



EUROPEAN
TELECOMMUNICATION
STANDARD

ETS 300 112

May 1994

Source: ETSI TC-TE

Reference: T/TE 05-07

ICS: 33.080

Key words: ISDN, facsimile, group 4

**Integrated Services Digital Network (ISDN);
Facsimile group 4 class 1 equipment on the ISDN
End-to-end protocols**

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE

Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE

X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 92 94 42 00 - Fax: +33 93 65 47 16

Copyright Notification: No part may be reproduced except as authorized by written permission. The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 1994. All rights reserved.

Contents

Foreword	5
1 Scope	7
2 Normative references	7
3 Definitions and abbreviations	8
3.1 Definitions	8
3.2 Abbreviations	8
4 Compatibility aspects	9
5 Specifications	9
5.1 Document Transfer and Manipulation (DTAM)	9
5.2 Document architecture	9
6 Testing philosophy	9
7 Office Document Architecture (ODA)/DTAM implementation rules	9
Annex A (normative): ODA/DTAM implementation rules	10
Introduction	10
A.1 ODA implementation rules for group 4 class 1 facsimile equipment	10
A.2 DTAM protocols and services	11
A.2.1 Association establishment	12
A.2.2 Capability negotiation	14
A.2.3 Transfer exchange	16
A.2.4 Normal and abnormal termination	20
Annex B (informative): Comparison between CCITT Recommendation T.73 and T.400/T.500 series coding in group 4 class 1 facsimile equipment	23
Introduction	23
B.1 Introduction of CCITT Recommendation T.62, T.73 and T.400 protocol elements	23
B.2 Comparison of interchange format	24
B.2.1 In CCITT Recommendation T.73	24
B.2.2 In the CCITT T.400/T.500 series of Recommendations	24
B.3 Abstract syntax definition of APDUs for use of session service	25
B.4 ASN.1 description of protocol elements	25
B.4.1 Correspondence of attributes and values	25
B.4.2 Protocol elements according to CCITT Recommendation T.73 and the T.400/T.500 series of CCITT Recommendations	28
B.5 Comparison of ASN.1 parameter coding	36
B.5.1 Session Communication Structure (CSS)	36
B.5.1.1 Coding in the CCITT T.400/T.500 series of Recommendations (1988)	36
B.5.1.2 Coding in CCITT Recommendation T.73 (1984)	36
B.5.2 Command Document Capability List (CDCL)	36
B.5.2.1 Coding in the CCITT T.400/T.500 series of Recommendations (1988)	36

B.5.2.2	Coding in CCITT Recommendation T.73 (1984).....	37
B.5.3	Session Activity Start (CDS).....	37
B.5.3.1	Coding in the CCITT T.400/T.500 series of Recommendations (1988)	37
B.5.3.2	Coding in CCITT Recommendation T.73 (1984).....	38
B.5.4	Command Document User Information (CDUI).....	38
B.5.4.1	Coding in the CCITT T.400/T.500 series of Recommendations (1988)	38
	B.5.4.1.1 Document layout root.....	39
	B.5.4.1.2 Page.....	39
	B.5.4.1.3 Text unit	39
B.5.4.2	Coding in CCITT Recommendation T.73 (1984).....	40
	B.5.4.2.1 Document.....	40
	B.5.4.2.2 Page.....	41
	B.5.4.2.3 Text unit	41
B.6	Conclusion	41
Annex C (informative):	Bibliography	42
History		43

Foreword

This European Telecommunication Standard (ETS) has been produced by the Terminal Equipment (TE) Technical Committee of the European Telecommunications Standards Institute (ETSI).

It is based upon the CCITT Recommendations stated in Clause 1 (Scope) and is closely related to the other ETSs given in Clause 1.

Annex A to this ETS is normative while Annexes B and C are informative.

The date of latest announcement of this ETS (doa):	9th May 1994
The date of latest publication of the new National Standard or endorsement of this ETS (dop/e):	9th August 1994
The date for the withdrawal of any conflicting National Standard (dow):	9th February 1995

Blank page

1 Scope

This ETS specifies the upper layers of the communications protocol employed in the group 4 class 1 facsimile communication procedures, i.e. the session layer and above.

This ETS is based upon CCITT Recommendations:

- T.503 [1] "A document application profile for the interchange of group 4 facsimile documents" (the document application profile (DAP));
- T.521 [2] "Communication application profile BT0 for document bulk transfer based on the session service (according to the rules in T.62bis)" (the communication application profile (CAP)),

as derived from the T.400 series of CCITT Recommendations (Document Architecture, Transfer and Manipulation) and other recommendations referred to therein.

This ETS is closely related to 4 other ETSs on group 4 class 1 facsimile equipment:

- ETS 300 080 [3] "Integrated Services Digital Network (ISDN); Lower layer protocols for telematic terminals".
- prETS 300 155 [4] "Integrated Services Digital Network (ISDN); Facsimile group 4 class 1 equipment on the ISDN, End-to-end protocols tests (interconnection capability testing)".
- ETS 300 087 [5] "Integrated Services Digital Network (ISDN); Facsimile group 4 class 1 equipment on the ISDN, Functional specification of the equipment".
- ETS 300 280 [6] "Integrated Services Digital Network (ISDN); Facsimile group 4 class 1 equipment on the ISDN, Terminal testing".

2 Normative references

This ETS incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] CCITT Recommendation T.503 (1991): " A document application profile for the interchange of group 4 facsimile documents".
- [2] CCITT Recommendation T.521 (1988): "Communication application profile BT0 for document bulk transfer based on the session service (according to the rules defined in T.62bis)".
- [3] ETS 300 080 (1992): "Integrated Services Digital Network (ISDN); ISDN lower layer protocols for telematic terminals".
- [4] prETS 300 155 (1994): "Integrated Services Digital Network (ISDN); Facsimile group 4 class 1 equipment on the ISDN; End-to-end protocols tests (interconnection capability testing)".
- [5] ETS 300 087 (1994): "Integrated Services Digital Network (ISDN); Facsimile group 4 class 1 equipment on the ISDN; Functional specification of the equipment".
- [6] ETS 300 280 (1994): "Integrated Services Digital Network (ISDN); Facsimile group 4 class 1 equipment on the ISDN; Terminal testing".

- [7] CCITT Recommendation T.400 (1988): "Introduction to document architecture, transfer and manipulation".
- [8] CCITT Recommendation T.563 (1988): "Terminal characteristics for group 4 facsimile apparatus".
- [9] CCITT Recommendation T.62 (1988): "Control procedures for teletex and group 4 facsimile service".
- [10] CCITT Recommendation T.62bis (1988): "Control procedures for teletex and G4 facsimile services based on Recommendations X.215 and X.225".
- [11] CCITT Recommendation T.412 (1988): "Open document architecture (ODA) and interchange format - Document structures".
- [12] CCITT Recommendation T.415 (1988): "Open document architecture (ODA) and interchange format - Open document interchange format (ODIF)".
- [13] CCITT Recommendation T.418 (1988): "Open document architecture (ODA) and interchange format - Geometric graphics content architecture".
- [14] CCITT Recommendation T.432 (1992): "Document transfer and manipulation (DTAM) - Service and protocols - Service definitions".
- [15] CCITT Recommendation T.433 (1992): "Document transfer and manipulation (DTAM) - Service and protocols - Protocol specification".
- [16] CCITT Recommendation T.411 (1988): "Open document architecture (ODA) and interchange format - Introduction and general principles".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETS, the definitions given in the CCITT Recommendations stated in Clause 2 apply with the following:

Facsimile equipment: Group 4 facsimile terminal equipment.

