3GPP TSG-RAN WG3#126 R3-247844

Orlando, US, 18th – 22nd November 2024

Agenda Item: 14.3

Source: CATT (Moderator)

Title: Summary of Discussion on CB: NRNTN2\_Regenerative

Document for: Discussions & Approval

#  Introduction

This is the Summary of the discussion for below CB:

**CB: # NRNTN2\_Regenerative**

**- Check the open issues above**

(moderator - CATT)

Summary of offline disc [R3-247844](Inbox/R3-247844.zip)

We only focus on the issues mentioned during the online session, including support of RRC\_INACTIVE, Support of NG

#  For Chair’s notes

**Support of RRC\_INACTIVE:**

**RAN3 assumes that current mechanisms to support UEs performing RRC connection resume and RRC connection re-establishment may be reused in regenerative payload architecture, subject to implementation and deployment.Whether to do any extra enhancement(s) for Inactive to be continued.**

**Support of NG Suspend/Resume:**

**Whether to support NG Suspend/Resume is to be continued, companies are encouraged to further consider the pros and cons of the NG Suspend/Resume.**

#  Discussion

## 3.1 Support of RRC\_INACTIVE

Information copied from Chair’s Note, reflect the situation of online discussion:

*RAN3 assumes that current mechanisms to support UEs performing RRC connection resume and RRC connection re-establishment may be reused in regenerative payload architecture, subject to implementation and deployment.*

**Any standard impact?**

**Option 1, UE context is forwarded to the next satellites**

**Option 2, UE context is kept on a fixed node (on-ground gNB or AMF)**

**Option 3, UE context is kept in the last serving gNB and NG-based UE context retrieve procedure is used**

Current situation is we have discussed and assumed *current mechanisms to support UEs performing RRC connection resume and RRC connection re-establishment may be reused in regenerative payload architecture, subject to implementation and deployment.* Which means whether to support Inactive, and how to configure RNA are pending to implementation. E.g. for GEO case, it seems Inactive could be support smoothly without any extra enhancement.

Now, we see some companies expect to make some new solutions aims to make UE context retrieval possible in case of NGSO moves, the corresponding solutions are copied below from [R3-247316](Docs%5C%5CR3-247316.zip) for reference.

Option 1, UE context is forwarded to the next satellites

- Option 1-1, before Xn is about to be disconnected, page and relocate UE context to next the satellite.

* The UE's last serving gNB can send paging messages to candidate gNB(s) relevant to the UE's RNA, when the Xn interface is about to be disconnected between the last serving gNB and the candidate gNB relevant to the UE's RNA.

- Option 1-2 Pro-actively move UE context to next satellite

* the inactive UE context is proactively moved from the gNB leaving a particular geographical area to an incoming gNB covering the same geographical area. This way when the UE resumes, the UE context is available in the nearby gNB to retrieve the context.

Option 2, UE context is kept on a fixed node (on-ground gNB or AMF)

- Option 2-1, relocate the UE context to the AMF on ground.

* When the UE resumes, the context is retrieved from the AMF by the gNB where the UE resumes. For a mobile terminated data/signaling, the AMF can initiate RNA-based paging procedure, then the serving gNB retrieve UE context from AMF.

- Option 2-2, relocate the UE context to the gNB on ground.

* UE context can be proactively relocated to an on-ground gNB. UE resumes by using the information generated by the on-ground gNB, the UE context is retrieved from the on-ground gNB. For a mobile terminated data/signaling, the AMF/UPF can directly communicate with the on-ground gNB.

Option 3, UE context is kept in the last serving gNB and NG-based UE context retrieve procedure is used

* the UE context remains in last serving gNB. When UE resumes, the current serving gNB initiate NG-based UE context retrieve procedure to retrieve the UE context from last serving gNB. For MT data/signaling, the AMF can initiate RNA-based paging procedure.

The Moderator understand it’s not possible to conclude that which option could be accepted at this meeting. Companies are encouraged to carefully consider the pains and gains to support the solution(s), e.g. the cost seems high to relocate the UE context for the Inactive UEs hop by hop towards the next satellite(s). Companies support the solution(s) should try to make the solution more clear, e.g. whether there’s any security issue to transport the UE context among the satellite gNBs, between on-board gNB and terrestrial gNB/CN, and how to address the issue, if exist. **The issue to be continued.**

**Proposal 1: RAN3 assumes that current mechanisms to support UEs performing RRC connection resume and RRC connection re-establishment may be reused in regenerative payload architecture, subject to implementation and deployment.Whether to do any extra enhancement(s) for Inactive to be continued.**

## 3.2 Support of NG Suspend/Resume

**Whether to support NG suspend/Resume?**

The moderator see the contributions 7283/7215/7547/7608/7675 would like to support NG Suspend/Resume, while the contributions 7345/7400/7461 say no to it.

It seems we do not have enough time to discuss the details and make any decision at this meeting. The moderator would encourage companies to carefully consider the pros and cons to support of the NG Suspend/Resume. **The issue to be continued.**

**Proposal 2: Whether to support NG Suspend/Resume is to be continued, companies are encouraged to further consider the pros and cons of the NG Suspend/Resume.**

#  Reference

1. R3-247283 (TP to BL CR for 38.413) Support of regenerative payload (CATT)
2. R3-247316 Support of Inactive UE mobility NTN (Xiaomi, Qualcomm Incorporated, Nokia, Nokia Shanghai Bell, China Telecom, Lenovo)
3. R3-247215 (TP for TS 38.300) Discussion on regenerative payload enhancement for NR NTN (NEC)
4. R3-247345 (TP for TS 38.300) Discussion on the support of Regenerative payload (Nokia, Nokia Shanghai Bell)
5. R3-247317 (TP for TS 38.300) Support of regenerative payload (Xiaomi)
6. R3-247328 (TP for TS 38.300) NR NTN Regenerative Payload Architecture (Qualcomm Incorporated, Xiaomi, LGE, NTT Docomo)
7. R3-247329 (TP for TS 38.300) Discussion on RAN Signaling impacts for NR NTN Regenerative Payload (Qualcomm Incorporated)
8. R3-247380 Discussion on regenerative payload enhancement (China Telecom)
9. R3-247400 (TP for TS 38.300) Support of regenerative payload (Huawei)
10. R3-247436 Interface management for regenerative payload in NTN (Lenovo)
11. R3-247461 Considerations on NG Interface Management over the Feeder Link (Ericsson, Thales)
12. R3-247462 Making the Case for Location-Based CHO in Rel-19 (Ericsson, Thales, ESA, Inmarsat, Viasat)
13. R3-247463 Location-Based CHO in Rel-19 - XnAP Aspects (Ericsson, Thales, ESA, Inmarsat, Viasat)
14. R3-247547 Further discussion on support of regenerative payload (ZTE Corporation)
15. R3-247593 Discussions on NG management from satellite gNB and Inactive support (LG Electronics Inc.)
16. R3-247594 (TP for NR\_NTN\_Ph3 TS 38.300 BL CR) (LG Electronics Inc.)
17. R3-247600 Discussion on NG interface management through ISL (ETRI)
18. R3-247608 Further discussion on support of regenerative payload for NR NTN (Samsung)
19. R3-247675 Discussion on support of regenerative payload for NR NTN (CMCC)
20. R3-247398 (TP for BLCR for TS 38.300) Correction on stage 2 (Huawei, Nokia, Nokia Shanghai Bell, Thales, CATT)