3GPP TSG-RAN WG3 Meeting #119bis-e R3-23xxxx

Electronic, 17 - 26 April 2023

**Agenda item: 26.2**

**Source: TBD**

**Title: (TP for TS 38.413 BL CR) 5GS network timing synchronization status and reporting**

**Document for: Discussion and Decision**

# 1 Introduction

At RAN#99, a new WID on NR Timing Resiliency and URLLC enhancements was approved in [1]. It includes the following objective:

|  |
| --- |
| 1. 5GS network timing synchronization status and reporting [RAN3, RAN2]:  a. AMF providing clock quality reporting control information per-UE to the gNB. [RAN3]  b. gNB delivering 5G Clock quality information to the UE in RRC\_CONNECTED state, based on the clock quality reporting control information and gNB capability. [RAN2, RAN3]  Note 1: Details of the 5G clock quality information will be decided by RAN3.  c. UE in RRC\_IDLE and RRC\_INACTIVE state determining that the 5G Clock quality information has changed via information received in the broadcast signalling. [RAN2]  d. gNB reporting node-level RAN timing synchronization status information towards the AMF, based on RAN timing synchronization status reporting configuration and gNB capability. [RAN3] |

A text proposal for TS 38.413 is provided in Annex A, reflecting the outcome of RAN3#119bis-e discussion as summarized in the SoD [2].

# References

1. RP-230754 *New WID on NR Timing Resiliency and URLLC enhancements*, Nokia, Nokia Shanghai Bell
2. R3-231899 Summary of Offline Discussion for CB # URLLC\_RANenh

# Annex A: Text Proposal for TS 38.413

*First Modification*

#### 9.3.1.220 Time Synchronisation Assistance Information

This IE indicates 5G access stratum time distribution parameters as defined in TS 23.501 [9].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Time Distribution Indication | M |  | ENUMERATED (enabled, disabled, …) |  |
| Uu Time Synchronisation Error Budget | C-ifEnabled |  | INTEGER (1..1000000, …) | Expressed in units of 1ns. |
| Clock Quality Reporting Control Information | O |  | 9.3.1.x1 |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| C-ifEnabled | This IE shall be present if the *Time Distribution Indication* IE is set to “enabled”. |

*Next Modification*

#### 9.3.1.x1 Clock Quality Reporting Control Information (Option 1, CHOICE)

This IE indicates the clock quality reporting control information as defined in TS 23.501 [9].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| CHOICE *Clock Quality Detail Level* | M |  |  |  |
| >*metrics* |  |  |  |  |
| >*indication* |  |  |  |  |
| >>Clock Quality Acceptance Criteria | M |  | 9.3.1.x2 |  |

#### 9.3.1.x1 Clock Quality Reporting Control Information (Option 2, ENUMERATED)

This IE indicates the clock quality reporting control information as defined in TS 23.501 [9].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Clock Quality Detail Level | M |  | ENUMERATED (metrics, indication, …) |  |
| Clock Quality Acceptance Criteria | C-ifIndication |  | 9.3.1.x2 |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| ifIndication | This IE shall be present if the *Clock Quality Detail Level* IE is set to "indication". |

#### 9.3.1.x2 Clock Quality Acceptance Criteria

This IE indicates the clock quality acceptance criteria as defined in TS 23.501 [9].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| [FFS] |  |  |  |  |

#### 9.3.1.x3 RAN Timing Synchronisation Status Information

This IE indicates the RAN timing synchronisation status information provided towards the AMF as defined in TS 23.501 [9].

Editor’s Note: The non-UE associated NGAP procedure(s) used to convey this IE towards the AMF is FFS.

Editor’s Note: This IE may be further refined based on SA2 and RAN3 progress.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Synchronisation State | O |  | ENUMERATED (locked, holdover, freeRun, …) |  |
| Traceable to UTC | O |  | ENUMERATED (true, false, …) |  |
| Traceable to GNSS | O |  | ENUMERATED (true, false, …) |  |
| Clock Frequency Stability | O |  | 9.3.1.z4 |  |
| Clock Accuracy | O |  | 9.3.1.z5 |  |
| Parent Time Source | O |  | ENUMERATED (syncE, pTP, gNSS, atomicClock, terrestrialRadio, serialTimeCode, nTP, handSet, other, …) |  |

#### 9.3.1.x4 Clock Frequency Stability

This IE indicates the clock frequency stability as defined in TS 23.501 [9].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| [FFS] |  |  |  |  |

#### 9.3.1.x5 Clock Accuracy

This IE indicates the clock accuracy as defined in TS 23.501 [9].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| [FFS] |  |  |  |  |

Editor’s Note: Encoding of the *Clock Accuracy* IE is to be decided by RAN3 and should allow for different RAN implementations (e.g., CHOICE structure). Details FFS.

*End Modification*