[101-bis-e][227] NR_SmallData_INACTIVE_NWM - Version 0.0.3
RAN4

3GPP TSG-RAN WG4 Meeting # 101-bis-e R4-220XXXX

Electronic Meeting, 17th – 25th January, 2022

Agenda item: 6.25

Source: Moderator (ZTE)

Title: Email discussion summary for [101-bis-e][227] NR_SmallData_INACTIVE

Document for: Information

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 1st round and 2nd round

- 1st 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
- 2nd round: TBA

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

Table 1:

TDoc	Title	Source	Moderator's remarks

R4-2200300	On RRM requirement for CG-SDT	Apple	(1) Sync req: existing UE sync requirements + SSB availability within the latest 160ms (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. (3) For FR2, CG-SDT RRM requirements are only applicable to BC-capable UEs.
R4-2200417	RRM requirements for NR-SDT	Qualcomm Incorporated	(1) Introduce usage-wise TA validation requirements for CG-SDT, e.g., NR-RedCap etc. (For LTE PUR, two usages NB-IoT and eMTC). (2) Two window sizes are based on intra-frequency measurement period without gap, and DRX cycles, similar equation to LTE PUR.
R4-2200918	On BS demodulation performance requirements for CG-SDT	Nokia, Nokia Shanghai Bell	(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. (2) Requirements introduced for CG-SDT should guarantee the CG-SDT performance (3) Discuss to introduced UE timing compensation requirements and BS demodulation performance requirements

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

R4-2201793	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. (3) RAN4 does not need to introduce additional sync requirements for the UE being allowed for CG-SDT transmission. (4) A good starting-point for the two windows sizes for TA validation is 480ms as in LTE PUR.
R4-2201853	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 (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

R4-2201869	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. (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 (4) Similar formulars to LTE PUR with different parameters for FR1 and FR2, based on measurement periods, scaling factors, and DRX cycles.

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:

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

R4-2201793	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.
R4-2201869	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
    - TBA

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

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

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

1 – Ericsson Hungary Ltd Support option 1.
2 – Apple Poland Sp. z.o.o. Option 1. Based on our understanding, the TA validation is only required for first SDT transmission rather than subsequent ones from RAN2.
3 – Qualcomm CDMA Technologies 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.
4 – MediaTek Inc. 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.
5 – HuaWei Technologies Co. option 1 In our view, the validity of SDT decision is a RAN2 issue, and there should be no impact to RAN4 requirements.
6 – Intel We agree with companies views on Option 1.
7 – Nokia Belgium We are fine with Option 1.

2.3 Summary for 1st round

2.3.1 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.

Table 3:

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

2.4 Discussion on 2nd round (if applicable)

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:

TDoc	**Title**	**Source**	**Moderator's remarks**

R4-2200918	On BS demodulation performance requirements for CG-SDT	Nokia, Nokia Shanghai Bell	(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. (2) Requirements introduced for CG-SDT should guarantee the CG-SDT performance (3) Discuss to introduced UE timing compensation requirements and BS demodulation performance requirements

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 (simialr 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
  - Option 1: Yes
  - Option 2: No, focused on defining UE RRM requirements for CG-SDT by following RAN plenary's agreements at this stage.
- Recommended WF
  - 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 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.

Table 5:

	Status summary
Sub-topic#2-1	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. *Tentative agreements:* With the clarification from Proponent, the issue is related to BS demodulation, therefore it is suspended according to RAN plenary's agreements. *Candidate options:* *Recommendations for 2nd round:* 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".

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:

TDoc	Title	Source	Moderator's remarks
R4-2200300	On RRM requirement for CG-SDT	Apple	(1) Sync req: existing UE sync requirements + SSB availability within the latest 160ms
R4-2201644	Discussion on remaining issues for SDT RRM	Huawei, Hisilicon	(3) Re-using the existing UE sync requirements from LTE PUR for CG-SDT
R4-2201793	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.
R4-2201853	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

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 optino 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 form 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 in 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 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.

Table 7:

	Status summary
Sub-topic#3-1	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. *Tentative agreements:* No new UE sync requirements to be introduced for CG-SDT transmission. *Candidate options:* UE sync requirements to be re-used for CG-SDT transmission: (1) LTE PUR sync requirements; (2) NR sync requirements; (3) NR sync requirements + NR serving cell availability requirement *Recommendations for 2nd round:* 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

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

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
R4-2200300	On RRM requirement for CG-SDT	Apple	(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. (3) For FR2, CG-SDT RRM requirements are only applicable to BC-capable UEs.
R4-2200417	RRM requirements for NR-SDT	Qualcomm Incorporated	(1) Introduce usage-wise TA validation requirements for CG-SDT, e.g., NR-RedCap etc. (For LTE PUR, two usages NB-IoT and eMTC). (2) Two window sizes are based on intra-frequency measurement period without gap, and DRX cycles, similar equation to LTE PUR.

