**3GPP TSG RAN WG1 #110bis R1-22xxxxx**

**eMeeting, October 10th– 14th, 2022**

Agenda Item: **8.14**

Source: **Moderator (Sony)**

Title: **FL summary 1 of AI 8.14: Maintenance on Timing Relationships for IoT-NTN**

Document for: **Discussion**

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# Introduction

This is the feature lead (FL) summary of contributions to the maintenance of timing relationships in the following discussion on Rel17 IoT NTN:

[110bis-e-R17-IoT-NTN-03] Email discussion for maintenance on timing relationship enhancements for issues 1-6, 1-7 and 1-8 to be handed as recommendation for editor’s alignment CR in R1-22XXXXX – Sam (Sony)

* Check points: October 14

Following the preparatory phase discussions on what issues to discuss at RAN1#110bis [R1-2210434], the issues related to timing relationships in IoT NTN for retained for discussion are summarised in the table below. For continuity, we will reuse the issue numbering from [R1-2210434].

|  |  |  |  |
| --- | --- | --- | --- |
| **Issue#** | **Issue** | **References** | **Nature of Issue** |
| 1-6 | Align Koffset parameter names in TS36.213 with names used in higher layer specs TS 36.331 and TS 36.321 | R1-2208689R1-2210219 | Editorial |
| 1-7 | Remove redundant definition of Kmac (clause 16.6) | R1-2208689 | Editorial |
| 1-8 |  $K\_{offset}$ parameter is missing in the procedures described in Clause 7.3.1 of TS 36.213 v17.2.0 | R1-2209650R1-2210070 | Functionality |

## Sections to consider in this discussion round

Companies should give their views on all of the topics in this FIRST ROUND.

# Detailed Analysis of Retained Issues

From company contributions to RAN1#110bis and the preparatory phase discussions, three issues have been retained as outlined in the table above. In this section, FL will summarise company contributions on each of the retained issues and make proposals.

## Issues# 1-6: Koffset name alignment to higher layer specs

ZTE and Huawei point out this issue in numerous clauses of TS 36.213 where the specification tries to define Koffset using parameter names *CellSpecificKoffset* and *UESpecificKoffset*. These names are not used by higher layer specifications such as TS 36.331 and TS 36.321. These specifications use instead the names *k-Offset* and *Differential Koffset* for the parameters in question. In R1-2208689, ZTE lists the affected clauses as: 4.2.3, 5.1.1.1, 6.1.1, 7.2.3, 7.3, 8, 10, 16, 16.1.2 and 16.6.

TPs are proposed to change the parameter names wherever they occur in TS36.213 such that the value of $K\_{offset}$ is defined by using the same names for the relevant parameters as are used in the higher layer specs:

==============Unchanged Text Omitted ==============================

- if the UE is configured with the higher layer parameter *~~CellSpecificKoffset~~ k-Offset,*

- $K\_{offset}= K\_{cell\\_offset}-K\_{UE\\_offset}$ where

 $K\_{cell\\_offset}$ is the parameter *~~CellSpecificKoffset~~ k-Offset* provided by higher layers, and

 $K\_{UE\\_offset}$ is the parameter *~~UESpecificKoffset~~* *Differential Koffset* provided by higher layers, otherwise $K\_{UE\\_offset}=0$

- otherwise,

- $K\_{offset}=0$.

==============End of TP==============================

### FIRST ROUND Discussion Issues# 1-6: Koffset name alignment to higher layer specs

FL thinks the TP is well construed and makes the following proposal.

Companies are respectfully asked to consider FL Proposal 1-6-1 on this issue and make their views known in the table.

FL Proposal 1-6-1: Adopt the proposed change of Koffset definition in clauses 4.2.3, 5.1.1.1, 6.1.1, 7.2.3, 7.3, 8, 10, 16, 16.1.2 and 16.6 of TS36.213.

|  |  |  |
| --- | --- | --- |
| Company | Support/No supportProposal 1-6-1  | Comments and Proposal |
| Lenovo | Support |  |
| MediaTek | Support |  |
| ZTE | Support |  |
| Nokia, NSB | Support |  |
| SONY | Support |  |
| Sequans | Support |  |

## Issues# 1-7: Redundant definition of Kmac in Clause 16.6 of TS36.213

Clause 16.6 of TS36.213 commences with the general statement:

“Throughout this clause, if a NB-IoT UE is configured with higher layer parameter *k-Mac*, *K*mac = *k-Mac* otherwise, *K*mac = 0.”

