**3GPP TSG-CT3 Meeting #135 *C3-243xxx***

**Hyderabad, India, 27th May 2024 - 31st May 2024 *(Revision of C3-243047)***

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.162** | **CR** | **0161** | **rev** | **1** | **Current version:** | **18.0.0** |  |
|  | | | | | | | | |
| *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 |  | Radio Access Network |  | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | Adding support for IVAS codec | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Qualcomm Incorporated | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | IVAS\_Codec | | | | |  | ***Date:*** | | | 2024-05-27 |
|  |  | | | |  | |  | | |  |
| ***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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | IVAS codec parameter handling is unspecified at the IBCF and TrGW. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Requirements for IVAS speech codec parameters handling at the IBCF and TrGW are defined. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Missing IVAS codec support at IBCF and TrGW prevents transcoding of the IVAS codec. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 3.3, 9.1.5, 10.2.5.x(new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 26.253 CR 0002  TS 26.114 CR 0561  TS 23.334 CR 0185 | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | The referenced clause 5.13.x of 3GPP TS 23.334 is added by CR #0185. Please supply appropriate number when implementing the CR. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* First Change \* \* \* \*

# 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 TS 24.229: "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".

[2] IETF RFC 3261: "SIP: Session Initiation Protocol".

[3] 3GPP TS 23.221: "Architectural requirements".

[4] 3GPP TS 29.061: "Interworking between the Public Land Mobile Network (PLMN) supporting packet based services and Packet Data Networks (PDN)".

[5] 3GPP TS 23.002: "Network architecture".

[6] Void.

[7] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[8] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[9] IETF RFC 791: "Internet Protocol".

[10] IETF RFC 2460: "Internet Protocol, Version 6 (IPv6) Specification".

[11] IETF RFC 2766: "Network Address Translation - Protocol Translation (NAT-PT)".

[12] IETF RFC 2663: "IP Network Address Translator (NAT) Terminology and Considerations".

[13] 3GPP TR 29.962 version 6.1.0: "Signalling interworking between the 3GPP profile of the Session Initiation Protocol (SIP) and non-3GPP SIP usage".

[14] Void.

[15] Void.

[16] Void.

[17] Void.

[18] IETF RFC 792: "Internet Control Message Protocol".

[19] IETF RFC 2463: "Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6".

[20] Void.

[21] Void.

[22] Void.

[23] Void.

[24] Void.

[25] 3GPP TS 29.238: "Interconnection Border Control Functions – Transition Gateway; H.248 Profile; Stage 3".

[26] ITU-T Recommendation H.248.1 (05): "Gateway Control Protocol: Version 3".

[27] Void.

[28] 3GPP TS 23.205: "Bearer-independent circuit-switched core network; Stage 2".

[29] 3GPP TS 29.235: "Interworking between SIP-I based circuit-switched core network and other networks".

[30] Void.

[31] IETF RFC 2474: "Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers".

[32] 3GPP TS 33.328: "IMS Media Plane Security".

[33] IETF RFC 4568: "Session Description Protocol (SDP) Security Descriptions for Media Streams".

[34] IETF RFC 3711: "The Secure Real-time Transport Protocol (SRTP)".

[35] IETF RFC 5124: "Extended Secure RTP Profile for Real-time Transport Control Protocol (RTCP)-Based Feedback (RTP/SAVPF)".

[36] 3GPP TS 26.114: "IP Multimedia Subsystem (IMS); Multimedia Telephony; Media handling and interaction".

[37] IETF RFC 3168: "The Addition of Explicit Congestion Notification (ECN) to IP".

[38] IETF RFC 6679: "Explicit Congestion Notification (ECN) for RTP over UDP".

[39] 3GPP TS 29.079: "Optimal Media Routeing within the IP Multimedia Subsystem; Stage 3".

[40] 3GPP TS 29.165: "Inter-IMS Network to Network Interface (NNI)".

[41] 3GPP TS 23.237: "IP Multimedia subsystem (IMS) Service Continuity; Stage 2".

[42] 3GPP TS 24.237: "IP Multimedia subsystem (IMS) Service Continuity; Stage 3".

