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INTERNATIONAL TELECOMMUNICATION UNION

ITU-T Addendum No. 1

ITU-T

X.225

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(11/95)

DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

OPEN SYSTEMS INTERCONNECTION – CONNECTION-MODE PROTOCOL SPECIFICATIONS

OPEN SYSTEMS INTERCONNECTION – PROTOCOL SPECIFICATION FOR SESSION LAYER EFFICIENCY ENHANCEMENTS

ITU-T Addendum No. 1 to Recommendation X.225

Superseded by a more recent version

(Previously "CCITT Recommendation")

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The 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.

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

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Addendum No. 1 to Recommendation X.225, was prepared by ITU-T Study Group 7 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 21st of November 1995.

NOTE

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

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DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

(February 1994)

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SUMMARY

This ITU-T Addendum specifies a new session protocol option – the null-encoding option, which provides an efficient session data transfer mechanism with zero protocol control information – that can be selected in the case when the session user has no requirements for orderly release of the session connection. If, in addition, no session layer addressing information is required to be exchanged, another protocol option – the short-encoding option – provides an efficient means to negotiate at session-connection establishment the use of the null-encoding option for data transfer.

INTRODUCTION

This ITU-T Addendum is one of a set of Addenda produced to facilitate the interconnection of information processing systems in an open environment where efficiency of communications is paramount. Such efficiencies include:

a) reduction in the overhead needed to encode control information for use in bandwidth-limited environments (such as radio links) or processing-limited systems (such as switching systems);

b) reduction in the delay to set up the association between the communicating applications so that data transfer can begin expeditiously;

c) reduction in the support of unneeded functionality in certain environments where the communications requirements of the applications are limited.

This set of Addenda covers the services and protocols required to achieve such interconnection within the framework of the layers defined in the Reference Model for Open Systems Interconnection (ITU-T Rec. X.200 | ISO/IEC 7498-1).

This ITU-T Addendum provides a set of rules for communication expressed in terms of the procedures to be carried out by peer entities at the time of communication. These rules for communication are intended to provide a sound basis for development in order to serve a variety of purposes:

a) as a guide for implementors and designers;

b) for use in the testing and procurement of equipment;

c) as part of an agreement for the admittance of systems into the open systems environment;

d) as a refinement of the understanding of OSI;

e) extend the usefulness and applicability of OSI to other application domains (e.g. real-time, or low bandwidth or long-delay environments).

This ITU-T Addendum specifies a new session protocol option – the null-encoding option, which provides an efficient session data transfer mechanism with zero protocol control information – that can be selected in the case when the session user has no requirements for orderly release of the session connection. If, in addition, no session layer addressing information is required to be exchanged, another protocol option – the short-connect option – provides an efficient means to negotiate at session-connection establishment the use of the null-encoding option for data transfer.

Superseded by a more recent version

ITU-T Addendum No. 1 to Recommendation X.225

OPEN SYSTEMS INTERCONNECTION – PROTOCOL SPECIFICATION FOR SESSION LAYER EFFICIENCY ENHANCEMENTS

(Geneva, 1995)

0 Preamble

This ITU-T Addendum No. 1 incorporates by reference the session layer protocol specification, ITU-T Rec. X.225 (1995) | ISO/IEC 8327-1: (1996), and modifies it as specified in the text below. This text defines additional new protocol options for the session protocol which specify:

a) procedures for the efficient transfer of data and control information from one session entity to a peer session entity when certain requirements of the session user are fulfilled;

b) the means of selecting, when these requirements are met, the procedures to be used by the session entities;

c) the structure and encoding of the session-protocol-data-units used for the efficient transfer of data and control information when these protocol options are selected.

1 Scope

{No change}

2 Normative references

2.1 through 2.2

{No change}

2.3 Additional References

{Add the following reference}

– ITU-T Addendum No. 1 to Recommendation X.215 (1995), *Open Systems Interconnection – Service definition for Session layer efficiency enhancements*.

3 Definitions

3.1 through 3.3

{No change}

3.4 Session protocol definitions

{Add the following definitions}

3.4.26 null-encoding protocol option: An option of the session protocol, negotiated during connection establishment, that permits a data transfer phase with zero session protocol control information and without the ability to signal the orderly release of the session-connection.

