**3GPP TSG SA WG 1 Meeting #99e S1-22xxxx**

**Electronic Meeting, 22 August – 1 September 2022** *(revision of S1-22xxxx)*

**Source: Nokia, Nokia Shanghai Bell**

**pCR Title: Pseudo-CR on consolidated potential KPIs for sensing scenarios**

**Draft Spec: 3GPP TR 22.837**

**Agenda item: x.x**

**Document for: Approval**

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*Abstract: This contribution proposes consolidated KPIs applicable to all use cases for integrated sensing and communications.*

**1. Introduction**

At SA1 #98e, some KPIs were proposed, which could be regarded as use case or application specific, and so hard to be evaluated from 3GPP functionality point of view. Therefore, this paper proposes a set of KPIs which is generic and can be applied for all services leveraging sensing functinalities.

**2. Reason for Change**

The following KPIs can be considered for all sensing use cases. The rationale behind each propose KPI is provided below, from the viewpoint of potential requirements for NR radio interface where applicable.

- **Minimum ranging distance;** Decisive factor on the bandwidh and time duration required for sensing signals, as well as the necessity of full-duplex capabilities.

- **Maximum ranging distance;** Impact on transmit power of sensing signals, receiver sensitivity and carrier frequency.

- **Spatial resolution;** Impact on the bandwidth range and beam width of radiated sensing signals.

- **Detectable Radio Croll Section (RCS);** Closely relates to the maximum ranging distance. Likewise, it impacts on transmit power of sensing signals, receiver sensitivity and carrier frequency.

- **Measurement latency;** The minimum requirement of measurement latency has been specified in 3GPP standard, e.g. for UE as in TS 38.133. Given that the required measurement latency might be different amongst different sensing use cases, it is worthwhile identifying the required value for each use case and checking if the existing requirement can cover it.

- **Reliability;** can be measured by the probability of missed detection of false alarm. The maximum ranging distnace, spatial relation, detectable RCS and measurement latency could affect these probabilities.

Needless to say, different use case would have different value for each KPI, which are to be discussed for further.

**3. Conclusions**

By defining the generic set of KPIs, the other WGs will be able to perform feasibility study from 3GPP functionality point of view.

**4. Proposal**

It is proposed to agree the following changes to 3GPP TR 22.837 and for every use case to use the same KPI table.

\* \* \* First Change \* \* \* \*

# 7 Consolidated potential requirements and KPIs

## 7.1 Consolidated potential requirements

## 7.2 Consolidated potential KPIs

Table 7.2-X Performance requirements for integrated sensing and communication scenarios

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scenario | Minimum ranging distance (note 1) | Maximum ranging distance (note 2) | Spatial resolution (note 3) | Detectable radio cross section (note 4) | Measurement latency (note 5) | Reliability (missed detection/false alarm) (note 6) |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| NOTE 1: The minimum distance between the transmitter of sensing signals and a taget objectNOTE 2: The maximum distnace between a transmitter of sensing signals and a target objectNOTE 3: The size of the smallest target object that can be detected by NR based sensingNOTE 4: A measure on detectability of a target object [dBsm]NOTE 5: Latency of obtaining sensing measurement resultsNOTE 6: Probability of missed detection and false alarm |