[94e-16-R18-SLRelayEnh] Rel-18 sidelink enhancements - Version 0.0.7
RAN

3GPP TSG RAN#94e **RP-213545**

Electronic Meeting, December 6 - 17, 2021

Agenda Item: 8.6.2

Source: LG Electronics

Title: Moderator's summary for discussion [94e-16-R18-SLRelayEnh]

Document for: Report

1 Initial round

This email discussion is to discuss WID on the sidelink relay enhancements. A draft based on October email discussion was submitted in RP□212712 and updated objective details are provided in RP-213469 which are now incorporated in the draft WID revision v000 in the draft folder.

According to RP-213469, around 1.5 TUs are being considered for this WI. It is the moderator's opinion that the objectives in the draft WID revision v000 are already enough for this TU allocation, thus he thinks that it is not practical to simply add or update the objectives leading to more works. So it is suggested that companies proposing such addition or update come up with a solution that can address the work load concern.

The moderator found the following contributions include discussion related to the sidelink relay enhancements:

RP□212925, RP□213087, RP□213123, RP□213224, RP□213290, RP□213331, RP□213372, RP□213383, RP□213399, RP□213202, RP□213272, RP□213231, RP-213450

1.1 Objective on UE-to-UE relay

This section is to discuss the objective on UE-to-UE relay contained in the draft WID revision v000:

1. Specify mechanisms to support single-hop Layer-2 and Layer-3 UE-to-UE relay (i.e., source UE -> relay UE -> destination UE) for unicast [RAN2, RAN3, RAN4].

a) Common part for Layer-2 and Layer-3 relay to be prioritized until RAN#98

   i) Relay discovery and (re)selection [RAN2, RAN4]

   ii) Necessary signalling support for Relay and remote UE authorization [RAN3]

b) Layer-2 relay specific part

i) UE-to-UE relay adaptation layer design [RAN2]
ii) Control plane procedures [RAN2]

Note 1A: This work should take into account the forward compatibility for supporting more than one hop in a later release.

Note 1B: A remote UE is connected to only a single relay UE at a given time.

Feedback Form 1: Company input on UE-to-UE relay

1 – FirstNet In our view N number of hops should be supported for UE-to-UE relay with N greater than 1. This is very critical in support of public safety and first responder needs. Our preference is not to delay this to a future release.
2 – HuaWei Technologies Co. We support moderator's update on considering unicast only for U2U for this release.
3 – vivo Mobile Communication Co. OK with the objective on UE-to-UE relay.
4 – SyncTechno Inc. Multi-hop UE-to-UE relay is an important feature which is highly requested by public safety and maritime domains. Therefore, we think multi-hop UE-to-UE relay should be included as part of this objective.
5 – Kyocera Corporation We agree with FirstNet that the support for N number of hops is important to be covered in Rel-18. [MF1]Good.
6 – Apple Europe Limited 1. We share the same view as FirstNet and SyncTechno. The multi-hop scenario is crucial for public safety use cases. So, if possible, multi-hop U2U relay needs to be included in Rel-18, e.g., as a secondary priority. 2. We think the SL groupcast using U2U relay UE is needed to support some relay use case (e.g., vehicle platooning). Also, as explained in the Pre-94 email discussion, SL groupcast support does not introduce additional work for relay (re)selection. Thus, we suggest to add "groupcast" along with "unicast" in this objective.
7 – ZTE Corporation We are fine with the objective on UE-to-UE relay.
8 – Spreadtrum Communications We think U2U relay for groupcast can be included withe secondary priority considering the public safety requirements.

9 – China Telecomunication Corp.

The current objective proposed by the moderator looks fine to us.

10 – CATT

Basically ok with the current objective on U2U relay. One comment to 'Layer-2 relay specific part' is that we think user plane impacts should also be taken into account, e.g., in our understanding at least resource allocation should be further discussed for U2U relay.

11 – NEC Corporation

We support this objective.

12 – BDBOS

The support for multiple hops (greater than one) is an essential functionality not only for daily operations of police, fire fighters, etc., but even more at natural catastrophic sites. The connectivity must be guaranteed everywhere and anytime. Using multiple hops not only extends the connectivity, but also the lifeline of every public servant.

13 – SHARP Corporation

We are fine with the moderator's objective.

14 – Lenovo Mobile Com. Technology

We also think that multi-hop is crucial for PS domain and agree with many other companies including Firstnet to get it included in the scope of R18. We think, the actual 3GPP work will not increase and we may even save some time not discussing what is not to be included since multi-hop is not supported! Besides, if future proofing needs to be supported anyways, the work e.g., for adaptation layer needs to happen in R18.

On the Note 1B (A remote UE is connected to only a single relay UE at a given time), we sincerely hope that this restriction is per destination UE only. It is not acceptable if a remote UE can only reach destinations UEs that are only available via the "same" U2U relay. Note needs to be clarified to say something like "A remote transmitter UE is connected to only a single relay UE at a given time to reach a particular destination UE".

15 – LG Electronics Inc.

We are fine with the update objective. UE-to-Network relay in Rel-17 is being defined for unicast, and thus relay for groupcast is a quite new feature which requires substantial work. Limiting the objective to unicast is desirable from the work load perspective.

16 – Samsung R&D Institute UK

We are fine with the proposed objective by the moderator.

17 – MediaTek Inc.

We agree with others that there is value in multi-hop, and the impact to support it is not so great (the relay UE needs to be capable of recognising traffic for itself and delivering it to upper layers, and otherwise passing it onward towards the destination remote UE).

Lenovo's suggested clarification on the "single relay UE" restriction seems correct; we understand this was always the intention.

We don't understand why the common part is indicated as "prioritized until RAN#98". What is the reasoning here?

18 – Ericsson LM

We support the proposed objective by the moderator.

19 – Beijing Xiaomi Mobile Software

support current objectives

20 – Qualcomm Incorporated

The objectives are fine, except 1.a).ii), which is a topic that have no clear system level requirements. For example, the following are not clear: based on what to perform such authorization, is there any assumption on the subscription model, and whether there is need for network to differentiate UE-to-UE relay operation against normal sidelink operation, etc. All these are prerequisite to work on this objective, but are not in RAN's scope. Therefore, it is proposed to remove it for now, and it can be added if SA2 concluded it is needed before the RAN work starts.

21 – InterDigital France R&D

We think the layer-2 relay specific part needs to be generalized to consider not only adaptation layer, but impact on other layers (e.g. MAC layer) associated with splitting the QoS (e.g. PDB) over the two links. We suggest the bullet on "UE to UE adaptation layer design" is changed to "adaptation layer design and other UP enhancements"

22 – Netherlands Police

Multi-hop UE to UE relay is required in release 18 for Mission Critical communications.

23 – AT&T

AT&T: We agree with and share the views of both FirstNet and SyncTechno as indicated above. Multi-hop development should definitely be included in Rel-18.

24 – BMWi

The multi-hop UE-to-UE relay is essential for Mission Critical communications and needs to be addressed in Rel-18.

25 – ROBERT BOSCH GmbH

We suggest to remove Note 1B "A remote UE is connected to only a single relay UE at a given time". At least non-overlapping frequency can be supported.

26 – MINISTERE DE L'INTERIEUR

Multi-hop UE-to-UE relay shoul be included in Rel.18 and not be delayed any longer. This is very critical in support of public safety and first responder needs.

27 – A.S.T.R.I.D. SA/NV Multi-hop UE-to-UE relay should be included in Rel.18 and not be delayed any longer. This is a very important functionality for public safety and first responder (PPDR) needs.
28 – Erillisverkot Multi-hop UE-to-UE relay should be included in Rel. 18, not later. This is important for public safety.
29 – MINISTERE DE L'INTERIEUR French Ministry of Interior strongly support Multiple Hop Ue-to-Ue relay functionality in release 18.
30 – Intel Korea We are fine in general with the wording of objective 1. We support including both L2 and L3 U2U relay while limiting the scope to unicast. We don't think it is necessary to separate the common parts out, however, we are fine to follow the same method used for U2N relaying.
31 – Philips International B.V. We do not understand why QoS handling has been removed for L2. QoS is fully in scope of L2 Relays. In fact QoS is a an AI in every RAN2 meeting in Rel-17 for Relays. In addition, we agree with other companies that multi-hop is an essential feature for public safety, and should not be postponed again.
32 – HOME OFFICE This objective multi-hop UE relay addresses a very important for public safety users' needs. We support this item is addressed with urgency in Rel-18.
33 – Nkom We support the opinion of other companies that multi-hop UE-to-UE relay should be addressed with urgency in Rel-18. There are many scenarioes where multi-hop will greatly address the needs of first reponders.
34 – TNO **KPN** We do not understand why QoS handling has been removed for L2. QoS is fully in scope of L2 Relays. In fact QoS is a an AI in every RAN2 meeting in Rel-17 for Relays. In addition, we agree with other companies that multi-hop is an essential feature for public safety, and should not be postponed again.

1.2 Objective on service continuity enhancements

This section is to discuss the objective on service continuity enhancements contained in the draft WID revision v000:

2. Specify mechanisms to enhance service continuity for single-hop Layer-2 UE-to-Network relay for the following scenarios [RAN2, RAN3]:

a) Inter-gNB indirect-to-direct path switching (i.e., “UE 1 <-> relay UE A <-> gNB X” to “UE 1 <-> gNB Y”)

b) Inter-gNB direct-to-indirect path switching (i.e., “UE 1 <-> gNB X” to “UE 1 <-> relay UE A <-> gNB Y”)

c) Intra-gNB indirect-to-indirect path switching (i.e., “UE 1 <-> relay UE A <-> gNB X” to “UE 1 <-> relay UE B <-> gNB X”)

d) Inter-gNB indirect-to-indirect path switching (i.e., “UE1 <-> relay UE A <-> gNB X” to “UE1 <-> relay UE B <-> gNB Y”)

Note 2A: Scenario D is to be supported by reusing solutions for the other scenarios without specific optimizations.

Feedback Form 2: Company input on service continuity enhancements

1 – vivo Mobile Communication Co. Firstly, the applicable RRC states of relay UE in above scenarios need to be clarified. This is also discussed in the ongoing R17 SL relay. We suggest to add in a NOTE that Relay UE in any RRC state (IDLE/INACTIVE/CONNECTED) can be indicated as target Relay. Secondly, according to RAN2#115e agreement “CHO-like path switch procedure for Remote UE can be studied after the baseline design is finalized.”, we want to confirm that the CHO-like path switch procedure can also be considered in above scenarios.
2 – Apple Europe Limited We are basically fine with this objective. Just an editorial comment to change ”UE 1 ” to either ”UE” or ”remote UE” in the description of Scenarios a,b,c and d, because there is no another remote UE (e.g.,UE 2) involved in the scenarios.
3 – ZTE Corporation We are fine with the current description of the service continuity objective.
4 – CATT We are fine with the objective on service continuity enhancements.
5 – NEC Corporation We support this objective.
6 – SHARP Corporation We are fine with the objective.
7 – LG Electronics Inc. We are fine with the objective.

8 – Samsung R&D Institute UK We are fine with the proposed objective by the moderator.
9 – MediaTek Inc. OK with the current objective (we agree with Apple's editorial correction).
10 – Ericsson LM We are fine with the current formulation.
11 – Beijing Xiaomi Mobile Software OK with current formation
12 – Qualcomm Incorporated The objective is fine.
13 – InterDigital France R&D We are fine with the current objective
14 – Swiss Federal Railways Ltd UIC (International Union of the Railways) UIC is fine with the proposed objectives in the service continuity context.
15 – ROBERT BOSCH GmbH Fine with the proposal.
16 – Intel Korea We are fine with the wording of objective 2 with the note 2A.
17 – Philips International B.V. Fine with the proposal

1.3 Objective on multi-path relay

This section is to discuss the objective on multi-path relay contained in the draft WID revision v000:

3. Study the benefit and potential solutions for multi-path support to enhance reliability and throughput (e.g., by switching among or aggregating the multiple paths) in the following scenarios [RAN2]:

a) A UE is connected to the same gNB using one direct path and one indirect path via 1) layer-2/layer-3 UE-to-Network relay, or 2) via another UE (where the UE-UE inter-connection is assumed to be ideal), where the solutions for 1) are to be reused for 2).

Note 3A: Study on the benefit and potential solutions are to be completed in RAN#98 which will decide whether/how to start the normative work.

Feedback Form 3: Company input on multi-path relay

1 – CMDI

Thanks for organizing this discussion. Considering the proposed objective for multipath, in which, it is said that where the solutions for 1) are to be used for 2), we can understand the intention to avoid duplicate design, but current restriction is beyond reasonable since it totally ignore the specific difference between these two secnarios. If the proponents of this wording think scenarios 2) (ideal link) is just a subset of scenario 1) (sidelink), we should naturally take the scenario 2) as baseline then introduce incremental functionality for scenario 1), rather than take the scenaio 1) as baseline and then simply subtract functionality for scenario 2) without considering some of the functionality or proceduress is necessary or not. Then we can revise the objective as option 1)

Option 1)

a) A UE is connected to the same gNB using one direct path and one indirect path via 1) layer-2/layer-3 UE-to-Network relay, or 2) via another UE (where the UE-UE inter-connection is assumed to be ideal), where the solutions for 2) are to be reused for 1).

if some companies prefer taking the scenario 1) as baseline and taking current wording, we would like to revise the objective as option 2)

Option 2)

a) A UE is connected to the same gNB using one direct path and one indirect path via 1) layer-2/layer-3 UE-to-Network relay, or 2) via another UE (where the UE-UE inter-connection is assumed to be ideal), where the solutions for 1) are to be reused for 2), if without imposing unnecessary functionality/procedure.