3.2 Abbreviations

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

APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation No. 1
CAP	Communication Application Profile
CDCL	Command Document Capability List
CDS	Session Activity Start
CDUI	Command Document User Information
CSS	Session Communication Structure
DAP	Document Application Profile
DTAM	Document Transfer and Manipulation
DTAM-PM	DTAM Protocol Machine
ETS	European Telecommunication Standard
ETSI	European Telecommunications Standards Institute
FDA	Formatted Document Architecture
IDE	Interchange Data Element
ISDN	Integrated Services Digital Network
ODA	Open Document Architecture
ODIF	Office Document Interchange Format
OSI	Open Systems Interconnection
RDCLP	Response Document Capability List Positive

SUD Session User Data
TE Terminal Equipment

All other abbreviations are defined in the normatively referenced CCITT Recommendations (see Clause 2).

4 **Compatibility aspects**

Annex B of CCITT Recommendation T.411 [16] makes it clear that the data streams produced by the CCITT Recommendation T.73 description of group 4 class 1 facsimile and the CCITT Recommendations T.563 [8], T.521 [2] and T.503 [1] description of Formatted Document Architecture (FDA) class B documents is identical.

5 **Specifications**

5.1 **Document Transfer and Manipulation (DTAM)**

CCITT Recommendation T.521 [2] defines the Communications Application Profile (CAP) for group 4 class 1 facsimile.

This specifies the Document Bulk Transfer mode BT0 of DTAM operating in the Transparent Mode of operation to interface directly to CCITT Recommendation T.62 [9] or CCITT Recommendation T.62bis [10].

5.2 **Document architecture**

CCITT Recommendation T.503 [1] defines the Document Application Profile (DAP) for the interchange of group 4 facsimile documents. This recommendation restricts the DAP to Formatted Document Architecture (FDA) as defined in CCITT Recommendation T.412 [11] and class B documents as defined in CCITT Recommendation T.415 [12] which makes the profile compatible with TIF.0 as defined in CCITT Recommendation T.73 (1984).

This ETS imposes the following restrictions using CCITT Recommendation T.412 [11] terminology:

- the page is the minimum structure of a group 4 class 1 document and it is therefore not allowed to change the Specific Layout Descriptor within a page, i.e. page dimensions or pel transmission density.
Also the coding attribute should not be changed within a page;

NOTE 1: This is not applicable in private mode.

- the exchange of private information is allowed inside the Presentation Capability Description protocol element which is carried inside the Session User Data field of the document commands response.

NOTE 2: It is recommended that implementations which do not support the "private implementation" parameter should ignore this parameter rather than to refuse the communication.

6 **Testing philosophy**

See ISO IS 9646 for a definition of the terminology of testing.

7 **Office Document Architecture (ODA)/DTAM implementation rules**

Annex A contains the ODA/DTAM implementation rules. Annex B contains the comparison between CCITT Recommendation T.73 (1984) and T.400/T.500 series coding.

Annex A (normative): ODA/DTAM implementation rules

Introduction

Group 4 facsimile has been considered in the CCITT as a subset of a more complex mechanism of the Office Document Architecture (ODA).

ODA requires DTAM (Document Transfer and Manipulation) protocols for communication which uses session service defined in CCITT Recommendation X.215 according the rules described in CCITT Recommendation T.62bis [10].

The CCITT Recommendations specifically relevant to group 4 facsimile are:

- | | |
|-----------|--|
| T.563 [8] | for the terminal characteristics (terminal characteristics for group 4 facsimile apparatus); |
| T.503 [1] | for the DAP (a Document Application Profile for the interchange of group 4 facsimile documents); |
| T.521 [2] | for the CAP (Communication Application Profile BT0 for document bulk transfer based on the session service (according to the rules in CCITT Recommendation T.62bis [10])). |

The purpose of this annex is to give some implementation rules, based on these Recommendations, leading to the development of a group 4 equipment.

This annex is not a specification, its target is to clarify the use of ODA and DTAM for facsimile applications.

A.1 ODA implementation rules for group 4 class 1 facsimile equipment

ODA consists of a large and embracing set of protocols (CCITT Recommendations T.400 to T.418 [13] and ISO IEC 8613), describing a standard form for documents, in order to exchange them between different systems.

Group 4 class 1 facsimile is considered as a subset of ODA, as defined in CCITT Recommendation T.503 [1].

This model considers that a group 4 class 1 facsimile document is constituted of two parts:

- the document profile;
- the document body.

The document profile gives information about the whole document (page dimension, pel density, compression ...) and identifies the type of document to be emitted.

The document body only contains the specific structure of the document, in terms of layout characteristics.

A facsimile document is represented in a predefined structure, consisting of three Interchange Data Elements (IDEs):

- Document Profile Descriptor;
- Layout Object Descriptor;
- Text Unit,

always transmitted in this order, although some of them may be omitted.

These IDEs are defined by the Office Document Interchange Format (ODIF).

In terms of protocol stack, ODA is the higher "sub-layer" of the Open Systems Interconnection (OSI) Application layer. The structure defined therein is supported by ODIF, which can be considered as the "middle sub-layer" of layer 7.

ODA/ODIF structures use services offered by DTAM at the bottom of layer 7. DTAM defines the full protocol to establish application connections, to transfer documents, and to terminate the connections between two group 4 machines.

DTAM, in its Transparent Mode used for group 4 class 1, uses services offered by the Session layer, as shown in figure A.1.

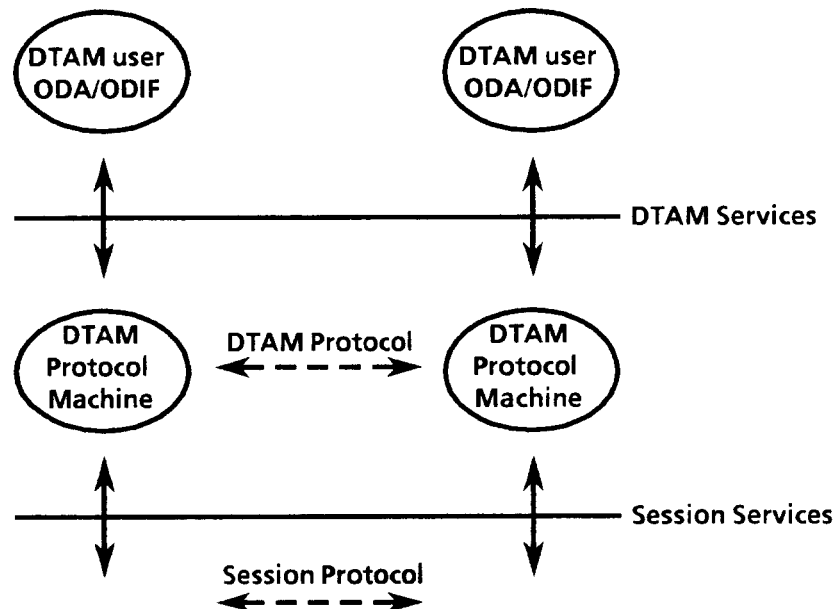


Figure A.1

A.2 DTAM protocols and services

The CAP (see CCITT Recommendation T.521 [2]) selects some service primitives from the DTAM services defined in CCITT Recommendation T.432 [14].

The services are required by ODA/ODIF - as DTAM users - and provided by the two DTAM Protocol Machine (DTAM-PM) using the DTAM protocol in Transparent Mode.

The logical "link" between the two DTAM-PM is called an **ASSOCIATION**.

The following **DTAM Services** are selected for document Bulk Transfer (BT0):

- D-INITIATE requests the establishment of an Association;
- D-TERMINATE terminates the Association normally e.g. without loss of information. This service can only be issued by the sender of the D-INITIATE or if he has data token;
- D-P-ABORT enables a DTAM service provider to abort the Association;
- D-U-ABORT enables a DTAM service user to abort the Association;
- D-CAPABILITY negotiates the application and communication characteristics of an Association;
- D-TRANSFER transmits the document content in bulk;
- D-TOKEN-PLEASE requests the data token to obtain the right to transfer documents;
- D-CONTROL-GIVE is used by a DTAM user to give the control (all available tokens) to the other DTAM user;

- D-U-EXCEPTION-REPORT permits a DTAM user to report exceptional conditions that occurred;
- D-P-EXCEPTION-REPORT permits a provider (DTAM-PM) to notify DTAM users of error situations (protocol errors ...).

