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SERIES Q: SWITCHING AND SIGNALLING

Broadband ISDN – B-ISDN application protocols for the network signalling

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Extensions to the Signalling System No. 7 B-ISDN User Part – Modification procedures with negotiation

ITU-T Recommendation Q.2725.4

Superseded by a more recent version

(Previously CCITT Recommendation)

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ITU-T RECOMMENDATION Q.2725.4

EXTENSIONS TO THE SIGNALLING SYSTEM No. 7 B-ISDN USER PART – MODIFICATION PROCEDURES WITH NEGOTIATION

Summary

This Recommendation extends the modification capabilities specified in Recommendation Q.2725.3, concerned with modification of Peak Cell Rate (PCR), Sustainable Cell Rate (SCR) and Maximum Burst Size (MBS), to support negotiation capabilities specified in Recommendation Q.2725.1.

Source

ITU-T Recommendation Q.2725.4 was prepared by ITU-T Study Group 11 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 15th of May 1998.

Keywords

MBS, modification, negotiation, PCR, SCR.

Superseded by a more recent version

FOREWORD

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The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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As of the date of approval of this Recommendation, the ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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Recommendation Q.2725.4

EXTENSIONS TO THE SIGNALLING SYSTEM No. 7 B-ISDN USER PART – MODIFICATION PROCEDURES WITH NEGOTIATION

(Geneva, 1998)

4.1 Scope

This Recommendation extends the modification capabilities specified in Recommendation Q.2725.3 to support negotiation of connection characteristics which is equivalent to that specified in Recommendation Q.2725.1.

Modification procedure with negotiation is only allowed during the active phase.

The actions to be taken at six exchange types are described as:

- initiating exchange;
- intermediate national exchange;
- outgoing international exchange;
- intermediate international exchange;
- incoming international exchange;
- terminating exchange.

Connection characteristics that may be modified are Forward PCR (CLP = 0 + 1), Forward PCR (CLP = 0), Forward SCR (CLP = 0 + 1), Forward SCR (CLP = 0), Forward MBS (CLP = 0 + 1), Forward MBS (CLP = 0), Backward PCR (CLP = 0 + 1), Backward PCR (CLP = 0), Backward SCR (CLP = 0 + 1), Backward SCR (CLP = 0), Backward MBS (CLP = 0 + 1), Backward MBS (CLP = 0). The above parameters can be requested to be incremented or decremented independently.

The request will only be accepted if all requested modifications with negotiation are accepted.

The request can be accepted even if in this request one or more requested parameter modifications with negotiation are the same as the present value.

Neither re-routing nor re-establishment procedures are supported.

Sequential modification with negotiation is applicable per connection. Parallel modification with negotiation is not applicable per connection.

Transferring of u-plane cells is not disturbed with the modification procedure with negotiation.

A connection release procedure takes precedence over the modification procedure with negotiation of the connection.

Only the connection owner is allowed to initiate the modification procedures with negotiation.

Only parameters specified during the initial connection establishment may be modified (e.g. if the Forward SCR (CLP = 0) parameter was not specified at connection establishment, then it cannot be modified by this procedure). The modification request may be for all or a subset of the parameters specified during call establishment.

During the modification, the initiating user transmits based on an ATM traffic descriptor for which the transmit traffic parameters are the lesser of the existing transmit traffic parameters and of the requested modified transmit traffic parameters.

No error procedure is required in the NNI for the case where a MODIFY CONFIRM message is not returned from the access.

The modification with negotiation capabilities for point-to-multipoint call/connection is outside the scope of this Recommendation.

