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SERIES Q: SWITCHING AND SIGNALLING

Supplement to the Q.2900-series Recommendations: Broadband integrated services digital network (B-ISDN) – Digital subscriber signalling system No. 2 (DSS2) – User-network interface layer 3 – Overview of B-ISDN DSS2 signalling capabilities

ITU-T Q-series Recommendations – Supplement 25

(Formerly CCITT Recommendations)

ITU-T Q-SERIES RECOMMENDATIONS

SWITCHING AND SIGNALLING

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

Supplement 25 to ITU-T Q-series Recommendations

**Supplement to the Q.2900-series Recommendations: Broadband integrated
services digital network (B-ISDN) – Digital subscriber signalling
system No. 2 (DSS2) – User-network interface
layer 3 – Overview of B-ISDN DSS2
signalling capabilities**

Summary

This Supplement provides an introduction to the capabilities included in the access signalling protocols for the Broadband Integrated Services Digital Network. Included is an overview of the capabilities supported, an introduction to, and index of, Recommendations which provide the detailed protocol descriptions.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

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services digital network (B-ISDN) – Digital subscriber signalling
system No. 2 (DSS2) – User-network interface
layer 3 – Overview of B-ISDN DSS2
signalling capabilities**

1   Scope

This Supplement contains an overview and scope of the signalling capabilities contained in Recommendations for the B-ISDN User-Network Interface. Details of those capabilities are provided within the specific Recommendations summarized within clause 5.

2   References

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

[1]   ITU-T Recommendation I.356 (2000), *B-ISDN ATM layer cell transfer performance*.

[2]   ITU-T Recommendation I.371 (2000), *Traffic control and congestion control in B-ISDN*.

[3]   ITU-T Recommendation X.219 (1988), *Remote operations*: *Model, notation and service definition*.

[4]   ITU-T Q-series Recommendations – Supplement 7 (1999), *Technical Report TRQ.2001*: *General aspects for the development of unified signalling requirements*.

3   Abbreviations

This Supplement uses the following abbreviations:

ABR   Available Bit Rate

ABT   ATM Block Transfer

AESA   ATM End System Address

ATM   Asynchronous Transfer Mode

ATS   Abstract Test Suite

BC   Bearer Control (Connection Control)

BCOB   Broadband Connection-Oriented Bearer

B-ISDN   Broadband Integrated Services Digital Network

CC   Call Control

CDVT   Cell Delay Variation Tolerance

CLIP   Calling Line Identification Presentation

CLIR   Calling Line Identification Restriction

CLP	Cell Loss Priority
COLP	Connected Line Identification Presentation
COLR	Connected Line Identification Restriction
CUG	Closed User Group
DDI	Direct-Dialling In
DLCI	Data Link Connection Identifier
DSS2	Digital Subscriber Signalling System No. 2
FR	Frame Relay
IP	Internet Protocol
ISDN	Integrated Services Digital Network
MBS	Maximum Burst Size
MCR	Minimum Cell Rate
MPOA	Multiprotocol encapsulation Over ATM
MSN	Multiple Subscriber Number
N-BC	Narrowband Bearer Capability
NNI	Network Node Interface
PCR	Peak Cell Rate
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
QoS	Quality of Service
RM	Resource Management
ROSE	Remote Operations Service Element
SBR	Statistical Bit Rate
SCR	Sustainable Cell Rate
SSCS	Service Specific Convergence Sublayer
SUB	Sub-addressing
TP	Test Purpose
TSS	Test Suite Structure
UNI	User Network Interface
UUS	User-to-User Signalling
VPN	Virtual Private Network

4   Description

This Supplement provides an overview of the DSS2 signalling capabilities and related testing recommendations, as follows:

1)   basic call/connection control;

2)   additional traffic parameters;

3)   connection characteristics negotiation;

4)   connection characteristics modification;

5)   network look ahead;

6)   point-to-multipoint connection control;

7)   generic functional protocol (allowing the support of supplementary services and other features);

8)   frame relay support;

9)   call priority;

10)   generic identifier transport (the transport through the network of identifiers used by various distributed applications);

11)   switched virtual path;

12)   signalling support for quality of service;

13)   multiconnection call support:

   •   separated call control;

   •   eparated bearer control;

   •   onnection pre-negotiation;

14)   signalling for supplementary services;

15)   testing.

