**3GPP TSG-CT WG1 Meeting #146 C1-240194\_r1**

**Online, 22– 26 January 2024**

**Source: Ericsson**

**Title: Pseudo-CR on Reference corrections**

**Spec: 3GPP TS 24.186 V1.0.0**

**Agenda item: 18.3.8**

**Document for: Decision**

**1. Introduction**

**2. Reason for Change**

Specification contains different errors related to the referenced documents than need to be corrected:

- TS 22.261 is listed twice in clause 2, under [2] and [12], so the second appearance need to be removed.

- In clause 7.1 wrong TS number is used instead of TS 26.114.

- 3GPP is missing in front of some references.

- Unique approach is not used regarding to usage of IETF in front of RFC in clauses containing references to RFCs.

There are only few cases without IETF in front of RFC and without 3GPP in front of TS, therefore this pCR proposes adding missing IETF and 3GPP.

In addition, in the impacted clauses unnecessary empty lines deleted and styles corrected, and word subclause relaced with clause as in new TSs word subclause should not be used.

Furthermore, identity to Change history annex needs to be assigned and heading style changed to Heading 8.

**3. Conclusions**

**4. Proposal**

It is proposed to agree the following changes to 3GPP 24.186 V1.0.0.

\*\*\* 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 TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 22.261: "Service requirements for the 5G system; Stage 1".

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

[4] 3GPP TS 26.114: "IP Multimedia Subsystem (IMS); Multimedia Telephony; Media handling and interaction".

[5] IETF RFC 5688: "A Session Initiation Protocol (SIP) Media Feature Tag for MIME Application Subtype".

[6] IETF RFC 6809: "Mechanism to Indicate Support of Features and Capabilities in the Session Initiation Protocol (SIP)".

[7] IETF RFC 3264: "An Offer/Answer Model with the Session Description Protocol (SDP)".

[8] 3GPP TS 22.173: "IP Multimedia Core Network Subsystem (IMS) Multimedia Telephony Service and supplementary services; Stage 1".

[9] 3GPP TS 24.229: "IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".

[10] 3GPP TS 24.173: "IMS Multimedia telephony communication service and supplementary services; Stage 3".

[11] 3GPP TS 24.275: "Management Object (MO) for Basic Communication Part (BCP) of IMS Multimedia Telephony (MMTEL) communication service".

[13] 3GPP TR 22.873: "Study on evolution of the IP Multimedia Subsystem (IMS) multimedia telephony service".

[14] IETF RFC 8864: "Negotiation Data Channels Using the Session Description Protocol (SDP)".

[15] 3GPP TS 24.147: "Conferencing using the IP Multimedia (IM) Core Network (CN) subsystem".

[16] 3GPP TS 24.604: "Communication Diversion (CDIV) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[17] 3GPP TS 24.615: "Communication Waiting (CW) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[18] 3GPP TS 29.175: "IP Multimedia Subsystem; IP Multimedia Subsystem (IMS) Application Server (AS) Services; Stage 3".

[19] 3GPP TS 29.176: "IP Multimedia Subsystems (IMS); Media Function (MF) Services; Stage 3".

[20] 3GPP TS 32.260: "Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging".

[21] 3GPP TS 32.255: "Telecommunication management; Charging management; 5G data connectivity domain charging; stage 2".

[22] 3GPP TS 24.647: "Advice Of Charge (AOC) using IP Multimedia (IM) Core Network (CN) subsystem".

[23] 3GPP TS 24.239: "Flexible Alerting (FA) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[24] 3GPP TS 24.174: "Support of multi-device and multi-identity in the IP Multimedia Subsystem (IMS); Stage3.

[25] 3GPP TS 24.642: " Completion of Communications to Busy Subscriber (CCBS) and Completion of Communications by No Reply (CCNR) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

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

## 5.4 IMS AS

The IMS AS interacts with the DCSF and the MF or MRF.

For functionalities of the IMS AS supporting IMS data channel refer to 3GPP TS 23.228 [3] clause AC.2.2.4.

For the IMS AS interaction with the Media Function (MF) refer to 3GPP TS 29.176 [19].

