requirements for CG-SDT?**

- Proposals
  - Option 1: Yes
  - Option 2: No, a single set of TA validation requirements for all usages
- Recommended WF

- o TBA

### Feedback Form 6: 1st round companies views on Issue 4-1-1

<p><b>1 – Ericsson Hungary Ltd</b></p> <p>It is not clear what "per-usage" means. Our view is to reuse the approach from LTE PUR requirements where the UE perform the TA validation before every transmission.</p>
<p><b>2 – Apple Poland Sp. z.o.o.</b></p> <p>Option 2. Same TA validation requirement is applied for each initial SDT transmission (we think RAN2 didn't require TA validation for subsequent transmission).</p>
<p><b>3 – Qualcomm CDMA Technologies</b></p> <p>We propose to have different TA validation requirements for different use cases such as NR-redcap. Like LTE-PUR has two sets of TA validation for eMTC and NB-IOT. If the question is related then option 1.</p>
<p><b>4 – MediaTek Inc.</b></p> <p>Support option 2. Our understanding is that the same TA validation requirements should be applicable to every CG-SDT transmission. However, If the issue here is regarding whether to introduce different TA validation requirements for different use cases, then it should be FFS.</p>
<p><b>5 – HuaWei Technologies Co.</b></p> <p>We need more clarification on option 1, i.e. what is the "usage" referring to.</p> <p>@QC, could you please elaborate a bit what are the counterparts to NB-IoT/eMTC in NR in your view, and what differences in the requirements are expected?</p>
<p><b>6 – Qualcomm CDMA Technologies</b></p> <p>@HuaWei : Principle of TA validation scheme is same as LTE-PUR but we need to define different TA validation requirements for different use cases. Actually we are already proposing different TA validation requirements for FR1 and FR2. In addition to FR1 and FR2, we can consider different TA validation requirements for NR-Redcap as counter parts of NB-IoT/eMTC with longer measurement period than the one in typical FR1 and FR2.</p>
<p><b>7 – Nokia Belgium</b></p> <p>From the comments there are different interpretations on the issue.</p> <p>If CG-SDT usage is related to subsequent transmissions: TA validation is performed before each CG-SDT usage.</p> <p>We agree with Ericsson that per-usage is not clear. We understand it is UE perform TA validation before every GC_SDT transmission. If the second RSRP window is large enough to contain 2 CG-SDT transmissions, only one verification could be performed, but the requirements for the second RSRP window still apply.</p> <p>If this is related to use cases:</p>

As for the use with RedCap, I think it might be a bit early to decide on different parameters for Redcap. Better to focus on the general case first.

**Issue 4-1-2: For FR2, are CG-SDT RRM requirements only applicable to BC-capable UEs?**

- Proposals
  - o Option 1: Yes
  - o Option 2: No
- Recommended WF
  - o TBA

**Feedback Form 7: 1st round companies views on Issue 4-1-2**

<p><b>1 – Ericsson Hungary Ltd</b></p> <p>The issue is not clear. Clarification needed on the question about the meaning of BC capable UEs.</p>
<p><b>2 – Apple Poland Sp. z.o.o.</b></p> <p>Option 1. Since FR2 CG-SDT is using the Tx beam based on the beam information derived from DL RS directly or indirectly, we assume only BC (beam correspondence) capable UE is required to meet those RRM requirements for CG-SDT in Rel-17.</p>
<p><b>3 – Qualcomm CDMA Technologies</b></p> <p>This is supposed to be discussed separately in Thread #138. We don't think the issue needs to be discussed in RRM unless there is a specific request or conclusion from RF/Thread #138.</p>
<p><b>4 – Ericsson Hungary Ltd</b></p> <p>@Apple, thanks for the clarification about the meaning of BC. We actually similar view as Qualcomm, i.e. beam correspondence is being discussed in RF group and we think the RRM requirements can be discussed independently.</p>
<p><b>5 – HuaWei Technologies Co.</b></p> <p>we have similar view as QC and Ericsson</p>
<p><b>6 – Nokia Belgium</b></p> <p>No need to restrict CG-SDT requirements in this thread. Agree with other colleagues that this can be discussed in the RF room.</p>

**Issue 4-1-3: Does the second window need to be extended from the moment of TA validation to CG-SDT resource time? Definition of second RSRP window**

– Proposals

- Option 1: ~~Yes~~Second window for TA validation should take into account the CG-SDT occasion where the UE targets to transmit.
- Option 2: ~~No~~Second window for TA validation should consider the instant when the UE performs the second RSRP measurement for TA validation.

– Recommended WF

- TBA

**Feedback Form 8: 1st round companies views on Issue 4-1-3**

<p><b>1 – Ericsson Hungary Ltd</b></p> <p>Option 1 is agreeable.</p>
<p><b>2 – Apple Poland Sp. z.o.o.</b></p> <p>Not very clear about this option 1 and 2. Does option 2 mean the ending boundary of second window is the time when the UE performs TA validation? if that's the case, we support option 2.</p>
<p><b>3 – Qualcomm CDMA Technologies</b></p> <p>Not clear about this questions. we consider same principle for both first and second window size as LTE-PUR.</p>
<p><b>4 – MediaTek Inc.</b></p> <p>We support option 2. Our view is that for window2 the TA validation should consider the instant when the UE performs the second RSRP measurement in the same way as in LTE-PUR. There is no need to consider the CG-SDT occasions when defining the second window size, because UE already knows the location of the CG occasions and can anyway delay the measurements of RSRP2 to be close to the next available CG occasions.</p>
<p><b>5 – Ericsson Hungary Ltd</b></p> <p>Our understanding of the question is whether or not the second RSRP measurement is associated with the next CG-SDT measurement occasion. We think that is reasonable, i.e. the time range that define the validity of the second measurement shall include the time when the next CG-SDT measurement occasion occurs. Otherwise, if there is no relation between the point when UE is performing the TA validation and point when UE is actually using those to carrying CG-SDT transmission, then the TA may still not be valid. Based on this understanding, we support option 1.</p>
<p><b>6 – Nokia Belgium</b></p> <p>We prefer option 1.</p> <p>The intention of this option is that the time for the second measurement should be close to when the actual transmission is happening.</p>

With Option 2, there is no clear link between the time the UE performs the measurement and when it will transmit.

The formula used in LTE PUR T2 is not related to the time of the actual transmission and we would like to make this connection on the requirements for SDT in NR.

**7 – HuaWei Technologies Co.**

We support option 2 which in our view is aligned with LTE PUR.