NOTE: Advanced versions of CCITT Recommendations T.432 [14] and T.433 [15] define the D-U-EXCEPTION-REPORT and the D-P-EXCEPTION-REPORT service as being for further study. Consequently, no mention is made to these services in the future version of T.521.

To provide these DTAM services, the two DTAM-PMs communicate by exchanging Application Protocol Data Units (ADPUs) which are mapped on the Session Service primitives. The correspondent protocol shows the internal behaviour of a DTAM-PM.

The following DTAM APDUs are used for group 4 class 1 to provide the related DTAM Services:

D-INITIATE-REQUEST	D-CAPABILITY-REQUEST
D-INITIATE-RESPONSE	D-CAPABILITY-RESPONSE

They have the same structure:

```
CHOICE { [4] IMPLICIT SET
  {
    [0] DocumentApplicationsProfile      =02 (T.503)
    [1] DocumentArchitecturesClass     =00 (FDA)
    [2] nonBasicDocCharacteristics
  }
}
```

[0] and [1] are mandatory and have predefined values;

[2] only appears in D-CAPABILITY and is optional.

The D-TRANSFER service does not use an explicit APDU; the "reconstructed" document information shall be in conformity with the ODA structure.

A.2.1 Association establishment

During this phase the two DTAM machines try to establish an Association using the D-INITIATE service and APDUs.

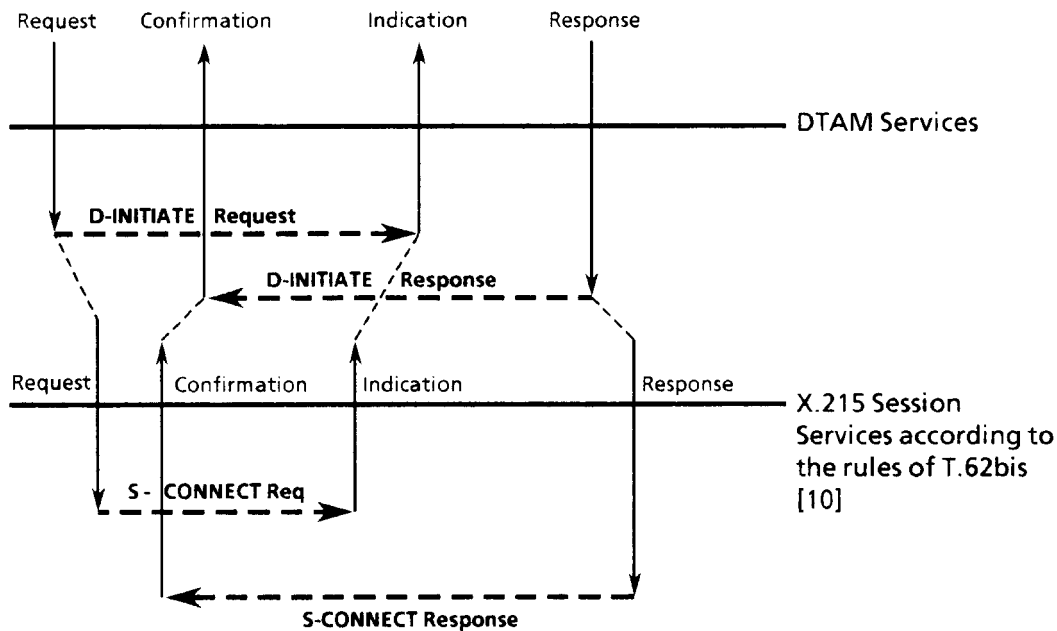


Figure A.2

The parameters of D-INITIATE service for Transparent Mode are (as in table 1-A/CCITT Recommendation T.521 [2]):

Parameter	Request	Indication	Response	Confirm
Transparent Mode	Mandatory			
Telematic requirements	Mandatory	Mandatory*	Mandatory	Mandatory*
Application capabilities	Mandatory	Mandatory*	Mandatory	Mandatory*
Result			User Option	Conditional*
* indicates that a parameter value is semantically equal to the value to its left in the table.				

These parameters are directly mapped to the Session services:

Transparent mode: implicit by use of coding A4 or 6A for D-Initiate Request.

Telematic requirement: if CCITT Recommendation X.215 according to CCITT Recommendation T.62bis [10] is used, direct mapping to the session service parameter "session requirements" (default value) shall be used, if CCITT Recommendation T.62 [9] is used, the telematic requirements are identical to the default value of the parameter "session service functions" (i.e. this parameter may be omitted, since the default value applies).

Application capabilities: this mandatory parameter shall be carried via the S-CONNECT user data.

Result: mapped to the S-CONNECT result parameter.

In addition to those parameters of the D-INITIATE service, some other parameters of CCITT Recommendation T.62 [9] are controlled by the DTAM-PM:

- Session Reference shall be mandatory;
 - Calling Terminal Identification;
 - Date and Time;
 - additional Session Reference Number (optional).
- Non-Basic Session Capabilities shall be mandatory to allow negotiation of window size;
- Session Service Identifier shall have the value 1, indicating Telematic services;
- Inactivity Timer is optional.

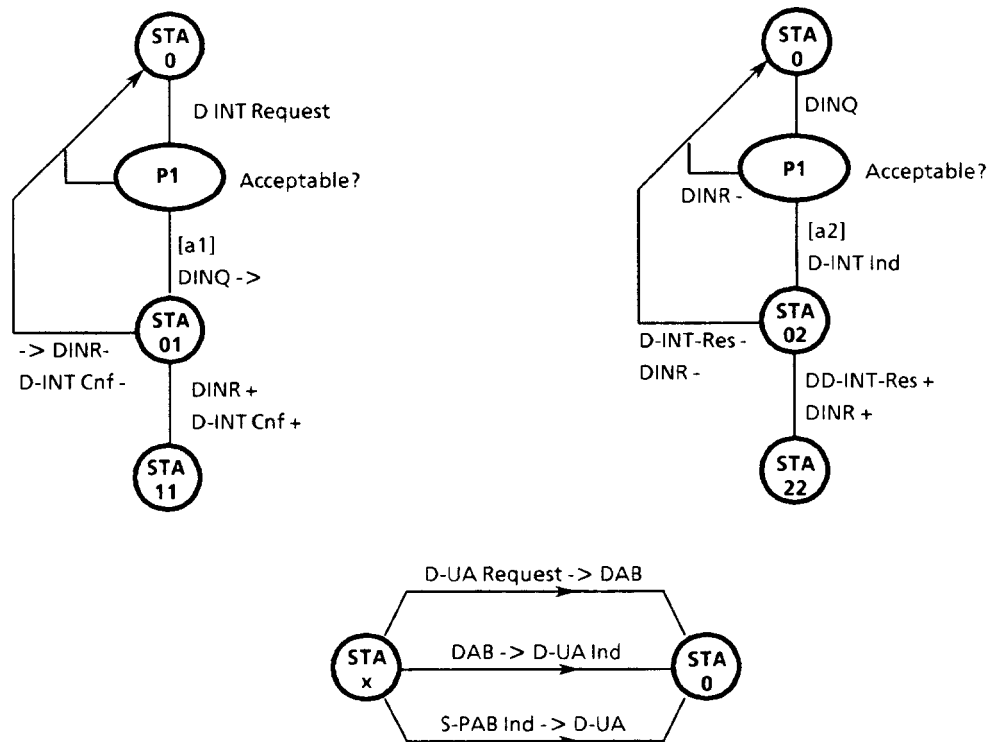


Figure A.3: Association establishment automata

A.2.2 Capability negotiation

During this phase, the two DTAM-PM negotiate the capabilities, using the D-CAPABILITY service and APDUs.

