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**Broadband Integrated Services Digital Network (B-ISDN);  
Digital Subscriber Signalling System No. two (DSS2);  
Guidelines for the interpretation of  
ETS 300 443-1 (ITU-T Recommendation Q.2931)**

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## Foreword

This ETSI Technical Report (ETR) was produced by the Signalling Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI).

ETRs are informative documents resulting from ETSI studies which are not appropriate for European Telecommunication Standard (ETS) or Interim European Telecommunication Standard (I-ETS) status. An ETR may be used to publish material which is either of an informative nature, relating to the use or the application of ETSs or I-ETSs, or which is immature and not yet suitable for formal adoption as an ETS or an I-ETS.

ETS 300 443-1 provides the Broadband Integrated Services Digital Network (B-ISDN) user-network interface layer 3 specification for basic call control protocol. It is an endorsement of ITU-T Recommendation Q.2931 with modifications.

This ETR gives some additional information for the interpretation of these documents by providing guidelines on various detailed aspects.

NOTE: At the time of publication of this ETR, ITU-T Recommendation Q.2931 had not yet been published by ITU. Therefore, this ETR is based on ITU-T Study Group 11 report COM 11-R 59-E of February 1994.

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## 1 Scope

This ETSI Technical Report (ETR) provides guidelines for the interpretation of ETS 300 443-1 [1] which specifies the layer 3 basic call protocol in the Broadband Integrated Services Digital Network (B-ISDN) at the User-Network Interface (UNI).

It is intended to provide for some background information on some major questions which may arise in the context of ETS 300 443-1 [1].

## 2 References

For the purposes of this ETR, the following references apply:

- [1] ETS 300 443-1: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2); B-ISDN user-network interface layer 3 specification for basic call/bearer control; Part 1: Protocol specification [ITU-T Recommendation Q.2931, modified]".
- [2] ITU-T Recommendation Q.2931: "Broadband Integrated Service Digital Network (B-ISDN) - Digital Subscriber Signalling System No.2 (DSS2) - User network interface layer 3 specification for basic call/connection control".
- [3] CCITT Recommendation F.811 (1992): "Broadband connection-oriented bearer service".
- [4] ITU-T Recommendation I.362 (1993): "B-ISDN ATM adaptation layer (AAL) functional description".

## 3 Abbreviations

For the purposes of this ETR, the following abbreviations apply:

ATM	Asynchronous Transfer Mode
B-BC	Broadband Bearer Capability
BCLB	Broadband Connectionless Bearer service
BCOB	Broadband Connection-oriented Bearer service
B-ISDN	Broadband Integrated Services Digital Network
DSS2	Digital Subscriber Signalling System No. two
RAI	Report And Ignore
RAP	Report And Proceed
UNI	User-Network Interface

## 4 Description

The general description of the B-ISDN Release 1 user-network interface layer 3 specification for basic call control protocol is provided by ETS 300 443-1 [1] which is an endorsement of ITU-T Recommendation Q.2931 [2] with modifications.

This ETR gives some additional information for the interpretation of these documents by providing guidelines for the interpretation of various detailed aspects. In particular, it covers:

- Bearer Class indications in the Broadband Bearer Capability (B-BC) information element (see ITU-T Recommendation Q.2931 [2], subclause 4.5.7);
- reporting of status (see ITU-T Recommendation Q.2931 [2], subclauses 4.4.1, 4.5.1, 5.6, 5.7 and annex A);
- compatibility of call states (see ITU-T Recommendation Q.2931 [2], subclauses 5.6.4, 5.6.12 and annex A);
- terminology: "Release", "Capability Set", "Phase".

It should be noted that the contents of this ETR are of tutorial nature, and does not impose any restrictions or requirements on implementations.

To avoid duplications, the following text makes reference only to ITU-T Recommendation Q.2931 [2].

## 5 Bearer Class indications in the Broadband bearer capability information element

ITU-T Recommendation Q.2931 [2] allows for the indication of Bearer Classes "BCOB-A", "BCOB-C" and "BCOB-X" in the B-BC information element (see table 4-8/Q.2931) within the scope of Release 1 of B-ISDN. These indications refer to the "**B**roadband **C**onnection-oriented **B**earer services" of types A, C, and X, respectively, as specified in CCITT Recommendation F.811 [3] and ITU-T Recommendation I.362 [4].

