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OF ITU

**Q.2630.3**

**Amendment 1**

(01/2006)

SERIES Q: SWITCHING AND SIGNALLING

Broadband ISDN – Common aspects of B-ISDN  
application protocols for access signalling and network  
signalling and interworking

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AAL type 2 signalling protocol – Capability Set 3

**Amendment 1: Support for the International  
Emergency Preference Scheme**

ITU-T Recommendation Q.2630.3 (2003) –  
Amendment 1



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*For further details, please refer to the list of ITU-T Recommendations.*

# **ITU-T Recommendation Q.2630.3**

## **AAL type 2 signalling protocol – Capability Set 3**

### **Amendment 1**

#### **Support for the International Emergency Preference Scheme**

##### **Summary**

This amendment was produced to meet the need for the implementation of the International Emergency Preference Scheme (IEPS) as specified in ITU-T Rec. E.106. It contains the modifications to ITU-T Rec. Q.2630.3 (2003) in order to accommodate these needs. This amendment is designed to be compatible with implementations conforming to ITU-T Rec. Q.2630.3 (2003).

##### **Source**

Amendment 1 to ITU-T Recommendation Q.2630.3 (2003) was approved on 27 January 2006 by ITU-T Study Group 11 (2005-2008) under the WTSA Resolution 1 procedure.

## FOREWORD

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# ITU-T Recommendation Q.2630.3

## AAL type 2 signalling protocol – Capability Set 3

### Amendment 1

#### Support for the International Emergency Preference Scheme

##### 1) Clause 2.1

*Revise clause 2.1 as follows:*

##### 2.1 Normative 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; 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. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [1] ITU-T Recommendation I.363.2 (2000), *B-ISDN ATM Adaptation Layer specification: Type 2 AAL*.
- [2] ITU-T Recommendation I.361 (1999), *B-ISDN ATM layer specification*.
- [3] ITU-T Recommendation X.200 (1994), *Information technology – Open Systems Interconnection – Basic reference model: The basic model*.
- [4] ITU-T Recommendation X.210 (1993), *Information technology – Open Systems Interconnection – Basic reference model: Conventions for the definition of OSI services*.
- [5] ITU-T Recommendation X.213 (2001), *Information technology – Open Systems Interconnection – Network service definitions*.
- [6] ITU-T Recommendation Q.850 (1998), *Usage of cause and location in DSS 1 and SS No. 7 ISUP*.
- [7] ITU-T Recommendation Q.2610 (1999), *Usage of cause and location in B-ISDN User Part and DSS 2*.
- [8] ITU-T Recommendation I.366.2 (1999), *AAL type 2 service specific convergence sublayer for trunking*.
- [9] ITU-T Recommendation I.366.1 (1998), *Segmentation and Reassembly Service Specific Convergence Sublayer for the AAL type 2*.
- [10] ITU-T Recommendation E.164 (1997), *The international public telecommunication numbering plan*.
- [11] IEEE Standard 802-2001, *IEEE Standards for Local and Metropolitan Area Networks: Overview and Architecture*.
- [12] ITU-T Recommendation Q.2150.0 (2001), *Generic signalling transport service*.
- [13] ITU-T Recommendation I.356 (2000), *B-ISDN ATM layer cell transfer performance*.

- [14] ITU-T Recommendation I.366.2 (2000), *AAL type 2 service specific convergence sublayer for narrowband services*.
- [15] ITU-T Recommendation Q.2630.1 (1999), *AAL type 2 signalling protocol – Capability Set 1*.
- [16] ITU-T Recommendation Q.2630.2 (2000), *AAL type 2 signalling protocol – Capability Set 2*.
- [17] ITU-T Recommendation E.412 (2003), *Network management controls*.
- [18] ITU-T Recommendation Q.542 (1993), *Digital exchange design objectives – Operations and maintenance*.
- [19] ITU-T Recommendation I.378 (2002), *Traffic control and congestion control at the ATM Adaptation Layer Type 2*.
- [20] ITU-T Recommendation E.106 (2003), *International Emergency Preference Scheme (IEPS) for disaster relief operations*.

**2) Clause 4**

*Add the following new abbreviations alphabetically:*

**4 Abbreviations**

|         |                                          |
|---------|------------------------------------------|
| A2P     | AAL type 2 Path Identifier               |
| A2SU    | AAL type 2 Served User                   |
| AAL     | ATM Adaptation Layer                     |
| ACC     | Automatic Congestion Control             |
| AESA    | ATM End System Address                   |
| AMR     | Adaptive Multi-rate Codec                |
| ANI     | Adjacent AAL type 2 Node Identifier      |
| ATM     | Asynchronous Transfer Mode               |
| ATM VCC | ATM Virtual Channel Connection           |
| BCD     | Binary Coded Decimal                     |
| BLC     | Block Confirm Message                    |
| BLO     | Block Request Message                    |
| CAS     | Channel Associated Signalling            |
| CAU     | Cause Parameter                          |
| CEID    | AAL type 2 Connection Element Identifier |
| CFN     | Confusion Message                        |
| CID     | Channel Identifier                       |
| CMD     | Circuit Mode Data                        |
| CP      | Connection Priority                      |
| CPHL    | CPS Packet Header Overhead Length        |
| CPS     | (AAL type 2) Common Part Sublayer        |

|             |                                                               |
|-------------|---------------------------------------------------------------|
| CS          | Capability Set                                                |
| CS-1        | Capability Set 1 (ITU-T Rec. Q.2630.1 [15])                   |
| CS-2        | Capability Set 2 (ITU-T Rec. Q.2630.2 [16])                   |
| CS-3        | Capability Set 3 (this Recommendation)                        |
| DA2EA       | Destination AAL type 2 Service Endpoint Address (Note 1)      |
| DESEA       | Destination E.164 Service Endpoint Address Parameter (Note 1) |
| DNSEA       | Destination NSAP Service Endpoint Address Parameter (Note 1)  |
| DSAID       | Destination Signalling Association Identifier                 |
| DTMF        | Dual Tone Multi-Frequency                                     |
| ECF         | Establish Confirm Message                                     |
| ERQ         | Establish Request Message                                     |
| FAX         | Demodulated Facsimile Data                                    |
| FBW         | Fixed Bandwidth Transfer Capability                           |
| FRM         | Frame Mode Data                                               |
| GST         | Generic Signalling Transport                                  |
| HBx         | Header Bit Rate associated with x                             |
| HC          | Hop Counter                                                   |
| ID          | Identifier                                                    |
| IEC         | International Electrotechnical Commission                     |
| IEEE        | Institute of Electrical and Electronics Engineers             |
| <u>IEPS</u> | <u>International Emergency Preference Scheme</u>              |
| <u>II</u>   | <u>IEPS Indicator</u>                                         |
| ISO         | International Organization for Standardization                |
| LB          | Loopback                                                      |
| LC          | Link Characteristics (Note 2)                                 |
| LM          | Layer Management                                              |
| LSB         | Least Significant Bit                                         |
| M           | Mandatory                                                     |
| MF-R1       | Multi-Frequency R1                                            |
| MF-R2       | Multi-Frequency R2                                            |
| MOA         | Modification Acknowledge message                              |
| MOD         | Modification Request message                                  |
| MOR         | Modification Reject message                                   |
| MSB         | Most Significant Bit                                          |
| MSLC        | Modify Support for Link Characteristics                       |
| MSSSI       | Modify Support for SSCS Information                           |
| MTP3b       | Message Transfer Part level 3 using ITU-T Rec. Q.2140 [29]    |

|        |                                                             |
|--------|-------------------------------------------------------------|
| NF     | Nodal Function                                              |
| NNI    | Network-Network Interface                                   |
| NSAP   | Network Service Access Point                                |
| O      | Optional                                                    |
| OA2EA  | Origination AAL type 2 Service Endpoint Address             |
| OESEA  | Origination E.164 Service Endpoint Address Parameter        |
| ONSEA  | Origination NSAP Service Endpoint Address Parameter         |
| OSAID  | Originating Signalling Association Identifier (Parameter)   |
| OUI    | Organizational Unique Identifier                            |
| PFBW   | Preferred FBW                                               |
| PLC    | Preferred Link Characteristics                              |
| PSSCS  | Preferred SSCS Information                                  |
| PSSIAE | Preferred Service Specific Information (Audio Extended)     |
| PSSIME | Preferred Service Specific Information (Multirate Extended) |
| PT     | Path Type                                                   |
| PTC    | Preferred Transfer Capability                               |
| PVBWS  | Preferred VBWS                                              |
| PVBWT  | Preferred VBWT                                              |
| PVC    | Permanent Virtual Channel                                   |
| RC     | Rate Control                                                |
| REL    | Release Request Message                                     |
| RES    | Reset Request Message                                       |
| RLC    | Release Confirm Message                                     |
| RSC    | Reset Confirm Message                                       |
| SAAL   | ATM Adaptation Layer for Signalling                         |
| SAID   | Signalling Association Identifier                           |
| SAP    | Service Access Point                                        |
| SAR    | Segmentation and Reassembly (Sublayer)                      |
| SDL    | Specification and Description Language                      |
| SDU    | Service Data Unit                                           |
| SPVC   | Soft PVC                                                    |
| SSCOP  | Service Specific Connection Oriented Protocol               |
| SSCS   | Service Specific Convergence Sublayer                       |
| SSCS   | SSCS Information                                            |
| SSIA   | Service Specific Information (Audio) Parameter              |
| SSIAE  | Service Specific Information (Audio Extended)               |
| SSIM   | Service Specific Information (Multirate) Parameter          |

