3GPP TSG-RAN WG2 Meeting #121bis-e draftR2-2304246

Elbonia, 17th – 26th of April 2023

**Agenda item: 7.7.4.1.1**

**Source: Nokia, Nokia Shanghai Bell**

**Title: Report from [AT121bis-e][106][NR NTN Enh] Signalling of TN coverage (Nokia)**

**WID/SID: NR\_NTN\_enh – Rel-18**

**Document for: Discussion and Decision**

# 1 Introduction

This is to discuss the following:

* [AT121bis-e][106][NR NTN Enh] Signaling of TN coverage (Nokia)

Initial scope: Continue the discussion on the signaling of TN coverage: signaling details for area center+radius (e.g. reuse of *Ellipsoid-PointWithUncertaintyCircle*?), which SIB to usse, whether additional information in dedicated signalling is needed, validity of the TN coverage area information, how to associate TN coverage info and frequency

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline for companies' feedback: Monday 2023-04-24 12:00 UTC
Deadline for rapporteur's summary (in R2-2304246): Monday 2023-04-24 18:00 UTC

Proposals marked "for agreement" in R2-2304246 not challenged until Tuesday 2023-04-25 08:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online in the Tuesday CB session).

In the next section we elaborate on TN coverage signaling and related matters.

# 2 Contact Information

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| Company | Contact: Name (E-mail) |
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# 3 Discussion

During the RAN2#121bis online discussion on 18th of April, the following agreements related to TN coverage were made [4]:

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| Agreements:1. For signaling the TN coverage, the corresponding geographical area information is provided by broadcast signalling by the network via a list of (possibly overlapping) areas where each area is defined using center location coordinates + radius (where the area is meant to describe a group of cells, not just a single one). FFS on the SIB. FFS on whether additional information in dedicated signalling is needed/useful |

In this e-mail discussion we want to collect companies’ views regarding the aforementioned FFS points and other TN coverage related aspects listed in the e-mail discussion scope.

## 3.1 Signalling details – area center and radius

As stated in the agreement box above, the TN coverage information will be signalled in the form of a list of areas. Each area should be defined using center location and the radius. There were various proposals submitted to this meeting regarding which IE to apply for signaling the coordinates and the range of the radius. In [1] it is suggested to use *Ellipsoid-Point* which would consume 48 bits to provide the latitude and longitude. During the online discussion it was pointed out that *Ellipsoid-PointWithUncertaintyCircle* could be applied alternatively. A related topic is how to signal the radius and how accurate it shall be. Thus, companies are asked to share their view on how to signal area’s center location and its radius.

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| **Question 1: For TN coverage information, how to signal area center and its radius?**1. **Ellipsoid-Point and radius separately**
2. **Ellipsoid-PointWithUncertaintyCircle**
3. **Other**

**In your response, please indicate how accurate that shall be and how many bits are jointly needed per single TN coverage area.** |
| **Company** | **Answer** | **Comments** |
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Summary for Q1:

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## 3.2 Signaling details – frequency information

In [2] and [3] there are different approaches presented on how to signal the frequency information which has been agreed to be provided per TN coverage area. [2] suggests to use a list of frequencies under each TN area information (Option 1). [3] proposes to introduce TN coverage area identity and then use this identifier in SIB4 and SIB5 for all TN frequencies listed there (Option 2). It seems both approaches have some benefits, so it would be good to check what companies prefer.

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| **Question 2: How the frequency information for TN coverage area should be signalled? Please choose from the options below.**1. **Option 1: use a list of frequencies under each TN area information**
2. **Option 2: introduce TN coverage area identity and the use this identifier in SIB4 and SIB5 for all TN frequencies listed there**
3. **Other**
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| **Company** | **Answer** | **Comments** |
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Summary for Q2:

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## 3.3 Signaling details – the size of TN coverage list

A somewhat related question to the issues discussed already above would be: how many TN coverage areas do we actually need? Please provide the justification on your preferred size of TN coverage list.

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| **Question 3: What shall be the size of TN coverage list?**  |
| **Company** | **Answer** | **Comments** |
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Summary for Q3:

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## 3.4 Signaling details – which SIB to use

It remains to be decided where TN coverage area information list is sent. Obviously, the final answer may depend on the ultimate design of this list (e.g. how many bits are consumed to signal a single TN coverage area information). However, companies are already encouraged to express their opinions.

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| **Question 4: Where TN coverage area list should be broadcast? Please select from the options below:**1. **SIB19**
2. **Other SIB**
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| **Company** | **Answer** | **Comments** |
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Summary for Q4:

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## 3.5 Signaling details – need for dedicated signaling

Another aspect that still needs to be concluded is whether there is a necessity for dedicated signaling to provide the UE with TN coverage area information. In some of the papers submitted to RAN2#121bis it was pointed out that SIB may provide just a coarse information, while more details shall be given using dedicated signaling. On the other hand, during the online discussion it was rather clear to RAN2 that TN coverage area information does not need to be very accurate/detailed, and it needs to work for the UEs in IDLE mode.

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| **Question 5: Is there a need to support dedicated signaling for providing the TN coverage information?**  |
| **Company** | **Answer** | **Comments** |
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Summary for Q5:

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## 3.6 Signaling details – validity of TN coverage information

Eventually, we need to discuss how long such TN coverage information shall remain valid and how to realize that. As this information is expected to be rather static, it would be good to allow the UE to store it, once acquired. On the other hand, we need to think of the triggers which should make the UE acquire new TN coverage information.

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| **Question 6: How long the UE should consider the acquired TN coverage information remains valid?**  |
| **Company** | **Answer** | **Comments** |
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Summary for Q6:

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And a related question:

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| **Question 7: Do we need to define any triggers making the UE reacquire the TN coverage information? Please share the details on those triggers or explain why there is no such need.**  |
| **Company** | **Answer** | **Comments** |
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Summary for Q7:

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# 4 Conclusion

This paper discussed TN coverage information details. The following proposals are made:

For agreement:

**Proposal x:**

For discussion:

**Proposal y:**

# References

1. R2-2303168 On TN Coverage Area Information - signaling, validity and definition aspects 3GPP TSG-RAN WG2 Meeting #121bis-e Elbonia, 17th – 26th of April 2023
2. R2-2303100 Discussion on the NTN-TN cell reselection enhancements 3GPP TSG-RAN WG2 Meeting #121bis-e Elbonia, 17th – 26th of April 2023
3. R2-2303037 TN cell coverage info and measurement relaxation 3GPP TSG-RAN WG2 Meeting #121bis-e Elbonia, 17th – 26th of April 2023
4. Report from Break-out session on NR-NTN and IoT-NTN