3GPP TSG-RAN WG2 Meeting #116bis electronic R2-220xxxx

Online, January 17 – 25, 2022

Agenda Item: 8.9.2.1

Source: MediaTek Inc.

**Title: Summary of [Post116bis-e][089][IoT-NTN] Open Issues (Mediatek)**

Document for: Discussion and decision

# Introduction

This document is to summarize the following offline discussion:

|  |
| --- |
| * [Post116bis-e][089][IoT NTN] Open Issues (Mediatek)

 Scope: Determine if Company input by Pre117-e discussions shall be used, and how many / which Pre-discussions shall be done. Capture Open Issues not captured in the CR email discussions and suggest how to treat. [After finalization, Merge open issues from other discussions into a WI OI list (OI for which company input is invited in some way shall be listed in the WI-list).  Intended outcome: Open Issues list, and organization of Pre117-e Company input discussions for the WI.  Deadline: Short.  |

NOTE: Each open issue should be associated with suggested treatment/handling.

1.       Company input into Pre117-e-offline (i.e. no company tdocs)

2.       Company tdocs invited.

3.       CR rapporteur handled issue (CR rapporteur will propose resolution as input to next meeting).

4.       Other, e.g., immature area, reference to dependency, unclear status etc.

NOTE: Some open issues may overlap with the discussions for running CRs. The WI rapporteur will merge the open issues into one list in the end.

**Contact information**

|  |  |
| --- | --- |
| Company | Name <email> |
| MediaTek | Abhishek Roy <Abhishek.Roy@mediatek.com>y |
| Huawei, HiSilicon  | odile Rollin(odile.rollinger@huawei.com)  |
| ZTE | lu.ting@zte.com.cn |
| Apple | Pavan Nuggehalli, pnuggehalli@apple.com |
| Spreadtrum | Xu.liu1@unisoc.com |
|  |  |

# **Discussion**

## **User Plane – Open Issues**

It has been agreed in RAN2 116bis-e

|  |
| --- |
| * Introduce a new MAC CE for provision of UE specific K\_offset and the size is fixed to 1 byte. FFS on the MAC CE’s name.
 |

OI 1.1a [Pre117-e-offline] Decide on a suitable name and contents for the MAC CE corresponding K\_Offset.

OI 1.1b [Pre117-e-offline] Decide on a suitable name and contents for the UE-specific TA Report MAC CE.

OI 1.2 [Pre117-e-offline]: How to extend SR-Prohibit Timer in IoT-NTN?

OI 1.3 [Pre117-e-offline]: How to extend RLC t-Reordering in IoT NTN?

OI 1.4 [Pre117-e-offline]: Decide whether to use LCID or eLCID for UE-specific TA Report MAC CE.

O1 1.5 [Pre117-e-offline]: Decide whether to use LCID or eLCID for MAC CE corresponding K\_Offset.

**Q1: Do companies agree with the open issues, listed above, for User Plane in IoT-NTN?**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Company | 1.1a(Y/N) | 1.1b(Y/N) | 1.2(Y/N) | 1.3(Y/N) | 1.4(Y/N) | 1.5(Y/N) | Comments |
| Ericsson | **Y** | **Y** | **Y** | **Y** | **Y** | **Y** |  |
| Huawei,HiSilicon | **Y** | **Y** | **Y** | **Y** | **Y** | **Y** | For 1a, 1b. we need also specify the contents.  |
| ZTE | **Y** | **Y** | **Y** | **Y** | **Y** | **Y** | Agree with HW |
| OPPO | **Y** | **Y** | **Y** | **Y** | **Y** | **Y** | Agree with HW |
| Nokia | **Y** | **Y** | **Y** | **Y** | **Y** | **Y** | Fine to add OI 1.6 to OI 1.8 as proposed by ZTE |
| Spreadtrum | **Y** | **Y** | **Y** | **Y** | **Y** | **Y** | Agree with HW. |

## **Control Plane – Open Issues**

OI 2.1 [Pre117-e-offline]: Decide on the contents of the new NTN-specific SIB. => No need

OI 2.2 [Company Tdocs invited]: Define a new barring bit for NTN UEs barring. => email

OI 2.3 [Company Tdocs invited]: Decide on Location Reporting by NAS and Coarse location report.

