**3GPP TSG-RAN WG2 #115-e *R2-210xxxx***

**E-meeting, August 2021**

Agenda Item: 8.x.x

Source: OPPO

Title: Summary of  [AT115-e][703][V2X/SL] SL DRX configuration for GC/BC (OPPO)

Document for: Discussion, Decision

# Introduction

This is for the following email discussion

* [AT115-e][703][V2X/SL] SL DRX configuration for GC/BC (OPPO)

 **Scope:** Discuss following FFS/TBD/open issues:

Q1: Whether the dedicated RRC is also used to configure SL DRX configuration for GC/BC?

 Q2: How to configure SL DRX on-duration and inactivity timers for GC/BC?

 Q3: How to configure SL DRX RTT and retransmission timers for GC/BC?

 Q4: Need of down-select other DRX configurations for a specific L2 DST ID if the UE has multiple QoS profiles for same DST L2 ID? If needed, how to do down-selection?

 Q5: Need to define default DRX configuration for GC/BC?

 Q6: Need for SL DRX MAC CE for GC/BC?

 **Intended outcome:** Discussion summary in R2-2108983

# Discussion

## Q1: Whether the dedicated RRC is also used to configure SL DRX configuration for GC/BC?

According to RAN2#113e agreement,

3: For broadcast/groupcast, for in-coverage case, for RRC\_CONNECTED TX-UE/RX-UE can obtain DRX configuration from SIB. FFS on whether dedicated-RRC is also used.

the only FFS point for BC/GC DRX configuration is whether dedicated-RRC can be used for RRC\_CONNECTED TX-UE/RX-UE.

Firstly, rapp understand this issue is independent of the case of SIB delivery using dedicated-RRC, which is still based on the cell-specific SIB information, i.e., not UE-specific configuration.

RRCReconfiguration-v1530-IEs ::= SEQUENCE {

 masterCellGroup OCTET STRING (CONTAINING CellGroupConfig) OPTIONAL, -- Need M

 fullConfig ENUMERATED {true} OPTIONAL, -- Cond FullConfig

 dedicatedNAS-MessageList SEQUENCE (SIZE(1..maxDRB)) OF DedicatedNAS-Message OPTIONAL, -- Cond nonHO

 masterKeyUpdate MasterKeyUpdate OPTIONAL, -- Cond MasterKeyChange

 dedicatedSIB1-Delivery OCTET STRING (CONTAINING SIB1) OPTIONAL, -- Need N

 dedicatedSystemInformationDelivery OCTET STRING (CONTAINING SystemInformation) OPTIONAL, -- Need N

 otherConfig OtherConfig OPTIONAL, -- Need M

 nonCriticalExtension RRCReconfiguration-v1540-IEs OPTIONAL

}

**Q2.1-1: For SL BC and GC, for in-coverage case, do you agree RRC\_CONNECTED TX-UE/RX-UE can obtain DRX configuration from SIB which is delivered via dedicated RRC signalling?**

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| --- | --- | --- |
| Company | Agree/Disagree | Comment |
| Xiaomi | Agree |  |
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Secondly, as we did for Rx pool, which is normally delivered via SIB instead of dedicated-RRC, one exceptional case is handover

SL-BWP-PoolConfig-r16 ::= SEQUENCE {

 sl-RxPool-r16 SEQUENCE (SIZE (1..maxNrofRXPool-r16)) OF SL-ResourcePool-r16 OPTIONAL, -- Cond HO

 sl-TxPoolSelectedNormal-r16 SL-TxPoolDedicated-r16 OPTIONAL, -- Need M

 sl-TxPoolScheduling-r16 SL-TxPoolDedicated-r16 OPTIONAL, -- Need N

 sl-TxPoolExceptional-r16 SL-ResourcePoolConfig-r16 OPTIONAL -- Need M

}

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| --- | --- |
| Conditional Presence | Explanation |
| *HO* | This field is optionally present, need M, in an *RRCReconfiguration* message including *reconfigurationWithSync*; otherwise it is absent, Need M. |

I.e., it can be delivered to UE in a dedicated RRC during handover procedure, i.e., in an *RRCReconfiguration* message including *reconfigurationWithSync*

**Q2.1-2: For SL BC and GC, for in-coverage case, do you agree RRC\_CONNECTED TX-UE/RX-UE can obtain DRX configuration from dedicated RRC signalling during handover, i.e., in an *RRCReconfiguration* message including *reconfigurationWithSyn*?**

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| --- | --- | --- |
| Company | Agree/Disagree | Comment |
| Xiaomi | Agree |  |
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Other than the two cases above, one may ask whether there is any other left use case for dedicated RRC signalling.

