3GPP TSG RAN WG2 Meeting #123bis R2-230xxxx

**Xiamen, China, October 09-13, 2023**

**Agenda item:** 7.18.2

**Source:** Intel Corporation

**Title:** Outcome of email discussion [POST123][303][MT-SDT] on UE Capabilities for Rel-18 MT SDT

**Document for:** Discussion and decision

# Introduction

This document aims to review the running CRs on UE capabilities for Rel-18 MT-SDT and to discuss one open topic identified during RAN2#123 meeting.

* [POST123][303][MT-SDT] CR to 38.306 (Intel)

Scope : review running CR

Outcome: CR to be submitted to next meeting

The following are RAN2#123 agreements relevant to this discussion:

* *A new optional radio capability signaling (e.g., MT-SDT-r18) is defined to indicate UE’s support of Rel-18* ***MT-RA-SDT-r18****. MT-RA-SDT-r18 indicates whether the UE supports initiation of MT-SDT procedure and transmission/reception in RRC\_INACTIVE state via Random Access procedure (i.e., RACH).*
* *Separate UE capability is used to indicate support* ***MT-CG-SDT****. If the UE support MT-CG-SDT, it has to support MT-RA-SDT.*
* *SRB2 capability will be captured by* ***adding “or MT-SDT”*** *Rel-17* ***srb-sdt-r-17*** *capability. (i.e. no separate capability)*
* *FFS how/whether we define UE capability to indicate UE’s support to select RACH resources instead of configured grant type 1 resource when triggering resume for SDT or MT-SDT and next CG-SDT resource is too far as specified in TS 38.331.*

Please provide your inputs **before/by Tuesday September 19th EOD PST** to have few days afterwards to further review the report and updated CRs (as official email discussion deadline is Friday September 22nd, 2023).

# Companies’ point of contact (PoC)

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| --- | --- | --- |
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# Discussion

## Drafted running CRs to TS 38.306 and 38.331 on UE Capabilities for MT-SDT

1. Please indicate if you have any input/comments on the drafted running CRs to TS 38.306 and 38.331 which captures the agreed details on UE Capabilities for MT-SDT during RAN2#123 meeting.

