**3GPP TSG-RAN WG3 Meeting #120 R3-23xxxx**

**Incheon, Korea, May 22 – 26, 2023**

**Agenda item:** 13.5

**Source:** Xiaomi (Moderator)

**Title:** Offline discussion on SA2 related issues on mobile IAB

**Document for:** Discussion

# 1 Introduction

This document contains the controversial issues about SA2’s issues for the following CRs

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| [R3-232834](file:///D:\\会议硬盘\\TSGR3_120\\Docs\\R3-232834.zip) | (draftCR TS 38.305) Introduction of Mobile TRP (Ericsson, Xiaomi, Qualcomm Inc., CATT, Nokia, Nokia Shanghai Bell, ZTE) | draftCR |
| [R3-232835](file:///D:\\会议硬盘\\TSGR3_120\\Docs\\R3-232835.zip) | Support for mobile TRP Location Information (Ericsson, Xiaomi, Qualcomm Inc., CATT, Nokia, Nokia Shanghai Bell, ZTE) | CR0101r1, TS 38.455 v17.4.0, Rel-18, Cat. B |
| [R3-232979](file:///D:\\会议硬盘\\TSGR3_120\\Docs\\R3-232979.zip) | (CR to TS 38.473) Support of mobile TRP Location Information (Xiaomi, Ericsson, Qualcomm, CATT, Nokia, Nokia Shanghai Bell, ZTE) | CR1176r, TS 38.473 v17.4.1, Rel-18, Cat. B |
| [R3-232903](file:///D:\\会议硬盘\\TSGR3_120\\Docs\\R3-232903.zip) | (TP for NR\_mobile\_IAB BL CRs for TS 38.455/ 38.413/38.473) Discussion on the UE positioning and additional ULI (Huawei) | other |
| R3-233174 | Enhancements on positioning and additional ULI for mobile IAB (ZTE) | discussion |

Note: considering the above spec impacts are from SA2 and there’s no BL CR for TS 38.455, the papers to capture the solutions to solve SA2’s issues can be CRs or draftCR. (this is also confirmed by the Rapporteur)

For R3-232903, if the additional ULI for NGAP can be agreeable, R3-232903 can be revised to CR format to capture the corresponding solutions for NGAP.

# 2 Discussion

### Mobile TRP involved positioning

After some offline discussions with companies that have concerns, there’re two issues to be discussed

* The format and presence of time stamp in mobile TRP location information
* NRRPa message(s) is to include the updated mobile TRP location information in case of network assisted positioning.

**Issue 1a, the presence of time stamp in mobile TRP location information**

Some companies think the time stamp is not needed for the case of network assisted positioning, but some companies think it’s useful, as UE positioning measurement may have an offset to the time of the mobile-TRP’s location/velocity measurement. It is suggested to use an optional presence for time stamp, and it’s up to gNB implementation to decide whether include it or not.

**Q1: do you agree that the time stamp in mobile TRP location information can be optional?**

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| --- | --- |
| **Company** | **Comment** |
| Xiaomi | Yes |
| ZTE | It may be beneficial to include the time stamp in the mobile TRP location information for the case of network assisted positioning. |
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**Issue 1b, the format of time stamp in mobile TRP location information**

Clarification: the intention to use UTC time format for the time stamp is to align LPP spec, which specifies the result of MO-LR. But one company has concerns on whether IAB-MT have the capability to provide UTC time, so they prefer to use SFN format time stamp.

After further checking, the moderator found that there’s no specifications saying that UE needs to have capability to provide UTC time, and UE can also get UTC time from the gNB via SIB9, there are many ways for UE (IAB-MT) or IAB-DU to get the UTC time, it may not be a problem to providing the UTC time.

However, to make it easier and more reliable, it is suggested to use SFN time format as it’s already specified in F1AP and NRPPa.

**Q1a: do you agree that the time stamp in the mobile TRP location information can use the SFN format (i.e. reuse the IE in F1AP and NRPPa)?**

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| **Company** | **Comment** |
| Xiaomi | Yes |
| ZTE | Yes |
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**Issue 2, which NRPPa message should be used to include the updated location information**

This issue is related to step 11 in SA2’s spec, according to the contributions, all the companies except one have the same understanding on which message to be used. One company thinks SA2 doesn’t make it clear which NRPPa message should be used.

It’s the moderator’s understanding, NRPPa is in RAN3 scope, SA2 are not familiar with the NRPPa messages, so they need RAN3’s guidance, RAN3 needs to decide which message to be used. After two meetings’ discussions, all the companies in RAN3 agrees that including the updated mobile TRP location information in Measurement Report and Response messages, there’s no technical concerns to object this.

**Q2: do you agree that the updated mobile TRP location information can be included in the following messages? If no, please provide technical issues.**

**NRPPa MEASUREMENT RESPONSE message**

**NRPPa MEASUREMENT REPORT message**

**F1AP POSITIONING MEASUREMENT RESPONSE message**

**F1AP POSITIONING MEASUREMENT REPORT message**

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| **Company** | **Comment** |
| Xiaomi | Yes |
| ZTE | Yes |
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### Additional ULI

For additional ULI, the following open issues are discussed in many contributions.