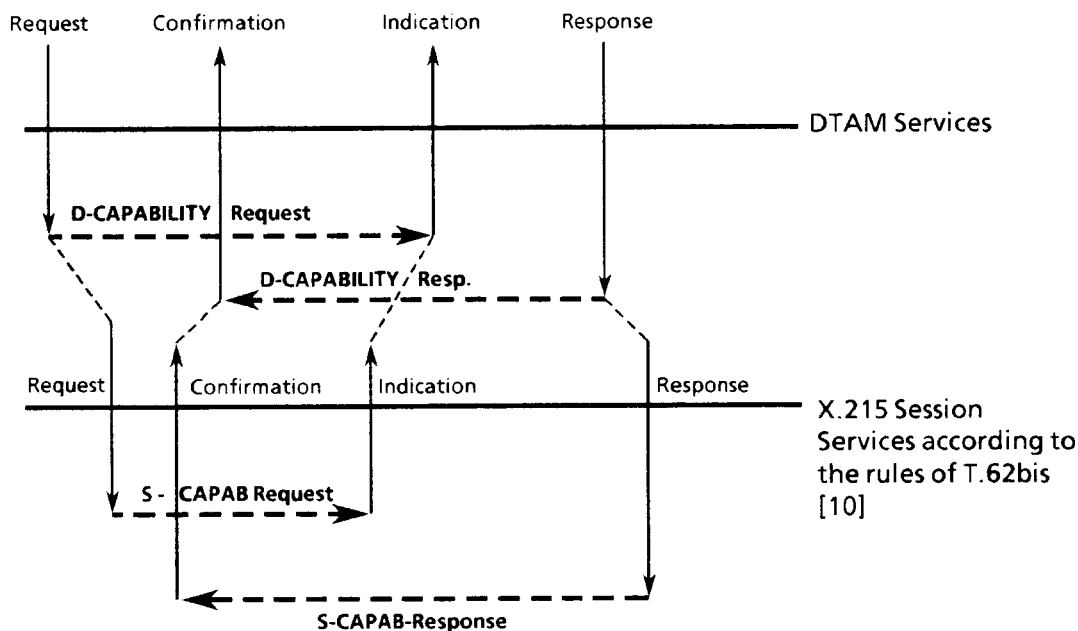


Figure A.4

The parameters of D-CAPABILITY for DTAM Transparent Mode are:

- Application capabilities
- Document application profile --> CCITT Recommendation T.503 [1]
- Document architecture class --> formatted (FDA)
- Non-basic document characteristics --> CCITT Recommendation T.432 [14]

other parameters are not used for the DTAM transparent mode.

These Application Capabilities are mapped to the User Data of the S-CAPAB-DATA Session protocol element.

The initiating/responding DTAM-PM may supply a storage capacity to negotiate the memory size of the communication. This DTAM-PM parameter is mapped to the "storage capacity" parameter of S-Capability as defined in CCITT Recommendation T.62bis [10].

Valid D-CAPABILITY APDU:

```
A4 1E
 80 01 02          (Document Application Profile: facsimile T.503)
 81 01 00          (Document Architecture Class: formatted FDA)
A2 16             (Non Basic Document Characteristics)
  A2 0A           (Page Dimension)
   30 08         (Measure pair)
     80 02 26 C0 (9920: Horizontal dim)
     80 02 36 CE (14030: Vertical dim)
A4 03             (Raster Graphic Presentation feature)
 8B 01 04         (pel Transmission density: 400ppi 3BMU)
A3 03             (Raster Graphic Coding Attribute)
 80 01 00         (uncompressed)
```

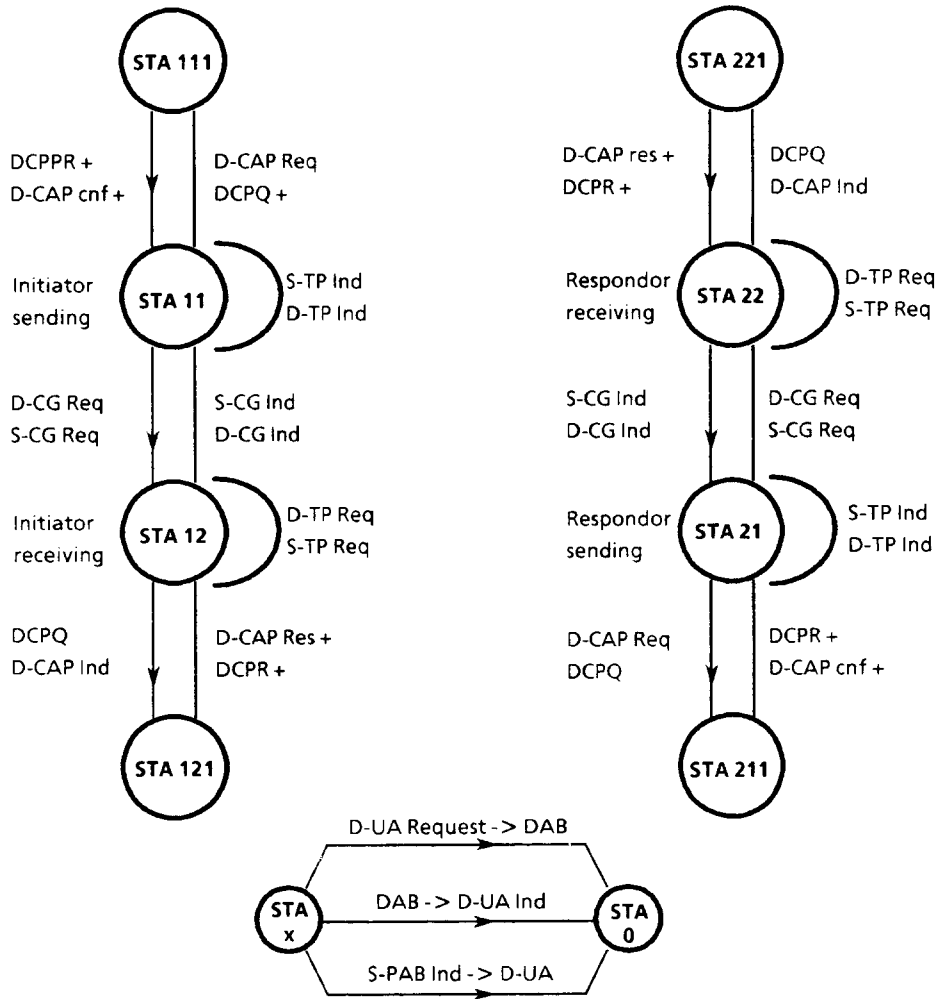


Figure A.5: Automata for capability token and control exchange

A.2.3 Transfer exchange

During this phase, the two DTAM-PM exchange data (i.e. ODA/ODIF document informations) using the S-DATA service and protocol of the session layer.

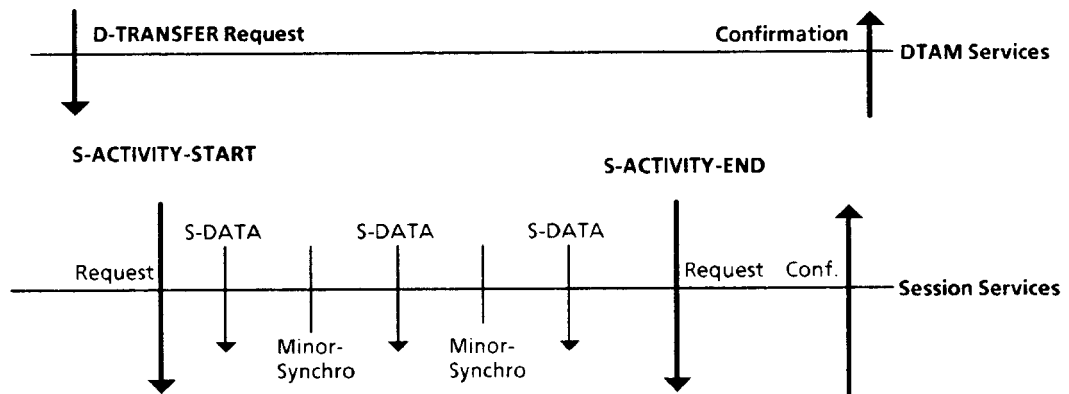
The DTAM transfer service is used to exchange the "Interchange Data Elements (IDEs)" (Document profile, Specific document and page descriptors and Content portions).

