**3GPP TSG-RAN WG4 Meeting # 99-e R4-2108362**

**Electronic Meeting 19th May– 27th May 2021**

**Agenda Item:** **9.20.1**

**Source: Ericsson, CATT, Intel Corporation**

**Title: Work plan for RRM core requirements**

**Document for: Approval**

# Introduction

In RAN#90-e the Rel-17 WID “Positioning enhancements for NR” was approved. The WID was revised at RAN#91-e to further elaborate the objectives including the updates and addition of RAN4 related objectives [1].

The objective of this work item is to specify solutions to enable RAT dependent (for both FR1 and FR2) and RAT independent NR positioning enhancements for improving positioning accuracy, latency, network and/or device efficiency. The objective of this work item also includes the support of GNSS enhancements. [1]

The objectives for the core part which include RAN4 are:

Core part:

* Specify methods, measurements, signalling, and procedures for improving positioning accuracy of the Rel-16 NR positioning methods by mitigating UE Rx/Tx and/or gNB Rx/Tx timing delays, including [RAN1, RAN2, RAN3, RAN4]
  + DL, UL and DL+UL positioning methods
  + UE-based and UE-assisted positioning solutions
* Specify the enhancements of signalling, and procedures for improving positioning latency of the Rel-16 NR positioning methods, for DL and DL+UL positioning methods, including:
  + Latency reduction related to the request and response of location measurements or location estimate and positioning assistance data; [RAN2, RAN3, RAN1]
  + Latency reduction related to the time needed to perform UE measurements; [RAN1, RAN4]
  + Latency reduction related to the measurement gap; [RAN1, RAN4, RAN2]
* Specify methods, measurements, signalling and procedures to support positioning for UEs in RRC\_ INACTIVE state, for UE-based and UE-assisted positioning solutions, including [RAN2, RAN1, RAN3, RAN4]:
  + DL NR positioning methods and RAT-independent positioning methods
    - Support of UE positioning measurements for UEs in RRC\_INACTIVE state
    - Reporting of positioning measurement or location estimate performed in RRC\_INACTIVE when the UE is in RRC\_INACTIVE state

Note: this work will be coordinated with the SDT WI.

* + As 2nd priority:
    - UL and DL+UL NR positioning methods
    - Support of gNB positioning measurements for UEs in RRC\_INACTIVE state
* Support the following enhancements of A-GNSS positioning [RAN2, RAN3, RAN4]
  + Specify support for BDS B2a signal
  + Specify support for BDS B3I signal
  + Specify support for NavIC to NR

Note: This objective is applicable to NR and E-UTRA.

* Discuss and specify new as well as the impact on the existing RAN4 requirements for positioning and other RRM measurements and corresponding procedures [RAN4]

# Timeline and workplan Core part

Starting the Core part of WI “NR\_pos\_enh” in RAN4#99-e, current TU allocation foresees to finish the Core part with RAN4#102 meeting, Q1-2022. The performance part shall be handled thereafter, starting with RAN4#102.

The work plan for RAN4 core part can be found in following Table 1.

Table 1 Work plan NR\_pos\_enh-Core for RAN4

|  |  |  |  |
| --- | --- | --- | --- |
| **Quarter** | **Meeting #** | **TU** | **Work plan** |
| RAN#92e (June 2021) | RAN4#99-e | 0.25 | * Start the discussion on impact of positioning measurements on RRM measurements and vice versa.   + Identify the impacted positioning and RRM measurement requirements * Start the discussion on enhancements of Rel-16 positioning measurements:   + Identify requirements which can be enhanced based on RAN1 and RAN2 agreements. * Start the discussion on the scope of the requirements for positioning measurement in RRC\_INACTIVE |
| RAN#93e (Sept. 2021) | RAN4#100-e | 1 | * Further discussion on impact of positioning measurements on RRM measurements and vice versa.   + Analyse the impacted positioning and RRM measurement requirements   + Agree on simulation assumptions if simulations are needed. * Further discussion on enhancements of Rel-16 positioning measurements:   + Analyse requirements which can be enhanced based on RAN1 and RAN2 agreements. * Further discussion on the scope of the requirements for positioning measurement in RRC\_INACTIVE   + Analyse the positioning measurement requirements   + Agree on simulation assumptions if simulations are needed. * Start discussion on requirements for enhancements of A-GNSS positioning * Start discussion on latency reduction related to the time needed to perform UE measurements * Start discussion on latency reduction related to the measurement gap |
| RAN#94e (Dec. 2021) Rel-17 completion for RAN1 | RAN4#101-e | 1 | * Further discussion on impact of positioning measurements on RRM measurements and vice versa.   + Further analysis on the impacted positioning and RRM measurement requirements   + Analyse simulation results (if provided)   + Agree requirement framework * Further discussion on enhancements of Rel-16 positioning measurements:   + Further analyse requirements which can be enhanced based on RAN1 and RAN2 agreements.   + Analyse simulation results (if provided)   + Agree requirement framework * Further discussion on the scope of the requirements for positioning measurement in RRC\_INACTIVE   + Further analyse requirements in RRC\_INACTIVE   + Analyse simulation results (if provided)   + Agree requirement framework * Further discussion on requirements for enhancements of A-GNSS positioning * Further discussion on latency reduction related to the time needed to perform UE measurements * Further discussion on latency reduction related to the measurement gap * Agree requirement framework |
| RAN#95e (Mar. 2022) Rel-17 completion for RAN2, 3, 4 (core part) | RAN4#101bis | 1 | * Finalization of the core requirements:   + Agree on the CR for enhancing the impacted positioning and RRM measurement requirements   + Agree on the CR for requirements for Rel-16 positioning enhancements:   + Agree on the CR for the requirements for positioning measurement in RRC\_INACTIVE   + Agree on the CR on requirements for enhancements of A-GNSS positioning   + Agree on the CR on requirements for latency reduction |
| RAN4#102 | 1 | * Finalization of the core requirements:   + Agree on open issues and finalize core part |

# Conclusion

In this contribution, we have provided a work plan on NR positioning work item “NR\_pos\_enh-Core”.

# References

1. RP-210903, “Revised WID on NR Positioning Enhancements”, Intel Corporation, CATT