5   Recommendations for DSS2 signalling capabilities

5.1   Scope of each capability

This clause clarifies the scope of the capabilities.

5.1.1   Basic call/connection control

Recommendation Q.2931 specifies the procedures for the establishing, maintaining and clearing of network connections at the B-ISDN user network interface. The procedures are defined in terms of messages exchanged and specifies the layer 3 call/connection states, messages, information elements, timers and procedures used for the control of B-ISDN point-to-point on-demand calls on virtual channels.

Recommendation Q.2931, and its amendments 1 to 4, is intended to specify the essential features, procedures and messages required for call/connection control. However, there are some details of procedure which are not specified, and other Recommendations use additional messages, additional operations (using Facility information element), additional information elements and/or modification of existing information elements to support additional capabilities in DSS2.

5.1.2   Additional Traffic Parameters

The release 1 basic call/connection control (see Recommendation Q.2931) enables the signalling of connection control with resource/bandwidth allocation based on peak cell rate PCR.

Additional capabilities are defined in Recommendation Q.2961 to enable connection control and resource/bandwidth allocation to support communication between users using a Broadband Connection-Oriented Bearer Service (BCOB). The capabilities are defined in parts of Recommendation Q.2961, which is a multipart Recommendation, supporting a set of traffic control and congestion control as defined in Recommendation I.371 [2].

Part 1 covers only the additional parameters required for the support of the tagging option and the support of Sustainable Cell Rate (SCR) parameter set.

Part 2 specifies the revised coding of the Q.2931 Broadband bearer capability information element specifically to enable the identification of the ATM transfer capability.

Part 3 defines the additional traffic parameters required for the support of the Available Bit Rate (ABR) ATM transfer capability. Available Bit Rate ABR refers to an ATM transfer capability where the limiting ATM layer transfer characteristics provided by the network may change subsequent to connection establishment. It is expected that a user which adapts its traffic to the changing ATM layer transfer characteristics will experience a low cell loss ratio. This Recommendation includes the use of the DSS2 signalling procedures for the negotiation of Minimum Cell Rate (MCR) during call establishment. ABR precludes use of DSS2 signalling procedures for the modification of traffic parameters during the active phase of the call.

Part 4 defines the additional traffic parameters required for the support of the ATM Block Transfer (ABT) ATM transfer capability. Part 4 includes the use of the DSS2 signalling procedures for the negotiation of Peak Cell Rate (PCR), Sustainable Cell Rate (SCR), Maximum Burst Size (MBS) and Resource Management (RM) peak cell rate traffic parameters during call establishment. ABT precludes use of the DSS2 signalling procedures for the modification of traffic parameters during the active phase of the call.

Part 5 defines the signalling capabilities to support the Cell Delay Variation Tolerance (CDVT) indications at call/connection establishment time for Peak Cell Rate with CLP = 0 + 1, for the Sustainable Cell Rate with CLP = 0 + 1, for the Sustainable Cell Rate with CLP = 0 and for the Resource Management peak cell rate, consistently with the traffic management features and requirements.

Part 6 defines the ATM transfer capabilities to 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.

5.1.3   Connection characteristics negotiation during call set-up

Recommendation Q.2962 specifies the signalling protocol to negotiate the cell rate traffic parameters that are specified in Recommendations Q.2931 and Q.2961 for basic call/connection control. The capability described in Recommendation Q.2962 is also applicable for negotiating the connection characteristics for the first party of a point-to-multipoint call/connections as specified in Recommendation Q.2971. The capabilities in Q.2962 are only applicable during the call/connection establishment phase.