For the IMS AS interaction with the Data Channel Signalling Function (DCSF) refer to 3GPP TS 29.175 [18].

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

## 7.1 IMS Session Control

The IMS multimedia telephony communication enhanced to support data channel applications can support different types of media, including IMS data channel media specified in 3GPP TS 26.114[4] in addition to MMTel media types listed in 3GPP TS 22.173 [8]. The session control procedures for the different media types shall be in accordance with 3GPP TS 24.229 [9], 3GPP TS 24.173 [10] and clause 9.

To identify how the IMS data channel media can be used in an IMS session, the SDP offer / answer negotiation is applied. When an originating SDP offer with a data channel media description in the SDP media, is included in the IMS session towards a target entity without data channel capability, to reject the offered data channel media stream, the target entity shall set the port number in the data channel media stream of the SDP answer to zero, as specified in section 6 of IETF RFC 3264 [7]. In this case the IMS session does not support IMS data channel media.

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

#### 9.2.1.1 Procedure at the UE

The policy related to the UE supporting the IMS data channel can be provided by the network to the UE using e.g. OMA-DM with the management objects specified in 3GPP TS 24.275 [11]. When the UE is configured as specified in 3GPP TS 24.275 [11] with configuration for IMS data channel allowed then the UE determines support for IMS data channel according to the configuration.

If the UE is configured with IMS\_DC\_configuration node specified in 3GPP TS 24.275 [11] and the DC\_allowed leaf indicates that IMS data channel is allowed, then a UE supporting IMS data channel on sending an unprotected REGISTER request shall include the media feature tag defined in IETF RFC 5688 [5] for supported streaming media type. For the data channel capability indication, the UE shall use +sip.app-subtype="webrtc-datachannel" as specified in 3GPP TS 26.114 [4].

Editor's Note: The policy related to the IMS data channel allowed at the UE, can also be provided by the network to the UE using e.g., UICC configuration.

On receiving the 200 (OK) response to the REGISTER request, if the 200 (OK) response includes a Feature-Caps header field containing feature-capability indicator "g.3gpp.datachannel", the UE shall determine that the network supports the data channel capability as specified in 3GPP TS 26.114 [4].

If the network doesn't support the data channel capability, the UE shall not include data channel capability indication in SIP headers and data channel related media description in SDP offers of SIP messages.

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

##### 9.3.2.1.3 IMS data channel setup in conjunction with MMTel session modification

If a UE determines to establish a bootstrap data channel within an existing MMTel session by configuration as described in clause 9.3.2.1.1, the UE:

1) shall generate a reINVITE request in accordance with 3GPP TS 24.229 [9] and 3GPP TS 24.173 [10];

2) shall include the media feature tag defined in IETF RFC 5688 [5] for supported streaming media type with +sip.app-subtype="webrtc-datachannel" as specified in 3GPP TS 26.114 [4] in the Contact header field;

3) may include an Accept-Contact header field containing the "sip.app-subtype" media feature tag defined in IETF RFC 5688 [5] with a value of "webrtc-datachannel" as specified in 3GPP TS 26.114 [4]; and

4) shall include an updated SDP offer that contains a data channel media description for the bootstrap data channel information according to 3GPP TS 26.114 [4].

If a UE wants to establish an application data channel within an existing MMTel session and when the UE has an established bootstrap data channel associated with the MMTel session available, the UE:

1) shall generate a reINVITE request in accordance with 3GPP TS 24.229 [9] and 3GPP TS 24.173 [10];

2) shall include the media feature tag defined in IETF RFC 5688 [5] for supported streaming media type with +sip.app-subtype="webrtc-datachannel" as specified in 3GPP TS 26.114 [4] in the Contact header field;

3) may include an Accept-Contact header field containing the "sip.app-subtype" media feature tag defined in IETF RFC 5688 [5] with a value of "webrtc-datachannel" as specified in 3GPP TS 26.114 [4]; and

4) shall include an updated SDP offer that contains a data channel media description for the bootstrap data channel, as well as the requested application data channel and the associated DC application binding information, according to 3GPP TS 26.114 [4].