**Q2: Do companies agree with the open issues, listed above, for Control Plane in IoT-NTN?**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Company | 2.1(Y/N) | 2.2(Y/N) | 2.3(Y/N) | Comments |
| Ericsson | **N** | **N** | **Y** | 2.1 – we have already introduced most content – what else is there to decide on? If anything else is needed we can address via company tdocs. 2.2 Should be decided as pre117-e-offline as the decision is yes/no and there are many companies who have the same view on how it should be implemented. |
| Huawei, HiSilicon | **N** | **N** | **Y** | 2.1 – agree with E/// 2.2 – agree with E/// |
| ZTE | **N** | **N** | **Y** | 2.1 – agree with E/// 2.2 – agree with E/// |
| Qualcomm | **N** | **Y** | **Y** | For 2.1, we can also wait what RAN1 replies on the content for NR NTN.For 2.2, we doubt we can decide the details via offline. |
| Apple | **Y** | **N** | **Y** | We agree that SIB content is mostly decided, but think there is benefit in consolidating views in pre117-e-offline. On 2.2, we agree with E///. |
| OPPO | **N** | **N** | **Y** | 2.2 – agree with E/// |
| Nokia | **N** | **N** | **Y** | We think below two issues should be discussed:OI 2.X [Company Tdocs invited]: FFS whether anything additional is needed if validity timer for UL synchronization expired.OI 2.Y [Pre117-e-offline]: Define the RRC signalling to report GNSS validity duration to NW according to R1-2112848. |
| Spreadtrum | **N** | **N** | **Y** | 2.1 – agree with E/// 2.2 – agree with E/// |

## **Discontinuous Coverage – Open Issues**

OI 3.1 [Pre117-e-offline]: Decide on the maximum number of satellites, whose ephemeris (assistance) information will be provided.

OI 3.2 [Pre117-e-offline]: How to signal this information (new SIB for this purpose or dedicated signaling)?

OI 3.3 [Pre117-e-offline]: Decide if average ephemeris and almanac information will be useful to the UE for estimating discontinuous coverage.

O1 3.4 [Pre117-e-offline]: What will be the UE behavior on receiving this ephemeris information?

O1 3.5 [Company Tdocs Invited]: Decide on whether additional new parameters like satellite footprint reference point on ground, satellite coverage radius can be used?

**Q3: Do companies agree with the open issues, listed above, for Discontinuous Coverage?**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Company | 3.1(Y/N) | 3.2(Y/N) | 3.3(Y/N) | 3.4(Y/N) | 3.5(Y/N) | Comments |
| Ericsson | **Y** | **Y** | **Y** | **N** | **Y** | Company tdocs invited for 3.4.  |
| Huawei, HiSilicon | **Y** | **Y** | **Y** | **N** | **Y** | 3.4: we assume no specified behaviour, up to UE implementation (assistance information) |
| ZTE | **Y** | **Y** | **Y** | **Y** | **Y** | Fine to discuss 3.4 via Pre117-e-offline |
| Qualcomm | **Y** | **Y** | **Y** | **Y** | **Y** | For 3.5, we are puzzled, for fixed cell, it is agreed additional information like upcoming satellite start time.But why 3.5 is problem for moving cell. This (3.5 beam information) is needed only for moving cell. |
| Apple | **Y** | **Y** | **Y** | **Y** | **Y** | For 3.4, we have the same view as Huawei. |
| OPPO | **Y** | **Y** | **Y** | **N** | **Y** | For 3.4, it may need to discuss based on companies’ Tdocs. In our understanding, it could be at least divided into two parts which could be discussed, respectively:OI 3.4.1 How UE to predict discontinuous coverage based on assistance info?OI 3.4.2 What will be the UE behaviour when UE becomes out of coverage / in coverage? |
| Nokia | **Y** | **N** | **N** | **N** | **Y** | Company tdoc invited for 3.2 and 3.3.For 3,2, We are not sure how dedicated signalling works since it is only for RRC Connected mode. For 3.3, it is not clear how this will help in predicting coverage. |
| Spreadtrum | **Y** | **Y** | **Y** | **N** | **Y** | For 3.4, we have the same view as OPPO. |

