3GPP TSG-RAN WG1 Meeting #110-e R2-200xxxx

Electronic Meeting, 1st – 12th June 2020

Agenda: 6.21

Source: Ericsson

Title: [AT110-e][607][OdSIB] Proposals for on-demand SI in connected

Document for: Discussion, Decision

# 1 Introduction

This document is to kick off the following email discussion:

 **[AT110-e][607][OdSIB] Proposals for on-demand SI in connected (Ericsson)**

      Scope: Condense the proposals from documents under agenda item 6.21, and identify any easy agreements

      Intended outcome: Summary of issues and agreements, in R2-2005883

      Deadline:  Comments Wednesday 2020-06-03 1000 UTC; report Thursday 2020-06-04 1000 UTC

# 2 Summary of remaining issues

This document is to summarize the contributions submitted to AI 6.21. Please not that contributions that were already captured in the RRC CR submitted in R2-2005172. Further, no proposal regarding the positioning WI will be treated in this email discussion.

## 2.1 Handling of prohibit timer and its values

The following proposals have an impact on the handling of the prohibit timer and with what values this can be configured:

* Starting of timer T350 and checking of timer T350 are performed in section 5.2.2.3.5 instead of 5.2.2.4.2. Adopt the TP in annexure 1.[1]
* Stopping of T350 is removed from section 5.3.13.2[1]
* Upon reception of reconfiguration message which includes reconfigurationWithSync in spCellConfig of MCG, UE stops T350, if running. Adopt the TP in annexure 2.[1]
* Specify a single prohibit timer that is applied for any SIB(s) which can be requested on-demand in RRC\_CONNECTED.[2]
* Specify prohibit timer T350 with 4-bits and value range {s0, s0dot5, s1, s2, s3, s4, s5, s6, s7, s8, s9, s10, s20, s30, spare2, spare1} in seconds.[2]
* Move the procedure of checking prohibit timer T350 from sub-clause 5.2.2.4.2 to 5.2.2.3.5 in TS 38.331.[5]

One of the issues proposed by companies is whether to move the checking on if the timer T350 is running from section 5.2.2.4.2 (action related to acquisition of SIB1) to section 5.2.2.3.5 (triggering of on-demand request in CONNECTED). Main motivation of this proposal is because the UE does not trigger the on-demand procedure only upon reception of SIB1 but also in other cases (e.g., request from upper layers). According to current specification, the UE will skip section 5.2.2.4.2 and will trigger section 5.2.2.3.5 without checking if the timer T350 is running.

**Question 1: Do companies agree to move the checking of the timer T350 from section 5.2.2.4.2 to section 5.2.2.3.5 of TS 38.331?**

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| --- | --- |
| Company | Comments |
| ZTE | Agree |
| Samsung | Agree |
| LG | Agree |
| NEC | Agree |
| Lenovo | Yes, we agree. |
| MediaTek | Agree |
| CATT | Agree |

The second issue on the prohibit timer regards with which values this can be configured. One proposal is to assign 4-bits and value range {s0, s0dot5, s1, s2, s3, s4, s5, s6, s7, s8, s9, s10, s20, s30, spare2, spare1} for T350.

**Question 2: Do companies agree to assign 4-bits and value range {s0, s0dot5, s1, s2, s3, s4, s5, s6, s7, s8, s9, s10, s20, s30, spare2, spare1} for T350? In not, please state in the comment section your proposal.**

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| --- | --- |
| Company | Comments |
| ZTE | We prefer to have the original 3-bit value range below by removing the spare bits. We do not see the need to have finer granularity.  onDemandSIB-RequestProhibitTimer ENUMERATED {s0, s0dot5, s1, s2, s5, s10, s20, s30} |
| Samsung | Same view as ZTE |
| LG | Agree with ZTE |
| NEC | Same as ZTE. Prefer to keep the original one, as we do not see need for additional finar granularity e.g. s3-4, s6-9. |
| MediaTek | OK with ZTE’s proposal |
| CATT | Slightly prefer to keep the origianl 3-bit value range. |

The third issue regarding the prohibit timer is when this should be stopped by the UE. According to this, we have two proposals that are independent to each other. One proposal is, indeed, to stop T350 when the UE triggers the RRC resume procedure and the motivation for doing it is that during RRC\_IDLE or RRC\_INACTIVE the timer T350 is never running. This is in a way true because the timer T350 is also stopped in section 5.3.8.3 when the RRC release procedure is triggered.

