

# SP-230316

## User experiences (UX) dependency on 3GPP standardizations

3GPP SA Meeting #99

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# Outline

- User experiences dependency on 3GPP
- 3GPP xR features and other features to advance user experiences
- Suggestions on Rel-19 and beyond works

# User experiences dependency on 3GPP

Immersive experience, feeling presence, and going beyond the limitation of physical world, are some of the key phases for next generation social experiences for the user at anywhere and anytime.

Beside the usual factors of latency, jitter, and bandwidth requirements to deliver application data from end to end, there are other obstacles that the industries need to overcome in order to bring the next level of QoE of this social experiences to the users.

For example, AR glasses have limited form factor and yet that limited real estate needs to pack battery, antenna, active display, sensors, etc., as well as the SoC. The SoC is required to have enough computational power, and good thermal management, etc., while ensuring long battery life and overall weight within a limit. Needless to say, there are also many other factors to be considered as well.

**Q:** What can 3GPP system do to advance the development on the device side (e.g, for AR) to achieve the expected UX?

# 3GPP xR features

R18 xRM feature is a starting point for more efficient delivery of xR media end-2-end. This is aimed to achieve more power saving at the device and allowing more efficient media processing of the Application PDUs as well.

However, this features seems to work only if UDP (and without encryption) is used for media applications.

- QUIC (as L4) or DTLS/TLS for SRTP/HTTP streaming protocols are widely adopted for media applications today. Those xRM features are not applicable when these types of L4 transport protocols are used.
- A second-order issue with using QUIC is that PDR (Packet Detection Rule) in 5GS for setting different QoS treatment among pose info, audio component, and video component of a session is not possible.

Overall, this means the power saving feature of xRM (main feature for UX) is not applicable for many xR applications from our view. Shorter battery life impacts user experience. In some use cases, pose info is more important than audio (or video). So not being able to have prioritization during congestion period between different components within the xR session can also impact the overall user experience.

# Other 3GPP features that can better UX for xR

Form factor matters! Placing 2 antennas (rather than 4 as mandated for NR) helps tremendously (reduce weight, more flexible form factor, etc). This is an ongoing discussion happening at the RAN domain.

5GS QoS framework based today's GBR, Non-GBR, and Delay-critical GBR may not be appropriate for xR applications mainly because data rate fluctuate within a wide range (e.g, few to few hundreds Mbps) and mostly depended on the user/device activities.

AI/ML and edge cloud rendering - this should help to achieve better UX with higher rendering display quality and lesser computation load at the device. However, 3GPP 5GS features on these domains have become so complex like a jigsaw puzzle. To help the industry to move faster with these 3GPP features, maybe a white paper (or technical report) on how they fit together for xR ecosystem would help? This requires E2E collaboration within the 3GPP partners from Application (AF), Infrastructure (CN+RAN), and Device/SoC vendors.

# Suggestions on Rel-19 and beyond works

Based on the outlined observations, Meta has found that there are challenges to enable the full potential of 3GPP features for XR applications.

Meta believes, considering the plethora of proposals and limited TUs of each release, that the **prioritization of works needs to be based on their applicability of enhancing user experience via better support of the 3GPP system for the device**. SA is requested to take this into account in the planning of Rel-19 and beyond works, and utilize limited resource in a more market-driven fashion.

**JFK** once said - *“Ask not what your country can do for you – ask what you can do for your country,”* to challenge every citizen to contribute in some way to the public good.

**In 3GPP**, it is time to say:

*“Ask not what the device can do [within 5GS] to enhance QoE for the users – ask what 5GS can do for the device to enhance the QoE for the users”.*