2 – vivo Mobile Communication Co.

Agree with CMDI, scenario 2 is different from scenario 1. We also agree, that solutions for scenario 1 cannot fully cover scenario 2. The revision proposed by CMDI is acceptable for us. Or alternatively, as this is a study phase, we should be open about solution design, so we can consider the following rewording as:

Option3) a) A UE is connected to the same gNB using one direct path and one indirect path via 1) layer-2/layer-3 UE-to-Network relay, or 2) via another UE (where the UE-UE inter-connection is assumed to be ideal), ~~where the solutions for 2) are to be reused for 1).~~

3 – HuaWei Technologies Co.

For this objectives, we have some specific comments:

· We still think the study phase can be followed by a normative phase without the need of another round of evaluation and decision. As mentioned by many companies including our contribution RP-213224, the benefits are obvious and normative work is very straightforward. This is still the case even taking scenario 2) into consideration as both share lots of commonalty and design principle.

· As mentioned in RP-213224, we do not think multi-path L3 relay should be part of this item as L3 relay path towards the remote UE is not visible to the RAN side, and thus there is nothing specific to RAN side.

· With scenario 2) included for UE aggregation, we understand there could be commonalities but reusing exactly the same solution could be too restrictive to accommodate the difference and design flexibility

for both scenarios. Thus we are fine either to remove this part as vivo proposed, or adopt the wording improvement from CMCC.

In summary we propose to make the following revisions for this objective:

1. Study and specify ~~the benefit and potential~~ solutions for multi-path support to enhance reliability and throughput (e.g., by switching among or aggregating the multiple paths) in the following scenarios [RAN2]:

A. A UE is connected to the same gNB using one direct path and one indirect path via 1) layer-2~~/layer-3~~ UE-to-Network relay, or 2) via another UE (where the UE-UE inter-connection is assumed to be ideal), where the solutions for 1) ~~are~~ **can be considered** to be reused for 2), if without imposing unnecessary functionality/procedure.

~~Note 3A: Study on the benefit and potential solutions are to be completed in RAN#98 which will decide whether/how to start the normative work.~~

4 – Spreadtrum Communications

We agree with the motivation from CMDI and fully support the proposed Option 1 or Option 2 by Xu xiaodong. Option 3 proposed by vivo is fine to us as well.

In addition, we have three revision suggestions to the current Draft WID:

*3. Study the benefit and potential solutions for multi-path support to enhance reliability and throughput (e.g., by switching among or aggregating the multiple paths) in the following scenarios [RAN2**, RAN1**]:*

*A UE is connected to the same gNB using one direct path and/**or** one indirect path via 1) layer-2/layer-3 UE-to-Network relay, or 2) ~~**via**~~ another UE (where the UE-UE inter-connection is assumed to be ideal), where the solutions for 1) are to be reused for 2).*

The reasons for the above revisions: first, as throughput is a physical metric, so **RAN1** may need to be involved at SI stage; second, as one path may be broken, **or** is added to accurately reflect the reality scenario e.g. by switching or aggregating; last, remove the second "**via**" as it is redundancy.

5 – Guangdong OPPO Mobile Telecom.

We wonder if "e.g.,by switching among or aggregating the multiple paths" aims to rule out the duplication case, i.e., data sent via different legs are duplicated, which seems not belong to either "switching" (i.e., the data is sent via either leg but not both) or "aggregating the multiple paths" (i.e., the data is sent via both legs, and the data sent via different legs are different)?

We do not think L3 relay is needed here, since L3 multi-path U2N relay has been supported since LTE Rel-13 and NR Rel-17, since the multi-path is implemented at NAS layer instead of AS layer, so no need for work at RAN WG, suggest to remove.

6 – Guangdong OPPO Mobile Telecom.

Btw, we prefer option-2 raised by CMDI as clarification of scenario-2.

7 – Apple Europe Limited

1. Regarding the UE aggregation work, we think it is not proper to merge it into the multi-path relay work. UE aggregation's target scenarios do not match Sidelink relay use cases. Sidelink relay discovery, which is crucial for SL relay case, is not applicable to the UE aggregation case. Also, the SRAP protocol introduced in Rel-17 seems not needed for UE aggregation case. All of those differences make it awkward

to force a common design for the two different scenarios . Therefore, we think UE aggregation should be separated from Sidelink relay WI and studied separately. Study for UE aggregation can include evaluating any existing or alternative ways to address the UL throughout bottleneck, e.g., carrier aggregation; or whether it can be done by upper layer solutions, if multiple UEs have to be involved.

2. If only the multi-path Sidelink relay scenario (scenario 1) is included for this objective, there is no need for a study phase.

3. We think Layer 3 multi-path scheme is not needed for this objective. Literally, split/merge of traffic in IP layer and above are out of the scope of RAN work. It can also be argued that the layer-3 multi-path solutions are already supported in Rel-17 as an in-coverage Layer 3 remote UE can always maintain its direct communication link towards NW while using a Layer 3 U2N relay at the same time. There is no AS layer restriction or checking mechanism to invalidate this operation. Thus, there is no need to further study or investigate Layer 3 solutions for multi-path in Rel-18.

8 – China Telecomunication Corp.

The motivation and potential solutions of multipath are relatively clear, we think this should be specified in R18. We propose to add 'specify' in the objective 3 and remove Note 3A.

Regarding multipath for Layer 3 U2N relay, the multi-path can only be done at CN level. We think its major impact is in SA2 . If SA2 specify multi-path in Layer 3 U2N relay and RAN impact is identified, the related work can be trigged by LS. The text '[layer-3]' can be removed.

9 – Guangdong OPPO Mobile Telecom.

Same view as above to add 'specify' in the objective 3 and remove Note 3A.

10 – vivo Mobile Communication Co.

Agree with OPPO that we should add 'specify' in the objective 3 and remove Note 3A.

11 – CATT

First of all we also think for multi-path related objective, we should add 'specify' instead of only say 'study…'.

Then we think RAN should mainly consider L2 relay, and whether L3 relay is supported for multi-path can be left to SA2 to decide.

Regarding the handling of UE aggregation here in this objective, we tend to agree with CMCC and vivo that the current wording is not quite clear and might be a bit restrictive.

12 – ZTE Corporation

For the multi-path relay, we think it is beneficial to support both L3 and L2 relay for the multi-path delivery. For example, remote UE may divide its traffic transmission via direct and indirect L3 relay path for the purpose of throughput improvement. Considering that we now support UE aggregation with multiple another UEs for relay, it is not clear why we could not support the L3 relay.

Since this WID is SL relay specific, it is natural to first consider the scenario 1) as baseline and then check if it can be reused for 2). The revised wording of Option 2) from CMDI is fine for us.

13 – NEC Corporation

We do not support '2) via another UE (where the UE-UE inter-connection is assumed to be ideal)' since current WI package is big enough and UE-UE is connected via non-specific link rather than SL as mentioned in RP-212684.

14 – Nokia Denmark

The restriction that the UE is connected to the same gNB via the direct and indirect path should be for L2 relay only, as this restriction makes no sense for L3 relay, which is transparent to the RAN.

15 – Lenovo Mobile Com. Technology

Multi-path work for L3 relay case can be left for SA2 decision because it will impact CN more. There is less impact on RAN.

16 – SHARP Corporation

We think L3 multi-path relay should be left to SA2 and we should mainly focus on the L2 multi-path relay.

17 – Deutsche Telekom AG

The entire topic **should be dropped** from Rel-18 as there is no commercial interest in SL relay.

Espcially this strange ”UE aggregation” topic (which has never been really discussed nor there are any requirements) should not be hidden into this WI !

18 – LG Electronics Inc.

We are fine with the updated objective. UE aggregation is certainly a new feature in 3GPP, a study phase is essential and it is early to claim that this shall be specified. We think that even with Note 3A, some RAN2 work is expected to adapt the solutions for 1) for 2).

19 – Beijing Xiaomi Mobile Software

we think the multi-path is different to the aggregation scenarios and prefer to study this further. We support option 3 from vivo for the clarification.

20 – MediaTek Inc.

We think the UE aggregation scenario can be included, relying on the same basic operation as relaying. We can target the same solution at the remote UE, i.e., protocol aggregation/split at L2, and we should avoid imposing additional requirements for relay UE behaviour on the ”helper” UE. Our understanding is that the relation between the ”helper” and remote UEs is 1:1, which could be clarified in the objective.

21 – Ericsson LM

Although it is not exactly our preference, we are supportive the current formulation as compromise which takes different views into account. Also, based on the earlier discussions, we support keeping the intention and formulation regarding the study phase. Regarding L3 relay specifically, we think it is too early to conclude there is no RAN impact at all, thus it should be kept in.

22 – China Unicom

We agree with vivo’s modification to remove **~~where the solutions for 2) are to be reused for 1).~~**

For multi-path solutions, it’s proposed to modify the words as Huawe’s comments: **”study and specify ~~the benefit and potential~~ solutions for multi-path support to enhance reliability and throughput (e.g., by switching among or aggregating the multiple paths) in the following scenarios [RAN2].”**

23 – Qualcomm Incorporated

We support the current formulation of the objective.

Suggest to replace "where the UE-UE inter-connection is assumed to be ideal" with "where the UE-UE inter-connection is **not standardized**", because "ideal" is ambiguous.

24 – InterDigital France R&D

We think 2) "via another UE (where the UE-UE interconnection is assumed to be ideal)", should be removed from the scope, since it is related to the UE aggregation SI discussions, and it is not clear this work is directly related to UE to NW relaying in the first place. It has not been discussed in the past in the scope of this WI and would only add additional work to an already larger WI. Furthermore, we doubt the need for a separate study phase, since the multi-path can use DC architecture as a baseline. We can therefore directly start from normative phase.

25 – ROBERT BOSCH GmbH

We agree with Huawei to to remove "~~the benefit and~~".

We also support removing layer 3 and focus on Layer 2 only to limit the discussion in RAN2 or any possible discussion between RAN2 and SA2.

We also support Qualcomm comment, to replace **ideal** by "not specified".

Accordingly, remove Note 3A.

26 – Intel Korea

We are fine in general but agree with other company views that support of L3 relay is up to SA2.

27 – Intel Korea

We are fine with rapporteur's suggestion to conclude in RAN#95e to have clear understanding on Rel-17 status. One thing to note is that from RAN4 perspective it does not matter whether the RAN2 decision is made in Rel-17/Rel-18. In case RAN2 concludes that SL DRX is supported, then the corresponding RRM Core requirements would be considered in Rel-18 timeframe only.

28 – Philips International B.V.

We agree with CMDI and Vivo's proposal to clarify the reuse issue of scenarios 1 and 2.

29 – Swiss Federal Railways Ltd

UIC (International Union of the Railways)

UIC is very interested on this topic. Therefore some clarifications might be essential.

The benefit is already included in the same sentence and represented by reliability and throughput. Accordingly, the benefit can be deleted from the sentence. In order to be able to control runtimes, the layer 3 approach should not be pursued any further. Layer 2 seems to be completely sufficient. It is not evident in the objectives what is effectively to be achieved with the direct and indirect path? In any case, delay differences are to be expected, which may restrict the use of the application which are latency-sensitive.

1.4 Objective on sidelink DRX for sidelink relay operation

This section is to discuss the potential objective on sidelink DRX for sidelink relay operation which was subject to the Rel-17 progress as in the draft WID revision v000:

4. [Support of SL DRX for sidelink relay operation if not done in Rel-17] [RAN2]

[Note 4A: This objective is to be checked in RAN#94e.]

The moderator notes that the following RAN2 agreements are relevant to this topic:

- RAN2 confirms Rel-17 SL-DRX design can be reused for relay-related ProSe communication in layer-3 relay without additional specific solution discussion/specification effort.
- Keep RAN2 previous agreement (prioritize the non-relay case without consideration of relay specific optimization in Rel-17) but we're not going to make any conclusion if L2 relay-related ProSe communication is supported or not in Rel-17 now.
- RAN2 confirms Rel-17 SL-DRX design can be reused for L3 relay-related ProSe discovery without additional specific solution discussion/specification effort (by applying SL default-DRX configuration). No conclusion if L2 relay-related ProSe discovery is supported or not in Rel-17 now. RAN2 does not specify any restriction now.

The moderator understands that RAN2 confirmed the ongoing Rel-17 sidelink DRX can be used for Layer-3 relay while no conclusion has been made for Layer-2 relay yet. With this understanding, the moderator thinks that the inclusion of this potential objective can be decided in RAN#95e by checking whether there is any problem in applying sidelink DRX to Layer-2 relay in the completed Rel-17 specifications.

Companies are requested to provide views on this objective.