For the Document Profile Descriptor, compatibility with CCITT Recommendation T.73 (1984) machines prohibits the sending of this element, part of it shall be reconstructed from implicit parameters and part of it shall be sent via the User Data of the S-ACTIVITY-START protocol element.

The transfer also uses the minor-synchronization functional unit according to special rules defined in CCITT Recommendation T.521 [2].

There is no visible DTAM protocol element associated with the Transfer Service.

The D-TRANSFER Indication shall be reconstructed from elements in the S-DATA and S-ACTIVITY-START, in addition to implicit parameters.



NOTE 1: Only the messages exchanged by the requesting DTAM-PM are shown in this picture.

NOTE 2: In Minor synchro mechanism, a single vertical line represents both request and confirmation of the synchro point.

Figure A.6

The parameters of the D-TRANSFER are:

- Document information (Document Profile Desc., Object Desc., Text Unit);
- Document Information type, mandatory: start from the beginning;
- Document reference information; mandatory;
- Result; mandatory (for confirmation);
- Checkpoint mechanism; mandatory and defined by CCITT Recommendation T.521 [2] (the number of IDE (Interchange Data Element) per segment = 2).

NOTE: The parameter "Checkpoint mechanism" will be renamed in the future versions of T.430 series of ITU-T Recommendations and ITU-T Recommendation T.521. The new parameter name will be: "Checkpoint value".

These parameters are mapped to the session services:

- Document Information Type and Document Reference Information are mapped to the equivalent parameters of the S-ACTIVITY-START;
- the checkpoint mechanism is according to CCITT Recommendation T.62bis [10] on a "page by page" basis;
- the result goes to equivalent parameter;
- the ODA structure is:
 - Document Profile descriptor;
 - Specific Document layout descriptor;
 - Specific basic Page layout descriptor n times (until completion of document transfer);
 - Content portion.

For group 4 class 1 facsimile, the Document Profile Descriptor shall not be sent; only the other elements shall go on the S-DATA protocol element. The Document Profile shall have to be reconstructed as follows:

Document Profile Descriptor:

[1] Specific layout structures	mandatory	: specific document and pagelayout
[2] Document characteristics	mandatory	
[0] Document application profile	mandatory:	G4 fax(2) as in D-INITIATE
[1] Document architecture class	mandatory	: FDA (0) " - "
[5] Contents architecture class	implicit	: raster graphics
[6] Interchange format class	implicit	: "B" of ODIF
[2] Non basic document characteristics	non mandatory	

Parameters [1], [2 [0]], [2 [1]], [2 [5]], [2 [6]] are mandatory and easy to reconstruct (see CCITT Recommendation T.503 [1] or D-INITIATE parameters); nevertheless parameters [2 [0]], [2 [1]] are sent even if it is not necessary.

The only element which cannot be guessed is the non-Basic Document Characteristics which is sent via the S-ACTIVITY-START user data field.

At DTAM user level, the automata are rather simple (in the absence of incidents); all the complexity is at the session level with ACTIVITY management and Minor-Synchronization functional units and controlled by the DTAM-PM.