4.2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

– ITU-T Recommendation Q.2650 (1995), *Interworking between Signalling System No. 7 Broadband ISDN User Part (B-ISUP) and Digital Subscriber Signalling System No. 2 (DSS 2).*

– ITU-T Recommendation Q.2723.1 (1996), *B-ISDN User Part – Support of additional traffic parameters for Sustainable Cell Rate and Quality of Service.*

– ITU-T Recommendation Q.2725.1 (1998), *B-ISDN User Part – Support of negotiation during connection setup.*

– ITU-T Recommendation Q.2725.2 (1996), *B-ISDN User Part – Modification procedures.*

– ITU-T Recommendation Q.2725.3 (1997), *Extensions to the B-ISDN User Part – Modification procedures for sustainable cell rate parameters.*

– ITU-T Recommendation Q.2763 (1995), *Signalling System No. 7 B-ISDN User Part (B-ISUP) – Formats and codes.*

– ITU-T Recommendation Q.2764 (1995), *Signalling System No. 7 B-ISDN User Part (B-ISUP) – Basic call procedures.*

– ITU-T Recommendation Q.2963.3 (1998), *Digital subscriber Signalling System No. 2 – Connection Modification – ATM traffic descriptor modification with negotiation by the connection owner.*

4.3 Definitions

See 3.1.4/Q.2725.3.

4.4 Abbreviations

See 3.1.3/Q.2725.3.

4.5 Specification model

See 3.1.5/Q.2725.3.

4.6 General functions of messages and parameters

See 3.1.6/Q.2725.3.

4.7 B-ISDN User Part messages and parameters

4.7.1 Parameters

See 3.2/Q.2725.3 with the following modifications:

- The following is added to Table 3-1/Q.2725.3:

Table 4-1/Q.2725.4

Parameter name	Reference (Rec.)	Code
Alternative ATM cell rate	1.2.1.1/Q.2725.1	0101 0111
Minimum ATM cell rate	1.2.1.2/Q.2725.1	0101 0010

4.7.2 Messages

See 2.2.2/Q.2725.2.

4.7.3 Modify request

- The following is added to Table 2-3/Q.2725.2 and Table 3-2/Q.2725.3:

Table 4-2/Q.2725.4 – Additional parameter to be included in the Modify request

Parameter	Reference (Rec.)	Length (octets)
Alternative ATM cell rate	1.2.1.1/Q.2725.1	8-28
Minimum ATM cell rate	1.2.1.2/Q.2725.1	8-28

4.7.4 Modify acknowledgement

- The following is added to Table 2-4/Q.2725.2:

Table 4-3/Q.2725.4 – Additional parameter to be included in the Modify acknowledge

Parameter	Reference (Rec.)	Length (octets)
ATM cell rate	7.6/Q.2763	8-21
Additional ATM cell rate	1.2.1.1/Q.2723.1	9-29

4.7.5 Modify reject

See Table 2-5/Q.2725.2.

4.7.6 Modify confirm

See Table 2-6/Q.2725.2.

4.8 Call Control, Application Process Functions

4.8.1 Primitive Interface

See 3.3.1/Q.2725.3.

4.8.2 Successful modification with negotiation

4.8.2.1 Modify Request/Indication primitive

4.8.2.1.1 Action at the initiating exchange

On receipt of a request to modify connection characteristics from the connection owner, the initiating exchange will perform the following actions.

a) *Assigning exchange*

For the minimum ATM cell rate parameter:

If the exchange can support the requested connection characteristics, then it will reserve the corresponding resources on the outgoing side of the exchange and issue a Modify request primitive including the original requested connection characteristics, as well as the minimum ATM cell rate parameter, to the succeeding exchange.

Depending on routing conditions, the following applies:

If the exchange cannot support the requested connection characteristics, but can support a cell rate between the requested cell rate and the minimum ATM cell rate, then the exchange will reserve the corresponding resources on the outgoing side of the exchange, insert this cell rate into the ATM cell rate parameter and additional ATM cell rate parameter (if applicable) and issue a Modify request primitive including the ATM cell rate, additional ATM cell rate (if applicable) and minimum ATM cell rate parameters to the succeeding exchange.

If the exchange can support only the minimum ATM cell rate, then the exchange will reserve the corresponding resources on the outgoing side of the exchange, insert this value into the ATM cell rate parameter and additional ATM cell rate parameter (if applicable) and issue a Modify request primitive including the ATM cell rate and additional ATM cell rate (if applicable) parameter to the succeeding exchange.