|       |                                                                   |
|-------|-------------------------------------------------------------------|
| SSIME | Service Specific Information (Multirate Extended)                 |
| SSISA | Service Specific Information (SAR-assured) Parameter              |
| SSISU | Service Specific Information (SAR-unassured) Parameter            |
| SSSAR | Segmentation and Reassembly Service Specific Convergence Sublayer |
| STC   | Signalling Transport Converter                                    |
| SUCI  | Served User Correlation ID                                        |
| SUGR  | Served User Generated Reference                                   |
| SUT   | Served User Transport                                             |
| SVC   | Switched Virtual Channel                                          |
| SYN   | Synchronization of change in SSCS operation                       |
| TAR   | Temporary Alternative Routing                                     |
| TC    | Transfer Capability                                               |
| TCC   | TAR Controlled Connection                                         |
| TCI   | Test Connection Indication                                        |
| TCS   | Transfer Capability Support                                       |
| TED   | Transmission Error Detection                                      |
| UBC   | Unblock Confirm Message                                           |
| UBL   | Unblock Request Message                                           |
| UNI   | User-Network Interface                                            |
| UU    | User-user                                                         |
| VBWS  | Variable Bandwidth Stringent Transfer Capability                  |
| VBWT  | Variable Bandwidth Tolerant Transfer Capability                   |
| VCC   | Virtual Channel Connection                                        |
| VPC   | Virtual Path Connection                                           |

NOTE 1 – In ITU-T Recs Q.2630.1 [15] and Q.2630.2 [16], the abbreviation A2EA was used instead of DA2EA, ESEA instead of DESEA, and NSEA instead of DNSEA.

NOTE 2 – In ITU-T Rec. Q.2630.1 [15], the abbreviation ALC was used instead of LC.

### 3) **Clause 5.1.2**

*Revise clause 5.1.2 as follows:*

#### **5.1.2 Primitives between AAL type 2 signalling entities and the AAL type 2 served user**

The A2SU-SAP primitives are used:

- 1) by the originating served user to initiate AAL type 2 connection establishment and by the originating and destination served users to initiate the release of a connection;
- 2) by the AAL type 2 signalling entities to indicate an incoming connection to the destination served user and notifying either the originating or destination served user of the release of a connection;
- 3) by the modification sending served user to originate, and the modification receiving served user to respond to, an AAL type 2 connection resource modification request; and

- 4) by the AAL type 2 signalling entities to indicate a modification of the AAL type 2 connection resource to the modification receiving served user and notify the modification originating served user of the successful or unsuccessful modification.

NOTE – When sending a primitive between the signalling protocol and its user, the primitive needs to be associated with a particular AAL type 2 connection instance. The mechanism used for this binding is considered to be an implementation detail and therefore is outside the scope of this Recommendation.

The services are provided through the transfer of primitives which are summarized in Table 5-1, and are defined after the table.

The AAL type 2 served user passes information in parameters in the primitives. Some of those parameters are mandatory and some are optional; the appropriate usage of the parameters is described in clause 8.

**Table 5-1/Q.2630.3 – Primitives and parameters exchanged between the AAL type 2 signalling entities and the AAL type 2 served user**

| Primitive<br>Generic Name | Type                                                                                                                   |                                                                                                              |             |                     |
|---------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------|---------------------|
|                           | Request                                                                                                                | Indication                                                                                                   | Response    | Confirm             |
| ESTABLISH                 | DA2EA,<br>OA2EA,<br>SUGR, SUT,<br>TC, PTC, TCS,<br>LC, PLC, MSLC,<br>SSCS, PSSCS,<br>MSSSI,<br>PT, <u>IL</u> , CP, TCI | OA2EA,<br>SUGR, SUT,<br>TC, PTC, TCS,<br>LC, PLC, MSLC,<br>SSCS, PSSCS,<br>MSSSI,<br>PT, <u>IL</u> , CP, TCI | Not defined | TCS, MSLC,<br>MSSSI |
| RELEASE                   | Cause                                                                                                                  | Cause                                                                                                        | Not defined | Cause               |
| MODIFY                    | TC, LC, SSCS,<br>SUCI                                                                                                  | TC, LC, SSCS,<br>SUCI                                                                                        | SUCI        | SUCI                |
| MODIFY-REJECT             | Not defined                                                                                                            | Not defined                                                                                                  | Not defined | Cause               |

a) **ESTABLISH.request**

This primitive is used by the AAL type 2 served user to initiate the establishment of a new AAL type 2 connection, and optionally request the capability for subsequent modification to be performed on the requested connection.

b) **ESTABLISH.indication**

This primitive is used by the AAL type 2 signalling entities to indicate that an incoming connection has been successfully established, and optionally indicate that the incoming connection is capable of subsequent modification.

c) **ESTABLISH.confirm**

This primitive is used by the AAL type 2 signalling entities to indicate that the connection (which was previously requested by the served user) has successfully been established and optionally indicate that the established connection is capable of subsequent modification.

d) **RELEASE.request**

This primitive is used by the AAL type 2 served user to initiate clearing of an AAL type 2 connection.

e) **RELEASE.indication**

This primitive is used by the AAL type 2 signalling entities to indicate that an AAL type 2 connection has been released.

- f) **RELEASE.confirm**  
This primitive is used as a negative acknowledgement for an ESTABLISH.request.
- g) **MODIFY.request**  
This primitive is used by the AAL type 2 served user to originate the modification of the AAL type 2 connection resource.
- h) **MODIFY.indication**  
This primitive is used by the AAL type 2 signalling entities to indicate that the modification of the AAL type 2 connection resource has been successfully performed.
- i) **MODIFY.response**  
This primitive is used by the AAL type 2 served user to respond to the modification of the AAL type 2 connection resource.
- j) **MODIFY.confirm**  
This primitive is used by the AAL type 2 signalling entities to indicate that the AAL type 2 connection resource modification (which was previously requested by the served user) has successfully been performed.
- k) **MODIFY-REJECT.confirm**  
This primitive is used by the AAL type 2 signalling entities to indicate that the AAL type 2 connection resource modification (which was previously requested by the served user) has been rejected.

#### 4) **Clause 5.1.3**

*Revise clause 5.1.3 as follows:*

##### **5.1.3 Parameters between AAL type 2 signalling entities and the AAL type 2 served user**

- a) **Destination AAL type 2 Service Endpoint Address (DA2EA)**  
This parameter carries the service endpoint address of the destination. It can have the form of an E.164 address or an NSAP address.
- b) **Origination AAL type 2 Service Endpoint Address (OA2EA)**  
This parameter carries the service endpoint address of the origination. It can have the form of an E.164 address or an NSAP address.
- c) **Served User Generated Reference (SUGR)**  
This parameter carries a reference provided by the originating AAL type 2 served user and this reference is transported unmodified to the destination served user.
- d) **Served User Transport (SUT)**  
This parameter carries the served user data that is transported unmodified to the destination served user.
- e) **Transfer Capability (TC)**  
This parameter gives an indication of the AAL type 2 transfer capability required for the AAL type 2 connection. This parameter can have the form of either:
- Fixed Bandwidth Transfer Capability; or
  - Variable Bandwidth Stringent Transfer Capability; or
  - Variable Bandwidth Tolerant Transfer Capability.

f) **Preferred Transfer Capability (PTC)**

This parameter gives an indication that the AAL type 2 Transfer Capability shall be set as indicated in this parameter if the modification of the AAL type 2 Transfer Capability is permitted. This parameter can have the form of either:

- Preferred Fixed Bandwidth Transfer Capability; or
- Preferred Variable Bandwidth Stringent Transfer Capability; or
- Preferred Variable Bandwidth Tolerant Transfer Capability.

g) **Transfer Capability Support (TCS)**

This parameter gives an indication whether Transfer Capabilities are supported by all AAL type 2 nodes of the AAL type 2 connection.

h) **Link Characteristics (LC)**

This parameter gives an indication of the resources required for the AAL type 2 connection and is used only for AAL type 2 path selection and connection admission control.

i) **Preferred Link Characteristics (PLC)**

This parameter gives an indication that the Link Characteristics shall be set as indicated in this parameter if the modification of the Link Characteristics is permitted.

j) **Modify Support for Link Characteristics (MSLC)**

This parameter gives an indication that the AAL type 2 Link Characteristics of the AAL type 2 connection may need to be modified during the lifetime of the AAL type 2 connection (ESTABLISH.request) or is permitted to be modified (ESTABLISH.indication and ESTABLISH.confirm).

k) **SSCS Information (SSCS)**

This parameter identifies the type and the capabilities of an AAL type 2 SSCS protocol. This parameter can have the form of either:

- Service Specific Information (Multirate) (see ITU-T Rec. I.366.2 [14]);
- Service Specific Information (Audio) (see ITU-T Rec. I.366.2 [14]);
- Service Specific Information (Multirate Extended) (see Note);
- Service Specific Information (Audio Extended) (see Note); or
- Service Specific Information (SAR) (see ITU-T Rec. I.366.1 [9]) with or without the additional parameters necessary for the assured data transfer.

