



INTERNATIONAL TELECOMMUNICATION UNION

**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**Q.2961.6**

(05/98)

SERIES Q: SWITCHING AND SIGNALLING

Broadband ISDN – B-ISDN application protocols for  
access signalling

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**Digital Subscriber Signalling System No. 2 –  
Additional traffic parameters: Additional  
signalling procedures for the support of the  
SBR2 and SBR3 ATM transfer capabilities**

ITU-T Recommendation Q.2961.6

(Previously CCITT Recommendation)

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## **ITU-T RECOMMENDATION Q.2961.6**

### **DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 2 – ADDITIONAL TRAFFIC PARAMETERS: ADDITIONAL SIGNALLING PROCEDURES FOR THE SUPPORT OF THE SBR2 AND SBR3 ATM TRANSFER CAPABILITIES**

#### **Summary**

This Recommendation defines the operation of the Digital Subscriber Signalling System No. 2 (DSS 2) for the support of the SBR2 and SBR3 ATM transfer capabilities defined in Recommendation I.371 that may be used for basic call and connection control at the  $T_B$  or at the coincident  $S_B$  and  $T_B$  reference point of the user-to-network interface of the Broadband Integrated Services Digital Network (B-ISDN). The additional procedures defined in this Recommendation enable the call requesting user to invoke call/connection establishment between users using a connection for which the Statistical Bit Rate configuration 2 or 3 (SBR2 or SBR3) ATM transfer capability is applied by the network.

#### **Source**

ITU-T Recommendation Q.2961.6 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.

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## Recommendation Q.2961.6

### DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 2 – ADDITIONAL TRAFFIC PARAMETERS: ADDITIONAL SIGNALLING PROCEDURES FOR THE SUPPORT OF THE SBR2 AND SBR3 ATM TRANSFER CAPABILITIES

(Geneva, 1998)

#### 1 Scope

Recommendation Q.2961 covers the support of additional traffic parameters for the Broadband Integrated Services Digital Network (B-ISDN) at the  $T_B$  reference point or coincident  $S_B$  and  $T_B$  reference point as defined in Recommendation I.413 [1] by means of the Digital Subscriber Signalling System No. 2 (DSS 2). This Recommendation defines the DSS 2 protocol procedures, formats and functions needed to support the identified ATM traffic related additional capabilities.

This Recommendation is part of the DSS 2 family of ITU-T Recommendations; it specifies extensions to Recommendations Q.2931 [2] and Q.2961.1 [6], and does not repeat states, information elements, messages and procedures contained therein.

This Recommendation defines more specifically the additional signalling capabilities to support the SBR2 and SBR3 ATM transfer capabilities as defined in Recommendation I.371 [3].

#### 2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. All 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 references listed below. A list of currently valid ITU-T Recommendations is regularly published.

- [1] ITU-T Recommendation I.413 (1993), *B-ISDN user-network interface*.
- [2] ITU-T Recommendation Q.2931 (1995), *Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) layer 3 specification for basic call/connection control*.
- [3] ITU-T Recommendation I.371 (1996), *Traffic control and congestion control in B-ISDN*.
- [4] ITU-T Recommendation Q.2951 (1995), *Stage 3 description for number identification supplementary services using B-ISDN Digital Subscriber Signalling System No. 2 (DSS 2) – Basic call*.
- [5] ITU-T Recommendation Q.2957 (1995), *Stage 3 description for additional information transfer supplementary services using B-ISDN Digital Subscriber Signalling System No. 2 (DSS 2) – Basic call*.
- [6] ITU-T Recommendation Q.2961.1 (1995), *Digital Subscriber Signalling System No. 2 – Additional traffic parameters: Additional signalling capabilities to support traffic parameter for the tagging option and the sustainable call rate parameter set*.
- [7] ITU-T Recommendation Q.2955 (1997), *Stage 3 description for community of interest supplementary services using B-ISDN Digital Subscriber Signalling System No. 2 (DSS 2)*.

