**3GPP TSG-CT WG1 Meeting #133-eC1-21xxxx**

**Electronic meeting, 11-19 November 2021 (was C1-216649)**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **24.581**  | **CR** | **0083** | **rev** | **1** | **Current version:** | **14.7.0** |  |
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| *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:***  | Non-controlling MCVideo function |
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| ***Source to WG:*** | FirstNet |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | MCImp-MCVIDEO-CT |  | ***Date:*** | 11 November 2021 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-14 |
|  | *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 canbe 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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17) Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | The transmission control server interface and the transmission participant interface procedures and state machine are not specified for the non-controlling MCVideo function. Specifically:* Clause 4.2.4 is missing that should give the architectural view of the non-controlling MCVideo function.
* Clause 6.3.2.3 is missing that should provide the procedural text for switching from a non-controlling to a controlling function.
* Clause 6.5 and subclauses are missing that provide the state machine diagram and procedural text for the floor control server and floor participant interface procedures.
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| ***Summary of change:*** | * Clause 4.2.4 is added to give the architectural view of the non-controlling MCVideo function.
* Clause 6.3.2.3 is added to provide the procedural text for switching from a non-controlling to a controlling function.
* Clause 6.5 and subclauses are added to provide the state machine diagram and procedural text for the floor control server and floor participant interface procedures of the non-controlling MCVideo function.
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| ***Consequences if not approved:*** | It will not be possible to support an MCVideo non-controlling function. This would make regrouping of MCVideo groups impossible. |
|  |  |
| ***Clauses affected:*** | (all new) 4.2.4, 6.3.2.3, 6.5, 6.5.1, 6.5.2, 6.5.2.1, 6.5.2.2, 6.5.2.3, 6.5.2.3.1, 6.5.2.3.2, 6.5.2.3.3, 6.5.3, 6.5.4, 6.5.4.1, 6.5.4.2, 6.5.4.3, 6.5.4.4, 6.5.4.5, 6.5.4.6, 6.5.4.7, 6.5.4.8, 6.5.4.9, 6.5.4.10, 6.5.4.11, 6.5.4.12, 6.5.4.13, 6.5.4.14, 6.5.4.15, 6.5.4.16, 6.5.5, 6.5.5.1, 6.5.5.2, 6.5.5.2.1, 6.5.5.2.2, 6.5.5.3, 6.5.5.3.1, 6.5.5.3.2, 6.5.5.3.3, 6.5.5.3.4, 6.5.5.3.5, 6.5.5.3.6, 6.5.5.3.7, 6.5.5.3.8, 6.5.5.3.9, 6.5.5.3.10, 6.5.5.3.11, 6.5.5.4, 6.5.5.4.1, 6.5.5.4.2, 6.5.5.4.3, 6.5.5.4.4, 6.5.5.4.5, 6.5.5.4.6, 6.5.5.4.7, 6.5.5.4.8, 6.5.5.5, 6.5.5.5.1, 6.5.5.5.2, 6.5.5.5.3, 6.5.5.6, 6.5.5.6.1, 6.5.5.6.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | Rev 1:* Added steps 4-5 in clause 6.5.5.3.11.
* Corrected bullet numbering in clause 6.5.5.4.3.
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**\* \* \* \* \* FIRST CHANGE \* \* \* \* \***

### 4.2.4 Non-controlling MCVideo function of an MCVideo group

According to 3GPP TS 24.281 [2] clause 5.3 the MCVideo server can act in a non-controlling MCVideo function of an MCVideo group role. In the present document the internal structure of the non-controlling MCVideo function of an MCVideo group is illustrated in figure 4.2.4-1.



NOTE: The real internal structure of the MCVideo server is implementation specific but a possible internal structure is shown to illustrate the logic and the procedures.

Figure 4.2.4-1: Internal structure of the non-controlling MCVideo function

All entities in the non-controlling MCVideo function of an MCVideo group are assumed to have a direct communication interface to the application and signalling plane. The interface to the application and signaling plane carries information about SIP session initialisation and SIP session release, SDP content, etc.

The transmission participant interface receives and transmits the transmission control messages from and to the MCVideo client via the participating MCVideo function or non-controlling MCVideo function. The procedures are controlled by a state machine described in clause 6.5.5. One state machine is needed for each MCVideo client participating in an MCVideo call. A non-controlling MCVideo function is seen by the transmission participant interface as an MCVideo client.

The transmission control server interface is distributing transmission control messages to and from the transmission control server in the controlling MCVideo function or non-controlling MCVideo function. The transmission control server interface procedures are described in clause 6.5.4. One transmission control server interface is needed per MCVideo call.

The network media interface is receiving and sending media from and to the associated MCVideo client via the participating MCVideo function or non-controlling MCVideo function. The network media interface is out of scope of the present document. One network media interface is needed for each MCVideo client participating in an MCVideo call. A non-controlling MCVideo function is seen by the network media interface as an MCVideo client.