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| **Company’s name** | **TS #** | **Section** | **Comments, if any** |
| Ericsson |  |  | No comments on .331 and .306 CRs. |
| Huawei | 38.306 | mt-CG-SDT-r18 definition | The capability agreed by RAN2 was supposed to be an MT-SDT equivalent of cg-SDT-r17 capability, it should not be related to switching from CG-SDT to RA-SDT. We should simply have a capability description basing on cg-SDT-r17, but with MT-SDT in mind, e.g.:  Indicates whether the UE supports initiating MT-SDT procedure over configured grant type 1, in response to reception of MT-SDT indication in paging message, as specified in TS 38.331 [9].”.  A UE supporting this feature shall also support mt-SDT-r18.  ZTE: Agree with the comment from Huawei.  The description can be simplified further (since paging is not the only condition to check before initiating MT-SDT)… :  *Indicates whether the UE supports initiating MT-SDT procedure over configured grant type 1 as specified in TS 38.331 [9]. A UE supporting this feature shall also support mt-SDT-r18.*  **[Rapp (v1)]**: The field description is updated as suggested by ZTE. |
| Huawei | 38.306 | mt-SDT-r18 | The description of this capability sounds as if the only thing the UE can do in reply to Paging with MT-SDT is to send RACH, but the UE can also perform CG-SDT. We suggest rephrasing as:  “Indicates whether the UE supports initiating MT-SDT procedure over RACH, in response to reception of MT-SDT indication in paging message, as specified in TS 38.331 [9].”  ZTE: Agree with the comment from Huawei.  The description can be simplified further (since paging is not the only condition to check before initiating MT-SDT)… :  *Indicates whether the UE supports initiating MT-SDT procedure over RACH, as specified in TS 38.331 [9]..*  **[Rapp (v1)]**: The field description is updated as suggested by Huawei. ZTE’s suggestion is not adopted as MT-SDT procedure does not include the reception of paging with MT-SDT indication (e.g., current TPs captures “*initiating MT-SDT procedure over configured grant type 1*” or “*MT-SDT procedure over RACH*”) and this paging related TP should still be captured as part of the definition of this new UE capability. |
| Huawei | 38.306 | cg-SDT-r17  ra-SDT-r17 | The descriptions of these capabilities need to be updated to clarify they are for MO-SDT.  ZTE: Agree  **[Rapp (v1)]**: Their field description is updated as suggested. |
| Huawei | 38.306 | srb-SDT-r17 | RA-SDT and CG-SDT are applicable to both MO-SDT and MT-SDT. And for MT-SDT, SRB2 can be applicable for either RA-SDt or CG-SDT. Suggest to reword as:  “***srb-SDT-r17***  Indicates whether the UE supports the usage of signalling radio bearer SRB2 over RA-SDT or CG-SDT for MO-SDT and/or MT-SDT, as specified in TS 38.331 [9].  A UE supporting this feature shall also indicate support of *ra-SDT-r17 or cg-SDT-r17* or *mt-SDT-r18 or mt-CG-SDT-r18*.”  ZTE: Agree  **[Rapp (v1)]**: Their field description is updated as suggested with some additional change (as indicated below) to avoid confusions as MT-SDT cannot be used over RA-SDT. To align the description between MO-SDT and MT-SDT, it is possible option a) remove the reference “over RA-SDT or CG-SDT” in relation to MO-SDT or option b) add “over RA or CG-SDT” in relation to MT-SDT. Rapp suggestion is to go with option b) as it is not common practice to remove text added in previous releases.  “***srb-SDT-r17***  Indicates whether the UE supports the usage of signalling radio bearer SRB2 for MO-SDT (over RA-SDT or CG-SDT) or MT-SDT (over RA or CG-SDT), as specified in TS 38.331 [9].  A UE supporting this feature shall also indicate support of *ra-SDT-r17 or cg-SDT-r17* or *mt-SDT-r18 or mt-CG-SDT-r18*.” |
| vivo | 38.306 | mt-CG-SDT-r18 | The granularity of mt-CG-SDT should be per band, considering that the cg-SDT for R17 Mo-SDT is per band. We fail to see the motivation to differentiate the granularity of these similar features.  ZTE: Agree  **[Rapp (v1)]**: The UE capability is updated as suggested, i.e. to be defined per band (instead per UE). |
| vivo | 38.306 | ncd-SSB-forRedCapInitialBWP-SDT-r17  srb-SDT-NTN -r17  *pusch-Repetition-CG-SDT-r17* | Clarification corrections are needed to clarify those capabilities are used for MO-SDT only.  ZTE: Some clarification is needed, but we should not make all these only for MO-SDT. Of instance, if the UE indicates support for these capabilities and also supports MT-SDT (either CG or RA), then the UE should support these also for MT-SDT.  **[Rapp (v1)]**: Added reference to MO-SDT as it is done in other field description and it is also captured Editor’s note to discuss this during RAN2#123bis meeting as this is a new topic. |
| Qualcomm | 38.306 | mt-CG-SDT-r18 | The description not cover the condition that ‘in response to the reception of the MT-SDT indication in paging message.’  ‘(Instead of RACH)’ seems not useful. We just need to describe the CG resource used in MT-SDT.  Should be similar to cg-SDT-r17. This is a per band capability instead of per UE.  **[Rapp (v1)]**: This comment is addressed in previous responses. |
| Qualcomm | 38.306 | mt-SDT-r18 | ‘when DL data awaits transmission for radio bearers configured for SDT’ is a little redundant.  Huawei’s suggested wording looks better.  **[Rapp (v1)]**: This comment is addressed in previous responses. |
| Qualcomm | 38.306 | ncd-SSB-forRedCapInitialBWP-SDT-r17 | This capability may not be only for MO-SDT and needs more discussions.  ZTE: Agree that more discussion may be needed. We prefer not to simply make every existing capability just MO-SDT specific. We should discuss if we do actually need a separate capability for MT-SDT first.  **[Rapp (v1)]**: This comment is addressed in previous responses. |
| MediaTek |  |  | No comment for the updated version (v1) from rapporteur, and agree with that NCD-SSB for RedCap is a new topic which needs more discussion. |
| CATT | 38.306 | Add Abbreviations for MO-SDT and MT-SDT | It is better to introduce the abbreviations for MO-SDT and MT-SDT.  **[Rapp (v2)]**: Abbreaviation is added to 38.306 draftCR. |
| CATT | 38.306 | mt-SDT-r18 | According to description on the UE capability of *ra-SDT-r17*, it indicated that the RA procedure including the 4-step RA and 2-step. So we think whether can we align with samiliar description as R17.  ***mt-SDT-r18***  Indicates whether the UE supports initiating MT-SDT procedure via random access procedure with 4-step RA type and if UE supports *twoStepRACH-r16,* with 2-step RA type, in response to the reception of MT-SDT indication in paging message, as specified in TS 38.331 [9].  **[Rapp (v2)]**: TP is updated as suggested in 38.306 draftCR. |
| CATT | 38.306 | *ra-SDT-NTN-r17* | The UE capability of *ra-SDT-NTN-r17* maybe also need more discussion on whether only for MO-SDT.  **[Rapp (v2)]**: A similar editor’s note is added and point for discussion is added. |