- [8] ITU-T Recommendation Q.2961.2 (1997), *Digital Subscriber Signalling System No. 2 – Additional traffic parameters: Support of ATM transfer capability in the broadband bearer capability information element*.
- [9] ITU-T Recommendation I.356 (1996), *B-ISDN ATM layer cell transfer performance*.

### 3 Definitions

The definitions of Annex J/Q.2931 [2] apply. This Recommendation defines the following terms:

**3.1 traffic parameters:** A traffic parameter is a specification of a particular traffic aspect. It may be quantitative or qualitative. Traffic parameters may for example describe peak cell rate, sustainable cell rate, maximum burst size, Tagging option indicators, etc.; see Recommendation I.371 [3].

**3.2 SBR2:** See 5.5.4/I.371 [3].

**3.3 SBR3:** See 5.5.4/I.371 [3].

### 4 Abbreviations

The abbreviations of Annex J/Q.2931 [2] apply. This Recommendation uses the following abbreviations:

ATC	ATM Transfer Capability
MBS	Maximum Burst Size
PCR	Peak Cell Rate
SBR	Statistical Bit Rate ATM transfer capability
SBR2	SBR configuration 2 ATM transfer capability
SBR3	SBR configuration 3 ATM transfer capability
SCR	Sustainable Cell Rate

### 5 Description

This Recommendation specifies the additional signalling procedures beyond the ones already specified by Recommendation Q.2931 [2] and Recommendation Q.2961.1. In particular, the following additional capabilities are specified:

- support of traffic parameters for Statistical Bit Rate configuration 2 ATM transfer capability as defined in Recommendation I.371 [3];
- support of traffic parameters for Statistical Bit Rate configuration 3 ATM transfer capability as defined in Recommendation I.371 [3].

### 6 Operational requirements

#### 6.1 Provision and withdrawal

Additional ATC indications as specified in this Recommendation may be included in signalling messages by the user without any prior arrangement with the service provider.

## **6.2 Requirements at the originating network side**

The procedures according to 6.9 shall apply.

## **6.3 Requirements at the terminating network side**

The procedures according to 6.9 shall apply.

## **7 Primitive and state definitions**

### **7.1 Primitive definitions**

Clause 8/Q.2931 [2] shall apply.

### **7.2 Call states**

See clause 2/Q.2931 [2]. No additional call states are defined.

## **8 Coding requirements**

### **8.1 Messages**

No additional messages are specified beyond the ones of 3.1/Q.2931 [2]. The existing Q.2931 messages that have had their contents modified to support the SBR2 and SBR3 ATM transfer capabilities are described below.

#### **8.1.1 SETUP**

The maximum length of the ATM traffic descriptor information element included in the SETUP message is changed from 20 (in Recommendation Q.2931 [2]) to 28 octets to allow inclusion of the additional traffic descriptor parameters SCR and MBS described in Recommendation Q.2961.1 [6]. The Traffic management options field described in Recommendation Q.2961.1 shall not be included (i.e. the local tagging option as described in Recommendation Q.2961.1 cannot be combined with a request for SBR2 or SBR3 ATC as specified in Recommendation I.371 [3]).

### **8.2 Information elements**

See clause 4/Q.2931 [2].

#### **8.2.1 ATM traffic descriptor information element**

The coding of the ATM traffic descriptor information element is specified in Recommendation Q.2961.1 [6]. For Recommendation Q.2961.1, the Local Tagging subfield in the Traffic Management Options field specified in Recommendation Q.2961.1 (i.e. in octet group 17) shall not be included.

#### **8.2.2 Broadband bearer capability information element**

The Broadband bearer capability information element is specified in Recommendation Q.2961.2 [8] and is used to explicitly identify the ATM transfer capability as indicated below.

