**3GPP TSG-RAN WG2 #119bis-e *R2-221xxxx***

**E-meeting, October 2022**

Agenda Item: 8.9.4

Source: OPPO

Title: Summary of  [AT119bis-e][426][Relay] Control plane aspects for multi-path (OPPO)

Document for: Discussion, Decision

# Introduction

This is for the following offline discussion.

* [AT119bis-e][426][Relay] Control plane aspects for multi-path (OPPO)

Scope: Discuss P11/P12/P18/P19/P20 of R2-2209375, considering applicability to both scenarios 1 and 2.

Intended outcome: Report to CB session

Deadline: Monday 2022-10-17 1700 UTC

# Discussion

## Scenario

For Scenario, two proposals are provided in 09375

*Proposal 11 For scenario-1 of multi-path relay, R2 does not pursue applying multi-path relay to the procedures of SIB delivery, paging delivery, RRC setup/resume and re-establishment.*

*Proposal 12 For scenario-1 of multi-path Relay, R2 focus on the application of multi-path relay to RRC\_CONNCTED UEs only, i.e., after RRC setup/resume / re-establishment procedure.*

Firstly, to check companies view on the applicability of MP-relay for RRC states.

**Q1-1: Do you think multi-path Relay is applicable to RRC\_CONNECTED remote-UE or not?**

|  |  |  |  |
| --- | --- | --- | --- |
| Company | Scenario-1 | Scenario-2 | Comment |
| OPPO | Yes | Yes |  |
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**Q1-2: Do you think multi-path Relay is applicable to RRC\_INACTIVE remote-UE or not?**

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| --- | --- | --- | --- |
| Company | Scenario-1 | Scenario-2 | Comment |
| OPPO | No | No |  |
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**Q1-3: Do you think multi-path Relay is applicable to RRC\_IDLE remote-UE or not?**

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| --- | --- | --- | --- |
| Company | Scenario-1 | Scenario-2 | Comment |
| OPPO | No | No |  |
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Secondly, besides the applicability to the dimension of RRC states, to check companies view on the other dimension, i.e., related RRC procedures.

**Q2-1: Do you think R2 needs to enhance R17 mechanism of SIB-delivery for R18 MP Relay?**

|  |  |  |  |
| --- | --- | --- | --- |
| Company | Scenario-1 | Scenario-2 | Comment |
| OPPO | No | No | We do not think MP-Relay is applicable to RRC\_IDLE/RRC\_INACTIVE UEs, where R17 procedure (where the UE can by its implementation to perform the SI reception via direct path besides the indirect path) is sufficient.  Although it is applicable to RRC\_CONNECTED remote UE, we do not think there is a need for specific optimization for it:  If the SIB is delivered via dedicated RRC signaling, then it is a just about split-SRB configuration issue; Or if the SIB is delivered via SIB directly, then UE can acquire the SIB directly if configured with CSS. |
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**Q2-2: Do you think R2 needs to enhance R17 mechanism of Paging-delivery for R18 MP Relay?**

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| --- | --- | --- | --- |
| Company | Scenario-1 | Scenario-2 | Comment |
| OPPO | No | No | Since we do not think MP-Relay is applicable to RRC\_IDLE/RRC\_INACTIVE UEs, where R17 procedure (where the UE performs the paging reception via a single path) is sufficient. |
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**Q2-3: Do you think R2 needs to enhance R17 mechanism of RRC setup/resume/re-establishment procedure for R18 MP Relay?**

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| --- | --- | --- | --- |
| Company | Scenario-1 | Scenario-2 | Comment |
| OPPO | No | No | R17 procedure (where the UE performs the RRC procedure via a single path) is sufficient. |
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## PCell configuration

For Pcell configuration, one proposal is provided in 09375

*Proposal 18 For scenario-1 of multi-path Relay, PCell is always configured on the direct path when configured.*

**Q3: For UEs operating in MP Relay, if the two paths are for different cells, which case(s) is a valid case?**

**Case-1: The cell of direct path is PCell of the UE**

**Case-2: The cell of indirect path is PCell of the UE**

|  |  |  |  |
| --- | --- | --- | --- |
| Company | Scenario-1 | Scenario-2 | Comment |
| OPPO | Case-1 | Case-1 | If we put PCell on direct path, it means Uu interface is only with SCell, which did not happen before, and the problem is how to perform RACH, PUCCH reporting and RLM, which relies on the existence of PCell based on the current spec. |
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## Path Switching

R2 reached the conclusion as follows

Agreements:

Proposal 1-1A (modified): The following cases are to be supported for Scenario 1.