3.4.27 short-connect protocol option: An option of the session protocol that permits an efficient negotiation, during connection establishment, of the null-encoding protocol option by defining more compact encodings for the connection establishment SPDUs than those defined in ITU-T Rec. X.225 (1995) | ISO/IEC 8327-1:1996.

NOTE – The specification of a protocol option which defines encodings for other Session SPDUs (i.e. those not used on the connection establishment) that are shorter than those defined in ITU-T Rec. X.225 (1995) | ISO/IEC 8327-1:1996 is for further study.

4 Abbreviations

{No change}

5 Overview of the session protocol

5.1 Model of the session layer

{No change}

5.2 Services provided by the session layer

{In Table 1, referenced in this subblause, add the following items underlined to the cell identified by [Session Conection, Associated SPDUs] as well as the accompanying notes}

TABLE 1/Add. 1/X.225

Service	Primitives	Associated SPDUs
Session Connection	S-CONNECT request S-CONNECT indication S-CONNECT (accept) response S-CONNECT (accept) confirm S-CONNECT (reject) response S-CONNECT (reject) confirm	CONNECT SPDU <u>or</u> <u>SHORT-CONNECT SPDU (Note 1)</u> ACCEPT SPDU <u>or</u> <u>SHORT-ACCEPT SPDU (Note 1)</u> REFUSE SPDU <u>or</u> <u>SHORT-REFUSE SPDU (Note 1)</u>
Normal Data Transfer	S-DATA request S-DATA indication	DATA-TRANSFER SPDU <u>or</u> <u>NULL SPDU (Note 2)</u> DATA-TRANSFER SPDU <u>or</u> <u>NULL SPDU (Note 2)</u>
NOTES 1 Used only if the short encoding protocol option is supported (see 5.8.8). 2 The NULL SPDU is used only if the null-encoding protocol option is supported (see 5.8.7 and 7.11 *bis*).		

5.3 Services assumed from the transport layer

{No change}

5.4 Functions of the session layer

5.4.1 Overview of functions

{No change}

5.4.2 Connection establishment phase

{Add at end of list in 5.4.2 and before the note the following new item}

h) to negotiate the data transfer (and termination) null-encoding protocol option (see 5.8.7).

5.4.3 through 5.4.4

{No change}

5.5 Protocol version numbers

{No change}

5.6 Functional units

{Add in Table 3 referenced in this subclause the following additional items and additional notes shown underlined}

TABLE 3/Add. 1/X.225

Functional unit	SPDU code	SPDU name	Reference
Kernel	CN	CONNECT (Note 1)	7.1
	OA	OVERFLOW ACCEPT (Note 2)	7.2
	CDO	CONNECT DATA OVERFLOW (Note 2)	7.3
	AC	ACCEPT (Note 1)	7.4
	RF	REFUSE (Note 1)	7.5
	FN	FINISH (Note 10)	7.6
	DN	DISCONNECT (Note 10)	7.7
	AB	ABORT (Note 11)	7.9
	AA	ABORT ACCEPT (Note 3)	7.10
	DT	DATA TRANSFER	7.11
	PR	PREPARE (Note 7)	7.26
	SCN	SHORT-CONNECT (Note 12)	7.38
	SAC	SHORT-ACCEPT (Note 12)	7.39
	SRF	SHORT-REFUSE (Note 12)	7.40
	NL	NULL (Note 12)	7.11 *bis*
No orderly release		No additional associated SPDUs	

NOTES

10 Not used if the no orderly release functional unit is selected.

11 Not used if the null-encoding protocol option is selected.

12 Used only if the null-encoding protocol option is supported.

{Add the following new subclause 5.6.2 bis after 5.6.2}

5.6.2 *bis* No-orderly-release functional unit

This functional unit removes the orderly release function from the kernel functional unit.

5.7 Tokens

{No change}

5.8 Negotiation

{No change}

5.8.1 through 5.8.6

{No change}

{Add the following two new subclauses after 5.8.6}

5.8.7 Negotiation of null-encoding protocol option

The use of the null-encoding protocol option is negotiated between the peer SPMs at session-connection establishment. It shall only be offered by the initiating SPM if the initiating Session user has requested, and the initiating SPM supports, the no-orderly-release functional unit. In addition, it can only be offered by the initiating SPM if no session layer addressing information is required to be conveyed.

The null-encoding protocol option is selected for use on the session connection by the responding SPM. It shall only select the use of the option if:

a) the null-encoding protocol option was offered by the initiating SPM;

b) the responding SPM has selected the kernel, full-duplex and no-orderly-release functional units, and no other functional units.