NOTE – Multirate Extended and Audio Extended are used in this Recommendation to support the services of the U-Plane definitions of the 2000 version of ITU-T Rec. I.366.2 [14]. The (non-extended) Multirate and Audio are retained for backward compatibility with ITU-T Rec. Q.2630.1 [15]. For example, the Audio Extended form of the SSCS Information parameter in this Recommendation (see 7.4.19) adds support for LB, RC, and SYN that were added as U-Plane functions in the 2000 version of ITU-T Rec. I.366.2 [14].

l) **Preferred SSCS Information (PSSCS)**

This parameter gives an indication that the SSCS Information shall be set as indicated in this parameter if the modification of the SSCS Information is permitted. This parameter can have the form of either:

- Preferred Service Specific Information (Multirate Extended) (see Note); or
- Preferred Service Specific Information (Audio Extended) (see Note).

Modification of Frame Mode Data as specified in ITU-T Rec. I.366.2 [14], or modification of SAR as specified in ITU-T Rec. I.366.1 [9] is outside the scope of this Recommendation.

- m) **Modify Support for SSCS Information (MSSSI)**  
This parameter gives an indication that the SSCS Information of the AAL type 2 connection may need to be modified during the lifetime of the AAL type 2 connection (ESTABLISH.request) or are permitted to be modified (ESTABLISH.indication and ESTABLISH.confirm).
- n) **Path Type (PT)**  
This parameter indicates a request for an AAL type 2 path with a specified Quality of Service.
- o) **Connection Priority (CP)**  
This parameter carries information sent in the forward direction to indicate the priority level of the connection request.
- p) **Test Connection Indicator (TCI)**  
By its presence, this parameter indicates that the AAL type 2 connection to be established is a test connection.
- q) **Cause**  
This parameter describes the reason for the release of the AAL type 2 connection. It also may indicate the reason why an AAL type 2 connection could not be established or a modification was rejected.
- r) **Served User Correlation ID (SUCI)**  
This parameter carries the SSCS correlation ID (as specified in ITU-T Rec. I.366.2 [14]) during the modification of SSCS information and is transported unmodified to the destination or origination served user.
- s) **IEPS Indicator (II)**  
This parameter indicates an IEPS (as specified in ITU-T Rec. E.106 [20]) preferential connection establishment.

## 5) **Clause 7.2.2**

*Revise clause 7.2.2 as follows:*

### **7.2.2 Parameters of the AAL type 2 signalling protocol messages**

The parameters of the AAL type 2 signalling protocol messages are shown in Table 7-6. The indications of "mandatory" and "optional" are for information only. The authoritative definition is given in clause 8 and Annex C. If any difference between the indications in this clause and the definitions in clause 8 and Annex C exists, the definitions in clause 8 take precedence.

Multiple presence of the same parameter in a single message is not permitted.

**Table 7-6/Q.2630.3 – (part 1 of 2)**  
**Parameters of the AAL type 2 signalling protocol messages**

| Parameter                                                   | Message             |        |     |         |                 |     |     |
|-------------------------------------------------------------|---------------------|--------|-----|---------|-----------------|-----|-----|
|                                                             | ERQ                 | ECF    | REL | RLC     | MOD             | MOA | MOR |
| Automatic Congestion Control                                | –                   | –      | O   | O       | –               | –   | –   |
| Cause                                                       | –                   | –      | M   | Note 12 | –               | –   | M   |
| Connection Element Identifier                               | M                   | –      | –   | O       | –               | –   | –   |
| Connection Priority                                         | <u>Note 18</u><br>⊖ | –      | –   | –       | –               | –   | –   |
| Destination E.164 Service Endpoint Address                  | Note 2              | –      | –   | –       | –               | –   | –   |
| Destination NSAP Service Endpoint Address                   | Note 2              | –      | –   | –       | –               | –   | –   |
| Destination Signalling Association Identifier (Note 1)      | Note 3              | M      | M   | M       | M               | M   | M   |
| Hop Counter                                                 | <u>Note 18</u><br>⊖ | –      | –   | –       | –               | –   | –   |
| <u>IEPS Indicator</u>                                       | <u>Note 18</u>      | =      | =   | =       | =               | =   | =   |
| Link Characteristics                                        | Note 4              | –      | –   | –       | Note 4          | –   | –   |
| Modify Support for Service Specific Information             | Notes 4,<br>16      | Note 4 | –   | –       | –               | –   | –   |
| Modify Support for Link Characteristics                     | Notes 4,<br>14      | Note 4 | –   | –       | –               | –   | –   |
| Originating Signalling Association Identifier               | M                   | M      | –   | –       | –               | –   | –   |
| Origination E.164 Service Endpoint Address                  | Note 5              | –      | –   | –       | –               | –   | –   |
| Origination NSAP Service Endpoint Address                   | Note 5              | –      | –   | –       | –               | –   | –   |
| Path Type                                                   | Note 6              | –      | –   | –       | –               | –   | –   |
| Preferred Link Characteristics                              | Notes 4,<br>15      | –      | –   | –       | –               | –   | –   |
| Preferred Service Specific Information (Audio Extended)     | Notes 4,<br>7       | –      | –   | –       | –               | –   | –   |
| Preferred Service Specific Information (Multirate Extended) | Notes 4,<br>7       | –      | –   | –       | –               | –   | –   |
| Preferred Transfer Capability (FBW)                         | Notes 4,<br>8       | –      | –   | –       | –               | –   | –   |
| Preferred Transfer Capability (VBWS)                        | Notes 4,<br>8       | –      | –   | –       | –               | –   | –   |
| Preferred Transfer Capability (VBWT)                        | Notes 4,<br>8       | –      | –   | –       | –               | –   | –   |
| Served User Correlation ID                                  | –                   | –      | –   | –       | O               | O   | –   |
| Served User Generated Reference                             | O                   | –      | –   | –       | –               | –   | –   |
| Served User Transport                                       | O                   | –      | –   | –       | –               | –   | –   |
| Service Specific Information (Audio Extended)               | Notes 9,<br>10      | –      | –   | –       | Notes 13,<br>17 | –   | –   |
| Service Specific Information (Audio)                        | Notes 4,<br>9, 10   | –      | –   | –       | –               | –   | –   |
| Service Specific Information (Multirate Extended)           | Notes 9,<br>10      | –      | –   | –       | Notes 13,<br>17 | –   | –   |
| Service Specific Information (Multirate)                    | Notes 4,<br>9, 10   | –      | –   | –       | –               | –   | –   |
| Service Specific Information (SAR-assured)                  | Note 9              | –      | –   | –       | –               | –   | –   |
| Service Specific Information (SAR-unassured)                | Note 9              | –      | –   | –       | –               | –   | –   |
| TAR Controlled Connection                                   | <u>Note 18</u><br>⊖ | –      | –   | –       | –               | –   | –   |
| Test Connection Indicator                                   | O                   | –      | –   | –       | –               | –   | –   |

**Table 7-6/Q.2630.3 – (part 1 of 2)**  
**Parameters of the AAL type 2 signalling protocol messages**

| Parameter                         | Message |        |     |     |              |     |     |
|-----------------------------------|---------|--------|-----|-----|--------------|-----|-----|
|                                   | ERQ     | ECF    | REL | RLC | MOD          | MOA | MOR |
| Transfer Capability (FBW)         | Note 11 | –      | –   | –   | Notes 13, 17 | –   | –   |
| Transfer Capability (VBWS)        | Note 11 | –      | –   | –   | Notes 13, 17 | –   | –   |
| Transfer Capability (VBWT)        | Note 11 | –      | –   | –   | Notes 13, 17 | –   | –   |
| Transfer Capability Support (TCS) | Note 4  | Note 4 | –   | –   | –            | –   | –   |

M Mandatory parameter  
O Optional parameter  
– Parameter not present

NOTE 1 – This row designates the Destination Signalling Association Identifier field in the message header.

NOTE 2 – Exactly one of these parameters must be present in an instance of the message.