## **Remaining UE Capabilities**

OI 4.1 [Company Tdocs Invited]: UE capability for supporting soft-switching procedure

OI 4.2 [Company Tdocs Invited]: UE capability for supporting PUR Timer modifications

OI 4.3 [Company Tdocs Invited]: Reuse of the existing CHO capability indication for IoT-NTN CHO

 OI 4.4 [Company Tdocs Invited]: Whether Capability Indication of existing IoT-Features until Rel-16 are reused in NTN, or to what extent they need to be duplicated to allow for different Interoperability Test (IOT) Status

**Q4: Do companies agree with the open issues, listed above, for UE capabilities for IoT-NTN topics?**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Company | 4.1(Y/N) | 4.2(Y/N) | 4.3(Y/N) | Comments |
| Ericsson | **N** | **Y** | **Y** | Clarify what is meant by 4.1 |
| Huawei, HiSilicon  | **Y** | **Y** | **Y** |  |
| Qualcomm | **Y** | **Y** | **Y** |  |
| Apple | **Y** | **Y** | **Y** |  |
| OPPO | **Y** | **Y** | **Y** |  |
| Nokia | **Y** | **Y** | **Y** |  |
| Spreadtrum | **Y** | **Y** | **Y** |  |

# Open Issues from RRC and Idle Mode CR

Open Issues From 36.304 CR [2] are listed below:

* Open issue: FFS whether t-Service applies to higher priority frequencies. ()
* **Open issue: Any needed specified behaviour in idle mode for discontinuous coverage.**
* **Open issue: Change/amend text on location registration related to TAU in NTN.**
* **Open issue: Whether existing offset are sufficient to prioritize TN vs NTN frequencies.**

Open Issues from 36.331 CR [3] are listed below:

**~~O~~pen Issue 1**: Satellite assistance information for discontinuous coverage

**Open Issue 2**: How to extend sr-ProhibitTimer, and PDCP discardTimer, RLC t-Reordering

**Open Issue 3**: Configuration of event-triggered TA report

**Open Issue 4**: FFS if RRC\_IDLE UE is required to read SIBXX and whether some mechanism is needed to trigger the UE to reacquire the NTN specific SIB in RRC\_IDLE

**Open Issue 5**: FFS if anything additional is needed on expiry of the UL synchronisation timer

**Open Issue 6**: FFS if we define a new barring bit for NTN UEs barring

**Open Issue 7**: Signalling range of positionX, positionY, positionZ

**Open Issue 8**: Signalling range and step size of velocityVX, velocityVY, velocityVZ

**Open Issue 9**: Signalling of multiple TACs per PLMN in EMTC and NB-IoT

**Open Issue 10**: UE location reporting in eMTC

**Open Issue 11**: UE location reporting in NB-IoT

**Open Issue 12**: UE capability signalling

**Open Issue 13**: Provision of SIBxx in dedicated signalling at HO

**Open Issue 14**: Signalling of Part-of ARFCN indication in MIB for NB-IoT

# Conclusion

After merging the Open issues from RRC Running CR (36.331) and Idle Mode Running CR (36.302), the rapporteur proposes to discuss and decide on the following open issues:

**User Plane**

OI 1.1a [Pre117-e-offline] Decide on a suitable name and contents for the MAC CE corresponding K\_Offset.

OI 1.1b [Pre117-e-offline] Decide on a suitable name and contents for the UE-specific TA Report MAC CE.

OI 1.2 [Pre117-e-offline]: How to extend SR-Prohibit Timer in IoT-NTN?