**Q2.1-3: For SL BC and GC, for in-coverage case, other than the two cases in Q2.1-1/2, is there any other use case for RRC\_CONNECTED TX-UE/RX-UE to obtain DRX configuration from dedicated RRC signalling?**

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| Company | Yes/No | Comment |
| Xiaomi | Yes | We understand it’s optional for NW to include SL BC/GC DRX in SIB, even NW is capable of SL DRX. If NW choose not to include these in SIB, dedicated signalling shall be used to carry SL BC and GC DRX configuration to CONNECTED UE. Otherwise, SL DRX capable gNB is mandated to include BC/GC DRX configuration in SIB. |
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## Q2: How to configure SL DRX on-duration and inactivity timers for GC/BC?

Based on the RAN2#114 agreement,

4: For GC/BC, DRX cycle is configured per QoS profile.

5a: For GC/BC, RAN2 understands that sl-drx-startoffset does not take QoS requirement into consideration.

5b: For GC/BC, For GC/BC, sl-drx-startoffset is set based on DST L2 ID.

So there are left issues on the configuration granularity for on-duration timer length and inactivity timer length.

**Q2.2-1: For BC/GC, what is the granularity for configuration of on-duration timer length?**

**Option-1: Per QoS profile**

**Option-2: Per DST L2 ID**

**Option-3: Others (if this option is selected, please indicate the preferred granularity)**

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| Company | Option(s) | Comment |
| Xiaomi | Option-1 | We prefer common solution. |
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Considering the following agreement, inactivity time is not applicable to BC

15: SL Inactivity timer is not supported for broadcast transmissions.

**Q2.2-2: For GC, what is the granularity for configuration of inactivity timer length?**

**Option-1: Per QoS profile**

**Option-2: Per DST L2 ID**

**Option-3: Others (if this option is selected, please indicate the preferred granularity)**

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| --- | --- | --- |
| Company | Option(s) | Comment |
| Xiaomi | Option-1 |  |
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## Q3: How to configure SL DRX RTT and retransmission timers for GC/BC?

The issue here is similar to Q2 above. Besides, considering that although the need of RTT/Re-tx timer for BC is still FFS, pending on the conclusion in [POST114-e][706], but it is of clear majority support, rapp understand the questions for Q3 can be limited to GC for now.

Proposal 13 –SL HARQ RTT timer and SL Retransmission timer are not used for broadcast transmissions [13/15].

**Q2.3-1: For GC, what is the granularity for configuration of RTT timer length?**

**Option-1: Per QoS profile**

**Option-2: Per DST L2 ID**

**Option-3: Per retransmission mode**

**Option-4: Others (if this option is selected, please indicate the preferred granularity)**

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| Company | Option(s) | Comment |
| Xiaomi | Option-3 | We understand the RTT timer is decided in following way. RTT is configured per resource pool considering the PSFCH allocation in feedback based retransmission. RTT timer should be a fixed value in blind retransmission. RTT timer is selected per retransmission mode.We don’t see the relation between RTT and QoS profile, since the RTT is to describe the round trip time. |
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**Q2.3-2: For GC, what is the granularity for configuration of re-transmission timer length?**

**Option-1: Per QoS profile**

**Option-2: Per DST L2 ID**

**Option-3: Others (if this option is selected, please indicate the preferred granularity)**

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| --- | --- | --- |
| Company | Option(s) | Comment |
| Xiaomi | Option-1 |  |
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## Q4: Need of down-select other DRX configurations for a specific L2 DST ID if the UE has multiple QoS profiles for same DST L2 ID? If needed, how to do down-selection?

So far, R2 has already conclude on the need of per-QoS configuration for DRX cycle, so this question is at least valid for DRX cycle.