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

##### 9.3.2.1.4 Closing IMS data channel in conjunction with MMTel session modification

If the UE wants to close the established application data channel, it shall initiate the SDP re-negotiation as defined in IETF RFC 8864 [14] clause 6.6.1.

The UE shall not close the bootstrap data channel during MMTel session modification procedure.

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

##### 9.3.2.1.5 Closing IMS data channel in conjunction with MMTel session release

The bootstrap and application data channel shall be closed along with the call release, and the UE triggered IMS call release procedure shall apply the procedures described in 3GPP TS 24.229 [9] clause 5.1.5.

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

##### 9.3.3.1.2 IMS data channel setup in conjunction with MMTel session setup

If the terminating UE determines that the UE and the network supports the data channel and it is configured to setup data channel as part of the initial session setup, on the reception of SIP INVITE request, the terminating UE shall include the media feature tags defined in IETF RFC 5688 [5] for supported streaming media type with +sip.app-subtype="webrtc-datachannel" as specified in 3GPP TS 26.114 [4] in the Contact header field of SIP 18x and 2xx responses to the SIP INVITE request.

If the terminating UE receives an SDP offer which includes the data channel media descriptions, i.e. the "m=application" section, and the terminating UE accepts the data channel, it shall return a 18x response with the generated the SDP answer based on the 3GPP TS 26.114 [4] and IETF RFC 8864 [14].

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

##### 9.3.3.1.3 IMS data channel setup in conjunction with MMTel session modification

When the terminating UE determines that the UE and the network supports the data channel and it is configured to setup data channel during session modification, and the terminating UE receives an SDP offer in the re-INVITE message, which includes the data channel media descriptions, i.e. the "m=application" section, it shall return a 200 OK response to the reINVITE with the generated the SDP answer based on the 3GPP TS 26.114 [4] and IETF RFC 8864 [14].

If the UE determines that the UE and the network supports data channel and it is configured to setup data channel as part of the initial session setup, the above paragraph also applies.

If the terminating UE wants to setup a data channel during the session modification by sending SIP re-INVITE request, the procedure defined in clause 9.3.2.1.3 applies.

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

#### 9.4.3.1 IMS AS

When the IMS AS sends INVITE request to the MRF for resource reservation or modification for IMS data channel, if the failure response is received from the MRF as specified in 3GPP TS 24.229 [9], the following applies:

- the IMS AS shall continue the ongoing session procedure;

- the IMS AS shall remove the data channel SDP media description from the SDP offer for the INVITE request or set the port number of the "m=" lines for data channel as zero in the SDP answer of the response to the INVITE request.

The IMS AS will send the DCSF session event failure notification message.

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

### 10.6.2 Procedure at IMS AS serving the User

On reception of the SIP INVITE request in conjunction with IMS data channel setup as per clause 9.3.2.1.2 and request URI set to the conference factory URI in accordance with clause 5.3.1.3 3GPP TS 24.147 [15], the IMS AS serving the user (conference creator):

* will send session establishment event notification request to the DCSF as per 3GPP TS 29.175 [18], based on the user (conference creator) service subscription data and proceed with DC media resource reservation in accordance with clause 9.3.2.1.2; and
* shall not send the remote bootstrap data channel setup media information (e.g., data channels with stream ID 100 or 110) in SDP offer of SIP INVITE request towards the conference focus, based on the operator policy, on reception session establishment event notification response from the DCSF.

NOTE: Local bootstrap data channel (e.g., data channels with stream ID 0 or 10) setup between the user (conference creator) and the DCSF serving the user (conference creator) will be as per clause 9.3.2.1.2 and as per 3GPP TS 23.228 [3].

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

#### 10.7.2.1 Actions at the AS of the diverting User

On reception of incoming session setup INVITE request in the IMS AS of the diverting user with the media feature tag +sip.app-subtype="webrtc-datachannel" as specified in 3GPP TS 26.114 [4] in the Contact header field and SDP offer containing the media descriptions for the MMTel media according 3GPP TS 24.173 [10] and a data channel media description for the bootstrap data channel in accordance with 3GPP TS 26.114 [4], diverting user's network functions shall reserve the data channel media resources before routing the session setup request to the diverting user.