5.8.8 Negotiation using short-connect protocol option

The SPMs may use the short-connect protocol option to establish a session connection using the null-encoding option. The short-connect protocol option, as applied to connection establishment, uses the SHORT-CONNECT SPDU, SHORT-ACCEPT SPDU and (if unsuccesful) the SHORT-REFUSE SPDU. Use of the short-connect protocol option can only be attempted by the initiating SPM if there are no parameters of the S-CONNECT request other than, optionally, user data. The responding SPM can only issue the SHORT-ACCEPT SPDU if there are no parameters of the S-CONNECT response other than, optionally, user data.

The SHORT-CONNECT SPDU, SHORT-ACCEPT SPDU and SHORT-REFUSE SPDUs can be transferred as User-data on the Transport-layer T-CONNECT primitives or as User-data on T-DATA primitives, if the Transport connection is already established. The mapping to the User-data of the T-CONNECT primitives is only possible if the complete SPDUs, including any User-data, meet any size restrictions of the T-CONNECT User-data.

5.9 Local variables

{No change}

6 Use of the transport service

{No change}

6.1 Assignment of a session connection to a transport connection

{No change}

6.1.1 through 6.1.3

{No change}

6.1.4 Description

{Add the following underlined phrase to the antepenultimate paragraph of 6.1.4}

Only the initiator of the transport connection is permitted to issue the CONNECT SPDU <u>or the SHORT-CONNECT SPDU</u>.

{Replace the last paragraph of 6.1.4 with the following new paragraphs}

The TS-user data parameter in T-CONNECT request and indication is used for the SHORT-CONNECT SPDU. The TS-user data parameter in T-CONNECT response and confirm is used for the SHORT-ACCEPT SPDU. When a T-CONNECT request is issued, the TS-user data parameter shall either contain a SHORT-CONNECT SPDU or shall be empty. When a T-CONNECT response is issued, the TS-user data parameter shall be empty, unless the T-CONNECT indication contained a SHORT-CONNECT SPDU, when the TS-user data parameter on the T-CONNECT response shall contain a SHORT-ACCEPT or SHORT-REFUSE SPDU or shall be empty.

If the responding session implementation does not support the short-connect protocol option, it shall ignore the TS-user data parameter on T-CONNECT indication and confirm.

6.2 Reuse of the transport connection

{No change}

6.3 Use of the transport normal data

6.3.1 through 6.3.2

{No change}

6.3.3 SPDUs used

{Add the following item at the end of the list of SPDUs in 6.3.3.}

NULL SPDU (see 7.11 *bis*);

SHORT-CONNECT SPDU (see 7.38);

SHORT-ACCEPT SPDU (see 7.39);

SHORT-REFUSE SPDU (see 7.40).

6.3.4 Transfer of SPDUs

{No change}

6.3.5 Segmenting

{Change the first sentence of 6.3.5 as follows, with the additions underlined}

Segmenting of SSDUs takes place under the following circumstances, provided the null-encoding option has not been selected:

6.3.6 Maximum TSDU size

{No change}

6.3.7 Concatenation

{Add the following to the column of Category 1 SPDUs in Table 6}

NULL SPDU;

SHORT-CONNECT;

SHORT-ACCEPT;

SHORT-REFUSE.

6.4 Use of the transport expedited service

6.4.1 through 6.4.3

{No change}

6.4.4 Description

{Add the following additional underlined text to 6.4.4 b)}

b) ABORT SPDUs are sent on the transport normal flow unless the null-encoding option is selected, in which case ABORT SPDUs are not sent;

6.5 Flow control

{No change}

6.6 Transport disconnect

6.6.1 through 6.6.3

{No change}

6.6.4 Description

{Change the title of 6.6.4 as indicated by underlined text}

6.6.4 Description (when null-encoding option is not selected)

{Add the following new subclause after 6.6.4}

6.6.5 Description (when null-encoding option is selected)

When the null-encoding option is selected, the session connection is terminated by disconnection of the supporting transport connection.

7 Elements of procedure related to SPDUs

{No change}

7.1

{No change}

7.1.1 Content of CONNECT SPDU

{Add the following underlined text to 7.1.1 b) 1)}

b) a Connect/Accept Item parameter group containing:

1) A Protocol Options parameter which enables the initiator to indicate its ability to receive extended concatenated SPDUs <u>and to use the null-encoding option</u>;

<u>The initiator is not able to use the null-encoding option unless the no-orderly-release functional unit was proposed by the calling SS-user</u>.

