3GPP TSG RAN#102
11th – 15th, December 2023

Agenda: 9.1.1.7

RP-233862

Views on Rel-19 ISAC Study Item(s)

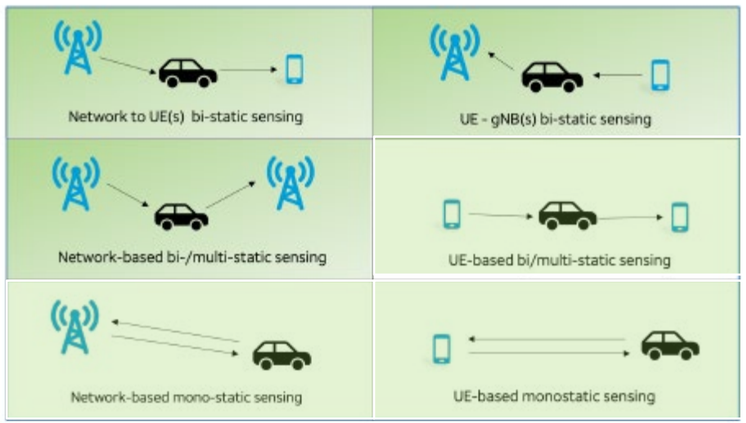
Source: AT&T, FirstNet

Background & General Observations

- Per endorsed, RP-231540 ISAC (Integrated Communications and Sensing) has garnered significant support for a Study Item in Rel-19
- Moderator summary from RAN#101 (RP-232617)
  - A significant number of companies have expressed interest in ISAC for Rel-19 including use cases, sensing modes, and channel modeling
  - ISAC should be considered a high priority topic for Rel-19

Observations/discussion (1)

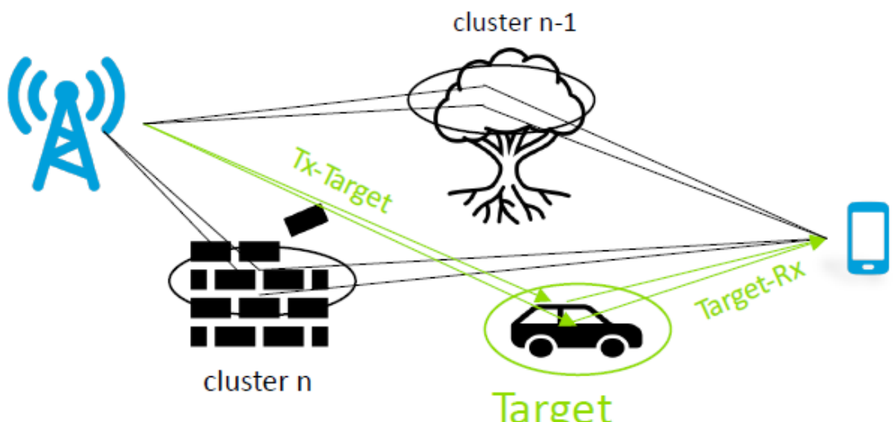
- 3GPP SA1 concluded a feasibility study on ISAC and started a WI to introduce KPIs and 5G system functional requirements for sensing
  - Plethora of ISAC use cases described in TR22.837
  - Ongoing SA1 work on requirements in TS22.137
  - RAN must identify corresponding info, e.g., scenarios, frequency ranges, and sensing modes for the different use cases
- RAN must select and prioritize a subset of 3-4 representative use cases based on
  - Feasibility (KPIs and NR air interface requirements)
  - Potential deployment (good commercial viability)
  - Diversity of cases (outdoor/indoor, KPIs small/large range, coordinating devices, etc.)
- RAN must select/prioritize sensing topologies
  - Sensing topologies depend on where the sensing Tx, sensing Rx, and/or computation/aggregation is implemented
  - Bi-static or multi-static sensing distributes the process among multiple network/device nodes
  - Monostatic sensing might not be fully realizable without full duplex operation
  - Network-based candidate sensing modes/topologies are a priority



Observations/discussion (2)

- Existing 3GPP channel model in TR38.901 is not sufficient to assess the performance of sensing solutions
  - Scope of the SCM updates are dependent upon clear guidance on use cases, topologies, and scenarios.

- RAN1 to modify the channel models in TR38.901 including
  - Adding/ Modeling of the target over the range of considered use cases
  - Depending on the target, radar cross section can be modeled as fixed or random with a given distribution.
  - Modeling of the Tx-target and target-Rx channels for bi-static and/or mono-static sensing
  - Large scale and small scale fading for bi-static and/or mono-static topologies at the BS and UE
  - Spatial consistency procedures to include mobile targets
  - Modifications for both SLS and LLS channel models
  - Considerations on ray-tracing models with stochastic elements for sensing use cases



Proposal

1. RAN Plenary to approve a RAN Plenary-led ISAC Study Item at RAN#102 to evaluate and select:
   - Representative use cases
   - Sensing modes/topologies
   - Identification of potential KPIs
2. RAN Plenary to approve a follow-on RAN1-led ISAC Study Item at RAN#102 to begin after completion of item 1 to
   - Modify the 3GPP channel model in TR 38.901 to support the evaluation of integrated communication and sensing including modeling of targets and spatial consistency procedures for mobile targets

Thank you!