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Views on Rel-18 Positioning Project

Sidelink Positioning: Include Unlicensed spectrum in scope

- To achieve the V2X positioning accuracy requirements, sidelink PRS will require a bandwidth of the order of 100MHz or better.
  - No region has allocated this much spectrum for ITS, and there is no clear indication of plans from operators to allow the use of sufficient licensed spectrum for V2X positioning operation.
  - For the out-of-coverage use case, where only ITS and unlicensed spectrum are available, absent support of unlicensed band SL-PRS, the limited ITS spectrum precludes successful Sidelink Positioning operation.
    - Note that that for V2X, vehicles may sometimes be frequently entering and leaving network coverage areas which could damage in-coverage performance as well as out-of-coverage performance if PRS resources are being added and removed.

- Without support of SL-PRS over unlicensed band, Sidelink Positioning cannot support the important automotive market as 5GAA pointed out.

Proposal 1: Include unlicensed spectrum in the scope of SL Positioning

- If this is not possible at this phase, our alternate proposal is the following:

Proposal 2: Include in the scope of the study an assessment of spectrum and bandwidth necessary to satisfy the supported use cases and positioning accuracy requirements.

Improved Accuracy, Integrity, Power (I)

- **Highest priority in this area is the scope of PRS/SRS Bandwidth Aggregation**
  - Justification:
    - WiFi/UWB offers competitive positioning performance exploiting its large system bandwidth: WiFi 6 can utilize up to 160MHz BW and it is expected that WiFi 7 will increase the supported BW to 320MHz. Commercially available UWB based positioning utilizes at least 500MHz BW and higher in some scenarios.
  - Spectrum of Interest:
    - Licensed Bands Examples: 200 MHz in 3400 MHz – 3600 MHz, 160 MHz in 2496 MHz – 2690 MHz, 150 MHz in 3550 MHz – 3700 MHz CBRS (US). In FR2 bands (e.g. 28GHz and 39GHz), BW aggregation could for example allow an effective 800MHz PRS BW by aggregating two PRS of 400MHz BW.
    - Unlicensed Bands: 3GPP specification does not prevent/preclude PRS to be sent in unlicensed spectrum even in NR Rel-17, even if further enhancements of PRS operation in unlicensed have not been explicitly specified.
  - RAN1 has already studied this enhancement in TR38.857 and concluded that it is beneficial for the purpose of improving positioning accuracy.

Improved Accuracy, Integrity, Power (II)

- **Lower Priority in this area are the following two items:**
  - **Integrity**
    - The scope remains too broad and vague.
      - Rel-17 supports “GNSS positioning integrity determination” only, since the positioning integrity determination is different for each RAT-Independent method (e.g., GNSS, Sensors, WLAN, etc.). Similarly, the “integrity solutions” for “RAT-dependent methods” may be different for each method (e.g., DL-TDOA, UL-TDOA, multi-RTT, E-CID, etc.)
    - The feasibility of integrity for UE-assisted mode is unclear, even for GNSS only positioning in Rel-17, which is a technology for which integrity has been worked on for several years now.

  - **Carrier phase positioning**
    - Increased Sensitivity to multipath environments compared to non-carrier-phased based measurements, which may render the methods impractical to real scenarios. This is applicable to both outdoor, indoor, factory environments of interest
    - Implications to RF architectures/antennas/requirements for both UE & gNBs

Red Cap Positioning

- **Proposal 3: Support the suggested scope from the moderator**

  Positioning support for RedCap UEs, considering the following:
  - *Evaluate positioning performance of existing positioning procedures and measurements with RedCap UEs[RAN1, RAN4]*
  - *Based on the evaluation assess the necessity of enhancements and, if needed, identify enhancements to help address limitations associated with for RedCap UEs [RAN1, RAN2]*
  - *Define core and performance requirements for positioning measurements performed by RedCap UEs [RAN4]*

- Justification
  - RedCap will be completed in NR Rel-17 - opens up a new market of “mid tier IOT”
    - Supporting NR Positioning enhancements in NR Rel-18 would expand further the value of these IoT devices with low Bandwidth & low processing capabilities

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