

vivo

3GPP TSG RAN Rel-18 workshop  
Electronic Meeting, June 28 – July 2, 2021

RWS-210174

# Further positioning enhancement for Rel-18

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Document for: Discussion & Decision

Agenda Item: 4.3

## 1 Rel-18 positioning motivations

## 2 Rel-18 new topics

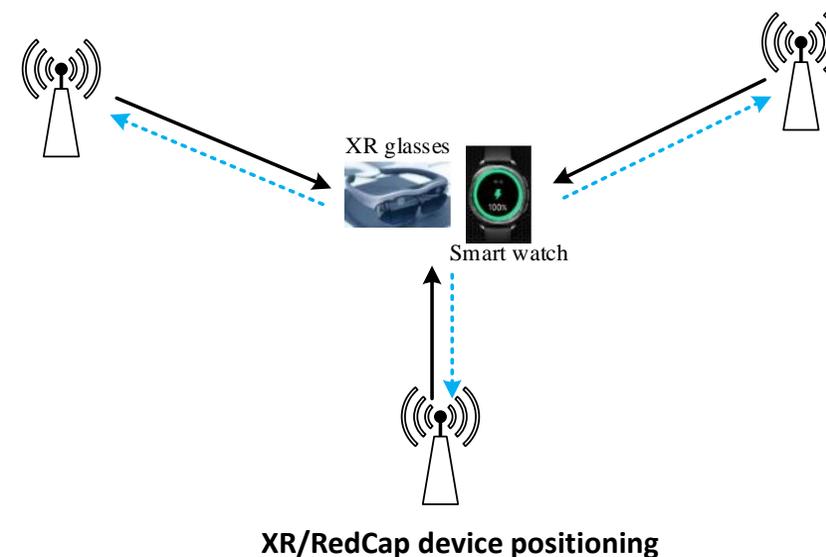
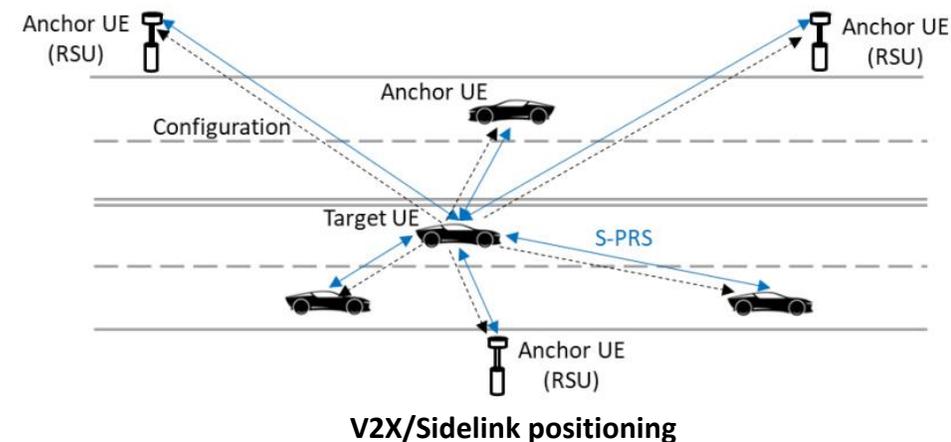
- Sidelink positioning
- Positioning from 52.6GHz to 71GHz
- Positioning for RedCap UE

## 3 Rel-17 continuation topics

- Aperiodic/semi-persistent PRS
- Idle/inactive state positioning enhancements
- Positioning with DRX