If the exchange cannot support the connection characteristics requested by the user, and also cannot support the minimum ATM cell rate requested by the user, then the exchange will issue a Modify_Rejected request primitive with the cause #37 "User cell rate not available" towards the preceding exchange.

For the alternative ATM cell rate parameter:

If the exchange can support the requested connection characteristics, it will include the original requested connection characteristics, as well as the alternative ATM cell rate parameter in the Modify request primitive. The exchange checks the alternative ATM cell rate parameter to see if this can be supported by the allocated resources. If not, then the alternative ATM cell rate parameter is discarded.

Depending on routing conditions, the following applies:

If the exchange cannot support the requested connection characteristics, but can support the alternative ATM cell rate, then the exchange will reserve the corresponding resources on the outgoing side of the exchange, insert this value into the ATM cell rate parameter and additional ATM cell rate parameter (if applicable) in the Modify request primitive, discard the alternative ATM cell rate parameter and issue a Modify request primitive.

If the exchange cannot support the connection characteristics requested by the user, and also cannot support the alternative ATM cell rate requested by the user, then the exchange will issue a Modify_Rejected request primitive with the cause #37 "User cell rate not available" towards the preceding exchange.

b) *Non-assigning exchange*

The exchange passes the received alternative ATM cell rate parameter or minimum ATM cell rate parameter in the Modify request primitive.

Policing policy in forward direction shall be changed when decrease of any forward direction bandwidth is requested. The action of changing policing policy shall be taken before issuing the Modify request primitive.

4.8.2.1.2 Action at an intermediate national exchange

On receipt of the Modify indication primitive, an intermediate exchange will perform the following actions.

4.8.2.1.2.1 Incoming side of the exchange

a) *Assigning exchange*

If the request to modify connection characteristics contains the alternative ATM cell rate parameter or the minimum ATM cell rate parameter, the following applies:

For the minimum ATM cell rate parameter:

If the exchange can support the requested connection characteristics, then it will reserve the corresponding resources using normal procedures and issue a Modify request primitive to the succeeding exchange.

If the exchange cannot support the requested connection characteristics, but can support a cell rate between the requested cell rate and the minimum ATM cell rate, then the exchange will reserve the corresponding resources based on this cell rate and issue a Modify request primitive to the succeeding exchange. This cell rate is used as the ATM cell rate in subsequent processing, together with the minimum ATM cell rate.

If the exchange only supports the minimum ATM cell rate, then the exchange will reserve the corresponding resources based on this cell rate and issue a Modify request primitive to the succeeding exchange. This cell rate is used as the ATM cell rate in subsequent processing, and the minimum ATM cell rate parameter is not passed.

If the exchange cannot support the connection characteristics requested by the user, and also cannot support the minimum ATM cell rate requested by the user, then the exchange will issue a Modify_Rejected request primitive with the cause #37 "User cell rate not available" towards the preceding exchange.

For the alternative ATM cell rate parameter:

If the exchange can support the requested connection characteristics, then it will reserve the corresponding resources using normal procedures. The exchange checks the alternative ATM cell rate parameter to see if this can be supported by the allocated resources. If not, then the alternative ATM cell rate parameter is discarded.

If the exchange cannot support the requested connection characteristics, but can support the alternative ATM cell rate parameter, then the exchange will reserve the corresponding resources. This bandwidth allocation is used in subsequent processing, and the alternative ATM cell rate parameter is not passed.

If the exchange cannot support the connection characteristics requested by the user, and also cannot support the alternative ATM cell rate requested by the user, the exchange will issue a Modify_Rejected request primitive with the cause #37 "User cell rate not available" towards the preceding exchange.

b) *Non-assigning exchange*

The exchange follows normal procedures.

4.8.2.1.2.2 Other actions at the exchange

a) *Assigning exchange*

See 4.8.2.1.1, with the following addition:

After issuing the Modify request primitive, a response, i.e. the Modify response primitive or Modify_Rejected request primitive are awaited.

b) *Non-assigning exchange*

The exchange follows normal procedures.