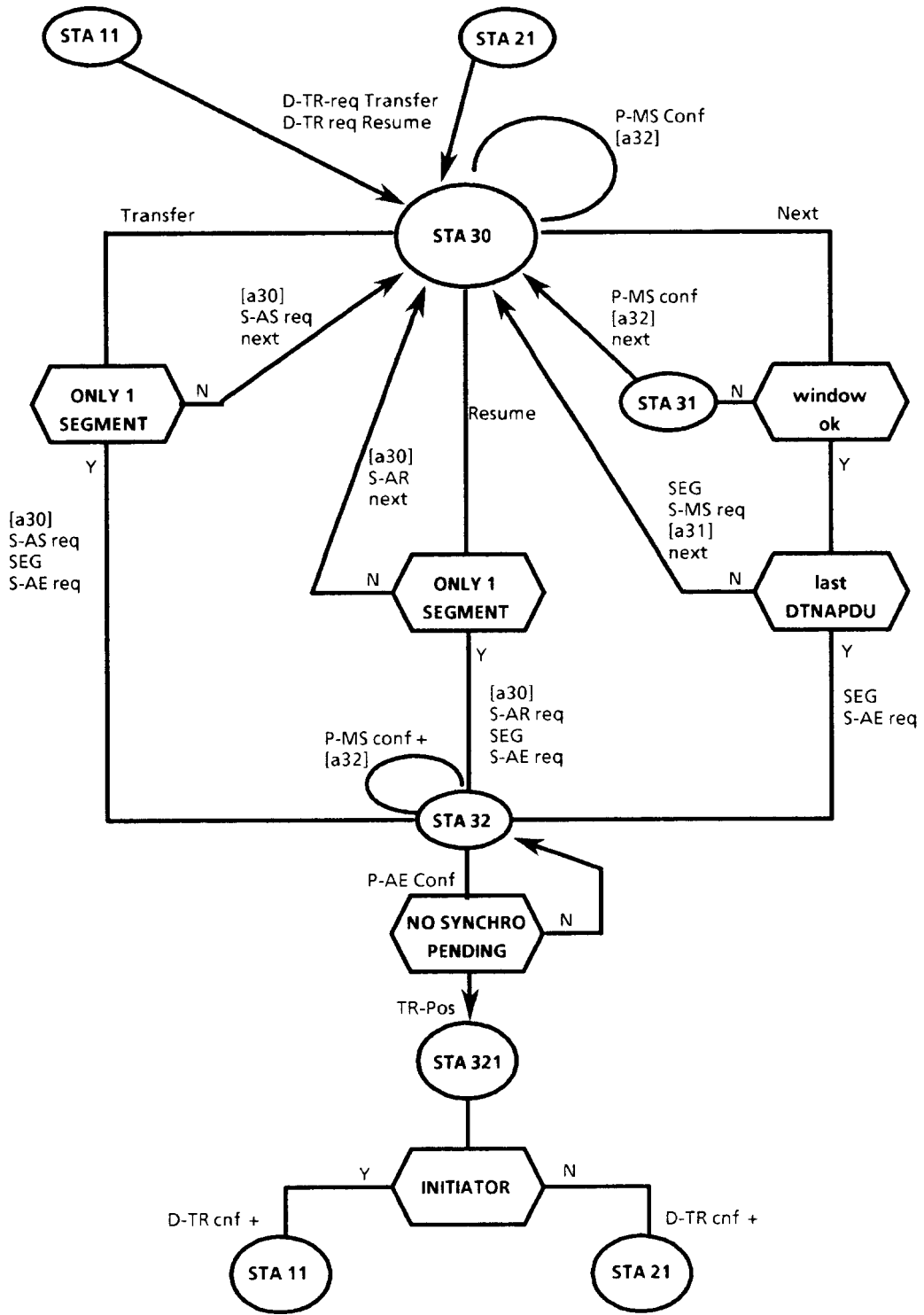


Figure A.7: DTAM automata for transfer phase

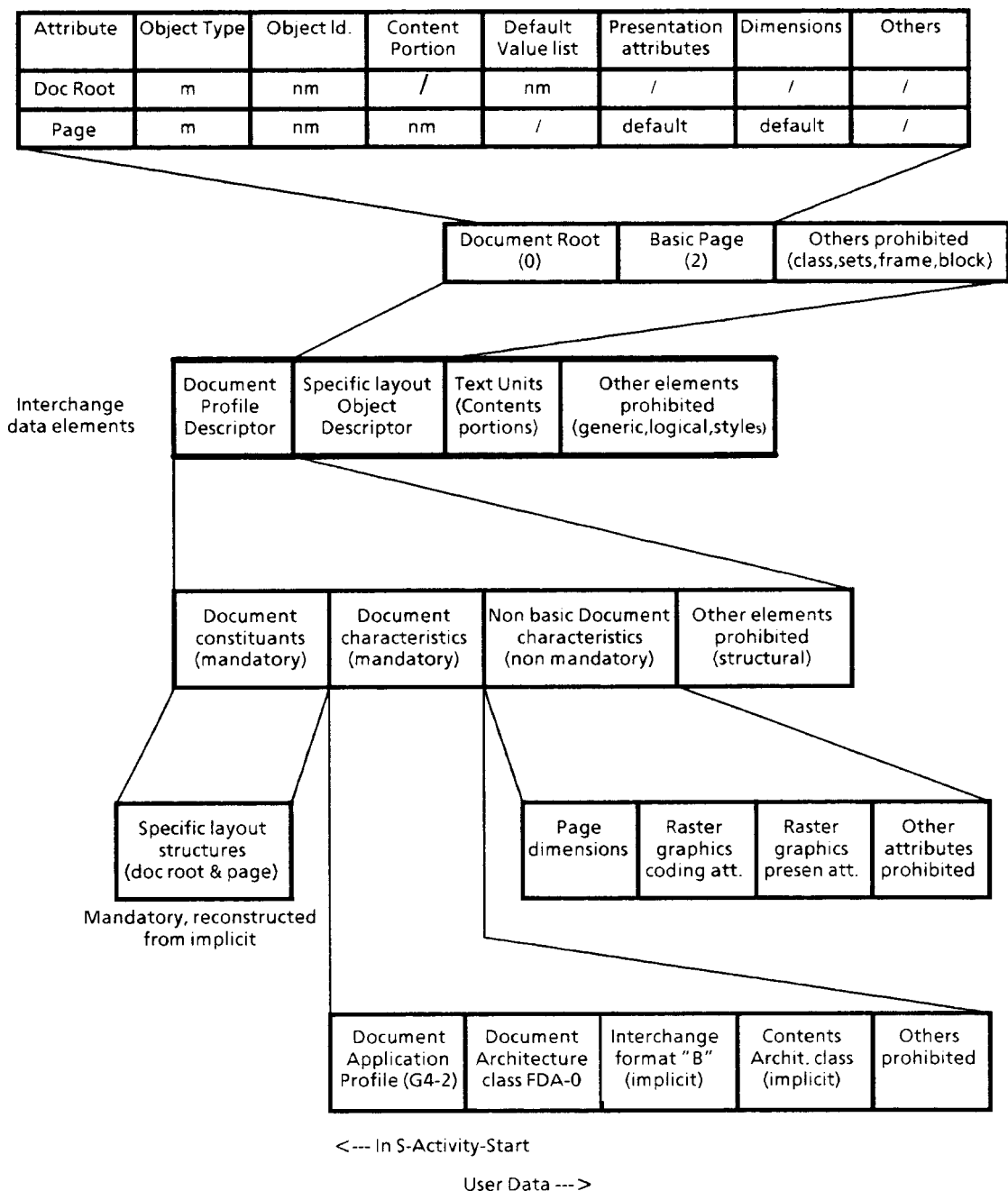


Figure A.8: Allowed interchange data elements for G4 class 1 facsimile (from table 2/T.503 [1])

A.2.4 Normal and abnormal termination

During this phase, the two DTAM machines put an end to their association due to the normal termination of the transmission or due to an incident with an origin within a machine or within the network.

The DTAM service elements are:

- D-TERMINATE
- D-P-ABORT
- D-U-ABORT
- D-P-EXCEPTION-REPORT
- D-U-EXCEPTION-REPORT

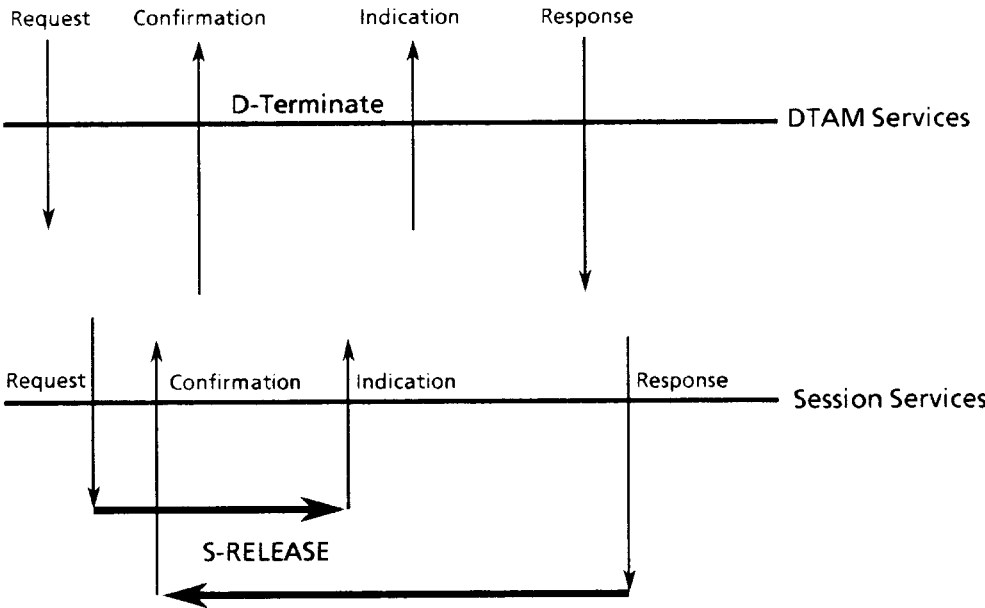


Figure A.9

In DTAM Transparent Mode, the D-TERMINATE service has no protocol element associated with it. The reasons are mapped into the parameters of S-RELEASE.