[43] 3GPP TS 23.334: "IP Multimedia Subsystem (IMS) Application Level Gateway (IMS-ALG) – IMS Access Gateway (IMS-AGW) interface: Procedures descriptions".

[44] 3GPP TS 22.153: "Multimedia Priority Service".

[45] IETF RFC 5285: "A General Mechanism for RTP Header Extensions".

[46] IETF RFC 6236: "Negotiation of Generic Image Attributes in the Session Description Protocol (SDP)".

[47] IETF RFC 4975: "The Message Session Relay Protocol (MSRP)".

[48] IETF RFC 6714: "Connection Establishment for Media Anchoring (CEMA) for the Message Session Relay Protocol (MSRP)".

[49] IETF RFC 4583: "Session Description Protocol (SDP) Format for Binary Floor Control Protocol (BFCP) Streams".

[50] Void.

[51] IETF RFC 6947: "The Session Description Protocol (SDP) Alternate Connectivity (ALTC) Attribute".

[52] 3GPP TS 26.441: "Codec for Enhanced Voice Services (EVS); General Overview".

[53] 3GPP TS 26.445: "Codec for Enhanced Voice Services (EVS); Detailed Algorithmic Description".

[54] IETF RFC 4573: "MIME Type Registration for RTP Payload Format for H.224".

[55] ITU-T Recommendation H.224 (01/2005): "A real time control protocol for simplex applications using the H.221 LSD/HSD/MLP channels".

[56] ITU-T Recommendation H.281 (11/1994): "A far end camera control protocol for videoconferences using H.224".

[57] IETF RFC 5939: "Session Description Protocol (SDP) Capability Negotiation".

[58] IETF RFC 5009: "Private Header (P-Header) Extension to the Session Initiation Protocol (SIP) for Authorization of Early Media".

[59] IETF RFC 7728: "RTP Stream Pause and Resume".

[60] IETF RFC 4585: "Extended RTP Profile for Real-time Transport Control Protocol (RTCP)-Based Feedback (RTP/AVPF)".

[61] IETF RFC 5104: "Codec Control Messages in the RTP Audio-Visual Profile with Feedback (AVPF)".

[62] IETF RFC 8445: "Interactive Connectivity Establishment (ICE): A Protocol for Network Address Translator (NAT) Traversal".

[63] IETF RFC 8839: "Session Description Protocol (SDP) Offer/Answer Procedures for Interactive Connectivity Establishment (ICE)".

[64] 3GPP TS 26.250: "Codec for Immersive Voice and Audio Services – General Overview".

[65] 3GPP TS 26.253: "Codec for Immersive Voice and Audio Services – Detailed Algorithmic Description incl. RTP payload format and SDP parameter definitions".

\* \* \* Next Change \* \* \* \*

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [7] and the following apply: An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [7].

ALTC ALTernative Connection

APP APPlication-defined RTCP packet

ATCF Access Transfer Control Function

ATGW Access Transfer Gateway

B2BUA Back-to-Back User Agent

BFCP Binary Floor Control Protocol

BGCF Breakout Gateway Control Function

CCM Codec Control Messages

CS-TrGW CS (domain) TrGW

CVO Coordination of Video Orientation

DBI Delay Budget Information

DRVCC Dual Radio Voice Call Continuity

ECN Explicit Congestion Notification

ECN-CE ECN Congestion Experienced

EVS Enhanced Voice Services

FECC Far End Camera Control

FIR Full Intra Request

IBCF Interconnect Border Control Function

ICE Interactive Connectivity Establishment

ICS IMS Centralized Services

I-CSCF Interrogating CSCF

IMS-ALG IMS - Application Level Gateway

ITU-T International Telecommunication Union – Telecommunication Standardization Sector