**Issue 4-1-4: Does RAN4 introduce a single formular on the two windows for TA validation applicable for both FR1 and FR2 but with different parameters?**

- Proposals
  - Option 1: Yes
  - Option 2: No
- Recommended WF
  - TBA

**Feedback Form 9: 1st round companies views on Issue 4-1-4**

**1 – Ericsson Hungary Ltd**

Support option 2. The formula needs to be different. The FR2 formula needs to take into account the FR2 specific parameters from existing requirements.

**2 – Apple Poland Sp. z.o.o.**

It's hard to say which option is correct, e.g., the generic formula could be same but the detailed parameters inside the formula could be different. Like in our paper, we put FR1 and FR2 TA validation into one general proposal, but we clarify the parameters between FR1 and FR2 are different.

**3 – Qualcomm CDMA Technologies**

Option1. we first need to define the formula and then FFS for detail parameters. Parameters can be defined differently per use cases.

**4 – MediaTek Inc.**

Option 2. The two window measurements have different sizes, therefore it is clearer to have separate formulas for each as in LTE PUR. In addition, these two windows might also need to be defined separately for FR1 and FR2 since some of the parameters used for defining the window sizes might not be common for both FR1 and FR2. However, we think this issue can be discussed later after agreeing and finalizing the design of the window sizes and whether they can be simplified.

**5 – Qualcomm CDMA Technologies**

Sorry for the typo. we are supporting option2. Separate formulas for each each window as similar to the one in LTE-PUR.

**6 – Ericsson Hungary Ltd**

It was agreed at previous meeting to introduce requirements for CG-SDT following the approach used in LTE PUR. This means, in our view, that the formula using the two RSRP measurements windows is reused, this can be a high-level agreement. However, the specific formula needs to be different for FR1 and FR2.

**7 – Nokia Belgium**

We do not have a strong view but prefer option 1 for simplicity. FR1 and FR2 can be separated in parameters.

**8 – HuaWei Technologies Co.**

Suggest to discuss this issue after we agree on the principle to define the window size, so that we know better which parameters or formulars are being considered.

**Issue 4-1-5: Is UE required to meet inter-frequency and inter-RAT measurement requirements during SDT session?**

- Proposals
  - Option 1: Yes
  - Option 2: No
- Recommended WF
  - TBA

**Feedback Form 10: 1st round companies views on Issue 4-1-5**

**1 – Ericsson Hungary Ltd**

Support option 1. SDT transmission are expected be short and SDT shall not impact other existing measurement procedures.

**2 – Apple Poland Sp. z.o.o.**

Option 2. The TA validation needs RSRP measurement, and we think UE would coordinate to measure serving cell for such TA validation before SDT transmission rather than sharing measurement resource with other carriers, and therefore during such TA validation period we don't expect the inter-freq or inter-RAT measurement requirement still applies.

**3 – Qualcomm CDMA Technologies**

Option2. Once UE perform SDT during inactive mode and utilize the latest TA from connected mode, Intra frequency is considered.

#### **4 – Ericsson Hungary Ltd**

The inter-frequency and inter-RAT measurements stated here are related to mobility while the CG-SDT transmissions are small data originated from the serving cells. They are independent, mobility should not be affected by CG-SDT. This is also how the LTE PUR works.

#### **5 – HuaWei Technologies Co.**

option 2.

For subsequent transmission in SDT session, UE needs to monitor configured search space for PDCCH and receive PDSCH or transmit PUSCH as scheduled. This is very similar to data reception and transmission in RRC Connected mode, and it means UE may not have the opportunity to perform inter-freq or inter-RAT measurement.

To Ericsson, we understand the duration of SDT session is up to NW (NW can ask always UE to transition to Connected mode). If the duration is small, we do not see it as an issue for UE not to meet the inter-freq or inter-RAT requirements during SDT session (which is anyway only a small time period).

#### **6 – Nokia Belgium**

We agree with Ericsson and prefer Option 1.

### **Issue 4-1-6: Should scheduling restriction apply to the SDT subsequent transmission during SSB occasions?**

- Proposals
  - Option 1: Yes
  - Option 2: No
- Recommended WF
  - TBA

### **Feedback Form 11: 1st round companies views on Issue 4-1-6**

#### **1 – Ericsson Hungary Ltd**

Support option 2. SDT transmission are expected be short and should not impact other existing measurement procedures.

#### **2 – Apple Poland Sp. z.o.o.**

Option 2. In legacy IDLE/Inactive requirement, if paging is colliding with SSB, we don't consider such scheduling restriction to let UE drop paging, here we may use the similar logic, or network probably needs to avoiding configuring such SDT CG colliding with SSB occasions.

#### **3 – Qualcomm CDMA Technologies**

Option 2 is okay with us for FR1 and FFS for FR2.

@Apple: isn't this ("network probably needs to avoid configuring such SDT CG colliding with SSB occasions") effectively scheduling restriction?

@Ericsson: Is your view same for both FR1 and FR2?

#### 4 – Apple Poland Sp. z.o.o.

@Qualcomm, it's a bit different in my understanding. 'Network to avoid colliding' means colliding is an error case and if it happens there would be no requirement applied (up to UE which one shall be dropped). Scheduling restriction requirement is used to define UE behavior (dropping SDT) when such colliding happens, but scheduling restriction cannot limit network behavior or cannot avoid such colliding happening.

#### 5 – HuaWei Technologies Co.

option 1.

To Apple/Ericsson: we are not concerned with paging reception but with the subsequent data transmission during SDT session. As we mentioned in the previous issue, during the subsequent transmission, UE needs to Rx and Tx data similar as in Connected mode, and this is why we think the scheduling restriction applies.

#### 6 – Nokia Belgium

We agree with option 2.

### 5.2.2 Sub-topic 4-2

*Sub-topic description: This sub-topic addresses the first window in TA validation for CG-SDT*

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

#### **Issue 4-2-1: The size and position of the first window for FR1 should be defined as:**

– Proposals

- Option 1:  $(T1 - \min(X, N_{serv})) \leq T1' \leq (T1 + \min(X, N_{serv}))$ , where
  - X is the measurement period for intra-frequency measurements without gap for No DRX
  - Nserv can be the consecutive DRX cycles for UE to evaluate a serving cell
- Option 2: 1.28 seconds
- Option 3:  $(T1 - \min(\Delta T1/2, DRX \text{ cycle})) \leq T1' \leq (T1 + \min(\Delta T1/2, DRX \text{ cycle}))$ 
  - $\Delta T1$ : starting point 480ms
- Option 4:  $(T1 - \min(Tm1, M1 * T_{DRX})) \leq T1' \leq (T1 + \min(Tm1, M1 * T_{DRX}))$ 
  - Tm1 = measurement period during which UE performs the measured value for FR1,
  - Tm2 = measurement period during which UE performs the measured value for FR2,
  - $T_{DRX}$  is the length of DRX cycle configured in cell where TA validation is performed,