NOTE 3 – The Destination Signalling Association Identifier field contains the value "unknown".

NOTE 4 – This parameter is only used for backward compatibility, i.e., for interworking with AAL type 2 nodes that conform only to ITU-T Recs Q.2630.1 [15] or Q.2630.2 [16] (see Annex C).

NOTE 5 – At most one of these parameters is present in an instance of the message.

NOTE 6 – If the path type parameter is not included, the path type shall be considered to be the network default stringent QoS class.

NOTE 7 – This parameter may only be included if "Modify Support for Service Specific Information" is included; at most one of these parameters is present in an instance of the message. If present it must refer to the same service specific information as the Service Specific Information parameter present in the same Establish Request message, i.e., Audio or Multirate.

NOTE 8 – This parameter must be included if a "Preferred Link Characteristics" and/or a "Preferred Service Specific Information" is included. At most one of these parameters is present in an instance of the message. If present it must refer to the same transfer capability as the Transfer Capability parameter present in the same Establish Request message.

NOTE 9 – At most one of these parameters is present in an instance of the message.

NOTE 10 – If the Modify Support for Service Specific Information parameter is included, this parameter shall also be included.

NOTE 11 – Exactly one of these parameters is present in an instance of the message.

NOTE 12 – The "Cause" parameter is present in the Release Confirm message if:

- the RLC is used to reject a connection establishment; or
- the cause reports unrecognized information received in the REL message.

NOTE 13 – At most one of these parameters is present in an instance of the message, and only the same parameter that was present in the Establish Request message may be present.

NOTE 14 – This parameter may be present only if the parameter "Link Characteristics" is present also.

NOTE 15 – This parameter may be present only if the parameter "Modify Support for Link Characteristics" is present also.

NOTE 16 – This parameter may be present only if one of the parameters "Service Specific Information (Audio)", "Service Specific Information (Audio Extended)", "Service Specific Information (Multirate)", and "Service Specific Information (Multirate Extended)" is present also.

NOTE 17 – At least one of these parameters is present in an instance of the message.

NOTE 18 – At most one of these parameters is present in an instance of the message.

**Table 7-6/Q.2630.3 – (part 2 of 2)  
Parameters of the AAL type 2 signalling protocol messages**

| Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Message |        |             |        |             |        |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|-------------|--------|-------------|--------|-----|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | RES     | RSC    | BLO         | BLC    | UBL         | UBC    | CFN |
| Cause                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | –       | Note 4 | –           | Note 4 | –           | Note 4 | M   |
| Connection Element Identifier                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | M       | –      | M<br>Note 3 | –      | M<br>Note 3 | –      | –   |
| Destination Signalling Association Identifier<br>(Note 1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Note 2  | M      | Note 2      | M      | Note 2      | M      | M   |
| Originating Signalling Association Identifier                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | M       | –      | M           | –      | M           | –      | –   |
| M Mandatory parameter<br>O Optional parameter<br>– Parameter not present<br><br>NOTE 1 – This row designates the Destination Signalling Association Identifier field in the message header.<br>NOTE 2 – The Destination Signalling Association Identifier field contains the value "unknown".<br>NOTE 3 – The Channel Identifier field is set to "Null", but the Path Identifier includes a value identifying an AAL type 2 path.<br>NOTE 4 – The "Cause" parameter is present only if the cause reports unrecognized information received. |         |        |             |        |             |        |     |

The identifiers of the AAL type 2 message parameters are defined in Table 7-7.

**Table 7-7/Q.2630.3 – Identifiers of the AAL type 2 message parameters**

| AAL type 2 Parameter                                                  | Ref.          | Acronym   | Identifier             |
|-----------------------------------------------------------------------|---------------|-----------|------------------------|
| Automatic Congestion Control                                          | 7.3.25        | ACC       | 0 0 0 1 1 0 0 0        |
| Cause                                                                 | 7.3.1         | CAU       | 0 0 0 0 0 0 0 1        |
| Connection Element Identifier                                         | 7.3.2         | CEID      | 0 0 0 0 0 0 1 0        |
| Connection Priority                                                   | 7.3.26        | CP        | 0 0 0 1 1 0 0 1        |
| Destination E.164 Service Endpoint Address                            | 7.3.3         | DESEA     | 0 0 0 0 0 0 1 1        |
| Destination NSAP Service Endpoint Address                             | 7.3.4         | DNSEA     | 0 0 0 0 0 1 0 0        |
| Hop Counter                                                           | 7.3.27        | HC        | 0 0 0 1 1 0 1 0        |
| <u>IEPS Indicator</u>                                                 | <u>7.3.36</u> | <u>II</u> | <u>0 0 1 0 0 1 0 0</u> |
| Link Characteristics (Note)                                           | 7.3.5         | LC        | 0 0 0 0 0 1 0 1        |
| Modify Support for Link Characteristics (Note)                        | 7.3.20        | MSLC      | 0 0 0 0 1 1 1 0        |
| Modify Support for Service Specific Information (Note)                | 7.3.21        | MSSSI     | 0 0 0 0 1 1 1 1        |
| Originating Signalling Association Identifier                         | 7.3.6         | OSAID     | 0 0 0 0 0 1 1 0        |
| Origination E.164 Service Endpoint Address                            | 7.3.23        | OESEA     | 0 0 0 1 1 0 1 1        |
| Origination NSAP Service Endpoint Address                             | 7.3.24        | ONSEA     | 0 0 0 1 0 1 0 1        |
| Path Type                                                             | 7.3.14        | PT        | 0 0 0 1 0 0 0 0        |
| Preferred Link Characteristics (Note)                                 | 7.3.19        | PLC       | 0 0 0 1 0 0 0 1        |
| Preferred Service Specific Information (Audio Extended)<br>(Note)     | 7.3.17        | PSSIAE    | 0 0 0 1 0 0 1 0        |
| Preferred Service Specific Information (Multirate Extended)<br>(Note) | 7.3.18        | PSSIME    | 0 0 0 1 0 0 1 1        |
| Preferred Transfer Capability (FBW) (Note)                            | 7.3.29        | PFBW      | 0 0 0 1 1 1 0 0        |

**Table 7-7/Q.2630.3 – Identifiers of the AAL type 2 message parameters**

| <b>AAL type 2 Parameter</b>                                                                                                                                                                         | <b>Ref.</b> | <b>Acronym</b> | <b>Identifier</b> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------|-------------------|
| Preferred Transfer Capability (VBWS) (Note)                                                                                                                                                         | 7.3.30      | PVBWS          | 0 0 0 1 1 1 0 1   |
| Preferred Transfer Capability (VBWT) (Note)                                                                                                                                                         | 7.3.31      | PVBWT          | 0 0 0 1 1 1 1 0   |
| Served User Correlation ID                                                                                                                                                                          | 7.3.22      | SUCI           | 0 0 0 1 0 1 0 0   |
| Served User Generated Reference                                                                                                                                                                     | 7.3.7       | SUGR           | 0 0 0 0 0 1 1 1   |
| Served User Transport                                                                                                                                                                               | 7.3.8       | SUT            | 0 0 0 0 1 0 0 0   |
| Service Specific Information (Audio Extended)                                                                                                                                                       | 7.3.15      | SSIAE          | 0 0 0 1 0 1 1 0   |
| Service Specific Information (Audio) (Note)                                                                                                                                                         | 7.3.9       | SSIA           | 0 0 0 0 1 0 0 1   |
| Service Specific Information (Multirate Extended)                                                                                                                                                   | 7.3.16      | SSIME          | 0 0 0 1 0 1 1 1   |
| Service Specific Information (Multirate) (Note)                                                                                                                                                     | 7.3.10      | SSIM           | 0 0 0 0 1 0 1 0   |
| Service Specific Information (SAR-assured)                                                                                                                                                          | 7.3.11      | SSISA          | 0 0 0 0 1 0 1 1   |
| Service Specific Information (SAR-unassured)                                                                                                                                                        | 7.3.12      | SSISU          | 0 0 0 0 1 1 0 0   |
| TAR Controlled Connection                                                                                                                                                                           | 7.3.28      | TCC            | 0 0 0 1 1 1 1 1   |
| Test Connection Indicator                                                                                                                                                                           | 7.3.13      | TCI            | 0 0 0 0 1 1 0 1   |
| Transfer Capability (FBW)                                                                                                                                                                           | 7.3.32      | FBW            | 0 0 1 0 0 0 0 0   |
| Transfer Capability (VBWS)                                                                                                                                                                          | 7.3.33      | VBWS           | 0 0 1 0 0 0 0 1   |
| Transfer Capability (VBWT)                                                                                                                                                                          | 7.3.34      | VBWT           | 0 0 1 0 0 0 1 0   |
| Transfer Capability Support (Note)                                                                                                                                                                  | 7.3.35      | TCS            | 0 0 1 0 0 0 1 1   |
| NOTE – In this Recommendation, this parameter is only used for backward compatibility, i.e., for interworking with AAL type 2 nodes that conform only to ITU-T Recs Q.2630.1 [15] or Q.2630.2 [16]. |             |                |                   |

**6) New clause 7.3.36**

*Add the following new clause:*

**7.3.36 IEPS Indicator**

The IEPS Indicator parameter has no fields, i.e., the parameter length is always zero.

