**3GPP TSG- Meeting #**

**Athens, Greece, –**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** | **1** | **Current version:** |  |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **x** | Core Network |  |

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| ***Title:*** | Clarification of primary source event | | | | | | | | | |
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| ***Source to WG:*** | Nokia, Nokia Shanghai Bell, Ericsson, Huawei, Qualcomm?, ZTE? | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | 8 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | RAN TSS reports are triggered when the gNB-DU detects a primary source event. However, the description of “event c)” is not entirely clear/accurate:   1. The wording “*event a) occurred and b) has not yet been reached*” is intended to mean that event b) has not yet been reached for every attribute for which event a) has occurred. 2. Periodic reporting is not an event, and it seems overly restrictive to require that reports are sent periodically even when no RAN TSS attribute values have changed (this should be left to implementation). | | | | | | | | |
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| ***Summary of change:*** | | 1. To avoid possible misinterpration of “*event a) occurred and b) has not yet been reached*”, it is clarified that it is for a (particular) RAN TSS attribute. 2. Rather than requiring time-triggered reports to be sent at periodic intervals, it is softened to “implementation-dependent time interval” (e.g. gNB-DU implementation may skip a report if no RAN TSS attribute values have changed). | | | | | | | | |
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| ***Consequences if not approved:*** | | The description of primary source events remains unclear/inaccurate. | | | | | | | | |
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| ***Clauses affected:*** | | 8.24.1, 8.24.2 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | rev1: updated to reflect RAN3#123 discussion | | | | | | | | |

*start of changes*

## 8.24 Timing resiliency service

The following clauses describe the overall procedures for RAN Timing Synchronisation Status (TSS) reporting involving gNB-CU/gNB-DU.

### 8.24.1 RAN TSS reporting towards the CN

The signaling flow for RAN TSS reporting towards the CN is shown in Figure 8.24.1-1. This procedure is used when the TSCTSF subscribes to RAN TSS reporting at the AMF as described in TS 23.502 [32].



Figure 8.24.1-1: RAN TSS reporting towards the CN

0. The gNB-DU is pre-configured with a threshold for each RAN TSS attribute it supports. The gNB-DU does not report RAN TSS attribute values better than the pre-configured thresholds, i.e. if a RAN TSS attribute has a value better than the pre-configured threshold, the gNB-DU reports the threshold value to the gNB-CU instead.

NOTE 1: It is assumed the pre-configured thresholds in the gNB-DU are sufficient to meet UE time sync performance requirement which are configured by the operator.

1. The AMF requests RAN TSS reporting by sending the TIMING SYNCHRONISATION STATUS REQUEST message to the gNB-CU.

2. The gNB-CU requests RAN TSS reporting from at least one gNB-DU by sending the TIMING SYNCHRONISATION STATUS REQUEST message to the gNB-DU.

NOTE 2: It is up to gNB-CU implementation whether to send the request to all its gNB-DUs or to a particular subset of its gNB-DUs, depending on e.g. network topology.

3. The gNB-DU replies to the gNB-CU by sending the TIMING SYNCHRONISATION STATUS RESPONSE message.

4. The gNB-CU replies to the AMF by sending the TIMING SYNCHRONISATION STATUS RESPONSE message. If the gNB-CU does not receive a successful response from at least one gNB-DU, the gNB-CU replies to the AMF by sending the TIMING SYNCHRONISATION STATUS FAILURE message and the flow stops at this step.

5. Upon sending the response to the gNB-CU, the gNB-DU provides a first RAN TSS report to the gNB-CU by sending the TIMING SYNCHRONISATION STATUS REPORT message.

NOTE 3: The RAN TSS attributes included in the report is up to gNB-DU implementation.

6. The gNB-CU sends the TIMING SYNCHRONISATION STATUS REPORT message to the AMF. The message contains the RAN TSS attributes received from the gNB-DU and the *RAN TSS Scope* IE to indicate whether the scope of the RAN TSS report is “RAN node level” or “cell list level”.

7. Later, the gNB-DU detects a primary source event:

a) a RAN TSS attribute cannot meet a pre-configured threshold (i.e. status is degraded);

b) a RAN TSS attribute meets the pre-configured threshold again (i.e. status is no longer degraded);

c) event a) occurred and b) has not yet been reached for a RAN TSS attribute, and either an implementation-dependent time interval has passed or a previously reported value can no longer be met.

NOTE 4: Additional primary source events, if any, are up to gNB-DU implementation.

8. Upon detecting the primary source event, the gNB-DU provides an updated RAN TSS report to the gNB-CU by sending a TIMING SYNCHRONISATION STATUS REPORT message.

9. Same as step 6.

### 8.24.2 RAN TSS reporting towards the UE

The signaling flow for RAN TSS reporting towards the UE in RRC\_CONNECTED state is shown in Figure 8.24.2-1.



Figure 8.24.2-1: RAN TSS reporting towards the UE in RRC\_CONNECTED state

NOTE 1: In this signalling flow, it is assumed that RAN TSS reporting is already enabled at the gNB-DU.

1. The AMF sends the INITIAL CONTEXT SETUP REQUEST message to the gNB-CU, containing the *Clock Quality Reporting Control Information* IE within the *Time Synchronization Assistance Information* IE. The clock quality reporting control information indicates the clock quality detail level to provide to the UE, i.e. “metrics” or “acceptable/not acceptable indication”. If clock quality detail level equals “acceptable/not acceptable indication”, the clock quality reporting control information also contains the clock quality acceptance criteria.

NOTE 2: The clock quality reporting control information can also be provided in the UE CONTEXT MODIFICATION REQUEST, HANDOVER REQUEST, or PATH SWITCH REQUEST ACKNOWLEDGE messages.

2. The gNB-CU replies to the AMF by sending the INITIAL CONTEXT SETUP RESPONSE message.

3. The gNB-CU sends the latest clock quality information to the UE by sending the *DLInformationTransfer* message. The clock quality information provided to the UE depends on the clock quality detail level received in step 1 (i.e., “metrics” or “acceptable/not acceptable indication”).

4. Later, the gNB-DU detects a primary source event:

a) a RAN TSS attribute cannot meet a pre-configured threshold (i.e. status is degraded);

b) a RAN TSS attribute meets the pre-configured threshold again (i.e. status is no longer degraded);

c) event a) occurred and b) has not yet been reached for a RAN TSS attribute, and either an implementation-dependent time interval has passed or a previously reported value can no longer be met.

NOTE 3: Additional primary source events, if any, are up to gNB-DU implementation.

5. Upon detecting the primary source event, the gNB-DU provides an updated RAN TSS report to the gNB-CU by sending a TIMING SYNCHRONISATION STATUS REPORT message.

6. Same as step 3.

*end of changes*