The media distributor is controlled by the transmission control server interface. The media distributor is out of scope of the present document. One media distributor is needed per MCVideo call.

The internal interfaces are assumed to transport the following type of information.

1. The interface between the network media interface and the transmission participant interface:

a. Indication that the network media interface has started to receive media packets from the associated MCVideo client and requests from the transmission participant interface to forward received RTP packets towards the media distributor or to stop forward RTP media packets to the media distributor.

NOTE: It is an implementation option whether an indication e.g. is sent for every received RTP media packet or only when the first packet is received.

2. The interface between the transmission participant interface and the transmission control server interface:

a. Floor control messages to and from the associated transmission participant. The transmission control messages to the transmission control server interface are limited to transmission control messages that can result in an action towards the transmission control server.

3. The interface between the network media interface and the media distributor:

a. RTP media packets to and from associated MCVideo clients. This interface is out of scope of the present document.

4. The interface between the transmission control server interface and the media distributor:

a. Requests to start or stop distributing media to participants in the MCVideo call. Indication that the media distributor has started to receive media packets from the network media interface associated with the MCVideo client with the permission to send media.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.3.2.3 Switching from a non-controlling MCVideo function mode to a controlling MCVideo function mode

When the MCVideo server switches from the non-controlling MCVideo function mode to controlling MCVideo function mode a new instance of the transmission control server state machine for 'general transmission control operation' is created.

For each MCVideo client in the MCVideo call a new instance of the transmission control server state machine for 'basic transmission control operation towards the transmission participant' is added.

Any transmission request in the passive transmission request queue is moved to the active transmission request queue.

NOTE: The passive transmission request queue is a transmission request queue used by the non-controlling MCVideo function as specified in clause 6.5.4 to monitor transmission requests sent by transmission participants controlled by the non-controlling MCVideo function.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

## 6.5 Non-controlling MCVideo function of an MCVideo group

### 6.5.1 General

The transmission control server interface in the non-controlling MCVideo function of an MCVideo group shall support the procedures in clauses 6.5.2, 6.5.3 and 6.5.4.

The transmission participant interface in the non-controlling MCVideo function of an MCVideo group shall support the procedures in clause 6.5.5.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

### 6.5.2 The MCVideo call initialization procedure in the non-controlling MCVideo function of an MCVideo group

#### 6.5.2.1 General

The clause 6.5.2.2 describes the initial procedures when a new SIP session is establishing a group session.

The clause 6.5.2.3 describes the procedure for switching from a controlling MCVideo function mode to a non-controlling MCVideo function mode.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.2.2 Initial procedures when a new SIP session is establishing a group session

When receiving an indication from the application and signalling plane that a group session is initiated, the transmission control server interface:

1. shall initiate and store a message sequence number value with the value to be used in the Message Sequence Number field in the Transmission Idle and Transmission Arbitration Taken messages;

2. shall for each MCVideo client in the MCVideo group controlled by the non-controlling MCVideo function that are participating in the session:

a. generate a random temporary identifier between '0' and '4294967295';

b. store an association between the generated temporary identifier and the transmission participant interface;

c. store information about capabilities negotiated in the "mc\_queueing" and "mc\_priority" fmtp attributes as described in clause 14;

d. store information whether the MCVideo client requested privacy or not; and

e. initiate an instance of the 'transmission participant interface state transition' state machine as specified in clause 6.5.5; and

3. shall perform the actions in the clause 6.5.4.

When receiving an indication from the application and signalling plane that an MCVideo client has accepted an invitation to the session, the transmission participant interface shall perform the actions in clause 6.5.5.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.2.3 Switching from a controlling MCVideo function mode to a non-controlling MCVideo function mode

##### 6.5.2.3.1 Overview

The switching from working in a controlling MCVideo functional mode to a non-controlling MCVideo functional mode is a 2-step procedure.

Step 1 The controlling MCVideo function prepares for acting as a non-controlling MCVideo function. The step 1 procedure is specified in clause 6.5.2.3.2.

Before continuing with step 2, the application and signalling plane needs to receive a confirmation that the SIP session between the transmission control server and the interface to the transmission control server is established.

Step 2 The controlling MCVideo functions starts acting as a non-controlling MCVideo function. The step 2 procedure is specified in clause 6.5.2.3.3.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.2.3.2 Preparing for the switch to non-controlling MCVideo function (Step 1)

When receiving a request from the application and signalling plane to prepare for merging with another group session, the transmission control server:

1. if in the 'G: transmit taken' state, shall provide information about current transmitter to the signalling and application plane;

NOTE: The signalling and application plane will use the information about the current transmitter to send a transmission request in a SIP MESSAGE request as specified in 3GPP TS 24.281 [2].