**Question 3: Do companies agree to remove the stopping of timer T350 from section 5.3.13.2?**

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| Company | Comments |
| ZTE | Agree.  T350 can be started when UE is in connected. There are two possible cases that UE enter from connected to idle/inactive:  (1)Enter inactive or idle upon receiving RRCRelease message, T350 is stopped upon receiving RRCRelease.  (2)RRC connection release requested by UE upper layers, UE will enter idle state and T350 continues to run until initiation of RRC connection establishment.  So, T350 will never run when UE is in inactive and thus there is no need to stop T350 upon receiving RRCResume. |
| Samsung | Agree |
| LG | Agree. In RRC INACTIVE and RRC IDLE state, T350 is never running |
| NEC | Agree |
| Lenovo | Yes, we agree |
| MediaTek | Agree (we also understand that T350 will never be running in idle/inactive) |
| CATT | Agree |

A further issue is, instead, the handling of the timer T350 with receiving a reconfiguration with sync associated with the MCG. The motivation for this is because in case of handover, the UE should send the on-demand request eventually to the target node and thus the timer T350 configured by the source will not be valid anymore. However, one drawback of doing this is that the UE, in case of handover failure, when falling back to the source node will have to start again autonomously timer T350 and this may cause some wrong UE/NW behaviour (since the UE may receive an on-demand request by the UE that is not expecting).

**Question 4: Do companies agree that the UE should stop timer T350 upon the reception of reconfiguration message which includes *reconfigurationWithSync* in *spCellConfig* of MCG?**

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| Company | Comments |
| ZTE | The intention of this proposal is to reflect the agreement we made last meeting “After at PCell change the prohibit timer is reset (the common understanding is that the UE reacquires SI in the new PCell including SIBs needed in connected, i.e. including SIBs delivered with this mechanism)” but we do not think UE should stop T350 upon the reception of reconfiguration with sync.  In case of successful handover, UE should stop the T350 configured by the source cell, send SI request and start T350, if configured by the target cell and some required SIBs are not broadcasting.  In case of handover failure, we may have the following UE behaviors:   1. UE will re-establish the RRC connection and T350 is stopped upon initiating re-establishment procedure. 2. UE go back to the source cell for some cases when DAPS is supported. => The T350 configured by the source cell should keep running.   With the above analysis, I think the stop condition of T350 can be listed as follows:   * Upon acquiring the requested SIB(s). * Upon initiating the connection re-establishment procedures. * Upon receiving onDemandSIB-Request set to release. * Upon successful handover. (The only concern is how to capture this condition as we have never used the wording “successful handover” before.) |
|  | Yes. Not stopping the timer will delay transmission of SI request upon handover completion. In case of handover failure, RRC connection will be re-established. Note that currently, T350 is stopped when RRC connection re-estabslishment is triggered and UE will start the timer again when it sends SI request in newly selected cell. So we do not see any issue in stopping the timer when UE starts executing the handover command.  If UE should does not stop T350 upon the reception of reconfiguration with sync but stop it upon completion of handover (as commented by ZTE above), there will be an issue when *dedicatedSIB1-Delivery* andreconfiguration with sync is included in reconfiguration message. Whether to request SI or not is checked as part of *dedicatedSIB1-Delivery* processing which is performed before completion of handover. SI request in target will not be triggered as T 350 is still running. |
| LG | When DAPS HO fails, UE reverts back to the source cell. In this case, T350 should not stop. T350 should be stopped only after successful reconfiguration with sync (i.e. after successful RACH just before/after stopping T304, in 5.3.5.3) not upon initiation of the reconfiguration with sync.  1> if *reconfigurationWithSync* was included in *spCellConfig* of an MCG or SCG, and when MAC of an NR cell group successfully completes a Random Access procedure triggered above;  2> stop timer T304 for that cell group;  2> stop timer T350; |
| NEC | Firstly, our understanding on the previous agreement for HO is that the UE stops T350 upon receiving the reconfigurationWithSync (but never restart) and the T350 may be configured by target with non-zero value. Then, the UE may start the T350 again upon sending the request in the target cell. With this, we agree with the propsal. |
| Lenovo | No. Referring to the two agreements made below our understanding is that the UE shall stop timer T350 after (successful) PCell change.   * RAN2#109-e: RAN2 to confirm that upon receiving RRC reconfiguration message which includes reconfigurationWithSync in spCellConfig of an MCG and dedicatedSIB1-Delivery, SI request may be initiated after MAC of MCG completes the random access procedure towards the target SpCell. * RAN2#109bis-e: After at PCell change the prohibit timer is reset (the common understanding is that the UE reacquires SI in the new PCell including SIBs needed in connected, i.e. including SIBs delivered with this mechanism) |
| MediaTek | Agree with Lenovo and others that this should happen at *successful* PCell change, rather than upon receiving the reconfiguration. |
| CATT | As mentioned by ZTE, UE goes back to the source cell for some cases when DAPS is supported. Hence, we support the UE should stop T350 upon successful handover. In section 5.3.5.3, the UE stops timer T390 for all access categories upon successful reconfiguration with sync. Stopping T350 upon successful handover can be added in the same place as follows.  5.3.5.3 Reception of an *RRCReconfiguration* by the UE  …  1> if *reconfigurationWithSync* was included in *spCellConfig* of an MCG or SCG, and when MAC of an NR cell group successfully completes a Random Access procedure triggered above;  2> stop timer T304 for that cell group;  2> stop timer T310 for source if running;  2> apply the parts of the CSI reporting configuration, the scheduling request configuration and the sounding RS configuration that do not require the UE to know the SFN of the respective target SpCell, if any;  2> apply the parts of the measurement and the radio resource configuration that require the UE to know the SFN of the respective target SpCell (e.g. measurement gaps, periodic CQI reporting, scheduling request configuration, sounding RS configuration), if any, upon acquiring the SFN of that target SpCell;  2> if the *reconfigurationWithSync* was included in *spCellConfig* of an MCG:  3> if T390 is running:  4> stop timer T390 for all access categories;  4> perform the actions as specified in 5.3.14.4.  3> stop timer T350, if running;  3> if *RRCReconfiguration* does not include *dedicatedSIB1-Delivery* and  3> if the active downlink BWP, which is indicated by the *firstActiveDownlinkBWP-Id* for the target SpCell of the MCG, has a common search space configured by *searchSpaceSIB1*:  4> acquire the *SIB1*, which is scheduled as specified in TS 38.213 [13], of the target SpCell of the MCG;  4> upon acquiring *SIB1*, perform the actions specified in clause 5.2.2.4.2; |

