RAN102_R19_R2_WI_NR_Mob_Ph4 - Version 0.0.3

RAN1

https://nwm-trial.etsi.org/#/documents/8749

3GPP TSG-RAN Meeting #102

Edinburgh, UK, 11-15 December 2023

Agenda Item: 9.1.2.1

Source: Intel (moderator)

Title: Comment collection for Rel-19 new WI NR mobility enhancements Phase 4

Document for: Discussion and decision

1 Introduction

This NWM discussion is related to the following documents:

- RP-233103 Moderator's summary on new WI NR mobility enhancements Phase 4
- RP-233104 New WID: NR mobility enhancements Phase 4

These documents were provided prior to the start of RAN#102 and companies may provide, on a voluntary bass, their comments on these documents prior to the of the online session scheduled for the morning of Wednesday 13th December. The aim is that prior collection of comments may help the efficiency of the online discussion.

2 Inter-CU-LTM

Companies may provide comments to the proposed conclusion in RP-233103:

- "**Conclusion**: Clear majority in favour of supporting the CU acting as SN and this has been reflected in the initial version of the WID. Note in the WID it is captured as a second priority as the text from [1] already states that the MN non DC cases is prioritised."

Feedback Form 1: Inter-CU LTM: comments to conclusion

1 – VODAFONE Group Plc

we think that current prioritization is good and provide the right focus, Obviously if there is also a big support to consider CU as a CN, it needs to be taken into account, saying that, we still prefer to keep the

current prioritization in the WID.

2 – Samsung Electronics Co.

We also think that the case of CU acting as SN can be considered as a second priority. It should be noted that LTM of SN in NR-DC in intra-CU case is already supported in Rel-18, and this covers most of the deployment scenarios. To extend the case to inter-CU would result too much workload especially in RAN3 while the gain would be marginal, so we prefer to proceed it as a second priority.

3 – Sony Europe B.V.

We also think that CU acting as SN could be second priority.

4 – vivo Mobile Communication Co.

We actually think there is no need to mention such kind of priority in the WID, and it could be up to RAN WG to discuss/decide, e.g. there may be some common design for MN and SN.

But if majority companies think SN should be second priority, we can also accept it.

5 – Nokia Corporation

Some prioritization is needed definetely. Although we would like DC cases to be included we understnnd the need to not include everything in the WI. Thus we can live with the proposal

6 – CTSI

[China Telecom]: We support the CU acting as SN scenarios and suggest making the scenario clear in the WID instead of leaving to working group discussion. From network operator's perspective, we think the most possible scenario for inter-CU SN LTM in NR-DC case is to support SCG LTM with MCG unchanged. And with the clear scenario, there is no need to have such kind of priority in the WID.

7 – Spreadtrum Communications

We also agree to take the case of CU acting as SN as a second priority in the WI.

8 – Guangdong OPPO Mobile Telecom.

We also think the CU acting as SN case can be considered as second priority.

9 – LG Electronics France

We do not think prioritizing inter-CU MCG LTM is really needed given that beam based mobility (LTM) is promising for SCG deployed for throughput boosting in high frquency ranges.

10 – CATT

Ok with considering CU acting as SN as secondary priority, but when to start this work should be decided in RAN plenary later after sufficient progress of MN non-DC case.

11 – NTT DOCOMO INC.. we think CU acting as SN should be same priority as CU acting MN. From real deployment point of view, FR2 band is usually delpyed as SCG, and LTM especially has performance gain for higher frequency band(e.g. FR2). So CU acting SN is important to be included as the same priority.
12 – Lenovo (Beijing) Ltd We support to have Inter-CU SCG LTM. But we need to make 'second priority' clear. We wonder if Inter-CU SCG LTM is started after completing Inter-CU MCG LTM?
13 – Xiaomi Communications We are fine to prioritize inter-CU MCG LTM, but are also fine to follow the majority view if inter-CU SCG LTM is included.
14 – Ericsson LM We are OK with this prioritisation and there should be room at least for SN change when MN is not changed.
15 – NEC Corporation We are fine with the current approach, as some prioritization would be necessary considering the expected workload from listed potential objectives.
16 – InterDigital Support moderator's proposal. It makes sense to work on MCG LTM as a priority. We should also aim to support NR-DC cases MN change with SN unchanged, SN change with MN unchanged, and can address this later in the WI when the MCG only case is stable, similar to R18.
17 – Futurewei We support the CU acting as SN scenarios.
18 – SHARP Corporation We are also fine with that the case of CU acting as SN could be second priority. And we think inter-CU MN LTM with NR-DC configured case should be same priority as the case of CU acting as SN and these cases can be specified after the completion of the MN non-DC case.