**7) Clause 8**

*Revise clause 8 as follows:*

**8 Procedure of the AAL type 2 signalling protocol**

Before an ATM VCC (AAL type 2 path) is put into service between a pair of adjacent AAL type 2 nodes, certain actions need to be performed. An identifier called the AAL type 2 path identifier is assigned to the ATM VCC. This identifier is used to refer to the ATM VCC in the AAL type 2 signalling protocol messages. The AAL type 2 path identifier shall uniquely identify the ATM VCC between the two adjacent AAL type 2 nodes.

On any ATM VCC used for AAL type 2 connections, all CID values from "8" to "255" are available for assignment.

Any time a new ATM VCC is put into service, the ownership of the ATM VCC shall be determined before AAL type 2 connections are established in it. In case of switched ATM VCC, the owner of the VCC shall be the AAL type 2 node that initiated the establishment of the VCC. In case of PVC and soft PVC, it is the responsibility of the management system to determine the owner of the VCC.

The nodal function is informed by layer management of a newly established AAL type 2 path by the use of the ADD-PATH.indication primitive containing the adjacent AAL type 2 node identifier, the AAL type 2 path identifier, and the ownership. The nodal function is informed by layer management of the removal of an AAL type 2 path by use of the REMOVE-PATH.indication primitive containing the adjacent AAL type 2 node identifier and the AAL type 2 path identifier.

In order to minimize the likelihood of CID collision, the following CID allocation mechanism shall be used:

- if the AAL type 2 node owns the AAL type 2 path that carries the new connection, it allocates CID values from CID value 8 upwards; and
- if the AAL type 2 node does not own the AAL type 2 path that carries the new connection, it allocates CID values from CID value 255 downwards.

Each AAL type 2 connection request (regardless of coming directly from an AAL type 2 served user or from an adjacent AAL type 2 node) shall contain an AAL type 2 service endpoint address which indicates the destination of the intended AAL type 2 connection instance. This information is used to route the AAL type 2 connection via the AAL type 2 network to its destination service endpoint. In capability set 3, the supported address formats are: NSAP and E.164.

It is up to the application area or the operator of a particular network to decide what addressing plan is used in the AAL type 2 network. The addressing plan in the AAL type 2 network can be a reuse of the addressing plan in the underlying ATM network but it can also be an independent addressing plan defined exclusively for the AAL type 2 network.

NOTE\_1 – Causes in the procedures defined in clause 8 specify which ITU-T standardized code should be used in cause parameters of AAL type 2 signalling protocol messages. Implementation dependent non-standardized causes may be used for AAL type 2 signalling entity internal processing and for A2SU-SAP and LM-SAP cause primitive parameters.

The following procedures may be supported as a network option:

- a) Connection priority;
- b) Automatic congestion control (see ITU-T Rec. Q.542 [18]);
- c) Hop Counter Procedure;
- d) Temporary Alternative Routing Procedure (see ITU-T Rec. E.412 [17]);
- e) International Emergency Preference Scheme.

NOTE 2 – Restrictive network management controls are not applied to IEPS connections.

## **8) Clause 8.2.1.1.1.1**

*Revise clause 8.2.1.1.1.1 as follows:*

### **8.2.1.1.1.1 Actions at the originating AAL type 2 service endpoint**

When the nodal function receives an ESTABLISH.request primitive from the AAL type 2 served user, the following parameters are mandatory:

- Destination Endpoint Address; and
- Transfer Capability.

When the nodal function receives an ESTABLISH.request primitive from the AAL type 2 served user, the restrictions on the optionality of the parameters used only for interworking with CS-1 or CS-2 nodes is described in Annex C. These optional parameters are the following:

- The Preferred Transfer Capability;
- Transfer Capability Support;
- Link Characteristics;
- Preferred Link Characteristics;
- Modify Support for Link Characteristics;
- Preferred Service Specific Information;
- Modify Support for Service Specific Information;
- Service Specific Information (Audio); and
- Service Specific Information (Multirate).

When the nodal function receives an ESTABLISH.request primitive from the AAL type 2 served user, only one of the following parameters may be present:

- Connection Priority; and
- IEPS Indicator.

When the nodal function receives an ESTABLISH.request primitive from the AAL type 2 served user, only one of the following parameters may be present:

- Hop Counter; and
- IEPS Indicator.

When the nodal function receives an ESTABLISH.request primitive from the AAL type 2 served user, only one of the following parameters may be present:

- TAR Controlled Connection; and
- IEPS Indicator.

No optionality restrictions apply to the other parameters.

The nodal function analyses the routing information and selects a route with sufficient AAL type 2 path resources on a path with the requested path type (or network default if the path type is not specified) to the succeeding AAL type 2 node. It then selects an AAL type 2 path from within that route which is able to accommodate the new connection.

NOTE 1 – Routing typically is based on:

- Addressing information;
- The Test Connection Indicator;
- Transfer Capability;
- Requested Path Type;
- Automatic congestion control and the congestion level in the routing tables (not applicable to IEPS connections); and
- Temporary Alternative Routing control (see ITU-T Rec. E.412 [17]) (not applicable to IEPS connections).

When the nodal functions selects a route, the connection priority or IEPS Indicator information, if received from the AAL Type 2 served user is used to select a route that has sufficient AAL type 2 path resources to the succeeding AAL type 2 node.

Under the normal condition, when the network is not congested and the AAL Type 2 service endpoint has the necessary resources to complete it, the connection establishment is processed without special treatments.

NOTE 2 – In times of network congestion, when the AAL Type 2 service endpoint does not have sufficient resources to complete all of the incoming connection establishment requests, as one option, the AAL Type 2 service endpoint may give preferential treatments based on the connection priority level or IEPS Indicator.

NOTE 3 – The preferential treatment should include access to reserved network resources, e.g.:

- the highest priority connections, e.g., IEPS connection establishment, are given access to available network resources including the resources reserved for highest priority connections;
- the second highest priority connections are given access to available network resources including the resources reserved for the second highest priority connections, except for the resources reserved for the highest priority connections, and so on.

NOTE 4 – Allocation of reserved network resources to specific priority levels is implementation specific, and is not a subject for standardization.

AAL type 2 service endpoint internal resources are allocated for the new connection from the originating AAL type 2 served user to the outgoing AAL type 2 path. The connection priority or the IEPS Indicator information, if received, is taken into consideration when allocating these resources.

On the selected outgoing AAL type 2 path, the CID and other resources (e.g., indicated by the Transfer Capability parameter) are allocated for the outgoing AAL type 2 link. The handling of interworking with CS-1 and CS-2 nodes is specified in Annex C.

The following parameters – if they were conveyed by the originating AAL type 2 served user – shall not be modified by the nodal function:

- the Destination Service Endpoint Address;
- the Origination Service Endpoint Address;
- the Served User Generated Reference;
- the Served User Transport;
- the Transfer Capability;
- the Preferred Transfer Capability;
- the Transfer Capability Support;
- the Link Characteristics;
- the Preferred Link Characteristics;
- the Modify Support for Link Characteristics;
- the SSCS Information;
- the Preferred SSCS Information;
- the Modify Support for SSCS Information;
- the Path Type;
- the IEPS Indicator;
- the Connection Priority; and
- the Test Connection Indicator.

The following parameters – if they were conveyed by the originating AAL type 2 served user – have significance to the served user only; therefore, they shall not be examined by the nodal function:

- the Origination Service Endpoint Address;
- the Served User Generated Reference;

- the Served User Transport;
- the SSCS Information;
- the Preferred SSCS Information; and
- the Modify Support for SSCS Information.

An outgoing protocol entity instance is invoked and the following parameters are passed to it:

- the Destination AAL type 2 Service Endpoint Address;
- the Transfer Capability;
- the AAL type 2 Path Identifier; and
- a CID value.

The nodal function shall pass the following parameters to the outgoing protocol entity instance only if they were conveyed by the originating AAL type 2 served user:

- the Origination AAL type 2 Service Endpoint Address;
- the Served User Generated Reference;
- the Served User Transport;
- the Preferred Transfer Capability;
- the Transfer Capability Support;
- the Link Characteristics;
- the Preferred Link Characteristics;
- the Modify Support for Link Characteristics;
- the SSCS Information;
- the Preferred SSCS Information;
- the Modify Support for SSCS Information;
- the Path Type;
- the IEPS Indicator;
- the Connection Priority; and
- the Test Connection Indicator.