Both the use of an alternative ATM traffic descriptor information element and a minimum acceptable ATM traffic descriptor information element are used to allow negotiation of any relevant traffic parameters (i.e. peak cell rate, sustainable cell rate and maximum burst size parameters, depending on the ATM transfer capability actually used for the connection).

5.1.4 Connection characteristics modification

Recommendation Q.2963 is a multipart Recommendation that enables the modification of the characteristics of an established connection.

Part 1 specifies the signalling protocol for modification of the peak cell rate under the control of the user (currently the connection owner, who is the user who initiated the call/connection establishment). It is the initial Recommendation in a family of Recommendations that concern the modification of ATM traffic parameter. Peak cell rate modification is applicable to all connection oriented telecommunication services that are based on single point-to-point calls/connections. The peak cell rate modification for point-to-multipoint calls/connections is outside the scope of Recommendation Q.2963.1.

Part 2 extends the Peak Cell Rate (PCR) parameters modification capability specified in Recommendation Q.2963.1 to include the modification of the Sustainable Cell Rate (SCR) and the Maximum Burst Size (MBS) parameters.

Part 3 combines Recommendation Q.2963.2 and Q.2962 to enable the connection owner to modify the ATM Traffic Descriptor with negotiation for call/connections that have already been established. Recommendation Q.2963.3 specifies the procedure for modification with negotiation of PCR, SCR and MBS using either an alternative ATM traffic descriptor information element or a minimum acceptable ATM traffic descriptor information element.

5.1.5 Network look ahead

Recommendation Q.2964.1 defines the operation of the Digital Subscriber Signalling System No. 2 (DSS2) for the handling of the Look-ahead feature that may be supported, as a network option, prior to Basic call and connection control. The Look-ahead feature defined in Recommendation Q.2964.1 enables the network to check whether compatible user equipment is connected to a user-network interface and whether it is free or busy. This feature can be used prior to an incoming call offering at the user-network interface and uses the ROSE capabilities defined in Recommendation X.219 [3] .

5.1.6 Point-to-multipoint connection control

Recommendation Q.2971 defines the support of point-to-multipoint unidirectional switched virtual channel connections, between a root and multiple leaves. The procedures provide the capability to add or remove parties under the control of the root. In addition, a leaf party may initiate its withdrawal from the call. The signalling protocol to establish and clear point-to-multipoint calls/connections with bi-directional information transport is not supported.

Point-to-multipoint connections are also termed type 2 connections. For more details of type 2 connections, see Supplement 7.

It should be noted that the current draft of Recommendation Q.2971 imposes certain restrictions:

- Between the first and the second party (leaf), sequential adding is performed. This means, that a second leaf can only be added after the CONNECT message of the first leaf has been received by the root.

- Between the second and any other leaf, simultaneous adding can be performed. This means that several ADD PARTY messages can be sent directly after each other, but each of them only referring to one party. This also applies to the dropping of parties.

- Atomic adding or dropping is not supported. This means that the adding or dropping of one leaf party cannot be dependent on the adding or dropping of another leaf party or parties.

However, these restrictions do not seem to be imposed by the concept itself, and therefore might be removed by further extensions of the specification.

5.1.7 Generic functional protocol

Recommendation Q.2932.1 defines the operation of Generic Functional Protocol core functions. The Generic Functional Protocol core functions defined in this Recommendation provide a means of exchanging ROSE components on behalf of signalling application in peer entities. These signalling applications may either be for the support of supplementary services or provide protocol support for the other features (such as Look ahead, Status request, Local/remote interrogation), in association with existing calls and bearers (bearer related signalling), or independently of existing bearers (connection-oriented or connectionless bearer independent signalling).

The functional protocol is based on the use of the Facility information element. To be functional, this protocol requires knowledge of the additional basic call capabilities and supplementary services supported by the user equipment. This facilitates user equipment operation without human intervention by defining the semantics for the protocol elements which user equipment can process on its own.

