**3GPP T****SG-RAN WG2 Meeting #117-e R2-220xxxx**

**E-Meeting, Feb 21th – Mar 3rd, 2022**

**Agenda item:**  **8.10.4.1**

**Source: Intel Corporation**

**Title: Report of email discussion [Pre117-e][NTN][104] UE caps open issues (Intel)**

**Document for: Discussion**

# Introduction

This is the report of the following email discussion:

**[Pre117-e][NTN][104] UE caps open issues (Intel)**

Initial scope: Continue the discussion on the open issues for UE capabilities listed in R2-2201962, also the issue on L2 buffer size (mentioned in R2-2201545)

Initial intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals that require online discussions
    - List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Feb 14

Initial deadline (for rapporteur's summary): Feb 17

# Discussion

According to R2-2201962, the following open issues are identified for pre-meeting offline discussion:

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| **List of open issues on NR NTN UE capabilities**  **Set 1 for pre-meeting offline discussion:**  **Regarding Essential features:**   1. Whether to specify that SMTC enhancements (event-triggered assistance information reporting, 2 SMTC in parallel) are only essential for NGSO; 2. Whether CHO enhancements (time based and Event A4 based CHO) are essential for both GSO and NGSO, or only for NGSO, or optional.   **Regarding Optional features:**   1. Whether to have separate RAN2-specific TA reporting UE capability, i.e., TA offset threshold based reporting, or incorporate this feature into TA reporting UE capability defined in RAN1 feature list; 2. Whether to have two UE capabilities for UL HARQ state B and the new LCP restriction respectively.   **Regarding New UE capability bits:**   1. Whether/how to indicate a UE only supports NGSO or a UE only supports GSO or both; 2. Whether/how to indicate one TN feature can be supported or not in NTN:   Option 1:            We discuss case by case, e.g., 2-step RACH in NTN may need a separate IoT bit as existing 2-step RACH UE capability bit is considered only for TN.  Option 2:            We enable signalling possibility for at least MAC parameters, measurement parameters, SON/MDT, RRC\_INACTIVE to be separately indicated for NTN.  Option 3:            Whether optional TN feature can be supported or not in NTN is indicated based on the existing UE capability signalling, e.g., if UE indicates support of 2-step RACH using existing UE capability bit, 2-step RACH is supported in both TN and NTN. |

Companies are invited to provide views in the following questionnaire tables.

**Question 1: Whether to specify that SMTC enhancements (event-triggered assistance information reporting, 2 SMTC in parallel) are only essential for NGSO?**

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| **Company** | **Y or N** | **Additional comments** |
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**Question 2: Whether CHO enhancements (time based and Event A4 based CHO) are essential for both GSO and NGSO, or only for NGSO, or optional.?**

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| **Company** | **Essential for which case(s), or optional** | **Additional comments** |
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**Question 3: Whether to have separate RAN2-specific TA reporting UE capability, i.e., TA offset threshold based reporting, or incorporate this feature into TA reporting UE capability defined in RAN1 feature list?**

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| **Company** | **Views** | **Additional comments** |
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**Question 4: Whether to have two UE capabilities for UL HARQ state B and the new LCP restriction respectively?**

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| **Company** | **Y or N** | **Additional comments** |
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According to discussion in [Post116bis-e][110][NTN], one company pointed out that a single UE capability indication for essential features to support both GSO and GSO does not mean that interoperability testing between GSO and NGSO is also supported. UE needs to further indicate whether it is tested and supporting GSO, or NGSO, or both.

**Question 5: Whether/how to indicate a UE only supports NGSO or a UE only supports GSO or both?**

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| **Company** | **Views** | **Additional comments** |
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**Question 6: Whether/how to indicate one TN feature can be supported or not in NTN:**

**Option 1: We discuss case by case, e.g., 2-step RACH in NTN may need a separate IoT bit as existing 2-step RACH UE capability bit is considered only for TN.**

**Option 2: We enable signalling possibility for at least MAC parameters, measurement parameters, SON/MDT, RRC\_INACTIVE to be separately indicated for NTN.**

**Option 3: Whether optional TN feature can be supported or not in NTN is indicated based on the existing UE capability signalling, e.g., if UE indicates support of 2-step RACH using existing UE capability bit, 2-step RACH is supported in both TN and NTN.**

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| **Company** | **Option 1/2/3** | **Additional comments** |
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According to arrangement, also the issue on L2 buffer size (mentioned in R2-2201545) will be handled in offline discussion [Pre117-e][NTN][104].

Note that there is already an agreement made for IoT NTN in this aspect as below:

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| Don’t change the L2 buffer requirement for IoT NTN (assume the network may need to limit the bit rate in order to not exceed L2 buffer). |

In LTE (36.306) the actual buffer size is specified per category (RTT and buffer size calculation are “hidden”), however in NR (38.306) the data rate and RTT is specified along with the formula to calculate buffer size. The currently specified RTT of 50ms is obviously wrong for the case of NTN.

Layer 2 buffer size is specified in 38.306 as follows;

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| The required total layer 2 buffer size in MR-DC and NR-DC is the maximum value of the calculated values based on the following equations:  -     *MaxULDataRate\_MN* \* *RLCRTT\_MN* + *MaxULDataRate\_SN* \* *RLCRTT\_SN* + *MaxDLDataRate\_SN* \* *RLCRTT\_SN* + *MaxDLDataRate\_MN* *\** (*RLCRTT\_SN* + *X2/Xn delay* + *Queuing in SN*)  -     *MaxULDataRate\_MN* \* *RLCRTT\_MN* + *MaxULDataRate\_SN* \* *RLCRTT\_SN* + *MaxDLDataRate\_MN* \* *RLCRTT\_MN* + *MaxDLDataRate\_SN* *\** (*RLCRTT\_MN* + *X2/Xn delay* + *Queuing in MN*)  Otherwise it is calculated by *MaxDLDataRate \* RLC RTT + MaxULDataRate \* RLC RTT*. |
| **Table 4.1.4-1: RLC RTT for NR cell group per SCS**   | **SCS (kHz)** | **RLC RTT (ms)** | | --- | --- | | 15KHz | 50 | | 30KHz | 40 | | 60KHz | 30 | | 120KHz | 20 | |

**Question 7.1: What RLC RTT value(s) should be used in L2 buffer requirement calculations in 38.306 table 4.1.4-1 for NTN?**

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| **Company** | **Views** | **Additional comments** |
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**Question 7.2: Is any other change (e.g. data rate limitation) needed for the L2 buffer calculation for NTN?**

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| **Company** | **Views** | **Additional comments** |
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# Conclusion

Based on this offline discussion on UE capabilities, the following proposals are made:

** List of proposals for agreement:**

** List of proposals that require online discussions:**