**[Rap(v1)] Summary report:** The UE capability draft CRs to 38.306 and 38.331 are updated with the inputs provided in this email discussion and identified editor’s notes are captured to further discuss the preferred operation.

1. To endorse as baseline the UE capability draftCRs provided to TS 38.306 and 38.331 in R2-2xxxx and R2-2xxxx.
2. To discuss the following open points captured as editor’s notes in current TS 38.306 running draftCR:
   1. [*srb-SDT-NTN-r17* in section 4.2.2] FFS whether the field description needs to address MT-SDT similarly as it was done for *srb-SDT-r17*.
   2. [*ra-SDT-NTN-r17* in section 4.2.7.10] FFS whether the field description needs to also address MT-SDT (or only MO-SDT).
   3. [*pusch-Repetition-CG-SDT-r17* in section 4.2.7.10] FFS whether the field description needs to address MO-SDT and/or MT-SDT.
   4. [*ncd-SSB-ForRedCapInitialBWP-SDT-r17* in section 4.2.21.2] FFS whether the field description needs to address MO-SDT and/or MT-SDT.

## Open topics identified on UE Capabilities for MT-SDT

On the usage of CG-SDT resources to initiate SDT that it is equally applicable for MT-SDT and MO-SDT, the following was agreed in RAN2#122 meeting:

* *For both MO and MT-SDT, if the next CG-SDT resource is too far, then RACH resource can be selected first. This is checked at the point of initial resource selection (e.g. CG SDT selection). FFS what is too far and how this is configured. Assumption is that we will continue this discussion in SDT session. CONFIRM with main session [CB]*

During RAN2#123 meeting, the corresponding new UE capability was discussed and the following FFS was captured:

* ***FFS how/whether*** *we define UE capability to indicate UE’s support to select RACH resources instead of configured grant type 1 resource when triggering resume for SDT or MT-SDT and next CG-SDT resource is too far as specified in TS 38.331.*

In addition, during the online discussion, it was mentioned that same/common UE capability might be preferable with this and the related CG-SDT topic discussed as part of TEI18. This is on the extension of CG-SDT periodicities, the following was agreed in RAN2#122 meeting (as part of TEI18) and RAN2 sent an LS [1] to RAN1 asking to provide any necessary feedback or concerns on impacts, if any:

* *Agreeable, under condition that RAN1 impact is very small (e.g. update of a table): Extend the maximum periodicity for CG-SDT to cover longer periodicities.*
* *Send LS to R1 ask about impact.*

RAN1 corresponding respond LS [2] will be discussed in next RAN2#123bis meeting which indicates that the foreseen impact is low (details copied below for reference).