On reception of SIP response 486 (User Busy) from the diverting user, if CFB has been triggered as defined in 3GPP TS 24.604 [16], the diverting user’s network functions shall release the reserved data channel media as per procedures defined in clause 9.3 and route the incoming session setup INVITE request towards a diverted-to user as defined in 3GPP TS 24.604 [16]. The data channel media session setup shall be performed between originating user and the diverted-to user together with audio, video media negotiation as per procedures defined in clause 9.3.

In case of failure of data channel media resources reservations at serving network functions of diverting user, the IMS AS of diverting user shall proceed with setup of the MMTel session without performing data channel bootstrapping, by deleting data channel media description(m lines) from SDP offer of incoming INVITE request and route the updated INVITE request to the diverted-to user.

For the CFB under Network Determined User Busy as defined in 3GPP TS 24.604 [16], the CFB behaviour will be same with CFU as specified in clause 10.7.1.

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

#### 10.7.3.1 Actions at the AS of the diverting User

The CD service can only be triggered before the 200OK SIP response reception from the diverting user as defined in 3GPP TS 24.604 [16].

On reception of 302(Moved Temporarily) SIP response at IMS AS, the IMS AS:

- shall trigger the close of the established data channel media on early dialog of the MMTel session between the originating and the diverting user’s network by interacting with the DCSF and the MRF of the user-B as per procedures defined in clause 4.5.2.6.3 3GPP TS 24.604 [16] and in clause 9.3; and

- shall route the incoming session setup INVITE request towards a diverted-to user as defined in 3GPP TS 24.604 [16]. The data channel media negotiation shall be performed between the originating user and the diverted-to user together with audio, video media negotiation as per procedures defined in clause 9.3.

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

### 10.8.1 Actions at AS of user B

If a network-based CW ("approaching NDUB") or terminal based CW condition is determined, after a CW service execution, the serving IMS AS will interact with the serving DCSF and the MF or MRF of the user B, to reserve the DC media resources for waiting communication, based on the served user B subscription data. The serving IMS AS shall forward or send the INVITE request to the user B, as per 3GPP TS 24.615 [17].

NOTE: Bandwidth usage by active session DC media and the requested bandwidth usage in a waiting communication, can be one of the conditions to evaluate "approaching NDUB".

The user B may proceed with below actions when a communication waiting indication is to be given to the user B:

* the user B may accept the waiting communication and holds the active communication or releases the active communication (per procedures in 3GPP TS 24.615 [17]):
* on reception of a Re-INVITE request, which is meant for holding the active communication, the IMS AS interaction with DCSF and MF or MRF for DC media handling is not required; or
* on reception of a BYE request for the active communication, the serving IMS AS of the user B, will trigger the release of reserved DC Media resources of active communication by interacting with the serving DCSF and the MF or MRF of the user B. The serving IMS AS of the user B, shall follow the session release procedure as specified in 3GPP TS 24.229 [9].
* the user B may reject the waiting communication:
* on reception of an unsuccessful response for waiting communication from the user B, the serving IMS AS of the user B will trigger the release the reserved DC Media resources of waiting communication by interacting with the DCSF and the MF or MRF of the user B and shall reject the communication by sending unsuccessful response to the user C.

Upon expiry of the TAS-CWtimer, the serving IMS AS of the user B will trigger the release of the reserved DC Media resources of waiting communication by interacting with the DCSF and the MF or MRF of the user B before sending a CANCEL request for waiting communication towards the user B.

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

### A.1.1.1 Communication Forwarding unconditional

Figure A.1.1.1-1 shows an example signalling flow for a successful communication forwarding unconditional based on an AS providing the forwarding and initial communication setup request consist of DC media session setup request along with other MMTel media session setup request.