Companies may provide comments on the discussion point in RP-233103:

- "**To discuss**: Some companies provided views on further cases to be supported or excluded, for example "LTM for MCG when an SCG is configured", "Do not support LTM in both MN and SN". Whether to capture such cases should be discussed – and if conclusion cannot be made in RAN then it will need to be resolved as part of the WG discussions."

Feedback Form 2: Inter-CU LTM: comments to discussion point

1 – VODAFONE Group Plc

As more precise written WI as less time, we will spend in the WG. I think it makes sense to list the scenarios which are covered by the WI

2 – vivo Mobile Communication Co.

We prefer to leave this to WG(s), as it is also related to the detailed solution(s).

3 – Nokia Corporation

We are fine to leave

LTM configured in both SN and MN

4 – CTSI

[China Telecom]: As commented before, we think the most possible scenario for inter-CU SN LTM in NR-DC case is to support SCG LTM with MCG unchanged. We are fine to make the scenario clear in the WID.

5 – Guangdong OPPO Mobile Telecom.

We are ok to leave it as part of WG discussion.

6 – Spreadtrum Communications

We are fine to leave the discussion of the supported scenarios to WG, especially for "LTM in both MN and SN".

7 – CATT

"LTM for MCG when an SCG is configured" can also be considered as second priority, and we also agree to "Do not support LTM in both MN and SN".

8 – NTT DOCOMO INC..

we are fine to support LTM in both MN and SN

9 – Lenovo (Beijing) Ltd

In Rel-18 LTM, both MCG LTM and SCG LTM can be configured to UE at the same time. It is too early to exclude it. Whether both LTM can be configured is left for WG discussion.

10 – Xiaomi Communications

The case where LTM is configured in both MN and SN should not be excluded.

We are fine to leave this to WG discussion.

11 – Ericsson LM

We'd support inter-MN LTM at least with keeping or releasing SCG. Can be discussed further in meeting groups as well.

12 – LG Electronics France

We support including the scenario of configuring both intra/inter-CU MCG LTM and intra/inter-CU SCG LTM to a UE. Further restriction can be discussed in WG discussion.

13 – MediaTek Inc.

We prefer to suuport same scenario as intra-CU LTM case. Below 4 cases are supported in intra-CU.

<1> Inter-CU MCG LTM without SCG configuration

<2> Inter-CU SCG LTM without MN invovlement

<3> Inter-CU MCG LTM without SCG release

<4> Inter-CU MCG LTM with SCG kept

We tend to think inter-CU MCG LTM should not configured together with inter-CU SCG LTM. However, this could be left to WG decision

14 – InterDigital

The same scenarios as R18 should be supported, additional cases do not have enough support at the moment.

15 – Futurewei

We support MN initiated LTM for MN to SN and SN to SN switch when SCG(s) are configured.

16 – SHARP Corporation

If DC configured scenarios are supported, the same scenarios as Rel-18 intra-CU LTM can be baseline and it can be leave to WG how these scenarios can impact on the intra-CU procedures.

Companies may provide comments to the WID objective wording on Inter-CU-LTM proposed in RP-233104

Feedback Form 3: Inter-CU LTM: comments to WID objective wording

1 – CATT

"subsequent LTM mobility procedures without need for RRC configuration between procedures" should be discussed in inter-CU LTM first, since it's also an important feature for R18 intra-CU LTM. And in inter-CU case, the security key handling is the most important issue to address, which needs to get SA3 involved.

2 – MediaTek Inc. ”Coordination with SA3 needed with respect to security key handling” is needed for inter-CU case
3 – Futurewei RAN1 could be also involved in “Specify configuration of inter-CU candidate cells, L1 measurements, DL/UL early synchronization and timing advance handling, handover execution [RAN2]”.

3 Measurements related enhancements for purpose of supporting LTM

Companies may provide comments to the proposed conclusion in RP-233103:

- “**Conclusion**: No clear preference for how to handle this possible overlap. From the inputs the moderator proposes that the following would be a reasonable approach, “RAN1 and RAN2 to progress independently on the event triggered measurements objectives of respective MIMO and Mobility enhancement WIs. Review progress at RAN#104 to see if any modification of objectives is required to avoid/manage any overlap in the work.”. This proposal is captured in the initial version of the WID.”