## 2.2 Capability for the on-demand SIB in CONNECTED

The following proposals have been submitted regarding the need of UE capability for on-demand SIB in RRC\_CONNECTED:

* It’s mandatory to support on-demand SI in RRC\_CONNECTED by UEs capable of features, where the corresponding SIB(s) is on-demand SI in RRC\_CONNECTED, i.e. no UE capability for on-demand SI in RRC\_CONNECTED is introduced.[3]
* Proposal 1: define a non-mandatory capacity for on-demand SI in RRC\_CONNECTED in TS 38.306. [14]
* Proposal 2: UE needs to report its capability of on-demand SI in RRC\_CONNECTED to networks. [14]

So far, the understanding about this feature was that no UE capabilities were needed to be signalled by the UE regarding the on-demand SIB feature in CONNECTED. One reason is that, even if the network decides to signal the *onDemandSIB-RequestConfig*, since the triggering of this feature is UE-based, if the UE does not support it will just skip this configuration and will never trigger the procedure. On the other side, even the UE supports this feature and the network set the prohibit timer, the UE by implementation may decide to never trigger the on-demand message. Therefore, our assumption is that no capabilities are needed. However, in case this feature is not mandatory for the UE, having a one-bit capability will avoid the network to configure something that the UE cannot support.

**Question 5: Do companies agree that no L2 capabilities are needed for the on-demand SIB feature in CONNECTED? If the answer is not, please state your proposal in the comment section.**

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| Company | Comments |
| Yes | We agreed with the explanation above that reporting UE’s capability is not quite necessary since the on demand SI request in connected is a UE-based feature while having a capability bit is somehow helpful for NW to avoid useless configuration. |
| Samsung | If network supports the feature (i.e. it signals *onDemandSIB-RequestConfig*) and UE does not, UE capability seems needed. If UE does not support the feature (according to UE capability), network provide the SIBs in dedicated RRC signaling if SIBs required in connected are not broadcasted |
| LG | Same view as Samsung |
| NEC | We prefer to define one bit (per UE) capability unless this is mandatory for the UE. This can avoid the undesirable case the Rapporteur identified. |
| Lenovo | No. To be future-proof (more SIBs may be added in the on-demand SIB request list in the future) we think a UE capability may be beneficial in order to avoid the case where network enables a feature that a UE doesn’t support. |
| MediaTek | Disagree  We think a one-bit capability is useful. This is not primarily to prevent the network from configuring something unused, but so that the network knows which connected UEs will not be able to request the SIBs—the network can then presumptively send the needed SIBs (e.g. the V2X SIBs for V2X-capable UEs) to the UEs that do not support the on-demand feature, while letting the UEs that do support it request the SIBs on-demand when needed. |
| CATT | Share the same view with Samsung. We prefer to define a non-mandatory capacity for on-demand SI in RRC\_CONNECTED in TS 38.306. |