Feedback Form 4: Company input on sidelink DRX for sidelink relay operation

1 – HuaWei Technologies Co. We agree with the moderator that we can wait till RAN#95e to decide whether to include this objective in this WID.
2 – vivo Mobile Communication Co. Agree with the moderator to postpone it to RAN#95e. As sidelink DRX for sidelink relay operation is a cross-WI feature, it's practical to make decision after completing the basic Rel-17 SL DRX design.
3 – Guangdong OPPO Mobile Telecom. For this point, we tend to hold our position in RAN2 WG, i.e., there is no problem in applying sidelink DRX to L2 relay since R17 already, and the proposed additional work for L2 relay (as discussed in R2) is merely optimization. Considering the allocated TU, there is no room to carry such optimization work, so suggest to confirm the support of SL-DRX for L2 U2N relay in Rel-17 and remove this bullet from R18 WID.

4 – Apple Europe Limited

We share the same view as moderator. RAN2 has not made any conclusion if L2 relay-related ProSe communication is supported or not in Rel-17 now. Our understanding is that RAN2 will further discuss and conclude this issue in the meetings in early next year. If RAN2 cannot reach new agreements on this issue by then, SL-DRX enhancements for L2 relay need to be included in Rel-18 WID scope. Thus, a placeholder for SL-DRX in relay operation can be kept in WID until further clarification from RAN2 are provided by RAN#95.

5 – China Telecomunication Corp.

We are fine with the moderator's suggestion.

6 – CATT

Regarding whether to consider SL DRX for L2 U2N relay, we can postpone it to RAN#95 to wait for RAN2 conclusion.

Regarding whether to consider SL DRX for L2 U2U relay, we should be able to decide in this meeting, and we slightly prefers to not consider it in this release.

7 – ZTE Corporation

In our opinion, whether Rel-17 SL-DRX design can be used for L2 relay can be up to UE implementation and RAN2 does not specify any restriction now. If relay UE and remote UE have power saving requirement, they can activate SL DRX function just like normal SL capable UE. For example, Tx relay UE may decide the SL DRX for the Rx remote UE, or vice versa. We do not see big issue for the Rel-17 SL-DRX design being used for L2 U2N relay. On the other hand, the work scope of Rel-18 SL relay include many other objectives with higher priority, such as UE-to-UE relay, inter-gNB mobility and multi-path support. It is suggested not to consider additional SL DRX enhancement for L2 U2N relay in Rel-18.

8 – NEC Corporation

We agree with the moderator's proposal.

9 – Lenovo Mobile Com. Technology

It needs to be explicitly captured that any remaining SL DRX work is restricted to L2 U2N relay only, since RAN2 confirmed Rel-17 solution can be reused to L3 relay without additional effort.

10 – SHARP Corporation

We agree with the moderator's proposal. The inclusion of this potential objective and wording can be decided in RAN#95e.

11 – Deutsche Telekom AG

The entire topic **should be dropped** from Rel-18 as there is no commercial interest in SL relay.

12 – LG Electronics Inc.

As the moderator explained, whether SL DRX is supported for SL relay operation can be decided after the finalization of the spec which is scheduled in RAN#95e. So we think this objective needs to remain as it is while updating Node 4A to check the situation in RAN#95e.

13 – Samsung R&D Institute UK

We are fine with the moderator's suggestion.

14 – MediaTek Inc.

Technically, we think it is not a problem to support DRX for L2 relay, but we agree that RAN2 need to conclude on this. So we are OK with the moderator's suggestion to revisit the issue at RAN#95-e.

15 – Ericsson LM

Not supportive. We think that there is no need to extend the Rel-17 work beyond what is already being specified.

Regarding SL DRX for L2 relay, we think that RAN2 has concluded that whether SL DRX can be applied for L2 relay, RAN2 will not further discuss within Rel-17 time frame. Whether or how to apply SL DRX for L2 relay will be up to UE or gNB implementation. Any further discussion can be left to future releas, that is, Rel-18 where we can keep the objective and remove the brackets.

16 – Beijing Xiaomi Mobile Software

Support moderator's proposal

17 – Qualcomm Incorporated

It is fine to have some further check of the objective at RAN#95e.

18 – InterDigital France R&D

We have different understanding on the conclusions made in RAN2. In RAN2, it was decided to not further discuss any enhancements to DRX specific to the relay case for Rel17. In that sense, there is no need to wait for RAN#95, and instead a decision should be made at this meeting. Furthermore, this work needs to be done in Rel18, since early on in Rel17, RAN2 decided to prioritize the non-relay case without consideration of relay specific optimizations. We think the intent was to delay this topic to Rel18. So this objective on SL DRX can now already be included in Rel18.

19 – ROBERT BOSCH GmbH

Even though our understanding is that RAN2 is not going to cover this topic in Rel-17, we agree to wait until RAN#95e to confirm RAN2 decision.

20 – Intel Korea

We are fine with rapporteur's suggestion to conclude in RAN#95e to have clear understanding on Rel-17 status. One thing to note is that from RAN4 perspective it does not matter whether the RAN2 decision is made in Rel-17/Rel-18. In case RAN2 concludes that SL DRX is supported, then the corresponding RRM Core requirements would be considered in Rel-18 timeframe only.

21 – Philips International B.V.

We don't think SL DRX is currently properly supported for sidelink relay, but ok to wait until RAN#95e to make a final conclusion. Certainly the objective itself needs to remain as it is while updating Node 4A to check the situation in RAN#95e.

1.5 Additional core part objectives

The moderator observed that several contribution proposed to include additional core part objectives. Companies are requested to provide views on them.

Feedback Form 5: Company input on additional objectives

1 – LG Electronics Inc. Considering the objective in the draft WID, we think there is no room for additional core part objectives.
2 – Ericsson LM Agree with LG, we think there is no room for further objectives.
3 – ROBERT BOSCH GmbH No additional topics are needed. We are also fine to drop Layer 3 to limit the discussions.

1.6 Justification

This section is to discuss whether/how to update the justification section in the draft WID revision v000. Companies are requested to provide input.

Feedback Form 6: Company input on the justification section

1 – CMDI Justifcation should be revised to reflect the support of both scenarios correspondingly.
2 – vivo Mobile Communication Co. Agree with CMDI. the justification must reflect both scenarios of multi-path and UE aggregation.
3 – ZTE Corporation Agree with CMDI that the justification part should include the description of UE aggregation.
4 – Deutsche Telekom AG The entire topic **should be dropped** from Rel-18 as there is no commercial interest in SL relay.
5 – LG Electronics Inc. We think the all the text except the SL DRX for SL relay part can be accepted.
6 – MediaTek Inc. Agree with CMDI; the justification should cover the inclusion of UE aggregation.

7 – Ericsson LM We are fine with the justification, except the last part in brackets [Another enhancement is to support sidelink DRX introduced in Rel-17 for power saving in sidelink relay operations. => This part needs to be checked at RAN#94e.]. As explained above, this objective should be removed.

1.7 Others

Companies are requested to provide input on the other parts of the draft WID revision v000 if any.

Feedback Form 7: Company input on the other parts

1 – Apple Europe Limited For the 1.5 TU projected for SL relay R18 work in R2-213469, we think it is only enough for the WID scope without UE aggregation. In our view, supporting the study and work on ”UE aggregation” under SL relay scope need some substantial addition of work time.
2 – China Telecomunication Corp. Share similar view with Apple.
3 – Guangdong OPPO Mobile Telecom. To avoid cross-WI issue, it would be helpful to clarify whether the scenario of sidelink relay is limited to single-carrier at PC5 interface using NOTE.
4 – Deutsche Telekom AG The entire topic **should be dropped** from Rel-18 as there is no commercial interest in SL relay.
5 – Samsung R&D Institute UK In the section 5 expected output and time scale, TS 38.323 should be added since there would be specification impacts for SL relay discovery message for U2U relay.
6 – HuaWei Technologies Co. RAN4 Chair: in the core part, there is no dedicated objective for RAN4 core requirements, i.e., RF and/or RRM requirement. In the performance part, only the RRM performance objective is included. Not sure if demodulation requirement is needed.

1.8 Summary and moderator’s proposal

1.8.1 UE-to-UE relay

- Okay with v000
  - Huawei, vivo, ZTE, China Telecommunication, CATT, NEC, Sharp, LGE, Ericsson, Xiaomi, Qualcomm (except 1-a-ii), Intel (12)

- Multi-hop needs to be included
  - FirstNet, SyncTechno, Kyocera, Apple (second priority), Spreadtrum (second priority), BDBOS, Lenovo, MediaTek, Netherlands Police, AT&T, BMWi, MINISTERE DE L'INTERIEUR, A.S.T.R.I.D. SA/NV, Erillisverkot, Philips, HOME OFFICE, Nkom, TNO (19)
- Groupcast needs to be included
  - Apple
- Comments
  - CATT: User plane impacts on L2 specific part such as resource allocation
  - Lenovo, MediaTek: Note 1B means per destination UE
  - MediaTek: Asked reason to prioritize the common part
  - Qualcomm: add "if SA2 concludes it is needed" to objective 1-a-ii
  - InterDigital: generalize objective 1-b-i to other UP enhancements
  - Bosch: remove Note 1B
  - Philips, TNO: Put QoS aspects back

1.8.2 Service continuity

- Okay with v000
  - Apple, ZTE, CATT, NEC, Sharp, LGE, Samsung, MediaTek, Ericsson, Xiaomi, Qualcomm, InterDigital, Swiss Federal Railways, Bosch, Intel, Philips,
- Comments
  - Vivo: Relay UE can be in any RRC state, CHO-like path switch can be considered
  - Apple, MediaTek: change "UE 1" to "UE" or "remote UE"

1.8.3 Multi-path relay

- Okay with v000
  - LGE, Ericsson, Qualcomm, Intel,
- Alternative options for the scenarios including UE aggregation
  - Option 1: CMDI, vivo, Huawei, Spreadtrum, Philips,
  - Option 2: CMDI, vivo, Huawei, Spreadtrum, OPPO, ZTE, Philips,
  - Option 3: vivo, Spreadtrum, Xiaomi, China Unicom, Philips,
  - No UE aggregation (i.e., no scenario 2): NEC, Apple, China Telecommunication, InterDigital, Deutsche Telekom
- Study phase is followed by normative phase
  - Huawei, China Telecommunication, OPPO, vivo, CATT, Bosch,

- L3 needs to be removed
  - Yes: Huawei, Apple, China Telecommunication, Bosch, UIC
  - No: ZTE, Ericsson
  - Up to SA2: CATT, Lenovo, Sharp, Intel
- Add RAN1 as a secondary WG
  - Spreadtrum
- Needs to clarify whether duplication is included
  - OPPO
- UE aggregation should be separated from sidelink relay WI
  - Apple
- Same gNB restriction is not needed for L3
  - Nokia
- Multi-path relay objective should be dropped
  - Deutsche Telekom
- Avoid imposing additional requirements for relay UE behavior on the helper UE
  - MediaTek
- Change “ideal” to “non-standardized” in scenario 2
  - Qualcomm, Bosch,
- No study phase
  - InterDigital

1.8.4 SL DRX for SL relay

- Wait until RAN#95e
  - Huawei, vivo, Apple, China Telecommunication, CATT (U2N relay), NEC, Sharp, LGE, Samsung, MediaTek, Xiaomi, Qualcomm, Bosch, Intel, Philips
- Remove this objective
  - OPPO, CATT(U2U relay), Deutsche Telekom
- Remove the bracket and keep the objective
  - Ericsson
- Decide to include the objective in this meeting
  - InterDigital
- Comments
  - Lenovo: clarify that this is restricted to L2 relay

1.8.5 Additional core part objectives

- No more objectives
  - LGE, Ericsson, Bosch

1.8.6 Justification

- Reflect multi-path relay and UE aggregation
  - CMDI, vivo, ZTE,
- Delete the SL DRX part
  - Ericsson
- No sidelink relay
  - Deutsche Telekom

1.8.7 Others

- No UE aggregation
  - Apple, China Telecommunication
- Sidelink relay is limited to single carrier PC5
  - OPPO
- No sidelink relay
  - Deutsche Telekom
- Add TS 38.323 in the expected outcome
  - Samsung
- Check the RAN4 core and performance objectives
  - Huawei

1.8.8 Moderator's proposal

The moderator observed that one company (Deutsche Telekom) proposed to drop the entire objectives of this thread, but given that the Rel-18 package endorsed on Monday GTW includes the sidelink relay enhancement, he propose to focus on the objective details under the TU allocation.

The moderator observed that the UE-to-UE relay objective is rather stable except the issue of supporting multi-hop relay, though there were several comments on different parts of the objective. The moderator is of

the opinion that simple addition of this is not feasible under the given TU allocation as multi-hop UE-to-UE relay clearly requires additional discussions; for example, some signaling is necessary between potential relay UEs to deliver what destination UEs can be reached from each of them. He understands this was also in line with the chair's proposal in RP-213469. The moderator asked to come up with a solution to address the workload issue when proposing an update leading to more works, and it seems that some companies considered to drop the UE aggregation part. He thinks that the current framework can be a reasonable balance among different directions to enhance sidelink relay and thus proposes to keep it in the draft WID revision for the next round, but it seems necessary to check the group on whether this addition should be done and how the workload issue can be resolved.