5.1.8 Signalling specification for Frame relay

Recommendation Q.2933 defines the operations for the support of the Frame relay service that may be provided as a network provider option. The signalling procedures defined support only single step Frame relay call/connection control with one ATM virtual connection supporting one frame relay connection. Recommendation Q.2933 supports only single step call control with one virtual connection supporting only one frame relay connection. Multiple frame relay switched virtual connections (each identified by a DLCI value at the FR-SSCS level) over a single broadband virtual channel connection is not supported. The capability specified in this Recommendation also allows the user of the Frame Relaying bearer service to access a frame handler in a B-ISDN. Recommendation Q.2933 does not cover procedures for the negotiation and modification/re-negotiating of traffic parameters.

5.1.9 Call priority

Recommendation Q.2959 defines the handling of Call priority that may be provided, as a service provider option, for basic call and connection control. The call priority capability allows for preferential treatment of high priority calls during network congestion, based on the priority level allocated to the call.

Specifically, Recommendation Q.2959 provides the following optional capabilities:

– The originating user may provide priority information for each call set-up request. If not provided, the network shall include the priority information for the lowest priority.

– The originating side of the network shall provide for screening of the priority to ensure that the user does not exceed the highest assigned priority level.

– The network shall transport the priority information on the NNI.

– The destination UNI shall deliver the priority information to the destination user.

5.1.10 Generic identifier transport

The Generic identifier transport signalling capability allows the generation and transport by the B-ISDN of identifiers used by different distributed applications. The Generic identifier transport capability is a signalling capability for exchanging identifiers between an originating entity and a peer entity. The Recommendation consists of three parts, described below.

Recommendation Q.2941.1 defines a signalling capability to allow identifiers to be carried between a call originating entity (e.g. a calling user) and an addressed entity (e.g. a remote user, or an interworking unit or a high layer function node addressed by the calling user). The identifiers are transmitted unchanged through the network and they are used by various distributed applications. This signalling capability is a means of end-to-end signalling using identifiers having a specific

purpose which the network can optionally access but not change. In some cases the network may create an identifier on behalf of the user or at its request.

Recommendation Q.2941.2 defines the use of DSS2 Generic identifier transport signalling capability to carry H.321 and H.310 End Station Identifier, H.245 portNumber, ATM VCC Identifier, ATM signalling VCC identifier, Internet related Identifiers and MPOA VPN Identifier. Instances of these identifiers may be carried in the Generic identifier transport information element defined in Recommendation Q.2941.1

Recommendation Q.2941.3 extends the GIT mechanism specified in Recommendation Q.2941.1 to support the transport of the Backbone Network Connection identifier, which is used to coordinate ATM bearer connection establishment with calls established using bearer independent call control signalling.

5.1.11   Switched Virtual Path

Recommendation Q.2934 specifies the procedures for establishing, maintaining, and clearing of switched virtual path connections in a point-to-point call/connection. Recommendation Q.2934 specifies extensions to Recommendations Q.2931, Q.2961.1, Q.2961.2, Q.2961.3, Q.2961.4 and Q.2961.6 related to the switched virtual path capability.

5.1.12   Support of Quality of Service

The capability for users to signal the quality of service required on a per call basis is specified in two parts of Recommendation Q.2965, described below.

Recommendation Q.2965.1 specifies the capability for users to signal their preferred Quality of Service (QoS) class among a number of classes defined in Recommendation I.356 [1].

Recommendation Q.2965.2 specifies extension to Recommendation Q.2965.1, enabling the optional signalling of the individual Quality of Service (QoS) parameters defined in Recommendation I.356 [1].

5.1.13   Multiconnection

Multiconnection has been defined using the principles of call and bearer separation. The protocols for call and bearer control have been defined in separate Recommendations. Two options for call control exist, one using the remote operations service element (Recommendation X.219 [3]), the other based on the procedures in Recommendation Q.2931.

5.1.13.1   Call control protocol

Recommendation Q.2981 specifies a signalling protocol for the purpose of call control at the access to Broadband Integrated Services Digital Networks. The protocol operates between two adjacent call control entities. The protocol is applicable to a terminal or network node in a separated call and bearer (connection) control environment for the support of calls having none, a single bearer or multiple bearers. The protocol is applicable to a two-party call. The protocol also provides forward compatibility to the extent that an implementation can also operate within a multiparty call with other implementations that use additional capabilities, provided the implementation is deployed where it does not need to be aware of more than two parties. Recommendation Q.2981 is independent of the supporting transport service, and is also independent of the protocol used for bearer establishment.