2. shall release the instance used for 'general transmission control operation'; and

3. shall for each MCVideo client in the MCVideo group controlled by the controlling MCVideo function and participating in the session:

a. generate a random temporary identifier between '0' and '4294967295';

b. store an association between the generated temporary identifier and the transmission participant interface;

c. store information about capabilities negotiated in the "mc\_queueing" and "mc\_priority" fmtp attributes as specified in clause 14;

d. store information whether the MCVideo client requested privacy or not; and

e. initiate an instance of the 'transmission participant interface state transition' state machine as specified in clause 6.5.5.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.2.3.3 Start acting as a non-controlling MCVideo function (Step 2)

When receiving a request from the application and signalling plane to finalize the switch to non-controlling MCVideo function behaviour, the transmission control server:

1. shall start acting as a transmission control server interface;

2. if an active transmission request queue exists, for each queued transmission request in the active transmission request queue:

NOTE: The active transmission request queue was built up when the non-controlling MCVideo function was acting as a transmission control server.

a. shall send a Transmission Request message to the transmission control server. The Transmission Request:

i. shall include all fields included by the transmission participant;

ii. if a Track Info field is included, shall include the temporary identifier at the end of the <Transmission Participant Reference> value item; and

iii. if a Track Info field is not included, shall include a Track Info field populated as follows:

A. shall include the "mc\_queueing" fmtp attribute value negotiated as specified in clause 14 in the <Queueing Capability> value;

B. shall include a <Participant Type> value based on the <participant-type> element specified in 3GPP TS 24.481 [12], if a value in the <participant-type> element is available, otherwise set the <Participant Type> value to "unknown"; and

C. shall include the temporary identifier as the first <Transmission Participant Reference> value;

3. if an active ttransmission request queue exists, shall move the active ttransmission request queue to a passive ttransmission request queue; and

4. shall perform the actions in the clause 6.5.4.

When receiving an indication from the application and signalling plane that an MCVideo client has joined the session, the transmission participant interface shall perform the actions in clause 6.5.5.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

### 6.5.3 The MCVideo call release procedure in the non-controlling MCVideo function of an MCVideo group

When an MCVideo client leaves an MCVideo call and the MCVideo call remains ongoing with the other MCVideo clients, the non-controlling MCVideo function of an MCVideo group follows a two-step procedure:

Step 1 The transmission participant interface stops sending transmission control messages and RTP media packets to the MCVideo client leaving the MCVideo call and the transmission participant interface discards transmission control messages and RTP media packets received from the MCVideo client leaving the MCVideo call; and

Step 2 When the application and signalling plane has determined that the session with this transmission participant has been released, the corresponding instance of the 'transmission participant interface state transition' state machine is released.

When an MCVideo call is released, the transmission control server interface follows a two-step procedure:

Step 1 The transmission control server interface stops sending transmission control messages and RTP media packets to MCVideo clients in the MCVideo call; and

Step 2 When the application and signalling plane has determined that the MCVideo call has been released, resources in the transmission control server interface are released, along with all 'transmission participant interface state transition' state machines.

The non-controlling MCVideo function of an MCVideo group can initiate an MCVideo call release depending on the release policy specified in 3GPP TS 24.281 [2].

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

### 6.5.4 Floor control server interface procedures

#### 6.5.4.1 General

The transmission control server interface is stateless with regards to the transmission control messages received and sent.

The following clauses specify what the transmission control server interface shall do when receiving a transmission control message sent by the controlling MCVideo function or received at the transmission participant interface and how the transmission control server controls the media distribution function in the non-controlling MCVideo function.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.4.2 Receiving a Transmission Request message

Upon receiving a Transmission Request message from one transmission participant interface, the transmission control server interface:

1. shall forward the Transmission Request message to the controlling MCVideo function. The Transmission Request message:

a. shall include all fields included by the transmission participant;

b. if a Track Info field is included, shall include the temporary identifier at the end of the <Transmission Participant Reference> value item; and

c. if a Track Info field is not included, shall include a Track Info field populated as follows:

i. shall include the "mc\_queueing" fmtp attribute value negotiated as specified in clause 14 in the <Queueing Capability> value;

ii. shall include a <Participant Type> value based on the <participant-type> element specified in 3GPP TS 24.481 [12], if value in the <participant-type> element is available, otherwise set the <Participant Type> value to "unknown"; and

iii. shall include the temporary identifier as the first <Transmission Participant Reference> value; and

2. if the value of the <Queueing Capability> in the Track Info is '1' (the transmission participant in the MCVideo client supports queueing), shall store the outgoing Transmission Request message in the passive transmission request queue.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.4.3 Receive Transmission Release message

Upon receiving a Transmission Release message from one transmission participant interface, the transmission control server interface:

NOTE: A Transmission Release message can be received from the permitted transmission participant and from any participant that is queued in the transmission control server.

