3GPP TSG-RAN WG3 #112-e R3-212701

E-meeting, May 17th - May 28th, 2021

Agenda Item: 20.2.6

Source: Rakuten Mobile (moderator)

Title: Summary of offline discussion on NTN Others

Document for: Discussion and Decision

# Introduction

**CB: # 82\_NTN\_Others**

**- (Rak)**

**NTN specific information such as doppler shift value, delay value, etc. should be conveyed from gNB-DU to gNB-CU over F1-U and between gNBs over Xn-U interface**

**- (E///)**

**Cell reconfigurations (including for energy saving purposes) can be handled via OAM configuration, including interaction aspects between terrestrial and NTN cells, with no need for Xn signaling.**

**Current Xn resource coordination functionality is not applicable for NTN in Rel-17.**

**Given the different geographical scales of Xn scope and NTN, exchanging traffic information between terrestrial and NTN is probably best done at a higher level, e.g. involving OAM.**

**Xn support for SON is not used in Rel-17 NTN.**

**Given the above, as no specific information so far has been identified as necessary to exchange between terrestrial and NTN over Xn, Xn interface management functionality between terrestrial and NTN does not seem needed.**

**Xn between a HAPS and local terrestrial neighbors may be beneficial and is not precluded.**

**- Chair: discuss 1) Whether to use UP to convey doppler shift and fixed delay values through F1-U and Xn-U – Are scenarios acknowledged? 2) whether to capture further observations w.r.t. Xn functions and NTN**

(Rak - moderator)

Summary of offline disc R3-212701

The deadline for comments is Thursday, May 20th 8h00 UTC (10h00 CEST).

# Discussion

|  |
| --- |
| 20.2.6. OthersXn mobility between NTN gNBs and terrestrial gNBs is treated with low priority in Rel-17*NTN specific adaptations in Rel-17 for Xn Setup, Load Management and Energy Saving related function are FFS* *To be continued...*MR-DC has low priority for Rel-17Secondary RAT Data Volume Reporting has low priority for Rel-17Trace has low priority for Rel-17*Whether Resource coordination over Xn and SON functions are applicable for NTN in Rel-17, at least for some scenarios only (like HAPS) is FFS, as well as NTN specific adaptations for Rel-17.* *To be continued...* |
| R3-211920 | NR-U plane protocol enhancement for NTN (Rakuten Mobile, Inc) | discussion |
| R3-211921 | Non-Terrestrial Networks support for NR-U plane protocol (Rakuten Mobile, Inc) | CR0117r, TS 38.425 v16.3.0, Rel-17, Cat. B |
| R3-212111 | Continuing Discussion on Xn Functions and NTN (Ericsson) | discussion |

R3-211920 proposes to discuss and agree on NTN specific information such as doppler shift value, delay value, etc. to be conveyed from gNB-DU to gNB-CU over F1-U and between gNBs over Xn-U interface. Thus, R3-211921 provides CR towards TS 38.425.

***Proposal 1 (1920): NTN specific information such as doppler shift value, delay value, etc. should be conveyed from gNB-DU to gNB-CU over F1 interface and between gNBs over Xn interface.***

**Question#1: Do you agree with the proposal 1 (1920) above?**

|  |  |  |
| --- | --- | --- |
| Company | YES/NO | Comment |
| Thales | No | From the ephemeris and NTN-GW location as provided by the NTN-Control function, the CU is able to compute the pre compensation to be applied in terms of Doppler shift and delay variation on the feeder link. Such information are hence provided by the CU to the DU. No information are expected to be provided by DU to CU over F1 interface.As per service link, information on the delay and Doppler don’t need to be raised by the DU to the CU over F1 interface.NTN specific information such as Doppler shift value, delay value, etc. doesn’t need to be exchanged between gNBs over Xn interface since each gNB (source and target) is responsible for the compensation on its cell (source and target). |
| CATT | No | Share the view with Thales.And in current NTN transparent payload architecture, gNB is collocated with NTN GW. It seems CU-DU split is not the typical deployment.  |
| Nokia | No | Agree with the comments from Thales. |
| China Telecom | No | Agree with above. |
| Samsung | No |  |
| Ericsson | No, no | no!please don’t confuse the flow control functions in CU with L1 functions in DU. And we refuse to discuss aspects of disaggregated gNBs in the Rel-17 NTN WI. |
| Qualcomm | No | Agree with Thales |

R3-212111 proposes to discuss the remaining two open points below.

* NTN specific adaptations in Rel-17 for Xn Setup, Load Management and Energy Saving related function are FFS
* Whether Resource coordination over Xn and SON functions are applicable for NTN in Rel-17, at least for some scenarios only (like HAPS) is FFS, as well as NTN specific adaptations for Rel-17

## *Energy Saving*

***Proposal 1 (2111): Cell reconfigurations (including for energy saving purposes) can be handled via OAM configuration, including interaction aspects between terrestrial and NTN cells, with no need for Xn signaling.***

**Question#2: Do you agree with the proposal 1 (2111) above?**

|  |  |  |
| --- | --- | --- |
| Company | YES/NO | Comment |
| Thales | Yes |  |
| CATT | Yes |  |
| Nokia | No | OAM may be difficult given the potentially large number of LEO satellites (e.g. Starlink). Is there any issue to reuse current Xn procedure? If not, there is no need to have such restriction. |
| China Telecom | Yes |  |
| Samsung | Yes |  |
| Ericsson |  | As I understand the current situation, there was / is / will not be any consensus on applicability of Xn functions. So best would be to agree that we will not introduce any explicit statement to that respect, which enables all kind of deployments. |
| Qualcomm | Yes | Perhaps the proposal from Ericsson is a better way forward (i.e. less prescriptive) |