- M1 is a scaling factor related to reference signal transmission periodicity
    - M1=2 if SMTC periodicity ( $T_{SMTC}$ ) > 20 ms and  $T_{DRX} \leq 0.64$  second
    - Otherwise M1=1
  - Option 5:  $T1 - X \leq T1' \leq T1 + X$ 
    - $X = \min(\max(200\text{ms}, 5 \times \text{SMTC period}), M1 * \text{DRX cycle})$
  - Option 6:  $(T1 - \min(X, M1 \times N1 \times \text{DRX cycle})) \leq T1' \leq (T1 + \min(X, M1 \times N1 \times \text{DRX cycle}))$
  - Option 7:  $(T1 - \min(\text{NR-measurement-period}, M \times \text{DRX cycle})) \leq T1' \leq (T1 + \min(\text{NR-measurement-period}, M \times \text{DRX cycle}))$ 
    - NR-measurement-period is equivalent to gapless intra-frequency measurement period without  $K_p$ ,  $K_{layer1\_measurement}$  and DRX in connected mode (section 9.2.5.2 TS38.133).
    - M is the beam sweeping factor for FR2 as defined in table 4.2.2.2-1 (serving cell measurement period table), and 1 for FR1.
- Recommended WF
- TBA

### Feedback Form 12: 1st round companies views on Issue 4-2-1

<p><b>1 – Ericsson Hungary Ltd</b></p> <p>Support option 4.</p>
<p><b>2 – Apple Poland Sp. z.o.o.</b></p> <p>Option 7.</p>
<p><b>3 – Qualcomm CDMA Technologies</b></p> <p>The principle of option 1,4,5,6,7 are similar.</p> <p>Left parameter in min function at LTE-PUR is defined (480ms,800ms) for eMTC from <math>T_{measure\_intra\_UEcat\_M1}</math> in table 8.13.2.1.1.1-1 and 8.13.3.1.1.1-1 at 36.133 and (800ms, 1600ms) for NB-IoT can be found at 8.14.2.1, 8.14.3.1.</p> <p>Similarly, the combination of the measurement period for intra-frequency and DRX cycle can be defined for CG-SDT TA validation.</p> <p>The measurement period for NR can be found in table 4.2.2.3-1, 38.133. But FFS to define exact values per use cases.</p>
<p><b>4 – MediaTek Inc.</b></p> <p>Support option 5. The window size here for CG-SDT is defined based on the same principle as in LTE-PUR with taking into consideration the NR specs factors. Since in LTE-PUR the window size boundaries were originally derived from <math>\min(T_{measure\_intra\_UE}, DRX\ cycle)</math> expression, the corresponding expression in NR would be <math>\min(T_{SSB\_measurement\_period\_intra}, M1 * N1 * DRX\ cycle)</math>, where <math>T_{SSB\_measurement\_period\_intra}</math> is the measurement period for intra-frequency measurements without gap for No DRX (given in Table</p>

9.2.5.2-1).  $M1=2$  if SMTC periodicity (TSMTC)  $> 20$  ms and DRX cycle  $\leq 0.64$  second, otherwise  $M1=1$ .  $N1=1$  for FR1. Therefore, this expression can be further concluded (from Table 9.2.5.2-1) as:

$$\min(\max(200\text{ms}, 5 \times \text{SMTC period}), M1 * \text{DRX cycle})$$

#### 5 – Ericsson Hungary Ltd

Our formula for FR1 is simply reusing the approach from LTE PUR and replacing with NR FR1 specific parameters. Agree that some of the options are very related.

#### 6 – HuaWei Technologies Co.

option 2.

We need to agree on the principles or consideration factors to define the window size.

**We do not think intra-frequency measurement period for Connected mode has been considered in defining the window size in LTE PUR.** Instead, RAN4 has considered the potential UE movement (or timing change) during the window and the need for sync before the PUR transmission to determine the high bound, and DRX cycle was considered to allow UE to re-use the measurement for reselection.

Considering the difference between NR UE and NB/IoT/eMTC UE, we suggest to increase the high bound to 1.28s, and as such DRX cycle may not need to be considered. A single fixed value is also simpler than a formula, and can help to save the standardization efforts.

#### 7 – Nokia Belgium

We prefer option 6. The value of X can be set to NR-measurement-period as in Option 7.

#### 8 – Nokia Belgium

we are probably fine with Option4 as well, we would just like to clarify the meaning of  $Tm1/Tm2$ .

### Issue 4-2-2: The size and position of the first window for FR2 should be defined as:

– Proposals

- Option 1:  $(T1 - \min(X, N_{\text{serv}})) \leq T1' \leq (T1 + \min(X, N_{\text{serv}}))$ , where
  - X is the measurement period for intra-frequency measurements without gap for No DRX
  - $N_{\text{serv}}$  can be the consecutive DRX cycles for UE to evaluate a serving cell
- Option 2: 1.28 s
- Option 3: Option 3:  $(T1 - \min(\Delta T1/2, \text{DRX cycle})) \leq T1' \leq (T1 + \min(\Delta T1/2, \text{DRX cycle}))$ 
  - $\Delta T1$ : starting point 480ms
- Option 4:  $(T1 - \min(Tm2, M1 * N1 * T_{\text{DRX}})) \leq T1' \leq (T1 + \min(Tm2, M1 * N1 * T_{\text{DRX}}))$ 
  - $Tm1$  = measurement period during which UE performs the measured value for FR1,
  - $Tm2$  = measurement period during which UE performs the measured value for FR2,
  - $T_{\text{DRX}}$  is the length of DRX cycle configured in cell where TA validation is performed,

- M1 is a scaling factor related to reference signal transmission periodicity
  - M1=2 if SMTC periodicity (TSMTC) > 20 ms and  $T_{DRX} \leq 0.64$  second
  - Otherwise M1=1
- N1 is scaling factor related to beam sweeping factor and/or the UE power class.
- Option 5:  $T1 - X \leq T1' \leq T1 + X$ 
  - $X = \min(\max(400\text{ms}, M_{\text{meas\_period\_w/o\_gaps}} \times \text{SMTC period}), M1 * N1 * \text{DRX cycle})$
- Option 6:  $(T1 - \min(X, M1 \times N1 \times \text{DRX cycle})) \leq T1' \leq (T1 + \min(X, M1 \times N1 \times \text{DRX cycle}))$
- Option 7:  $(T1 - \min(\text{NR-measurement-period}, M \times \text{DRX cycle})) \leq T1' \leq (T1 + \min(\text{NR-measurement-period}, M \times \text{DRX cycle}))$ 
  - NR-measurement-period is equivalent to gapless intra-frequency measurement period without  $K_p$ ,  $K_{\text{layer1\_measurement}}$  and DRX in connected mode (section 9.2.5.2 TS38.133).
  - M is the beam sweeping factor for FR2 as defined in table 4.2.2.2-1 (serving cell measurement period table), and 1 for FR1.