The following codepoints are added to the BTC field of the Broadband bearer capability information element to indicate SBR2 or SBR3. Accordingly, the following is added to the part of Table 1/Q.2961.2 entitled "Values used on transmission and reception":

– Broadband Transfer Capability (octet 5a)

Bits

7 6 5 4 3 2 1

0 0 1 0 1 0 0    SBR2

0 0 1 0 1 0 1    SBR3

## 9 Signalling procedures at the coincident $S_B$ and $T_B$ reference point

The procedures for basic call/connection control as defined in clause 5/Q.2931 [2] shall apply. Procedures to handle the additional traffic parameters (SCR and MBS) that may be present in the ATM traffic descriptor information element are defined in 1.9/Q.2961.1 [6].

In the following subclauses only additional procedures to handle call/connections based on the SBR2 or SBR3 ATM transfer capability are described. These procedures shall only apply when the SETUP message contains a Broadband bearer capability information element indicating SBR2 respectively SBR3 according to the guidelines in Annex A.

1.9.1/Q.2961.1 [6] applies with the restriction that:

- procedures for the support of local tagging do not apply; and
- the combination of traffic parameters shall be the same for both directions, as described in Annex A.

For the support of SBR2 and SBR3, 1.9.2/Q.2961.1 [6] shall be replaced by 9.1 and 9.2 below.

Valid combinations of bearer class, broadband transfer capability, and ATM traffic descriptor parameters for the support the SBR2 and SBR3 ATM transfer capability are included in Annex A.

Additional clarification on the support of SBR2 and SBR3 ATM transfer capabilities by the signalling procedures described in this Recommendation are included in Annex B.

### 9.1 Procedures applicable at the originating interface

The procedures described in 5.1.1/Q.2931 [2] as modified by 1.9/Q.2961.1 [6] shall apply with the following additional procedures.

The calling party requests SBR2 respectively SBR3 call/connection establishment by sending a SETUP message containing a Broadband bearer capability information element which indicates SBR2 respectively SBR3 in the Broadband transfer capability field.

Additionally, the following rules apply:

- the calling user shall include the forward and backward PCR (CLP = 0 + 1) parameter value in the ATM traffic descriptor information element;
- the calling user shall include the forward and backward SCR/MBS (CLP = 0) parameter value in the ATM traffic descriptor information element;
- the Traffic Management Options field shall not be present in the ATM traffic descriptor information element (i.e. local tagging using the Tf subfield and the Tb subfield of the ATM traffic descriptor information element shall not be requested).

### **9.1.1 Traffic parameter selection procedures**

If the network is able to provide the requested SBR ATC, the network shall progress the call to the called user.

If the network is not able to provide the requested SBR ATC, the network shall reject the call, returning a RELEASE COMPLETE message with cause # 65 "*Bearer capability not implemented*".

### **9.2 Procedures applicable at the destination interface**

The procedures described in 5.2/Q.2931 [2] apply, modified by the following additional procedures.

The network shall send a SETUP message containing a Broadband bearer capability information element indicating either SBR2 or SBR3 as received from the calling user.

When the called user receives a SETUP message and the called user can handle the requested SBR ATC, the called user shall proceed with the call/connection establishment in accordance with 5.2/Q.2931 [2].

An incompatible user shall respond by sending a RELEASE COMPLETE message with a cause value as specified in Annex B/Q.2931 [2]. The network shall process this message in accordance with 5.2.5.3/Q.2931 [2].

### **9.3 Handling of specific error conditions**

When the SETUP message is received with an ATM traffic descriptor information element which contains a combination of traffic parameters that is not allowed when SBR2 or SBR3 is requested (see 6.8.2.1, 6.9.1 and 6.9.2), the ATM traffic descriptor information element shall be treated as a mandatory information element received with content error (see 5.6.7.2/Q.2931 [2]).

## **10 Signalling procedures at the T<sub>B</sub> reference point for interworking with private B-ISDNs**

The procedures of 6.9 shall apply.

## **11 Interworking with other networks**

### **11.1 Interaction with entities which do not support SBR2 and SBR3**

If an entity which does not support the capabilities described in this Recommendation receives a Broadband bearer capability information element identifying the SBR2 or the SBR3 ATC in a SETUP message, it shall follow the procedures described in 5.6, 5.7 and 5.8/Q.2931 [2].