## Resource Coordination

***Proposal 2 (2111): Current Xn resource coordination functionality is not applicable for NTN in Rel-17.***

**Question#3: Do you agree with the proposal 2 (2111) above?**

|  |  |  |
| --- | --- | --- |
| Company | YES/NO | Comment |
| Thales | No | It is highly beneficial to have information about resource coordination exchanged in real time between gNB via Xn interface (e.g. inter cell interference coordination)  |
| CATT | Yes | Resource coordination between gNBs is not supported today, which could be further studied in the future release if needed.  |
| Nokia  | No | Agree with Thales. Is there any issue to reuse current Xn procedure? If not, there is no need to have such restriction. |
| China Telecom | Yes | Same view with CATT. |
| Samsung | Yes |  |
| Ericsson |  | As I understand the current situation, there was / is / will not be any consensus on applicability of Xn functions. So best would be to agree that we will not introduce any explicit statement to that respect, which enables all kind of deployments. |
| Qualcomm |  | We think this may be worth studying – e.g. for Release 18. |

## *Load Management*

***Proposal 3 (2111): Given the different geographical scales of Xn scope and NTN, exchanging traffic information between terrestrial and NTN is probably best done at a higher level, e.g. involving OAM.***

**Question#4: Do you agree with the proposal 3 (2111) above?**

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| --- | --- | --- |
| Company | YES/NO | Comment |
| Thales | Yes |  |
| CATT | Yes, with comment | Coordination between TN and NTN is low prioritized in this Release, we have not made clear solutions yet in RAN groups. Exchanging the traffic info between TN and NTN is possible, no spec impact is expected. |
| Nokia | No | It may be a big challenge to OAM considering the potentially large number of LEO satellites and the short period for a satellite serving a geo-area.  |
| China Telecom | Yes |  |
| Samsung | Yes |  |
| Ericsson |  | We shouldn’t open this can of worms by forcing explicit statements to the subject. Best it is kept not explicitly stated in stage 2/3 |
| Qualcomm | Yes, but | As Ericsson states, if we go in this direction, we are potentially creating new requirements. Practically yes, but we don’t need to capture this in specs. |

## *Data Exchange for SON*

***Proposal 4 (2111): Xn support for SON is not used in Rel-17 NTN.***

**Question#5: Do you agree with the proposal 4 (2111) above?**

|  |  |  |
| --- | --- | --- |
| Company | YES/NO | Comment |
| Thales | Yes | Can be considered in a future release |
| CATT | Yes | Same view with Thales. |
| Nokia |  | No strong view. Ok for a future release |
| China Telecom | Yes |  |
| Samsung | Yes |  |
| Ericsson |  | I propose to rather ask whether Rel-17 works on NTN specific SON functions, for which the answer is clearly “NO” |
| Qualcomm | Yes | Similar comments as above. Ericsson’s statement is safer. It is hard to see why we should prohibit anything. |

## *Interface Management*

***Proposal 5: Given the above, as no specific information so far has been identified as necessary to exchange between terrestrial and NTN over Xn, Xn interface management functionality between terrestrial and NTN does not seem needed.***

**Question#6: Do you agree with the proposal 5 (2111) above?**

|  |  |  |
| --- | --- | --- |
| Company | YES/NO | Comment |
| Thales | Yes |  |
| CATT | Yes | Depends on the investigation of coordination between TN and NTN, which is been low prioritized now. |
| Nokia | No | TN-NTN mobility is listed in the WID, and is under discussion in RAN2.Again, a general comment: unless issue is discovered in reusing current Xn procedure in NTN, there is no need to exclude it. It may be up to the deployment on whether use or not use an Xn procedure.  |
| China Telecom | Yes | Xn mobility between NTN gNBs and terrestrial gNBs is treated with low priority in Rel-17. |
| Samsung | Yes |  |
| Ericsson | No | this is contradictory to §2.6don’t confuse the necessity to setup an Xn interface instance with the information foreseen to exchange over it. |
| Qualcomm | ?? | Interface management includes setting up and tearing down interfaces. I assume we are not stating that we don’t need Xn interfaces in this case. Yes TN-NTN mobility is low priority but that just means we do not work on aspects related specifically to this, no need to make statements about interface management functionality. |

## *Further Observations on HAPS*

***Proposal 6: Xn between a HAPS and local terrestrial neighbors may be beneficial, and is not precluded.***

**Question#7: Do you agree with the proposal 6 (2111) above?**

|  |  |  |
| --- | --- | --- |
| Company | YES/NO | Comment |
| CATT | Yes | It should not be precluded. |
| Nokia | Yes |  |
| China Telecom | Yes |  |
| Samsung | Yes |  |
| Ericsson | Yes | this is not precluded |
| Qualcomm | Yes |  |

# Conclusion and Recommendations

TBD

# References

1. R3-211920, NR-U plane protocol enhancement for NTN, Rakuten Mobile, Inc
2. R3-211921, Non-Terrestrial Networks support for NR-U plane protocol, Rakuten Mobile, Inc
3. R3-212111, Continuing Discussion on Xn Functions and NTN, Ericsson