If the Temporary Alternative Routing control is applied a "TAR controlled connection" indication shall be passed to the outgoing protocol entity instance (not applicable to IEPS connections).

If the hop counter procedure has been activated a Hop Counter containing an initial count value shall be passed to the outgoing protocol entity instance (not applicable to IEPS connections). The initial count value of the Hop Counter shall be provisioned by the network operator on a per AAL type 2 node basis (31 maximum).

NOTE 5 – Through-connection at AAL type 2 service endpoints is not specified by this Recommendation. It may be controlled by the AAL type 2 served user.

After receiving an indication of the successful AAL type 2 connection setup from the outgoing protocol entity instance, an ESTABLISH.confirm primitive is sent to the AAL type 2 served user. If a Transfer Capability Support parameter, a Modify Support for Link Characteristics, or a Modify Support for SSCS Information parameter was received from the outgoing protocol instance, the respective parameter shall be included in the ESTABLISH.confirm primitive.

## 9) Clause 8.2.1.1.1.2

Revise clause 8.2.1.1.1.2 as follows:

### 8.2.1.1.1.2 Actions at the destination AAL type 2 service endpoint

Upon receiving an indication from an incoming protocol entity instance requesting a new connection, the nodal function checks the availability of the CID value and other resources (e.g., indicated by the Transfer Capability parameter), in the incoming AAL type 2 path.

NOTE 1 – In case of interworking, the Transfer Capability and the Preferred Transfer Capability may be generated by the AAL type 2 service endpoint (see Annex C).

The following parameters – if they were conveyed by the incoming protocol entity instance – shall not be modified by the nodal function:

- the Destination Service Endpoint Address;
- the Origination Service Endpoint Address;
- the Served User Generated Reference;
- the Served User Transport;
- the Transfer Capability;
- the Preferred Transfer Capability;
- the Transfer Capability Support;
- the Link Characteristics;
- the Preferred Link Characteristics;
- the Modify Support for Link Characteristics;
- the SSCS Information;
- the Preferred SSCS Information;
- the Modify Support for SSCS Information;
- the Path Type;
- the IEPS Indicator;
- the Connection Priority; and
- the Test Connection Indicator.

The following parameters – if they were conveyed by the incoming protocol entity instance – have significance to the served user only; therefore, they shall not be examined by the nodal function:

- the Origination Service Endpoint Address;
- the Served User Generated Reference;
- the Served User Transport;
- the SSCS Information;
- the Preferred SSCS Information; and
- the Modify Support for SSCS Information.

If the Test Connection Indicator parameter is present, a "locally blocked" or "remotely blocked" AAL type 2 path shall be acceptable for the incoming connection.

If the CID and the other resources are available for the new connection, they are allocated to the new connection and then the AAL type 2 service endpoint address is examined. The nodal function determines that the destination AAL type 2 service endpoint has been reached.

When the nodal function checks the availability of resources in the incoming AAL type 2 path, the Connection Priority or IEPS Indicator information, if received, is taken into consideration.

Under the normal condition, when the network is not congested and the AAL Type 2 service endpoint has the necessary resources to complete it, the connection establishment is processed without special treatments (see Notes in 8.2.1.1.1.1).

If a Temporary Alternative Routing (TAR) control parameter or a Hop Counter parameter is received, they shall be ignored.

AAL type 2 service endpoint internal resources are allocated for the new connection from the incoming AAL type 2 path to the destination AAL type 2 served user. The Connection Priority or IEPS Indicator information, if received, is taken into consideration when allocating these resources.

The nodal function acknowledges the successful AAL type 2 connection establishment towards the incoming protocol entity instance. The nodal function shall pass the following parameters to the incoming protocol entity instance only if they were conveyed by the incoming protocol entity instance:

- the Transfer Capability Support;
- the Modify Support for Link Characteristics; and
- the Modify Support for SSCS Information.

An ESTABLISH.indication primitive is sent to the AAL type 2 served user to inform it of the successfully established new connection. The nodal function shall pass the following parameters to the destination AAL type 2 served user only if they were conveyed by the incoming protocol entity instance:

- the Origination AAL type 2 Service Endpoint Address;
- the Served User Generated Reference;
- the Served User Transport;
- the Transfer Capability;
- the Preferred Transfer Capability;
- the Transfer Capability Support;
- the Link Characteristics;
- the Preferred Link Characteristics;
- the Modify Support for Link Characteristics;
- the SSCS Information;
- the Preferred SSCS Information;
- the Modify Support for SSCS Information;
- the Path Type;
- the IEPS Indicator;
- the Connection Priority; and
- the Test Connection Indicator.

NOTE 2 – Through-connection at AAL type 2 service endpoints is not specified by this Recommendation. It may be controlled by the AAL type 2 served user.

## 10) Clause 8.2.1.1.2.1

Revise clause 8.2.1.1.2.1 as follows:

### 8.2.1.1.2.1 Actions at the originating AAL type 2 service endpoint

If the AAL type 2 path selection or the allocation of a CID and other resources for the outgoing AAL type 2 link described in 8.2.1.1.1.1 fails, a RELEASE.confirm primitive is returned to the AAL type 2 served user with one of the following causes:

- "Unallocated (unassigned) number";
- "No route to destination";
- "No circuit/channel available";
- "Resource unavailable, unspecified";
- "Network out of order"; or
- "Temporary failure".

NOTE – Path selection failure may be due to the unavailability of an AAL type 2 path with the requested path type.

If AAL type 2 service endpoint internal resources are not available for the new connection, a RELEASE.confirm primitive is sent to the AAL type 2 served user with the cause "Switching equipment congestion".

If the AAL Type 2 service endpoint cannot complete a high priority or IEPS connection establishment request even after application of the preferential treatment, a RELEASE.confirm primitive is sent to the AAL type 2 served user with the cause "Resource unavailable, unspecified".

Upon receiving a negative acknowledgement for the connection setup request from the outgoing protocol entity instance, all the resources associated with this AAL type 2 link are released and made available for new traffic. The association to the outgoing protocol entity instance is released.

Features that enable a further connection attempt, involving the selection of a different AAL type 2 path within the same route or of an alternative route, may be implemented. Such reattempts may use the CEID parameter returned in the Release Confirm (RLC) message and may select a different AAL type 2 path within the same route only. If the CEID parameter specifies an AAL Type 2 path with insufficient resources available for the connection attempt, no connection attempt is made on that path.

If no further connection attempt is made, the AAL type 2 service endpoint internal resources are released and a RELEASE.confirm primitive is sent to the AAL type 2 served user with the cause received from the outgoing protocol entity instance.

When an indication is received from the outgoing protocol entity that the establishment request has been rejected, and there has been a change in the level of congestion of the adjacent node, the routing tables in the nodal function shall be updated accordingly. The absence of an Automatic Congestion Control parameter indicates that there is no reported congestion in the adjacent node, whilst if the Automatic Congestion Control parameter is present it indicates whether congestion level 1 or 2 has been exceeded. After the routing tables have been updated, the Automatic Congestion Control parameter is discarded.

Upon receiving an indication from the outgoing protocol entity instance that a timer has expired, the association to the outgoing protocol entity instance is released and a reset procedure is started (see 8.2.1.2.1.1 case 3 a)). The AAL type 2 service endpoint internal resources are released. A RELEASE.confirm primitive is sent to the AAL type 2 served user with the cause received from the outgoing protocol entity instance, i.e., "Recovery on timer expiry".

## 11) Clause 8.2.1.1.2.2

Revise clause 8.2.1.1.2.2 as follows:

### 8.2.1.1.2.2 Actions at the destination AAL type 2 service endpoint

If resources on the incoming AAL type 2 path are not available, the nodal function requests the incoming protocol entity instance to reject the AAL type 2 connection with one of the following causes as applicable:

- "Resource unavailable, unspecified"; or
- "Requested circuit/channel not available".

If the nodal function detects that the destination is not reachable it may issue a redirection request by rejecting the AAL type 2 connection with the cause "No route to destination" and include an alternative AAL type 2 path identifier in a Connection Element Identifier parameter.

If the nodal function is aware that the SSCS parameters are not supported, it requests the incoming protocol entity instance to reject the AAL type 2 connection with the cause "AAL parameters cannot be supported".

The association between the nodal function entity and its incoming protocol entity instance is released.

If an AAL type 2 path is "locally blocked" and an indication from an incoming protocol entity instance of the request for a new connection other than a test connection is received, the following actions are taken:

- 1) The indication of the request for a new connection establishment is ignored and the incoming protocol entity instance is instructed to terminate and enter state "Idle"; the association with the incoming protocol entity instance is released and an ERROR.indication primitive with the CEID and the cause "Temporary failure" is sent to layer management.
- 2) The blocking procedure specified in 8.2.1.2.2.1 case b) is initiated for the AAL type 2 path on which the new connection was requested to be established.

