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 |
| Huawei, HiSilicon | Agree |
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The second issue on the prohibit timer regards with which values this can be configured. On 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 |
| Huawei, HiSilicon | We think the proposed range of values are too long for the prohibit timer. |
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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 |
| Huawei, HiSilicon |  |
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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; |
| Huawei, HiSilicon | The time should be stoped and restarted after resending the SI request in the target cell if SI request is configured in the traget cell |
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## 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 |
| Huawei, HiSilicon | If the UE does not report teh capability, the network should signal *onDemandSIB-RequestConfig* to all the UE connected to the network. This might be a large overhead for both the UE and the network if there are a lot of UEs in the network, e.g., 1000 UEs in the network and then, 1000 such configurations should be included in the RRC reconfig for each UE. While if a capability is reported, the network does not need to send these to the un-capable UEs. |
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## 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. |
| Huawei, HiSilicon | We think SIB10 SI request should be supported  It is beneficial to enable UE to perform manual selection in RRC\_CONNECTED state. For example, in the RAN sharing case, when the UE is connected to the public network cell of a shared-RAN, if the user later wants to perform manual selection to a PNI-NPN cell of the same shared-RAN, the UE needs to release the AN (Access Network) connection (RRC and DRBs) and CN connection to perform manual search. It stops the UP data transmission and causes latency, while the UE requests to the same shared-RAN when the UE falls back to RRC-IDLE state for the on-demand SIB10. On the contrary, if RRC\_CONNECTED on-demand request of SIB10 is supported, the UP data transmission and the on-demand request of SIB10 via dedicated RRC can be performed simultaneously. It reduces the duration of RRC-IDLE state for the UE to switch from the public network to the PNI-NPN. For SNPN, when the UE in SNPN access mode automatically connects to an SNPN cell, the user can verify whether the connected SNPN is what the user wants by reading HRNN, and the UE can display the HRNN to the user after requesting on-demand SIB10 in RRC\_CONNECTED. |
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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. |
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## 2.4 Comments on the on-demand SIB CR (38.330 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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### 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: |
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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