

**3GPP TSG RAN Meeting #84**  
**Newport Beach, USA, June 3-6, 2019**

**RP-191328**



# China Unicom Views on Rel-17

A stylized, light gray graphic of a city skyline with various skyscrapers of different heights and shapes, spanning the width of the slide.

China Unicom

# PART1

## General Views on Rel-17

# PART2

## New SI Proposals from China Unicom

### PART2.1

NR QoE management and optimizations  
for diverse services

### PART2.2

Enhancement of RAN support of  
network slicing

### PART2.3

Multi-RAT energy efficiency  
enhancement

### PART2.4

NR UAV

### ➤ Views on Rel-17 timeline:

- Rel-16 ASN.1 is supposed to be frozen at 2020 Q2, to ensure Rel-17 items have enough time to study and specify, we prefer Rel-17 ASN.1 to be frozen at 2021 Q3.

### ➤ NR Rel-17 overview (high priority or interest aspects)

#### New Services and Verticals

- NR AR/VR
- Video surveillance
- NR multicast
- NR UAV

*Services*

#### Awareness and Intelligent RAN

- NR QoE
- RAN slicing enh.
- NW Energy saving

#### RAN Performance enh.

- Coverage enh. Includes UL enh. and outdoor-indoor enh.
- Small data transmission
- HP positioning, e.g. for V2X
- NR UDC

*Network*

#### Devices and device type

- Multi-SIM device to support different operators
- Define UE type for verticals, e.g. URLLC UE type

*Devices*

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### PART2.4

NR UAV

- In UTRAN and E-UTRAN, **QoE Measurement Collection for streaming services** have been specified. NR is designed for different kinds of services and scenarios, and **operators have strong demands to optimize their networks in order to offer better user experiences to different services.**
- In SA4, the SI of “Study on QoE metrics for VR” has been 100% completed. The related **WI of “New WID on VR QoE metrics”** was agreed at TSG SA WG4#103 meeting.
- We have observed that different 5G services have different requirements and the typical QoE metrics may be also different. Thus **NR QoE management scheme should be designed for more services**, e.g. typical stream services, MTSI, VR, AR, URLLC, etc.
- QoE management in 5G will not just collect the experience parameters of streaming services but also consider the typical performance requirements of diverse services (e.g. AR/VR and URLLC). Based on requirements of services, we suggest Rel-17 to focus on more adaptive QoE management schemes and corresponding network intelligent optimization to satisfy user experience for diverse services.

➤ **Service types:**

- Streaming services
- MTSI services, e.g. IMS related services
- AR/VR video services, including real-time gaming
- URLLC services, e.g. remote healthcare, smart factory

➤ **Network deployment scenarios:** operators have different choices of 5G network options and NR QoE should consider different options.

➤ **Scope:** in order to support traditional streaming services and new services in NR , the following aspects can be considered:

➤ RAN collects the QoE measurement information from the UE side:

- QoE based/assisted RAN resource management and optimization.
- UE services differentiate RAN QoE parameters definition and optimizations.
- To reduce the RAN resource utilization.

➤ For solutions:

- Trigger, configuration and corresponding optimization mechanisms for QoE measurement collection.

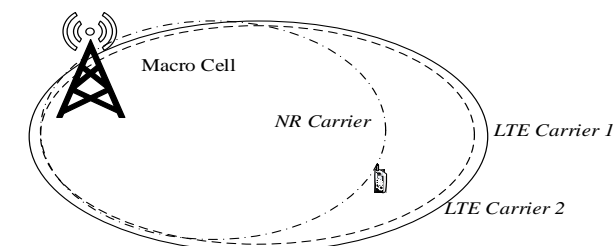
➤ RAN sends resource utilization status for achieving certain QoE to OAM/CN.

- 5G networks have been pre-commercial deployed in more and more countries. 5G slicing is one of the most needed features from vertical industries side. They have become more and more in-depth understanding of slicing and how to practically utilize slicing feature to satisfy the requirements of their typical services is very challenging for the operators.
- New requirements have sprung up and some of them cannot be supported by Rel-15 slicing.
- For operators, targeting at certain well established vertical services of large customer base and abundant financial means will:
  - Enable network operators to make value propositions directly to service providers, as advanced features are rolled out in networks;
  - Generate monetary revenue not “passively” from the amount of data traffic hit on the network, but directly from the business success of vertical services.