If an AAL type 2 path is "remotely blocked" and an indication from an incoming protocol entity instance of the request for a new connection other than a test connection is received, the following actions are taken:

- 1) The AAL type 2 path is set to "remotely unblocked".  
NOTE – This procedure shall not be considered as the normal way to remove the "remotely blocked" condition.
- 2) The incoming connection establishment request is processed normally, i.e., as if the AAL type 2 path was not "remotely blocked" to begin with.

If AAL type 2 service endpoint internal resources are not available for the new connection, a negative acknowledgement for the connection setup request shall be returned to the incoming protocol entity instance with the cause "Switching equipment congestion". The resources allocated to the incoming AAL type 2 path are released and the association between the incoming protocol entity instance and the nodal function is released.

If the AAL Type 2 service endpoint cannot complete a high priority or IEPS connection establishment request even after application of the preferential treatment, a negative acknowledgement for the connection setup request shall be returned to the incoming protocol entity instance with the cause "Resource unavailable, unspecified". The resources allocated to the incoming AAL type 2 path are released and the association between the incoming protocol entity instance and the nodal function is released.

Upon receiving an indication from an incoming protocol entity instance requesting a new connection and the connection request is to be rejected, the nodal function checks the level of congestion of the node. If either of the two congestion thresholds is exceeded, an Automatic Congestion Control parameter is passed to the protocol entity with the rejection indication. This parameter indicates the level of congestion (congestion level 1 or 2) to the adjacent AAL Type 2 node.

## 12) Clause 8.2.2.1.1

*Revise clause 8.2.2.1.1 as follows:*

### 8.2.2.1.1 Successful connection set up

Upon receiving notification from an incoming protocol entity instance requesting a new connection, the nodal function checks the availability of the CID value and other resources (e.g., indicated by Transfer Capability parameter), in the incoming AAL type 2 path.

NOTE 1 – In case of interworking, the Transfer Capability and the Preferred Transfer Capability may be generated by the AAL type 2 switch (see Annex C).

If the Test Connection Indicator parameter is present, "locally blocked" or "remotely blocked" AAL type 2 paths shall be acceptable for the incoming connection.

If the CID and the other resources are available for the incoming AAL type 2 link, the resources are allocated to the new connection.

If the Hop Counter is received, and the hop counter procedure is activated, the nodal functions shall decrement the Hop Counter value by 1. If the result is greater than 0, the nodal function shall pass the updated Hop Counter to the outgoing protocol entity instance when it is invoked. If the Hop Counter is received, and the hop counter procedure is not activated, the nodal functions shall pass the Hop Counter unmodified to the outgoing protocol entity instance when it is invoked (not applicable to IEPS connections).

NOTE 2 – If the result is 0, see 8.2.2.1.2.

The AAL type 2 service endpoint address is then examined. The nodal function determines that the AAL type 2 connection needs to be routed further to reach the destination AAL type 2 service endpoint and analyses the routing information. It selects a route with sufficient AAL type 2 path resources on a path with the requested path type (or network default if the path type is not specified) to the next AAL type 2 node. It then selects an AAL type 2 path from within the route which is able to accommodate the new connection.

NOTE 3 – Routing typically is based on:

- Addressing information;
- Transfer Capability;
- Test Connection Indicator;
- Requested Path Type;
- Automatic congestion control and the congestion level in the routing tables (not applicable to IEPS connections); and
- Temporary Alternative Routing (TAR) control (see ITU-T Rec. E.412 [17]) (not applicable to IEPS connections).

When the nodal functions selects a route, the Connection Priority or IEPS Indicator information, if received from the incoming protocol entity instance is used to select a route that has sufficient AAL type 2 path resources to the succeeding AAL type 2 node.

If the "TAR controlled connection" indication is received, the nodal functions shall not apply network management Temporary Alternative Routing (TAR) to the same connection (not applicable to IEPS connections).

If a Hop Counter is not received, and the hop counter procedure is activated, the nodal function shall pass the Hop Counter containing an initial count value to the outgoing protocol entity instance when it is invoked (not applicable to IEPS connections). The initial count value shall be provisioned by the network operator on a per AAL type 2 node basis (31 maximum).

AAL type 2 node internal resources are allocated for the new connection from the incoming AAL type 2 path to the outgoing AAL type 2 path. The Connection Priority or IEPS Indicator information, if received, is taken into consideration when allocating these resources.

Under the normal condition, when the network is not congested and the AAL Type 2 node has the necessary resources to complete it, the connection establishment is processed without special treatments.

NOTE 4 – In times of network congestion, when the AAL Type 2 node does not have sufficient resources to complete all of the incoming connection establishment requests, as one option, the AAL Type 2 node may give preferential treatments based on the connection priority level or the IEPS Indicator.

NOTE 5 – The preferential treatment should include access to reserved network resources, e.g.:

- the highest priority connections, e.g., IEPS connection establishment, are given access to available network resources including the resources reserved for highest priority connections;
- the second highest priority connections are given access to available network resources including the resources reserved for the second highest priority connections, except for the resources reserved for the highest priority connections, and so on.

NOTE 6 – Allocation of reserved network resources to specific priority levels is implementation specific, and is not a subject for standardization.

On the selected outgoing AAL type 2 path, the CID and other resources (e.g., indicated by Transfer Capability, Link Characteristics, or SSCS information) are allocated for the outgoing AAL type 2 link. The handling of Transfer Capability, Link Characteristics, and SSCS information is specified in Annex C.

The following parameters – if they were conveyed by the incoming protocol entity instance – shall not be modified by the nodal function:

- the Destination Service Endpoint Address;
- the Origination Service Endpoint Address;
- the Served User Generated Reference;
- the Served User Transport;
- the Transfer Capability;
- the Preferred Transfer Capability;
- the Transfer Capability Support;
- the Link Characteristics;
- the Preferred Link Characteristics;
- the Modify Support for Link Characteristics;
- the SSCS Information;
- the Preferred SSCS Information;
- the Modify Support for SSCS Information;
- the Path Type;
- the IEPS Indicator;

- the Connection Priority; and
- the Test Connection Indicator.

The following parameters – if they were conveyed by the incoming protocol entity instance – have significance to the served user only; therefore, they shall not be examined by the nodal function:

- the Origination Service Endpoint Address;
- the Served User Generated Reference;
- the Served User Transport;
- the SSCS Information;
- the Preferred SSCS Information; and
- the Modify Support for SSCS Information.

An outgoing protocol entity instance is invoked and the following parameters are passed to it:

- the Destination AAL type 2 Service Endpoint Address;
- the AAL type 2 Path Identifier;
- a CID value; and
- the Transfer Capability.

The nodal function shall pass the following parameters to the outgoing protocol entity instance only if they were conveyed by the incoming protocol entity instance:

- the Origination AAL type 2 Service Endpoint Address;
- the Served User Generated Reference;
- the Served User Transport;
- the Preferred Transfer Capability;
- the Transfer Capability Support;
- the Link Characteristics;
- the Preferred Link Characteristics;
- the Modify Support for Link Characteristics;
- the SSCS Information;
- the Preferred SSCS Information;
- the Modify Support for SSCS Information;
- the Path Type;
- the IEPS Indicator;
- the Connection Priority; and
- the Test Connection Indicator.

A received "TAR controlled connection" indication shall be passed to the invoked outgoing protocol entity instance unchanged; alternatively, if the "TAR controlled connection" indication is not received and the nodal function applies network management Temporary Alternative Routing to the connection, the nodal function shall pass a "TAR controlled connection" parameter to the invoked outgoing protocol entity instance (not applicable to IEPS connections).

If the Hop Counter has been received or generated by the nodal function, it is passed to the invoked outgoing protocol entity instance (not applicable to IEPS connections).

Through-connection in both directions will then be completed.

After receiving an indication of the successful AAL type 2 connection setup from the outgoing protocol entity instance, the incoming protocol entity instance is informed of the successful AAL type 2 connection setup. If one or more of the parameters Transfer Capability Support, Modify Support for Link Characteristics, or Modify Support for SCS Information parameter, was received from the outgoing protocol instance they shall be conveyed to the incoming protocol entity instance.

### 13) Clause 8.2.2.1.2

*Revise clause 8.2.2.1.2 as follows:*

#### **8.2.2.1.2 Unsuccessful/abnormal connection set up**

If resources on the incoming AAL type 2 path are not available, the nodal function requests the incoming protocol entity instance to reject the connection with one of the following causes as applicable:

- "Resource unavailable, unspecified"; or
- "Requested circuit/channel not available".

The association between the nodal function entity and its incoming protocol entity instance is released.

If an AAL type 2 path is "locally blocked" and an indication from an incoming protocol entity instance of the request for a new connection other than a test connection is received, the following actions are taken:

- 1) The indication of the request for a new connection establishment is ignored and the incoming protocol entity instance is instructed to terminate and enter state "Idle"; the association with the incoming protocol entity instance is released and an ERROR.indication primitive with the CEID and the cause "Temporary failure" is sent to layer management.
- 2) The blocking procedure specified in 8.2.1.2.2.1 case b) is initiated for the AAL type 2 path on which the new connection was requested to have been established.