5.1.13.2   Q.2931-based separated call control protocol

Recommendation Q.2982 specifies the procedures for establishing, maintaining and clearing multiconnection calls in a separated call and connection control environment . Only point-to-point multiconnection call control is specified. The multiconnection call control protocol extends and adapts the Q.2931 call/connection to enable the control of a call independently of the bearers, which

can be subsequently added to the call and dropped from the call. The protocol also enables the simultaneous establishment of the call and of the first bearer.

5.1.13.3 Separated bearer control protocol

Recommendation Q.2983 specifies the procedures for establishing, maintaining and clearing of bearer connections in point-to-point multiconnection calls at the B-ISDN user-network interface. Recommendation Q.2983 specifies the essential features, procedures, and messages required for controlling bearer connections associated to point-to-point multiconnection calls in a functionally separated Call and Bearer control environment. The separated bearer control protocol is applicable to control bearers associated to a multiconnection call which is controlled independently by means of a separate call control protocol. The bearer control supports both the Q.2931-based separated call control protocol (see Recommendation Q.2982) or the generic functional protocol-based separated call control protocol (see Recommendation Q.2981).

5.1.13.4 Pre-negotiation

Recommendation Q.2984 specifies the signalling protocol for the purpose of pre-negotiation at the access to B-ISDN. The protocol operates between two adjacent call control entities and is applicable in a separated call and bearer (connection) control environment for the support of calls having none, one or multiple bearers.

The purpose of pre-negotiation is to allow a user to check compatibility and availability at the remote user with regard to one or more connections the user intends to establish during the lifetime of the call, without reserving connection-oriented resources in the network.

5.1.14 Supplementary Services

The supplementary service sets supported by DSS2 capabilities are:
- number identification services;
- Closed User Group (CUG); and
- User-to-User Signalling (UUS).

An overview of these supplementary services is given in the following subclauses.

5.1.14.1 Stage 3 description for number identification supplementary services

The operation of DSS2 for the support of number identification supplementary services is defined in parts 1 to 6 and parts 8 and 9 of Recommendation Q.2951. The eight number identification supplementary services are:
- Direct-Dialling-In (DDI) – Q.2951.1;
- Multiple Subscriber Number (MSN) – Q.2951.2;
- Calling Line Identification Presentation (CLIP) – Q.2951.3;
- Calling Line Identification Restriction (CLIR) – Q.2951.4;
- Connected Line Identification Presentation (COLP) – Q.2951.5;
- Connected Line Identification Restriction (COLR) – Q.2951.6;
- Sub-addressing (SUB) – Q.2951.8;
- ATM end system addressing – Q.2951.9.

DDI supplementary service enables a user to call directly to another user on a B-ISDN private branch exchange or other private systems, without attendant intervention, based exclusively on the use of the ISDN number.

The MSN supplementary service provides the possibility for assigning multiple ISDN numbers to a single public or private access.

Calling Line Identification Presentation (CLIP) is a supplementary service offered to the called party which provides the calling party's ISDN number, possibly with sub-address information, to the called party.

Calling Line Identification Restriction (CLIR) is a supplementary service offered to the calling party to restrict presentation of the calling party's ISDN number and sub-address to the called party.

Connected Line Identification Presentation (COLP) is a supplementary service offered to the calling party which provides the connected party's ISDN number, possibly with sub-address information, to the calling party.

Connected Line Identification Restriction (COLR) is a supplementary service offered to the called party to restrict presentation of the connected party's ISDN number and sub-address to the calling party.

The sub-addressing supplementary service allows the called (served) user to expand his addressing capacity beyond the one given by the ISDN number.