The moderator also add the SA2 related text proposed by Qualcomm to objective 1-a-ii and by Philips to objective to objective 1-b-iii, which seem reasonable to him. Also he propose to clarify Note 1B is per destination UE. For the other parts of the objective, given that quite many companies were fine with the current version, the moderator proposes to keep it unless more companies become supportive of some of them in the next round.

The moderator thinks that the service continuity enhancement objective is quite stable, so keep the current version with the editorial update proposed by Apple. On vivo's comment, the moderator understands that such aspects were concluded in RAN2 in Rel-17 and thus the supported RRC state and whether to support CHO-like path switch can be decided in RAN2 as well in this release.

The moderator observed that the multi-path relay objective is stable at least in scenario 1. For scenario 2, several options were discussed on the wording without a clear majority view. The moderator understands that the addition of scenario 2 for UE aggregation in this WI can be justified only when it becomes possible with a lot of commonality with scenario 1 where the indirect path is already being specified in Rel-17. With this understanding, if the intention of Option 1, 2, 3 is to avoid unnecessary restriction of reusing some part of scenario 1 solution that are not necessary for scenario 2, the moderator suggests the following updates:

A. A UE is connected to the same gNB using one direct path and one indirect path via 1) layer-2/layer-3 UE-to-Network relay, or 2) via another UE (where the UE-UE inter-connection is assumed to be ideal), where the solutions for 1) are to be reused for 2) <u>without precluding the possibility of excluding a part of the solutions which is unnecessary for the operation for 2)</u>.

There was some comments on the UE-to-Network relay part in scenario 1. The moderator proposes to clarify that this part will reuse Rel-17 design and the support of layer-3 relay is up to SA2 progress. Also he proposes to check whether we can add the duplication as questioned by OPPO.

The moderator observed that several companies proposed to add "specify" to this objective, but given that the scenario 2 is something new and not much discussed/studied in the context of sidelink relay, he thinks it is better to keep the current formulation. He suggests having a specific question on this in the next round.

To the proposal of adding RAN1 to this objective, it seems not possible as the endorsed Rel-18 package does not have RAN1 TU for this WI and its availability is quite unclear.

The moderator observed that majority view is to revisit the SL DRX for SL relay objective in the next meeting. He thinks it needs to clarify that this is for Layer-2 UE-to-Network relay.

Assuming that the current framework, the moderator proposes to reflect multi-path relay and UE aggregation in the justification while removing the SL DRX part for the time being. He also proposes to check the RAN4 objectives in the next round and clarify that there will be no specific enhancements for sidelink relay support in sidelink CA. And he thinks that TS 38.323 can be added in the expected outcome.

2 Intermediate round

2.1 Objective on UE-to-UE relay

The moderator asks company input on the inclusion of UE-to-UE relay and how to address the workload issue if introduced (e.g., by removing a certain part of the other objectives).

Feedback Form 8: Company input on the including of multi-hop UE-to-UE relay

1 – InterDigital France R&D We would support the removal of the UE aggregation part (scenario 2 in objective 3A) if we decide to include mutihop UE to UE relay. The motivation of multihop (further extension of range/coverage) seems clearer than that of UE aggregation. We also see the potential for further discussion of the interpretation of scenario 2 with the current wording, and we should avoid considering such scenario if it is not clear at this stage.
2 – CMDI if we recall the dicussion on sidelink enhancement in last GTW session, if we go with this kind of discussion, all objectives will be controversial, it is not a right approach to carry out or lead the discussion at this stage.
3 – Apple Europe Limited We support multi-hop U2U relay. we want to point out that UE-to-UE relay has a more homogenous topology than U2N relay. Different from U2N case, there is no gNB served as the end-point in U2U relay scenarios and there is no special “in-coverage relay UE” which is one-hop away from the gNB. So, similar to IAB, it makes sense to focus on finding a scalable multi-hop solution instead of one-hop solution. The multi-hop solution will automatically work for single-hop case. Hence, it is worth to have slightly more TUs to achieve a unified design for “any-hop” case in this release, as contrast to spend additional TUs in future release to extend 1-hop solution for multi-hop case. Also, we suggest to drop UE aggregation, Layer 3 multi-path, and SL-DRX for relay from the WID to counter-balance the work-load concerns, if necessary.
4 – Kyocera Corporation We think UE aggregation in one area as mentioned in the moderator summary that could be down prioritized compared to the need for supporting multi-hop relay if extra TU is not available.

5 – HuaWei Technologies Co.

We are in general OK with current scope proposed by the moderator. This has already been discussed several rounds and what we have now is already a compromised scope considering interests from multiple companies.

We do not support to include the multi-top U2U relay in Rel-18. The U2U relay was studied in Rel-17 but was only limited to single hop. Thus the first step in Rel-18 would be to specify single hop UE-to-UE relay, which can be the basis for future evolution.

It is also worth mentioning that in Rel-17 SI, SA2 already spent long time to discuss/down-select basic single hop U2U connection establishment procedure. It can be foreseen the discussion on the basic single hop U2U relay in RAN2/SA2 takes time. To discuss the multi-hop design would have more open issues, e.g. establish the end-to-end PC5 connection, whether connection between each UE pair in the link is needed and what topology to be used, etc., all these issues require a long time study and cannot be accommodated in Rel-18.

6 – CATT

Considering the overall work load, we prefer not to consider multi-hop U2U relay in this release.

7 – NEC Corporation

We do not support the introducing of multi-hop.

8 – vivo Mobile Communication Co.

We do not support adding multi-hop U2U relay in Rel-18 SL relay WI. As far as we know there is no clear use case for multi-hop U2U relay, but rather some vague mentioning for public safety. Additionally, companies proposing remove UE aggregation for multi-hop U2U relay did not seriously consider multi-hop U2U relay design workload. As mentioned by Huawei, many issues are still open.

On the other hand concrete use cases for UE aggregation have been proposed by some operator and some UE vendors, and discussed at RAN#93-e. And the work for UE aggregation can be done along multi-path SL relay, almost for free, without any major workload.

Conclusion: The best way to deal with multi-hop U2U relay is to postpone the discussion to after Rel-18.

9 – ZTE Corporation

According to the RP-213469 endorsed on Monday's GTW meeting, 1.5 TU may be allocated to R18 SL relay WI. Considering the potential workload, it is suggested not to consider multi-hop UE-to-UE relay in Rel-18. If the proponents of multi-hop relay really think this feature is important, we may further discuss it in Rel-19.

10 – Spreadtrum Communications

We suggest to not included muti-hop UE-to-UE relay in Rel-18, consider the overall workload.

11 – China Telecomunication Corp.

We prefer to not include multi-hop U2U relay in this release to make the work load reasonable.

12 – SHARP Corporation

We think multi-hop is not considered for UE-to-UE relay in Rel-18 work.

13 – MediaTek Inc.

We see value in multi-hop U2U relay, but we also recognise the concern expressed that the WI is large. As a compromise, the U2U objective could indicate that the adaptation layer is designed with forward compatibility towards future multi-hop in mind. We can accept looking at multi-hop in a future release, but we want to avoid the need for a redesign at that time.

14 – LG Electronics Inc.

We understand the potential of multi-hop U2U relay especially for the public safety use cases, but we need to note that such aspect was not fully studied so far in RAN2. Thus its introduction will require substantial study in WGs, which does not seem feasible. So we propose not to include this scope in this release, or alternatively, multi-hop U2U relay is supported only for Layer-3 relay with marginal impact in RAN2.

15 – KT Corp.

Multi-hop U2U seems to be considered as one of the important feature for public safety. While understanding this issue, still not sure how this can be squeezed into the Objectives when we only have very limited TU budget. My suggestion is to specify multi-hop in Rel-19

16 – Samsung R&D Institute UK

We prefer to keep the current proposed objective on U2U relay with consideration of the work load.

17 – Beijing Xiaomi Mobile Software

We also feel multi-hop can be done in future release.

18 – Ericsson LM

We do not support adding multi-hop relay to the WI scope. For multiple reasons:

- It has a a huge impact on workload. The whole SL feature is being discussed, so we do not think it is a good idea to reduce the scope of one SL WI to increase another SL WI.
- From a technical point of view, there is no support for single-hop UE-to-UE relay. We need to go one step at a time.

We think the current wording in v001 as proposed by moderator is a good compromise based on all the earlier discussions.

19 – FirstNet

Multi-hop relay is considered as an important feature for public safety. As Moderator noted there were 19 supporting companies for the feature in the initial round. The public safety community has been waiting for this critical feature since Rel-15.

20 – AT&T

AT&T

AT&T supports multi-hop UE to UE relay be included in the Rel-18 WID. We agree with Apple that developing a scalable multi-hop solution would be an acceptable way forward that will also work for single-hop needs.

21 – Futurewei Technologies

Considering the workload and available TU, we think a practical wayforward can be a more clear note emphasizing forward compatibility with multi-hop when one hop UE-to-UE relay is specified in Rel-18.

22 – Deutsche Telekom AG

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Multiphop to be dropped

Hiding the strange "UE aggreation" (which has never been discussed
   somewhere and has clear implications outside RAN) is not acceptable
    to us.
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23 – TCCA

Multi-hop capability is important in critical communications sectors - PPDR, transport, mining - to enable crucial coverage extension. This capability should be designed in a way to enable also other verticals and user sectors to harvest the benefit and stay connected at all times.

24 – ROBERT BOSCH GmbH

We prefer not to consider multi-hop in Rel-18 to limit the work scope. For us, UE aggregation part is more important as discussed in the UE aggregation email discussions.

25 – Qualcomm Incorporated

Due to the workload issue, it is unlikely that the multi-hop UE-to-UE relay can be properly handled in Rel-18 as it requires extensive study. The Rel-18 design can however try to be future proof accounting for the multi-hop use cases.

26 – MINISTERE DE L'INTERIEUR

Multi-hop relay is of the utmost importance for public safety. The support of the feature can not be delayed any longer and should be included in Rel-18.

27 – A.S.T.R.I.D. SA/NV

Multi-hop relay is very important for public safety. The support of the feature can not be delayed any longer and should be included in Rel-18.

28 – Softil Ltd

Multi-hop relay is critical for public safety. It is required to deliver reliable public safety and group communications overall and can't be postponed. It should be included in the Rel-18.

29 – Philips International B.V.

We agree with Interdigital, I.e. we support multi-hop UE-to-UE relay, and we can consider removal of the UE aggregation part (scenario 2 in objective 3A) if we decide to include multihop UE to UE relay to balance the workload.

30 – Erillisverkot

Multi-hop relay is considered as an important feature for public safety.

31 – Intel Korea

We understand the value of supporting multi-hop as it is required for PS use case, but we agree with the concern on the workload due to two big topics to work on; In that sense, we support MediaTek's suggestion that RAN2 focus on single hop with forward compatibility towards future multi-hop in mind.

The moderator asks company input on the updates marked in yellow in draft WID revision v001 on the following parts:

- UE authorization subject to SA2 progress
- Addition of QoS handling subject to SA2 progress
- Clarification in Note 1B that the restriction is for a given destination UE

Feedback Form 9: Company input on the updates in the draft WID revision on UE-to-UE relay

1 – InterDigital France R&D

We are fine with each of these changes. Furthermore, in our understanding, QoS handling should include some of the enhancements suggested by companies in the previous round (e.g. resource allocation enhancements).

2 – vivo Mobile Communication Co.

1) Wording suggestion to remove "Necessary" since it has duplication meaning with the " if SA2 concludes it is needed".

~~Necessary~~ signalling support for Relay and remote UE authorization **if SA2 concludes it is needed** [RAN3]

2) Not OK with the modified Note 1B. We think a remote UE connected with multiple destination UEs for different services is a typical scenario and should not be precluded.

3 – Apple Europe Limited

1. For UE authorization, we are find to let it subject to SA2.
2. We are fine to add QoS aspects, if SA2 deems it necessary for U2U relay.
3. For NOTE 1B, the restriction is indeed per a certain destination UE. We are fine to clarify this.

4 – HuaWei Technologies Co.

1. On authorization, we are OK to leave this to SA2 as usual.
2. On QoS, there was some discussion on the QoS split during Rel-17 SA2 SI. We are OK to wait for SA2 progress with coordination if needed. In short, We are fine to keep it as is.
3. On Note 1B, we agree the change is reasonable.

5 – CATT

We are basicly fine with the changes except for the QoS bullet. We share the same view as IDT, at least we should also cover resource allocation in the QoS bullet.

6 – NEC Corporation We are fine with these changes
7 – New H3C Technologies Co. We are fine with these modifications.
8 – ZTE Corporation We are fine with the updates proposed by moderator.
9 – SHARP Corporation We are fine with them.
10 – MediaTek Inc. We are OK with this set of modifications.
11 – LG Electronics Inc. We are fine with the modifications.
12 – Samsung R&D Institute UK In general the updates are fine. Regarding A-ii, Vivo's proposed change (remove 'Necessary') looks fine.
13 – Ericsson LM We are OK with the updates. However, note that authorization has impact on TS 38.473 (F1AP).
14 – ROBERT BOSCH GmbH We are fine to add QoS part. We are also interested to study end-to-end QoS and further enhancements accordingly.
15 – Qualcomm Incorporated The proposed text additions are fine.
16 – Philips International B.V. We agree with the proposed changes
17 – Intel Korea We are fine with the changes to authorization and QoS handling. We are fine with note 1B change for single hop case; we might have to revisit it if multi-path is to be considered.