Bearer Class C refers to connection-oriented services with variable bit rate (and no requirement for end-to-end timing). These services may be indicated for B-ISDN Release 1, however, it should be noted that Release 1 only allows for traffic indications via the peak cell rate values of a connection. This means that, although BCOB-C services can be indicated according to ITU-T Recommendation Q.2931 [2], these services may get only some limited support within Release 1 which will not take advantage of the bursty nature of their traffic flow. In particular, the network may allocate resources (as if Bearer Class A was requested) and therefore allocate resources only on the basis of the peak cell rate.

If, within the scope of Release 1, a user indicates BCOB-C in the B-BC information element together with additional traffic parameters in the ATM traffic descriptor information element beyond the peak cell rate indications, the call will be rejected (mandatory information element content error).

Additional traffic parameters for the support of BCOB-C services will be provided within the scope of DSS2 Capability Set 2 step 1 (see clause 8).

NOTE: In particular, such parameters will be specified within the scope of work item DE/SPS-05081-1 on connection characteristics indication.

The same restrictions as indicated for Bearer Class C also apply for indications of Bearer Class X, i.e. indication of a user-defined connection-oriented bearer class. Also for BCOB-X, only the peak cell rate values can be indicated within B-ISDN Release 1.



ITU-T Recommendation Q.2931 [2] does not contain a codepoint for Bearer Class D (or "BCLB", **B**roadband **C**onnectionless **B**earer service), although the support of such connectionless bearer services has been defined as part of Release 1 by ITU-T SG 13. However, these services will be supported in Release 1 via semi-permanent connections providing access to connectionless servers, and therefore do not require on-demand signalling functions. Therefore, no codepoint for Bearer Class D is provided within the B-BC information element in Release 1.

## 6 Reporting of status

Within clause 5 (particularly subclauses 5.6 and 5.7) and annex A of ITU-T Recommendation Q.2931 [2], the text and the SDL diagrams often refer to the reporting of status. It is already known from N-ISDN signalling that some clarifications on the reporting of status are needed to avoid interoperability problems, particularly with regard to the question: "Call state before or after processing a message?".

During the ITU-T SG 11 meeting in Geneva in December 1993, some clarifications have been reached on these questions. However, these clarifications are only partly reflected within the procedure text (cf. Q.2931 [2], subclauses 5.6.7.1, 5.6.8.1 and 5.7.2, item d)), and the detailed reporting of status can only be derived from the SDL diagrams (cf. Q.2931 [2], annex A), where the clarifications have been incorporated. Therefore, the following information may be helpful.

If a procedure within ITU-T Recommendation Q.2931 [2] requests the reporting of status, this reporting refers to the "call state" as defined in clause 2 and table 4-11 of Q.2931 [2]. Two cases have to be distinguished:

- a) if a received message (other than SETUP, RELEASE or RELEASE COMPLETE) has to be discarded (or "ignored"), no action should be taken on the message and no state change shall occur. Therefore, if the procedure text in this case requests the reporting of status (this is referred to as the "Report And Ignore" (RAI) case within the SDL diagrams), the call state is indicated as if the message has never been received (cf. Q.2931 [2], subclause 5.6.7.1).

The same applies if an error handling according to the action indicator "discard message and report status" (cf. Q.2931 [2], subclause 5.7.2, item b)) has to be taken; in particular, in case of a severely incorrect SETUP message, the reported state is the "Null" state;

- b) if a reporting of status is done on a received message which can be processed, the call state should be indicated which is reached after taking action on the message. The same applies for the action indicator "discard information element, proceed and report status", if no discarding of the message has to be done in addition.

This solution has been taken since in the case where the message can be processed, the receiver of this message should report its status in such a way that an unnecessary call clearing because of incompatibility of call states can be avoided. The SDL diagrams show the details of which state has to be reported. Within the SDL diagrams, case b) is referred to as the "Report And Proceed" (RAP) case.