R4-2200919	TA validation requirements for CG-SDT	Nokia, Nokia Shanghai Bell	(1) Similar formulas to LTE PUR for CG-SDT TA validation. (2) Extend the second window from T2(i.e., the moment to perform TA validation) to T3(i.e., CG-SDT resource time)
R4-2201644	Discussion on remaining issues for SDT RRM	Huawei, Hisilicon	(4) The window size for the two RSRP measurements in TA validation is 1.28s (5) UE is not required to meet inter-frequency and inter-RAT measurement requirements during SDT session (6) Scheduling restriction applies to the SDT subsequent transmission during SSB occasions
R4-2201793	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.
R4-2201853	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
R4-2201869	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
  - TBA

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

1 – Ericsson Hungary Ltd 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.
2 – Apple Poland Sp. z.o.o. Option 2. Same TA validation requirement is applied for each initial SDT transmission (we think RAN2 didn't require TA validation for subsequent transmission).
3 – Qualcomm CDMA Technologies 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.
4 – MediaTek Inc. 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.

5 – HuaWei Technologies Co.

We need more clarification on option 1, i.e. what is the ”usage” referring to.

@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 requriements are expected?

6 – Qualcomm CDMA Technologies

@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.

7 – Nokia Belgium

From the comments there are different interpretations on the issue.

If CG-SDT usage is related to subsequent transmissions: TA validation is performed before each CG-SDT usage.

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.

If this is related to use cases:

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

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

1 – Ericsson Hungary Ltd

The issue is not clear. Clarification needed on the question about the meaning of BC capable UEs.

2 – Apple Poland Sp. z.o.o. 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.
3 – Qualcomm CDMA Technologies 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.
4 – Ericsson Hungary Ltd @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.
5 – HuaWei Technologies Co. we have similar view as QC and Ericsson
6 – Nokia Belgium No need to restrict CG-SDT requirements in this thread. Agree with other colleagues that this can be discussed in the RF room.

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

1 – Ericsson Hungary Ltd Option 1 is agreeable.

2 – Apple Poland Sp. z.o.o.

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.

3 – Qualcomm CDMA Technologies

Not clear about this questions. we consider same principle for both first and second window size as LTE-PUR.

4 – MediaTek Inc.

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.

5 – Ericsson Hungary Ltd

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.

6 – Nokia Belgium

We prefer option 1.

The intention of this option is that the time for the second measurement should be close to when the actual transmission is happening.

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 alwasy 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 avoiding 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)) <= T1' <= (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(ΔT1/2, DRX cycle)) ≤ T1' ≤ (T1 + min(ΔT1/2, DRX cycle))
    - ΔT1: starting point 480ms
  - Option 4: (T1 – min(Tm1, M1* T_{DRX})) ≤ T1' ≤ (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 (TSMTC) > 20 ms and T_{DRX} ≤ 0.64 second
      - Otherwise M1=1
  - Option 5: T1 – X ≤ T1' ≤ T1 + X
    - X = min(max(200ms,5 x SMTC period) ,M1* DRX cycle)
  - Option 6: (T1 – min(X, M1xN1x DRX cycle)) ≤ T1' ≤ (T1 + min(X, M1xN1xDRX cycle))
  - Option 7: (T1 – min(NR-measurement-period, M×DRX cycle)) ≤ T1' ≤(T1 + min(NR-measurement-period, M×DRX cycle))
    - 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 12: 1st round companies views on Issue 4-2-1

1 – Ericsson Hungary Ltd

Support option 4.

2 – Apple Poland Sp. z.o.o.

Option 7.

3 – Qualcomm CDMA Technologies

The principle of option1,4,5,6,7 are similar.

Left parameter in min function at LTE-PUR is defined (480ms,800ms) for eMTC from T*measure*intra*UE*cat_M1 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.

Similarly, the combination of the measurement period for intra-frequency and DRX cycle can be defined for CG-SDT TA validation.

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.

4 – MediaTek Inc.