A. The remote UE operating only on the direct path adds the indirect path under the same gNB;

B. The remote UE operating only on the indirect path adds the direct path under the same gNB;

C. The remote UE operating in multi-path releases the indirect path;

D. The remote UE operating in multi-path releases the direct path;

G. The remote UE operating in multi-path changes to a new relay UE for the indirect path while keeping the direct path under the same gNB. FFS if this case would be supported via separate release-and-add (A+C in separate reconfigurations) or a single switch procedure (e.g. similar to i2i service continuity).

Proposal 1-1B (modified): The following case is to be not supported for Scenario 1 as a group mobility scenario.

F. The remote UE configured with multi-path keeps the serving relay UE for the indirect path and the serving cell of the remote UE for the direct path while the serving relay UE changes the serving cell of the relay UE under the same gNB;

Agreement:

The following case can be supported via separate release-and-add for scenario 1 (B+D in separate reconfigurations):

E. The remote UE operating in multi-path changes the direct path to a different cell of the same gNB while using the serving relay UE for the indirect path under the same gNB.

FFS if a single procedure for this case would be supported.

Agreements:

Proposal 1-2A: The following cases are proposed to be supported for Scenario 2.

A. The remote UE configured only on the direct path adds the indirect path under the same gNB;

C. The remote UE configured with multi-path releases the indirect path;

Proposal 1-2B: The following case is proposed to be not supported for Scenario 2.

F. The remote UE configured with multi-path keeps the serving relay UE for the indirect path and the serving cell of the remote UE for the direct path while the serving relay UE changes the serving cell of the relay UE under the same gNB;

Proposal 1-2C: Whether to support the following case can be further discussed for Scenario 2.

B. The remote UE configured only on the indirect path adds the direct path under the same gNB;

D. The remote UE configured with multi-path releases the direct path;

E. The remote UE configured with multi-path changes the serving cell of the remote UE for the direct path while keeping the serving relay UE for the indirect path under the same gNB;

G. The remote UE configured with multi-path changes to a new relay UE for the indirect path while keeping the direct path under the same gNB.

One proposal is provided in 09375

*Proposal 19 For scenario-1 of multi-path Relay, in case of path switching, a RRC\_IDLE/RRC\_INACTIVE Relay UE initiates RRC connection establishment procedure upon the message received from a Remote UE via SL-RLC, not limited to SL-RLC0/1.*

**Q4-1: For R18 MP Relay, for the supported path switching scenario (which scenarios to support is up to the specific discussion on scenarios), when there is an addition of indirect path or a change of indirect path, do you agree to support RRC\_IDLE/RRC\_INACTIVE target relay UE?**

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| --- | --- | --- | --- |
| Company | Scenario-1 | Scenario-2 | Comment |
| OPPO | Yes | Yes | Same as in R17. |
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**Q4-2: If Yes to Q4-1, how to trigger the RRC\_IDLE/RRC\_INACTIVE target relay UE to initiate RRC connection establishment procedure?**

**Option-1: Upon the message received from a Remote UE via SL-RLC, not limited to SL-RLC1**

**Option-2: Other (please clarify the solution if this is selected)**

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| --- | --- | --- | --- |
| Company | Scenario-1 | Scenario-2 | Comment |
| OPPO | 1 | 2 (Up to UE implementation) | For Sce-1: in R17, it is limited to SL-RLC1, yet for MP Relay, since SRB1 may not be configured at indirect path, it does not have to be limited to it.  For Sce-2: Since UE-to-UE link is a blackbox, maybe OK to leave it to UE implementation. |
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## RLM/RLF

One proposal is provided in 09375

*Proposal 20 For scenario-1 of multi-path Relay, UE performs RLM on both direct and indirect path.*

When UE operating in MP Relay, which path(s) to perform RLM?

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| --- | --- | --- | --- |
| Company | Scenario-1 | Scenario-2 | Comment |
| OPPO | Uu + PC5 | Uu, and UE-UE link is left to UE implementation | For Scenario-1, it is clear and it is just to follow legacy procedure.  For Scenario-2, the handling of UE-UE link is a blackbox, so the key issue is whether/how to handle if there is some ‘failure’ like event at UE-UE link, yet no need to dig into the need of RLM though. |
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1. xxx.

# Conclusion

We have the following proposals:

[Proposal 1 xxx.](#_Toc116550638)

# Reference

1. xxx