3GPP Rel19
Orange priorities for RAN

5G Advanced – high priorities for Orange in Rel19

- ✓ Massive MIMO evolution
- ✓ UL performance

Higher Performance

Advanced Services

- ✓ XR / Metaverse
- ✓ Ambient IoT

Intelligent Networks

- ✓ AI/ML for high layers
- ✓ SON & AI/ML for Energy
- ✓ AI/ML for physical layers

Power Efficient Networks

- ✓ Network power saving
- ✓ UE power saving

Massive MIMO Evolution

Massive MIMO evolution to pave the way for deployments in higher bands (≥ 6 GHz)

- Adapted to higher number of transmitter elements in AAS
- Risk of increased cost & energy consumption with larger antenna arrays
- Optimisation for hybrid beamforming (e.g. reduced overheads)
- Enhancements in UE performance
  - Opportunity for more antennas in devices (e.g. 8 antennas)
  - More stringent RAN4 UE demodulation performance requirements for SU-MIMO (Soft IC)

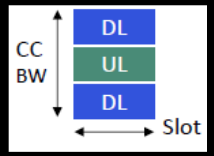
- **Massive MIMO enhancements of interest for higher frequency bands with large arrays**
- **Trade-off between performance, energy efficiency and cost**

Higher Performance

UL oriented services

NR duplex evolution

- **flexibility to use UL oriented TDD configurations in the network (e.g. indoor)**
- **improved interference management (CLI gNB to gNB) of high interest**
  - key to handle indoor vs macro coexistence
- **Sub-Band Full Duplex – nice to have for better latency**

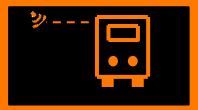


UL coverage & capacity

UL coverage & capacity enhancements

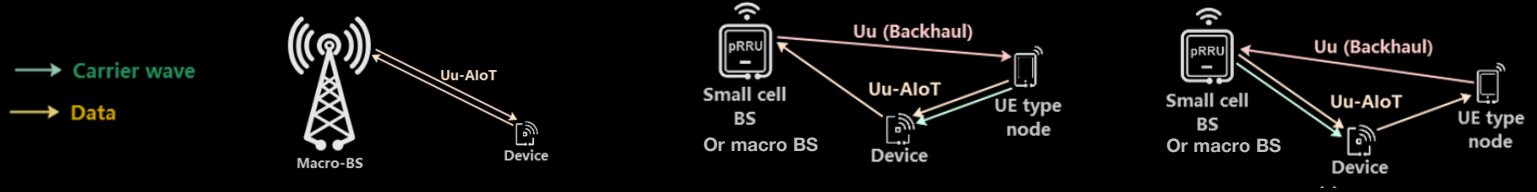
- **Better UE performance (lower MPR requirements)**
- **Further UL coverage enhancements: inc.**
  - PRACH for initial access
  - UL Tx switching with more bands,…
- **Further advanced receivers in Base Station**
  - more stringent RAN4 BS demodulation performance requirements (LMMSE-IRC, Successive IC / Parallel IC, Soft IC for SU-MIMO,…)

- **Demand for UL heavy services**
  - **instant upload (e.g. train at station)**
  - **mass events**
- **Coverage & capacity limited by UL, benefit from UL enhancement features**



Ambient IoT

- **Zero / Ultra low energy devices with ambient energy harvesting (RF / solar)**
- **Use cases of interest**
  - Passive tags (RFID-like): asset tracking, UE geolocation
  - Semi-passive / Active Ambient IoT devices: low complexity sensors
- **Main deployment scenarios for Orange**
  - Case 1: Base Station – tag connectivity, e.g. inventory in local areas (factory, shop,…)
  - Case 2: bistatic backscattering (UE as a relay), e.g. asset tracking & UE geolocation
    - UE as a relay seen as a way to overcome limited coverage of BS
- **Key operator requirements**
  - Network control with tag & UE (authentication, billing,…)
  - Managed coexistence between adjacent operators



(Sc1) (Sc3.1) (Sc3.2)

➢ **Seen as a new IoT market segment for ultra low energy & low cost (i.e. RFID-like)**

XR / Metaverse

Further QoS enhancements for XR / Metaverse services

- **Further XR-awareness in RAN & CN for tailored QoS optimisation**
  - multi-flow services (audio, video, haptic,…)
- **Performance enhancements**
  - low latency services inc. haptic data flows
  - UL specific optimisation for UL-heavy XR services
- **Enhanced monitoring & reporting**
  - new metrics dedicated to XR / Metaverse
- **Open framework with Open APIs (primarily a CN objective, with potential RAN impact)**
  - for interoperability with diverse XR services & formats
  - for operators to monetize XR / Metaverse ready network capabilities (e.g. with end user and / or service providers)

➢ **XR is a key innovative service on the rise (Gaming, B2B, Metaverse,…)**

Power Efficient Networks

Network Power Saving

Network Power Saving

- **Further network energy savings techniques (leftovers of Rel18)**
  - common channels switch-off: SIB1-less and on-demand SSB
- **SON & AI/ML evolution**
  - consider new Rel18 features into the SON & AI/ML frameworks
- **Further Energy Efficiency KPIs with open framework, inc.**
  - reporting for all network elements
  - predictive energy consumption metrics

UE Power Saving

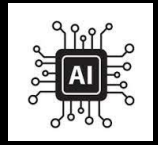
UE Power Saving

- **Low-power wake-up signal and receiver for NR (WI phase)**

- **Orange target: 30% less CO_2 by 2025 (vs. 2015) & net Zero Carbon by 2040**
- **Need for more granularity for switch-off**
- **Need for more intelligence to automate activation of power saving features,**

AI/ML

- **AI / ML for RAN – high layers (WI – with study phase depending on use cases)**
  - Enhancements of Rel18 use cases
    - load balancing & mobility optimization
    - network energy saving – to also include Rel18 features (e.g. SSB-less)
  - New use cases
    - Slicing, QoE optimization, Coverage & Capacity Optimization,…



- **AI / ML for RAN – physical layers (SI continued – WI in Rel19 depending on progress)**
  - beam management, CSI compression, improved positioning

- **AI / ML for optimised performance with increased operational efficiency**
- **Need for open, secure & operator-controlled AI/ML ecosystem**