As an illustrative example for the cases a) and b) (or RAI and RAP), you are invited to look up the receiving of a CALL PROCEEDING message by the user (sheet 2 of 31 of process Q.2931-U):

- in the RAI case, the user will report call state U1 "call initiated". U1 is the state before receiving the CALL PROCEEDING;
- in the RAP case, the user will report call state U3 "outgoing call proceeding". U3 is the call state taken after processing the message, and presumably N3 will be the call state which the network has taken at this point of time.

In addition to the clarifications of the two basic cases above, at least two other situations have to be taken into account:

- if both actions a) and b) would be required (e.g. action indicator "discard message and report status" for one or more errored information elements and action indicator "discard information element, proceed and report status" also for one or more other errored information elements), only the "discard message and report status" action should be performed (this is based on the order of priority as specified in Q.2931 [2], subclause 5.7.2);
- if the action "discard information element, proceed and report status" would be required for more than one information element (and the message can be processed), the receiver should nevertheless only report the status once (cf. Q.2931 [2], subclause 5.7.2, fourth paragraph which states: "If more than one information element is received in error only one response shall be given.").

## 7 Compatibility of states

ITU-T Recommendation Q.2931 [2], subclause 5.6.12 specifies whether call states are regarded as incompatible. According to this subclause, the determination of incompatibility of call states is left as an implementation option, except for some rules referring to the "Null" state.

Usually, call states having the same number (e.g. U3 and N3) are regarded as being compatible. However, in order to avoid unnecessary clearing of calls, call states not equal to the local call state might also be regarded as "compatible". As an example, a user in state U3 might regard a network state indication of N4 as compatible.

Such examples are not subject to standardization or conformance testing.

## 8 Terminology: "Release", "Capability Set", "Phase"

The use of the terms "Release", "Capability Set", and "Phase" has led to some misunderstandings. The following text tries to provide some explanation.

All three terms refer to a stepwise approach to B-ISDN, but are used by different bodies:

- ITU-T SG 13 has defined three "Releases" for B-ISDN, mainly defined from the service point of view;
- ITU-T SG 11 uses the term "Capability Set" to characterize its stepwise approach for B-ISDN signalling protocols;
- the ATM Forum has used the term "Phase" to characterize its stepwise approach for B-ISDN UNI signalling.

Capability Set 1 of ITU-T SG 11 mainly corresponds to Release 1 of ITU-T SG 13 (except for a few deviations, e.g. supplementary service CUG); therefore, ITU-T SG 11 often also refers to "Release 1 signalling protocols".

Capability Set 2, however, only refers to a subset of Release 2 of SG 13 (see figure 1); this is the main reason why SG 11 uses the term "Capability Set" instead of "Release".