*RAN3 to discuss whether to include the TAI and the time stamp of the location information of IAB-MT’s serving cell into the new IAB-MT User Location Information IE.*

**Issue 1, whether to include TAI of IAB-MT’s serving cell as additional ULI of UE**

Only one company has concerns on TAI, as they think according to the SA2’s TR, TAI is not needed and SA2 didn’t make it clear whether they want TAI.

It is the moderator’s understanding, SA2 already specified in TS 23. 501 that the additional ULI can be used for e.g. mobility restriction, which including per TAI restrictions, this means that the TAI is needed. In addition, the SA2 clearly asked RAN3 in their LS that they want ULI of IAB-MT, instead of only NCGI.

**Issue 2, whether to have a separate Age of location for IAB-MT’s ULI.**

Considering there is already age of location in UE’s ULI, which indicates the UTC time when the information was generated, so there may be no need a separate Age of location for IAB-MT’s ULI.

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| >>Age of Location | O |  | Time Stamp  9.3.1.75 | Indicates the UTC time when the location information was generated. | - |  |

**Q3: do you agree that the NCGI and TAI of IAB-MT’s serving cell should be included in the new IAB-MT User Location Information IE into the existing User Location Information NGAP IE**

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| **Company** | **Comment** |
| Xiaomi | Yes |
| ZTE | Disagree.  We can look at the original motivation of introducing additional ULI, which is related to Key Issue#6 as captured in TR 23.700. The point of Key Issue#6 is that the serving cell ID/TAC of the UE may not always accurately reflect the location of the UE. As agreed in RAN3#119 meeting that the TAC/RANAC broadcast by the mobile IAB-DU can be changed in order to reflect the mIAB-node’s physical location. In this context, we believe there is no motivation to include TAI info as additional ULI together with UE ULI, even if the DU’s broadcast TAI is different from its serving cell.  In the reply LS from RAN3 R3-226048, RAN3 doubted the necessity of introducing additional ULI considering that RAN3 is discussing whether the TAC broadcast by the mobile IAB-cell should change with the IAB-node’s movement to reflect the IAB-node’s actual location.  In the latest reply LS from SA2 R3-230032, SA2 replied that additional ULI is needed for the support of services that rely on the cell ID to infer the UE locations. In our understanding, that implies that only cell ID is required to be included in the additional ULI. In other words, the addition of TAI as additional ULI is not validated in the latest SA2 reply LS.  Regarding the text in TS 23. 501 that the additional ULI can be used for e.g. mobility restriction, we think the SA2 spec may be not stable now and the meaning of “mobility restriction” is vague. It’s not clear how it works from our point of view. In our understanding, the NCGI of MT’s serving cell can be used for mobility restriction as well. The SA2 text doesn’t validate that TAI needs to be included as well.  As analyzed above, we suggest to send an LS to SA2 to ask whether TAI of MT’s serving cell needs to be included in the additional ULI considering that the TAC/RANAC broadcast by the mobile IAB-DU can be changed in order to reflect the mIAB-node’s physical location as agreed in RAN3. After receiving feedback from SA2, we can proceed to the signaling design and CR.  **Proposal: Send an LS to SA2 to ask whether TAI of mobile IAB-MT’s serving cell needs to be included in the additional ULI to be sent to UE’s AMF considering that the TAC/RANAC broadcast by the mobile IAB-DU can be changed in order to reflect the mIAB-node’s physical location as agreed in RAN3.** |
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### Wording issue

If there’s wording issues, please directly revise it in the draft folder with technical notes.

### LS

**Q4: Do you think we need LS to SA2?**

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| **Company** | **Comment** |
| Xiaomi | Yes, we could let SA2 know RAN3’s solutions if the CRs are agreed. |
| ZTE | Yes, as commented in Q3, we suggest to send an LS to SA2 to ask whether TAI of mobile IAB-MT’s serving cell needs to be included in the additional ULI to be sent to UE’s AMF considering that the TAC/RANAC broadcast by the mobile IAB-DU can be changed in order to reflect the mIAB-node’s physical location as agreed in RAN3. |
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# References

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| [R3-232978](file:///D:\\会议硬盘\\TSGR3_120\\Docs\\R3-232978.zip) | Discussion on SA2 related issues on mobile IAB (Xiaomi) | discussion |
| [R3-232833](file:///D:\\会议硬盘\\TSGR3_120\\Docs\\R3-232833.zip) | Discussion of SA2 FS\_VMR Solutions (Ericsson) | discussion |
| [R3-232765](file:///D:\\会议硬盘\\TSGR3_120\\Docs\\R3-232765.zip) | Discusssion on issues related to SA2 VMR (Qualcomm Inc.) | discussion |
| [R3-232927](file:///D:\\会议硬盘\\TSGR3_120\\Docs\\R3-232927.zip) | Discussion on positioning with mobile IAB (Nokia, Nokia Shanghai Bell) | discussion |
| [R3-233043](file:///D:\\会议硬盘\\TSGR3_120\\Docs\\R3-233043.zip) | Discussion on location information for mobile IAB (Lenovo) | discussion |
| [R3-233174](file:///D:\\会议硬盘\\TSGR3_120\\Docs\\R3-233174.zip) | Enhancements on positioning and additional ULI for mobile IAB (ZTE) | discussion |
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