3GPP TSG-RAN WG2 Meeting #113bis-e***R2-2104586***

Electronic, April 12 – April 20, 2021

**Agenda item:** 8.11.2

**Source:** Qualcomm Incorporated

**Title:** Summary of [AT113bis-e][612][POS] LS to SA2 on scheduled location
 time

**Document for:**  Discussion and Decision

# 1. Introduction

This document summarizes the following email discussion:

* [AT113bis-e][612][POS] LS to SA2 on scheduled location time (Qualcomm)

 Scope: Draft an LS to SA2 indicating that RAN2 intend to support a scheduled location time. Questions for clarification on the SA2 CR can be discussed.

 Intended outcome: Approved LS

 Deadline: Tuesday 2021-04-20 0800 UTC

The corresponding incoming LS is in

[1] R2-2102665 (S2-2102048), "LS on Scheduling Location in Advance to reduce Latency", SA2.

The question to RAN2 is:

 "SA2 would like to ask RAN1 and RAN2 whether support can be provided for a scheduled location time as part of Rel-17 and as defined in the attached CR to TS 23.273. SA2 also invite RAN1 and RAN2 to provide any other comments on support of this feature which may be applicable to support in 5GC."

A draft reply LS with an initial proposed response was submitted to this meeting in:

[2] R2-2103899, "[draft] Response LS on Scheduling Location in Advance to reduce Latency, Qualcomm Incorporated, LS out To:SA2; Cc:RAN1, RAN3.

# 2. Discussion

The draft reply LS in [2] is proposed to be modified as shown below (according to the scope of this email discussion shown section 1).

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| **1. Overall Description:**RAN2 thanks SA2 for their LS on Scheduling Location in Advance to reduce Latency and the endorsed CR 0151r1 to TS 23.273 in S2-2102047.RAN2 discussed the subject matter and ~~agreed to add~~ intend to add support for a scheduled location time as part of Rel-17 and as defined in the CR 0151r1 to TS 23.273 in S2-2102047.**2. Actions:****To SA2 group.****ACTION:** RAN2 kindly asks SA2 to take the above information into account. |

**Question 1:** Do you agree with the above proposed response to SA?

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| Company | Yes/No/With modification | Comment |
| CATT | With modification | Please see the additional question in Q2. |
| Huawei, HiSilicon | Yes |  |
| Nokia | With modification | Before RAN2 tells SA2 that we intend to add support for a feature as defined in the SA2 endorsed CR, we must fully understand what is in the CR and how the feature works. Instead of jumping to conclusion in the first meeting (where we had 30 minutes of discussion time), we should allow opportunity for RAN2 to ask SA2 for clarifications on the proposed new feature. Note that SA2 LS also invites comments on the feature from RAN1 and RAN2 and it is fair to send the comments and questions first, and once we get a better understanding we can indicate support for the feature on the RAN side also.So, the 2nd para in the LS should say:*RAN2 discussed the subject matter and have some questions for clarification to enable us to better understand the feature. Before RAN2 can decide on support of the feature as defined in the SA2 endorsed CR 0151r1 to TS 23.273 in S2-2102047, RAN2 would first like to understand what the CR describes. Please see below for RAN2 questions*: |
| Intel | Yes | But would be ok to ask question for clarifications.  |
| ZTE | Yes |  |
| Xiaomi | Yes |  |
| OPPO | Yes |  |
| Ericsson | Yes, or with modification |  |
| Lenovo, Motorola Mobility | Yes |  |
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Multiple companies suggested to include questions to SA2 on the incoming LS and/or attached CR in S2-2102047.

Please provide the question RAN2 should ask SA2 in the Table below. Please phrase your question or comment in a suitable way for inclusion in the LS.

