**3GPP TSG-RAN WG2 Meeting #121bis-e R2-230xxxx**

**E-meeting, April 2023**

**Agenda item: 7.15.3**

**Source: Xiaomi**

**Title: Summary of** **[AT121bis-e][509][V2X/SL] The need of Assistance Information (Xiaomi)**

**Document for: Discussion and Decision**

# Introduction

This is the summary of the following offline discussion.

* [AT121bis-e][509][V2X/SL] The need of Assistance Information (Xiaomi)

 **Scope:** To check the need of Assistance Information (P1, 4020) or not (P3, 3587)

 **Intended outcome:** Discussion summary in R2-2304234.

**Deadline:** Comeback at 4/25 CB session

# Contact Information

|  |  |  |
| --- | --- | --- |
| Company | Name | Email Address |
| Xiaomi | Li Zhao | zhaoli6@xiaomi.com |
| LG | Giwon Park | giwon.park@lge.com |
| CATT | Jie Shi | Shijie@catt.cn |
| OPPO | Bingxue Leng | lengbingxue@oppo.com |
| Ericsson | Min Wang | Min.w.wang@ericsson.com |
| Intel | Rafia Malik | Rafia.malik@intel.com |
| Sharp | Chongming Zhang | Chongming.zhang@cn.sharp-world.com |
| Lenovo | Joachim Löhr | jlohr@lenovo.com |
| vivo | Jing Liang | liangjing@vivo.com |
| Nokia | Jakob Buthler | Jakob.buthler@nokia.com |
| Qualcomm | Qing Li | qinli@qti.qualcomm.com |
| InterDigital | Martino Freda | martino.freda@interdigital.com |
| NEC | Satoaki Hayashi | Satoaki-hayashi@nec.com |

# 3. Discussion

During RAN2#121 meeting, there was some discussion on the assistance information for COT sharing, due to limited time, companies cannot reach consensus, thus we agreed with the following FFS.

Agreement on SL LCP and COT

1: UE can select 1/ either to do a changed-LCP, in order to satisfy the COT requirement, and to do the type-2 LBT (How to do the LCP can be decided after RAN1 agreement) 2/ or to do a legacy-LCP, e.g. using type-1, type-2 LBT. FFS on the need of assistance INFO to initiating UE. FFS on spec impact, e.g., conditions for UE to choose either solution.

Some contributions on this issue are submitted to RAN2#121bis-e, proposal 1 in R2-2304020 proposes to adopt this assistance information for COT sharing based on the following observations.

|  |
| --- |
| Observation 1: In NR-U, rely on the NW to share COT to UE with satisfied CAPC. Observation 2: Enhanced LCP solution only works under some certain conditions, i.e., COT sharing information is available before packet generation, and/or there is data satisfying the COT requirement in the buffer. Observation 3: If the initiating UE shares COT randomly to the responding UE without any assistance information, it is quite possible that the responding UE is not able to rely on the enhanced LCP to satisfy the shared COT. Observation 4: The information collected via sensing is not enough for the initiating UE to determine which responding UE is a “satisfied” UE. Observation 5: With assistance information, future LBT operations for the responding UE can be reduced/avoided through effective COT sharing by the initiating UE.  |

While proposal 3 in R2-2303587 propose to not have the assistance information due to the following drawbacks.

|  |
| --- |
| -The cost of LBT type 1 or 2 and transmission of UE assistence info is higher than sharing the COT with LBT type 2 (e.g., negative system performance impact observed.)- Most spec impact. |

Thus, according to the scope of the email discussion/guidance from the session chair, we would like to check companies view on the need of the assistance information for COT sharing via a single question without touching other details, e.g., detailed content/format and/or triggers.

**Question: Do you want to support the assistance information for COT sharing to assit the initiating UE to share COT to the “satisfied” responding UE?**