If you have any comments on the other parts of this objective, please specify them.

Feedback Form 10: Company input on the other parts of UE-to-UE relay

2.2 Objective on multi-path relay

The moderator asks company input on the relationship between scenario 1 and 2 on which multiple options were discussed including the following:

- Option 0: Draft WID v000

  A UE is connected to the same gNB using one direct path and one indirect path via 1) layer-2/layer-3 UE-to-Network relay, or 2) via another UE (where the UE-UE inter-connection is assumed to be ideal), where the solutions for 1) are to be reused for 2)

- Option 1

  A UE is connected to the same gNB using one direct path and one indirect path via 1) layer-2/layer-3 UE-to-Network relay, or 2) via another UE (where the UE-UE inter-connection is assumed to be ideal), where the solutions for 2) are to be reused for 1).

- Option 2

  A UE is connected to the same gNB using one direct path and one indirect path via 1) layer-2/layer-3 UE-to-Network relay, or 2) via another UE (where the UE-UE inter-connection is assumed to be ideal), where the solutions for 1) are to be reused for 2), if without imposing unnecessary functionality/procedure.

- Option 3

  A UE is connected to the same gNB using one direct path and one indirect path via 1) layer-2/layer-3 UE-to-Network relay, or 2) via another UE (where the UE-UE inter-connection is assumed to be ideal).

- Option 4: Draft WID revision v001

  A UE is connected to the same gNB using one direct path and one indirect path via 1) layer-2/layer-3 UE-to-Network relay, or 2) via another UE (where the UE-UE inter-connection is assumed to be ideal), where the solutions for 1) are to be reused for 2) without precluding the possibility of excluding a part of the solutions which is unnecessary for the operation for 2).

Feedback Form 11: Company input on the options of describing the scenarios

1 – InterDigital France R&D

We prefer not to discuss the UE aggregation aspect in this WI, and leave this to a future release. This work does not seem to fall in the scope of SL relay. Furthermore, we would have a better picture of the multi-path solution before we can conclude whether there is any commonality between the two scenarios.

2 – CMDI

Since it is trying to understand clearer both scenarios in the study, on top of which, we can understand what could be common or reused for each other, what is otherwise, then in normative stage, we will have a clear understanding on how to enable both scenarios. In this sense, Option 3 is preferred, and Option 2) and Option 4) are acceptable. in addition, we also support modifying ”Study the benefit and potential solutions

for multi-path support" to "**Study and specify** multi-path support" to faciliate the following work in both Working group and RAN.

3 – Spreadtrum Communications

Option 3 is our first preference. And we can accept Option 2 or Option 4 as well for progress.
For Option 2 and Option 4, we suggest to modify one word: "..... where the solutions for 1) ~~are to~~ **can** be reused for 2)....."

4 – vivo Mobile Communication Co.

Thanks for the moderator effort the revision proposal in Option 4). But, it is worth noting that beside what solution for scenario 1 that can be reused for scenario 2, there may be other solutions that may be specific to scenario 2, e.g., how the inter-connected UE are correlated at RAN or CN. Thus, we propose to revised option 4) as:

Option 4'): A UE is connected to the same gNB using one direct path and one indirect path via 1) layer-2/layer-3 UE-to-Network relay, or 2) via another UE (where the UE-UE inter-connection is assumed to be ideal), where the solutions for 1) are to be reused for 2) without precluding the possibility of excluding a part of the solutions which is unnecessary for the operation for 2), **and considering specific solutions that may be necessary for the operation for 2).**

Based on above options **Option 3)** and **Option 4')** are preferred, and **Option 2)** is acceptable. in addition, we agree with CMDI to support modifying "Study the benefit and potential solutions for multi-path support" to "**Study and specify** multi-path support" to facilitate the following work in both Working group and RAN.

5 – Apple Europe Limited

Our primary position is still to not include "UE aggregation" study in SL relay WID but keep it in a separate SID in Rel-18., given that this new addition is controversial and will increase work-load. It is also true that having a separate study for UE aggregation will give more freedoms and spaces for RAN2 to evaluate different approaches and not to be limited by Rel-17 U2N relay baseline solution.

If it has to be included, we prefer the wording suggested in Option 4 by the moderator. We do not support to study any "specific solutions that unique for scenario 2" because those specific solutions are not appropriate to be included in the Sidelink relay work, but rather to be studied separately.

6 – Kyocera Corporation

We prefer to remove UE aggregation from Rel-18.

7 – HuaWei Technologies Co.

We prefer Option 3, as whether or how to design common solutions can leave to WG discussion. Without knowing all the details it is difficult to declare how much commonalities can be achieved. Option 2/4 are also acceptable from our side. We agree it should be "study and specify", this does not preclude the study of solutions, but we understand like other topics, this can be followed up with normative work as the gains are straight forward.

8 – CATT

We prefers option 3, since the UE-UE interface in 2) is not PC5 link, the detailed mechanisms for 1) and 2) may be different. It is too early to say the solution of 1) or 2) is baseline.

9 – Guangdong OPPO Mobile Telecom.

Option-4 as in v001 is good for us.

10 – NEC Corporation

We prefer no UE aggregation (i.e., no scenario 2).

11 – New H3C Technologies Co.

We support Option 3 and we can live with option 2 and option 4.

12 – ZTE Corporation

Based on the 4 options on the table, we now prefer Option 3, which is more simple and clear. Whether the solution for scenario 1) can be reused for scenario 2), or solution for scenario 2) can be reused for scenario 1) can be futher clarified during the SI phase.

13 – CEPRI

Thank moderator great efforts on organizing this important and interesting topic. And sorry for joining the discussion a bit late.

As an electrical power company, we can see potential beneficial of UE aggregation scenarios for smart grid service, e.g. differential protection backup requirement in our contribution RP-213243.

For the solutions for scenario 1&2, we share the similar view with CMDI: Option 3 is our 1st choice, and Option 2) or Option 4) is our 2nd choice.

14 – China Telecomunication Corp.

We support both scenario1 and scenario2 in this objective.

The option 3 is prefered to avoid unnecessary limitation of the solution design before the study phase.

15 – SHARP Corporation

We prefer just include 1) case for this objective, and after that, 2) can be considered within the SI/WI which overlooking UE aggregation.

16 – MediaTek Inc.

We support both scenarios. On the UE aggregation scenario, a couple of comments:

- We prefer option 4 as a description. We have a concern that option 3 will lead to a lot of discussion time at WG level, because it doesn't exclude the possibility of separate solutions with divergent specification impact for the two cases–we don't think any company intends to encourage specifying separate solutions, but we think the guidance in the WID should be clear in this respect.
- As indicated in the first round, we have the understanding that "the UE-UE inter-connection is assumed to be ideal **and 1:1**", i.e., a "helper" UE only helps one remote UE and a remote UE only has one helper.

17 – LG Electronics Inc.

We understand the main motivation of considering UE aggregation in this WI is it can reuse the solution for the original multi-path relay operation based on UE-to-Network relay. So if there is an intention to consider a separate solution for UE aggregation, we think it shall be done in a separate SI. If it will remain in this WI, then we think Option 4 should be the choice under the current situation with a lot of work load issues in order to limit WG discussions.

18 – Beijing Xiaomi Mobile Software

We think option 3 is enough.

19 – Ericsson LM

We are generally fine with the direction in Option 0 or Option 2, but we think it is necessary to clarify what the expected impact is. Similarly as in some other comments, we this separate solutions for the aggregation should not be considered. Thus we'd like to make a stronger statement: The solutions developed for 1) may be used for 2) and no additional spec to support 2) will be considered. (It is not clear to us if intention of any of the existing options is the same?)

20 – Samsung R&D Institute UK

Since the commonality of solutions for both scenarios should be achieved and the potential solution for 1) should be reused to 2) as much as possible, we prefer to keep option 0. However option 2 or option4 is acceptable.

21 – Deutsche Telekom AG

This is far too large and complex. Mutipath incl. any variant of "UE aggregation" should be dropped.

It would still be better to **drop the entire SL relay topic** as there is no market requirement visible and this is another example where 3GPP spents lot of ressources in paper work.

22 – Futurewei Technologies

From project management point of view, a real practical wayforward got to leverage possible commonality in solutions for scenarios 1) and 2) to fit the available TU. Option 4 seems to be the one which can be acceptable to most companies who are open to both scenarios 1) and 2).

23 – ROBERT BOSCH GmbH

We prefer option 3. However, we can accept option 4 as compromise.

24 – Qualcomm Incorporated

Prefer option 4 formulation (i.e. WID revision v001), followed by option 2, option 3, and then option 0.

We would object to option 1, as it is an unreasonable approach. The case 2) of using the unspecified inter-UE connection does not cover the sidelink specific operations. As suggested by Opt.4, the solution for case 2) could be a subset of the solution for 1), not the other way around.

25 – Philips International B.V.

We prefer option 2, 3 or 4. We also prefer to prioritize scenario 1 for multi-path over the UE-aggregation scenario 2. As mentioned in multi-hop UE-to-UE relay we are ok to remove the UE-aggregation in release 18 if this allows us to make room for multi-hop relay.

26 – Intel Korea

We think that there are still diverse views on this topic due to late addition of this topic in general and furthermore, late introduction of scenario 2. Our preference in order:

a) If multi-hop is supported, only study this objective as it relates to relaying (Remove Note 3A)

b) If multi-hop is not supported, prefer to study and later specify by prioritizing only scenario 1)

c) If multi-hop is not supported, prefer to study and later specify scenario 1) with priority and consider scenario 2) as per option 4 with lower priority. Since we have not studied this objective at all, we think it is difficult to nail down the reusability details now.

The moderator asks company input on the updates marked in yellow (other than the option for the scenario description) in draft WID revision v001 on the following parts:

- Addition of packet duplication in the example
- Note 3B to reuse Rel-17 solution for UE-to-Network relay
- Note 3C to clarify that Layer-3 relay study is subject to SA2 progress

Feedback Form 12: Company input on the update to draft WID revision v001

1 – InterDigital France R&D

For addition of the example, we are fine with addition of duplication, however, ”aggregation” should be removed.

For note 3B, we are fine with adding it, but think it is unnnecessary, as it should be clear that Rel17 is used as the baseline for the relay

For Note 3C, we prefer to exclude layer 3 in the work from the beginning. We think multipath using L3 relay is already possible and does not impact RAN.

2 – Spreadtrum Communications

We are OK with addition of duplication, Note 3B and Note 3C.

3 – Apple Europe Limited

1. There is no need for addition of packet duplication example.

2. For the suggestion of NOTE 3B, we think this is a common understanding to reuse R17 design. We are fine to have it, if this is not already clear to all companies.

3. For the suggestion of NOTE 3C, we think it is better to just delete “layer 3” from the objective. We do not foresee any RAN impact for Layer 3 multi-path U2N solutions.

4 – HuaWei Technologies Co.

1. We think packet duplication improves the reliability which is already stated in the objective. If clarification is needed in the example, we are fine to add it.

2. We are not clear about the intention for this NOTE 3B. Certainly the U2N relay shall be based on Rel-17 solution, if the intention is to avoid the case that solutions which are totally different than Rel-17 framework, perhaps we can say sth. like Rel-17 framework of U2N relay is the baseline for scenario 1)? .

3. We think if L3 relay to support multi-path is subject to SA2 decision, and again remote UEs are not visible to RAN, we don't understand how RAN2 can study solutions on this. L3 relay should be removed from this objective.

5 – CATT

1. We don't see a big problem in adding duplication. But on the other hand maybe the whole e.g., part is not very critical anyway...

2. Regarding note 3B, no strong view, but we feel that it is a bit obvious.

6 – Guangdong OPPO Mobile Telecom.

We are fine with the revision in general, except for the layer-3 part, for which we share the view by Huawei above.

7 – NEC Corporation

We are fine with these changes.

8 – New H3C Technologies Co.

We are fine with these modifications.

9 – ZTE Corporation

We think both data split and data duplication should be considered for multi-path relay. They can be regarded as potential forms of the aggregation. It It is suggested to change it as follows:

"(e.g., by by switching among or aggregating the multiple paths via data split or data duplication)"

It is obvious that Rel-17 UE-to-Network relay design should be the baseline, so we are fine to keep the note.

For the Note 3C, we prefer to keep the L3 relay.

10 – vivo Mobile Communication Co.

Generally fine with the modifications.

11 – China Telecomunication Corp.

We are fine with NOTE 3C.

12 – SHARP Corporation

We are fine with them.