## 2.3 SIBs to be requested on-demand while in CONNECTED

The following proposals have been formulated regarding new SIBs to be requested on-demand while in CONNECTED:

* SIB10 can’t be requested on-demand by UEs in RRC\_CONNECTED.[3]
* Allow the UE in RRC\_CONNECTED to request SIB9, irrespective of the relation to IIoT.[4]
* Introduce a reference SFN as an optional field in SIB9, which is only included when the SIB is delivered via unicast.[4]
* SIB10 can be requested on-demand by UEs in RRC\_CONNECTED.[8]

Regarding the request of SIB10, as Vivo pointed out in [3], it looks like that this SIB may not essential to be received by the UE while in RRC\_CONNECTED because the UE The UE may use local release of RRC connection to perform manual search if it is not possible to perform the search while RRC connected.

**Question 6: Do companies agree that SIB10 should not be requested on-demand by UEs in CONNECTED?**

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| Company | Comments |
| ZTE | Yes. Even though it is possible for UE in connected to perform manual selection, we do not think it is necessary to support on demand for SIB10 since UE can use local release of RRC connection to perform manual selection. |
| LG | Agree.  We acknowledge that in case network does not broadcast SIB10, it might take a long time for UE to collect HRNN name from multiple cells across frequencies because UE has to request SIB10 in each cell of those. However, we do not think this is a serious problem to optimize because problem a) manual NPN slection is not a frequent event, and b) such a long interruption caused by repetitive SIB request could be somehow shortened by broadcasing SIB10 in those cells. |
| NEC | Yes. we agree with the ZTE and do not see a need of such optimization for rare (or less frequent) case. |
| Lenovo | No. We suggest to let discuss and decide this topic in the PRN WI session. We have submitted a contribution for discussing this topic there. |
| MediaTek | Disagree  We agree with the argument in [8], that a UE that supports manual selection may want to request SIB10. It seems excessive to require the UE to use local release for this purpose—it’s much less disruptive if the network can just provide SIB10.  In general we do not understand the drive to avoid making SIBs available for request in connected. What’s the undesirable impact of supporting additional SIBs for this purpose? Is it just about the size of the enumerated type? |
| CATT | Agree |

A second proposal is, instead, to allow the UE to request SIB9 on-demand while in CONNECTED (irrespectively of the relation with IIoT). Even if this it may be, of course, possible, our understanding is that the request of the UTC time reference has been already widely discussed in the IIoT session. According to this, after a long and painful discussion, it was agreed that there was no benefit to request the UTC time on-demand and that is also one of the reasons why the on-demand SIB framework was not adopted at the end. Further, allowing this now, it poses two problematic that is quite difficult to solve at the last meeting of this release. On problem is that will create double handling of SIB9 for IIoT and the general framework and network and UE restriction need to be specified to avoid any collision in the handling of this SIB. This is something to be avoided at this late stage of the release. The second problem is that the request on-demand of UTC time of SIB9 may have implication in RAN3 for the CU-DU split and therefore, we should consult RAN3 is this is okay. If this is the case, it would be impossible to sort out this problem during this meeting. Therefore, our suggestion would be to not support the SIB9 on-demand, while in CONNECTED, in Rel-16.

**Question 7: Do companies agree that SIB9 (regardless of the relation with IIoT) should not be requested on-demand by UEs in CONNECTED?**

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| Company | Comments |
| ZTE | Agree, no need to support.   1. It has been agreed in IIOT session that the reference time info is requested via UEAssistanceInformation message and received via DLInformationTransfer message. There is no need to support two separate procedures for the same functionality. 2. For SIB9 without reference information, it is not the essential or required SIB thus not necessary to support on demand for SIB9. |
| Samsung | Agree |
| LG | Agree. Given the fact that UEAssistanceInformation mesage can be used to request reference time info, we do not need to support on-demand SIB request for the same purpose. |
| NEC | Agree. similar view as ZTE. We are not yet convinced of its need.. |
| MediaTek | Disagree  As noted in the question, this is independent of the IIoT discussion; the UE may need SIB9 for other purposes such as GNSS initialisation (this is already identified in the IE description in the RRC spec). We don’t see what the „double handling“ concern is (the same UE should never see separate instances of SIB9). |
| CATT | Agree |

## 2.4 Comments on the on-demand SIB CR (38.300 and 38.331)

### 2.4.1 ASN1 comment on the RRC CR

Companies are invited to provide their comments on the submitted RRC CR in R2-2005172