4.8.2.1.3 Action at an outgoing international exchange

See 4.8.2.1.2, with the following addition:

If policing is applied, policing policy in backward direction shall be changed when increase of any backward bandwidth is requested. The action of changing policing shall be taken before issuing the Modify request primitive.

4.8.2.1.4 Action at an intermediate international exchange

See 4.8.2.1.2, with the following addition:

If policing is applied, policing policy in forward direction shall be changed when decrease of any forward bandwidth is requested, and policing policy in backward direction shall be changed when increase of any backward bandwidth is requested. The action of changing policing shall be taken before issuing the Modify request primitive.

4.8.2.1.5 Action at an incoming international exchange

See 4.8.2.1.2, with the following addition:

If policing is applied, policing policy in forward direction shall be changed when decrease of any forward bandwidth is requested. The action of changing policing shall be taken before issuing the Modify request primitive.

4.8.2.1.6 Action at the terminating exchange

On receipt of the Modify indication primitive, the terminating exchange will reserve the corresponding resources specified in 4.8.2.1.2.1 on the incoming side of the exchange (if it is the assigning exchange) and will proceed to request a modification to the non-connection owner.

4.8.2.2 Modify Response/Confirmation primitive

4.8.2.2.1 Action at the terminating exchange

On receipt of the modification acknowledgement from the non-connection owner, the terminating exchange will perform the following actions:

When the called party responds to the modification acknowledgement with an indication of the final bandwidth used, the exchange shall modify the allocated bandwidth on those portions of the connection for which it is the assigning exchange according to the reported ATM cell rate, if the bandwidth already allocated is different. Then, the exchange will issue the Modify response primitive including the ATM cell rate parameter and, if applicable, the additional ATM cell rate parameter to the preceding exchange.

When the called party responds to the modification acknowledgement without the indication of the final bandwidth allocation, the exchange shall put the ATM cell rate parameter and, if applicable, the additional ATM cell rate parameter in the Modify response primitive according to the bandwidth allocation used in that exchange and issue the Modify response primitive to the preceding exchange.

The policing in backward direction shall be changed if modification of backward bandwidth is requested. The action of changing policing policy shall be taken before Modify response primitive is issued.

4.8.2.2.2 Action at an intermediate national exchange

On receipt of the Modify confirmation primitive, an intermediate exchange will perform the following actions:

Upon receipt of a Modify confirmation primitive with the ATM cell rate parameter and, if applicable, the additional ATM cell rate parameter, the exchange shall modify the allocated bandwidth on those portions of the connection for which it is the assigning exchange according to the reported final bandwidth allocation, if the bandwidth previously allocated by the exchange is different. Then, the exchange will issue the Modify response primitive including the ATM cell rate parameter and, if applicable, additional ATM cell rate parameter to the preceding exchange.

Upon receipt of a Modify confirmation primitive without the ATM cell rate parameter, the exchange shall put the ATM cell rate parameter and, if applicable, the additional ATM cell rate parameter in the Modify response primitive according to the bandwidth allocation used in that exchange and issue the Modify response primitive to the preceding exchange.

4.8.2.2.3 Action at an outgoing international exchange

See 4.8.2.2.2, with the following addition:

If policing is applied, policing policy in backward direction shall be changed when decrease of any backward bandwidth is requested. The action of changing policing shall be taken before issuing the Modify response primitive.

4.8.2.2.4 Action required at an intermediate international exchange

See 4.8.2.2.2, with the following addition:

If policing is applied, policing policy in backward direction shall be changed when decrease of any backward bandwidth is requested, and policing policy in forward direction shall be changed when increase of any forward bandwidth is requested. The action of changing policing shall be taken before issuing the Modify response primitive.

4.8.2.2.5 Action at an incoming international exchange

See 4.8.2.2.2, with the following addition:

If policing is applied, policing policy in forward direction shall be changed when increase of any forward bandwidth is requested. The action of changing policing shall be taken before issuing the Modify response primitive.