13 – MediaTek Inc. The duplication example and Note 3B are fine. For node 3C, we agree with other companies that L3 could be excluded from this objective; L3 multi-path is not visible at RAN level.
14 – LG Electronics Inc. We are fine with them.
15 – Beijing Xiaomi Mobile Software Note 3B may be changed to 'as baseline'. We understand there may be some impact to R17 U2N to enable multipath.
16 – Ericsson LM We are fine in general but Note 3B should replace "should reuse" by "reuses"
17 – Samsung R&D Institute UK We are fine with the updates.
18 – Futurewei Technologies We agree with other companies that L3 could be excluded from this objective, as L3 multi-path is not visible at RAN.
19 – ROBERT BOSCH GmbH We are fine with Note 3C; however, we still prefer to down scope Layer 3.
20 – Qualcomm Incorporated The addition of the packet duplication example is not needed. Such examples can be part of the justification, but not the objectives. NOTE 3B wording needs update, as Rel-17 has no solution supporting multi-path. Suggest to reword to "NOTE 3B: The indirect path in scenario 1 will be based on the Rel-17 UE-to-Network Relay solution."
21 – Philips International B.V. We agree with the proposed changes
22 – Intel Korea We are fine with the updates in general. One suggestion to keep it generic is to change to: "e.g. by switching among or utilizing multiple paths simultaneously". In that sense, the two paths can be used by aggregating or duplicating and can be discussed during study phase.

The moderator kept the structure of v000 with the understanding that the addition of UE aggregation part is something new which requires reasonable study. He asks company input on "Study the benefit and potential solutions for multi-path support" vs. "Study and specify solutions for multi-path support."

Feedback Form 13: Company input on whether to add ”specify”

1 – InterDigital France R&D

We prefer that we don’t discuss UE aggregation, in which case, we could go with “study and specify solutions” right away in this release.

2 – Spreadtrum Communications

We are fine to add ”specify”.

3 – Apple Europe Limited

Add “specify” is not needed in WID(v001). However, we share the similar view with InterDigital that if multi-path objective contains scenario 1 only, we can even omit the study phase and specify solutions directly.

4 – HuaWei Technologies Co.

As mentioned by many companies that the benefits of multi-path relay is clear and normative work is straightforward, we think “specify” part should be included. Even with the inclusion of scenario 2) for UE aggregation, we still think the necessary normative work is similar (some part could be less) with the binding relation between these two scenarios.

5 – CATT

We are fine to add “specify”.

6 – Guangdong OPPO Mobile Telecom.

Seems the uncertainty mainly comes from UE-aggregation part, if so, we can separately handle the two, and the “specify” can be added at least on top of scenario 1)? (Rely on the moderator for the wording)

7 – NEC Corporation

We are fine to add ‘specify’ if the UE aggregation part is excluded from multi-path objective.

8 – New H3C Technologies Co.

We support adding “specify”.

9 – vivo Mobile Communication Co.

We are fine to add “specify”.

10 – ZTE Corporation

If the multi-path relay is limited to scenario 1, we may directly go to WI phase to specify the solutions for this simple scenario. Suppose the UE aggregation is to be merged with the multi-path SL relay, it is better to have SI objective for the multi-path relay support. The detailed objective for normative phase can be rediscussed after the completion of the SI phase. At that time, we should have better understanding of the dependency of scenario 1 and scenario 2 and given more specific objectives. In this case, it is suggested not to add ”specify”.

11 – China Telecomunication Corp.

We support to add 'specify' as our comment in the previous round. At least it is straightforward for scenario 1 (multi-path sidelink relay) to have the WI phase.

12 – SHARP Corporation

We support to add 'specify' if the UE aggregation is not included in the objective.

13 – ZTE Corporation

An update of our previous comments. Please moderator take this one as our final comment on this question.

We think UE aggregation is an important feature to improve throughput and reliability, and should definitely be supported in Rel-18. It is recommended to add "specify" to the WID. Actually, we may have better understanding of the dependency of scenario 1 and scenario 2 after the SI phase, so we may further refine the objectives for specification at that time.

14 – MediaTek Inc.

We support adding "specify".

15 – LG Electronics Inc.

Considering the lack of previous discussion especially on the UE aggregation part, we think it is safer not to add "specify" for this objective. We also think this is one way of addressing the work load issue as discussed in Tuesday GTW for other items.

16 – Ericsson LM

We think it is clear from the discussions so far that the benefits need to be assessed before deciding whether having normative work or not. Similarly, the main aspects of the potential solutions need to be understood before normative work, if any, can proceed. Therefore, we support to "study" at this point.

17 – Beijing Xiaomi Mobile Software

Seems companies understand there would be no specific solution for UE aggregation. With this understanding, specify could be added. Otherwise, it's better not to add specify

18 – Samsung R&D Institute UK

Since this objective is to study multi-path support on scenario 1) and scenario 2), we prefer to keep the text "Study the benefit and potential solutions for multi-path support".

19 – Futurewei Technologies

We support to have "study and specify solutions" as the goal of this objective.

20 – Qualcomm Incorporated

It is fine to add "specify".

21 – Philips International B.V.

We agree with OPPO

22 – Intel Korea

We are fine with the changes in general. We understand that note 3A indicates whether we can proceed to WI for this part. This can also help with workload manageability and we will have a better picture of dependency between scenario 1) and 2) after the study.

If you have any comments on the other parts of this objective, please specify them.

Feedback Form 14: Company input on the other parts of the objective

1 – Spreadtrum Communications

1. We are fine with not adding RAN1 into the objective as moderator suggested, but we want to clarify that no RAN1 TU doesn't mean this item will not affect RAN1.

2. As we commented in the first round, for "by switching among or aggregating the multiple paths", we suggest add one word "**or**" to accurately reflect the reality scenario: A UE is connected to the same gNB using one direct path and/**or** one indirect path via……

2 – Samsung R&D Institute UK

For CU-DU case, the same gNB means one gNB-CU and one or more gNB-DUs. Since those multiple paths may be from different gNB-DUs and RAN3 impacts should be considered to support multi-path relay between different gNB-DUs, RAN3 needs to be involved.

2.3 Objective on SL DRX for SL relay

The moderator asks company input on the update to the SL DRX for SL relay in draft WID revision v001.

Feedback Form 15: Company input on SL DRX for SL relay

1 – InterDigital France R&D

We are fine with the removal of the square brackets. However, note 4A should be removed, as it assumes RAN2 will do further study/discussion in the next meeting, which is contrary to what was agreed in the last RAN2 meeting. RAN2 has limited time to discuss this if we want to complete Rel17. Regarding the addition of the sentence that assumes DRX enhancements for carrier aggregation are out of scope, we think it may not be critical to add, since as is usually the case, features being added in one WI for a given release should not consider/assume the presence of another feature being worked on at the same time in another WI.

2 – vivo Mobile Communication Co.

OK with the updated version. We have to wait alt least until RAN#95e.

3 – Apple Europe Limited

We are fine with the current text in this objective. However, if there is work-load concern, we are also fine to drop this objective from SL relay WID because we believe Rel-17 SL-DRX solution can work for L2 SL relay, without optimization.

4 – CATT

We are fine with the updated text.

5 – HuaWei Technologies Co.

We agree with Apple.

6 – Guangdong OPPO Mobile Telecom.

Same view with Apple.

7 – NEC Corporation

We agree with the moderator's modification

8 – New H3C Technologies Co.

We are fine with moderator's modification

9 – ZTE Corporation

Once again, we think the Rel-17 SL DRX can be directly reused for SL relay. It is not necessary to further optimize it in Rel-18. If companies really think it is necessary to include this objective, it is suggested to mark it as secondary priority.

10 – SHARP Corporation

We are fine with the moderator's update.

11 – MediaTek Inc.

In our understanding, the agreements from RAN2#116-e do not currently exclude support of SL DRX with L2 relaying in Rel-17; rather, RAN2 did not take a decision on this case. From the meeting report:

2: Keep RAN2 previous agreement (prioritize the non-relay case without consideration of relay specific optimization in Rel-17) but we're not going to make any conclusion if L2 relay-related ProSe communication is supported or not in Rel-17 now.

3: RAN2 confirms Rel-17 SL-DRX design can be reused for L3 relay-related ProSe discovery without additional specific solution discussion/specification effort (by applying SL default-DRX configuration). No conclusion if L2 relay-related ProSe discovery is supported or not in Rel-17 now. RAN2 does not specify any restriction now.

We believe Rel-17 SL DRX solution can work with L2 relay, but there was disagreement in RAN2 and we think it's safest to keep the objective and check at RAN#95-e to have updated RAN2 status.

12 – LG Electronics Inc.

We are fine with the change. For clarification, we don't think RAN2 will have any further discussion in Rel-17 for this matter. The intention is to check the final specification at RAN#95e and if a hole is found in applying SL DRX for L2 U2N relay, this objective will be in effect to fill the gap. If RAN#95e finds that nothing in specifications blocks applying SL DRX for L2 U2N relay, we think this objective will be deleted.

13 – Samsung R&D Institute UK We are fine with the update.
14 – Ericsson LM We support the moderator's updates for SL DRX.
15 – Beijing Xiaomi Mobile Software fine with the update
16 – Futurewei Technologies Since the need of Rel-18 work is not clear now, this objective can be removed from this version. Update of WID can always be done later when the need becomes clear and there is consensus.
17 – Qualcomm Incorporated The moderator's proposal is fine.
18 – Philips International B.V. We agree with InterDigital
19 – Intel Korea We are fine with moderator's updates.

2.4 Others

The moderator asks company input on the other objectives including the following:

- Updates to the justification section in draft WID revision v001
- Addition of a statement of no specific enhancement for SL CA
- Addition of 38.323 in the expected outcome

Feedback Form 16: Company input on the other WID updates

1 – InterDigital France R&D The updates to the justification section do not seem to be aligned with the presence of the objective on SL DRX, so the sentence removed in the justification should be left in place. Regarding the addition of a statement for carrier aggregation, we think it may not be critical to add, since as is usually the case, features being added in one WI for a given release should not consider/assume the presence of another feature being worked on at the same time in another WI.
2 – vivo Mobile Communication Co. Regarding the additional statement of no specific enhancement of SL CA, we agree with the intention to

avoid cross-WI discussion with Rel-18 SL enhancement. But the wording should be more general as SL CA is only part of the Rel-18 SL enhancement scope. For example:

This work will not consider specific enhancement for sidelink relay support in Rel-18 sidelink enhancement~~carrier aggregation~~.

3 – Apple Europe Limited

1. We are fine with the justification update, except some slight rewording of the following sentence:

"In addition, support of multi-path with relay, where a remote UE is connected to NW via direct and indirect paths

2. We are fine to explain that SL CA is not considered for relay in R18.
3. We are fine to add PDCP spec TS 38.323 as the WID output.

4 – HuaWei Technologies Co.

As scenario 2) is included for multi-path objectives, we think justification can be added accordingly.

5 – ZTE Corporation

It is suggested to add the description of UE aggregation in the justification part. We are fine with the statemen of no specific enhancement for SL CA and the addition of 38.323 in the expected outcome.

6 – LG Electronics Inc.

We are fine with the updates.

7 – Samsung R&D Institute UK

We are fine with the updates.

8 – Ericsson LM

We are OK with the updates.

9 – Beijing Xiaomi Mobile Software

fine with the update

10 – Qualcomm Incorporated

The statement on the SL CA is not necessary, and it only brings confusion. SL CA should not be prevented if both Relay and Remote UE can support it. We should avoid the issue we had for the SL DRX again.

If you have any comments on the parts other than those discussed above (including any RAN4 related objectives), please specify them.

Feedback Form 17: Company input on other aspects

1 – Samsung R&D Institute UK

The impacted TS may need to include TS38.473 in case of CU-DU split.

2 – HuaWei Technologies Co.

RAN4 Chair: It is better to add one objective for RAN4 RRM core requirement is expected, i.e.,

5. Specify RRM core requirements for relay discovery and (re)selection in UE-to-UE relay [RAN4]

although there is an indicator of RAN4 involvement in bullet 1.

To clarify, is the correct understanding that there is no RAN4 RF requirements needed for bullet 1, no RRM requirement for bullet 2, and no demodulation performance requirement in this WID? If yes, fine.

