

3GPP TSG-RAN Meeting #84
Newport Beach, California, USA, June 3rd – 6th 2019

RP-191480
(RP-191418)



Agenda Item: 8
Source: Ericsson

On Rel-17 NR positioning

NR positioning in Release 16



- SI on NR positioning (RP-182155), outcome on TR 38.855
 - Considered indoor office, outdoor micro and macro use cases
 - user mobility up to 3kph for Indoor and Umi and 60kph for Uma
- WI ongoing specifying solutions to enable RAT dependent (for both FR1 and FR2) and RAT independent NR positioning techniques while considering E911 (e.g. floor level) and commercial requirements for horizontal and vertical positioning accuracies according to TR38.855.
- Techniques include: DL-TDOA, DL-AoD, UL-TDOA, UL-AoA, multi-cell RTT and E-CID
- Signals include UL and DL RS
- Scope of Rel 16 positioning is large and potential leftovers for rel17 should be taken into account

Requirements [TR 38.855]



- Regulatory requirements (minimum performance targets for NR positioning):
 - Horizontal positioning error $\leq 50\text{m}$ for 80% of UEs
 - Vertical positioning error [$<5\text{ m}$] for [80%] of Ues
 - End to end latency and TTFF < 30 seconds
- Commercial use cases requirements for positioning error:
 - Indoor Ues: Horizontal and vertical $< 3\text{m}$ for 80% of Ues
 - Outdoor Ues: Horizontal $< 10\text{m}$, Vertical $< [3]\text{m}$ for [80]% of UE
 - End to end latency $< [1]\text{s}$

New use cases for NR positioning



- Factory Automation
 - In manufacturing use cases, the requirement may exceed the ones Rel16 is based on, e.g.
 - Positioning accuracy of <1m is required for many indoor manufacturing use-cases
 - It is also unlikely that the 3GPP Rel-16 methods will fulfill the tightest manufacturing requirements
 - Requirement example from 22.672
 - The 5G system shall be able to provide positioning service with [50] cm horizontal position accuracy, [1-3] m vertical position accuracy, and less than [20] ms latency for the moving UE at the speed of [50] km/hour indoor, taking into account at least a service area from [1 000 to 100 000] m².
 - Larger area than currently considered indoor cases, very low latency and high accuracy, relatively high speed.
 - Utilize new channel model for industrial indoor from Rel-16

New use cases for NR positioning



- IOT positioning
 - Power efficiency aspects : According to 22.261 positioning in 5G should “allow the UE to operate at Service Level 1 for at least 12 years using less than 1800 mWh of battery capacity, assuming multiple position updates per hour”
 - Scalability: large amount of devices to serve
 - Low bandwidth aspect: Support positioning with very narrow bandwidth devices (~ 5 MHz).
- Positioning for higher speed
 - Add vehicular (high speed) case for outdoor deployment (out of scope in Rel-16 positioning)
 - Potential new use cases include vehicular cellular positioning (high speed UE)
- Additional enhancements to Rel-16 positioning
 - Consider leftovers from Rel-16

Conclusion



- Potential new use cases to handle in Rel-17
 - Factory automation / positioning in industrial scenarios
 - Positioning for IOT devices
 - Vehicular positioning