4.8.2.2.6 Action at the initiating exchange

On receipt of the Modify confirmation primitive, the initiating exchange will perform the following actions:

Upon receipt of a Modify confirmation primitive containing the ATM cell rate parameter and, if applicable, additional ATM cell rate parameter, the exchange shall modify the allocated bandwidth on those portions of the connection for which it is the assigning exchange according to the reported ATM cell rate, if the bandwidth already allocated is different. The final bandwidth allocation is transferred in the indication returned to the calling user.

Upon receipt of a Modify confirmation primitive without the ATM cell rate parameter, the exchange shall indicate the final bandwidth allocation used in that exchange in the indication returned to the calling user.

The policing in forward direction shall be changed when increase of any forward bandwidth is requested. The action of changing policing policy shall be taken before modification acknowledge is notified to the connection owner.

4.8.2.3 Modify Confirm Request/Indication primitive

See 2.3.2.3/Q.2725.2.

4.8.2.4 Modify Reject Request/Indication primitive

See 2.3.3.2/Q.2725.2.

4.8.3 Unsuccessful modification with negotiation

See 3.3.3/Q.2725.3, with the following addition:

- If the exchange cannot modify the allocated bandwidth, the connection shall be released in both directions with the cause #37 "User cell rate not available".

4.8.4 Handling of unexpected primitives

See 2.6.3.1.2.1/Q.2725.2.

4.8.5 Error indication primitive

See 3.3.6/Q.2725.3.

4.8.6 Primitive Contents

See Recommendation Q.2725.3, with the following modifications:

- The following is added to Table 3-3/Q.2725.3:

Table 4-4/Q.2725.4 – Parameters for Modify Request/Indication primitive

Modify Request/Indication	
Parameter	**Mandatory/Optional**
Alternative ATM cell rate	O (Note)
Minimum ATM cell rate	O (Note)
NOTE – Either the alternative ATM cell rate parameter or the minimum ATM cell rate parameter is included depending on the specific procedure.	

- The following is added to Table 2-9/Q.2725.2:

Table 4-5/Q.2725.4 – Parameters for Modify Response/Confirmation primitive

Modify Response/Confirmation	
Parameter	**Mandatory/Optional**
ATM cell rate	O
Additional ATM cell rate	O

4.9 Maintenance Control, Application Process Functions

See 3.4/Q.2725.3.

4.10 Single Association Control Function (SACF)

See 3.5/Q.2725.3.

4.11 Bearer Connection Control ASE (BCC ASE)

See 3.6/Q.2725.3, with the following modifications:

- The following is added to Table 3-4/Q.2725.3:

Table 4-6/Q.2725.4 – Parameters for Link_Modify Request/Indication primitive

Alternative ATM cell rate
Minimum ATM cell rate

- The following is added to Table 2-18/Q.2725.2:

Table 4-7/Q.2725.4 – Parameters for Link_Modify Response/Confirmation primitive

ATM cell rate
Additional ATM cell rate

4.12 Call Control ASE (CC ASE)

See 3.7/Q.2725.3, with the following modification:

- The following is added to Table 2-23/Q.2725.2:

Table 4-8/Q.2725.4 – Parameters for Call_Modify Request/Indication primitive

Alternative ATM cell rate
Minimum ATM cell rate

4.13 Maintenance Control ASE (MC ASE)

See 3.8/Q.2725.3.

4.14 Unrecognized Information ASE (UI ASE)

See 3.9/Q.2725.3.

4.15 Timers in B-ISUP

See 3.10/Q.2725.3.

