**3GPP TSG-RAN WG2 Meeting #127 *DRAFT*\_R2-2407812**

**Maastricht, Netherlands, Aug 19th – 23rd, 2024**

Agenda Item: 8.8.1

Source: CATT (Rapporteur)

Title: Summary of [AT127][305][LTE\_TN\_NR\_NTN\_mob] RRC CR (CATT)

Document for: Discussion and Decision

# Introduction

This document provides summary on the following email discussion:

* [AT127][305][LTE\_TN\_NR\_NTN\_mob] RRC CR (CATT)

Scope: Update the RRC CR for E-UTRAN to NR NTN mobility based on meeting agreements

Intended outcome: Endorsable CR

Deadline for companies' feedback: Thursday 2024-08-22 20:00

Deadline for final CR (in R2-2407617): Friday 2024-08-23 08:00

# Discussion

During Tuesday discussion, it is agreed to adopt signalling Option 2 (introduce new NR NTN Sat. list in SIB33), but also to introduce a signalling design that avoid ephemeris data duplication, if the NR NTN satellite in the new Sat. list can use the ephemeris data of any IoT NTN satellite in the existing Sat. list:

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| Proposal 3: RAN2 down-selects following alternatives to identify the NR satellite assistance information:  - Alternative 1: Reuse the SatelliteId-r18 to identify either an NR satellite or an IoT NTN satellite;  - Alternative 2: Define NR specific satellite ID, e.g. SatelliteId-NR-r19, to identify NR satellite specifically.  - Samsung thinks we can go for Alt1 unless we find problems   * We go for Alt1 * We consider a solution that avoids repeating the ephemeris for a satellite which provides both IoT NTN and NR NTN cells. |

For this, Rapporteur proposes two Alternatives in the draft CR uploaded to the server, and wants to check companies views on which way to go with. Note that the legacy IoT NTN UEs can only rely on existing Sat. list to find the ephemeris data, thus is invisible to any ephemeris data included in the new NR NTN Sat. list.

**Question 1**: Which signalling alternative in the draft CR is preferred to save the ephemeris data duplication, if a satellite can supports both IoT NTN and NR NTN cells?

1. Alternative A;
2. Alternative B;
3. Others. If this is selected, please provide a direct TP on the signalling design.

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| Company | Option selection (1/2/3) | Comments/TPs, if any |
| Nokia | Alt A | A pointer to another satellite ID whose ephemeris can be used allows to save signalling bits and it seems to be a clean solution. |
| THALES | Alt A | It seems to be clearer and cleaner solution while reducing overhead. Especially, it exists scenarios where the same satellite provide both NR and IoT services. |
| Xiaomi | Alt A |  |
| ZTE | Alt B or Modified Alt A | Alt B is the approaches adopted in NR which allows the same UE behavior. For signalling efficiency we are also fine relying on satellite ID. But we understands since satellite id is only used to link UE with the satellite ephemeris therefore the same satellite ID can be used in both NR and LTE list if there are referring to the same satellite. No need to introduce a reference satellite ID. When ephemeris info is absent, UE can knows the satellite ephemeris in NR neighboring cell entry is the ephemeris information provided in the LTE neighboring cell entry that has the same id. |
| China Telecom | Alt B | Alt B is much clearer for NR satellite information configuration. Only one satellite ID is sufficient to refer to the satellite providing both IoT NTN and NR NTN cells. When they are the same satellite, satellite ID. Alt A introducing satelliteRefId and satelliteId at the same time is redundant. |
| Lenovo | Alt A | Alt A is clearer to us. |
| Ericsson | Alt A | Given the possibility brought up by satellite companies of a single satellite supporting both NR and IoT NTN, we think this option is the most signalling efficient. The current field range is enough for the network to ensure there is no possibility of confusion for the UE. |
| LGE | Alt A | We prefer to keep ephemeris as mandatorily present within neighbour satellite information IE. In case of duplicated ephemeris with other satellite, a pointer of satellite ID is signalled instead of ephemeris, as alt-A. |
| Samsung | Alt A | Alternative A is much cleaner. |
| Qualcomm | Alt A with change.  See comments | We would prefer other IEs such as t-ServiceStartNeigh, K-Mac could also be reused from LTE satellite. |
| Google | No strong view, but... | We are not sure if the issue really exists. If SIB33 is transmited in an NTN cell, then it must contain only the Rel-18 satellite list. On the other hand, if SIB33 is transimtted in a TN cell, then it must contain only the new (Rel-19) satellite list. It seems SIB33 cannot contain both the Rel-18 and Rel-19 satellite lists and hence the issue of duplicating the ephemeris data seems to be not justified. |
| vivo | Slightly perfer AltB | We share the same view as ZTE. |

**Rapp's remarks**:

A majority of the companies (9 out of 12) prefer, or at least are Okay, to go for Alternative 1 which is regarded as a cleaner signaling design with better readability. In addition, Qualcomm raised another issue on whether some other information than ephemeris can be reused by a IoT NTN satellite and NR NTN satellite. Since we have only the agreement to reuse the ephemeris, Rapp suggest to stick to the agreement without further extension. On Google's concern, we think that was discussed during online discussion, finally leading to the need to have this signaling optimization mechanism. So, Rapp suggests not reopening the same discussion.

**Proposal 1: RAN2 agrees signaling Alternative 1 to indicate ephemeris data for a satellite supporting both NR NTN and IoT NTN, i.e. introducing a Satellite reference ID that refers to the ephemeris data of an IoT NTN satellite in the existing list *neighSatelliteInfoList-r18*, and using the "CHOICE" signaling structure including this Satellite reference ID and explicit ephemeris data configuration as the two choices.**

**Proposal 2: RAN2 sticks to the agreement that only duplication of ephemeris data needs to be avoided in the case of same satellite supporting both NR NTN and IoT NTN.**

**Question 2**: Any remaining Stage-3 issues that need to be further addressed?

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| Company | Issues and potential solutions, if any |
| Nokia | For ntn-PolarizationDL maybe we can clarify in the field description this applies to NR?  [Rapp\_v09] Thanks, already adopted in the draft CR. |
| Xiaomi | maxSatNR-r19 INTEGER ::= FFS -- Maximum number of NR satellites  The maxSatNR-r19 is 4 according to the agreements (maxSat-r17 (4) is reused for the maximum number of NR satellites).  [Rapp\_v09] Thanks, already updated in the draft CR. |
| vivo | For the Need code of ntn-PolarizationDL:  ntn-PolarizationDL-r19 ENUMERATED {rhcp,lhcp,linear} OPTIONAL -- Need OP  If the filed is not present, there is no specifical handling in the draft spec. So we suggest OR instead of OP. Or the intention is to specify something? |
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**Rapp's remarks**:

Thanks for the comments to Question 2. The proposed changes are merged into the CR [1]. So no explicit proposal is needed.

# Conclusion

Thanks to all companies that pariticipated in this offline discussion. The proposals derived from this discussion are listed as follows:

**Proposal 1: RAN2 agrees signaling Alternative 1 to indicate ephemeris data for a satellite supporting both NR NTN and IoT NTN, i.e. introducing a Satellite reference ID that refers to the ephemeris data of an IoT NTN satellite in the existing list neighSatelliteInfoList-r18, and using the "CHOICE" signaling structure including this Satellite reference ID and explicit ephemeris data configuration as the two choices.**

**Proposal 2: RAN2 sticks to the agreement that only duplication of ephemeris data needs to be avoided in the case of same satellite supporting both NR NTN and IoT NTN.**

# Reference

[1] R2-2407617 Introduction of LTE TN to NR NTN IDLE mode mobility (Option 2)