The ATM end system addressing capability specifies extensions to Recommendations Q.2951.1, Q.2951.2, Q.2951.3 and Q.2951.5 to specify the support the use of ATM end system addresses within the DDI, MSN, CLIP and COLP supplementary services.

5.1.14.2   Closed User Group (CUG)

Recommendation Q.2955.1 defines the CUG supplementary service which enables users to form groups, to and from which access is restricted. Members of a specific closed user group can communicate among themselves but not, in general, with users outside the group. Specific CUG members can have additional capabilities that allow them to originate calls to destinations outside the group, and/or to receive calls from outside the group. Specific CUG members can have additional restrictions that prevent them from originating calls to other members of the CUG or from receiving calls from other members of the CUG. A specific user may be a member of one or more closed user groups.

The protocol specified in Recommendation Q.2955.1 distinguishes two different types of CUG calls:

–   Type 1 considers CUG calls with emulated N-ISDN services, identified by the presence of the N-BC information element. For these services, the control of the CUG supplementary service depends on the ISDN numbers (calling and called party) and on the basic telecommunications service involved in the call. This service dependency is required in order to guarantee CUG integrity in the same manner as in N-ISDN.

–   Type 2 considers CUG calls with B-ISDN applications for which CUG is provided without basic service dependence. No emulated N-ISDN services are involved, and no B-ISDN service type has been specified for these applications. These calls can be identified by the absence of the N-BC information element and by the absence of a coding specifying a B-ISDN service type in the SETUP message. For these applications, the control of the CUG supplementary service depends only on the ISDN numbers (calling and called party) involved in the call.

In Recommendation Q.2955.1, the control of the CUG supplementary service is based on the usage of a CUG specific information element. In order to ease interworking with N-ISDN, some networks may wish to support the control of CUG also by the ROSE components.

5.1.14.3   User-to-User Signalling (UUS)

The User-to-User Signalling (UUS) supplementary service defined in Recommendation Q.2957 allows a B-ISDN user to send and receive a limited amount of information to/from another B-ISDN user over the signalling virtual channel in association with a call/connection to the other B-ISDN user.

5.1.15 Testing

Testing documentation is provided in two categories, protocol conformance testing and end-to-end network integration testing.

The conformance tests are related to each base Recommendation. These documents are given the same number as the base Recommendation number but with the extension "*B*", "*C*", "*D*", "*E*" and "*F*". These extensions identify the different parts of the testing documentation, as follows:

B: the PICS;

C: TSS & TP for the user side;

D: ATS & PIXIT for user side;

E: TSS & TP for network side;

F: ATS & PIXIT for network side.

Four testing recommendations for Q.2971 provide the *C*, *D*, *E* and *F* documents.

End-to-end testing checks the overall interworking of different implementations within one or more networks. This, and all other test related material, is documented within the Q.299x series. There are currently two Recommendations handling the end-to-end network integration tests: Q.2991.1 and Q.2991.2.

Recommendation Q.2991.1 contains the end-to-end test specification for network integration testing within DSS2 based B-ISDN networks. The main body of the Recommendation presents the requirements regarding the chosen test method, the test suite structure and the test purposes.

Recommendation Q.2991.2 contains the Implementation Conformance Statement (ICS) proforma and the Implementation Extra Information (IXIT) proforma for the End-to-end Network Integration Tests to verify the overall compatibility of B-ISDN and B-ISDN/N-ISDN over the national and international networks. Annex D covers the graphical form of the ATS and Annex E handles the machine processable format.