– Recommended WF

- TBA

### Feedback Form 13: 1st round companies views on Issue 4-2-2

<p><b>1 – Ericsson Hungary Ltd</b></p> <p>Support option 4.</p>
<p><b>2 – Apple Poland Sp. z.o.o.</b></p> <p>Option 7</p>
<p><b>3 – Qualcomm CDMA Technologies</b></p> <p>option1,4,5,6,7 are okay.</p>
<p><b>4 – MediaTek Inc.</b></p> <p>Support option 5. The same approach followed for FR1 can also be followed for FR2 with taking into consideration the parameters used in FR2. Therefore, the window size can be derived from <math>\min(T_{SSB\_measurement\_period}, M1 * N1 * DRX cycle)</math>, which can be further concluded (from Table 9.2.5.2-2) as:  <math>\min(\max(400\text{ms}, M_{\text{measperiodw/o\_gaps}} \times \text{SMTC period}), M1 * N1 * DRX cycle)</math></p>

### 5 – Ericsson Hungary Ltd

In our option 4, we have reused the approach from LTE PUR but replaced the formula to include the FR2 parameters such as SMTC transmission periodicity, beam sweeping factor, UE power class etc.

### 6 – HuaWei Technologies Co.

support option 2, similar comment as for 4-2-1

### 7 – Nokia Belgium

We prefer option 6. The value of X can be set to NR-measurement-period as in Option 7.

### 8 – Nokia Belgium

we are probably fine with Option4 as well, we would just like to clarify the meaning of Tm1/Tm2.

## 5.2.3 Sub-topic 4-3

*Sub-topic description: This sub-topic addresses the second window in TA validation for CG-SDT*

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

### **Issue 4-3-1: The size and position of the second window for FR1 should be defined as:**

#### – Proposals

- Option 1:  $(T2 - \min(X, N_{\text{serv}})) \leq T2' \leq T2$ 
  - X is the measurement period for intra-frequency measurements without gap for No DRX
  - Nserv can be the consecutive DRX cycles for UE to evaluate a serving cell
- Option 2: 1.28s
- Option 3:  $T2 - \min(\Delta T2, \text{DRX cycle}) \leq T2' \leq T2$ 
  - $\Delta T2$ : starting point 480ms
- Option 4:  $T2 - \min(Tm1, b \cdot K1 \cdot T_{\text{DRX}}) \leq T2' \leq T2$
- Option 5:  $T2 - X \leq T2' \leq T2$ 
  - $X = \min(\max(200\text{ms}, 5 \times \text{SMTC period}), M1 \cdot \text{DRX cycle})$
- Option 6:  $T3 - \min(X, M1 \times N1 \times \text{DRX cycle}) \leq T2' \leq T2 \leq T3$ , where T3 is the time of the CG-SDT occasion
- Option 7:  $T2 - \min(\text{NR-measurement-period}, M \times \text{DRX cycle}) \leq T2' \leq T2$

- NR-measurement-period is equivalent to gapless intra-frequency measurement period without Kp, Klayer1\_measurement and DRX in connected mode (section 9.2.5.2 TS38.133).
- M is the beam sweeping factor for FR2 as defined in table 4.2.2.2-1 (serving cell measurement period table), and 1 for FR1.

– Recommended WF

- TBA

**Feedback Form 14: 1st round companies views on Issue 4-3-1**

<p><b>1 – Ericsson Hungary Ltd</b></p> <p>Support option 4.</p>
<p><b>2 – Apple Poland Sp. z.o.o.</b></p> <p>Option 7</p>
<p><b>3 – Qualcomm CDMA Technologies</b></p> <p>Option 1,4,5,7 are okay. FFS for details.</p>
<p><b>4 – MediaTek Inc.</b></p> <p>Support option 5. The second window size here for CG-SDT is also defined based on the same principle as in LTE-PUR with taking into consideration the NR specs factors. Since in LTE-PUR the window size boundaries were originally derived from <math>\min(T_{\text{measurement\_intra\_UE}}, DRX \text{ cycle})</math> expression, the corresponding expression in NR would be <math>\min(T_{\text{SSB\_measurement\_period\_intra}}, M1*N1*DRX \text{ cycle})</math>, where <math>T_{\text{SSB\_measurement\_period\_intra}}</math> is the measurement period for intra-frequency measurements without gap for No DRX (given in Table 9.2.5.2-1). <math>M1=2</math> if SMTC periodicity (TSMTC) &gt; 20 ms and DRX cycle <math>\leq 0.64</math> second, otherwise <math>M1=1</math>. <math>N1=1</math> for FR1. Therefore, this expression can be further concluded (from Table 9.2.5.2-1) as:</p> <p><math>\min(\max(200\text{ms}, 5 \times \text{SMTC period}), M1 * DRX \text{ cycle})</math></p>
<p><b>5 – HuaWei Technologies Co.</b></p> <p>support option 2, same comment as for 4-2-1.</p> <p>BTW, option 2 is only about the size of the window, and for the location of the windows, we think LTE PUR definition can be re-used.</p>
<p><b>6 – Nokia Belgium</b></p> <p>We prefer option 6. The value of X can be set to NR-measurement-period as in Option 7.</p>

**Issue 4-3-2: The size and position of the second window for FR2 should be defined as:**

– Proposals

- Option 1:  $(T2 - \min(X, N_{serv})) \leq T2' \leq T2$ 
  - X is the measurement period for intra-frequency measurements without gap for No DRX
  - Nserv can be the consecutive DRX cycles for UE to evaluate a serving cell
- Option 2: 1.28s
- Option 3: Option 3:  $T2 - \min(\Delta T2, DRX \text{ cycle}) \leq T2' \leq T2$ 
  - $\Delta T2$ : starting point 480ms
- Option 4:  $T2 - \min(Tm2, b * K1 * N1 * T_{DRX}) \leq T2' \leq T2$
- Option 5:  $T2 - X \leq T2' \leq T2$ 
  - $X = \min(\max(400ms, M_{meas\_period\_w/o\_gaps} \times SMTC \text{ period}), M1 * N1 * DRX \text{ cycle})$
- Option 6:  $T3 - \min(X, M1 \times N1 \times DRX \text{ cycle}) \leq T2' \leq T2 \leq T3$ , where T3 is the time of the CG-SDT occasion
- Option 7:  $T2 - \min(NR\text{-measurement-period}, M \times DRX \text{ cycle}) \leq T2' \leq T2$ 
  - NR-measurement-period is equivalent to gapless intra-frequency measurement period without Kp, Klayer1\_measurement and DRX in connected mode (section 9.2.5.2 TS38.133).
  - M is the beam sweeping factor for FR2 as defined in table 4.2.2.2-1 (serving cell measurement period table), and 1 for FR1.