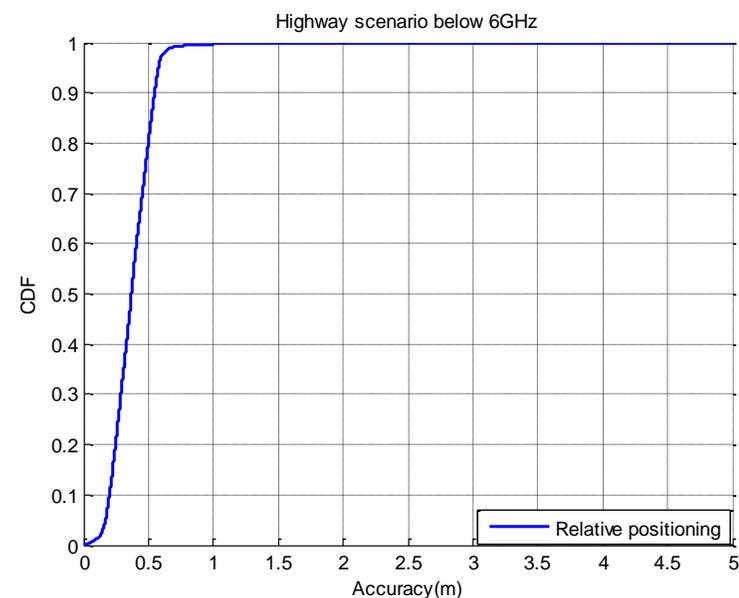
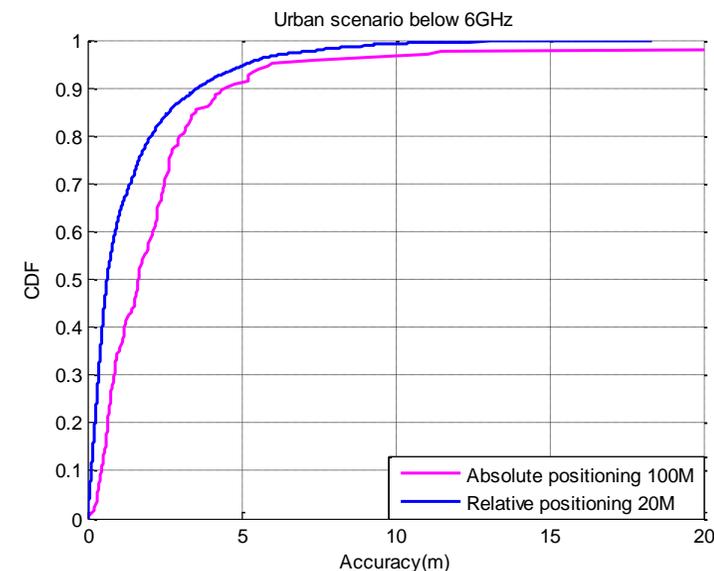
# Rel-18 positioning motivations

- Focus on positioning support for multiple **commercial use cases**, e.g. verticals
  - **V2X positioning**
    - ✓ Absolute and relative positioning for better traffic safety and traffic efficiency
    - ✓ **Sidelink positioning**: sidelink assisted/based positioning
    - ✓ In coverage, out of coverage, and partial coverage scenarios support
  - **XR positioning**
    - ✓ Ultra-high accuracy and ultra-low latency positioning support for better user experience
  - **IOT positioning**
    - ✓ **RedCap devices positioning** support, e.g. wearables tracking for minors or the elderly people, industrial wireless sensors tracking
    - ✓ Positioning with low power/complexity requirement
- **Potential enhancements** on positioning accuracy, latency and power consumption for these commercial use cases
  - **Higher accuracy**
    - ✓ **Positioning from 52.6GHz to 71GHz**, e.g. for XR positioning
  - **Lower latency**
    - ✓ **Aperiodic and semi-persistent PRS**
  - **Lower power consumption**
    - ✓ **Idle/inactive state positioning enhancements**
    - ✓ **Positioning with DRX**



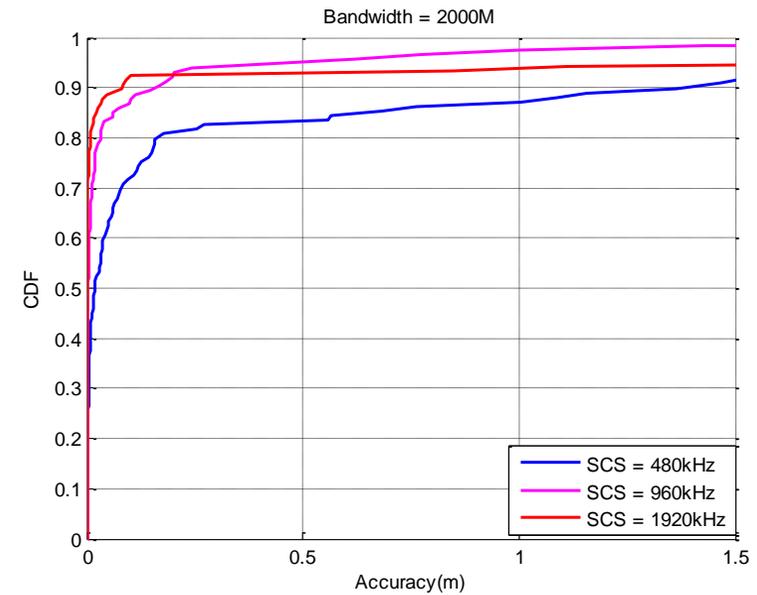
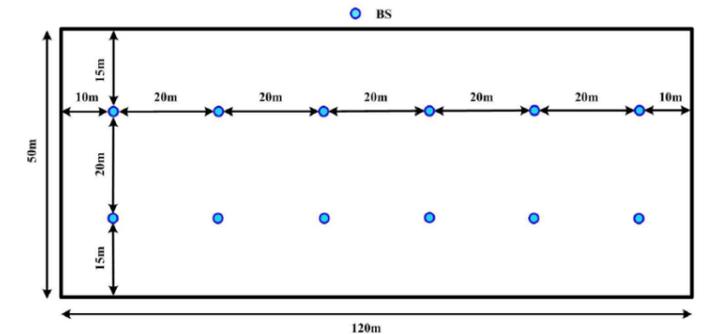
# Rel-18 new topics-sidelink positioning