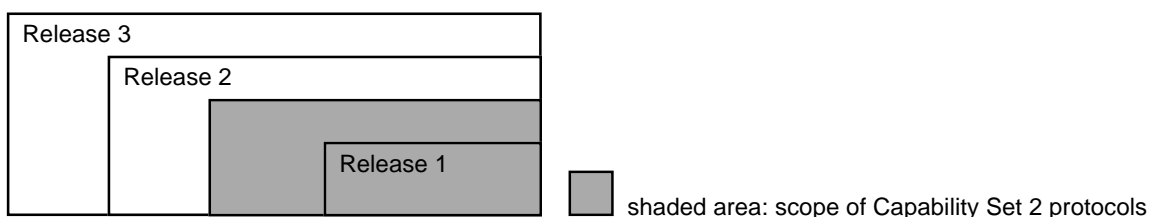
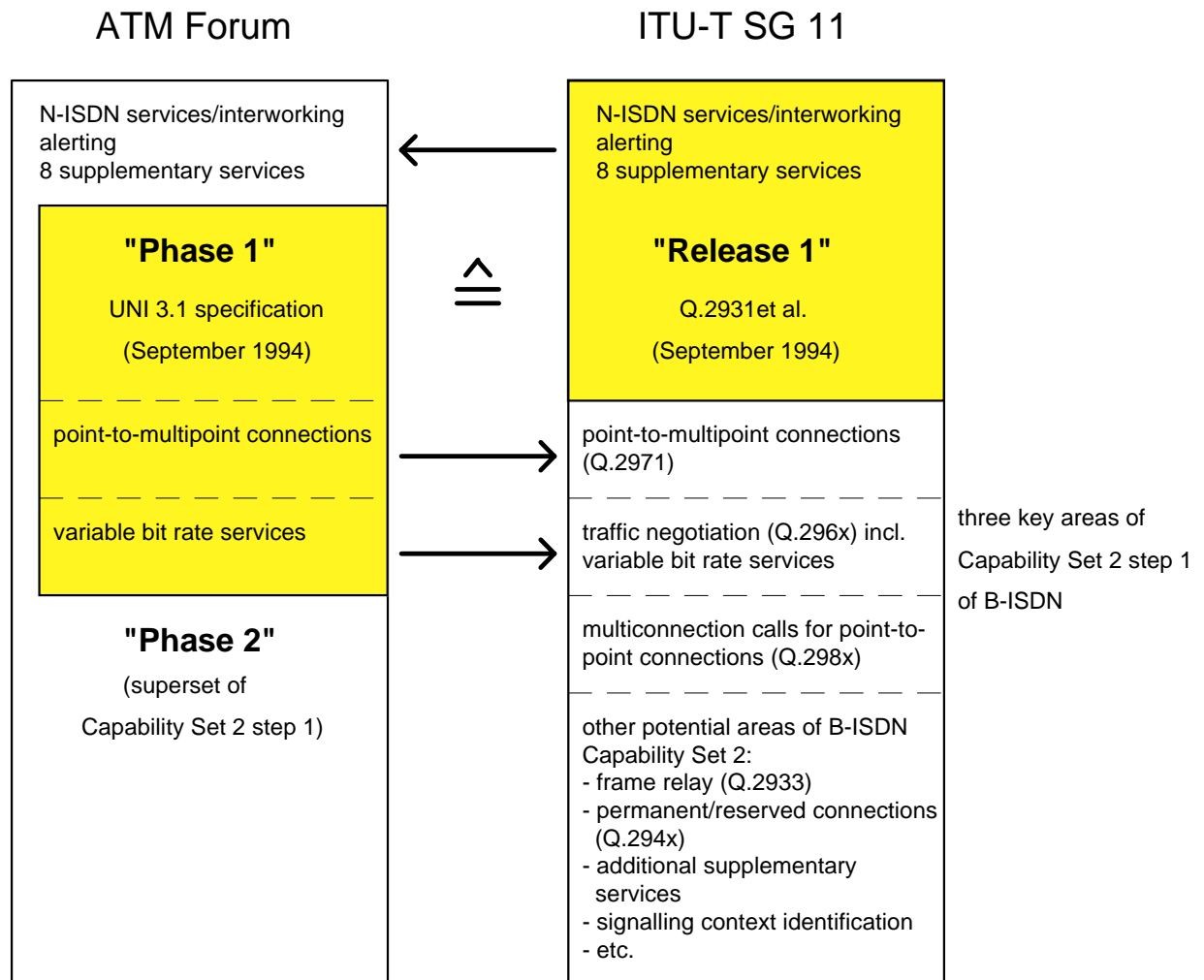


Figure 1: Scope of "Capability Set 2" signalling protocol

The UNI signalling protocols of ITU-T SG 11's Capability Set 1 and the Phase 1 of the ATM Forum have a considerable area of overlapping (see figure 2); but each of them provides different functional additions:

- ITU-T SG 11 also specifies human user support (alerting), the support of N-ISDN services in B-ISDN, interworking to N-ISDN and eight simple supplementary services;
- the ATM Forum also specifies support of point-to-multipoint connections and of additional traffic parameters for variable bit rate services.