undefined

– Recommended WF

- TBA

**Feedback Form 15: 1st round companies views on Issue 4-3-2**

<p><b>1 – Ericsson Hungary Ltd</b></p> <p>Support option 4.</p>
<p><b>2 – Apple Poland Sp. z.o.o.</b></p> <p>Option 7</p>
<p><b>3 – Qualcomm CDMA Technologies</b></p> <p>Option 1,4,5,7 are okay. FFS for details.</p>

**4 – MediaTek Inc.**

Support option 5. The same approach followed for FR1 can also be followed for FR2 with taking into consideration the parameters used in FR2. Therefore, the window size can be derived from  $\min(T\_SSB\_measurement\_period, MI * NI * DRX\ cycle)$ , which can be further concluded (from Table 9.2.5.2-2) as:  
 $\min(\max(400ms, Mmeasperiodw/o\_gaps \times SMTC\ period), MI * NI * DRX\ cycle)$

**5 – HuaWei Technologies Co.**

support option 2, same comment as for 4-2-1.

**6 – Nokia Belgium**

We prefer option 6. The value of X can be set to NR-measurement-period as in Option 7.

5.3 Summary for 1st round

5.3.1 Open issues

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

**Table 9:**

	<b>Status summary</b>
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## Sub-topic#4-1

Issue 4-1-1: "Per-usage" seems not clear enough for three companies, and one company thinks there should be only one use case, and one company (Proponent) clarifies that separate requirements should be defined for NR RedCap, and two companies advise FFS for NR RedCap and focus on general use case.

Issue 4-1-2:

Majority view (4/5) that this should be discussed in RF session #138.

Issue 4-1-3:

One company has different understanding on the question. Proponent wants a different T2 from LTE-PUR. The rest 4 companies seems to prefer to the same T2 as LTE-PUR.

Issue 4-1-4

Understandings on the question itself are not fully aligned, however, Moderator sees some common ground: 1) High level principle should be applicable for both FR1 and FR2; 2) Different parameters for FR1 and FR2.

Issue 4-1-5

Sided views (2 Vs 3) between Option 1 and 2. The key issue here is whether or not the SDT session duration is small enough thus does not impact mobility if UE does not meet inter-freq and inter-RAT measurement requirements.

Issue 4-1-6

Majority view (4 Vs 1) goes to Option 2. Opponent's concern is that Tx/Rx is similar to Connected mode for the subsequent transmission in SDT session, thus scheduling restriction applies. This seems to require further clarification.

*Tentative agreements:*

Issue 4-1-1:

- Focus on the general use case
- FFS on other use cases e.g., NR RedCap.

Issue 4-1-2:

- Continue discussion on this issue in Email thread RF #138

Issue 4-1-3:

Discuss further on potential reasons on why NR CG-SDT should have a different T2 from LTE PUR?

Issue 4-1-4:

For high level principles, the agreement in RAN4#101-e still applies (Following LTE-PUR approach).

For FR1/FR2 different parameters, leave details to the issues in Sub-topic 4-2 and 4-3.

*Candidate options:*

35 *Recommendations for 2<sup>nd</sup> round:*

Issue 4-1-1:

Closed. No further discussion needed.

**Sub-topic#4-2**

Issue 4-2-1/4-2-2: Not converged views. However, it is observed that some options are quite related, and all options can be categorized into two groups: (1) Unified pattern:  $(T1 - \min(X1, X2)) \leq T1' \leq (T1 + \min(X1, X2))$  with different X1/X2 proposals (different for FR1/FR2 as well); (2) A fixed window size of 1.28s for all cases.

*Tentative agreements:*

Moderator suggests to select one in the 2nd round, and leave X1/X2 for further discussion if Group (1) is agreed.

*Candidate options:*

(1) Unified pattern:  $(T1 - \min(X1, X2)) \leq T1' \leq (T1 + \min(X1, X2))$

- o FFS: X1, X2

(2) A fixed window size of 1.28s for all cases.

*Recommendations for 2<sup>nd</sup> round:*

New issue 4-2-3 for 2nd round:

Issue 4-2-3: Which option do you prefer to on the selection of size and position of the first window?

Option 1: Unified pattern:  $(T1 - \min(X1, X2)) \leq T1' \leq (T1 + \min(X1, X2))$

- FFS: X1, X2

Option 2: A fixed window size of 1.28s for all cases.

<p><b>Sub-topic#4-3</b></p>	<p>Issue 4-3-1/4-3-2: Not converged views. However, it is observed that some options are quite related, and all options can be categorized into three groups: (1) Unified pattern: <math>(T2-\min(Y1,Y2)) \leq T2' \leq T2</math> with different Y1/Y2 proposals (different for FR1/FR2 as well); (2) Unified pattern: <math>(T2-\min(Y1,Y2)) \leq T2' \leq T3</math> with different Y1/Y2 proposals (different for FR1/FR2 as well);(3) A fixed window size of 1.28s for all cases.</p> <p><i>Tentative agreements:</i> Moderator suggests to select one in the 2nd round, and leave parameters for further discussion if there are in the agreed option.</p> <p><i>Candidate options:</i> (1) Unified pattern: <math>(T2-\min(Y1,Y2)) \leq T2' \leq T2</math> with different Y1/Y2 proposals (different for FR1/FR2 as well); (2) Unified pattern: <math>(T2-\min(Y1,Y2)) \leq T2' \leq T3</math> with different Y1/Y2 proposals (different for FR1/FR2 as well); (3) A fixed window size of 1.28s for all cases.</p> <p><i>Recommendations for 2<sup>nd</sup> round:</i> New issue 4-3-3 for 2nd round: Issue 4-3-3: Which option do you prefer to on the selection of size and position of the second window?</p>
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## 5.4 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".*

**Issue 4-1-7: What could make T2 selection in NR SDT different from that in LTE PUR? Please elaborate.**

### Feedback Form 16: Issue 4-1-7 (New issue for 2nd round)

#### 1 – Nokia Belgium

In our view, the LTE PUR requirement for TA validation can be improved with this simple modification that we proposed in our paper.

From our understanding, for LTE-PUR the second window ends when the UE performed the measurement, and it is not necessarily connected to the moment of the transmission. For LTE PUR we have

- **T2** is the time when the **UE performs TA validation** defined in clause 5.3.3.19 of TS 36.331 [2] for transmission using PUR,
- **T2** is the time when the **UE has completed NRSRP2**.

It is important that the moment when the second RSRP measurement is performed is not too far away from the actual transmission.