1. shall forward a Transmission Release message to the controlling MCVideo function. The Transmission Release message:

a. shall include all fields included by the transmission participant in the Transmission Release message;

b. if a Track Info field is included, shall include the temporary identifier at the end of the <Transmission Participant Reference> value item; and

c. if a Track Info field is not included, shall include a Track Info field as follows:

i. shall include the "mc\_queueing" fmtp attribute value negotiated as specified in clause 14 in the <Queueing Capability> value; and

ii. shall include the temporary identifier as the first <Transmission Participant Reference> value; and

2. if a Transmission Request message received from this transmission participant is in the passive transmission request queue, shall remove the transmission request from the passive transmission request queue.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.4.4 Receive Queue Position Request message

Upon receiving a Queue Position Request message from one transmission participant interface, the transmission control server interface:

1. shall forward the Queue Position Request message to the controlling MCVideo function. The Queue Position Request message:

a. shall include all fields included by the transmission participant;

b. if a Track Info field is included, shall include the temporary identifier at the end of the <Transmission Participant Reference> value item; and

c. if a Track Info field is not included, shall include a Track Info field as follows:

i. shall include the "mc\_queueing" fmtp attribute value negotiated as specified in clause 14 in the <Queueing Capability> value; and

ii. shall include the temporary identifier as the first <Transmission Participant Reference> value.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.4.5 Receive Transmission Control Ack message

Upon receiving a Transmission Control Ack message from one transmission participant interface the transmission control server interface:

1. shall send the Transmission Control Ack message towards the controlling MCVideo function. The Transmission Control Ack message:

a. shall include all fields included by the transmission participant in the Transmission Control Ack message;

b. if a Track Info field is included, shall include the temporary identifier at the end of the <Transmission Participant Reference> value item; and

c. if a Track Info field is not included, shall include a Track Info field with temporary identifier as the first <Transmission Participant Reference>.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.4.6 Receive Transmission Granted message

Upon receiving a Transmission Granted message sent from the controlling MCVideo function, the transmission control server interface:

1. shall send the Transmission Granted to the transmission participant interface identified by the <Participant Reference> value at the end of the Track Info field. The Floor Granted message:

a. shall include the fields as received with the following exceptions:

i. if the Track Info field only contains one <Participant Reference> value, shall remove the Track Info field from the outgoing Transmission Granted message; and

ii. if the Track Info field contains more than one <Participant Reference> value, shall remove the last <Participant Reference> value from the Track Info field from the outgoing Transmission Granted message;

2. shall send a Transmission Arbitration Taken message populated as specified below to all participant interfaces with the exception of the transmission participant interface to which the Floor Granted message is sent;

i. shall include the granted MCVideo user's MCVideo ID in the Granted Party's Identity field and may include the functional alias of the granted MCVideo user in the Functional Alias field, if privacy is not requested by the granted transmission participant when the MCVideo client was invited to the session;

NOTE 1: The privacy request was stored for each invited MCVideo client when the MCVideo client accepted the invitation as specified in clause 6.5.2.

ii. shall include in the Message Sequence Number field the local <Message Sequence Number> value increased with 1;

iii. shall include the Permission to Request the Transmission field set to '0', if the group call is a broadcast group call;

iv. may include the Permission to Request the Transmission field set to '1', if the group call is not a broadcast group call; and

v. shall set the first bit in the subtype of the Transmission Arbitration Taken message to '0' (acknowledgement is not required); and

NOTE 2: A Transmission Arbitration Taken message sent to all participants does not require acknowledgement.

e. if the Transmission Indicator field was included in the Transmission Granted message, shall include the received Transmission Indicator field; and

3. if the Transmission Request message received from the transmission participant is in the passive transmission request queue, shall remove the transmission request from the passive transmission request queue.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.4.7 Receive Transmission Rejected message

Upon receiving a Transmission Rejected message sent from the controlling MCVideo function, the transmission control server interface:

1. shall use the <Participant Reference> value at the end of the Track Info field to identify the transmission participant interface;

2. if:

a. the Track Info field only contains one <Participant Reference> value, shall remove the Track Info field from the outgoing Transmission Rejected message; and

b. if the Track Info field contains more than one <Participant Reference> value, shall remove the last <Participant Reference> value from the Track Info field;

3. shall forward the Transmission Rejected message to the transmission participant interface; and

4. if the Transmission Request message received from the transmission participant is in the passive transmission request queue, shall remove the transmission request from the passive transmission request queue.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.4.8 Receive Transmission Idle message

Upon receiving a Transmission Idle message sent from the controlling MCVideo function, the transmission control server interface:

NOTE 1: The Transmission Idle message can be either destined to transmission participants in all MCVideo clients or is sent to the transmission participant in a specific MCVideo client. In the latter case the Transmission Idle message contains the Track Info field.

