**3GPP TSG-RAN WG4 Meeting # 104-e R4-2214462**

**Electronic Meeting, August 15 ‒ 26, 2022**

**Title: [DRAFT]** WF on expanded and improved NR positioning study

**Agenda Item:** 11.14.4

**Source: Intel Corporation**

**Document for:** Approval

# General aspects

## RAN4 work plan

A tentative work plan for RAN4 tasks is included in R4-2212149. For RAN4 #104Bis-e, the following is captured:

|  |  |
| --- | --- |
| **RAN4 Meeting** | **Tentative Work Plan** |
| RAN4#104bis-eOctober 2022,(RF 0.25 TUsRD 0.5 TUs) | * Evaluation work on potential solutions for PRS/SRS bandwidth aggregation for intra-band carriers considering potential timing errors, phase coherency, frequency errors, power imbalance, etc.
* Continue study solutions for accuracy improvement based on NR carrier phase measurements
	+ Focus on RAN4 RF aspects and potential inputs to RAN1, if any
* Preparation of text proposals for 3GPP TR 38.859, if there are any
 |

Given the work scope, the above discussion split may not be the most effective. It was suggested to not split discussions between the two sessions in the upcoming meeting.

**Way forward**: Consider suggested change to discussion split and focus for upcoming RAN4 #104Bis-e meeting

# Accuracy improvement study based on PRS/SRS bandwidth aggregation

## Intra-band CA scenario

**Agreement:**

* Intra-band contiguous CA scenario will be prioritized in study.

## Scope of study based on PRS/SRS bandwidth aggregation

**Agreement:**

* Deprioritize power imbalance discussion

**Way forward**: Further discuss the following in the next RAN4 meeting:

* RF architecture – can we focus on a single RF architecture (i.e., single Tx/Rx chain), align on target architectures
* Studying RF impairment model (timing/group delay/frequency/phase) first to assess performance and accuracy gain with realistic impairments
* Studying achievable accuracy gain when TAE is within specified requirement for intra-band contiguous CA
* Notifying RAN1 of the UE transmit power limitation due to potential prioritization

## Baseline assumptions

Candidate option:

* Proposal: RAN4 assumes that the legacy FFT processing strategy of legacy RXs, that is one FFT processing per CC with standard FFT size, must be baseline. Processing with extended FFT-size specifically for high accuracy positioning measurement is not assumed as baseline.

**Way forward:**

* Continue discussion in RAN4 #104Bis-e

## Initial conclusion on feasibility

**Agreement:**

* PRS/SRS bandwidth aggregation for intra-band contiguous carrier is feasible for single chain Tx/Rx architectures

# Accuracy improvement study based on carrier phase measurements

## Scope of study based on carrier phase measurements

Candidate options:

* Proposal 1: RAN4 should study how to model impacts of antenna/beam phase response, residual carrier-frequency offset, and frequency drift on carrier phase positioning
* Proposal 2: RAN4 to wait for further progress in RAN1 to evaluate and assess the scope of solutions based on NR carrier phase measurements to be studied by RAN4.
* Proposal 3: RAN4 need to study the timing error and phase errors among different TRPs and provide the corresponding information to RAN1.

**Agreement:**

* Wait for RAN1 conclusion or RAN1 LS to start RAN4 work on accuracy improvement study based on carrier phase measurements

## ~~RF requirements~~

**~~Agreement:~~**

* ~~RAN4 shall postpone RF requirement discussions for this study~~

# References

1. R4-2214248, “Email discussion summary for [104-e][137] FS\_NR\_pos\_UERF,” Moderator (Intel Corporation), RAN4 #104e, August 2022