*“RAN1 confirms that extension of CG-SDT periodicities would have low impact on RAN1 specifications”.*

The following discussion points aim to get inputs on those open topics raised during RAN2#123 online to easy related capability discussion in next RAN2#123bis meeting with the assumption that RAN2 will go ahead and extend the maximum periodicity for CG-SDT.

### Support to select RACH instead of CG resources for (MT-)SDT and the extension of CG-SDT periodicity

1. Do you prefer defining a single or two separate new UE capabilities for UE to indicate its Rel-18 support to select RACH resources instead of configured grant type 1 resource when triggering resume for SDT or MT-SDT and next CG-SDT resource is too far and to use extended values of the CG-SDT periodicities? If applicable, please indicate whether any pre-requirement or relation to other UE capability that needs to also be considered.
2. **Single** new UE capability is defined. For example, ***cg-SDT-Enh*-r18** could indicate the support of both enhancements related to CG-SDT operation (i.e., support to select RACH resources instead of configured grant type 1 resource when triggering resume for SDT or MT-SDT and next CG-SDT resource is too far and support to extend the range of CG-SDT periodicities).
3. **Two** separate new UE capabilities are defined. E.g., ***ra-InsteadCG-SDT-r18*** could indicate the support to select RACH resources instead of configured grant type 1 resource when triggering resume for SDT or MT-SDT and next CG-SDT resource is too far and ***cg-SDT-ExtendedPeriodicity-r18*** could indicate support to extend the range of CG-SDT periodicities.
4. **No** new/additional capability is defined but instead its support is defined as part of Rel-18 UE capability *MT-CG-SDT-r18*. Note that based on current RAN2 agreements, UE capability draft CR to 38.306 defines *MT-CG-SDT-r18* capability to indicates whether the UE supports the selection of configured grant type 1 resource (instead of RACH) to perform MT-SDT procedure as specified in TS 38.331 (moreover a UE supporting this *MT-CG-SDT-r18* feature shall also support *mt-SDT-r18*). This option c) would mean that the UE capability definition will also mandate that UE supporting this *MT-CG-SDT-r18* feature shall also support the two features here explained in this discussion point 2).

In addition, if option c) is preferable, please clarify how to allow the usage of this feature explained in this discussion point 2) by UEs only performing MO-SDT.

1. Other approach is preferred.

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| **Company’s name** | **Option** | **Comments, if any** |
| Ericsson | A | We think a single capability for the SDT enhancements would be enough, given that the longer periodicities are designed to work together with the RA fallback. However, if the majority view would be B, we think this is also an acceptable option. |
| Huawei | b) | This is a standalone feature which can be used for both MO-SDT and MT-SDT with both existing CG-SDT periodicities and extended periodicities. There is no reason to bind it to any of other capabilities. |
| vivo | option b) | As two separate capabilities are used for MO CG-SDT (per band level) and MT CG-SDT (per UE level), it seems a spontaneous logic to go with option b) also considering the normative text is also independent for MO CG-SDT and MT CG-SDT. It helps to make everything clear and flexible. |
| Qualcomm | b | They are two separate features. Supporting CG-SDT periodicity extension should be an independent capability. |
| ZTE | b | However, if longer periodicities are supported, then the fallback seems more important and we can consider making support of fallback to RACH as mandatory if the longer periodicities are supported. |
| Intel | b | We share Qualcomm’s view |
| MediaTek | b | We share the same view with ZTE. |
| CATT | b | We share the similar view as ZTE. The fallback mechanism is important for supporting longer periodicity. It is better to restrict UE shall support fallback mechanism if UE supports longer periodicities. |

**[Rap(v1)] Summary report:** the number of companies preferring option a) is 1 and option b) is 7. Even thouh not a lot of companies provided their view, the proposal is to go with current majority view. In addition, the corresponding TP of these new UE capabilities is also added to the UE capabilitiy running CRs under email discussion including an Editor's note with the following point raised for discussion - “FFS whether a UE supporting *cg-SDT-ExtendedPeriodicity-r18* feature shall also indicate the support if *ra-InsteadCG-SDT-r18*”. In addition, an FFS is also added to align the field definitions with the corresponding operation defined on 38.331 for each of those features.