Feedback Form 4: Measurements: comments to conclusion

1 – Samsung Electronics Co. We support the proposal from the moderator: from our understanding, MIMO will discuss the future-proof and generic solution of the L1 event triggered measurement report, while Mobility will focus on the mobility aspects which involves the cell change, so each WI can have separate objectives.
2 – vivo Mobile Communication Co. We are fine with the proposal from Moderator. Our understanding is MIMO should focus on the case for ICBM, while Mobility should focus on on the case of cell change.
3 – Sony Europe B.V. agree with moderator proposal
4 – Transsion Holdings we are fine with the proposal from the moderator.
5 – CTSI [China Telecom]: We are fine with moderator’s proposal. If there are similar objectives related to mobility aspects across these two WIs, we think the more effective way is to put the objective related to mobility aspects in Mobility WI.

6 – Guangdong OPPO Mobile Telecom.

We are fine with the proposal.

7 – Spreadtrum Communications

We support moderator's proposal.

8 – VODAFONE Group Plc

On L1 event triggered measurement report: I have not found that much information on that, but could someone highlight for which use case is it beneficial? In my understanding the main advantage would be that UE could measure beams based and report only if even threshold is reached and if this is correct, then this is rather FR2 related functionality.

9 – CATT

We generally agree with moderator, and in our view L1 measurement event can be discussed firstly in MIMO, and then R19 MIMO progress can be checked at RAN#104 to see if the design of L1 measurement event developed in R19 MIMO could be the baseline for R19 mobility. The reason is that L1 measurement event may be used for both triggering cell switch and signaling overhead reduction, but the baseline solution could be the same for both R19 MIMO and R19 mobility.

10 – Lenovo (Beijing) Ltd

We are fine with the current proposal. Rel-19 LTM only focuses on mobility case. However, MIMO will discussion it for general case not limited to cell switching case. It is resonable to review the progress from two topics in RAN#104.

11 – Xiaomi Communications

We are fine with the moderator's proposal

12 – NTT DOCOMO INC..

We support the moderator's proposal.

13 – Ericsson LM

We are OK with the proposal but should we not add RAN1 as well to impacted WGs? At least some discussions and coordination with RAN2 is expected (also RAN1 is already referred to in the objective text).

14 – LG Electronics France

We support moderator proposal, thanks.

15 – NEC Corporation The conclusion from moderator looks good to us. Our assumption is during this study, RAN1/2 can focus on mobility, while MIMO work will consider more generic but without mobility.
16 – MediaTek Inc. OK with this direcion. But should we check at RAN#105 ? Note that R2 only start mobility in Q2 and it is not clear whether we can have clear view based on 1Q progress.
17 – InterDigital Support moderator's proposal
18 – Futurewei We are fine with the moderator's proposal.
19 – SHARP Corporation We also support Moderator's proposal

Companies may provide comments on the discussion point in RP-233103

- "**To discuss:** One company proposed to already agree that the event triggered L1 measurement reporting for triggering LTM will be captured in RAN2 specifications. If agreeable then this would be useful to capture but it may also be too early to conclude."

Feedback Form 5: Measurements: comments to discussion point

1 – CATT The solutions need to be further discussed in working groups first, and we agree it's too early to conclude.
2 – Ericsson LM We would support this way forward
3 – MediaTek Inc. Support (Proponent). We understand the L1 event will be similar from L3 event (or simplfied version of L3 event). It make sense to have both these event define in one SPEC.
4 – InterDigital Support this way forward

5 – Futurewei

We agree that event triggered L1 measurement report can be a sub-objective.

Companies may provide comments on the Other enhancements related to L1 measurements for LTM as listed in RP-233103, noting the moderator's view that non of these proposals current have sufficient company interest to justify potential inclusion in the WID.

Feedback Form 6: Measurements: comments to other measurements proposals

1 – Nokia Corporation

in R18 RAN4 discussed inclusion of L3 measurement results in L1 report - This is quite widely agreeable in RAN4 but due to lack of time it was not progressed in RAN4. It would seem bit pity as lots of work on that has already been done in RAN4. All that would be lost if we don't continue it in release 19.

2 – CATT

In our opinion, the following two issues could be further considered in Rel-19, since there was not enough time for discussion in Rel-18 and it attracted some common interests:

Issue-1: Filtering for L1 measurements results considering the ping-pong effect

Issue-2: MAC-CE to activate a set of measurement RSs for LTM measurement report

3 – Xiaomi Communications

We think that L1-SINR measurement quantity for L1 measurement reporting can be considered. For LTM, the interference of candidate cell should be considered. Only L1-RSRP is not enough.