**Q2.4-1a: If the UE has multiple QoS profiles, and thus they associate with different DRX cycle length value(s), for same DST L2 ID, do you think TX/RX UE has to down-select to a single associated DRX cycle length value?**

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| --- | --- | --- |
| Company | Yes/No | Comment |
| Xiaomi | Yes | Without down selection, the UE has to wake in multiple DRX cycle, so the power saving gain is marginal. |
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If one answer Yes to Q2.4-1a, how to do the down-selection? Rapp observed some proposals in companies submitted tdocs

* Select the DRX configuration associated with the QoS profile whose priority level is the highest
* Select the DRX configuration associated with the QoS profile whose PDB is the smallest
* Select the DRX configuration whose DRX cycle is the smallest

**Q2.4-1b: If one answer Yes to Q2.4-1a, how to do the down-selection**

**Option-1: Select the DRX configuration associated with the QoS profile whose priority level is the highest**

**Option-2: Select the DRX configuration associated with the QoS profile whose PDB is the smallest**

**Option-3: Select the DRX configuration whose DRX cycle is the smallest**

**Option-4: Others (if this option is selected, please indicate the preferred granularity)**

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| Company | Option(s) | Comment |
| Xiaomi | Option-3 | We understand option-2 and option-3 should be the same in practice. Small PDB requires small DRX cycle. Regarding option-1, high priority level doesn’t necessarily requrie small DRX cycle. If a long DRX cycle is selected, the delay requirement may not be fulfilled for the low priority QoS profile which requires low latency. |
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The same issue is applicable to the other DRX settings.

For on-duration timer length:

**Q2.4-2a: If one selected option-1 for Q2.2-1, and if the UE has multiple QoS profiles, and thus they associate with different on-duration timer length value(s), for same DST L2 ID, do you think TX/RX UE has to down-select to a single associated on-duration timer length value?**

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| Company | Yes/No | Comment |
| Xiaomi | Yes | Since we prefer to down select to one DRX cycle, on-duration timer should also down-select to one. |
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**Q2.4-2b: If one answer Yes to Q2.4-2a, how to do the down-selection**

**Option-1: Select the DRX configuration associated with the QoS profile whose priority level is the highest**

**Option-2: Select the DRX configuration associated with the QoS profile whose PDB is the smallest**

**Option-3: Select the DRX configuration whose on-duration timer length is the largest**

**Option-4: Select the on-duration timer associated with the QoS profile, which is associated with the selected DRX cycle.**

**Option-5: Others (if this option is selected, please indicate the preferred granularity)**

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| Company | Option(s) | Comment |
| Xiaomi | Option-4 | As DRX cycle has been selected as in Q2.4-1b, the on-duration timer, which is associated with the same QoS profile, should also be selected. Otherwise, there may be the case that on-duration timer is longer than DRX cycle and UE can’t go to sleep. Initial transmission is restricted within the on-duration timer running. Inactivity timer could provide extended wakeup time for subsequent transmission. |
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For inactivity timer length:

**Q2.4-3a: If one selected option-1 for Q2.2-2, and if the UE has multiple QoS profiles, and thus they associate with different inactivity timer length value(s), for same DST L2 ID, do you think TX/RX UE has to down-select to a single associated inactivity timer length value?**

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| --- | --- | --- |
| Company | Yes/No | Comment |
| Xiaomi | Yes | MAC entity is not aware of the QoS profile of the received MAC PDU. It’s not feasible for MAC to start different inactivity timer based on QoS profile. |
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**Q2.4-3b: If one answer Yes to Q2.4-3a, how to do the down-selection**

**Option-1: Select the DRX configuration associated with the QoS profile whose priority level is the highest**

**Option-2: Select the DRX configuration associated with the QoS profile whose PDB is the smallest**

**Option-3: Select the DRX configuration whose inactivity timer length is the largest**

**Option-4: Others (if this option is selected, please indicate the preferred granularity)**

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| Company | Option(s) | Comment |
| Xiaomi | Option-3 | The largest length should be selected to cover the longet interval between initial and subsquent transmission.  |
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For RTT timer length:

**Q2.4-4a: If one selected option-1 for Q2.3-1, and if the UE has multiple QoS profiles, and thus they associate with different RTT timer length value(s), for same DST L2 ID, do you think TX/RX UE has to down-select to a single associated RTT timer length value?**

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| Company | Yes/No | Comment |
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**Q2.4-4b: If one answer Yes to Q2.4-4a, how to do the down-selection**

**Option-1: Select the DRX configuration associated with the QoS profile whose priority level is the highest**

**Option-2: Select the DRX configuration associated with the QoS profile whose PDB is the smallest**

**Option-3: Select the DRX configuration whose RTT timer length is the smallest**

**Option-4: Others (if this option is selected, please indicate the preferred granularity)**

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| Company | Option(s) | Comment |
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For Retransmission timer length:

**Q2.4-5a: If one selected option-1 for Q2.3-2, and if the UE has multiple QoS profiles, and thus they associate with different Retransmission timer length value(s), for same DST L2 ID, do you think TX/RX UE has to down-select to a single associated Retransmission timer length value?**

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| --- | --- | --- |
| Company | Yes/No | Comment |
| Xiaomi | Yes |  |
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**Q2.4-5b: If one answer Yes to Q2.4-5a, how to do the down-selection**

**Option-1: Select the DRX configuration associated with the QoS profile whose priority level is the highest**

**Option-2: Select the DRX configuration associated with the QoS profile whose PDB is the smallest**

**Option-3: Select the DRX configuration whose Retransmission timer length is the largest**

**Option-4: Others (if this option is selected, please indicate the preferred granularity)**

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| Company | Option(s) | Comment |
| Xiaomi | Option-3 | The largest length should be selected to cover the longest transmission duration. |
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## Q5: Need to define default DRX configuration for GC/BC?

As raised in [7], a default DRX configuration is helpful so that in case a QoS profile cannot be mapped to the configured QoS-to-DRX mapping (considering it is difficult for network configuration to exhaust all possible QoS profiles), it can be mapped to the default DRX configuration.

**Q2.5-1: Do you agree to introduce a default DRX configuration for GC/BC, so that in case a QoS profile cannot be mapped to the DRX parameters configured for the dedicated QoS profiles, it can be mapped to the default DRX configuration.**

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| Company | Agree/Disagree | Comment |
| Xiaomi | Agree |  |
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## Q6: Need for SL DRX MAC CE for GC/BC

DRX MAC CE was adopted for Uu in unicast case, it is questionable whether it should be adopted for GC/BC case for SL.

**Q2.6-1: Do you agree NOT to adopt DRX MAC CE for sidelink GC/BC case in Rel-17?**

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| Company | Agree/Disagree | Comment |
| Xiaomi | Agree |  |
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1. xxx.

# Conclusion

We have the following proposals

[Proposal 1 xxx.](#_Toc62216175)