### **11.2 Interworking with N-ISDN**

It is not possible to interwork these capabilities with an N-ISDN entity. The request is rejected by the interworking function.

## **12 Interactions with supplementary services**

The support of the capabilities covered by this Recommendation have no impact on the support of CLIP, CLIR, COLP, COLR, DDI, SUB, UUS, MSN, and CUG supplementary services as specified in Recommendations Q.2951 [4], Q.2957 [5], and Q.2955 [7].

### 13 Parameter and timer values

See clause 7/Q.2931 [2]. No additional parameters are defined.

### 14 Dynamic description (SDLs)

See Annex A/Q.2931 [2]. No additional SDLs are defined.

## ANNEX A

### Valid combinations of bearer class, broadband transfer capability, and ATM traffic descriptor parameters for the support of the SBR2 and SBR3 ATM transfer capability

Recommendation Q.2961.2 [8] defines valid combinations of ATM traffic related parameters. The table in this annex contains the necessary additions to Table A.1/Q.2961.2 within Annex A of Recommendation Q.2961.2 [8] to allow a user to explicitly request SBR2 and SBR3 ATM transfer capabilities based on the signalling capabilities and procedures described in this Recommendation.

**Addition to Table A.1/Q.2961.2**

<i>Broadband bearer capability</i>				
Bearer class	C	X or FR	C	X or FR
Broadband transfer capability (value)	20	20	21	21
<i>Traffic descriptor for a given direction</i>				
PCR (CLP = 0)				
PCR (CLP = 0 + 1)	S	S	S	S
{SCR, MBS} (CLP = 0)	S	S	S	S
{SCR, MBS} (CLP = 0 + 1)				
Tagging	Note	Note	Note	Note
End-to-End Timing required	N	N	N	N
<i>Requested ATC</i>	SBR2	SBR2	SBR3	SBR3
<i>Implicitly requested QoS when the QoS Class is 0</i>	Class 3	Class 3	Class 3	Class 3
<i>I.371 [3] ATC that supports the requested ATC</i>	SBR2	SBR2	SBR3	SBR3
<i>I.356 [9] defined QoS Class that supports the requested QoS</i>	Class 3	Class 3	Class 3	Class 3

NOTE – The Local Tagging subfield in the Traffic Management Options field shall not be included in the ATM traffic descriptor information element when SBR2 or SBR3 ATM transfer capability is requested.

## ANNEX B

### **Clarification on the support of SBR2 and SBR3 ATM transfer capabilities by this Recommendation**

The signalling capabilities and procedures described in this Recommendation, support SBR2 and SBR3 ATC according to the following criteria:

- 1) SBR2 or SBR3 is supported if and only if it is supported at all standardised interfaces along the complete connection path;
- 2) for any ATC, the ATC in forward direction equals the ATC in backward direction, so, either both directions support SBR2 or both directions support SBR3;
- 3) the calling user determines which ATC (whether SBR2 or SBR3 or another ATC) is requested and will be used for the connection after acceptance by the network and the called user;
- 4) the called user is not allowed to modify the requested ATC (e.g. a request for SBR3 cannot be modified into SBR2); in case of incompatibility or disagreement with the requested ATC included in the call or connection establishment request, the called party shall reject the establishment request;
- 5) the network cannot alter the ATC requested by the calling user (e.g. a request for SBR3 cannot be altered into SBR2) in case the network cannot support the requested ATC, but the network will reject the establishment of the call or connection.

In Recommendation Q.2961.1 [6] the capability to support *local tagging* is defined to be only performed by the UPC function. According to Recommendation Q.2961.1, this may result in local tagging not being applied at all or being applied in one, or both directions of a connection. Furthermore, local tagging for the forward direction is partly under control of the calling user and the request may be altered by the network. Local tagging for the backward direction is not under control of the calling user and will be determined by the network and the called user.



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