7.1.2 through 7.1.3

{No change}

7.2 through 7.3

{No change}

7.4

{No change}

7.4.1 Content of ACCEPT SPDU

{Add the following underlined text to 7.4.1 b) 1)}

b) a Connect/Accept Item parameter group containing:

1) A Protocol Options parameter which enables the initiator to indicate its ability to receive extended concatenated SPDUs <u>and whether the null-encoding option is selected for use on this session connection</u>.

<u>The responder shall not select the null-encoding option unless</u>:

<u>a)</u> <u>the initiator indicates on the SHORT-CONNECT SPDU that it is able to use the null-encoding option; and</u>

<u>b)</u> <u>the functional units selected for use on the session connection [(see d) below)] are precisely:</u>

<u>i)</u> <u>kernel functional unit</u>;

<u>ii)</u> <u>full-duplex functional unit</u>;

<u>iii)</u> <u>no-orderly-release functional unit</u>.

7.5 through 7.10

{No change}

7.11 DATA-TRANSFER SPDU

{No change}

7.11.1 Content of DATA-TRANSFER SPDU

{Add the following underlined text at the end of the first sentence of 7.11}

Normal data is transferred by use of the DATA-TRANSFER SPDU <u>unless the null encoding option is selected</u>.

7.11.2 through 7.11.3

{No change}

{Add the following new subclause after 7.11}

7.11 *bis* NULL SPDU

When the null encoding option is selected, normal data is transferred by use of the NULL SPDU.

7.11 *bis*.1 Content of NULL SPDU

The NULL SPDU contains a User Information Field to transfer transparent user data whose maximum size is unlimited.

NOTE – Segmentation does not occur with the null-encoding option. Since null-encoding is only used when the kernel, no-orderly-release and full-duplex functional units are the only functional units selected, there is no data token.

7.11 *bis*.2 Sending the NULL SPDU

An S-DATA request, when the null-encoding option has been selected, results in a NULL SPDU.

7.11 *bis*.3 Receiving the NULL SPDU

When the null encoding option is selected, a received T-DATA indication shall be treated as the receipt of an incoming NULL SPDU, and results in an S-DATA indication.

7.5 through 7.37

{No change}

{Add the following four new subclauses, 7.38 through 7.41, after 7.37}

7.38 SHORT-CONNECT SPDU

A SHORT-CONNECT SPDU is sent as a protocol option at the choice of the initiating SPM to establish a session-connection if the Session user requirements parameter in the S-CONNECT request consist of only the kernel, full-duplex and no-orderly-release functional units, and there are no calling and called session selectors.

7.38.1 Content of SHORT-CONNECT SPDU

The SHORT-CONNECT SPDU contains zero, one or more parameter fields and an optional user information field.

NOTE – The definition of one or more parameter fields for this SPDU is for further study.

7.38.2 Sending the SHORT-CONNECT SPDU

An S-CONNECT request results in the assignment of an existing or a new transport connection. If the transport connection already exists, a SHORT-CONNECT SPDU is sent on the transport normal flow. If the transport connection is new, the SPM, as a local choice, either sends a SHORT-CONNECT SPDU as user data on the transport connection establishment T-CONNECT request, or establishes the transport connection without sending any SPDU. If the latter choice is made, when the transport connection is established a SHORT-CONNECT SPDU is sent on the transport normal flow.

7.38.3 Receiving the SHORT-CONNECT SPDU

A valid incoming SHORT-CONNECT SPDU which is acceptable to the receiving SPM results in an S-CONNECT indication to the SS-user. The SPM then waits for a S-CONNECT response from the called SS-user. If the receiving SPM is not able to handle the incoming request for a session connection, it does not issue any service primitive to the SS-user and formats a SHORT-REFUSE SPDU (see 7.40.2).

If the receiving SPM does not support the short-connect option and the SHORT-CONNECT SPDU is received as user data on a T-CONNECT indication primitive, it shall ignore the SHORT-CONNECT SPDU and shall not use the user data parameter on the T-CONNECT response primitive.