We understand that the end of the second RSRP window should be the moment when the UE transmits on CG-SDT, or the CG-SDT occasion. That is why we would like to introduce T3

- **T3** is the time of transmission using CG-SDT.

## 2 – Qualcomm CDMA Technologies

Second window for CG-SDT can follow the same format in LTE-PUR.

I understand what Nokia tries to say, but T3 can be redundant factor because TA validation is pre-requirements for transmitting LTE-PUR based on 5.3.3.1c, 36.331

## 3 – Nokia Belgium

To Qualcomm

Sorry but we cant find that timing link between TA validation on the 36.133 and also on the RAN2 running CRs.

Could you clarify more on why this would be redundant?

## 4 – ZTE Wistron Telecom AB

The actual CG-SDT transmission shall satisfy UE sync requirement. In this sense, we understand that there is no issue if we still stick to LTE PUR approach for T2, and Nokia's concern on obsolete TA validation for CG-SDT transmission seems not likely to happen.

## 5 – Qualcomm CDMA Technologies

After review the Nokia comments carefully, I understand the statement. My understanding is T2 in LTE-PUR is for PUR transmission time.

I suggest how company understand the definition of T2. if T2 is time for the PUR transmission T2 and T3 are same. otherwise we need to consider to define second window relate to actual CG SDT transmission timing.

## 6 – MediaTek Inc.

Since UE already knows the location of the CG resources, UE can perform the second window measurements (which ends at T2) to be adjacent to CG resources without defining another time period T3.

**7 – ZTE Wistron Telecom AB**

Moderator: The main concern is the duration between the moment when TA validation is confirmed, and the moment when the actual CG-SDT transmission happens. The duration should not be too large if considering its impact on performance.

Recommended WF:

- Similar approach as LTE PUR for defining the second window, i.e., only T2 is introduced.
- Discuss further in the next meeting on whether or not to introduce any requirements between T2 and the moment of the actual CG-SDT transmission.

**Issue 4-1-8: Whether or not the SDT session duration is small enough thus does not impact mobility if UE does not meet inter-freq and inter-RAT measurement requirements Whether UE can meet inter-frequency and inter-RAT requirements if considering that Tx/Rx is similar to Connected mode for the subsequent transmission in SDT session?**

**Feedback Form 17: Issue 4-1-8 (New issue for 2nd round)**

**1 – MediaTek Inc.**

Our view is that during subsequent SDT transmission (Tx/Rx) UE might not be able to meet the inter-frequency and inter-RAT measurement requirements. We appreciate that this subsequent transmission might be too long, therefore in that case we think it more sensible for the network to trigger the UE to move to the connected state.

**2 – HuaWei Technologies Co.**

UE may not be able to perform inter-frequency and inter-RAT measurement unless data interruption to the subsequent transmission is allowed. Given measurement gap is not applicable in Inactive state, our view is that UE should not be required to meet the inter-frequency and inter-RAT measurement requirements during SDT session.

**3 – ZTE Wistron Telecom AB**

Moderator:

Recommended WF:

- UE does not meeting inter-frequency or inter-RAT requirements for the subsequent transmission in SDT session.

**4 – ZTE Wistron Telecom AB**

Moderator (updated on Monday):

According to Email discussions, this issue will be discussed in the next meeting.

Recommended WF:

- FFS: whether or not UE meets inter-frequency or inter-RAT requirements for the subsequent transmission in SDT session.

**Issue 4-1-9: Clarify why scheduling restriction applies for subsequent SDT transmission in SSB occasion if considering that Tx/Rx is similar to Connected mode for the subsequent transmission in SDT**

session.

**Feedback Form 18: Issue 4-1-9 (New issue for 2nd round)**

**1 – MediaTek Inc.**

Scheduling restriction can be applied here similar to the connected mode since it is important to keep the serving cell measurements and detect the SSBs.

**2 – HuaWei Technologies Co.**

Data Tx/Rx for the subsequent transmission in SDT session is similar to Connected mode, so we understand that the scheduling restriction defined in Connected mode would apply, e.g. due to Rx beam sweeping during measurement, UE may not be able to Tx/Rx data from the serving cell.

**3 – Qualcomm CDMA Technologies**

we think this could be FFS.

**4 – ZTE Wistron Telecom AB**

Moderator:

Recommended WF:

scheduling restriction applies for subsequent SDT transmission in SSB occasion.

**5 – ZTE Wistron Telecom AB**

Moderator (updated on Monday):

According to Email discussions, this issue will be discussed in the next meeting.

Recommended WF:

· FFS: whether or not scheduling restriction applies for subsequent SDT transmission in SSB occasion.

**Issue 4-2-3: Which option do you prefer to on the selection of size and position of the first window?**

- Option 1: Unified pattern:  $(T1 - \min(X1, X2)) \leq T1' \leq (T1 + \min(X1, X2))$ 
  - o FFS: X1, X2
- Option 2: A fixed window size of 1.28s for all cases.

**Feedback Form 19: Issue 4-2-3 (New issue for 2nd round)**

**1 – MediaTek Inc.**

We support option 1. This option should be agreeable as it is based on the same principle used in LTE PUR.

<p><b>2 – Nokia Belgium</b></p> <p>We support option 1.</p>
<p><b>3 – Qualcomm CDMA Technologies</b></p> <p>Support option 1</p>
<p><b>4 – Apple Poland Sp. z.o.o.</b></p> <p>we support option 1</p>
<p><b>5 – ZTE Wistron Telecom AB</b></p> <p>Option 1.</p>
<p><b>6 – HuaWei Technologies Co.</b></p> <p>We can compromise to option 1 given values of X1 and X2 are FFS.</p>
<p><b>7 – ZTE Wistron Telecom AB</b></p> <p>Moderator: Among received comments, unanimous consensus on Option 1.</p> <p>Agreement: Option 1.</p>

Issue 4-3-3: Which option do you prefer to on the selection of size and position of the second window?

- Option 1: Unified pattern:  $(T2 - \min(Y1, Y2)) \leq T2' \leq T2$  with different Y1/Y2 proposals (different for FR1/FR2 as well)
  - FFS: Y1, Y2
- Option 2: Unified pattern:  $(T2 - \min(Y1, Y2)) \leq T2' \leq T3$  with different Y1/Y2 proposals (different for FR1/FR2 as well);
  - FFS: Y1, Y2
- Option 3: A fixed window size of 1.28s for all cases

**Feedback Form 20: Issue 4-3-3 (New issue for 2nd round)**

<p><b>1 – MediaTek Inc.</b></p> <p>We support option 1. This option is also based on the same principle used in LTE PUR for defining the second window. Regarding option 3, we don't think it is necessary to include T3 in the expression which is to consider the CG occasions. Because UE already knows the location of the CG resources and therefore UE can perform the second window measurements to be close to these resources without defining another time period (i.e., T3).</p>
<p><b>2 – Nokia Belgium</b></p>

We prefer Option 2, for the reasons on Issue 4-1-7

There is a typo on option 2, it should be

Option 2: Unified pattern: (T3-min (Y1,Y2)) <= T2' <= T3 with different Y1/Y2 proposals (different for FR1/FR2 as well);

FFS: Y1, Y2

### 3 – MediaTek Inc.

Just correcting a typo from our first comment#1.