NOTE: The arrows symbolize the expected takeover of results

**Figure 2: UNI Signalling - "Phases" (ATM Forum) vs. "Capability Sets" (ITU-T SG 11)**

Figure 2 gives an overview on the functions provided by the UNI signalling of the ATM Forum and of ITU-T SG 11; the arrows indicate that it is expected that the solutions in the non-overlapping areas will mutually be accepted. It should be noted that the ATM Forum specification differs from ITU-T results also in some other areas (e.g. local interface management), but this is outside the scope of this ETR.

ITU-T Recommendation Q.2931 [2] (and by implication ETS 300 443-1 [1]) provide for the basic call/connection control functions within the scope of B-ISDN Capability Set 1/Release 1.

## Annex A: Bibliography

In the context of this ETR, the following future ETSs may be of interest:

- 1) ETS 300 661-1: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2); Direct Dialling In (DDI) supplementary service; Part 1: Protocol specification (ITU-T Recommendation Q.2951.1, modified)".
- 2) ETS 300 662-1: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2); Multiple Subscriber Number (MSN) supplementary service; Part 1: Protocol specification (ITU-T Recommendation Q.2951.2, modified)".
- 3) ETS 300 663-1: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2); Calling Line Identification Presentation (CLIP) supplementary service; Part 1: Protocol specification (ITU-T Recommendation Q.2951.3, modified)".
- 4) ETS 300 664-1: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2) Calling Line Identification Restriction (CLIR) supplementary service; Part 1: Protocol specification (ITU-T Recommendation Q.2951.4, modified)".
- 5) ETS 300 665-1: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2) Connected Line Identification Presentation (COLP) supplementary service; Part 1: Protocol specification (ITU-T Recommendation Q.2951.5, modified)".
- 6) ETS 300 666-1: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2); Connected Line Identification Restriction (COLR) supplementary service; Part 1: Protocol specification (ITU-T Recommendation Q.2951.6, modified)".
- 7) ETS 300 667-1: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2); Subaddressing (SUB) supplementary service; Part 1: Protocol specification (ITU-T Recommendation Q.2951.8, modified)".
- 8) ETS 300 668-1: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2); User-to-User Signalling type 1 implicit (UUS1i) supplementary service; Part 1: Protocol specification (ITU-T Recommendation Q.2957.1, modified)".
- 9) ETS 300 669-1: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2); Supplementary service interaction; Part 1: Protocol specification".
- 10) DE/SPS-05081-1: "Broadband Integrated Services Digital Network (B-ISDN); User-network interface layer 3; Signalling Capability Set 2 (CS2) - step 1; Connection characteristics: indication; Part 1: Protocol specification".
- 11) DE/SPS-05082-1: "Broadband Integrated Services Digital Network (B-ISDN); User-network interface layer 3; Signalling Capability Set 2 (CS2) - step 1; Connection characteristics: negotiation; Part 1: Protocol specification".

- 12) DE/SPS-05083-1: "Broadband Integrated Services Digital Network (B-ISDN); User-network interface layer 3; Signalling Capability Set 2 (CS2) - step 1; Connection characteristics: modification; Part 1: Protocol specification".
- 13) DE/SPS-05084-1: "Broadband Integrated Services Digital Network (B-ISDN); User-network interface layer 3; Signalling Capability Set 2 (CS2) - step 1; Connection characteristics: look-ahead; Part 1: Protocol specification".
- 14) DE/SPS-05085-1: "Broadband Integrated Services Digital Network (B-ISDN); User-network interface layer 3; Signalling Capability Set 2 (CS2) - step 1; Multiparty call for point-to-multipoint connection; Part 1: Protocol specification".
- 15) DE/SPS-05086-1: "Broadband Integrated Services Digital Network (B-ISDN); User-network interface layer 3; Signalling Capability Set 2 (CS2) - step 1; Point-to-point multiconnection call; Part 1: Protocol specification".
- 16) DE/SPS-05100-1: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2); Closed User Group (CUG) supplementary service; Part 1: Protocol specification (ITU-T Recommendation Q.2955.1, modified)".
- 17) DE/SPS-05101-1: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2); Generic functional protocol for the support of supplementary services; Part 1: Protocol specification (ITU-T Recommendation Q.2932, modified)".

## History

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