1. if the Transmission Idle message contains a Track Info field;

a. shall use the <Participant Reference> value at the end of the Track Info field to identify the transmission participant interface;

b. if:

i. the Track Info field only contains one <Participant Reference> value:

A. shall remove the Track Info field from the outgoing Transmission Idle message;

B. shall increase the stored message sequence number value with 1; and

C. shall include in the Message Sequence Number field the local <Message Sequence Number> value increased with 1; and

ii. if the Track Info field contains more than one <Participant Reference> value, shall remove the last <Participant Reference> value from the Track Info field; and

c. shall send the Transmission Idle message to the transmission participant interface;

2. if the Transmission Idle message does not contain a Track Info field;

a. shall set the first bit in the subtype of the Transmission Idle message to '0' (acknowledgement is not required);

NOTE 2: A Transmission Idle message sent to all participants does not require acknowledgement.

b shall send the Transmission Idle message to all transmission participant interfaces. The Transmission Idle message:

i. shall include received fields; and

ii. shall include in the Message Sequence Number field the local <Message Sequence Number> value increased with 1; and

c. shall send a Transmission Ack message towards the controlling MCVideo function if the first bit in the subtype of the received Transmission Idle message is set to '1' (acknowledgement is required) as specified in clause 8.2.2. The Transmission Ack message:

i. shall include the Source field set to '3' (the non-controlling MCVideo function is the source); and

ii. shall include the Message Type field set to '5' (Transmission Idle); and

3. shall empty the passive transmission request queue.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.4.9 Receive Transmission Arbitration Taken message

Upon receiving a Transmission Arbitration Taken message sent from the controlling MCVideo function, the transmission control server interface:

NOTE 1: The Transmission Arbitration Taken message can be either destined to transmission participants in all MCVideo clients or is sent to the transmission participant in a specific MCVideo client. In the latter case the Transmission Arbitration Taken message contains the Track Info field.

1. if the Transmission Arbitration Taken message contains a Track Info field;

a. shall use the <Participant Reference> value at the end of the Track Info field to identify the transmission participant interface;

b. if the Track Info field only contains one <Participant Reference> value:

A. shall remove the Track Info field from the outgoing Transmission Arbitration Taken message; and

B. shall include in the Message Sequence Number field the local <Message Sequence Number> value increased with 1;

c. if the Track Info field contains more than one <Participant Reference> value, shall remove the last <Participant Reference> value from the Track Info field; and

d. shall send the Transmission Arbitration Taken message to the transmission participant interface;

2. if the Transmission Arbitration Taken message does not contain a Track Info field:

a. shall set the first bit in the subtype of the Transmission Arbitration Taken message to '0' (acknowledgement is not required);

NOTE 2: A Transmission Arbitration Taken message sent to all participants does not require acknowledgement.

b. shall send the Transmission Arbitration Taken message to the transmission participant interface;

3. shall send a Transmission Ack message towards the controlling MCVideo function if the first bit in the subtype of the received Transmission Arbitration Taken message is set to '1' (acknowledgement is required) as specified in clause 8.2.2. The Transmission Ack message:

i. shall include the Source field set to '3' (the non-controlling MCVideo function is the source); and

ii. shall include the Message Type field set to '2' (Transmission Arbitration Taken);

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.4.10 Receive Transmission Revoked message

Upon receiving a Transmission Revoked message from the controlling MCVideo function, the transmission control server interface:

1. shall use the <Participant Reference> value at the end of the Track Info field to identify the transmission participant interface;

2. if:

a. the Track Info field only contains one <Participant Reference> value, shall remove the Track Info field from the outgoing Transmission Revoked message; and

b. if the Track Info field contains more than one <Participant Reference> value, shall remove the last <Participant Reference> value from the Track Info field; and

3. shall forward the Transmission Revoked message to the transmission participant interface.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.4.11 Receive Queue Position Info message

Upon receiving a Queue Position Info message from the controlling MCVideo function, the transmission control server interface:

1. shall use the <Participant Reference> value at the end of the Track Info field to identify the transmission participant interface;

2. if:

a. the Track Info field only contains one <Participant Reference> value, shall remove the Track Info field from the outgoing Queue Position Info message; and

b. if the Track Info field contains more than one <Participant Reference> value, shall remove the last <Participant Reference> value from the Track Info field; and

3. shall forward the Queue Position Info message to the transmission participant interface.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.4.12 Receive RTP media packets from controlling MCVideo function

Upon receiving an indication from the media distributor that RTP media packets are received from the controlling MCVideo function, the transmission control server interface:

1. shall request the network media distributor to forward received RTP media packets to all MCVideo clients in the session controlled by the non-controlling MCVideo function where the SSRC of the received RTP media packets are different from the SSRC used by the MCVideo client.