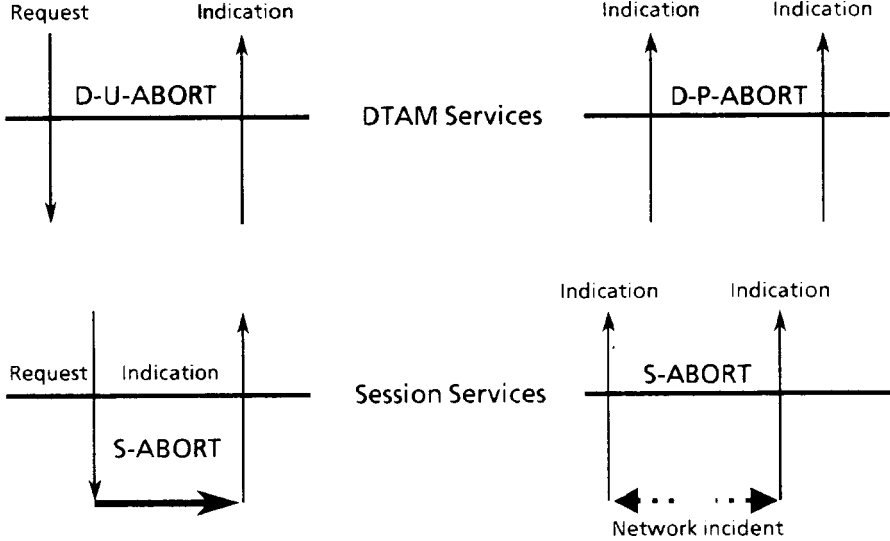
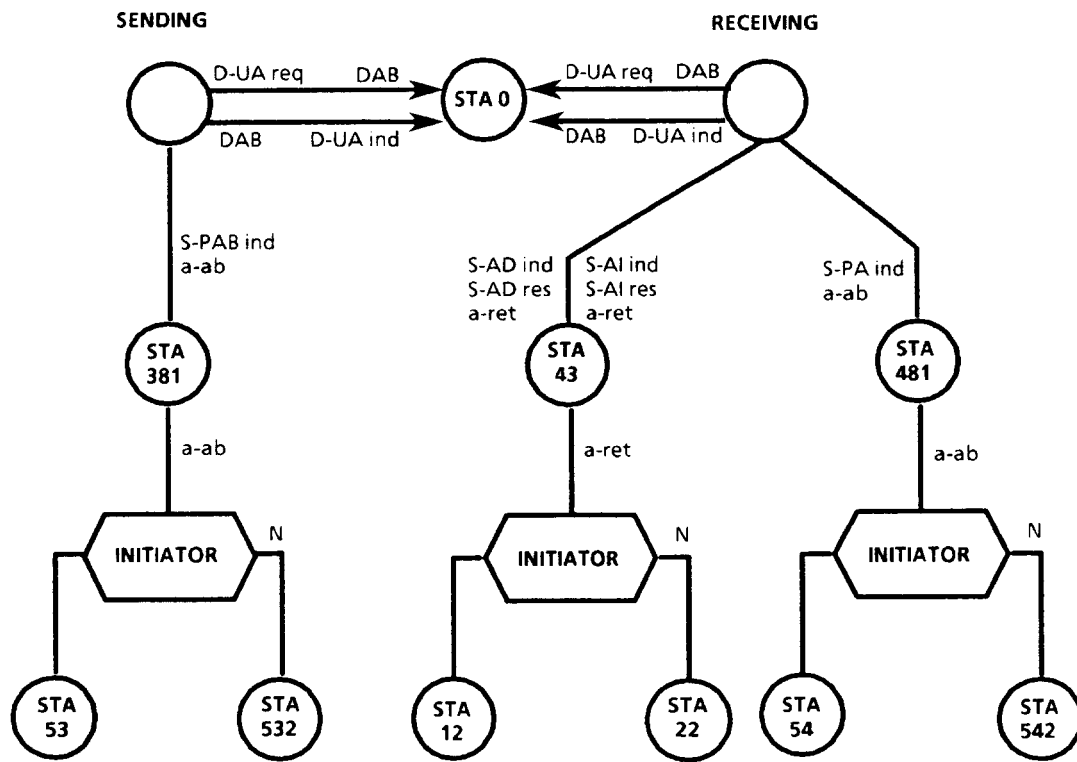


Figure A.10

The D-U-ABORT and D-P-ABORT do not have ADPUs associated with them because an abort means that no other information will be exchanged and therefore there is no way to actually run a protocol exchange. The parameters of the DTAM ABORT service are mapped to the parameters of the S-ABORT service.



recovery states sending

recovery states receiving

Figure A.11: DTAM automata abnormal termination

Annex B (informative): Comparison between CCITT Recommendation T.73 and T.400/T.500 series coding in group 4 class 1 facsimile equipment

Introduction

The present ETS concerns the study of compatibility between CCITT Recommendations given in CCITT "Red Book" of 1984 and those given in CCITT "Blue Book" 1988, both concerning facsimile group 4 class 1 equipment.

Clause B.1 gives some basic information about APDUs used and the Session services invoked. Clause B.2 compares Interchange Format. Clause B.3 gives the Abstract Syntax Notation No. 1 (ASN.1) definition of APDUs. Clause B.4 gives an extensive description of protocol elements related to group 4 class 1. Clause B.5 compares the coding of all relevant parameters described in both CCITT Recommendation T.73 and the T.400/T.500 series of CCITT Recommendations. Finally, Clause B.6 gives the conclusion.

CCITT Recommendation T.73 (1984) "Document interchange protocol for the telematic services" was subdivided into a series of new recommendations, and the description of terminals (CCITT Recommendation T.5 (1984)) "General aspects of Group 4 facsimile apparatus" was superseded by CCITT Recommendation T.563 [8]. It needs to be verified if there is compatibility between these different Recommendations.

The verification made here is based on ASN.1 description of protocol elements.

B.1 Introduction of CCITT Recommendation T.62, T.73 and T.400 protocol elements

CCITT Recommendation T.73 refers to protocol elements (see CCITT Recommendation T.62 [9]), while DTAM refers to CCITT Recommendation X.215 session service primitives.

Table B.1 refers to the content of table B.1 of CCITT Recommendation X.225 and consists, in addition, (on the left) of the name of the transmitted DTAM APDU.

In the negotiation and invocation (Session User Data = 'SUD' of: CONNECT, ACTIVITY-START, CAPABILITY) in CCITT Recommendation T.73, the Presentation Capabilities descriptor is used for the transmission of each characteristic.

The T.400/T.500 series of CCITT Recommendations consists of the DTAM APDU of the parameter 'Application Capabilities' (for D-INITIATE and D-CAPABILITY), which is transmitted in the SUD. The S-ACTIVITY-START user data are directly defined in CCITT Recommendation T.433 [15].

Table B.1

DTAM APDU	Session service/SUD of session commands
D-INITIATE-REQ PDU	S-CONNECT req.ind / CSS
D-INITIATE-RESP PDU	S-CONNECT resq.conf / RSSP
D-INITIATE-RESP PDU	S-CONNECT resq.conf / RSSN
Document segments	S-DATA / CSUI-CDUI
Directly defined in T.433 [15]	S-ACTIVITY-START / CSUI-CDS
Directly defined in T.433 [15]	S-ACTIVITY-RESUME / CSUI-CDC
D-CAPABILITY-REQ PDU	S-CAPABILITY-DATA / CSUI-CDCL
D-CAPABILITY-RESP PDU	S-CAPABILITY-DATA-ACK / RSUI-RDCLP

B.2 Comparison of interchange format

B.2.1 In CCITT Recommendation T.73

CCITT Recommendation T.73 provides the following protocol elements for the document transmission (S-DATA):

- document profile descriptor;
- generic layout descriptor;
- specific layout descriptor;
- text unit.

For facsimile group 4 class 1 an interchange format (TIF.0) is prescribed, reducing the quantity of protocol elements to two. Only the two last will be interchanged during the communication, because there is only one specific layout structure (CCITT Recommendation T.73, section 6.3) in the document descriptor and page descriptor definition.

Each protocol element consists of several attributes. The transmission sequence of protocol elements is determined by the 'naturally' ordered sequence (see CCITT Recommendation T.415 [12]). The document descriptor is followed by one/several page descriptor(s), while each text unit is placed immediately after the associated page descriptor (see CCITT Recommendation T.73, section 6.2).

B.2.2 In the CCITT T.400/T.500 series of Recommendations

CCITT Recommendation T.503 [1] also gives a description of a facsimile group 4 document. A document is considered as a sequence of pages (CCITT Recommendation T.503 [1], section 5.3.1). The content of one page consists of a raster graphic content only. This document only consists of specific layout elements (CCITT Recommendation T.503 [1], section 6.1.1).

The interchange format TIF.0 will not be noted in an explicit way in the CCITT T.400/T.500 series of Recommendations. The parameter of these series, which will be appropriate for the interchange format, is called 'documentArchitecture_Class'. The value according to the parameters is identical. In order to transmit facsimile group 4 class 1 documents, structure elements, such as 'Document layout root', 'Page' and 'Text unit' will be used according to CCITT Recommendation T.503 [1]. A definition of these elements is given in CCITT Recommendation T.412 [11].