4.16 Mapping tables for interworking with DSS 2

See 3.11/Q.2725.3, with the following modifications:

- The following is added to Table 3-5/Q.2725.3:

Table 4-9/Q.2725.4 – Mapping of Modification Request Procedure parameters

Initiating U/N ——————>	Network ——————>	Terminating U/N ——————>

Modify Request	MOD	Modify Request
Alternative ATM Traffic Descriptor	Alternative ATM cell rate	Alternative ATM Traffic Descriptor
Minimum Acceptable ATM Traffic Descriptor	Minimum ATM cell rate	Minimum Acceptable ATM Traffic Descriptor

- The following is added to Table 2-27/Q.2725.2:

Table 4-10/Q.2725.4 – Mapping of Modification Acknowledge Procedure parameters

Initiating U/N <——————	Network <——————	Terminating U/N <——————

Modify Acknowledge	MOA	Modify Acknowledge
ATM Traffic Descriptor	ATM cell rate Additional ATM cell rate (Note)	ATM Traffic Descriptor
NOTE – Mapping as in Recommendation Q.2723.1		

4.17 Interworking with ISUP

See 3.3.5/Q.2725.3.

4.18 Interworking with nodes which do not support the procedures described in this Recommendation

See 3.12/Q.2725.3 and 1.5.1/Q.2725.1.