4 – MediaTek Inc.

We don't see strong motivation to include more

5 – InterDigital

It seems natural to include activation of measurement RSs e.g. with MAC CE. In particular if we have event triggered report on SSB measurements, and introduce CSI-RS measurement, then activation of the CSI-RS measurement seems necessary.

Companies may provide comments to the WID objective wording on Measurements related enhancements for purpose of supporting LTM proposed in RP-233104.

Feedback Form 7: Measurements: comments to WID objective wording

1 – Lenovo (Beijing) Ltd It is better to clarify this bullet for measurment is applied to Intra-CU MCG/SCG LTM and Inter-CU MCG/SCG LTM.
2 – Ericsson LM Should add RAN1 to impacted groups (?)
3 – MediaTek Inc. Should be R1-led objective – [RAN1, RAN2]

4 Conditional mobility with short mobility interruption time

Companies may provide comments too the proposed conclusion in RP-233103:

- "**Conclusion**: A significant number of companies are supportive to specify conditional mobility with short mobility interruption time based on LTM. This is interpreted as both the UE evaluated mobility conditions and the ability for UE to perform subsequent mobility procedures without need for RRC configuration (as captured in the text from RAN#101). This has been captured in the initial version of the WID. As there are also a good number of companies supportive of Early TA/RACHless for subsequent CHO/CPAC then this proposed conclusion should be confirmed during the meeting.."

Feedback Form 8: Conditional mobility with short mobility interruption time: comments to conclusion

1 – Samsung Electronics Co. We support to discuss the conditional LTM (i.e. the UE evaluated mobility conditions) under this objective to cope with e.g., the characteristics of high frequency. This can also work together with RACH-less by using e.g., UE-based TA.
2 – Nokia Corporation It would be real shame if RAN does not continue evolution of L3 based mobility at all in mobility enhancements WI. Thus we would see it important to do simple L3 mobility optimizations in the line of RACHless/early TA type of solutions. Thus we would even prioritize RACH-less/early TA based solutions over conditional mobility and focus for improving LTM with inter-CU part and various other solutions in other objectives of the WI (e.g. inclusion of CSI-RS based LTM)

3 – Sony Europe B.V.

We think both L3 and LTM conditional HO without RRC configuration should be included in the scope

4 – vivo Mobile Communication Co.

We think the current WID objective from Moderator is enough, considering LTM should be the basic approach for cell switch in future.

Regarding CHO enh., e.g. RACH-less/Early TA, we can also accept it if there is strong requirements from operators.

5 – Transsion Holdings

we think L3 based mobility enh should be included in this WID, about how to achieve this we think both early TA/RACHless and subsequent CHO/CPAC can be ok.

6 – CTSI

[China Telecom]: From operator's point of view, we support to specify L3 based mobility enhancement in R19 with the support of Early TA or RACHless in CHO/CPAC, which is proposed by many companies in their papers. By introducing early TA management into CHO/CPAC, the data interruption time can be further reduced, reaching a better handover performance. And the early TA management for LTM in R18 could be a baseline, so the specification work to support early TA management for CHO is not too complex.

7 – Spreadtrum Communications

We support to specify conditional LTM first in the WI.

Regarding Early TA/RACHless for subsequent CHO/CPAC, we accept to include it if most companies agree.

8 – Guangdong OPPO Mobile Telecom.

We agree with the current WID objective for conditional mobility, i.e. LTM is considered as the baseline. And for CHO enhancement, we are fine to introduce early TA solution.

While for subequent CHO, we think it is related to the security update mechanism that we will study in Rel-19, we prefer to consider it as low priority in the WID.

9 – CATT

As a follow-up feature, conditional LTM should be based on R18 intra-CU LTM, so intra-CU conditional LTM should be prioritized. Regarding inter-CU case, conditional inter-CU LTM should be considered after sufficient progress of inter-CU LTM objective.

10 – NTT DOCOMO INC..

we support UL early sync for CHO

11 – NTT DOCOMO INC..

we support UL early sync for CHO

12 – Lenovo (Beijing) Ltd

We support condition based LTM which is related to both MCG and SCG LTM. in addition, we are also fine that early TA and UE measured TA can be applied to CHO/CPAC.

13 – Xiaomi Communications

We think that both L3 condition mobility and LTM without need for RRC configuration between procedure should be included. For L3 conditional mobility, both RACH-less and RACH based subsequent CHO/C-PAC can be considered.