2.5 Summary and moderator's proposal

2.5.1 UE-to-UE relay

Inclusion of multi-hop U2U relay

- Support
  - InterDigital, Apple, Kyocera, FirstNet, AT&T, TCCA, MINISTERE DE L'INTERIEUR, A.S.T.R.I.D. SA/NV, Softil, Philips, Erillisverkot (12)
  - Remove the UE aggregation part
    - InterDigital, Apple, Kyocera, Philips
  - Allocate more TU
    - Apple
  - Remove L3 multi-path
    - Apple
  - Remove SL DRX for relay
    - Apple
- Not support
  - Huawei, CATT, NEC, vivo, ZTE, Spreadtrum, China Telecommunication, Sharp, MediaTek, LGE, KT, Samsung, Xiaomi, Ericsson, Futurewei, Deutsche Telekom, Bosch, Qualcomm, Intel (19)
- Possible compromise
  - Consideration of forward compatibility for multi-hop in Rel-18
    - MediaTek, Futurewei, Qualcomm, Intel
  - Multi-hop is supported only in L3 relay
    - LGE
  - Multi-path relay objective is only for study in Rel-18
    - Intel

Updates in WID revision v001

- UE authorization subject to SA2 progress

    - Okay
        - InterDigital, vivo (editorial change), Apple, Huawei, CATT, NEC, New H3C Technologies, ZTE, MediaTek, LGE, Samsung, Ericsson (impact on TS 38.473), Qualcomm, Philips, Intel
    - Not okay
- Addition of QoS handling subject to SA2 progress
    - Okay
        - InterDigital, Apple, Huawei, CATT, NEC, New H3C Technologies, ZTE, MediaTek, LGE, Samsung, Ericsson, Bosch, Qualcomm, Philips, Intel
    - Not okay
    - Need to consider resource allocation
        - InterDigital, CATT
- Clarification in Note 1B that the restriction is for a given destination UE
    - Okay
        - InterDigital, Apple, Huawei, CATT, NEC, New H3C Technologies, ZTE, MediaTek, LGE, Samsung, Ericsson, Qualcomm, Philips, Intel
    - Not okay
        - Vivo

2.5.2 Multi-path relay

Description of the two scenarios

- Option 0
    - Ericsson, Samsung, Qualcomm (4th preference)
- Option 1
- Option 2
    - CMDI (acceptable), Spreadtrum (acceptable), vivo (acceptable), Huawei (acceptable), New H3C Technologies (acceptable), CEPRI (acceptable), Ericsson, Samsung, Qualcomm (2nd preference), Philips,
- Option 3
    - CMDI, Spreadtrum, vivo, Huawei, CATT, New H3C Technologies, ZTE, CEPRI, China Telecommunication, Xiaomi, Bosch, Qualcomm (3rd preference), Philips,
- Option 4
    - CMDI (acceptable), Spreadtrum (acceptable), Apple, Huawei (acceptable), OPPO, New H3C Technologies (acceptable), CEPRI (acceptable), MediaTek, LGE, Samsung, Futurewei, Bosch, Qualcomm, Philips, Intel (acceptable)
- Option 4’ (proposed by vivo)

    - vivo
- No scenario 2 for UE aggregation
    - InterDigital, Apple, Kyocera, NEC, Sharp, Deutsche Telekom, Intel

Updates in WID revision v001

- Addition of packet duplication in the example
    - Okay
        - InterDigital, Spreadtrum, Huawei, CATT, OPPO, NEC, New H3C Technologies, ZTE, vivo, Sharp, MediaTek, LGE, Ericsson, Samsung, Philips, Intel (generalized wording)
    - Not okay
        - Apple, Qualcomm
- Note 3B to reuse Rel-17 solution for UE-to-Network relay
    - Okay
        - InterDigital, Spreadtrum, Apple, CATT, OPPO, NEC, New H3C Technologies, ZTE, vivo, Sharp, MediaTek, LGE, Ericsson (editorial change), Samsung, Philips, Intel
    - Not okay
    - Rel-17 is baseline
        - Huawei, Xiaomi, Qualcomm
- Note 3C to clarify that Layer-3 relay study is subject to SA2 progress
    - Okay
        - Spreadtrum, NEC, New H3C Technologies, ZTE, vivo, China Telecomunication, Sharp, LGE, Ericsson, Samsung, Bosch, Philips, Intel
    - Not okay
    - Exclude L3 relay
        - InterDigital, Apple, Huawei, OPPO, MediaTek, Futurewei, Bosch

Whether to add “specify”

- Add
    - Spreadtrum, Huawei, CATT, New H3C Technologies, vivo, China Telecomunication, ZTE, MediaTek, Futurewei, Qualcomm,
        - For scenario 1
            - OPPO, NEC, Sharp, Philips
- Keep the current wording
    - LGE, Ericsson, Samsung, Intel

- No scenario 2 for UE aggregation
    - InterDigital, Apple

Other parts

- Spreadtrum: “A UE is connected to the same gNB using one direct path and/or one indirect path via……”
- Samsung: RAN3 involvement is necessary for the CU-DU split case

2.5.3 SL DRX for SL relay

Update in WID revision v001

- Okay
    - vivo, Apple, CATT, Huawei, OPPO, NEC, New H3C Technologies, Sharp, MediaTek, LGE, Ericsson, Xiaomi, Qualcomm, Intel
- Not okay
- Remove Note 4A
    - InterDigital, Philips
- Mark as second priority
    - ZTE
- Remove the objective from this version and consider it later
    - Futurewei

2.5.4 Others

Update in WID revision v001

- Updates to the justification section in draft WID revision v001
    - Okay
        - Apple (with editorial change), LGE, Samsung, Ericsson, Xiaomi
    - Not okay
        - InterDigital
    - Add UE aggregation aspects
        - Huawei, ZTE
- Addition of a statement of no specific enhancement for SL CA

    - Okay
        - Vivo (with rewording), Apple, ZTE, LGE, Samsung, Ericsson, Xiaomi
    - Not okay
        - InterDigital, Qualcomm

- Addition of 38.323 in the expected outcome
    - Okay
        - Apple, ZTE, LGE, Samsung, Ericsson, Xiaomi,
    - Not okay

Comments on the other parts

- Samsung: Add TS38.473 in case of CU-DU split
- Huawei (RAN4 chair): Add a separate RAN4 objective for RRM core requirements for relay discovery and (re)selection in U2U relay

2.5.5 Moderator's proposal

The moderator observes that the most outstanding issues are whether/how to introduce multi-hop UE-to-UE relay and UE aggregation while keeping the manageable workload. He proposes the following way forward (planned to discuss it during Wednesday GTW) for the balance between the two objectives under the reasonable workload:

- Support multi-hop UE-to-UE relay only for Layer-3 relay.
    - Note 1A in the current WID "This work should take into account the forward compatibility for supporting more than one hop in a later release" applies to Layer-2 relay.
- Adopt Option 4 for the description of the scenarios in the multi-path relay objective.
    - Keep the current wording "Study the benefit and potential solutions for multi-path support" and Note 3A "Study on the benefit and potential solutions are to be completed in RAN#98 which will decide whether/how to start the normative work."
    - Remove Layer-3 relay from the objective.

For SL DRX for SL relay, the moderator thinks that it can be postponed to the next meeting to check whether there will be any blocker in applying SL DRX to SL relay in the final version of the specifications RAN2 will produce after the progress as per their agreements. He thinks that Note 4A is necessary for this purpose.

The moderator agrees with the comments that the justification section needs to include some text for the UE aggregation if it remains in the WID. He thinks the wording in RP□213202 can be a starting point.

The moderator considers that the other updates in v001 are generally acceptable, so he proposes to keep them in the next version with some rewording proposed by the companies.

3 Final round

The following was agreed in Wednesday GTW:

- Rel-18 supports single hop UE-to-UE relay. A note will be added to consider the forward compatibility for the multi-hop relay.
- Option 4 is used for the description of multi-path relay scenarios.

Draft WID revision v002 is made based on this agreement and the comments received during the previous rounds on the other parts. It is uploaded in the draft folder and the moderator seeks company input on it in the subsequent subsections. The moderator proposes to aim to make an approvable version after the final round, so suggest focusing on finalizing the remaining substantial issues.

3.1 Justification

This section is to collect company input on the justification section in the draft WID revision V002. The moderator added some text on the UE aggregation aspects. He also thinks that the text for SL DRX for SL relay can be added later by WID revision once RAN agrees to have the corresponding objective.

Feedback Form 18: Company input on the justification section

1 – New H3C Technologies Co. We are fine with Justification section.
2 – HuaWei Technologies Co. The justification for UE aggregation looks ok to us in general.
3 – NEC Corporation We agree with the moderator’s modification.
4 – SHARP Corporation We are fine with the moderator’s update.
5 – MediaTek Inc. OK with the updated justification.

6 – Ericsson LM We are OK in principle, however it is not entirely clear to us what is meant by the ”non-standardized UE-UE interconnection”. Should this interconnection be SL? Or does this refer to a possible physical link or connection between the UEs, or to some other (non-3GPP) wireless technologies?
7 – ZTE Corporation We are fine with the justification part.
8 – Beijing Xiaomi Mobile Software Support the latest justification.
9 – LG Electronics Inc. We support the latest version. On Ericsson’s question, ”non-standardized UE-UE interconnection” means the inter-UE link uses a link not standardized in 3GPP which can include any wireless and wired connections.
10 – Samsung R&D Institute UK The addition looks fine in general.
11 – Qualcomm Incorporated The justification change is fine.
12 – InterDigital France R&D The justification is fine for us.
13 – Intel Korea We are in general supportive of adding justification for the non-standardized UE-UE link as part for UE aggregation. While the objective indicates relaying and non-standardized UE-UE link are two scenarios of UE aggregation; the justification seems to indicate the latter is the only way to support UE aggregation. A slight suggestion is to change: ”to support the concept of UE aggregation where” to ”for UE aggregation where”
14 – Philips International B.V. We are fine with it

3.2 Objective 1: UE-to-UE relay

This section is to collect company input on Objective 1 for UE-to-UE relay in the draft WID revision V002. The moderator thinks that the existing Note 1A reflects what was agreed in GTW but suggestion for further improvement is welcome.

Feedback Form 19: Company input on Objective 1

1 – New H3C Technologies Co. We are fine with Objective 1.
2 – HuaWei Technologies Co. We are fine with Objective 1.
3 – NEC Corporation We support this objective.
4 – China Telecomunication Corp. The updated objective is fine to us.
5 – SHARP Corporation We are fine with Objective 1.
6 – MediaTek Inc. We are OK with this objective. We agree that Note 1A is in line with what was agreed in the GTW.
7 – Ericsson LM We are fine with Objective 1
8 – Samsung R&D Institute UK We are fine with Objective 1.
9 – ZTE Corporation We are fine with Objective 1
10 – Beijing Xiaomi Mobile Software Support objective 1
11 – LG Electronics Inc. We support this objective.
12 – ROBERT BOSCH GmbH We are fine with Objective 1

13 – AT&T

AT&T

1. We propose a small modification to Note 1A (modification in bold): **"If time does not permit to support multi-hop in Rel-18, the** work should take into account the forward compatibility for supporting more than one hop in a later release.".

2. Assuming the proposed modification is acceptable, please include AT&T as a supporting company of the proposed, new WID.

14 – Nkom

Nkom support point 1 of AT&Ts input (#13) and would like to see the modified Note 1A, in the WID.

15 – FirstNet

FirstNet supports AT&T's suggested revision to Note 1A. Also, please include FirstNet as a supporting IM assuming that modification to Note 1A is agreed as suggested.

16 – MINISTERE DE L'INTERIEUR

MINISTERE DE L'INTERIEUR supports AT&T's suggested revision to Note 1A.

17 – MINISTERE DE L'INTERIEUR

French DGGN supports point 1 of AT&T's input and would like to see the modified Note 1A in the WID.

18 – Qualcomm Incorporated

The objective for UE-to-UE Relay is fine.

19 – TCCA

Erillisverkot (and TCCA as MRP) support point 1 of AT&Ts input (#13) and would like to see the modified Note 1A, in the WID.

20 – A.S.T.R.I.D. SA/NV

ASTRID supports point 1 of AT&T's input and would like to see the modified Note 1A in the WID.

21 – InterDigital France R&D

We are fine with the objective.

22 – Intel Korea

We are fine with the wording of objective 1

23 – Philips International B.V.

We are fine with the objective

24 – Apple Europe Limited

We support the AT&T 's rewording of NOTE 1A.

3.3 Objective 2: Service continuity enhancement

This section is to collect company input on Objective 2 for service continuity enhancements in the draft WID revision V002. The moderator thinks this objective is stable and made some editorial changes.

Feedback Form 20: Company input on Objective 2

1 – HuaWei Technologies Co. We are fine with Objective 2.
2 – NEC Corporation We support this objective.
3 – China Telecomunication Corp. We support objective 2.
4 – SHARP Corporation We support Objective 2.
5 – MediaTek Inc. We support this objective.
6 – Ericsson LM We are fine with Objective 2
7 – Samsung R&D Institute UK We are fine with Objective 2.
8 – ZTE Corporation We are fine with Objective 2.
9 – Beijing Xiaomi Mobile Software We support objective 2
10 – LG Electronics Inc. We support this objective.
11 – ROBERT BOSCH GmbH We are fine with objective 2
12 – Qualcomm Incorporated We support this objective.

13 – InterDigital France R&D We are fine with the objective.
14 – Intel Korea We are fine with the updated wording of objective 2
15 – Philips International B.V. We are fine with the objective
16 – Apple Europe Limited We are fine with this objective.

3.4 Objective 3: Multi-path relay

This section is to collect company input on Objective 3 for multi-path relay in the draft WID revision V002. This version reflects what was agreed in GTW, and several changes are made based on the received comments. The moderator would like to ask feedback on the addition of baseline wording in Note 3B.

Feedback Form 21: Company input on Objective 3

1 – Spreadtrum Communications Thank Hanbyul for your great efforts. We are fine with 3B. But we still have one old comment: in the main bullet objective 3, it is said "…(e.g., by switching among or utilizing the multiple paths simultaneously) …", we think the sub-bullet A should be aligned with the main bullet, so we suggest adding one word "or" into the sub-bullet, "A UE is connected to the same gNB using one direct path and/**or** one indirect path…". Thanks.
2 – New H3C Technologies Co. We want to clarify whether scenario 1 in Note 3B means "1) layer-2/layer-3 UE-to-Network relay" or not?
3 – Guangdong OPPO Mobile Telecom. Firstly, to repeat the comment in the previous rounds (as commented by others as well), the objective on Layer-3 case is not clear / motivated, so we are still not convinced by it. Secondly, for the scenario-2) on UE aggregation, we wonder if the target scenario means it does not have to consider together with the objective-2 which is mainly on inter-gNB mobility or indirect-2-indirect mobility scenario.
4 – HuaWei Technologies Co. For objective 3, we are fine to use option 4 as discussed earlier to clarify the relation between scenarios 1) and 2). We understand from the GTW that adoption of option 4 in RP-213496 has two sub-bullets, and the current modification did not reflect the second sub-bullet of removing L3 relay? We suggest to remove it. Again we don't see what can be studied for L3 relay in RAN2.