Annex A

Message flow diagrams

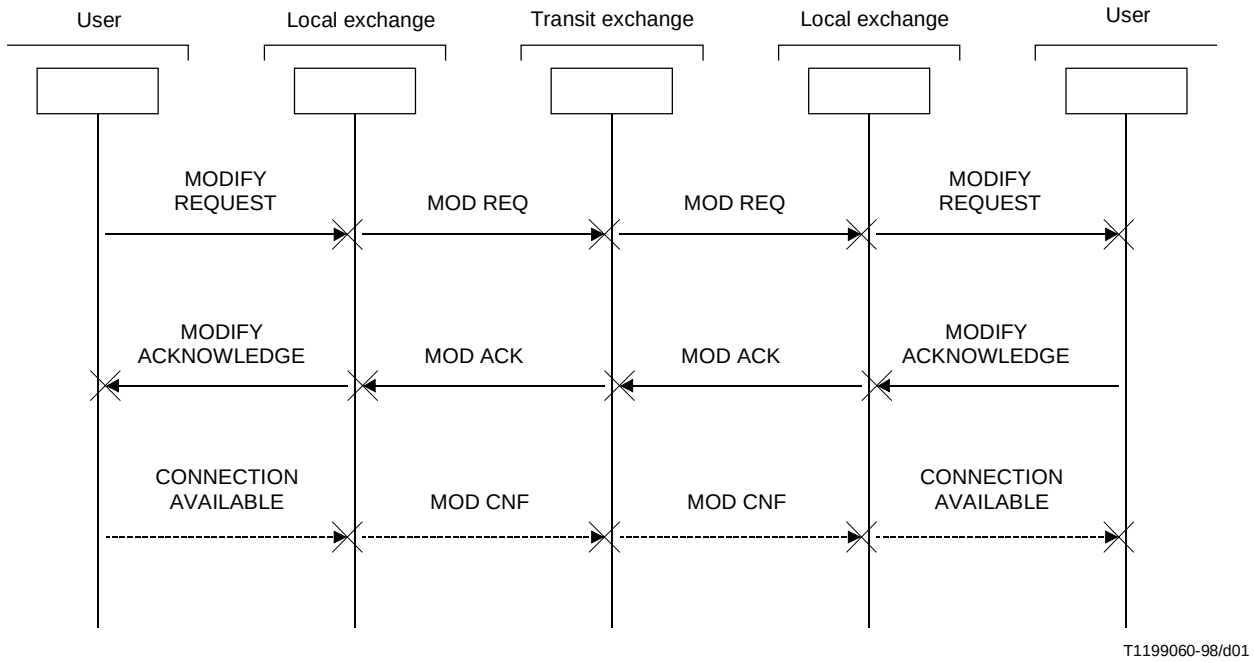

Figure A.1/Q.2725.4 – Example of successful Modification with Negotiation

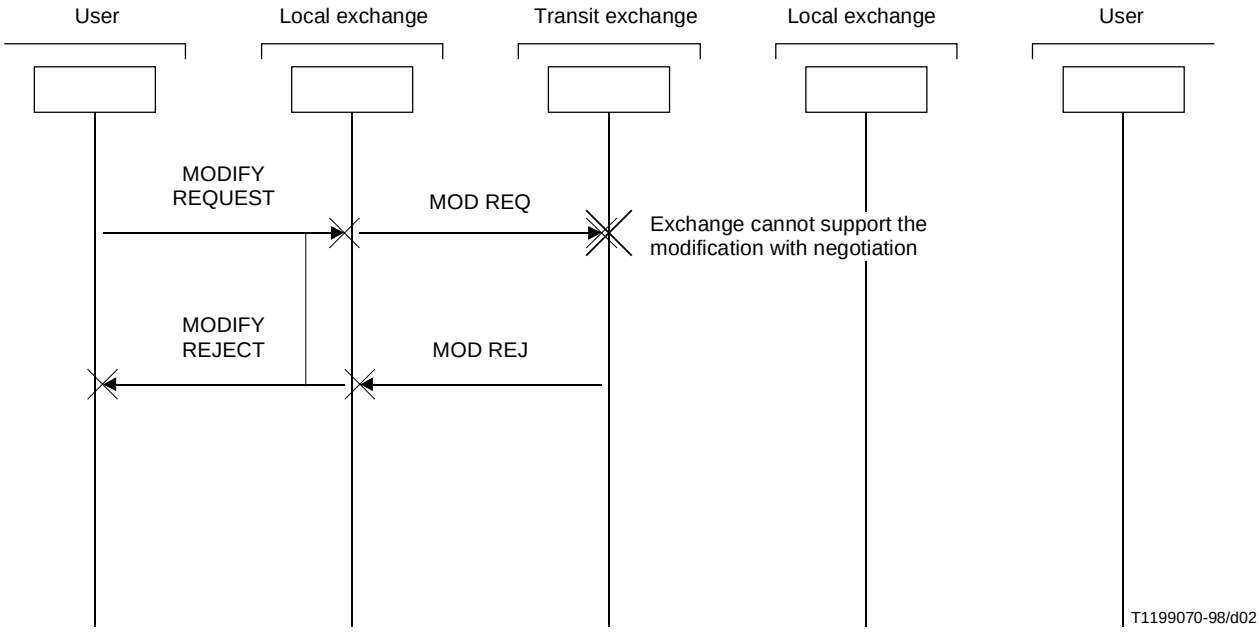

Figure A.2/Q.2725.4 – Example of successful Modification with Negotiation