If an AAL type 2 path is "remotely blocked" and an indication from an incoming protocol entity instance of the request for a new connection other than a test connection is received, the following actions are taken:

- 1) The AAL type 2 path is set to "remotely unblocked".  
NOTE 1 – This procedure shall not be considered as the normal way to remove the "remotely blocked" condition.
- 2) The incoming connection establishment request is processed normally, i.e., as if the AAL type 2 path was not "remotely blocked" to begin with.

If the Hop Counter is received, the nodal functions shall decrement the Hop Counter value by 1. If the result equals 0, the nodal function shall request the incoming protocol entity instance to reject the connection with cause value "exchange routing error". The association between the nodal function entity and its incoming protocol entity instance is released and all the resources associated with the incoming AAL type 2 link are released and made available for new traffic.

In all cases where the request from an incoming protocol entity instance to establish a new connection has to be rejected, the nodal function checks the level of congestion of the node. If either of the two congestion thresholds is exceeded, an Automatic Congestion Control parameter is passed to the protocol entity with the rejection indication. This parameter indicates the level of congestion (congestion level 1 or 2) to the adjacent AAL Type 2 node.

If AAL type 2 node internal resources are not available for the new connection, a negative acknowledgement for the connection setup request shall be returned to the incoming protocol entity instance with the cause "Switching equipment congestion". The resources allocated to the incoming AAL type 2 path are released and the association between the incoming protocol entity instance and the nodal function is released.

If the AAL Type 2 node cannot complete a high priority or IEPS connection establishment request even after application of the preferential treatment, a negative acknowledgement for the connection setup request shall be returned to the incoming protocol entity instance with the cause "Resource unavailable, unspecified". The resources allocated to the incoming AAL type 2 path are released and the association between the incoming protocol entity instance and the nodal function is released.

If the AAL type 2 path selection or the allocation of a CID and other resources for the outgoing AAL type 2 link described in 8.2.2.1.1 fails, a negative acknowledgement for the connection setup request shall be returned to the incoming protocol entity instance with one of the following causes:

- "Unallocated (unassigned) number";
- "No route to destination";
- "No circuit/channel available";
- "Resource unavailable, unspecified";
- "Network out of order"; or
- "Temporary failure".

NOTE 2 – Path selection failure may be due to the unavailability of an AAL type 2 path with the requested path type.

The resources allocated to the preceding AAL type 2 path are released and the association between the incoming protocol entity instance and the nodal function is released.

Upon receiving a negative acknowledgement from the outgoing protocol entity instance, all resources associated with the outgoing AAL type 2 link are released and made available for new traffic. The association to the outgoing protocol entity instance is released.

Features that enable a further connection attempt, involving the selection of a different AAL type 2 path within the same route or of an alternative route, may be implemented. Such reattempts may use the CEID parameter returned in the Release Confirm (RLC) message and may select a different AAL type 2 path within the same route only. If the CEID parameter specifies an AAL Type 2 path with insufficient resources available for the connection attempt, no connection attempt is made on that path.

If no further connection attempt is made, the AAL type 2 node internal resources are released, the rejection of the connection establishment is forwarded to the incoming protocol entity instance with the cause received from the outgoing protocol entity instance; a Connection Element Identifier parameter possibly received in the Release Confirm (RLC) message is not forwarded to the incoming protocol entity instance. All the resources associated with the incoming AAL type 2 link are freed. The association to the incoming protocol entity instance is released.

When an indication is received from the outgoing protocol entity that the establishment request has been rejected, and there has been a change in the level of congestion of the adjacent node, the routing tables in the nodal function shall be updated accordingly. The absence of an Automatic Congestion Control parameter indicates that there is no reported congestion in the adjacent node, whilst if the Automatic Congestion Control parameter is present it indicates whether congestion level 1 or 2 has been exceeded. After the routing tables have been updated, the Automatic Congestion Control parameter is discarded.

Upon receiving an indication from the outgoing protocol entity instance that a timer has expired, the association to the outgoing protocol entity instance is released and a reset procedure is started (see 8.2.1.2.1.1 case 3 a)). The AAL type 2 node internal resources are released. The rejection of the connection establishment is forwarded to the incoming protocol entity instance with the cause received from the outgoing protocol entity instance (i.e., "Recovery on timer expiry") and all the resources associated with the incoming AAL type 2 link are released and made available for new traffic. The association to the incoming protocol entity instance is released.

#### **14) Clause B.3**

*Revise clause B.3 as follows:*

#### **B.3 Coding of the compatibility information of the new parameters for CS-1 and CS-2 networks**

To ensure backward compatibility with AAL type 2 nodes conforming only to ITU-T Recs Q.2630.1 [15] or Q.2630.2 [16], the parameter compatibility field of the new parameter shall be set as indicated in Table B.5.

**Table B.5/Q.2630.3 – Coding of the parameter compatibility information**

| Parameter                                                                         | 8                    | 7                                           | 6                                      | 5              | 4                                           | 3                                      | 2 | 1 |
|-----------------------------------------------------------------------------------|----------------------|---------------------------------------------|----------------------------------------|----------------|---------------------------------------------|----------------------------------------|---|---|
|                                                                                   | pass-on not possible |                                             |                                        | general action |                                             |                                        |   |   |
|                                                                                   | res.                 | send notification indicator                 | instruction indicator                  | res.           | send notification indicator                 | instruction indicator                  |   |   |
| Origination AAL type 2 Service Endpoint Address (OA2AE) in ERQ message            | 0                    | 0<br>do not send notification               | 0 1<br>discard parameter               | 0              | 0<br>do not send notification               | 0 0<br>pass on parameter               |   |   |
| <u>IEPS Indicator (II) in ERQ message</u>                                         | <u>0</u>             | <u>0</u><br><u>do not send notification</u> | <u>0 1</u><br><u>discard parameter</u> | <u>0</u>       | <u>0</u><br><u>do not send notification</u> | <u>0 0</u><br><u>pass on parameter</u> |   |   |
| Connection Priority (CP) in ERQ message                                           | 0                    | 0<br>do not send notification               | 0 1<br>discard parameter               | 0              | 0<br>do not send notification               | 0 0<br>pass on parameter               |   |   |
| Congestion Level (CL) in REL or RLC message                                       | 0                    | 0<br>do not send notification               | 0 1<br>discard parameter               | 0              | 0<br>do not send notification               | 0 1<br>discard parameter               |   |   |
| Hop Counter (HC) in ERQ message                                                   | 0                    | 0<br>do not send notification               | 0 1<br>discard parameter               | 0              | 0<br>do not send notification               | 0 0<br>pass on parameter               |   |   |
| TAR Controlled Connection (TCC) in ERQ message                                    | 0                    | 0<br>do not send notification               | 0 1<br>discard parameter               | 0              | 0<br>do not send notification               | 0 0<br>pass on parameter               |   |   |
| Transfer Capability Support (TCS) in ERQ and ECF messages                         | 0                    | 0<br>do not send notification               | 0 1<br>discard parameter               | 0              | 0<br>do not send notification               | 0 1<br>discard parameter               |   |   |
| Fixed Bandwidth Transfer Capability (FBW) in ERQ and MOD messages                 | 0                    | 0<br>do not send notification               | 0 1<br>discard parameter               | 0              | 0<br>do not send notification               | 0 0<br>pass on parameter               |   |   |
| Variable Bandwidth Stringent Transfer Capability (VBWS) in ERQ and MOD messages   | 0                    | 0<br>do not send notification               | 0 1<br>discard parameter               | 0              | 0<br>do not send notification               | 0 0<br>pass on parameter               |   |   |
| Variable Bandwidth Tolerant Transfer Capability (VBWT) in ERQ and MOD messages    | 0                    | 0<br>do not send notification               | 0 1<br>discard parameter               | 0              | 0<br>do not send notification               | 0 0<br>pass on parameter               |   |   |
| Preferred Fixed Bandwidth Transfer Capability (PFBW) in ERQ message               | 0                    | 0<br>do not send notification               | 0 1<br>discard parameter               | 0              | 0<br>do not send notification               | 0 0<br>pass on parameter               |   |   |
| Preferred Variable Bandwidth Stringent Transfer Capability (PVBWS) in ERQ message | 0                    | 0<br>do not send notification               | 0 1<br>discard parameter               | 0              | 0<br>do not send notification               | 0 0<br>pass on parameter               |   |   |
| Preferred Variable Bandwidth Tolerant Transfer Capability (PVBWT) in ERQ message  | 0                    | 0<br>do not send notification               | 0 1<br>discard parameter               | 0              | 0<br>do not send notification               | 0 0<br>pass on parameter               |   |   |



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