5.2 Capability dependencies

Whilst some capabilities are not applicable to other capabilities (e.g. Frame Relay cannot modify traffic parameters), Figure 5-1 shows the main dependencies and interactions of the capabilities.
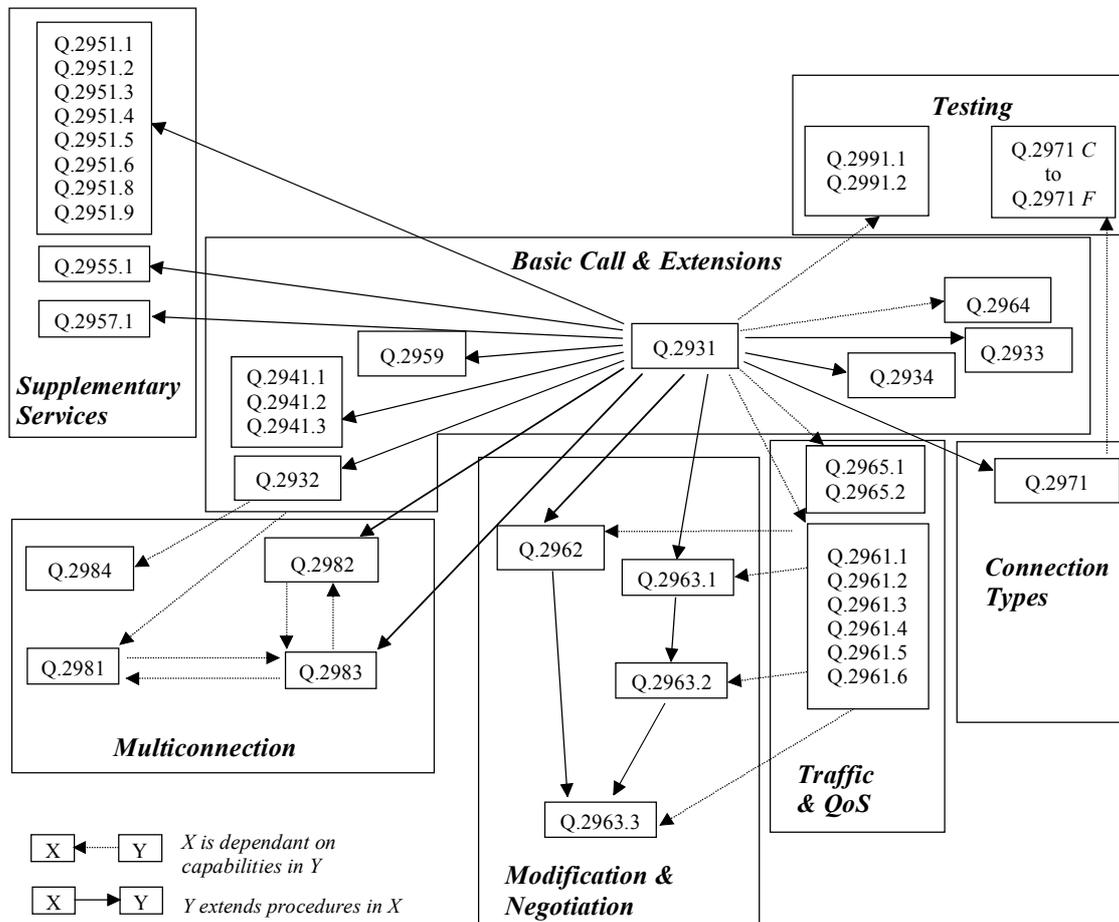
Figure 5-1 – Recommendation dependencies and interactions

ANNEX A

List of Recommendations for DSS2 signalling capabilities and testing

Table A.1 lists the Recommendations for B-ISDN DSS2 signalling capabilities, and provides an indication of the related B-ISUP Recommendation. B-ISDN Recommendations are available in two editions, the later edition is known as "B-ISUP 2000".

