**3GPP TSG-RAN WG3 Meeting #121 *R3-234599***

**Toulouse, France, 21 – 25 Aug, 2023**

**Title:** (TP for TS 38.413 BL CR) TSS reporting and RAN feedback

**Source:** Huawei, China Unicom

**Agenda item:** 26.2

**Document Type:** Other

# 1. Introduction

This contribution provides the NGAP TP, as per the discussion **CB: # R18URLLC\_Solution**

# Annex A – TP to BLCR for TS 38.413 (on top of R3-233755)

# 8 NGAP Procedures

## 8.1 List of NGAP Elementary Procedures

In the following tables, all EPs are divided into Class 1 and Class 2 EPs (see subclause 3.1 for explanation of the different classes):

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Table 8.1-1: Class 1 procedures

|  |  |  |  |
| --- | --- | --- | --- |
| Elementary Procedure | Initiating Message | Successful Outcome | Unsuccessful Outcome |
| Response message | Response message |
| AMF Configuration Update | AMF CONFIGURATION UPDATE | AMF CONFIGURATION UPDATE ACKNOWLEDGE | AMF CONFIGURATION UPDATE FAILURE |
| RAN Configuration Update | RAN CONFIGURATION UPDATE | RAN CONFIGURATION UPDATE ACKNOWLEDGE | RAN CONFIGURATION UPDATE FAILURE |
| <<<<<<<<<<<<<<<<<<<< Unmodified Text Omitted >>>>>>>>>>>>>>>>>>>> | | | |
| Distribution Release | DISTRIBUTION RELEASE REQUEST | DISTRIBUTION RELEASE RESPONSE |  |
| Multicast Session Activation | MULTICAST SESSION ACTIVATION REQUEST | MULTICAST SESSION ACTIVATION RESPONSE | MULTICAST SESSION ACTIVATION FAILURE |
| Multicast Session Deactivation | MULTICAST SESSION DEACTIVATION REQUEST | MULTICAST SESSION DEACTIVATION RESPONSE |  |
| Multicast Session Update | MULTICAST SESSION UPDATE REQUEST | MULTICAST SESSION UPDATE RESPONSE | MULTICAST SESSION UPDATE FAILURE |
| Timing Synchronisation Status | TIMING SYNCHRONISATION STATUS REQUEST | TIMING SYNCHRONISATION STATUS RESPONSE | TIMING SYNCHRONISATION STATUS FAILURE |

Table 8.1-2: Class 2 procedures

|  |  |
| --- | --- |
| Elementary Procedure | Message |
| Downlink RAN Configuration Transfer | DOWNLINK RAN CONFIGURATION TRANSFER |
| Downlink RAN Status Transfer | DOWNLINK RAN STATUS TRANSFER |
| Downlink NAS Transport | DOWNLINK NAS TRANSPORT |
| Error Indication | ERROR INDICATION |
| Uplink RAN Configuration Transfer | UPLINK RAN CONFIGURATION TRANSFER |
| Uplink RAN Status Transfer | UPLINK RAN STATUS TRANSFER |
| Handover Notification | HANDOVER NOTIFY |
| <<<<<<<<<<<<<<<<<<<< Unmodified Text Omitted >>>>>>>>>>>>>>>>>>>> | |
| Uplink RAN Early Status Transfer | UPLINK RAN EARLY STATUS TRANSFER |
| Downlink RAN Early Status Transfer | DOWNLINK RAN EARLY STATUS TRANSFER |
| Multicast Group Paging | MULTICAST GROUP PAGING |
| Broadcast Session Release Required | BROADCAST SESSION RELEASE REQUIRED |
| Timing Synchronisation Status Report | TIMING SYNCHRONISATION STATUS REPORT |

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### 8.XX Timing Synchronisation Status Reporting Procedures

#### 8.xx.1 Timing Synchronisation Status

#### 8.xx.1.1 General

The purpose of the Timing Synchronisation Status procedure is to enable the AMF to request the NG-RAN node to start or stop reporting of RAN timing synchronisation status information as specified in TS 23.501 [9] and TS 23.502 [10]. The procedure uses non-UE associated signalling.

#### 8.xx.1.2 Successful Operation



Figure 8.XX.1.2-1: Timing synchronisation status procedure: successful operation

The AMF initiates the procedure by sending a TIMING SYNCHRONISATION STATUS REQUEST message to the NG-RAN node.

If the *RAN**TSS Request Type* IE included in the TIMING SYNCHRONISATION STATUS REQUEST message is set to “start”, the NG-RAN node shall reply with the TIMING SYNCHRONISATION STATUS RESPONSE message. If the *RAN**TSS Request Type* IE is set to “stop”, the NG-RAN node shall stop the report and reply with the TIMING SYNCHRONISATION STATUS RESPONSE message.

#### 8.xx.1.3 Unsuccessful Operation



Figure 8.XX.1.3-1: Timing synchronisation status procedure: unsuccessful operation

If the NG-RAN node is not able to report timing synchronisation status, it shall consider the procedure as failed and reply with the TIMING SYNCHRONISATION STATUS FAILURE message.

#### 8.xx.1.4 Abnormal Conditions

Void.

#### 8.xx.2 Timing Synchronisation Status Report

#### 8.xx.2.1 General

The purpose of the Timing Synchronisation Status Report procedure is to enable the NG-RAN node to provide RAN timing synchronisation status information to the AMF as specified in TS 23.501 [9] and TS 23.502 [10]. The procedure uses non-UE associated signalling.