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| Company | Proposed question to SA2 to be included in the response LS | Comment |
| CATT | Could SA2 clarify what the time unit of Scheduled Location Time and the range is if possible? | We take the CR as requirement from SA2 but different time unit (e.g. timeslot or seconds) from SA2 would require different solutions in RAN2.[Huawei, HiSilicon]SA2 may not be able to answer the question of time unit and range[Intel] Same view as Huawei on time unit and range.[Qualcomm]Any definition of T for the positioning procedures should be RAN business. The scheduled location time T for the RAN positioning procedures may have a different format compared to the format used in the 5GC Location Request. I.e., the location time requested by an client may be some universal time (SA/CT business), but the positioning measurement time may be some radio specific time (e.g., SFN/slot, etc. --- in principle, already the case for UL positioning and aperiodic SRS).**Ericsson: But then it should be clear as how to convert the universal time T to RAN preferred time unit.**[Qualcomm]I think we would need RAN1/2 contributions on this.Maybe we can add a general 5GC related question; e.g.:"Can SA2 clarify the time format used for the scheduled location time T which is provided to an LMF (e.g., UTC, etc.)" |
| Huawei, HiSilicon | We would like to know how scheduled location time can work with deferred MT-LR for periodic or triggered location. From our understanding, 1. Deferred MT-LR is triggered according to the event that is defined according to the UE behaviour, which is sporadic in nature and for this, we cannot appoint a time “T”.
2. Deferred MT-LR for periodic triggering is triggered according to the periodic timer and the UE starts the measurement at expiry of the periodic timer. This is duplicated with the functionality of the proposed “T”
 | [Qualcomm]For deferred MT-LR (or any other LCS procedure; e.g., MO-LR, MT-LR, NI-LR) there should be no principle difference for the RAN positioning procedures. At the end, all these LCS procedures may result in UE/NG-RAN positioning procedures as defined in 38.305.For periodic reporting, the SA2 CR defines in 6.3.1, Step 1: "For periodic location, the LCS Service Request may include a scheduled location time for the first periodic location report."I.e., this is the "first fix" as part of the overall Deferred MT-LR procedure.For the remaining periodic fixes, the time T seem not needed/applicable anymore (i.e., it is the periodic timer):NOTE 6: When a scheduled location time is provided for periodic location at step 16, a UE shall start to perform steps 23-27 some time in advance of the scheduled location time for the first periodic event report or some time in advance of the periodic interval expiration for each succeeding periodic event report in order to enable location measurements at step 23 or step 27 to occur at or near to each of these times, respectively.For non-periodic events, the SA2 CR seems not defining anything new.I suggest to rephrase the question as follows:"*For a Deferred 5GC-MT-LR for periodic location events, RAN2's understanding is that a scheduled location time may apply for the first periodic location report only. For each succeeding periodic location report, the* *"scheduled location time" is equivalent to the periodic reporting interval.**Please confirm whether RAN2's understanding is correct.**RAN2 would also like to understand how a scheduled location time can be applicable to deferred MT-LR for triggered location event for which the scheduled location time can hardly be predictable given to its sporadic nature*"[Huawei, HiSilicon]We are OK with QC’s wording on periodic deferred MT-LR.SA2’s CR has mentioned the following and it seems that they intend to support deferred MT-LR for triggered location events. So, this is not a question of whether they want to support it or not. Our question is how can this be supported given the sporadic nature of triggered location events. Hence, I would like to revise the text above a bit.[Qualcomm]O.K., I see now. Included in the draft LS (slightly rephrased). |
| Nokia | 1. The definition of scheduled location time is unclear since the SA2 endorsed CR describes the scheduled location time differently in different parts of the CR and there is a different description of scheduled location time in the SA2 LS itself. RAN2 would like to have a clear definition of scheduled location time first as this impact what is signalled to UE and/or NG-RAN. Please see below for detailed comments:---In section 4.1c it says “*The request includes the scheduled location time T*” which is described as the start of location preparation phase. So, time T is the scheduled location time. Section 4.1c also says “*the scheduled location time allows an external LCS Client, AF or the UE to specify a time in the future at which a current location of the UE is to be obtained*”. However, in Figure 4.1c-1, the time when the LCS client, AF or UE obtains the location is T+t2. The time T in the figure is shown as the time at which the UE or NG-RAN obtains the location measurements.The SA2 LS description also states “…*support scheduling of location of a target UE in advance using a scheduled location time* ***at which location measurements for the target UE would be obtained by the UE*** *(in the case of DL measurements)* ***and/or NG-RAN*** *(in the case of UL measurements)*”. This seem to align with the time T in Figure 4.1c-1 which show it as a scheduled **measurement** time.In section 6.3.1, step 25 describes the schedule location time as the time at which **the LMF** must obtain the UE location, not the time at which the LCS client receives the location or the time at which the LMF schedules the measurement.---2. In section 6.1.2, there is the following editor’s note:*Editor's note: Feedback from RAN is needed to verify whether location measurements can be scheduled to occur at a UE or NG-RAN at a specific scheduled location time*Please clarify the requirement whether measurements in UE/NG-RAN need to be scheduled at the scheduled location time received from 5GC or at a time before the scheduled location time received from 5GC.  |  |
| Intel | We can list the different descriptions on T mentioned by Nokia above as described in SA2 CR, and ask SA2 what’s the correct understanding on T.  |  |
| ZTE | Which part should be responsible for the value of timing T and the period T-t1 and T+t2?How does the system do if the location preparation/execution phase can not be completed in time? | [Qulcomm]I think the first question is covered by Nokia above (general question on definition of T).For the 2nd question, error/exception handling should not be specific to a location time/procedure and generally depends on LCS QoS Class as specified in 23.273 (and 22.071), and seems not impact RAN.The SA2 CR says:"The following attributes may be included in the location service response:…Indication of a failure to fulfil a scheduled location time for the best effort LCS QoS class." |
| Xiaomi | We would like to indicate following issues in the reply LS：1. Could SA2 clarity what the scheduled location time T is the correct understanding?
* LMF obtains the positioning measurement and/or location estimate at time T;
* For DL positioning, UE obtains the positioning measurement at time T or UE starts to perform positioning measurement at time T;
* For UL positioning， RAN obtains the positioning measurement at time T or RAN starts to perform positioning measurement at time T;
1. The actual scheduled location time is decided by RAN, and there may be an error between scheduled location time T and actual scheduled location time, and if the actual scheduled location time within the error range, the scheduled location time T is fulfilled.
 | [Qulcomm]I think this is generally covered by the questions above where we ask for a definition of T. |
| OPPO | The format of the scheduled location time T and the relation between the scheduled location time T and the deferred MT-LR positioning method (is the scheduled location time T could be considered as the first periodic positioning time?) should be clarified. | [Qualcomm]Added a general question on the (5GC) time format. See first row above. |
| Ericsson | Questions for SA21.Some companies in RAN2 view that the SA2 agreed CR on scheduled location time T shall be supported by RAN2; i.e it is a requirement to support such functionality. Do SA2 have the same understanding?2.RAN2 have previously used the notion of time “T” as recommendation from LMF to gNB in order to activate UL SRS configuration. The granularity level of the time T previously used is in SFN Initialisation Time, subframe and slot number. Do SA2 have any view if it would be possible for RAN to deduce the time T with such granularity? **In case if in RAN2 it is clear as how to convert the universal time T to RAN preferred time unit then we do not need to send this question. Else good to mention/inform to SA2 what is the RAN requirements in terms of timing.**3.Would the LCS client send just “one-time T” or “series of time T” or “one Time T with subsequent offsets”? | [Qualcomm]1. The SA2 LS asks "whether support can be provided" by RAN, Also the CR itself mentions that "Feedback from RAN is needed to verify whether location measurements can be scheduled to occur at a UE or NG-RAN at a specific scheduled location time."The SA2 LS also asks for a response "once RAN1 and RAN2 are in a position to answer". We do not answer the above question yet; instead, we first ask SA2 questions for clarifications on the feature/CR. The LS does not say that RAN2 "must" support something.2. I've suggested a general question on time format in the 1st row above. The "RAN Time T" should be RAN1/2 business.3. It seems this question is related to aperiodic location reports? I can't see this feature is supported (or proposed to be supported). But the question seems generally covered by the Deferred MT-LR for periodic events above. Maybe we can extend the question:"For a Deferred 5GC-MT-LR for periodic location events, RAN2's understanding is that a scheduled location time may apply for the first periodic location report only. For each succeeding periodic location report, the "scheduled location time" is equivalent to the periodic reporting interval.Please confirm whether RAN2's understanding is correct, *or whether different location times T can apply for succeeding periodic location reports*.  |
| Lenovo, Motorola Mobility | 1. Could SA2 confirm if multiple ‘T’ values can be configured from multiple LCS clients resulting in different configuration and scheduling for each ‘T’ value.
2. Could SA2 confirm if multiple ‘T’ values are required for subsequent fixes after the initial fix of the position estimate using this procedure?