5 – NEC Corporation

We support this objective.

6 – MediaTek Inc.

We have the same understanding as Huawei, that multi-path for L3 relay should be removed because there is no RAN impact. Reviewing the comments in the intermediate round, we find that there were only a few companies who affirmatively supported Note 3C, and none of those comments indicated what impact the proponents foresee. (Most of the companies listed as ”okay” with note 3C in section 2.5.2 just indicated support of the objective as a whole and had no specific comment on the note.) If companies want to keep L3 in this objective, what do they understand RAN2/RAN3 would do?

7 – Deutsche Telekom AG

We agree that L3 might be transparent for RAN and hence should be deleated from the WID.

For L2 the scenario and benfits are still far from being clear and hence in order to have a managable workload especially for RAN2 this objective 3 should be dropped form Rel-18.

8 – Ericsson LM

For Note 3B: We would like to update the note to cover both Rel-17 and pre-Rel-17 solutions, if applicable.

Regarding Note 3C and the Layer 3 relay: Objective 3 is to ”study”, and we are not OK to remove Layer 3 solutions from the scope of the study. If the opposing companies do not think there is any RAN impact, then there should be no workload implications thus there should be no problem in keeping in the L3 part. This is already subject to SA2 progress as mentioned in the note, so the exact details depend on that. Any potential spec impacts can be then determined during the study phase, where a possible outcome is that there would be minor or negligible impact in RAN specs.

9 – ZTE Corporation

We are fine with the current wording of Note 3B and we think L3 relay should be kept in the objective.

10 – Beijing Xiaomi Mobile Software

We understand L3 is transparent to RAN. There is no need to keep L3 in the objective.

11 – LG Electronics Inc.

We understand the comment that L3 can be kept in this objective for study, but we now prefer removing it. The reason is that, even though L3 has no/marginal specification impact, WG discussion will be necessary to identify the exact specification impact which will anyhow require some time units. Thus removing L3 would help the workload management.

12 – Samsung R&D Institute UK

We are fine with Note 3B.

13 – ROBERT BOSCH GmbH

We are fine with objective 4; however, we still prefer to remove L3 from the wording.

We would like to echo and support Ericsson comment for Note 3B:

Note 3B: We would like to update the note to cover both Rel-17 and pre-Rel-17 solutions, if applicable.

14 – Sony Europe B.V. We are ok with the latest objective
15 – Apple Europe Limited We think Layer-3 needs to be removed from multi-path. This objective should be only for Layer 2.
16 – Qualcomm Incorporated We support the objective with the current formulation.
17 – InterDigital France R&D As with other companies, we think L3 should be removed from the objective.
18 – Intel Korea We are fine in general with the wording of objective 3 and the notes.
19 – Philips International B.V. We are fine with the objective, as mentioned by other companies L3 can be removed

3.5 Objective 4: SL DRX for SL relay

This section is to collect company input on Objective 4 for SL DRX for SL relay in the draft WID revision V002. The moderator would like to clarify his understanding: This temporary objective will not task RAN2 to do something in Rel-17. RAN2 will proceed with the existing agreements and finalize the specifications by the next RAN meeting. RAN will review the situation and check whether SL DRX is applicable to SL relay operations. RAN will decide whether to keep the objective considering the review result.

Feedback Form 22: Company input on Objective 4

1 – New H3C Technologies Co. We are fine with Objective 4.
2 – NEC Corporation We support this objective.
3 – MediaTek Inc. We agree with the moderator's analysis and think this is a good way forward.
4 – SHARP Corporation We support the objective 4, and we think if RAN2 will not bring updates for this issue by next RAN meeting, objective 4 should be included in this WID scope.

5 – Ericsson LM We are fine with Objective 4 and agree this does not task RAN2 to do anything particular beyond proceeding with their normal work.
6 – Nokia Denmark For objective 4, question is why only L2 U2N relay is in the scope for SL DRX. In our view, both L2 and L3 U2N relay will have similar impact on SL DRX over PC5 interface. This objective, if needed, should be applied commonly for L2 and L3 relay.
7 – Samsung R&D Institute UK We are fine with Objective 4.
8 – Beijing Xiaomi Mobile Software We support Objective 4
9 – LG Electronics Inc. We support this objective. In our understanding, RAN2 already agreed that SL DRX can be used for L3 U2N relay operations, so this objective needs to be considered only for L2.
10 – ROBERT BOSCH GmbH We support this proposal.
11 – Qualcomm Incorporated We support objective 4.
12 – InterDigital France R&D We are fine with the objective.
13 – Intel Korea We are fine with the wording of objective 4
14 – Philips International B.V. We are fine with the objective

3.6 Other parts of the objective section

This section is to collect company input on the other parts of the objective section in the draft WID revision V002.

Feedback Form 23: Company input on other parts of the objective section

1 – HuaWei Technologies Co.

It is not clear to us about the following addition. We think any other enhancement done in other SI/WI could be used for sidelink relay if nothing more needs to be specified. So this seems not needed.

This work will not consider specific enhancement for sidelink relay support in Rel-18 sidelink enhancements to be done in other items.

2 – MediaTek Inc.

Similar view to Huawei. We agree with the moderator's marginal comment on this part, but the text in the objective is not quite clear. If there is a strong preference to keep this addition, maybe we could reword as follows, taking some language from the marginal note:

This work will not consider specific enhancement for sidelink relay support of functionality specified in Rel-18 sidelink enhancements. If Rel-18 sidelink enhancements can be operated in relay without any special handling, they can be used in relaying operations.

3 – Ericsson LM

We support keeping in the proposed addition.

If there would be no impact on adding other Rel-18 enhancement, it would be fine. However, there is value in the added text as it specifically says that there is no intention to do anything new or have further spec impacts because of possible other Rel-18 enhancements. This can help in keeping the workload better balanced especially towards the end of the release.

4 – LG Electronics Inc.

We think the proposed addition on the other WI is necessary in order to avoid discussion in WGs about whether some enhancements related to other WIs are allowed by this WI. We are okay with the wording from MediaTek.

5 – Samsung R&D Institute UK

We think that the addition "This work will not consider specific enhancement for sidelink relay support in Rel-18 sidelink enhancements to be done in other items." is necessary to avoid any cross work item impact.

6 – Apple Europe Limited

For the issue about the cross-work impact, we support MediaTek's rewording:

This work will not consider specific enhancement for sidelink relay support of functionality specified in Rel-18 sidelink enhancements. If Rel-18 sidelink enhancements can be operated in relay without any special handling, they can be used in relaying operations.

7 – Qualcomm Incorporated

We support MediaTek's wording.

The motivation is understandable, but we should not unnecessarily restrict the Sidelink Relay's use of new features.

8 – InterDigital France R&D We also support the wording suggestion from Mediatek.

3.7 Other parts of the draft WID

This section is to collect company input on the other parts in the draft WID revision V002. This can include the excel sheet for the TU allocation which does not contain TUs for the performance part yet.

Feedback Form 24: Company input on the other parts of the draft WID

1 – Nokia Denmark We support the WID. Please add Nokia and Nokia Shanghai Bell as supporting IM.
2 – Swiss Federal Railways Ltd UIC (International Union of the Railways) UIC supports the WID and please add UIC as supporter.
3 – ROBERT BOSCH GmbH We support the WID. Please add Robert Bosch GmbH as a supporting company
4 – Qualcomm Incorporated Qualcomm Inc. support the WID, and would like to be added as a supporting company.
5 – InterDigital France R&D We support the WID. Please add InterDigital as a supporting company.
6 – Philips International B.V. Please add Philips as a supporting company for this WID

3.8 Summary

Justification

- Okay with v002
  - New H3C Technologies, Huawei, NEC, Sharp, MediaTek, Ericsson, ZTE, Xiaomi, LGE, Samsung, Qualcomm, InterDigial, Intel (wording change proposed), Philips
- Comment
  - Ericsson: Unclear about “non-standardized UE-UE interconnection”

Objective 1: UE-to-UE relay

- Okay with v002
  - New H3C Technologies, Huawei, NEC, China Telecomunication, Sharp, MediaTek, Ericsson, Samsung, ZTE, Xiaomi, LGE, Bosch, Qualcomm, InterDigital, Intel, Philips
- Add “If time does not permit to support multi-hop in Rel-18” to Note 1A
  - AT&T, Nkom, FirstNet, MINISTERE DE L’INTERIEUR, TCCA, A.S.T.R.I.D. SA/NV

Objective 2: Service continuity enhancements

- Okay with v002
  - Huawei, NEC, China Telecomunication, Sharp, MediaTek, Ericsson, Samsung, ZTE, Xiaomi, LGE, Bosch, Qualcomm, InterDigital, Intel, Philips

Objective 3: Multi-path relay

- Okay with v002
  - NEC, ZTE, Sony, Qualcomm, Intel,
- Remove Layer-3 relay case
  - Yes: OPPO, Huawei, MediaTek, Deutsche Telekom, Xiaomi, LGE, Bosch, Apple, InterDigital, Philips
  - No: Ericsson, ZTE
- Comments:
  - Spreadtrum: add “/or” in the main bullet
  - New H3C Technologies: clarification question about scenario 1 in Note 3B
  - OPPO: scenario 2 does not need to consider Objective 2
  - Deutsche Telekom: Drop Objective 3
  - Ericsson, Bosch: Update Note 3B to cover both Rel-17 and pre-Rel-17 solutions
  - Samsung: Note 3B is fine

Objective 4: SL DRX for SL relay

- Okay with v002
  - New H3C Technologies, NEC, MediaTek, Sharp, Ericsson, Samsung, Xiaomi, LGE, Bosch, Qualcomm, InterDigital, Intel, Philips
- Comment
  - Nokia: The solution should be applicable to L3

Other objectives

- The note about other WI
  - Not necessary: Huawei, MediaTek (proposed an alternative wording which is supported by LGE, Apple, MediaTek, InterDigital)
  - Needs to keep it: Ericsson, LGE, Samsung,

4 Final summary

The moderator updated the WID revision and submit it in RP-213548. The changes with respect to V002 are as follows:

- In the justification, Intel's suggestion was adopted, i.e., "This multi-path relay solution can also be utilized to for UE aggregation."
- Layer-3 relay is removed from Objective 3 as the moderator observed this is the majority view. He also thinks that, even though L3 relay can have no or marginal specification impact in AS layer, it will still require some time units to study what kind of specification impact is necessary and how RAN2/3 need to interact with SA WGs, etc. Thus removing L3 would also be helpful from the workload perspective while the moderator understands that several companies wanted to keep it.
- In the statement on Rel-18 sidelink enhancements, MediaTek's suggestion was adopted to clarify that such enhancements can be operated if possible without specification enhancements for relaying.

The moderator would like to respond to the comments and questions received during the final round as follows:

On the meaning of "non-standardized UE-UE interconnection" in the justification, the moderator thinks that it can be any wireless or wired interfaces. It simply says that the UE-UE interconnection does not use an interface 3GPP standardized.

On the addition of "If time does not permit to support multi-hop in Rel-18" to Note 1A, the moderator thinks that such an addition would contradict to the main bullet which already says "single-hop Layer-2 and Layer-3 UE-to-UE relay."

On the addition of "/or" in the main bullet of Objective 3, the moderator thinks it is not necessary because this objective is for the "multi-path" relay. A remote UE will have two connections via direct and indirect link, but

when the “switching” is applied under this scenario, data will be sent via only one of them. He thinks this would be difference from the traditional “path switching” where a remote UE has only a single connection, and this switching under multi-path relay may provide a faster data path change, less interruption, etc.

On Note 3B, the moderator thinks that the submitted version is okay. It is unclear why pre-Rel-17 is necessary because Rel-17 is the first release UE-to-Network relay is specified in NR. The moderator understands that any relay enhancements developed in Rel-18 can be used in scenario 2 as they will be a part of UE-to-Network solutions for scenario 1 which will be reused for scenario 2.

On the comment to apply SL DRX for L3 relay, the moderator thinks it is not necessary for the time being because RAN2 confirmed that SL DRX can be used for L3 relay.

Based on the discussion so far, the moderator proposes to approve RP-213548 as the WID of Rel-18 sidelink relay enhancements.

5 Week 2: Initial round

Companies discussed in the RAN email reflector the WID submitted in RP-213548 where Layer-3 UE-to-Network relay was removed from Objective 3 on multi-path relay. Several companies proposed to put it back to the WID while some other companies questioned the RAN2 impact of adding that feature. An alternative proposal was made to add a new note ”Note 3C: Support of Layer-3 UE-to-Network relay in multi-path scenario is assumed to have no RAN impact and the work and solutions are subject to SA2 to progress.” The moderator observed that adding this note can be an agreeable way forward, and thus added to the updated WID submitted in RP-213585.

The moderator proposes to approve RP-213585.