Figure A.1.1.1-1: Call Forwarding Unconditional

The description of the steps mentioned in the figure A.1.1.1-1 is in accordance with the 3GPP TS 24.604 [16] with the additions defined in the present document:

1. in step 1), user A(UA-A) sends initial INVITE request towards the user B(UA-B), which contains:

* the media feature tag defined in IETF RFC 5688 [5] for supported streaming media type with +sip.app-subtype="webrtc-datachannel" as specified in 3GPP TS 26.114 [4] in the Contact header field;
* optionally the Accept-Contact header field containing the "sip.app-subtype" media feature tag defined in IETF RFC 5688 [5] with a value of "webrtc-datachannel" as specified in 3GPP TS 26.114 [4]; and
* the SDP offer containing the media descriptions for the MMTel media according 3GPP TS 24.173 [10] and a data channel media description for the bootstrap data channel in accordance with 3GPP TS 26.114 [4];

2. in step 3), the IMS AS serving the user B(UA-B) receives SIP INVITE request with DC media. CFU service condition is satisfied based on the diverting user B(UA-B) subscription data. Depending on the diverting user B (UA-B) IMS data channel subscription, the IMS AS of the diverting user does not send session event notification to the DCSF for data channel setup. Procedures for CFU are executed;

3. in step 5) the IMS AS sends SIP INVITE request with data channel media towards the diverted-to-user C(UA-C);

4. in step 7) the communication is routed towards the diverted-to-user C(UA-C) along with data channel media;

5. in step 9) bootstrap data channel is established for the originating user A(UA-A)/network and the diverted-to-user C(UA-C)/network; and

6. in step 10) application data channel is established along with other MMTel media.

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

### A.1.1.2 Communication Forwarding on Busy

Figures A.1.1.2-1 shows an example signalling flow for a successful communication forwarding on busy based on an AS providing the forwarding and initial communication setup request consist of DC media session setup request along with other MMTel media session setup request.



Figure A.1.1.2-1: Call Forwarding on Busy

The description of the steps mentioned in the figure A.1.1.2-1 is in accordance with the 3GPP TS 24.604 [16] with the additions defined in the present document:

1. in step 1) user A(UA-A) sends initial INVITE request towards the user B(UA-B) in accordance with clause A.1.1.1 step 1);

2. in step 3) to step 12) the IMS AS serving the user B(UA-B) receives SIP INVITE request with DC media. Depending on the user B(UA-B) IMS data channel subscription, the IMS AS of the user B(UA-B) triggers the reservation of resources for data channel setup in accordance with clause 9.3.3.2.1 and clause AC.7.1 3GPP TS 23.228 [3];

3. in step 13) the initial INVITE request is sent to the user B(UA-B) along with data channel media due to normal communication procedures;

4. in step 15) to step 17) on reception of the 486 (Busy Here) response for the initial INVITE request, in the IMS AS, CFB service condition is satisfied based on the diverting user B(UA-B) subscription data. Procedures for CFB are executed. The IMS AS notifies session reject event to the DCSF and as per media instruction request from the DCSF, the IMS AS sends media resource management request to the MRF to release the allocated data channel media resources for this SIP Session. The IMS AS notifies the DCSF about the DC media release as part of the media instruction response;

5. in step 19) the IMS AS sends SIP INVITE request with data channel media towards the diverted-to-user C(UA-C);

6. in step 21) the communication is routed towards the diverted-to-user C(UA-C) along with data channel media;

7. in step 23) bootstrap data channel is established between the originating user A(UA-A)/network and the diverted-to-user C(UA-C)/network; and

8. in step 24) application data channel is established along with other MMTel media.

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

### A.1.2.1 Network based CW flows

Figure A.1.2.1-1 shows an example of network-based communication waiting signalling flow at the terminating side and successful communication establishment. Waiting communication request contains DC media session along with other MMTel media sessions.



Figure A.1.2.1-1: Network based CW flow: Successful communication establishment.