Table A.1 – DSS2 Recommendations

Rec. No.	Title	B-ISUP Rec. No. (Note)	B-ISUP 2000 Rec. No. (Note)
Q.2931	DSS2 Basic Call/Connection Control	Q.2761, Q.2762, Q.2763 and Q.2764	Q.2761, Q.2762, Q.2763 and Q.2764
Q.2932.1	Generic Functional Protocol – Core Functions	N/A	N/A
Q.2933	DSS2 Signalling specification for Frame Relay Service	Q.2727	Q.2727
Q.2934	DSS2 Switched Virtual Path Capability	Q.2766	Q.2766
Q.2939.1	Application of DSS2 Service-Related Information Elements by Equipment Supporting B-ISDN Services	N/A	N/A
Q.2941.1	Generic Identifier Transport Capability	Q.2726.4	Q.2726.4
Q.2941.2	Generic Identifier Transport Capability (extensions)	Q.2726.4	Q.2726.4
Q.2941.3	Generic Identifier Transport Capability (BNC-Id)	Q.2726.4	Q.2726.4
Q.2951	Stage 3 description for number identification supplementary services	Q.2730	Q.2730
Q.2955.1	Closed User Group (CUG) supplementary service	Q.2735.1	Q.2735.1
Q.2957.1	User-to-User Signalling (UUS) supplementary service	Q.2730	Q.2730
Q.2959	Call Priority Handling	Q.2726.2	Q.2726.2
Q.2961.1	Additional Traffic Parameter Indications Part 1 (SCR and MBS)	Q.2723.1	Q.2764
Q.2961.2	Additional Traffic Parameter Indications (DBR, SBR1)	Q.2723.2	Q.2764
Q.2961.3	Additional Traffic Parameter Indications (ABR)	Q.2723.3	Q.2764
Q.2961.4	Additional Traffic Parameter Indications (ABT)	Q.2723.4	Q.2764
Q.2961.5	Additional Traffic Parameter Indications (CDVT)	Q.2723.5	Q.2764
Q.2961.6	Additional Traffic Parameter Indications (SBR2 and SBR3)	Q.2723.6	Q.2764
Q.2962	Connection Characteristics Negotiation during Call/Connection Establishment Phase	Q.2725.1	Q.2764
Q.2963.1	Peak Cell Rate Modification by the Connection Owner	Q.2725.2	Q.2764
Q.2963.2	Connection Modification – Modification procedures for Sustainable Cell Rate	Q.2725.3	Q.2764
Q.2963.3	Connection Modification – ATM Traffic Descriptor Modification with Negotiation by the connection owner	Q.2725.4	Q.2764
Q.2964.1	Basic Look ahead	Q.2724.1	Q.2724.1
Q.2965.1	Support of Quality of Service Classes	Q.2723.1	Q.2764
Q.2965.2	Support of individual Quality of Service Parameters	N/A	Q.2764
Q.2971	User Network Interface Layer 3 Specification for Point-to-Multipoint Call/Connection Control	Q.2722.1	Q.2722.1

Table A.1 – DSS2 Recommendations *(concluded)*

Rec. No.	Title	B-ISUP Rec. No. (Note)	B-ISUP 2000 Rec. No. (Note)
Q.2971 *C*	Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS2) – User-Network Interface Layer 3 Specification for Point-to-Multipoint Call/Connection Control Test Suite Structure and Test Purposes (TSS and TP) for the user	N/A	N/A
Q.2971 *D*	Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS2) – User-Network Interface Layer 3 Specification for Point-to-Multipoint Call/Connection Control – Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma for the user	N/A	N/A
Q.2971 *E*	Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS2) – User-Network Interface Layer 3 Specification for Point-to-Multipoint Call/Connection Control Test Suite Structure and Test Purposes (TSS and TP) for the network	N/A	N/A
Q.2971 *F*	Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS2) – User-Network Interface Layer 3 Specification for Point-to-Multipoint Call/Connection Control Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma for the network	N/A	N/A
Q.2981	Call Control Protocol (ROSE based)	N/A	N/A
Q.2982	Q.2931-based Call Control Protocol	N/A	N/A
Q.2983	Separated Bearer Control Protocol	N/A	N/A
Q.2984	Pre-negotiation	N/A	N/A
Q.2991.1	Abstract Test Suite for the Network Integration Testing for B-ISDN and B-ISDN/N-ISDN: TSS and TP	N/A	N/A
Q.2991.2	Abstract Test Suite for the Network Integration Testing for B-ISDN and B-ISDN/N-ISDN: ICS and IXIT and the ATS	N/A	N/A
NOTE – B-ISUP Recommendations cross-indexed may be related Recommendations and do not have the same title.			

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