7.39 SHORT-ACCEPT SPDU

A S-CONNECT (accept) response results in a SHORT-ACCEPT SPDU if the responding SS-user selects in the Session user requirements parameter of the S-CONNECT response only the kernel, full-duplex and no-orderly-release functional units, and there is no responding session selector. After this, the SPM enters the data transfer phase and can receive any session service request or SPDU allowed by the selected functional units.

7.39.1 Content of SHORT-ACCEPT SPDU

The SHORT-ACCEPT SPDU contains zero, one or more parameter fields and an optional user information field.

NOTE – The definition of one or more parameter fields for this SPDU is for further study.

7.39.2 Sending the SHORT-ACCEPT SPDU

An S-CONNECT (accept) response results in a SHORT-ACCEPT SPDU being sent as user data on the transport connection establishment T-CONNECT response primitive.

7.39.3 Receiving the SHORT-ACCEPT SPDU

A valid incoming SHORT-ACCEPT SPDU which is acceptable to the initiating SPM results in an S-CONNECT (accept) confirm primitive to the SS-user. The session connection is considered to be successfully established, and the SPM enters the data transfer phase and can receive any service request or SPDU that is allowed by the selected functional units.

7.40 SHORT-REFUSE SPDU

An SHORT-REFUSE SPDU is used by the responder (SS-user or SPM) to reject an attempt to establish a session connection.

7.40.1 Content of SHORT-REFUSE SPDU

The SHORT-REFUSE SPDU contains, in order, a field that identifies if the transport connection may be retained, a field which identifies if the refusal is permanent or transient, followed by zero, one or more parameter fields and, optionally, a user information field.

NOTE – The definition of one or more parameter fields for this SPDU is for further study.

7.40.2 Sending the SHORT-REFUSE SPDU

An S-CONNECT (reject) response results in a SHORT-REFUSE SPDU being sent as user data on the transport connection T-CONNECT response primitive. The SHORT-REFUSE SPDU may also be sent if the responding SPM is unable to handle the request for a session connection. No session connection is established.

If the Transport Disconnect parameter indicates that the transport connection can be reused, the SPM waits for a CONNECT SPDU or a SHORT-CONNECT SPDU. Otherwise, the SPM starts the timer, TIM, and waits for a T-DISCONNECT indication. If the timer expires before the receipt of a T-DISCONNECT indication, the SPM requests transport disconnection with a T-DISCONNECT request. The timer is cancelled on receipt of a T-DISCONNECT indication.

NOTE – The value of TIM is a local implementation-dependent matter related to quality of service.

7.40.3 Receiving the SHORT-REFUSE SPDU

A valid incoming SHORT-REFUSE SPDU results in an S-CONNECT (reject) confirm primitive to the SS-user. No session connection is established. If the Transport Disconnect parameter indicates that retention of the transport connection has been requested by the called SPM, and this is acceptable to the calling SPM, the SPM waits for an S-CONNECT request. Otherwise, the SPM releases the transport connection, by making a T-DISCONNECT request.

7.41 Connection release when the null-encoding option is selected

When the null encoding option is selected, the session connection is only terminated by the termination of the supporting transport connection. No ABORT SPDU is transmitted.

7.41.1 Initiating termination

An S-U-ABORT request or the detection of a protocol error results in a T-DISCONNECT request. The SPM may optionally use the T-DISCONNECT user data field to indicate the reason for the transport disconnection to the remote SPM. The reason code consists of one octet with the following values:

a) 0: session protocol error;

b) 1: S-U-ABORT request received;

Other values are reserved.

7.41.2 Receiving T-DISCONNECT

An incoming T-DISCONNECT indication with a user data field containing one octet with the value 1 results in an S-U-ABORT indication with no parameters.

An incoming T-DISCONNECT indication with an empty user data field, or a user data field that is anything other than one octet with a value 1 results in an S-P-ABORT with no parameters.

8 Structure and encodings of SPDUs

{No change}

8.1 TSDU structure

{No change}

8.2 SPDU structure

{Change title of 8.2 as shown below underlined}

8.2 SPDU structure (long-form SPDUs)

{Change, based on the underlined additions, the first sentence of 8.2 as follows}

This subclause specifies the general structure of long-form SPDUs in terms of their constituent fields. Long-form SPDUs are all SPDUs whose names do not begin with "SHORT".

{Make the following change throughout the rest of 8.2}

Add "long-form" in front of "SPDU".

{Add the following paragraph after the first paragraph of 8.2}

The NULL SPDU does not use this structure (see 8.2.9).