14 – Ericsson LM

We have preference for conditional LTM, but actually we would be fine to drop the whole objective and instead spend the time on the other objectives (whose scope can be considered then accordingly). This objective will for sure take a lot of time both in discussions and actual spec work.

15 – LG Electronics France

We support conditional LTM (CLTM). For CLTM, we think the support for RACH-based CLTM and RACH-less CLTM can be both in scope.

Whether to support inter-CU CLTM or only to support intra-CU CLTM can be discussed in WG.

16 – NEC Corporation

We support additional conditional mobility enhancement in general. We understand conditional LTM seems major support and thus can be included. For subsequent CHO, we also proposed in the past. In the offline session in the last RANP, many companies suggested focusing on one of two directions (i.e. LTM or CHO) for further enhancements and LTM got more supports to our feeling. However, if time allows, we still support to work on the subsequent CHO in Rel-19.

17 – MediaTek Inc.

If we want to include only one topic, we prioritize conditional LTM over CHO enhancement

If we want to support RACH-less for conditional mobility. The RACH-less design should apply both to C-LTM and CHO.

18 – InterDigital

It makes sense to evolve LTM to support conditional trigger, since LTM supports candidate configuration, reconfiguration execution, early TA acquisition and RACH-less. For us the main question is which measurements and trigger are used, and this is a technical discussion that needs to happen in WGs - e.g. one option would be to include L3 based measurement events (as currently used for CHO) in LTM configuration as the conditional trigger, and another other option would be to use the (new) L1 based events to trigger LTM.

19 – Futurewei

We share similar view with Samsung. Comparing legacy conditional mobility with R18 LTM, both have early RRC configuration and cell switch is triggered later (by the network or UE). The enhancement can be started from legacy CHO/CPAC with early DL/UL sync including RACH-less by using, e.g. UE based TA.

20 – SHARP Corporation

We support to specify Conditional LTM (i.e. conditional mobility with short mobility interruption time based on LTM) in Rel-19 and we think RACH-based scenario for this should be prioritized.

For RACH-less/Early TA for CHO enhancements, we think it should be low priority, but if many companies support CHO enhancements we would be fine to spend this objective as study phase to evaluate the gain for the short interruption time of CHO enhancements.

Companies may provide comments to the WID objective wording on Conditional mobility with short mobility interruption time proposed in RP-233104.

Feedback Form 9: Conditional mobility with short mobility interruption time: comments to WID objective wording

1 – Nokia Corporation

I guess name of this section is wrong - comments should be for ”conditional mobility objective”?

2 – Intel Corporation (UK) Ltd

Moderator comment: Name now fixed

3 – CATT

Same comments as for feedback form 8

4 – MediaTek Inc.

We don’t need ”Specify support subsequent LTM mobility procedures without need for RRC configuration between procedures”. Subsequent LTM is already supported.

We don’t need ”Coordination with SA3 needed with respect to security key handling” if the conditional LTM is limited to R18 intra-CU case.

5 – Futurewei

RACHless/Early TA, e.g., UE based TA, can be used to also enhance conditional mobility.

5 Others (e.g. RAN4)

Companies may provide comments on the RAN4 related objectives as listed in RP-233103, noting the moderator's view that non of these proposals current have sufficient company interest to justify potential inclusion in the WID.

Feedback Form 10: Others: Comments to RAN4 related proposals

1 – vivo Mobile Communication Co. I assume many companies think these aspects would be discussed in RAN4 RRM package. We think it is better to clarify which part should be discussed/decided there. Or at least we need to leave the door open for any discussion on LTM specific RRM enhancement, if anything is not considered in RAN4 RRM package.
2 – CATT Specific RRM enhancements for LTM related enhancements are needed, but the detail can be further discussed after other objectives are stable.
3 – Xiaomi Communications We think that inter-frequency L1 measurement of LTM candidate cells based on enhanced gap configuration (e.g. NCSG, con-current gap, no gap) can be included, if it is not captured in RAN4 RRM enhancement WID.
4 – MediaTek Inc. We are fine to postpone R4 objectives for now.

Companies may provide comments on the Other proposals as listed in RP-233103, noting the moderator's view that non of these proposals current have sufficient company interest to justify potential inclusion in the WID.

Feedback Form 11: Others: Comments to the other proposals (non RAN4 related)

6 WID Text other than objectives

Companies may provide comments to non objective parts of the WID in RP-233104:

https://nwm-trial.etsi.org/#/documents/8749

Feedback Form 12: WID: detail comments to the non objective parts