**3GPP TSG-SA WG4 Meeting #126 *S4-231945***

**Chicago, USA, 13th November 2023 - 17th November 2023**

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| *CR-Form-v12.2* | | | | | | | | |
| **PSEUDO CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **26.119** | **CR** | **<CR#>** | **rev** | **<Rev#>** | **Current version:** | **0.3.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | Audio capabilities and device support | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Xiaomi, Dolby France SAS, Orange, Qualcomm, Fraunhofer IIS | | | | | | | | | |
| ***Source to TSG:*** | S4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | MeCAR | | | | |  | ***Date:*** | | | 11-08-2023 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Defining the audio capabilities and their device support. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The proposed changes add:   * AAC-ELDv2 decoding and encoding capabilities * EVS decoding and encoding capabilities * Tentative IVAS decoding and encoding capabilities for a to-be-defined level. * Related support for each device type | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 8, 10.2.4, 10.3.4, 10.4.4, 10.5.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

CHANGE #1

# 1 Scope

The present document defines the supported media formats, codecs, processing functions for XR Devices in UE per XR device type category. The present document addresses the interoperability gaps identified in the conclusions of TR 26.998 [3].

CHANGE #2

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TR 26.928: "Extended Reality (XR) in 5G".

[3] 3GPP TR 26.998: "Support of 5G glass-type Augmented Reality / Mixed Reality (AR/MR) devices".

[4] 3GPP TR 26.857: "5G Media Service Enablers".

[5] Khronos, "The OpenXR Specification", https://registry.khronos.org/OpenXR/specs/1.0/html/xrspec.html.

[6] 3GPP TS 26.506: "5G Real-time Media Communication Architecture (Stage 2)".

[7] ITU-T Recommendation H.264 (08/2021): "Advanced video coding for generic audiovisual services".

[8] ITU-T Recommendation H.265 (08/2021): "High efficiency video coding".

[9] 3GPP TS 26.117: "5G Media Streaming (5GMS); Speech and audio profiles".

CHANGE #3

# 8 Audio functions and capabilities

### 8.1.1 Audio/Speech Decoding

The following audio/speech decoding capabilities are defined:

- **EVS-Dec**: thedecodingcapability as defined in 3GPP TS 26.117 [9] clause 5.2.

- **IVAS-[Editor’s note: IVAS level TBD]-Dec**: the decodingcapability as defined in 3GPP TS 26.117 [9] clause 5.2.

- **EVS-Dec-2**: the decoding capability as defined 3GPP TS 26.117 [9] clause 5.2.

- **EVS-Dec-4**: the decoding capability as defined 3GPP TS 26.117 [9] clause 5.2.

- **AAC-ELDv2-Dec**: thedecoding capability as defined 3GPP TS 26.117 [9] clause 5.2.

- **AAC-ELDv2-Dec-2**: thedecoding capability as defined 3GPP TS 26.117 [9] clause 5.2.

### 8.1.2 Audio/Speech Encoding

The following audio/speech encoding capabilities are defined:

- **EVS-Enc**: the sender requirements for the **EVS** Operation Point as defined in 3GPP TS 26.117 [9] clause 6.2.4.3.

- **IVAS-[Editor’s note: IVAS level TBD]-Enc**: the sender requirements for the **IVAS** Operation Point as defined in 3GPP TS 26.117 [9] clause 6.3.5.3.

- **AAC-ELDv2-Enc:** the sender requirements for the **AAC-ELDv2** Operation Point as defined in 3GPP TS 26.117 [9] clause 6.3.6.3.

CHANGE #4

## 10.2 Device type 1: Thin AR glasses

[Editor’s note: For each device type, it is expected that rendering capabilities will also be added before completing the TS.]

### 10.2.1 General

The thin AR glasses device type represents a type of device which is considered to be power-constrained and with limited computing power with respect to the other device types. These limitations typically come from the requirement to design a device with a small and lightweight form factor. Regarding rendering capacity, this device type is expected to rely on remote rendering to be able display complex scenes to the user. For example, such device type may run a split rendering session where the split rendering server delivers pre-rendered views of the scene. However, devices in this category can still operate without external support for applications that do not require complex rendering capabilities, for instance, text messaging, 2D video communication, etc. Lastly, the thin AR glasses offers AR experiences to the user via optical see-through display.