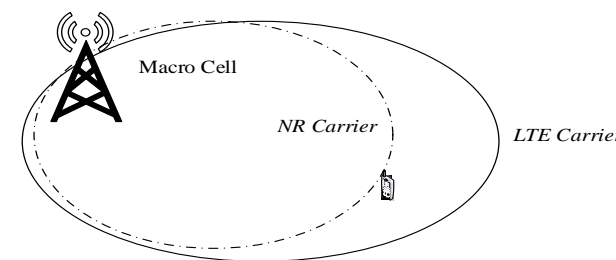
- **Scenario 1: UE aware of network slice and the availability of a vertical service on NR RAN**
- **Scenario 2: Support of on-demand and dynamic deployment of diverse and different network slices.**
  - Instead of TA based deployment, it is anticipated to have smaller granularity slice deployment
  - Different network slices deployment at MN and SN to allow flexible deployment
- **Scenario 3: Network slicing service continuity for NSA and SA co-deployment, e.g. for handover between NSA and SA, or inter-system handover, e.g. from standalone 5GS to ENDC EPS.**
- **Scenario 4: Support of slice-specific connection management and control**
  - Slice-specific idle/inactive UE access
  - Slice-aware connected UE configuration
  - Multicast slice support



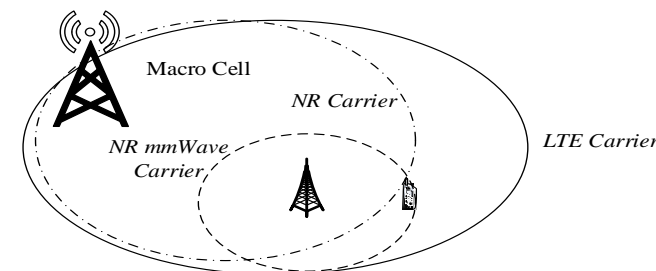
- The power consumption of 5G base station including BBU and 64T64R AAU is estimated to be ~3 to 5 times of power consumption of 4G base station.
- Multi-RAT scenarios for energy efficiency:
  - **Scenario 1** :For the overlapping area of 4G and 5G network, 4G network is deployed with multiple carriers, such as B1 and B3, and 5G network is single carrier in 3.5GHz.
  - **Scenario 2**: For the overlapping area of 4G and 5G network, both 4G and 5G network are single carrier.
  - **Scenario 3**: For the overlapping area of 4G and 5G network, 4G network is deployed with single carrier, such as B3, 5G network are multiple carrier in 3.5GHz and mmWaves.
- SI scope:
  - Study the enhancement mechanism for multi-RAT scenarios for inter-vendor scenarios, cooperated with AI/ML solution.
  - Study the potential impacts on S1 and NG interface, X2 and Xn interface.



Scenario 1

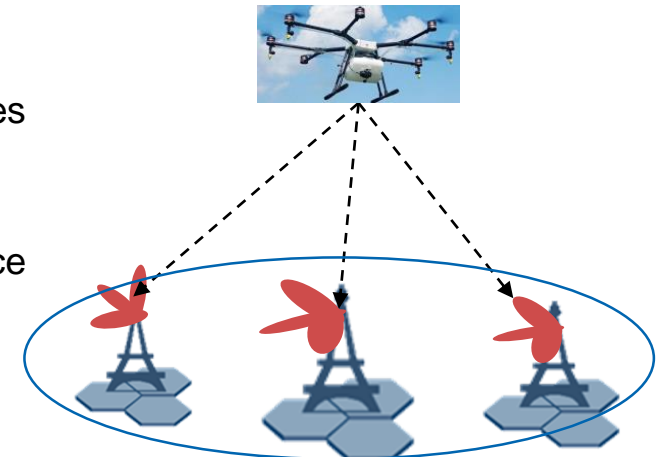


Scenario 2



Scenario 3

- **In order to support different scenarios of drones considering the following requirements:**
  - **Scenario 1:** Aerial video transferred to network. The video captured by the drone is transmitted to mobile network in real time, frequent cell switching in RRC connected mode should be solved in this scenario.
  - **Scenario 2:** Routing inspection. Network can provide robust flight controls of UAV users with low latency and high reliability.
  - **Scenario 3:** Indoor supervisory control. It needs high precision 3d positioning capability at 10cm level, and guarantee position moving frequently at 100ms or lower.
- **Rel-15 has specified necessary enhancements for drones in LTE. In NR, SA1 has the study on enhancement for UAVs (100% completed).**
- **R17 RAN work for NR Drones:**
  - Support drones in NR, e.g. specify height, location, and flight path reporting of drones based on R15 LTE drones enhancements.
  - Connected mode mobility enhancements to avoid frequent handover and interference cancellation for drones.
  - Support network control UAV users.
  - Support indoor 3D high precision real-time positioning.



THANKS