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 *min(T_measure_intra_UE, DRX cycle)* expression, the corresponding expression in NR would be *min(*T_SSB_measurement_period_intra*, M1*N1*DRX cycle)*, where *T_SSB_measurement_period_intra* is the measurement period for intra-frequency measurements without gap for No DRX (given in Table 9.2.5.2-1). M1=2 if SMTC periodicity (TSMTC) > 20 ms and DRX cycle ≤ 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(200ms,5 x SMTC period) ,M1 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 consieration 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 measruemetn 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 formular, 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_serv)) <= T1' <= (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 s
  - Option 3: Option 3: (T1 – min(ΔT1/2, DRX cycle)) ≤ T1' ≤ (T1 + min(ΔT1/2, DRX cycle))
    - ΔT1: starting point 480ms
  - Option 4: (T1 – min(Tm2, M1*N1* T_{DRX})) ≤ T1' ≤ (T1 + min(Tm2, M1*N1* 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 (TSMTC) > 20 ms and T_{DRX} ≤ 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 ≤ T1' ≤ T1 + X
    - X = min(max(400ms,Mmeas_period_w/o_gaps x SMTC period) ,M1* N1* DRX cycle)
  - Option 6: (T1 – min(X, M1xN1x DRX cycle)) ≤ T1' ≤ (T1 + min(X, M1xN1xDRX cycle))
  - Option 7: (T1 – min(NR-measurement-period, M×DRX cycle)) ≤ T1' ≤(T1 + min(NR-measurement-period, M×DRX cycle))
    - 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 13: 1st round companies views on Issue 4-2-2

1 – Ericsson Hungary Ltd Support option 4.
2 – Apple Poland Sp. z.o.o. Option 7
3 – Qualcomm CDMA Technologies option1,4,5,6,7 are okay.
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_r M1*N1*DRX cycle),* which can be further concluded (from Table 9.2.5.2-2) as: *min(max(400ms,Mmeasperiodw/o_gaps x SMTC period) ,M1*N1*DRX cycle)*
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_serv)) <= T2' <= 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(ΔT2, DRX cycle) ≤ T2' ≤ T2
        - ΔT2: starting point 480ms
    - Option 4: T2 – min(Tm1, b*K1* T_{DRX}) ≤ T2' ≤ T2
    - Option 5: T2 – X ≤ T2' ≤ T2
        - X = min(max(200ms,5 x SMTC period) ,M1* DRX cycle)
    - Option 6: T3 – min(X, M1xN1xDRX cycle) ≤ T2' ≤ T2 ≤ T3, where T3 is the time of the CG-SDT occasion
    - Option 7: T2 – min(NR-measurement-period, M×DRX cycle) ≤ T2' ≤ 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

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

4 – MediaTek Inc.

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 *min(Tmeasureintra_UE, DRX cycle)* expression, the corresponding expression in NR would be *min(T_SSB_measurement_period_intra, M1*N1*DRX cycle),* where *T_SSB_measurement_period_intra* is the measurement period for intra-frequency measurements without gap for No DRX (given in Table 9.2.5.2-1). M1=2 if SMTC periodicity (TSMTC) > 20 ms and DRX cycle ≤ 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(200ms,5 x SMTC period) ,M1 DRX cycle)*

5 – HuaWei Technologies Co.

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

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.

6 – Nokia Belgium

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

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)) <= T2' <= 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(ΔT2, DRX cycle) ≤ T2' ≤ T2
    - ΔT2: starting point 480ms
  - Option 4: T2 – min(Tm2, b*K1*N1* T_{DRX}) ≤ T2' ≤ T2
  - Option 5: T2 – X ≤ T2' ≤ T2
    - X = min(max(400ms,Mmeas_period_w/o_gaps x SMTC period) ,M1* N1* DRX cycle)
  - Option 6: T3 – min(X, M1xN1xDRX cycle) ≤ T2' ≤ T2 ≤ T3, where T3 is the time of the CG-SDT occasion
  - Option 7: T2 – min(NR-measurement-period, M×DRX cycle) ≤ T2' ≤ 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

1 – Ericsson Hungary Ltd Support option 4.
2 – Apple Poland Sp. z.o.o. Option 7
3 – Qualcomm CDMA Technologies Option 1,4,5,7 are okay. FFS for details.
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_i M1*N1*DRX cycle),* which can be further concluded (from Table 9.2.5.2-2) as: *min(max(400ms,Mmeasperiodw/o_gaps x SMTC period) ,M1*N1*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 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.

Table 9:

	Status summary

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:* *Recommendations for 2nd 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)) <= T1' <= (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)) <= T1' <= (T1+min(X1,X2) ◦ FFS: X1, X2 (2) A fixed window size of 1.28s for all cases. *Recommendations for 2nd 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)) <= T1' <= (T1+min(X1,X2) – FFS: X1, X2 Option 2: A fixed window size of 1.28s for all cases.