# Reference

1. R2-2106985 Leftover Issues for Sidelink Unicast DRX CATT discussion Rel-17 NR\_SL\_enh-Core
2. R2-2106986 Leftover Issues for Sidelink Groupcast and Broadcast DRX CATT discussion Rel-17 NR\_SL\_enh-Core
3. R2-2106987 Further Issues Regarding to the Tx Profile CATT discussion Rel-17 NR\_SL\_enh-Core
4. R2-2106988 Impacts of SL DRX on Other Procedures CATT discussion Rel-17 NR\_SL\_enh-Core
5. R2-2107041 Discussion on left issue from [704][705][706] OPPO discussion Rel-17 NR\_SL\_enh-Core
6. R2-2107151 NR SL DRX Fraunhofer IIS, Fraunhofer HHI discussion Rel-17
7. R2-2107155 Consideration on sidelink DRX for groupcast and broadcast Huawei, HiSilicon discussion Rel-17 NR\_SL\_enh-Core
8. R2-2107156 Remaining issues on the sidelink DRX for unicast Huawei, HiSilicon discussion Rel-17 NR\_SL\_enh-Core
9. R2-2107157 Discussion on SL communication impact on Uu DRX Huawei, HiSilicon discussion Rel-17 NR\_SL\_enh-Core
10. R2-2107190 Left issues on SL-DRX OPPO discussion Rel-17 NR\_SL\_enh-Core
	* Revised in R2-2108830
11. R2-2108830 Left issues on SL-DRX OPPO discussion Rel-17 NR\_SL\_enh-Core
12. R2-2107191 Discussion on SL-DRX impact to mode-1 scheduling OPPO discussion Rel-17 NR\_SL\_enh-Core
13. R2-2107238 Leftover issues on overall flow of unicast TX-UE centric mechanism NEC Corporation discussion
14. R2-2107239 Discussion on DRX suspend/resume mechanism NEC Corporation discussion
15. R2-2107242 Further discussion on Uu/SL DRX timer LG Electronics France discussion Rel-17 NR\_SL\_enh-Core
16. R2-2107269 Resource Allocation Considering DRX InterDigital discussion Rel-17 NR\_SL\_enh-Core
17. R2-2107270 Open Issues on SL DRX Timers InterDigital discussion Rel-17 NR\_SL\_enh-Core
18. R2-2107271 DRX Configuration Determination in Unicast InterDigital discussion Rel-17 NR\_SL\_enh-Core
19. R2-2107310 On SL DRX Configuration aspects Intel Corporation discussion Rel-17 NR\_SL\_relay-Core
20. R2-2107311 Discussion on SL DRX Timers Intel Corporation discussion Rel-17 NR\_SL\_enh-Core
21. R2-2107312 On DRX wake-up time alignment Intel Corporation discussion Rel-17 NR\_SL\_enh-Core
22. R2-2107355 Remaining issues on DRX Timers for SL Unicast Spreadtrum Communications discussion Rel-17
23. R2-2107432 Consideration on Backward compatibility for SL DRX ZTE Corporation, Sanechips discussion Rel-17 NR\_SL\_enh-Core
24. R2-2107433 Further consideration on DRX configuration ZTE Corporation, Sanechips discussion Rel-17 NR\_SL\_enh-Core
25. R2-2107434 Discussion on SL DRX timer ZTE Corporation, Sanechips discussion Rel-17 NR\_SL\_enh-Core
26. R2-2107472 Remaining aspects of SL DRX Ericsson discussion Rel-17 NR\_SL\_enh-Core
27. R2-2107474 Handling coexistence between UEs supporting different releases Ericsson discussion Rel-17 NR\_SL\_enh-Core
28. R2-2107626 Discussion on remaining issues of SL DRX configurations Apple discussion Rel-17 NR\_SL\_enh-Core
29. R2-2107627 Discussion on remaining issues of SL impact of Uu-DRX Apple discussion Rel-17 NR\_SL\_enh-Core
30. R2-2107653 Remaining details on HARQ RTT and Retransmission Timer for SL DRX Fujitsu discussion Rel-17 NR\_SL\_enh-Core R2-2105400
31. R2-2107654 SL DRX impact on LCP Fujitsu discussion Rel-17 NR\_SL\_enh-Core R2-2105401
32. R2-2107968 DRX impact on Uu Xiaomi communications discussion
33. R2-2107969 Discussion on Sidelink DRX for unicast Xiaomi communications discussion
34. R2-2107970 Discussion on Sidelink DRX for broadcast and groupcast Xiaomi communications discussion
35. R2-2108014 DRX Configuration for UC BC GC and its interaction with Sensing Lenovo Mobile Com. Technology discussion NR\_SL\_enh-Core
36. R2-2108016 DRX coordination between Uu and SL Lenovo Mobile Com. Technology discussion NR\_SL\_enh-Core
37. R2-2108072 Proposals for Sidelink DRX Sony discussion Rel-17 NR\_SL\_enh-Core
38. R2-2108151 Consideration on TX centric SL DRX configuration and alignment LG Electronics Inc. discussion Rel-17 NR\_SL\_enh-Core
39. R2-2108214 Discussion on Compatible Issues with Rel 16 UEs Qualcomm Finland RFFE Oy discussion
40. R2-2108215 Discussion on RLF and PC5 RRC Connection with SL DRX Qualcomm Finland RFFE Oy discussion
41. R2-2108217 Discussion on Remaining Issues Qualcomm Finland RFFE Oy discussion
42. R2-2108222 A Default PC5 DRX Configuration for Broadcast/Groupcast/Unicast vivo discussion
43. R2-2108223 DRX duration calculation vivo, Xiaomi, ZTE corporation discussion
44. R2-2108224 Remaining issues on SL DRX for unicast/groupcast/broadcast vivo discussion
45. R2-2108426 Discussion on TBD/FFS Samsung Research America discussion
46. R2-2108427 Further consideration for SL DRX operation in groupcast Samsung Research America discussion
47. R2-2108428 Further consideration for SL DRX and Uu DRX alignments Samsung Research America discussion
48. R2-2108469 Discussion on alignment of mode 1 RA of Tx UE and SL DRX of Rx UE Nokia, Nokia Shanghai Bell discussion NR\_SL\_enh-Core
49. R2-2108470 Further Issues on Sidelink Traffic Pattern for SL DRX Configuration Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_SL\_enh-Core R2-2105958
50. R2-2108471 SL DRX for SL groupcast Nokia, Nokia Shanghai Bell discussion NR\_SL\_enh-Core
51. R2-2108765 SL DRX enabled UE Mode 2 operation ITL discussion Rel-17
52. R2-2108822 Remaining issues of SL DRX MediaTek Inc. discussion Rel-17 NR\_SL\_enh-Core