**3GPP TSG|WG4 Meeting #117-e S4-22xxx**

**February 14 – 23, 2022, Electronic Meeting (Revision of S4-220261)**

**Source: Facebook, NTT, Qualcomm Incorporated, Dolby, KPN N.V., MediaTek Inc., TELUS, Xiaomi, Verizon UK Ltd, Tencent, Nokia Corporation, T-Mobile USA, China Mobile Communications Corporation, China Telecom Corporation Ltd., Motorola Mobility UK Ltd., AT&T, Samsung Electronics Co., Ltd, Orange, Fraunhofer IIS**

**Title: Draft New WID on immersive Real-time Communication for WebRTC**

**Document for: Agreement**

**Agenda Item: 11.7**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: immersive Real-time Communication for WebRTC

Acronym: iRTCW

Unique identifier: TBA

Potential target Release: Rel-18

# 1 Impacts

*{For Normative work, identify the anticipated impacts. For a Study, identify the scope of the study}*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Affects:** | **UICC apps** | **ME** | **AN** | **CN** | **Others (specify)** |
| **Yes** |  | X |  |  |  |
| **No** | X |  | X | X |  |
| **Don't know** |  |  |  |  | X |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

|  |  |
| --- | --- |
| X | **Feature** |
|  | **Building Block** |
|  | *Work Task* |
|  | **Study Item** |

## 2.2 Parent Work Item

For a brand-new topic, use “N/A” in the table below. Otherwise indicate the parent Work Item.

|  |
| --- |
| **Parent Work / Study Items**  |
| **Acronym** | **Working Group** | **Unique ID** | **Title (as in 3GPP Work Plan)** |
| FS\_5GSTAR | S4 | 880011 | Study on 5G Glass-type AR/MR Devices |
|  |  |  |  |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| **Other related Work /Study Items (if any)** |
| **Unique ID** | **Title** | **Nature of relationship** |
| [770024](https://www.3gpp.org/DynaReport/WiVsSpec--770024.htm%22%20%5Ct%20%22_blank) | EVS Codec Extension for Immersive Voice and Audio Services | Codec for spatial audio in conversational services |
| 810006 | Extended Reality (XR) in 5G | Initial study on AR/MR and key use cases |
| [830005](https://www.3gpp.org/DynaReport/WiVsSpec--830005.htm%22%20%5Ct%20%22_blank) | Terminal Audio quality performance and Test methods for Immersive Audio Services | Terminal performance requirements for spatial audio |
| 850042 | Study on evolution of IMS multimedia telephony service | Feasibility study on AR call |
| 600040 | Study on Web Real Time Communication (WebRTC) access to IP Multimedia Subsystem (IMS); Stage 2 | Architectural study of WebRTC access to IMS (SA2) |
| 630014 | Study on enhancements to Web Real Time Communication (WebRTC) access to IP Multimedia Subsystem (IMS); Stage 2 | SA1/2/3 study to enhance WebRTC for accessing IMS |
|  | Media Capabilities for Augmented Reality (MeCAR) | Media capabilities of AR devices (to be agreed) |
|  | 5G Generic Architecture for AR/MR Experience (5G\_AREA) | Stage-2 work on generic AR/MR media architecture (to be agreed) |
|  | 5G Real-time Transport Protocols (5G\_RTP) | RTP profile for WebRTC (to be agreed) |

# 3 Justification

Beyond traditional 3GPP MTSI services, real-time transport of media over 5G systems is needed in new areas: the transport of immersive media for XR conferencing services, as often illustrated in the use cases regarding Metaverse, and the transport of media between 3rd party applications in the device and network. To support these new features and applications it necessary to,

* Develop and enhance mechanisms to establish appropriate QoS, media handling and adaptation, cross-layer optimizations, and QoE reporting, to support the more demanding data rate, latency, error rate, and capacity requirements needed for the real-time transport of immersive media.
* Develop non-vertical/modularized components (e.g., transport, session negotiation, QoS establishment) of a real-time transport session to serve as enablers for other services, features, and flexible collaboration models with 3rd party service providers and application developers. Develop APIs to enable the use of these components by services, features, mobile operating systems, and applications.
* Develop WebRTC-based components that are integrated into, and optimized for, the 5G system.
* Extend the functional components of a terminal to support immersive media (e.g., 3D video and spatial audio) and enable wireless or wired tethering with devices external to the UE.

This work item defines a set of WebRTC-based component features to enable the transport of real-time media between UEs (including smartphones and standalone/tethered glass-type AR/MR devices) as outlined in the conclusions in clause 8.3 5G Real-time Communication of TR 26.998.