Sub-topic#4-3	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: (T2-min (Y1,Y2)) <= T2' <= T2 with different Y1/Y2 proposals (different for FR1/FR2 as well); (2) Unified pattern: (T2-min (Y1,Y2)) <= T2' <= T3 with different Y1/Y2 proposals (different for FR1/FR2 as well);(3) A fixed window size of 1.28s for all cases. *Tentative agreements:* Moderator suggests to select one in the 2nd round, and leave parameters for further discussion if there are in the agreed option. *Candidate options:* (1) Unified pattern: (T2-min (Y1,Y2)) <= T2' <= T2 with different Y1/Y2 proposals (different for FR1/FR2 as well); (2) Unified pattern: (T2-min (Y1,Y2)) <= T2' <= T3 with different Y1/Y2 proposals (different for FR1/FR2 as well); (3) A fixed window size of 1.28s for all cases. *Recommendations for 2nd round:* 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?

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)

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)

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)

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)) <= T1' <= (T1+min(X1,X2)
  - 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)

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

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:

Requirement	*Clause*	*Possible Changes*
UE synchronization	*TS 36.133, 4.6.3.2 (NB-IoT)* *TS 36.133, 4.7.4.2 (Cat M1/M2)*	*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.*
TA validation	*TS 36.133, 4.6.3.3 (NB-IoT)* *TS 36.133, 4.7.4.3 (Cat M1/M2)*	*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.*
UE transmit timing	*TS 36.133, 7.20.2 (NB-IoT)* *TS 36.133, 7.24.2 (Cat M1/M2)*	*The specification text was updated to reflect that existing requirement for UE initial transmission timing error also applies to LTE PUR.*

And the corresponding sections for NR CG-SDT:

Table 11:

Requirement	*Clause*	*Possible Changes*
UE synchronization	*TS 38.133, 5.x.2*	*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.*
TA validation	*TS 38.133, 5.x.3*	*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.*

UE transmit timing	*TS 38.133, 7.1.2*	*The specification text was updated to reflect that existing requirement for UE initial transmission timing error also applies to CG-SDT.*

6.1 Companies' contributions summary

Table 12:

TDoc	Title	Source	Moderator's remarks
R4-2200920	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).
R4-2201645	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
R4-2201870	Draft CR to TS 38.133: Requirements on UE synchoronization 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 1st round.

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

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

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

1 – Ericsson Hungary Ltd Looks good, but the terms needs to be checked whether this (SDT) is to be used or defined.

Feedback Form 23: Comments on R4-2201870 Draft CR to TS 38.133: Requirements on UE synchoronization for SDT

1 – Apple Poland Sp. z.o.o. Up to the above issue 3-1
2 – MediaTek Inc. This should be based on the conclusion on Sub-topic 3-1
3 – Nokia Belgium Depends on the outcome of Issue 3-1 If we decide to include these requirements, I think we could also consider taking the proposal form 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.***

6.2 Summary for 1st round

6.2.1 CRs/TPs

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

Table 13:

CR/TP number	CRs/TPs Status update recommendation
R4-2200920	*To be revised according to the outcome of the discussion*
R4-2201645	To be revised. Further check terms used.
R4-2201870	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 Recommendations for Tdocs

7.1 1st round

New tdocs

Table 14:

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

Existing tdocs

Table 15:

Tdoc number	Title	Source	Recommendation	Comments
R4-210xxxx	CR on …	XXX	Agreeable, Revised, Merged, Postponed, Not Pursued	
R4-2200300	On RRM requirement for CG-SDT	Apple	Noted	
R4-2200417	RRM requirements for NR-SDT	Qualcomm Incorporated	Noted	
R4-2200918	On BS demodulation performance requirements for CG-SDT	Nokia, Nokia Shanghai Bell	Noted	
R4-2200919	TA validation requirements for CG-SDT	Nokia, Nokia Shanghai Bell	Noted	

R4-2200920	Draft CR TA validation for Small Data Transmissions	Nokia, Nokia Shanghai Bell	Revised	
R4-2201644	Discussion on remaining issues for SDT RRM	Huawei, Hisilicon	Noted	
R4-2201645	CR on UL timing requirements for SDT	Huawei, Hisilicon	Revised	
R4-2201793	Further discussion on RRM requirements for SDT	ZTE Wistron Telecom AB	Noted	
R4-2201853	RRM requirements for SDT	MediaTek Inc.	Noted	
R4-2201869	Discussions on RRM requirements for Small Data Transmissions	Ericsson	Noted	
R4-2201870	Draft CR to TS 38.133: Requirements on UE synchoronization 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

7.2 2nd round

Table 16:

Tdoc number	Title	Source	Recommendation	Comments
R4-210xxxx	CR on …	XXX	Agreeable, Revised, Merged, Postponed, Not Pursued	
R4-210xxxx	WF on …	YYY	Agreeable, Revised, Noted	
R4-210xxxx	LS on …	ZZZ	Agreeable, Revised, Noted	
R4-2201792	Draft big CR for SDT RRM requirements	ZTE Wistron Telecom AB		

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

8 Annex

Contact information

Table 17:

Company	Name	Email address

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)