But later in the clause, there is a further definition of Kmac within the text. In the following TP, ZTE rightly proposes that this later definition be suppressed.

**<Unchanged parts are omitted>**

If the UE has initiated a NPUSCH transmission using preconfigured uplink resource ending in subframe *n*, the UE shall monitor the NPDCCH UE-specific search space in a search space window starting in subframe *n+4+**K*mac with duration given by higher layer parameter *pur-SS-window-duration* ~~where~~ $K\_{mac}$ ~~is provided by higher layer parameter~~ *~~K-mac~~*~~, otherwise~~ $K\_{mac}=0$~~.~~ Upon detection of a NPDCCH with DCI format N0 with CRC scrambled by PUR-RNTI intended for the UE within the search space window and the value of "modulation and coding scheme" field () in the corresponding DCI is set to '14', the UE is not required to monitor the NPDCCH UE-specific search space for the remaining search space window duration.

**<End of TP>**

### FIRST ROUND Discussion Issues# 1-7: Redundant definition of Kmac in Clause 16.6 of TS36.213

Firstly, the designation “*K-mac*” should be “*k-Mac*” as defined in TS36.331. Secondly, there is clearly no need to have yet another definition of *Kmac* within the text. FL therefore makes FL Proposal 1-7-1. Companies are respectfully asked to consider FL Proposal 1-7-1 on this issue and make their views known in the table.

FL Proposal 1-7-1: Adopt the proposed TP for Clause 16.6 of TS36.213.

|  |  |  |
| --- | --- | --- |
| Company | Support/No supportProposal 1-7-1:  | Comments and Proposal |
| Lenovo | Support |  |
| MediaTek | Support |  |
| ZTE | Support |  |
| Nokia, NSB | Support |  |
| SONY | Support |  |
| Sequans  | Support |  |

## Issues# 1-8: Missing Koffset in Clause 7.3.1 of TS36.213

For Clause 7.3.1 of TS36.213, Ericsson makes the following TP:

--------------------------------------------3GPP TS 36.213 --------------------------------------------

-------------------------------------------------- Text Starts --------------------------------------------------------

7.3.1 FDD HARQ-ACK reporting procedure

For FDD with PUCCH format 1a/1b transmission, when both HARQ-ACK and SR are transmitted in the same sub-frame/slot, a UE shall transmit the HARQ-ACK on its assigned HARQ-ACK PUCCH format 1a/1b resource for a negative SR transmission and transmit the HARQ-ACK on its assigned SR PUCCH resource for a positive SR transmission.

---------------------------------------------------Text Omitted -----------------------------------------------------

For a BL/CE UE with higher layer parameter *ce-PDSCH-14HARQ-Config* configured, for PDSCH transmission in subframe *n - k* - ~~K\_offset~~ *K*offset, if the UE is in half-duplex FDD operation and is configured with CEModeA, and 'PDSCH scheduling delay and HARQ-ACK delay for 14 HARQ' field is present in the corresponding DCI,

- if the HARQ-ACK delay value as defined in [4], in the corresponding DCI indicates value *k*, the UE shall determine the subframe *n* as the HARQ-ACK transmission subframe.

For a BL/CE UE in half-duplex FDD operation, if the UE is configured with CEModeA, and if the UE is configured with higher layer parameter *ce-HARQ-AckBundling* and the 'HARQ-ACK bundling flag' in the corresponding DCI is set to 1,

- for HARQ-ACK transmission in subframe *n*, the UE shall generate one HARQ-ACK bit by performing a logical AND operation of HARQ-ACKs across all  BL/CE DL subframes for which subframe *n* is the 'HARQ-ACK transmission subframe'.

- if subframe *n - k1 - K*offset is the most recent subframe for which subframe *n* is the 'HARQ-ACK transmission subframe', and if the 'Transport blocks in a bundle' field in the corresponding DCI for PDSCH transmission in subframe *n - k1 - K*offset indicates a number of transport blocks in a bundle other than , the UE shall generate a NACK for HARQ-ACK transmission in subframe *n*.