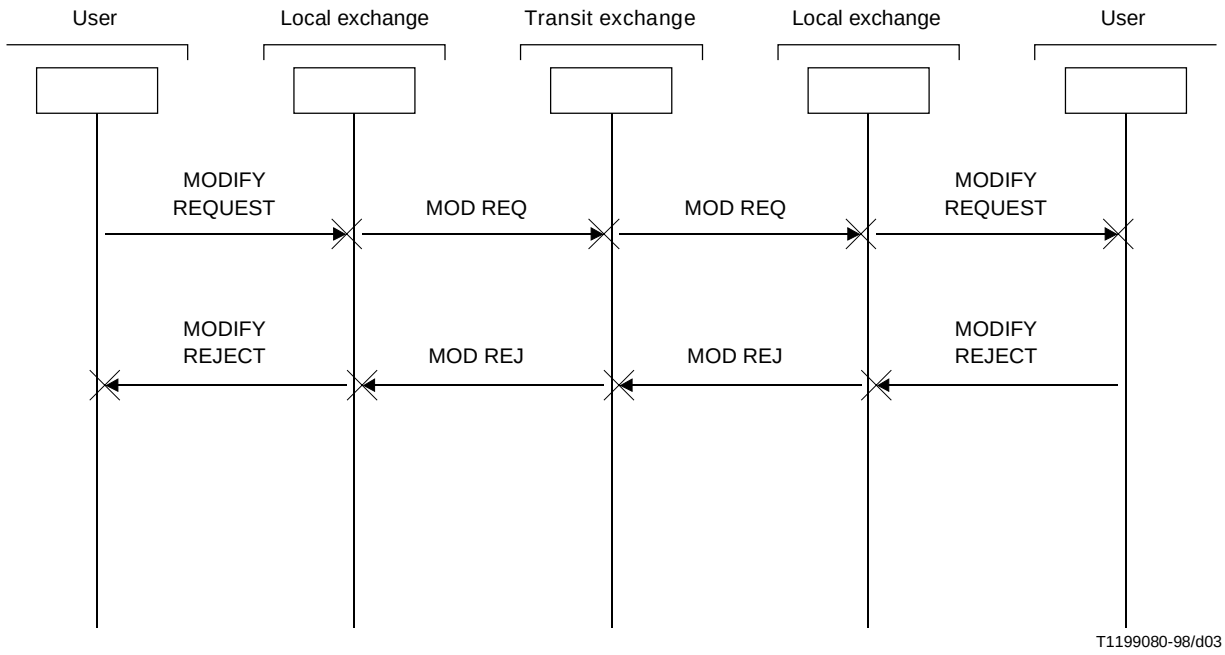

Figure A.3/Q.2725.4 – Example of unsuccessful Modification with Negotiation

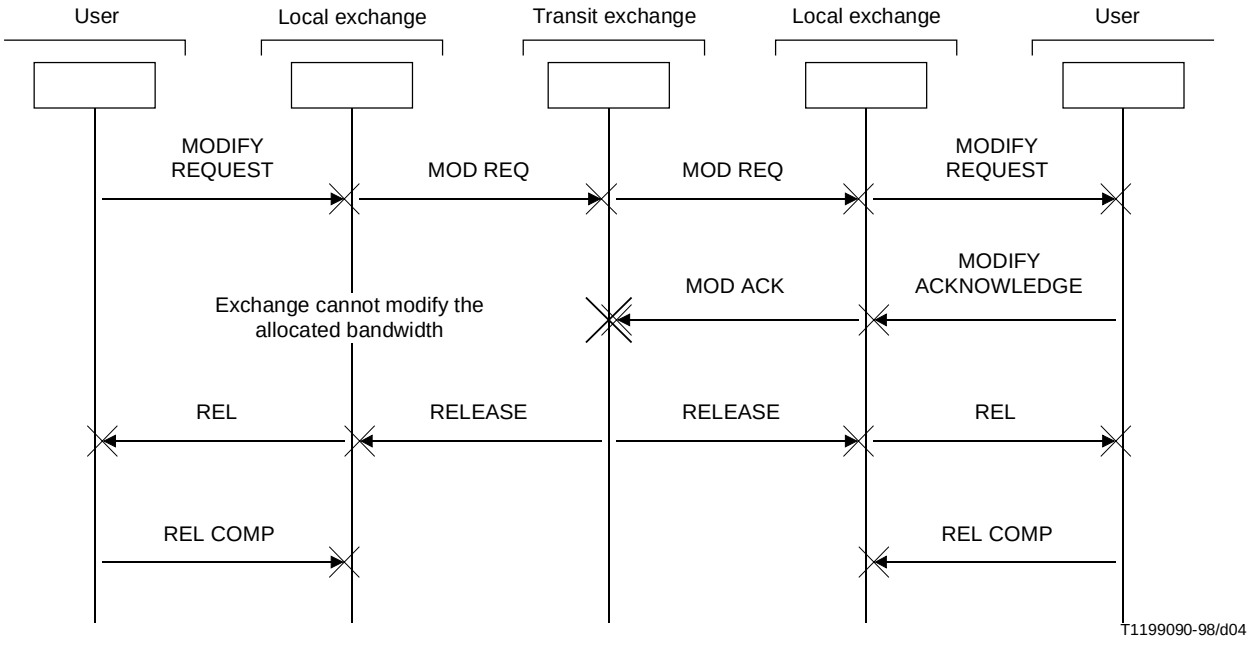

Figure A.4/Q.2725.4 – Example of unsuccessful Modification with Negotiation

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