IVAS Immersive Voice and Audio Services

MboIP Mb over IP

MPS Multimedia Priority Service

MRFP Multimedia Resource Function Processor

MSRP Message Session Relay Protocol

MTSI Multimedia Telephony Service for IMS

NAT/NAPT Network Address Translation / Network Address and Port Translation

NA (P) T-PT Network Address (and Port) Translation - Protocol Translation

OMR Optimal Media Routeing

P-CSCF Proxy CSCF

ROI Region of Interest

RTCP Real Time Control Protocol

SCTP Stream Control Transmission Protocol

SDPCapNeg SDP Capability Negotiation

SIP UA SIP User Agent

STUN Session Traversal Utilities for NAT

THIG Topology Hiding Internetwork Gateway

TLS Transport Layer Security

TMMBN Temporary Maximum Media Stream Bit Rate Notification

TMMBR Temporary Maximum Media Stream Bit Rate Request

TRF Transit and Roaming Function

TrGW Transition GateWay

UAC User Agent Client

UAS User Agent Server

URN Uniform Resource Name

WAN Wide Area Network

\* \* \* Next Change \* \* \* \*

### 9.1.5 Modification of SDP bandwidth information for IP version interworking

When the IMS ALG performs IP version interworking and passes an SDP offer or answer, it should adjust any SDP b=AS bandwidth modifiers contained in the SDP.

NOTE 1: 3GPP TS 26.114 [36] annex K, annex Q and annex YY contain information about bandwidths for speech media transported over IPv4 and IPv6. 3GPP TS 26.114 [36] subclause 12.7.5 contains information how to convert b=AS for video media.

NOTE 2: If the b=AS bandwidth modifiers are not adjusted, this can negatively impact the end-to-end media negotiation (e.g. the selection of a speech codec mode) and lead to an inaccurate resource reservation.

The IMS-ALG may support the enhanced bandwidth negotiation mechanism defined in 3GPP TS 26.114 [36]. The enhanced bandwidth negotiation mechanism is based on the "a=bw-info" SDP attribute (defined in clause 19 of 3GPP TS 26.114 [36]) to negotiate the additional bandwidth properties end-to-end.

If the IMS-ALG receives an SDP body containing the "a=bw-info" SDP attribute(s) and if:

- the IMS-AGW interconnects call legs in IP domains where different IP versions (IPv4 or IPv6) are used; and

- the received "a=bw-info" SDP attribute lines related to the same payload type and the same direction do not contain bandwidth properties for both IPv4 and IPv6;

the IMS-ALG shall, before forwarding the SDP body:

- re-calculate the received bandwidth properties (the maximum supported bandwidth, the maximum desired bandwidth, the minimum desired bandwidth and the minimum supported bandwidth for sending and/or receiving direction);

- include in the modified "a=bw-info" SDP attribute lines the IP version used for the re-calculation of the bandwidth properties;

NOTE 3: If no IP version is included for any of the "a=bw-info" SDP attribute lines related to a certain payload type and direction then IPv6 is assumed for all bandwidth properties related to the same direction and payload type, on all of the related "a=bw-info" SDP attribute lines, see clause 19 of 3GPP TS 26.114 [36].

- include the maximum packet rate assumed when re-calculating the maximum supported bandwidth, the maximum desired bandwidth and the minimum desired bandwidth properties; and

- include the minimum packet rate assumed when re-calculating the minimum supported bandwidth.

Otherwise, if the received SDP body contains bandwidth properties for both IPv4 and IPv6 and if the IMS-ALG does not support or does not apply the transcoding procedure defined in subclause 10.2.5, the IMS-ALG shall forward the SDP body with unmodified "a=bw-info" SDP attribute lines.

\* \* \* Next Change \* \* \* \*

#### 10.2.5.x IVAS speech codec parameters handling

The Immersive Voice and Audio Services (IVAS) speech and audio codec is defined in 3GPP TS 26.250 [64]. Its RTP payload type is defined in 3GPP TS 26.253 [65], and procedures for its usage as IMS Multimedia Telephony speech codec are defined in 3GPP TS 26.114 [36].

The IBCF and the TrGW may support transcoding to and from the IVAS speech and audio codec. If they do so, the requirements as described in clause 5.13.x of 3GPP TS 23.334 [43] for the IMS-ALG and the IMS-AGW, apply to the IBCF and the TrGW.

\* \* \* End of Changes \* \* \* \*