The description of the steps mentioned in the figure A.1.2.1-1 is in accordance with the 3GPP TS 24.615 [17] with the additions defined in the present document:

1. in step 1) initial INVITE request with data channel media is received for the user B(UA-B) in accordance with clause A.1.1.1 step 1);
2. in step 2) the IMS AS serving the user B(UA-B) receives SIP INVITE request with data channel media;
3. in step 2a) to step 2c) the IMS AS of user B(UA-B) executes network-based CW procedures. Depending on the user B(UA-B) IMS data channel subscription, the IMS AS of the user B(UA-B) triggers the reservation of resources for data channel setup for waiting communication in accordance with clause 9.3.3.2.1 and clause AC.7.1 3GPP TS 23.228 [3];

4. in step 3) the IMS AS of the user B(UA-B) sends SIP INVITE request with data channel media and call waiting indication for waiting communication, towards the user B(UA-B);

5. in step 13) the IMS AS of the user B(UA-B) receives 200OK response with data channel media from user B(UA-B) for the waiting communication; and

6. in step 13a) the IMS AS of the user B(UA-B) sends successful session establishment event notification for waiting communication to the DCSF serving the user B(UA-B).

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

#### A.1.2.2.1 Successful communication establishment

Figure A.1.2.2.1-1 shows an example of terminal-based communication waiting signalling flow at the terminating side and successful communication establishment. Waiting communication request contains DC media session along with other MMTel media sessions.



Figure A.1.2.2.1-1 Terminal based CW: Successful communication establishment.

The description of the steps mentioned in the figure A.1.2.2.1-1 is in accordance with the 3GPP TS 24.615 [17] with the additions defined in the present document:

1. in step 1) initial INVITE request with data channel media is received for the user B(UA-B) in accordance with clause A.1.1.1 step 1);
2. in step 2) the IMS AS serving the user B(UA-B) receives SIP INVITE request with data channel media;
3. in step 2a) to step 2c) the IMS AS of user B(UA-B) determines and executes terminal-based CW procedures. Depending on the user B IMS data channel subscription, the IMS AS of the user B(UA-B) triggers the reservation of resources for data channel setup for waiting communication in accordance with clause 9.3.3.2.1 and clause AC.7.1 3GPP TS 23.228 [3];
4. in step 3) the IMS AS of the user B(UA-B) sends SIP INVITE request with data channel media for waiting communication, towards the user B(UA-B);
5. in step 8a), step 13a) on reception of 18x responses with call waiting indication from user B(UA-B) for waiting communication, the IMS AS of the user B(UA-B) sends session progress event notification to the DCSF serving the user B(UA-B);
6. in step 18) the IMS AS of the user B(UA-B) receives 200OK response with data channel media from user B(UA-B) for the waiting communication; and

7. in step 18b) the IMS AS of the user B(UA-B) sends successful session establishment event notification for waiting communication, to the DCSF serving the user B(UA-B).

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

#### A.1.2.2.2 AS CW Timer expires

Figure A.1.2.2.2-1 shows an example of terminal-based communication waiting signalling flow at the terminating side and CW timer expires at IMS AS. Waiting communication request contains DC media session along with other MMTel media sessions.



Figure A.1.2.2.2-1 Terminal based CW: CW timer expires at AS.

The description of the steps mentioned in the figure A.1.2.2.1-1 is in accordance with the 3GPP TS 24.615 [17] with the additions defined in the present document:

1. in step 1) initial INVITE request with data channel media is received for the user B(UA-B) in accordance with clause A.1.1.1 step 1);
2. in step 2) the IMS AS serving the user B(UA-B) receives SIP INVITE request with data channel media;
3. in step 2a) to step 2c) the IMS AS of user B(UA-B) determines and executes terminal-based CW procedures. Depending on the user B(UA-B) IMS data channel subscription, the IMS AS of the user B(UA-B) triggers the reservation of resources for data channel setup for waiting communication in accordance with clause 9.3.3.2.1 and clause AC.7.1 3GPP TS 23.228 [3];
4. in step 3) the IMS AS of the user B(UA-B) sends SIP INVITE request with data channel media for waiting communication, towards the user B(UA-B);
5. in step 8a), 13a) on reception of 18x responses with call waiting indication from user B(UA-B) for waiting communication, the IMS AS of the user B(UA-B) sends session progress event notification to the DCSF serving the user B(UA-B); and

6. in step 14c) to step 14d) upon CW timer expiry for waiting communication, the IMS AS of the user B(UA-B) notifies session failure event to the DCSF of the user B(UA-B) and as per media instruction request from the DCSF, the IMS AS sends media resource management request to the MRF to release the allocated data channel media resources for this waiting communication SIP session. The IMS AS notifies the DCSF about the DC media release as part of the media instruction response.