8.2.1 through 8.2.8

{No change, except for the addition of the phrase "long-form" in front the word "SPDU" wherever it occurs in these subclauses}

{Add the following new subclause after 8.2.8}

8.2.9 Structure of NULL SPDU

The NULL SPDU consists only of a User Information field. There is no SI or LI field.

NOTE – The NULL SPDU maps an outgoing SSDU unchanged as a TSDU, and maps an incoming TSDU unchanged as an SSDU.

8.3 through 8.4

{No change}

{Add two new subclauses after 8.4 to be called 8.5 and 8.6}

8.5 SPDU structure (short-form SPDUs)

This subclause specifies the general structure of short-form SPDUs in terms of their constituent fields. Short-form SPDUs are all SPDUs whose names begin with "SHORT". The general structure for such SPDUs is illustrated in Table 47.

Codings and structural requirements specific to particular short-form SPDUs are specified in 8.6.

TABLE 47/Add. 1/X.225

Short-form SPDU structure

Short-form SPDUs	SI&P field	Parameter field	User information field
	i i i i i p p p	For further study	

Short-form SPDUs shall contain, in the following order:

a) an SI&P field of one octet;

b) zero, one or more parameter fields defined for the short-form SPDU;

NOTE – The parameter fields are not specified in this ITU-T Addendum. It is expected that parameter fields will be specified in future.

c) the user-information field, if defined for the short-form SPDU, and if present;

In the SI&P octet,

d) bits 4-8 (labelled "iiiii" in Table 47) are the SI field that identifies the type of short-form SPDU;

e) bits 1-3 (labelled "ppp" in Table 47) are defined as follows:

– bit 3 identifies if zero, one or more parameters accompany the SPDU;

– bits 2 and 1 in the SHORT-CONNECT and SHORT-ACCEPT SPDU are reserved for future use;

– bits 2 and 1 are defined for the SHORT-REFUSE (see 8.6.3.3 and 8.6.3.4);

The overall length of a short-form SPDU is determined by the TSDU length.

8.6 Short-form SPDUs and associated parameter fields

All short-form SPDUs have SI fields of 5 bits, in which the high-order bit (bit 8 of the SI&P field) is 1.

8.6.1 SHORT-CONNECT (SCN) SPDU

8.6.1.1 The SI field shall be coded "11101".

8.6.1.2 Bit 3 of the first octet (in which bits 4-8 are the SI field) indicates whether parameter fields are present.

- 0 = no parameter fields are present;
- 1 = parameter fields are present. (Use of this coding is for further study.)

NOTE – The parameter fields are not specified in this ITU-T Addendum. It is expected that parameter fields will be specified in future.

8.6.1.3 If no parameter fields are present, a user information field may be present containing user data provided by the calling SS-user.

8.6.2 SHORT-ACCEPT (SAC) SPDU

8.6.2.1 The SI field shall be coded "11110".

8.6.2.2 Bit 3 of the first octet (in which bits 4-8 are the SI field) indicates whether parameter fields are present.

- 0 = no parameter fields are present;
- 1 = parameter fields are present. (Use of this coding is for further study.)

NOTE – The parameter fields are not specified in this ITU-T Addendum. It is expected that parameter fields will be specified in future.

8.6.2.3 If no parameter fields are present, a user information field may be present containing user data provided by the called SS-user.

8.6.3 SHORT-REFUSE (SRF) SPDU

8.6.3.1 The SI field shall be coded "11100".

8.6.3.2 Bit 3 of the SI&P field (in which bits 4-8 are the SI field) indicates whether parameter fields are present.

- 0 = no parameter fields are present;
- 1 = parameter fields are present. (Use of this coding is for further study.)

NOTE – The parameter fields are not specified in this ITU-T Addendum. It is expected that parameter fields will be specified in future.

8.6.3.3 Bit 2 of the SI&P field (in which bits 4-8 are the SI field) shall indicate Transport disconnect field. This shall indicate whether or not the transport connection is to be kept. The encoding of this field shall be:

- bit 2 = 1: transport connection is released;
- bit 2 = 0: transport connection is retained.

8.6.3.4 Bit 1 of the SI&P field (in which bits 4-8 are the SI field) shall indicate whether the refusal is transient or permanent. The encoding of this field shall be:

- bit 1 = 1: rejection may be reported to calling SS-user as persistent;
- bit 1 = 0: rejection may be reported to the calling SS-user as transient.