While identifying the codecs and formats for immersive media (e.g., as listed in TR 26.928) may be necessary to understand QoS, media handling and adaptation, and cross-layer enhancements, the specification of these codecs and formats will be handled in other specifications focused on the codec and formats (MeCAR) and RTP profiles (5G\_RTP).

3GPP SA4 is working on the development of the EVS Codec Extension for Immersive Voice and Audio Services (IVAS) codec. It targets encoding/decoding/rendering of speech, music and generic sound, with low latency operation and support of high error robustness under various transmission conditions, The IVAS codec is expected to provide support for a range of service capabilities, e.g., from mono to stereo to fully immersive audio, implementable on a wide range of UEs. In the context of Release-18 under the Terminal Audio quality performance and Test methods for Immersive Audio Services (ATIAS) work item, 3GPP SA4 is working on the specification of test methods in 3GPP TS 26.260 and requirements in TS 26.261 for spatial audio.

To realize appropriate QoS for real-time communication using WebRTC-based session negotiation, this work also considers the architecture and C/U-Plane signalling requirements for possible use cases.

# 4 Objective

It is proposed to conduct the following work:

Objective 1: Define a non-vertical/modularized protocol stack for iRTC clients to support WebRTC-based real-time transport of media over 5G that,

* Identifies and integrates WebRTC components into the 5G system
* Develops APIs necessary to expose the functionality of these components to features, services, mobile operating systems and applications.

Objective 2: Define functional components of an iRTC client in terminal that (as in Figure 1 of TS 26.110 where video and audio I/Os are connected to 3G-324M protocol architecture),

* Support traditional 3GPP real-time media (e.g., 2D video and EVS mono audio)
* Support immersive media including 3D video and spatial audio, leveraging the audio inputs/outputs considered for IVAS and referencing the immersive audio quality tests defined by ATIAS
* Support immersive data channel media via WebRTC-based data channel (including QUIC if adopted by W3C for WebRTC)
* Enable interworking with devices tethered to the UE as defined in Table 4.2.2.1-1 of TR 26.998
* Extend architecture and components as defined in Figure 4.2 of TS 26.114 appropriately for WebRTC-based applications
* Specify sensor information required / recommended for media handling that,
* Identifies information to be consumed locally or transmitted with media (e.g., pose info.)
* Leverages sensor information currently provided by mobile operating systems when appropriate
* Support relevant metadata about user and environment (e.g., user/object position and direction).

Objective 3: Define inputs into an iRTC client in terminal and their required / recommended parameters, if any. This includes outputs from cameras / microphones (e.g., *N* depth streams / *M* RGB streams & their relationships or direction of microphones, in compact and scalable descriptions) with a focus on practical mobile implementations. (More advanced device configurations, e.g., studio-class cameras and microphone set-ups can be considered when available).

Objective 4: Identify the required architecture for radio access network QoS realization over 5G systems, using WebRTC-based transport.

Objective 5: Identify the minimum information / elements in the C/U-Plane signal to establish media sessions with appropriate QoS for WebRTC-based applications.

Objective 6: Document informative examples of iRTC operations to assist implementers.

.

# 5 Expected Output and Time scale

|  |
| --- |
| **New specifications {One line per specification. Create/delete lines as needed}** |
| **Type**  | **TS/TR number** | **Title** | **For info at TSG#**  | **For approval at TSG#** | **Rapporteur** |
| *TS* | *TBA (26.113 suggested)* | *Enabler for Immersive Real-Time Communication* | *SA#99 (March 2023)* | *SA#100 (June 2023)* | *Kyunghun Jung (kyunghun@fb.com)* |
|  |  |  |  |  |  |

|  |
| --- |
| **Impacted existing TS/TR {One line per specification. Create/delete lines as needed}** |
| **TS/TR No.** | **Description of change**  | **Target completion plenary#** | **Remarks** |
|  |  |  |  |
|  |  |  |  |

# 6 Work item Rapporteur(s)

*Kyunghun Jung, Facebook, kyunghun@fb.com*

# 7 Work item leadership

SA4

# 8 Aspects that involve other WGs

Coordination with other WGs, e.g., SA2, RAN1, and RAN2, may be necessary for the interworking of iRTC clients with 5G systems.

# 9 Supporting Individual Members

|  |
| --- |
| **Supporting IM name** |
| Facebook |
| Dolby |
| Qualcomm Incorporated |
| KPN N.V. |
| MediaTek Inc. |
| NTT |
| TELUS |
| Xiaomi |
| Verizon UK Ltd |
| Tencent |
| Nokia Corporation |
| T-Mobile USA |
| China Mobile Communications Corporation |
| China Telecom Corporation Ltd. |
| Motorola Mobility UK Ltd. |
| AT&T |
| Samsung Electronics Co., Ltd |
| Orange |
| Fraunhofer IIS |
|  |
|  |