OI 1.3 [Pre117-e-offline]: How to extend RLC t-Reordering Timer and PDCP Discard Timer in IoT NTN?

OI 1.4 [Pre117-e-offline]: Decide whether to use LCID or eLCID for UE-specific TA Report MAC CE.

O1 1.5 [Pre117-e-offline]: Decide whether to use LCID or eLCID for MAC CE corresponding K\_Offset.

OI 1.6 [Pre117-e-offline]: Decide whether the threshold-based TA-Trigger needs to deviate from NR-NTN agreements

OI 1.7 [Pre117-e-offline]: Decide whether we need different behavior for different re-configurations e.g., Re-establishment, Handover

OI 1.8 [Pre117-e-offline]: Decide if TA reporting in connected mode is not controlled by enabling/disabling indication in SI?

OI 1.9 [Pre117-e-offline]: What's the logical channel priority of the TA report MAC CE, e.g., compared with other MAC CEs?

OI 1.10 [Company Tdocs Invited]: Whether SR can be triggered if there is no available or sufficient UL-SCH resources for the triggered TA reporting?

**Control Plane**

OI 2.1 [Pre117-e-offline]: Define a new barring bit for NTN UEs barring.

OI 2.2 [Company Tdocs invited]: Decide on Location Reporting by NAS and Coarse location report.

OI 2.3 [Company Tdocs invited]: Whether existing offset are sufficient to prioritize TN vs NTN frequencies

OI 2.4 [CR rapporteur handled issue] FFS whether t-Service applies to higher priority frequencies

OI 2.5 [CR rapporteur handled issue] Change/amend text on location registration related to TAU in NTN

OI 2.6 [Pre117-e-offline] If some mechanism is needed to trigger the UE to reacquire the NTN specific SIB in RRC\_IDLE

OI 2.7 [Pre117-e-offline] If anything additional is needed on expiry of the UL synchronisation timer

OI 2.8 [Company Tdocs invited]: Configuration of event-triggered TA report

OI 2.9 [Company Tdocs invited]: Signalling of multiple TACs per PLMN in eMTC and NB-IoT

OI 2.10 [CR rapporteur handled issue] Signalling of Part-of ARFCN indication in MIB for NB-IoT

OI 2.11 [Other] Signalling range of positionX, positionY, positionZ

OI 2.12 [Other] Signalling range and step size of velocityVX, velocityVY, velocityVZ

OI 2.13 [Other] UE location reporting in eMTC

OI 2.14 [Other] UE location reporting in NB-IoT

OI 2.15 [Other] UE capability signaling

**Discontinuous Coverage**

OI 3.1 [Pre117-e-offline]: Decide on the maximum number of satellites, whose ephemeris (assistance) information will be provided.

OI 3.2 [Pre117-e-offline]: How to signal this information (new SIB for this purpose or dedicated signaling)?

OI 3.3 [Pre117-e-offline]: Decide if average ephemeris and almanac information will be useful to the UE for estimating discontinuous coverage.

O1 3.4 [Pre117-e-offline]: What will be the UE behavior on receiving this ephemeris information?

O1 3.5 [Company Tdocs Invited]: Decide on whether additional new parameters like satellite footprint reference point on ground, satellite coverage radius can be used?

**UE Capabilities**

OI 4.1 [Company Tdocs Invited]: UE capability for supporting soft-switching procedure

OI 4.2 [Company Tdocs Invited]: UE capability for supporting PUR Timer modifications

OI 4.3 [Company Tdocs Invited]: Reuse of the existing CHO capability indication for IoT-NTN CHO

 OI 4.4 [Company Tdocs Invited]: Whether Capability Indication of existing IoT-Features until Rel-16 are reused in NTN, or to what extent they need to be duplicated to allow for different Interoperability Test (IOT) Status

# Reference

1. [Post116bis-e][089][IoT NTN] Open Issues (Mediatek)
2. [Post116bis-e][088][IoT NTN] 36304 Running CR (Ericsson)
3. [Post116bis-e][046][IoT NTN] 36331 (Huawei)