NOTE: If one of the MCVideo clients controlled by the non-controlling MCVideo function is granted the transmission, media originated from that MCVideo client is not distributed back to the MCVideo client granted the transmission.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.4.13 Receive RTP media packets from an MCVideo client

Upon receiving an indication from the media distribution function that RTP media packets are received from one of the network media interfaces, the transmission control server interface:

1. shall request the network media distributor to forward received RTP media packets towards the controlling MCVideo function.

NOTE: If RTP media packets are received from an MCVideo client not permitted to send media, the transmission participant interface will send a Transmission Revoked message to the transmission participant of the misbehaving MCVideo client without involving the transmission control server interface.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.4.14 MCVideo session release step 1

Upon receiving an MCVideo call release step 1 request from the application and signalling plane e.g. when the session is going to be released, the transmission control interface:

1. shall ignore transmission control messages from the transmission control server;

2. shall request the media distributor to stop distributing RTP media packets to the network media interface of the MCVideo clients; and

3. shall ignore any transmission control messages received from the transmission participant interfaces.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.4.15 MCVideo session release step 2

Upon receiving an MCVideo call release step 2 request from the application and signalling plane, the transmission control server interface:

1. shall release all resources associated with this session.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.4.16 Receiving a split instruction (R: Split)

Upon receiving an instruction from the application and signalling plane to split the ongoing group session, as specified in 3GPP TS 24.281 [2] in clause 9.2.1.5.2.4 for prearranged group call and in clause 9.2.2.5.1.4 for chat group call, the transmission control server interface:

1. shall perform the actions in clause 6.3.2.3.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

### 6.5.5 Floor participant interface procedures

#### 6.5.5.1 General

The transmission participant interface shall behave according to the state diagram and state transitions specified in this clause.

Figure 6.5.5.1-1 shows the general transmission control operation states (P states) and the state transition diagram.



Figure 6.5.5.1-1: The 'transmission participant interface state transition' state diagram

The transmission participant interface shall keep one instance of the 'transmission participant interface state transition' state machine per MCVideo client in a session.

The transmission participant associated to the 'transmission participant interface state transition' state machine is in the following clauses referred to as the associated transmission participant.

If transmission control messages or RTP media packets arrives in a state where there is no procedure specified in the following clauses the transmission participant interface:

1. shall discard the transmission control message;

2. shall request the network media interface to discard any received RTP media packet; and

3. shall remain in the current state.

State details are explained in the following clauses.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.5.2 State: 'Start-Stop'

##### 6.5.5.2.1 General

When a new instance of the Transmission participant interface state transition' state machine is initiated, before any transmission control related input is applied, the state machine is in 'Start-stop' state. Similarly, when the session is released the state machine shall return to the 'Start-stop' state.

##### 6.5.5.2.2 Participant invited to session

When the transmission participant interface receives an indication from the transmission control server interface that an MCVideo client has accepted the invitation to a session (i.e. when the SIP 200 (OK) response to the initial SIP INVITE request is received as specified in 3GPP TS 24.281 [2]) , the transmission participant interface:

1. shall enter the 'P: has no permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.5.3 State: 'P: has no permission'

##### 6.5.5.3.1 General

The transmission participant interface uses this state when the associated transmission participant is not permitted to send media.

##### 6.5.5.3.2 Receive Transmission Idle message (R: Transmission Idle)

When the transmission participant interface receives a Transmission Idle message from the transmission control server interface, the transmission participant interface:

1. shall send the Transmission Idle message to the transmission participant;

2. if the first bit in the subtype of the Transmission Idle message is set to '1' (acknowledgement is required) as specified in clause 9.2.2, shall store an indication that a Transmission Ack message to a Transmission Idle message is expected; and

3. shall remain in the 'P: has no permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.3.3 Receive Transmission Arbitration Taken message (R: Floor Taken)

When the transmission participant interface receives a Transmission Arbitration Taken message from the transmission control server interface, the transmission participant interface:

1. shall send the Transmission Arbitration Taken message to the transmission participant;

2. if the first bit in the subtype of the Transmission Arbitration Taken message is set to '1' (acknowledgement is required) as specified in clause 9.2.2, shall store an indication that a Transmission Ack message to a Transmission Arbitration Taken message is expected; and

3. shall remain in the 'P: has no permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.3.4 Receive Transmission Request message (R: Transmission Request)

When the transmission participant interface receives a Transmission Request message from the transmission participant, the transmission participant interface:

1. shall send the Transmission Request message to the transmission control server interface; and

2. shall remain in the 'P: has no permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.3.5 Receive Transmission Granted message (R: Transmission Granted)

When the transmission participant interface receives a Transmission Granted message from the transmission control server interface, the transmission participant interface:

1. shall send the Transmission Granted message to the transmission participant;

2. if the first bit in the subtype of the Transmission Granted message is set to '1' (acknowledgement is required) as specified in clause 9.2.2, shall store an indication that a Transmission Ack message to a Transmission Granted message is expected; and

3. shall enter the 'P: has permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.3.6 Receive Transmission Rejected message (R: Transmission Rejected)

When the transmission participant interface receives a Transmission Rejected message from the transmission control server interface, the transmission participant interface:

1. shall send the Transmission Rejected message to the transmission participant;

2. if the first bit in the subtype of the Transmission Rejected message is set to '1' (acknowledgement is required) as specified in clause 9.2.2, shall store an indication that a Transmission Ack message to a Transmission Rejected message is expected; and

3. shall remain in the 'P: has no permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.3.7 Receive Queue Position Info message (R: Queue Position Info)

When the transmission participant interface receives a Queue Position Info message from the transmission control server interface, the transmission participant interface:

1. shall send the Queue Position Info message to the transmission participant;

2. if the first bit in the subtype of the Queue Position Info message is set to '1' (acknowledgement is required) as specified in clause 9.2.2, shall store an indication that a Transmission Ack message to a Queue Position Info message is expected; and

3. shall remain in the 'P: has no permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.3.8 Receive Queue Position Request message (R: Queue Position Request)

When the transmission participant interface receives a Queue Position Request message from the transmission participant, the transmission participant interface:

1. shall send the Queue Position Request message to the transmission control server interface; and

2. shall remain in the 'P: has no permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.3.9 Receive RTP media packets (R: RTP media)

When the transmission participant interface receives an indication from the network media interface that RTP media packets are received from the media distributor, the transmission participant interface

1. shall instruct the network media interface to send the received RTP media packets towards the MCVideo client; and

2. shall remain in the 'P: has no permission' state.

When the transmission participant interface receives an indication from the network media interface that RTP media packets are received from the MCVideo client, the transmission participant interface

1. shall send a Transmission Revoked message to the transmission participant. The Transmission Revoked message:

a. shall include the Reject Cause field with the <Reject Cause> value set to #3 (No permission to send a Media Burst);

2. shall store that a Transmission Release message is expected from the transmission participant; and

3. shall remain in the 'P: has no permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.3.10 Receive Transmission Release message (R: Transmission Release)

When the transmission participant interface receives a Transmission Release message from the transmission participant, the transmission participant interface:

1. if a Transmission Release message is not expected from the transmission participant:

a. if the first bit in the subtype of the Transmission Release message is set to '1' (acknowledgement is required) as specified in clause 9.2.2, based on local policy:

i shall send a Transmission Ack message to the transmission participant and set the first bit in the subtype of the Transmission Release message to '0' (acknowledgement is not required) in the outgoing Transmission Release message; or

ii. wait for the Transmission Ack from the transmission control server; and

b. shall forward the Transmission Release message to the transmission control server interface;

2. if a Transmission Release message is expected from the transmission participant:

a. if the first bit in the subtype of the Transmission Release message is set to '1' (acknowledgement is required) as specified in clause 9.2.2:

i. shall send a Transmission Ack message to the transmission participant; and

b. shall remove that a Transmission Release message is expected from the transmission participant; and

3. shall remain in the 'P: has no permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.3.11 Receive split instruction (R: Split)

Upon receiving an instruction to split the ongoing MCVideo call, to the transmission participant interface:

1. shall create a new instance of the 'basic transmission control operation towards the transmission participant' state machine;

2. shall move information associated with the instance used for 'transmission participant interface state transition' to the 'basic transmission control operation towards the transmission participant' state machine;

NOTE: Which information that needs to be moved is an implementation option.

3. shall enter the 'Start-stop' state and terminate the 'transmission participant state transition' state machine associated with this transmission participant and this session;

4. if the state in 'general transmission control operation' state machine is 'G: Transmit Idle' state; shall enter the 'U: not permitted and transmit Idle' state as specified in clause 6.3.5.3.2; and

5. if the state in 'general transmission control operation' state machine is 'G: Transmit Taken' state; shall enter the 'U: not permitted and Transmit Taken' state as specified in clause 6.3.5.4.2.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.5.4 State: 'P: has permission'

##### 6.5.5.4.1 General

The transmission participant interface uses this state when the transmission participant has permission to send media

##### 6.5.5.4.2 Receive RTP media packets

When the transmission participant interface receives an indication from the network media interface that RTP media packets are received from the MCVideo client, the transmission participant interface:

1. shall instruct the media interface to forward received RTP media packets towards the media distributor; and

2. shall remain in the 'P: has permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.4.3 Receive Transmission Release message

When the transmission participant interface receives a Transmission Release message from the transmission participant, the transmission participant interface:

1. shall send the Transmission Release message to the transmission control server interface; and

2. shall remain in the 'P: has permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.4.4 Receive Transmission Ack message

When the transmission participant interface receives a Transmission Ack message from the transmission control server interface, the transmission participant interface:

1. shall send the Transmission Ack message to the transmission participant; and

2. shall remain in the 'P: has permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.4.5 Receive Transmission Idle message

When the transmission participant interface receives a Transmission Idle message from the transmission control server interface, the transmission participant interface:

1. shall send the Transmission Idle message to the transmission participant;

2. if the first bit in the subtype of the Transmission Idle message is set to '1' (acknowledgement is required), shall store an indication that a Transmission Ack message to a Floor Idle messages is expected; and

3. shall enter the 'P: has no permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.4.6 Receive Transmission Arbitration Taken message

When the transmission participant interface receives a Transmission Arbitration Taken message from the transmission control server interface, the transmission participant interface:

1. shall send the Transmission Arbitration Taken message to the transmission participant;

2. if the first bit in the subtype of the Transmission Arbitration Taken message is set to '1' (acknowledgement is required), shall store an indication that a Transmission Ack message to a Floor Taken messages is expected; and

3. shall enter the 'P: has no permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.4.7 Receive Transmission Revoked message

When the transmission participant interface receives a Transmission Revoked message from the transmission control server interface, the transmission participant interface:

1. shall send the Transmission Revoked message to the transmission participant;

2. if the first bit in the subtype of the Transmission Revoked message is set to '1' (acknowledgement is required), shall store an indication that a Transmission Ack message to a Transmission Revoked messages is expected; and

3. shall remain in the 'P: has permission' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.4.8 Receive split instruction (R: Split)

Upon receiving an instruction to split the ongoing MCVideo call, the transmission participant interface:

1. shall create a new instance of the 'basic transmission control operation towards the transmission participant' state machine as specified in clause 6.3.5;

2. shall move information associated with the instance used for 'transmission participant interface state transition' to the 'basic transmission control operation towards the transmission participant' state machine;

NOTE: Which information that needs to be moved is an implementation option.

3. shall enter the 'Start-stop' state and terminate the 'transmission participant interface state transition' state machine associated with this transmission participant and this session; and

4. shall enter the 'U: permitted' state as specified in clause 6.3.5.5.2.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.5.5 In any state

##### 6.5.5.5.1 General

This clause describes the actions to be taken in all states defined for the 'transmission participant interface state transition' diagram with the exception of the 'Start-stop' and 'Releasing' states.

##### 6.5.5.5.2 Receive Transmission Ack message (R: Transmission Ack)

If a Transmission Ack message is received from the transmission participant, the transmission participant interface:

1. if an indication exists that a Transmission Ack message is expected for the message in the Message Type field;

a. shall forward the Transmission Ack message to the transmission control server interface; and

b. shall remove the indication that a Transmission Ack message is expected for the message in the Message Type field; and

NOTE: It is an implementation option what action to take if an indication exists that a Transmission Ack message is expected for the message in the Message Type field, but the Transmission Ack message is not received

2. shall remain in the current state.

If a Transmission Ack message is received from the transmission control server interface, the transmission participant interface:

1. shall send the Transmission Ack message to the transmission participant; and

2. shall remain in the current state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

##### 6.5.5.5.3 MCVideo session release step 1 (MCVideo call release - 1)

Upon receiving an MCVideo call release step 1 request from the application and signalling plane, e.g. when the session is going to be released or when the MCVideo client leaves the session, the transmission participant interface:

1. shall stop sending transmission control messages to the transmission participant;

2. shall request the network media interface to stop sending RTP media packets towards to the MCVideo client;

3. shall ignore any transmission control messages received from the transmission participant;

4. shall request the network media interface to stop forwarding RTP media packets from the MCVideo client to the media distributor;

5. shall indicate to the transmission control server interface that the MCVideo client has started to disconnect from the session; and

6. shall enter the 'P: Releasing' state.

**\* \* \* \* \* NEXT CHANGE \* \* \* \* \***

#### 6.5.5.6 State: 'P: Releasing'

##### 6.5.5.6.1 General

The transmission participant interface uses this state while waiting for the application and signalling plane to finalize the release of the session or to finalize the removal of the MCVideo client from the session.

##### 6.5.5.6.2 MCVideo session release step 2 (MCVideo call release - 2)

Upon receiving an MCVideo call release step 2 request from the application and signalling plane, the transmission participant interface:

1. shall request the network media interface to release all resources associated with this MCVideo client for this MCVideo call; and

2. shall enter the 'Start-stop' state and terminate the 'transmission participant interface state transition' state machine associated with this transmission participant and this session.

**\* \* \* \* \* END CHANGES \* \* \* \* \***