To help the review of TP on the new UE capability related to SDT, the TP of these two new UE capabilities is added as part of current MT-SDT UE capability draftCRs although separate CRs would need to be prepared for them as these topics are part of the TEI18 (and not the MT-SDT WI).

1. To define the following two separate new UE capabilities:
   1. *ra-InsteadCG-SDT-r18* indicates the support to select RACH resources instead of configured grant type 1 resource when triggering resume for MO-SDT or MT-SDT and next configured grant type 1 resource is too far.
      1. FFS whether the field description of *ra-InsteadCG-SDT-r18* requires further update (depending on the final update of running CR to TS 38.331)
   2. *cg-SDT-ExtendedPeriodicity-r18* indicates the support to extend the range of CG-SDT periodicities.
      1. FFS whether a UE supporting *cg-SDT-ExtendedPeriodicity-r18* feature shall also indicate the support if *ra-InsteadCG-SDT-r18*.
      2. FFS whether the field description of *cg-SDT-ExtendedPeriodicity-r18* requires further update (depending on the final update of running CR to TS 38.331).
   3. The TP of *ra-InsteadCG-SDT-r18* and *cg-SDT-ExtendedPeriodicity-r18* is added for review as part of the UE capabilities draftCRs prepared for MT-SDT WI but when it is stable, it would be moved to different draftCRs (as the features are part of TEI18 and would require a different WI code).

# Conclusion

The proposals captured are the following:

**Proposal 1.** To endorse as baseline the UE capability draftCRs provided to TS 38.306 and 38.331 in R2-2xxxx and R2-2xxxx.

**Proposal 2.** To discuss the following open points captured as editor’s notes in current TS 38.306 running draftCR:

**Proposal 2.1.** [*srb-SDT-NTN-r17* in section 4.2.2] FFS whether the field description needs to address MT-SDT similarly as it was done for *srb-SDT-r17*.

**Proposal 2.2.** [*ra-SDT-NTN-r17* in section 4.2.7.10] FFS whether the field description needs to also address MT-SDT (or only MO-SDT).

**Proposal 2.3.** [*pusch-Repetition-CG-SDT-r17* in section 4.2.7.10] FFS whether the field description needs to address MO-SDT and/or MT-SDT.

**Proposal 2.4.** [*ncd-SSB-ForRedCapInitialBWP-SDT-r17* in section 4.2.21.2] FFS whether the field description needs to address MO-SDT and/or MT-SDT.

**Proposal 3.** To define the following two separate new UE capabilities:

**Proposal 3.1.** *ra-InsteadCG-SDT-r18* indicates the support to select RACH resources instead of configured grant type 1 resource when triggering resume for MO-SDT or MT-SDT and next configured grant type 1 resource is too far.

**Proposal 3.1.1.** FFS whether the field description of *ra-InsteadCG-SDT-r18* requires further update (depending on the final update of running CR to TS 38.331)

**Proposal 3.2.** *cg-SDT-ExtendedPeriodicity-r18* indicates the support to extend the range of CG-SDT periodicities.

**Proposal 3.2.1.** FFS whether a UE supporting *cg-SDT-ExtendedPeriodicity-r18* feature shall also indicate the support if *ra-InsteadCG-SDT-r18*.

**Proposal 3.2.2.** FFS whether the field description of *cg-SDT-ExtendedPeriodicity-r18* requires further update (depending on the final update of running CR to TS 38.331).

**Proposal 3.3.** The TP of *ra-InsteadCG-SDT-r18* and *cg-SDT-ExtendedPeriodicity-r18* is added for review as part of the UE capabilities draftCRs prepared for MT-SDT WI but when it is stable, it would be moved to different draftCRs (as the features are part of TEI18 and would require a different WI code).

# Reference

1. R2-2306904, LS on longer CG-SDT periodicities, TEI18, From: RAN2, To: RAN1, May 2023.
2. R1-2308487, Reply LS on longer CG-SDT periodicities, TEI18, From: RAN1, To: RAN2, August 2023.