- if the UE has received *W* PDSCH transmissions before subframe *n*, and if the UE is expected to transmit HARQ-ACK for the *W* PDSCH transmissions in subframes , the UE is not expected to receive a new PDSCH transmission in subframe *n*, where *W*=10 if higher layer parameter *ce-pdsch-tenProcesses-config* is set to '*On*', *W*=12 if higher layer parameter *ce-PDSCH-14HARQ-Config* is configured, and *W*=8 otherwise.

- if the UE is expected to transmit HARQ-ACK for the PDSCH transmissions received before subframe *n* in subframes , the UE is not expected to receive a new PDSCH transmission in subframe *n* for which the HARQ-ACK is to be transmitted in subframe 

-------------------------------------------------- Text Ends ---------------------------------------------------------

--------------------------------------------3GPP TS 36.213 --------------------------------------------

### FIRST ROUND Discussion Issues# 1-8: Missing Koffset in Clause 7.3.1 of TS36.213

In the view of FL, the TP highlights omissions and so is sound. Companies are respectfully asked to consider FL Proposal 1-8-1 on this issue and make their views known.

FL Proposal1-8-1: Adopt the TP for Clause 7.3.1 of TS36.213

|  |  |  |
| --- | --- | --- |
| Company | Support/No supportProposal 1-8-1:  | Comments and Proposal |
| Lenovo | No | The latest version (TS36.213 v17.3.0) has already correctly capture the Koffset. Please have a double check.Regarding the following update, I don’t think it is necessary. Subframe n-k\_1 is the most recent subframe with n.*if subframe n - k1 - Koffset is the most recent subframe for which subframe n is the 'HARQ-ACK transmission subframe',* |
| ZTE | Support |  |
| Nokia, NSB | Support |  |
| SONY  | Support | Referring to Lenovo’s comment about v17.3.0, there are two places that refer to *ce-PDSCH-14HARQ-Config:*For a BL/CE UE with higher layer parameter *ce-PDSCH-14HARQ-Config* not configured, for PDSCH transmission in subframe *n-k-K*offset, if the UE is in half-duplex FDD operation and is configured with CEModeA and higher layer parameter *ce-HARQ-AckBundling* and the 'HARQ-ACK bundling flag' in the corresponding DCI is set to 1, or if the UE is configured with higher layer parameter *ce-SchedulingEnhancement*,- if the 'HARQ-ACK delay' field in the corresponding DCI indicates value *k*, the UE shall determine the subframe *n* as the HARQ-ACK transmission subframe.- the HARQ-ACK delay value *k* is determined from the corresponding DCI based on the higher layer parameters according to Table 7.3.1-2.For a BL/CE UE with higher layer parameter *ce-PDSCH-14HARQ-Config* configured, for PDSCH transmission in subframe *n-k*-K\_offset, if the UE is in half-duplex FDD operation and is configured with CEModeA, and 'PDSCH scheduling delay and HARQ-ACK delay for 14 HARQ' field is present in the corresponding DCI,- if the HARQ-ACK delay value as defined in [4], in the corresponding DCI indicates value *k*, the UE shall determine the subframe *n* as the HARQ-ACK transmission subframe.The blue text is the “not configured” case. We agree that “Koffset” is correctly captured. The green case is the “configured” case and we have the incorrect “K\_offset” (cyan).We understand this issue refers to the “configured” case and hence a correction is needed. |
| Sequans | Support |  |

# Referenced Documents

R1-2208689 Corrections on timing relationship for IoT-NTN, ZTE

R1-2209650 On SIB accumulation and Timing relationship enhancements in IoT NTN Ericsson Limited

R1-2210070 DRAFT CR Missing Koffset in FDD HARQ-ACK reporting procedure Ericsson

R1-2210219 Corrections on timing relationship parameter for IoT NTN Huawei, HiSilicon

R1-2210201 Corrections on NPDCCH monitoring restriction for IoT NTN Huawei, HiSilicon

R1-2210434 Summary of [110bis-e-R17-IoT-NTN-01] Email discussion to determine maintenance issues to be handled in RAN1#110bis-e, MediaTek