- Sidelink positioning can be studied in Rel-18 considering following aspects:
  - At least include commercial use cases and define corresponding requirement based on SA1 input
  - For use cases of NR V2X and public safety with absolute/relative location, consider output from 38.845
    - ✓ Consider in/partial/out of coverage
    - ✓ Consider requirement, deployment and operation scenarios in TR38.845
  - Prioritize study on ITS band, licensed band in FR1
  - Consider both sidelink based and assisted positioning techniques
- UE power consumption should be considered for all three use cases:
  - Define evaluation scenarios and assumptions for power consumption
- UE power consumption should be considered for all three use cases
- Initial results for V2X urban and highway scenario below 6GHz are shown in the right figures
  - For urban scenario, the absolute and relative positioning accuracy can reach 4.53m and 3.61m respectively, which is close to the requirement of set 2 (1-3m) defined in TR38.845
  - For highway scenario, the relative positioning accuracy can reach 0.55m, which is close to requirement of set 3 (0.1-0.5m) defined in TR38.845



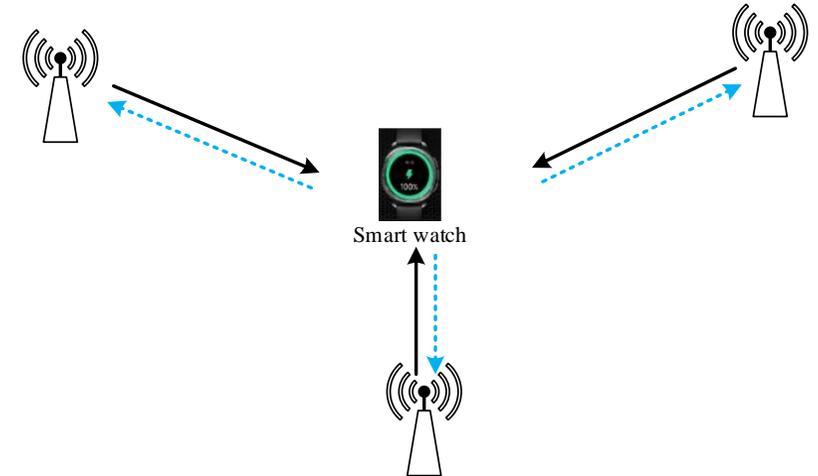
# Rel-18 new topics-positioning from 52.6GHz to 71GHz

- Use case: commercial use cases with ultra-high accuracy and ultra-low latency requirement, e.g. XR
- Perform a study and, if agreed, continue with normative work in Rel-18
  - Study based on Rel-17 framework of 52.6GHz to 71GHz
  - Define evaluation scenarios, and evaluate the achievable positioning accuracy, latency based on corresponding characteristics from 52.6GHz to 71GHz, such as
    - ✓ large bandwidth (e.g. 1G/2GHz)
    - ✓ large SCS (e.g. 240/480/960/1920kHz)
    - ✓ large number of antennas (e.g. 256 antennas)
  - Study and identify potential positioning techniques, positioning reference signals, signalling and procedures in licensed band (e.g. 66-71GHz) and unlicensed band (e.g. 60GHz)
    - ✓ Note: unlicensed band positioning below 52.6GHz may be studied separately
- **Observation:** Positioning from 52.6GHz to 71GHz can reach positioning accuracy of <0.1m



# Rel-18 new topics-positioning for RedCap UE

- Use cases: positioning for Wearables, Industrial wireless sensors
  - E.g. wearables tracking for minors or the elderly people
- Positioning with low power/complexity requirement
- Define positioning performance requirement considering UE complexity reduction features, such as
  - Limited bandwidth: FR1:20MHz, FR2:100MHz
  - Limited antenna number: 1Rx,2Rx



# Rel-17 continuation topics

- Aperiodic and semi-persistent PRS
  - Further study aperiodic reception of DL PRS from the TRPs of the serving gNB and aperiodic reception of DL PRS from the TRPs of the neighbouring gNBs (via DCI)
  - Further study semi-persistent reception of DL PRS from the TRPs of the serving gNB and Semi-persistent reception of DL PRS from the TRPs of the neighbouring gNBs (via MAC CE)
- Idle/inactive state positioning enhancements
  - Rel-17 inactive state positioning leftovers
  - Study methods, measurements, signalling and procedures to support positioning for UEs in RRC\_IDLE state, for UE-based and UE-assisted positioning solutions, including DL method, UL method and DL+UL method
- Positioning with DRX
  - PRS measurement/SRS transmission impacted by DRX configuration and related signalling can be considered

**THANK YOU.**

**谢谢。**