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

#### A.1.2.2.3 UE CW timer expires

Figure A.1.2.2.3-1 shows an example of terminal-based communication waiting signalling flow at the terminating side and CW timer expires at UE-B. Waiting communication request contains DC media session along with other MMTel media sessions.



Figure A.1.2.2.3-1 Terminal based CW: CW timer expires at UE-B.

The description of the steps mentioned in the figure A.1.2.2.3-1 is in accordance with the 3GPP TS 24.615 [17] with the additions defined in the present document:

1. in step 1) initial INVITE request with data channel media is received for the user B(UA-B) in accordance with clause A.1.1.1 step 1);
2. in step 2) the IMS AS serving the user B(UA-B) receives SIP INVITE request with data channel media;
3. in step 2a) to step 2c) the IMS AS of user B(UA-B) determines and executes terminal-based CW procedures. Depending on the user B(UA-B) IMS data channel subscription, the IMS AS of the user B(UA-B) triggers the reservation of resources for data channel setup for waiting communication in accordance with clause 9.3.3.2.1 and clause AC.7.1 3GPP TS 23.228 [3];
4. in step 8a, step 13a) on reception of 18x responses with call waiting indication from user B(UA-B) for waiting communication, the IMS AS of the user B(UA-B) sends session progress event notification to the DCSF serving the user B(UA-B); and

5. in step 18a) to step 18b) upon reception of 480 (Temporarily Unavailable) SIP response for waiting communication, the IMS AS of the user B(UA-B) notifies session failure event to the DCSF of the user B(UA-B) and as per media instruction request from the DCSF, the IMS AS sends media resource management request to the MRF to release the allocated data channel media resources for this waiting communication SIP session. The IMS AS notifies the DCSF about the DC media release as part of the media instruction response.

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

# B.1 Feature-capability indicators defined in the present document

This clause describes the feature-capability indicators definitions, according to IETF RFC 6809 [6], that are applicable for the 3GPP IM CN subsystem.

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

## B.1.1 Definition of feature-capability indicator g.3gpp.datachannel

Editor's note: this feature-capability indicator is to be registered with IANA when release 18 is completed.

Feature-capability indicator name: g.3gpp.datachannel

Summary of the feature indicated by this feature-capability indicator:

This feature-capability indicator indicates the support of data channel capability in the network, and can be included in a Feature-Caps header field as specified in IETF RFC 6809 [6] in a 200 (OK) response to the REGISTER request.

Feature-capability indicator specification reference:

3GPP TS 24.186, http://www.3gpp.org/ftp/Specs/archive/24\_series/24.186/

Values appropriate for use with this feature-capability indicator: Not applicable

Examples of typical use: Indicating the support of data channel capability in the network.

Security Considerations: Security considerations for this feature-capability indicator are discussed in clause 9 of IETF RFC 6809[6].

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

### C.2.1.1 General Description

According to clause 6.39.2 of 3GPP TS 22.261 [2], the IMS network should support AR media processing. AR Remote Cooperation is a typical AR call service and the detailed user experience of AR Remote Cooperation is described in clause 5.3 of 3GPP TR 22.873 [13].

It’s assumed that local UE shares the camera to its peer UE for assistance, and remote UE displays the shared camera and provides assistance. A voice call is established between local UE and remote UE, and then AR Remote Assistance application is triggered by local UE.

The overall solution is based on IMS DC architecture specified in Annex AC of 3GPP TS 23.228 [3] and shown as follows:

* The local UE triggers the media renegotiation for AR Remote Cooperation based on user actions to establish a new video stream to transmit local video content (see A002 in figure C.2.1.1-1) and an application data channel to transmit AR marks (see A001 in figure C.2.1.1-1).
* After the DCSF recognizes the AR Remote Cooperation service, it anchors the video stream and application data channel to MRF. Then DCSF initiates media renegotiation with remote UE to establish a new video stream to transmit local video content (see B002 in figure C.2.1.1-1) and an application data channel to transmit AR marks (see B001 in figure C.2.1.1-1).
* The local UE or remote UE extract the original AR marks input from the user and transmits the marks to the MRF through the application data channel.
* The MRF tracks the specified object in the video content based on the original AR marks, and sends the updated AR marks to the local UE and remote UE.
* The local UE and remote UE display the updated AR marks on the video stream.