(Similar to Ericsson’s Q3 above) | [Qualcomm]I think this is covered by the Deferred MT-LR question above.  |
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# 3. Other Comments

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| Company | Comment |
| Nokia | Scheduling a request for location information ahead of time is a useful feature. However, we wonder what use cases are envisioned by SA2 when they endorsed this feature. It also looks like a feature that allow scheduling measurements or estimating position ahead of time if the request can be scheduled ahead of time, but all component steps in the location preparation and location execution phases still takes the same amount of time as it takes before to perform those steps and so this is not really a latency reduction enhancement. An LCS client getting the location at the time it was willing to have it gives it the perception of reduced latency. If possible, we would like to ask SA2 for use cases it considered in evaluating this feature.[Qualcomm: The use cases have been discussed at SA2#142e and SA2#143e and are also briefly captured in R2-2103898.] |
| Ericsson | Agree with Nokia that all the steps would still need to be done. Hence there is no latency savings. However, it provides a tool to ensure that latency requirement is fulfilled.If LMF knows that UE need to be positioned every 30s; it may * provide AD every 22th second
* UE may perform measurement every 23rd second (from 23s to 26s for 3s for example)
* UE would send report every 27th second
* LMF would compute the result and provide location estimation every 30th second

If need be; we can ask the question to SA2 as in what way do they see the benefits? |
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# 4. Summary

The draft LS has been updated in R2-2104587 according to the discussion above.