#### 8.xx.2.2 Successful Operation



Figure 8.xx.2-1: Timing synchronisation status report

The NG-RAN node initiates the procedure by sending a TIMING SYNCHRONISATION STATUS REPORT message to the AMF.

#### 8.xx.2.3 Abnormal Conditions

Void.

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### 9.2.yy Timing Synchronisation Status Reporting Messages

#### 9.2.yy.1 TIMING SYNCHRONISATION STATUS REQUEST

This message is sent by the AMF to request the NG-RAN node to start or stop reporting of RAN timing synchronization status information.

Direction: AMF → NG-RAN node

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.3.1.1 |  | YES | reject |
| RAN TSS Request Type | M |  | ENUMERATED  (start, stop…) |  | YES | reject |

#### 9.2.yy.2 TIMING SYNCHRONISATION STATUS RESPONSE

This message is sent by the NG-RAN node to confirm the request to start or stop reporting of RAN timing synchronization status information.

Direction: NG-RAN node → AMF

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.3.1.1 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.3.1.3 |  | YES | ignore |

#### 9.2.yy.3 TIMING SYNCHRONISATION STATUS FAILURE

This message is sent by the NG-RAN node to indicate that reporting of RAN timing synchronisation status information cannot be initiated.

Direction: NG-RAN node → AMF

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.3.1.1 |  | YES | ignore |
| Cause | M |  | 9.3.1.2 |  | YES | Ignore |
| Criticality Diagnostics | O |  | 9.3.1.3 |  | YES | ignore |

#### 9.2.yy.4 TIMING SYNCHRONISATION STATUS REPORT

This message is sent by the NG-RAN node to report previously requested RAN timing synchronisation status information.

Direction: NG-RAN node → AMF

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.3.1.1 |  | YES | ignore |
| Timing Synchronisation Status Information | M |  | 9.3.1.x3 |  | YES | ignore |
| TSS Scope | M |  | 9.3.1.x6 |  | YES | ignore |

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#### 9.3.1.131 TSC Assistance Information

This IE provides the TSC assistance information for a TSC QoS flow in the uplink or downlink (see TS 23.501 [9]).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Periodicity | M |  | 9.3.1.132 |  | - |  |
| Burst Arrival Time | O |  | 9.3.1.133 |  | - |  |
| Survival Time | O |  | 9.3.1.221 |  | YES | ignore |
| CHOICE *RAN feedback type* |  | *0..1* |  |  | YES | ignore |
| >*proactive* |  |  |  |  |  |  |
| >>Burst Arrival Time Window | M |  | 9.3.1.z1 |  | - |  |
| >>Periodicity Range | O |  | 9.3.1.z2 |  | - |  |
| >*reactive* |  |  |  |  |  |  |
| >>Capability for BAT Adaptation | M |  | ENUMERATED (true, …) |  | - |  |

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#### 9.3.1.x1 Clock Quality Reporting Control Information

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 |  |  |  |
| >*clock quality metrics* |  |  |  |  |
|  |  |  |  |  |
| >*acceptance indication* |  |  |  |  |
| >>Clock Quality Acceptance Criteria | M |  | 9.3.1.x2 |  |

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#### 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].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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 |  | BIT STRING (SIZE (16)) | Indicates the offsetScaledLogVariance as specified in TS 23.501 [9]. |
| Clock Accuracy | O |  | 9.3.1.x5 |  |
| Parent Time Source | O |  | ENUMERATED (syncE, pTP, gNSS, atomicClock, terrestrialRadio, serialTimeCode, nTP, handSet, other, …) |  |

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#### 9.3.1.x6 RAN TSS Scope

This IE indicates the scope of the RAN timing synchronisation status as defined in TS 23.501 [9].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| CHOICE *RAN TSS scope* | M |  |  |  |
| >*RAN node level* |  |  |  |  |
| >>Global gNB ID | M |  | 9.3.1.6 |  |
| >*cell list level* |  |  |  |  |
| **>>RAN TSS Cell List** |  | *1* |  |  |
| **>>>RAN TSS Cell Item** |  | *1..<maxnoofCellsTSS* |  |  |
| >>>>NR CGI | M |  | 9.3.1.7 |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofCellsTSS | Maximum no. of Cell IDs in the scope of the RAN timing synchronisation status. Value is FFS. |

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#### 9.3.1.z1 Burst Arrival Time Window

This IE indicates the burst arrival time window of the TSC QoS flow as defined in TS 23.501 [9].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Burst Arrival Time Window Start | M |  | INTEGER (0..640000, …) | Start of the burst arrival time window calculated with reference to the *Burst Arrival Time* IE, expressed in units of 1 us. Integer values are negative. |
| Burst Arrival Time Window End | M |  | INTEGER (0..640000, …) | End of the burst arrival time window calculated with reference to the *Burst Arrival Time* IE, expressed in units of 1 us. Integer values are positive. |

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#### 9.3.1.z5 TSC Feedback Information

This IE provides the TSC feedback information for a TSC QoS flow in the uplink or downlink (see TS 23.501 [9]).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Burst Arrival Time Offset | M |  | INTEGER (-640000..640000, …) | Burst arrival time offset expressed in units of 1 us. |
| Adjusted Periodicity | O |  | Periodicity  9.3.1.132 | Not applicable to reactive RAN feedback. |

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