3GPP TSG-RAN#94-e
Online, December 6 - 17, 2021

RP-212987

Meta's Views on Rel. 18 XR Enhancements

Meta Platforms, Inc.

Meta

Proposals on XR Network Architectures and Glasses Type Devices

- Support of different XR architectures e.g. Table 4.2.2.1-1 of TR 26.998, TR 26.928)

Table 4.2.2.1-1: 5G Augmented Reality device types

Device Type Name	Reference	Tethering	5G Uu Modem	AR Runtime	Scene Manager	AR/MR Application	Power Supply
5G Standalone AR UE	1: STAR	N/A	Glass	Glass	Glass/Split 1)	Glass	Glass
5G EDGe-Dependent AR UE	2: EDGAR	N/A	Glass	Glass/Split 1)	Split 1)	Split	Glass
5G WireLess Tethered AR UE	3: WLAR	802.11ad, 5G sidelink, etc.	Tethered device	Glass	Split 2)	Tethered device	Glass
5G Wired Tethered AR UE 3)	4: WTAR	USB-C	Tethered device	Tethered device	Split 2)	Tethered device	Tethered device

1) Cloud/Edge
2) Phone/Puck and/or Cloud/Edge
3) Not considered in this document

- Glasses Type Devices as in SA4 FS_5GSTAR is an important form factor, e.g.
  - Enhance Power saving is extremely critical for the success (as all-day wearables)
  - Study RAN Impact if the media processing in edge/smartphone/puck/devices,
  - Study constraints on transmit powers/thermal, tradeoff complexity and latency/BW etc.

Figure 4.8-1 in 3GPP TR 26.928 Extended Reality (XR): XR Form Factors in 5G

On Application/XR-Aware RAN

- **Application/XR Awareness**
  - SPS/CG/DG enhancements to support XR application and services,
    - Diverse and flexible schemes, covering both low data rate AR applications due to limitation on battery life and high data rate immersive applications
  - Efficient inter-protocol layers information exchange (between media processing and lower layers)
    - Such as to enhance power saving, thermal mitigation, scheduling efficiency for latency sensitive applications, QoS/QoE information exchange between application and lower layers
  - The RAN enhancements/awareness should leverage on existing media processing architecture, media format, protocols and ecosystems (e.g. WebRTC, 3GPP MTSI), e.g.
    - Multi-flows definitions (e.g. I/P flows vs Voice/Video/Data flows), traffic pattern characterization, media-layer adaptivity, QoS requirements
    - Support both OTT-based, e.g. WebRTC, and 3GPP IMS/MTSI-based
    - Applicable to both operators and 3rd party applications
  - Enhance the UL performance in TDD system for delay-critical information such as pose/sensors, and UL traffic intensive application such as social sharing.
- **Alignment with other working groups, e.g**.
  - SA2/SA6 Edge Computing Architecture
  - SA4 work on media architecture and protocols (e.g. FS_EMSA, FS_5GSTAR and the follow up items)

Focus of XR/AR Applications/Use Cases (TR 26.628 and TR 26.998)

- **Observations**:
  - Definition of new ADU/KPI/QoS are tied to the applications
  - Application-aware RAN enhancement closely tied to the application and media processing

- **Proposals:**
  - Focus on AR use cases in the development of new ADU/KPI/QoS or abstraction of application layers, as in TR 26.628 such as AR conversational, AR Sharing
  - Both SA/RAN should align with each other on the use cases and architectures.

AR use cases in TR 26.628 (similarly in TR 26.998)

Service Type	**Use Case**
Interactive immersive	- UC#1: 3D Image Messaging - UC#2: AR Sharing - UC#4: AR guided assistant at remote location (industrial services) - UE#5: Police Critical Mission with AR - UE#15: 5G Shared Spatial Data - UE#16: AR remote cooperation - UC#21: AR gaming
Cognitive immersive	- UC#4: AR guided assistant at remote location (industrial services) - UE#5: Police Critical Mission with AR - UE#14: AR Streaming with Localization Registry - UE#16: AR remote cooperation - UC#20: AR IoT control
AR conversational	- UC#3: Real-time 3D Communication - UC#4: AR guided assistant at remote location (industrial services) - UC#7: Real-time communication with the shop assistant - UC#11: AR animated avatar calls - UC#16: AR remote cooperation - UC#19: AR conferencing

Meta