8.6.3.5 If no parameter fields are present, a user information field may be present containing user data provided by the called SS-user.

9 Conformance to this Recommendation | International Standard

9.1 Static conformance requirements

9.1.1 through 9.1.2

{No change}

9.1.3

{Add to the list in 9.1.3 two more items b.1) and b.2) after item b) as follows}

b.1) whether the null encoding option is supported;

b.2) whether the short-connect option is supported;

9.2 through 9.3

{No change}

Annex A State tables

A.1 through A.4

{No change}

A.5 Definitions of sets and variables

A.5.1 Functional units

{Add to the right-hand side of the definition of fu-dom, the underlined additional term}

fu-dom = {FD, HD, EXCEP, TD, NR, SY, SS, DS, MA, RESYN, EX, ACT, CD, <u>NOR</u>}

{Add to the list of functional units immediately following, the following definition for NOR}

NOR = no-orderly-release functional unit.

A.5.2 through A.5.4

{No change}

{Add the following nine rows with contents underlined to Table A.1 (Incoming events) and change, as shown by the underlined text, the descriptions of TCONind and TCONcnf.}

TABLE A.1/Add. 1/X.225

Abbreviated name	Category	Name and description
NL	SPDU	NULL SPDU
SAC-TC	SPDU	SHORT-ACCEPT SPDU in User-data of T-CONcnf
SAC-TD	SPDU	SHORT-ACCEPT SPDU on T-DATAind
SRF-TC-nr	SPDU	SHORT-REFUSE SPDU (with no reuse of transport connection) on User-data of T-CONcnf
SRF-TC-r	SPDU	SHORT-REFUSE SPDU (with reuse of transport connection) on User-data of T-CONcnf
SRF-TD-nr	SPDU	SHORT-REFUSE SPDU (with no reuse of transport connection) on T-DATAind
SRF-TD-r	SPDU	SHORT-REFUSE SPDU (with reuse of transport connection) on T-DATAind
SCN-TC (Note 3)	SPDU	SHORT-CONNECT SPDU on User-data of T-CON ind
SCN-TD	SPDU	SHORT-CONNECT SPDU on T-DATA ind
TCONind	TS-provider	T-CONNECTind with no SPDU on the User-data
TCONcnf	TS-provider	T-CONNECTcnf with no SPDU on the User-data
NOTE 3 – If the short-connect protocol option is not supported, receipt of a T-CONNECT indication with a SHORT-CONNECT SPDU in the user data is treated as event TCONind.		

{Add the following rows to Table A.2 (States)}

TABLE A.2/Add. 1/X.225

Abbreviated name	Name and description
STA01E	Await SAC in User-data of TCONrsp
STA01F	Await SCONrsp (after receiving SCN in User-data of TCONind)
STA02C	Await SAC on T-DATAind
STA08B	Await SCONrsp (after receiving SCN in User-data of T-DATAind)
STA700	Data transfer (null-encoding)

{Add the following seven rows with contents underlined to Table A.3(Outgoing events) and change, as shown by the underlined text, the descriptions of TCONreq and TCONrsp}

TABLE A.3/Add. 1/X.225

Abbreviated name	Category	Name and description
NL	SPDU	NULL SPDU
SAC-TC	SPDU	SHORT-ACCEPT SPDU in User-data of T-CONrsp
SAC-TD	SPDU	SHORT-ACCEPT SPDU on T-DATAreq
SRF-TC-r	SPDU	SHORT-REFUSE SPDU (with reuse of transport connection) on User-data of T-CONrsp
SRF-TC-nr	SPDU	SHORT-REFUSE SPDU (with no reuse of transport connection) on User-data of T-CONrsp
SRF-TD-nr	SPDU	SHORT-REFUSE SPDU (with no reuse of transport connection) on T-DATAreq
SRF-TD-r	SPDU	SHORT-REFUSE SPDU (with reuse of transport connection) on T-DATAreq
SCN-TC	SPDU	SHORT-CONNECT SPDU on User-data of T-CONreq
SCN-TD	SPDU	SHORT-CONNECT SPDU on T-DATA req
TCONreq	TS-provider	T-CONNECT request with no SPDU on the User-data
TCONrsp	TS-provider	T-CONNECT response with no SPDU on the User-data

{Add the following entries to Table A.7 (Predicates)}

TABLE A.7/Add. 1/X.225

p205	local choice and Session User Requirements in S-CONNECT request included FD and NOR only and User-data < 10240
p206	SCN SPDU is not acceptable to SPM for permanent or transient reasons
p207	local choice and Session User Requirements in S-CONNECT request included FD and NOR only and User-data < 31
p208	null-encoding protocol option has been selected
p209	local choice

{Add the following underlined note to the list of notes to Tables A.8 to A.25}

6 SyABind means generate event SUABind if the user data field of the T-DISCONNECT indication is one octet with the value 1; generate event SPAPind otherwise.