### 10.2.2 XR System support

An XR Device complying to the thin AR glasses device has an XR System with at least the following capabilities:

- orientationTracking is 'true'

- positionTracking is 'true'

- Value 'additive' of the enumeration blendMode

- Values 'monoscopic' and 'stereoscopic' of the enumeration viewConfigurationPrimary

- Values 'view', 'local' and 'stage' of the enumeration referenceSpace

- If swapchainSupported is 'true', numberSwapchainImages is equal to 2

- Values 'projection' and 'quad' of the enumeration compositionLayer

NOTE: For the definition of those capabilities, please refer to clause 4.1.3.

[Editor’s note: This list of capabilities is a starting point and more can be added after being defined in clause 4.1.3]

### 10.2.3 Video capabilities support

TBD

### 10.2.4 Audio/Speech capabilities support

[Editor’s note: The audio/speech capabilities for this device type are expected to be further adapted based on the characteristics of this device type.]

An XR Device complying to device type 1 device shall support the following decoding capabilities:

* **EVS-Dec**
* **AAC-ELDv2-Dec**

An XR Device complying to device type 1 should support the following decoding capabilities:

* **IVAS-[Editor’s note: IVAS level TBD]-Dec**
* **EVS-Dec-2**

An XR Device complying to device type 1 may support the following decoding capabilities:

* **EVS-Dec-4**
* **AAC-ELDv2-Dec-2**

An XR Device complying to device type 1 shall support the following encoding capabilities:

* **EVS-Enc**

An XR Device complying to device type 1 should support the following encoding capabilities:

* **IVAS-[Editor’s note: IVAS level TBD]-Enc**
* **AAC-ELDv2-Enc**

CHANGE #5

## 10.3 Device type 2: AR glasses

### 10.3.1 General

The AR glasses device type represents a type of device which is considered to have higher computation power compared to the thin AR glasses device type. As a result, this device type has higher rendering capacities and is generally expected to be capable of rendering scenes without external support, even though remote rendering is not precluded to lower the power consumption on the device or enable the display of scenes beyond the device’s rendering capability. Lastly, the AR glasses offers AR experiences to the user via optical see-through display.

### 10.3.2 XR System support

An XR Device complying to the AR glasses device type has offers XR System with at least the following capabilities:

- orientationTracking is 'true'

- positionTracking is 'true'

- Value 'additive' of the enumeration blendMode

- Value 'stereoscopic' of the enumeration viewConfigurationPrimary

- Values 'view', 'local' and 'stage' of the enumeration referenceSpace

- If swapchainSupported is 'true', numberSwapchainImages is equal to 2

- Values 'projection' and 'quad' of the enumeration compositionLayer

NOTE: For the definition of those capabilities, please refer to clause 4.1.3.

[Editor’s note: This list of capabilities is a starting point and more can be added after being defined in clause 4.1.3]

### 10.3.3 Video capabilities support

TBD

### 10.3.4 Audio/Speech capabilities support

[Editor’s note: The audio/speech capabilities for this device type are expected to be further adapted based on the characteristics of this device type.]

An XR Device complying to device type 2 device shall support at least the following decoding capabilities:

* **EVS-Dec**
* **AAC-ELDv2-Dec**

An XR Device complying to device type 2 should support the following decoding capabilities:

* **IVAS-[Editor’s note: IVAS level TBD]-Dec**
* **EVS-Dec-2**

An XR Device complying to device type 2 may support the following decoding capabilities:

* **EVS-Dec-4**
* **AAC-ELDv2-Dec-2**

An XR Device complying to device type 2 shall support at least the following encoding capabilities:

* **EVS-Enc**

An XR Device complying to device type 2 should support the following encoding capabilities:

* **IVAS-[Editor’s note: IVAS level TBD]-Enc**

AAC-ELDv2-EncCHANGE #6

## 10.4 Device type 3: XR phone

### 10.4.1 General

The XR phone device type represents a type of device which corresponds to a smartphone with capacities and resources sufficient to offer AR experiences. As a result, this device type is capable of rendering scenes without external support. Lastly, the XR phone offers AR experiences to the user via video see-through display.