**Option 1: Yes;**

**Option 2: No;**

**Option 3: Wait for more conclusion from RAN1;**

**Option 4: Others;**

|  |  |  |
| --- | --- | --- |
| Company | Option | Comments |
| Xiaomi | Option 1 or 3 | As we observed in our contribution, we think it is necessary to introduce this kind of assistance information to improve the efficiency of COT sharing. But we also see some companies pointed that there was some discussion on additional ID/other aspects in RAN1 that may have further impact on the assistance information and think it is not so mature for RAN2 to discuss this. We also see the point from these companies and can accept to wait for more guidance from RAN1.  |
| LG | Option 1 | It is obvious that assistance Information (e.g., SL-CAPC value of LCH data, QoS information and etc) can help COT Initiating UE generates the shared COT. |
| CATT | Option 2 or 3 | For SL GC/BC, the assistance information cannot work well, e.g., for responding UE, how to select the L2 ID used for transmitting the assistance information. For initiating UE, it may receive much assistance information, which one should be taken into account is unclear.For SL UC, the assistance information can work. But the gain is not benefit the specification effort, e.g., when to trigger the assistance information transmission, what should be contained in the assistance information and etc.Hence, we slightly prefer to not introduce it. Since it is related to RAN1, we are also OK to left it to RAN1 decision. |
| OPPO | Option 2 with comments | We doubt the benefit of this assistance information since there maybe a long gap between assistance information transmission and COT sharing, the data status has been changed, and it is also too complex to have this assistance information mechanism especially considering there are CA/FR2… works. |
| Ericsson | Option 1 | Agree with xiaomi and LG, we see the need for the assistance information. Further RAN1 discussions would only affect the content of the assistance information. |
| Apple | Option 3 | We think it is related to RAN1 design on how to genetate COT sharing info (i.e. the destination IDs included in COT info). So, it is better to leave it to RAN1. |
| Intel | Option 3 | We believe this has some direct relevance to RAN1 discussion on whether additional IDs will be introduced in the COT container, e.g., assistance information related to how the COT initiator UE derives additional IDs and selects the COT responding UE. Therefore, it will be prudent to wait for further input from RAN1 particularly related to the COT container and the information included within before RAN2 can decide on this aspect. |
| Sharp | Option 3 | It is preferred to wait for input from RAN1. |
| Huawei, HiSilicon | Option3 | It is OK to postpone the discussion because RAN1 is discussing the COT sharing based on sensing SCI of the other UEs. In this way, the initiating UE knows how to share the COT and which UE to share the COT. It would be non-ideal if we introduce duplicated functionality as RAN1. Also there are other pending issues, e.g., when to trigger the assistance information. Also, the assistance information itself needs LBT for transmission. If the UE has already obtained the COT, not sure if it is still as beneficial that it uses the COT shared by the other UEs. |
| ZTE | Option 1 | If a COT initiating UE does not know the traffic pattern or buffer size status of candidate COT responding UEs, it can only select COT responding UE randomly. If the selected COT responding UE has no available data which meet COT requirement during the shared COT duration, this COT will be wasted. So the COT assistance information is helpful to avoid COT wasting. Regarding comments from OPPO, we think the assistance information can indicate the estimated traffic data arrival characteristic of sidelink logical channel(s) just like UEassistantinformation does, so the gap between assistance information transmission and COT sharing is enough.In a word, COT assistance information is helpful in case COT requirement exist. Further RAN1 discussions would only affect the content of the assistance information. |
| Lenovo | Option 2 or 3  | From our point of view there are several question marks regarding the usefulness of such a new assistance information reporting mechanism. Since a SL UE is not aware of when another SL UE acquires a COT and intends to share the acquired COT with other UE(s), it is questionable what sensible triggers for the reporting of such assistance info could be specified. In general, we assume that the amount of reporting should be controlled respectively limited by some timers or specified trigger conditions similar to the BSR reporting. There is also the issue with GC/BC, where we don’t see how it would work well. We currently see only the scenario where a COT initiating UE explicitly requests some assistance information from a potential responding UE, e.g. similar to the CSI request functionality, in order to decide the destination of the COT sharing indication. Otherwise for simplicity, using PC5-RRC assistance information to indicate a semi-static assistance information e.g. destination of responding UE is enough.  |
| vivo | Option 1 or 3 | We think the benefit of this assistance information is clear, helping to increase the possibility that the responding UE can well utilize the shared COT. Although the buffer status of responding UE may vary with the time, the needed CAPC is relatively steady, thus we do not observe frequent need of assistance information update.If the majority can agree on the need of assistance information, we might need to send LS to RAN1 for our preference and ask RAN1 to further discuss COT sharing considering it. |
| Nokia | Option 1 or 3 | We believe that the assistance information can be useful in a carious set of ways, but can be OK to wait for RAN1 to not work on the same questions in parallel.However, some data has already been discussed in RAN2 to be relevant i.e. CAPC value, and it may be an advantage to send an LS to RAN1 including the parameters RAN2 could see the benefit of, and also inform them that we find it as a RAN1 decision. |
| Qualcomm | 2 | **We observed system performance degradation with UE’s assistance information**. **The reason is very obvious:**1. For a Single Responding UE candidate:

**the COST**: ([An Type 1 or 2 LBT + an Assistance Info] from UE2 to UE1) **is larger than** **the GAIN** : (a possible Type 2 LBT for UE2’s transmission)1. For *N* Responding UE candidates:

**the COST**: (N \* [An Type 1 or 2 LBT + an Assistance Info] from *N* UEs2 to UE1) **is even much larger than** **the GAIN**: (less than *N*  possible Type 2 LBT for less than *N* UEs2’ transmissions).**Therefore, we don’t support a solution with**1. **negative impact to the system performance, and**
2. **extra work for specification.**
 |
| InterDigital | Option 2 or 3. | We think there are significant challenges with using assistance information, such as how this would work for groupcast/broadcast, or how to ensure the COT initiator gets accurate BSR information, given that the receiving UE needs to acquire the channel to send it. Also, although RAN1 is discussing inclusion of additional destinations, this list of destination can be acquired in other ways (upper layers, PC5-RRC, etc). However, if majority prefers waiting for RAN1 discussion, we are also fine. |
| NEC | Option 2 | How the COT responding UE knows whether the COT iniating UE is going to share a COT in advance? Without the knowledge of that, efforts of transmiiting the assistance information would be wasteful.  |

# Conclusion