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| Company | Comments |
| CATT | 1. Duplicated checkings  As mentioned in [5], we find there are duplicate checkings, i.e. deciding whether to acquire the required SIB(s) via broadcast or to trigger an on demand SI request in RRC\_CONNECTED, in both sub-clause 5.2.2.4.2 and 5.2.2.3.5. Thus, we propose to remove the behaviors that the UE decides whether to acquire required SIB(s) via broadcast or to trigger a request in RRC\_CONNECTED from sub-clause 5.2.2.4.2, and add an entry to perform checking in sub-clause 5.2.2.3.5 directly.  2. Typo in the definition of OnDemandSIB-Request-r16 IE  onDemandSIB-RequestProhibitTimer -> onDemandSIB-RequestProhibitTimer-r16 |
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### 2.4.2 Comments on stage2 CR

Companies are invited to provide their comments on the submitted stage 2 CR in R2-2005173

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| Company | Comments |
| ZTE | For the first change, we suggest the following minor update:  - **Other SI** encompasses all SIBs not broadcast in the Minimum SI. Those SIBs can either be periodically broadcast on DL-SCH, broadcast on-demand on DL-SCH (i.e. upon request from UEs in RRC\_IDLE, RRC\_INACTIVE or RRC\_CONNECTED), or sent in a dedicated manner on DL-SCH to UEs in RRC\_CONNECTED (i.e., if configured by the network, upon request from UEs in RRC\_CONNECTED or when the UE has an active BWP with no common search space configured). Other SI consists of: |
| Lenovo | Category should be „F“. |
| CATT | In the following sentence in section 7.3.2, RRC\_CONNECTED needs to be added.  The Other SI may be broadcast at a configurable periodicity and for a certain duration. The Other SI may also be broadcast when it is requested by UE in RRC\_IDLE/RRC\_INACTIVE/ RRC\_CONNECTED. |
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# 3 Conclusion

Based on the discussions in Section 2, the following proposals are formulated:

# 3 References

1. [R2-2004530](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs//R2-2004530.zip), Corrections for onDemandSIB-RequestProhibitTimer operation, Samsung Electronics Co., Ltd, RAN2#110e, Electronic meeting, June 2020

1. [R2-2004604](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs//R2-2004604.zip), Open issues on Prohibit timer, Lenovo, Motorola Mobility, RAN2#110e, Electronic meeting, June 2020

1. [R2-2004641](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs//R2-2004641.zip), Remaining issues of on-demand SI in RRC\_CONNECTED, vivo, RAN2#110e, Electronic meeting, June 2020

1. [R2-2004706](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs//R2-2004706.zip), On-demand request for SIB9 (for reasons beyond IIoT) [M118], MediaTek Inc., RAN2#110e, Electronic meeting, June 2020

1. [R2-2004795](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs//R2-2004795.zip), [C701]Prohibit Timer for on Demand SIB Request in RRC\_CONNECTED, CATT, RAN2#110e, Electronic meeting, June 2020

1. [R2-2004986](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs//R2-2004986.zip), [H780] Text Proposal on PDCCH monitoring for SI request in RRC\_CONNECTED, Huawei, HiSilicon, RAN2#110e, Electronic meeting, June 2020

1. [R2-2004987](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs//R2-2004987.zip), [H781-783] Correction on OnDemandSIB-Request, Huawei, HiSilicon, RAN2#110e, Electronic meeting, June 2020

1. [R2-2005102](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs//R2-2005102.zip), Discussion on the remaining issue of on-demand SI in RRC\_CONNECTED, Huawei, HiSilicon, RAN2#110e, Electronic meeting, June 2020

1. [R2-2005172](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs//R2-2005172.zip), Introduction of on-demand SIB(s) procedure in CONNECTED, Ericsson (Rapporteur), RAN2#110e, Electronic meeting, June 2020

1. [R2-2005173](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs//R2-2005173.zip), Introduction of on-demand SIB(s) procedure in CONNECTED, Ericsson (Rapporteur), RAN2#110e, Electronic meeting, June 2020

1. [R2-2005174](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs//R2-2005174.zip), [E243] ASN.1 remaining issues on on-demand SIBs in CONNECTED, Ericsson, RAN2#110e, Electronic meeting, June 2020

1. [R2-2005597](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs//R2-2005597.zip), [Z113] [Z117] Text proposal for accepted RIL issues, ZTE Corporation, Sanechips, RAN2#110e, Electronic meeting, June 2020

1. [R2-2005696](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs//R2-2005696.zip), Condition for T350 stop, LG Electronics Inc., RAN2#110e, Electronic meeting, June 2020

1. [R2-2005460](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005460.zip), Discussion on UE capability for OdSIB, Huawei, HiSilicon, RAN2#110e, Electronic meeting, June 2020