### 10.4.2 XR System support

An XR Device complying to the XR phone device type offers an XR System with at least the following capabilities:

- orientationTracking is 'true'

- positionTracking is 'true'

- Values 'opaque' and 'alpha\_blend' of the enumeration blendMode

- Values 'monoscopic' and 'stereoscopic' of the enumeration viewConfigurationPrimary

- Values 'view', 'local' and 'stage' of the enumeration referenceSpace

- If swapchainSupported is 'true', numberSwapchainImages equal to 2

- Values 'projection' and 'quad' of the enumeration compositionLayer

NOTE: For the definition of those capabilities, please refer to clause 4.1.3.

[Editor’s note: This list of capabilities is a starting point and more can be added after being defined in clause 4.1.3]

### 10.4.3 Video capabilities support

TBD

### 10.4.4 Audio/Speech capabilities support

[Editor’s note: The audio/speech capabilities for this device type are expected to be further adapted based on the characteristics of this device type.]

An XR Device complying to device type 3 device shall support at least the following decoding capabilities:

* **EVS-Dec**
* **AAC-ELDv2-Dec**

An XR Device complying to device type 3 should support the following decoding capabilities:

* **IVAS-[Editor’s note: IVAS level TBD]-Dec**
* **EVS-Dec-2**

An XR Device complying to device type 3 may support the following decoding capabilities:

* **EVS-Dec-4**
* **AAC-ELDv2-Dec-2**

An XR Device complying to device type 3 shall support at least the following encoding capabilities:

* **EVS-Enc**

An XR Device complying to device type 3 should support the following encoding capabilities:

* **IVAS-[Editor’s note: IVAS level TBD]-Enc**
* **AAC-ELDv2-Enc**

CHANGE #7

## 10.5 Device type 4: XR HMD

### 10.5.1 General

The XR HMD device type represents a type of device which corresponds to HMDs capable of offering at least AR experiences but not precluding other types of XR experiences. This device type is expected to be capable of rendering scenes without external support. Lastly, the XR phone offers AR experiences to the user via video see-through display.

### 10.5.2 XR System support

An XR Device complying to the XR HMD device type offers an XR System with at least the following capabilities:

- orientationTracking is 'true'

- positionTracking is 'true'

- Value 'additive' or values 'opaque' and 'alpha\_blend' of the enumeration blendMode

- Values 'monoscopic' and 'stereoscopic' of the enumeration viewConfigurationPrimary

- Values 'view', 'local' and 'stage' of the enumeration referenceSpace

- If swapchainSupported is 'true', numberSwapchainImages is equal to 2

- Values 'projection' and 'quad' of the enumeration compositionLayer

NOTE For the definition of those capabilities, please refer to clause 4.1.3.

[Editor’s note: This list of capabilities is a starting point and more can be added after being defined in clause 4.1.3]

### 10.5.3 Video capabilities support

TBD

### 10.5.4 Audio/Speech capabilities support

[Editor’s note: The audio/speech capabilities for this device type are expected to be further adapted based on the characteristics of this device type.]

An XR Device complying to device type 4 device shall support at least the following decoding capabilities:

* **EVS-Dec**
* **AAC-ELDv2-Dec**

An XR Device complying to device type 4 should support the following decoding capabilities:

* **IVAS-[Editor’s note: IVAS level TBD]-Dec**
* **EVS-Dec-2**

An XR Device complying to device type 4 may support the following decoding capabilities:

* **EVS-Dec-4**
* **AAC-ELDv2-Dec-2**

An XR Device complying to device type 4 shall support at least the following encoding capabilities:

* **EVS-Enc**

An XR Device complying to device type 4 should support the following encoding capabilities:

* **IVAS-[Editor’s note: IVAS level TBD]-Enc**
* **AAC-ELDv2-Enc**

END OF CHANGES