3GPP TSG-RAN WG1 Meeting #106bis-e R1-2110652

e-Meeting, Oct 11th – Oct 19th, 2021

**Title: DRAFT** LS on Validity Timer for UL Synchronization

**Reply to:**

**Release:** Release 17

**Work Item:** LTE\_NBIOT\_eMTC\_NTN

**Source:** Moderator (MediaTek), [RAN1]

**To:** RAN2

**Cc:**

**Contact Person:**

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**Attachments:** None

**1. Overall Description:**

RAN1 has discussed the following aspects and leaves it up to RAN2 to specify UE behaviour related to expiry of UL synchronization validity timer and determine which of the following aspects are to be specified:

* Mechanisms for UE to declare loss of UL synchronization including mechanisms for UL synchronization recovery procedure when UL synchronization is lost if UL synchronization validity timer expires in RRC\_CONNECTED
  + It is up to RAN2 to specify this new behaviour for connected UE within RLF set of procedures or a new procedure for re-acquiring satellite ephemeris
  + Mechanism for UL synchronization includes re-acquiring the satellite ephemeris and common TA parameters if indicated on SIB
  + A new clause of RLF for loss of UL synchronization if validity timer for UL synchronization expires assuming a new re-interpretation of RLF set of procedures is specified for recovery of UL synchronization with re-acquisition of satellite ephemeris and common TA parameters if indicated
  + Potential additional RACH after re-acquisition of satellite ephemeris and common TA parameters if indicated for the UL synchronization recovery procedure in case of potential residual TA error.
* If validity timer for UL synchronization expires and no UL synchronization recovery mechanisms specified as above, UE behaviour shall declare RLF and go into idle mode autonomously to re-acquire ephemeris SIB. UE will then need to re-access the cell via Random Access procedure.
* UE signalling to indicate the validity timer for UL synchronization is about to expire

RAN1 respectfully requests RAN2 to prioritize the validity timer for UL synchronization specification work.

Relevant RAN1 agreements are attached below.

Agreement:

RAN1 has discussed the following aspects and leaves it up to RAN2 to specify UE behaviour related to expiry of UL synchronization validity timer and determine which of the following aspects are to be specified:

* Mechanisms for UE to declare loss of UL synchronization including mechanisms for UL synchronization recovery procedure when UL synchronization is lost if UL synchronization validity timer expires in RRC\_CONNECTED
  + It is up to RAN2 to specify this new behaviour for connected UE within RLF set of procedures or a new procedure for re-acquiring satellite ephemeris
  + Mechanism for UL synchronization includes re-acquiring the satellite ephemeris and common TA parameters if indicated on SIB
  + A new clause of RLF for loss of UL synchronization if validity timer for UL synchronization expires assuming a new re-interpretation of RLF set of procedures is specified for recovery of UL synchronization with re-acquisition of satellite ephemeris and common TA parameters if indicated
  + Potential additional RACH after re-acquisition of satellite ephemeris and common TA parameters if indicated for the UL synchronization recovery procedure in case of potential residual TA error.
* If validity timer for UL synchronization expires and no UL synchronization recovery mechanisms specified as above, UE behaviour shall declare RLF and go into idle mode autonomously to re-acquire ephemeris SIB. UE will then need to re-access the cell via Random Access procedure.
* UE signalling to indicate the validity timer for UL synchronization is about to expire

Agreement:

The validity timer for UL synchronization is started/restarted with configured timer validity duration at the epoch time of the assistance information (i.e. serving satellite ephemeris data).

* FFS: Precise definition of epoch time taking into account SIB repetitions

Agreement:

A single validity duration for both serving satellite ephemeris and common TA related parameters is defined at least if serving satellite ephemeris and common TA parameters are signalled in the same SIB message.

Agreement:

The validity timer of UL synchronization is configured by the network

* FFS: Whether a single validity timer or separate validity timers are used for satellite ephemeris and common TA parameters

Agreement:

* Satellite ephemeris read on SIB are valid for the duration of sporadic short transmission in RRC\_CONNECTED.
* Common TA parameters if indicated and read on SIB are valid for the duration of sporadic short transmission in RRC\_CONNECTED.
* Note: The duration of the short transmission is not longer than the “validity timer for UL synchronization” referred to in the WID objective (but which still needs further discussion for specifying further details)

Agreement:

UE in RRC\_IDLE reads the satellite ephemeris on SIB and the common TA parameters if indicated on SIB and (re-)start the validity timer(s) for UL synchronization before moving to RRC\_CONNECTED.

* FFS: Details of the precise (re-)start time for the validity timer for UL synchronization to ensure a common understanding between gNB and UE.
* Other signaling details for validity timer are up to RAN2

**2. Actions:**

**To RAN2 group:**

**ACTION:** RAN1 respectfully asks RAN2 to take the above into account for future work.

**3. Date of Next TSG-RAN WG1 Meetings:**

TSG-RAN WG1 Meeting #107-e 11 – 19 November 2021 Electronic Meeting