We support option 1. This option is also based on the same principle used in LTE PUR for defining the second window. Regarding option 2, we don't think it is necessary to include T3 in the expression which is to consider the CG occasions. Because UE already knows the location of the CG resources and therefore UE can perform the second window measurements to be close to these resources without defining another time period (i.e., T3).

### 4 – Nokia Belgium

We agree with Mediatek that the UE knows the location of the CG resources. That is why we think this is the time that should be used as a reference for the second window

From our understanding, for LTE-PUR the second window ends when the UE performed the measurement, and it is not necessarily connected to the moment of the transmission. For LTE PUR we have

- T2 is the time when the UE performs TA validation defined in clause 5.3.3.19 of TS 36.331 [2] for transmission using PUR,
- T2 is the time when the UE has completed NRSRP2.

It is important that the moment when the second RSRP measurement is performed is not too far away from the location of the targeted CG resources

We understand that the end of the second RSRP window should be the moment when the UE transmits on CG-SDT, or the CG-SDT occasion. That is why we would like to introduce T3

- T3 is the time of transmission using CG-SDT.

### 5 – Qualcomm CDMA Technologies

Option1. Copy the comments from 4.1.7

Second window for CG-SDT can follow the same format in LTE-PUR.

I understand what Nokia tries to say, but T3 can be redundant factor because TA validation is pre-requirements for transmitting LTE-PUR based on 5.3.3.1c, 36.331

### 6 – Apple Poland Sp. z.o.o.

We support option1 which is in line with LTE-PUR design.

<p><b>7 – ZTE Wistron Telecom AB</b></p> <p>Option 1.</p> <p>Yes, there is a typo in Option 2. T2 should be T3. Thanks to Nokia for pointing out this typo:)</p>
<p><b>8 – HuaWei Technologies Co.</b></p> <p>We can compromise to option 1 given values of Y1 and Y2 are FFS.</p>
<p><b>9 – Qualcomm CDMA Technologies</b></p> <p>update the comment from option1. need to clarify the definition of T2 whether T2 is actual SDT transmission timing.</p>
<p><b>10 – ZTE Wistron Telecom AB</b></p> <p>Moderator: Majority views ( 4 Vs 1) goes to Option 1, and 1 company goes to Option 2. With the recommended WF in Issue 4-1-7, the concern is addressed in another potential new requirement, not in the second window.</p> <p>Recommended WF: Option 1, but further discuss whether or not to introduce any requirement for the duration between T2 and the moment of actual CG-SDT transmission.</p>

## 6 Topic #5: CRs

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

*The CRs are discussed in this topic. The following sections in LTE PUR can be referred to (Excerpted from R4-2118961):*

**Table 10:**

<i>Requirement</i>	<i>Clause</i>	<i>Possible Changes</i>
<i>UE synchronization</i>	<i>TS 36.133, 4.6.3.2 (NB-IoT) TS 36.133, 4.7.4.2 (Cat M1/M2)</i>	<i>Specification text was added to set requirement that the UE is only allowed to transmit on PUR if the UE is synchronized to the serving cell.</i>
<i>TA validation</i>	<i>TS 36.133, 4.6.3.3 (NB-IoT) TS 36.133, 4.7.4.3 (Cat M1/M2)</i>	<i>Specification text was added to set requirements for the window wherein RSRP values can be considered valid by the UE to use for TA validation.</i>

<i>UE transmit timing</i>	<i>TS 36.133, 7.20.2 (NB-IoT) TS 36.133, 7.24.2 (Cat M1/M2)</i>	<i>The specification text was updated to reflect that existing requirement for UE initial transmission timing error also applies to LTE PUR.</i>
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*And the corresponding sections for NR CG-SDT:*

**Table 11:**

<i>Requirement</i>	<i>Clause</i>	<i>Possible Changes</i>
<i>UE synchronization</i>	<i>TS 38.133, 5.x.2</i>	<i>Specification text was added to set requirement that the UE is only allowed to transmit on CG-SDT if the UE is synchronized to the serving cell.</i>
<i>TA validation</i>	<i>TS 38.133, 5.x.3</i>	<i>Specification text was added to set requirements for the window wherein RSRP values can be considered valid by the UE to use for TA validation.</i>
<i>UE transmit timing</i>	<i>TS 38.133, 7.1.2</i>	<i>The specification text was updated to reflect that existing requirement for UE initial transmission timing error also applies to CG-SDT.</i>

## 6.1 Companies' contributions summary

**Table 12:**

<b>TDoc</b>	<b>Title</b>	<b>Source</b>	<b>Moderator's remarks</b>
<b>R4-2200920</b>	Draft CR TA validation for Small Data Transmissions	Nokia, Nokia Shanghai Bell	Similar to TS 36.133 Section 4.6.3.3 (NB-IoT), Section 4.7.4.3 (Cat M1/M2).
<b>R4-2201645</b>	CR on UL timing requirements for SDT	Huawei, Hisilicon	Similar to TS 36.133 Section 7.20.2(NB-IoT), Section 7.24.2(Cat M1/M2).

R4-2201792	Draft big CR for SDT RRM requirements	ZTE Wistron Telecom AB	Place holder for draft big CR
<b>R4-2201870</b>	Draft CR to TS 38.133: Requirements on UE synchrononization for SDT	Ericsson	Similar to TS 36.133 Section 4.6.3.2 (NB-IoT), Section 4.7.4.2 (Cat M1/M2).