Figure C.2.1.1-1 illustrates the media connection model of the AR Remote Cooperation.



Figure C.2.1.1-1: Media Connection model of AR Remote Cooperation

Table C.2.1.1-1 lists the media streams for the AR Remote Cooperation.

Table C.2.1.1-1 Media stream list for the AR Remote Cooperation

|  |  |  |  |
| --- | --- | --- | --- |
| Media ID  (Example) | Media Resource Type | Direction | Description |
| A001 | DC | bi-directional | Transmit upstream and downstream AR marks between MRF and local UE. |
| A002 | Video | unidirectional | Transmit video content from local UE to MRF. |
| B001 | DC | bi-directional | Transmit upstream and downstream AR marks between MRF and remote UE. |
| B002 | Video | unidirectional | Transmit local UE's video content to remote UE. |

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

#### C.2.2.1.2 Procedure at the IMS AS

When receiving the SIP re-INVITE request from local UE, IMS AS sends a request to notify DCSF of session events related to local UE requesting to setup application data channel.

When receiving media reservation instruction from DCSF, the IMS AS converts the media instructions to the corresponding media resource operations and sends request to create or update media resources on MRF, and reserve media processing resources for AR Remote Cooperation.

When receiving response from MRF, IMS AS sends media reservation response to DCSF, indicating the URL addresses of each stream involved AR Remote Cooperation service control, which is specified in 3GPP TS 29.175 [18].

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

Annex D (informative):  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2023-04 | CT1#141 | C1-232099 |  |  |  | Draft skeleton provided by the rapporteur. | 0.0.0 |
| 2023-04 | CT1#141 | C1-232932  C1-232933  C1-232934 |  |  |  | Implementing the agreed pCR:  C1-232932  C1-232933  C1-232934 | 0.1.0 |
| 2023-05 | CT1#142 | C1-234121  C1-234122  C1-234123  C1-234124 |  |  |  | Implementing the agreed pCR:  C1-234121  C1-234122  C1-234123  C1-234124 | 0.2.0 |
| 2023-08 | CT1#143 | C1-236169  C1-236178  C1-236184  C1-236188  C1-236189  C1-236191  C1-236544 |  |  |  | Implementing the agreed pCR:  C1-236169  C1-236178  C1-236184  C1-236188  C1-236189  C1-236191  C1-236544 | 0.3.0 |
| 2023-10 | CT1#144 | C1-238296  C1-238298  C1-238299  C1-238303  C1-238306  C1-238310  C1-238313  C1-238320  C1-238321  C1-238322  C1-238323 |  |  |  | Implementing the agreed pCR:  C1-238296  C1-238298  C1-238299  C1-238303  C1-238306  C1-238310  C1-238313  C1-238320  C1-238321  C1-238322  C1-238323 | 0.4.0 |
| 2023-11 | CT1#145 | C1-238764  C1-238928  C1-239524  C1-239525  C1-239526  C1-239527  C1-239528  C1-239530  C1-239531  C1-239532  C1-239534  C1-239535  C1-239536  C1-239539  C1-239542  C1-239543  C1-239544  C1-239545  C1-239546  C1-239555 |  |  |  | Implementing the agreed pCR:  C1-238764  C1-238928  C1-239524  C1-239525  C1-239526  C1-239527  C1-239528  C1-239530  C1-239531  C1-239532  C1-239534  C1-239535  C1-239536  C1-239539  C1-239542  C1-239543  C1-239544  C1-239545  C1-239546  C1-239555 | 0.5.0 |
| 2023-12 | CT#102 |  |  |  |  | Presentation to TSG CT for information | 1.0.0 |

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