Superseded by a more recent version

{Add, as shown with underlining, the following entries to Table A.8 (Connection establishment state table without the symmetric synchronize functional unit)}

TABLE A.8/Add. 1/X.225

State Event	STA01 idle No TC	STA01C idle TC con	STA01E Await SAC-TC	STA01F Await SCONrsp (after SCN-TC rcv.)	STA02C Await SAC-TD	STA08B Await SCONrsp (after SCN- TD rcv.)
SCONreq	p207 [2] SCN-TC STA01E ¬p207 TCONreq [2] STA01B	p01&p204 CN STA02B p01&p205 SCN-TD STA02C p01&¬p204&¬p205 CN STA02A				
SCN-TC	SCONind STA01F					
SCN-TD		¬p01& ¬p206 SCONind STA08B ¬p01&p206& ¬p02 SRF-TD-nr [4] STA16 ¬p01&p206& p02 SRF-TD-r STA01C p01 TDISreq STA01				
SCONrsp+				SAC-TC STA700		SAC-TD STA700
SCONrsp–				p02 SRF-TC-r STA01C ¬p02 SRF-TC-nr [4] STA16		p02 SRF-TD-r STA01C ¬p02 SRF-TD-nr [4] STA16
SAC-TC			SCONcnf+ STA700			
SAC-TD					SCONcnf+ STA700	

TABLE A.8/Add. 1/X.225 (*end*)

State Event	STA01 idle No TC	STA01C idle TC con	STA01E Await SAC-TC	STA01F Await SCONrsp (after SCN-TC rcv.)	STA02C Await SAC-TD	STA08B Await SCONrsp (after SCN- TD rcv.)
SRF-TC-r			p02 SCONcnf- STA01C ¬p02 SCONcnf- TDISreq STA01			
SRF-TD-r					p02 SCONcnf- STA01C ¬p02 SCONcnf- TDISreq STA01	
SRF-TC-nr			SCONcnf- TDISreq STA01			
SRF-TD-nr					SCONcnf- TDISreq STA01	
TCONcnf			~~SCONcnf~~ ~~STA01C~~ p 209 CN STA02A ¬p209 SCONcnf- STA01C			

{Add, as shown below with underlining, to the cell identified by [AC, STA02A] in Table A.8 (Connection establishment state table without the symmetric synchronize functional unit)}

p208 SCONcnf+ [5] STA700 ¬p208 SCONcnf+ [5] [11] STA713 [6]

{Add, as shown below with underlining, to the cell identified by [SCONrsp+, STA08] in Table A.8 (Connection establishment state table without the symmetric synchronize functional unit)}

p208 AC [5] STA700 ¬p208 AC [5] [11] STA713 [6]

{Add the following entries underlined to Table A.9 (Data transfer state table without the symmetric synchronize functional unit)}

TABLE A.9/Add. 1/X.225

State Event	STA700 data transfer (null-encoding)
SDTreq	NL STA700
NL	SDTind STA700

{Add the following entries underlined to Table A.16 (Abort state table without the symmetric synchronize functional unit)}

TABLE A.16/Add. 1/X.225

State Event	STA700 null-encoding	STA01E Await SAC-TC	STA01F Await SCONrsp (after SCN-TC rcv.)	STA02C await SAC-TD	STA08B await SCONrsp (after SCN-TD rcv.)
SUABreq	~~SPABind~~ ~~STA01~~ TDISreq STA01	TDISreq STA01	TDISreq STA01	TDISreq STA01	TDISreq STA01
TDISind	SyABind (Note 6) STA01	SPABind STA01	SPABind STA01	SPABind STA01	SPABind STA01

NOTE 6 – SyABIND means generate event SUABind if the user data field of the T-DISCONNECT indication is one octet with the value 1; generate event SPAPind otherwise.

Annexes B through D

{No change}