### 6.1.1 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 1<sup>st</sup> round.*

#### **Feedback Form 21: Comments on R4-2200920 Draft CR TA validation for Small Data Transmissions**

<p><b>1 – Ericsson Hungary Ltd</b></p> <p>Requirements need to be different for FR1 and FR2. The formula for FR1 and FR2 need to be different.</p>
<p><b>2 – Apple Poland Sp. z.o.o.</b></p> <p>Up to the conclusions from above issues</p>
<p><b>3 – MediaTek Inc.</b></p> <p>The formulas should be defined based on the conclusions on the issues of Sub-topic 4-2.</p>
<p><b>4 – HuaWei Technologies Co.</b></p> <p>the exact window size and the involvement of T3 should be based on the conclusion of open issue discussion.</p>

#### **Feedback Form 22: Comments on R4-2201645 CR on UL timing requirements for SDT**

<p><b>1 – Ericsson Hungary Ltd</b></p> <p>Looks good, but the terms needs to be checked whether this (SDT) is to be used or defined.</p>
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**Feedback Form 23: Comments on R4-2201870 Draft CR to TS  
38.133: Requirements on UE synchronizaton for SDT**

<p><b>1 – Apple Poland Sp. z.o.o.</b></p> <p>Up to the above issue 3-1</p>
<p><b>2 – MediaTek Inc.</b></p> <p>This should be based on the conclusion on Sub-topic 3-1</p>
<p><b>3 – Nokia Belgium</b></p> <p>Depends on the outcome of Issue 3-1</p> <p>If we decide to include these requirements, I think we could also consider taking the proposal form Apple’s paper:</p> <p><i>Proposal 1: The UE is allowed to transmit CG-SDT provided that the UE meets the existing sync requirements towards the serving cell prior to transmission, and if no SSB is available at the UE during the last 160 ms then the UE shall drop the CG-SDT transmission.</i></p>

6.2 Summary for 1st round

6.2.1 CRs/TPs

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

**Table 13:**

<b>CR/TP number</b>	<b>CRs/TPs Status update recommendation</b>
<b>R4-2200920</b>	<i>To be revised according to the outcome of the discussion</i>
<b>R4-2201645</b>	To be revised. Further check terms used.
<b>R4-2201870</b>	To be revised according to the outcome of the discussion.

6.3 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".*

## 7 Topic #6 Feature and feature groups on NR SDT

### 7.1 Discussion on 2nd round

Table 14: Feature and feature groups for NR SDT

Features	Index	Feature group	Components	Prerequisite feature groups	Need for the gNB to know if the feature is supported	Applicable to the capability signalling exchange between UEs (V2X WI only)*.	Consequence if the feature is not supported by the UE	Type (the 'type' definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)	Need of FD-D/TDD differentiation	Need of FR1/FR2 differentiation	Capability interpretation for mixture of FD-D/TDD and/or FR1/FR2	Note	Mandatory/Optional

NR small data trans- mis- sions in IN- AC- TIVE state		RA- SDT	Indi- cate sup- port of ran- dom ac- cess based small data trans- mis- sions in IN- AC- TIVE state 2- step ran- dom ac- cess based 4- step ran- dom ac- cess based		Yes	N. A.	RA- SDT is not sup- ported	Per UE	No	No	N. A.		Op- tional
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		CG-SDT	Indicate support of configured grant based small data transmissions in INACTIVE state		Yes	N.A.	CG-SDT is not supported	Per UE	No	Yes	N.A.		Optional
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**Feedback Form 24: NR SDT inputs to Rel-17 UE feature list**

<p><b>1 – Nokia Belgium</b></p> <p>We are fine with the proposal.</p>
<p><b>2 – ZTE Wistron Telecom AB</b></p> <p>Due to the urgency of Rel-17 UE feature list, we could agree on this in this meeting as a baseline, and leave it for further potential revision in the next meeting.</p>
<p><b>3 – MediaTek Inc.</b></p> <p>We also agree to have NR SDT feature in Rel-17 UE feature list.</p>
<p><b>4 – HuaWei Technologies Co.</b></p> <p>We do not support defining this capability in RAN4.</p> <p>We agree that this basic feature for SDT should be defined, but we understand it should be done in the leading WG (RAN2)?</p>
<p><b>5 – Qualcomm CDMA Technologies</b></p> <p>Similar view as Huawei, RAN2 should define UE features.</p>

**6 – ZTE Wistron Telecom AB**

Moderator’s recommended WF:

The above table is agreed to be the baseline as the input to UE feature list on NR SDT.

**7 – ZTE Wistron Telecom AB**

Moderator’s recommendation (Updated on Monday):

We may keep it open to allow more time for further consideration and eventually conclude whether or not RAN4 needs to define the feature.

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## 8 Recommendations for Tdocs

### 8.1 1st round

#### New tdocs

**Table 15:**

Title	Source	Comments
WF on RRM requirements for SDT in INACTIVE State	ZTE	Capture the potential agreements and issues still open.

#### Existing tdocs

**Table 16:**

Tdoc number	Title	Source	Recommendation	Comments
R4-210xxxx	CR on ...	XXX	Agreeable, Re-vised, Merged, Postponed, Not Pursued	
<b>R4-2200300</b>	On RRM require-ment for CG-SDT	Apple	Noted	
<b>R4-2200417</b>	RRM requirements for NR-SDT	Qualcomm Incor-porated	Noted	

<b>R4-2200918</b>	On BS demodulation performance requirements for CG-SDT	Nokia, Nokia Shanghai Bell	Noted	
<b>R4-2200919</b>	TA validation requirements for CG-SDT	Nokia, Nokia Shanghai Bell	Noted	
<b>R4-2200920</b>	Draft CR TA validation for Small Data Transmissions	Nokia, Nokia Shanghai Bell	Revised	
<b>R4-2201644</b>	Discussion on remaining issues for SDT RRM	Huawei, Hisilicon	Noted	
<b>R4-2201645</b>	CR on UL timing requirements for SDT	Huawei, Hisilicon	Revised	
<b>R4-2201793</b>	Further discussion on RRM requirements for SDT	ZTE Wistron Telecom AB	Noted	
<b>R4-2201853</b>	RRM requirements for SDT	MediaTek Inc.	Noted	
<b>R4-2201869</b>	Discussions on RRM requirements for Small Data Transmissions	Ericsson	Noted	
<b>R4-2201870</b>	Draft CR to TS 38.133: Requirements on UE synchronization for SDT	Ericsson	Revised	

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:
  - a) CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued

b) 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

## 8.2 2nd round

**Table 17:**

<b>Tdoc number</b>	<b>Title</b>	<b>Source</b>	<b>Recommendation</b>	<b>Comments</b>
R4-2202710	WF on RRM requirements for SDT in INACTIVE State	ZTE	Agreeable	
R4-2201792	Draft big CR for SDT RRM requirements	ZTE Wistron Telecom AB	For email approval	
R4-2202711	Draft CR TA validation for Small Data Transmissions	Nokia	Agreeable	<i>Revised according to the agreed WF</i>
R4-2202712	Draft CR to TS 38.133: Requirements on UE synchronization for SDT	Ericsson	Agreeable	
R4-2202713	draft CR on UE transmit timing requirements for SDT	Huawei	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:

a) CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued

b) Other documents: Agreeable, Revised, Noted

3. Do not include hyper-links in the documents

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## 9 Annex

Contact information

**Table 18:**

<b>Company</b>	<b>Name</b>	<b>Email address</b>

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)