In order to define the object transmission sequence, CCITT Recommendation T.503 [1] refers to the interchange format class B, which is specified in CCITT Recommendation T.415 [12]. The data flow is defined in CCITT Recommendation T.415 [12], section 5.3.

According to CCITT Recommendation T.503 [1], section 6.1.1, only the specific layout structure can be used for the facsimile group 4 documents. The transmission of the text units will be done just after the appropriate specific layout objects (pages) (interchange format class B in CCITT Recommendation T.415 [12], section 5.3).

As a matter of fact, the document profile descriptor is prescribed by CCITT Recommendation T.503 [1], but will not be transmitted. CCITT Recommendation T.433 [15] provides the possibility that the document profile may not be transmitted between both terminals as a part of the document data, in order to realize an efficient data transmission. CCITT Recommendation T.521 [2] gives an explicit description about the procedure, that a document profile will not be transmitted, but that it will be reconstructed by the user by the help of document characteristics (CDS data).

There is compatibility between CCITT Recommendation T.73 and the CCITT T.400/T.500 series of Recommendations about the quantity and the sequence of transmitted objects.

B.3 Abstract syntax definition of APDUs for use of session service

```
[1] D-INITIATE-REQ ::= CHOICE
    { [4] IMPLICIT ApplicationCapabilities }

Application-Capabilities ::= SET {
    documentApplicationProfileT73 [0] IMPLICIT OCTET STRING OPTIONAL
    --'02'H document application profile (T.503)
    documentArchitectureClass [1] IMPLICIT OCTET STRING OPTIONAL
    --'00'H means FDA }

[2] D-INITIATE-RESP ::= CHOICE
    { [4] IMPLICIT ApplicationCapabilities }

Application-Capabilities ::= SET {
    documentApplicationProfileT73 [0] IMPLICIT OCTET STRING OPTIONAL
    --'02'H document application profile (T.503)
    documentArchitectureClass [1] IMPLICIT OCTET STRING OPTIONAL
    --'00'H means FDA }

[3] D-CAPABILITY-REQ ::= CHOICE
    { [4] IMPLICIT ApplicationCapabilities }

ApplicationCapabilities ::= SET {
    documentApplicationProfileT73 [0] IMPLICIT OCTET STRING OPTIONAL
    documentArchitectureClass [1] IMPLICIT OCTET STRING OPTIONAL
    nonBasicDocCharacteristics [2] IMPLICIT
        NonBasicDocCharacteristics
        OPTIONAL }

[4] D-CAPABILITY-RESP ::= CHOICE
    { [4] IMPLICIT ApplicationCapabilities }

ApplicationCapabilities ::= SET {
    documentApplicationProfileT73 [0] IMPLICIT OCTET STRING OPTIONAL
    documentArchitectureClass [1] IMPLICIT OCTET STRING OPTIONAL
    nonBasicDocCharacteristics [2] IMPLICIT
        NonBasicDocCharacteristics
        OPTIONAL }
```

B.4 ASN.1 description of protocol elements

B.4.1 Correspondence of attributes and values

In CCITT Recommendation T.73 only one interchange data stream is specified, which corresponds to the interchange format Class B in CCITT Recommendation T.415 [12].

The "Presentation Capabilities Descriptor" specified in CCITT Recommendation T.73 corresponds to the "Document-Characteristics" in CCITT Recommendation T.433 [15].

Several attributes and attribute values have different names in CCITT Recommendation T.73 and in CCITT Recommendations T.411 [16], T.412 [11], and T.415 [12].

Table C.1 of CCITT Recommendation T.411 [16] lists all attributes of CCITT Recommendation T.73 along with their locations with the corresponding names and locations in CCITT Recommendations T.411 [16], T.412 [11], and T.415 [12]. An abstract of table C.1 of CCITT Recommendation T.411 [16] concerning Group 4 Class 1 protocol elements is given in table B.2.

Table B.1

T.73 (1984)		T.410 Series	
Attribute / Value	Location (section)	Attribute / Value	Location (section)
"Object type" 'document' 'page set' 'page' 'frame' 'block'	2.5.3.1	"Object type" 'document layout root' 'page set' 'page' 'frame' 'block'	T.412, 5.3.1.1
"object identifier"	2.5.3.2	"object identifier" or "object class identifier"	T.412, 5.3.1.2 T.412, 5.3.1.3
"reference to corresponding generic object"	2.5.3.3	"object class"	T.412, 5.3.3.1
"reference to subordinate objects"	2.5.3.4	"subordinates"	T.412, 5.3.3.2
"reference to content portions"	2.5.3.5	"content portions"	T.412, 5.3.3.3
"user-readable comments"	2.5.3.6	"user readable comments"	T.412, 5.3.5.1
"default value list"	2.5.3.7	"default value list"	T.412, 5.3.5.5
"position"	2.5.3.8	"position"	T.412, 5.4.1.1
"dimensions"	2.5.3.9	"dimensions"	T.412, 5.4.1.2
"claiming"	2.5.3.10	DELETED	
"transparent" 'transparent'	2.5.3.10	"transparency" 'transparent'	T.412, 5.4.3.2
"content architecture class" 'character box element' 'photographic element'	2.5.4.1	"content type" 'formatted character content architecture' 'formatted raster graphics content architectures'	T.412, 5.3.4.1

Table B.1 (continued)

T.73 (1984)		T.410 Series	
Attribute / Value	Location (section)	Attribute / Value	Location (section)
Presentation attributes for photographic elements		Presentation attributes for raster graphics content architectures	
"pel path" '0', '90', '180', '270'	2.5.4.3.1	"pel path" '0', '90', '180', '270'	T.417, 6.1.3
"line progression" '90', '270'	2.5.4.3.1	"line progression" '90', '270'	T.417, 6.1.2
"pel transmission density" '180', '200', '240', '300', '400', '600', '1200' (pels per 25,4 mm)	2.5.4.3.2	"pel transmission density" '6', '5', '4', '3', '2', '1' (BMU per pel spacing)	T.417, 6.2.2
"initial offset"	2.5.4.3.3	"initial offset"	T.417, 6.2.1
Attributes of content portions		Content portion attributes	
"content portion identifier"		"content identifier-layout"	T.412, 5.9.1
"type of coding" 'T.61', 'T.6'		"type of coding" 'ISO 2022', 'T.6'	T.412, 5.9.2
Coding attributes for photographic elements		Coding attributes for raster graphics content architectures	
"number of pels per line"	2.5.5.3	"number of pels per line"	T.417, 7.2.3
"number of discarded pels"	2.5.5.3	"number of discarded pels"	T.417, 7.2.4
"number of lines"	2.5.5.3	"number of lines"	T.417, 7.2.2
"compression"	2.5.5.3	"compression"	T.417, 7.2.1
"alternative graphic representation"	2.5.5.4	"alternative representation"	T.412, 5.9.3.2
Document profile attributes		Document profile attributes	
"reference to generic layout structure" value = obj.id. "0"	2.3.3	"generic layout structure" 'partial'	T.414, 5.2.1
"reference to generic layout structure" value = obj.id. "1"	2.3.3	"specific layout structure" 'present'	T.414, 5.2.2
presentation capabilities	2.3.3	document characteristics	T.414, 5.3
other document profile attributes	2.3.3	document management attributes	T.414, 5.4

Table B.1 (concluded)

T.73 (1984)		T.410 Series	
Attribute / Value	Location (section)	Attribute / Value	Location (section)
basic terminal characteristics 'Teletex' 'Group 4 Facsimile' 'Mixed Mode'	4.4	document application profile (no value for Teletex) 'Group 4 Facsimile' (no value Mixed Mode)	T.414, 5.3.1
interchange format 'TIF.0' 'TIF.1'	4.4	"document architecture class" (no value for TIF.0) 'formatted'	T.414, 5.3.3
non basic terminal capabilities "graphic character sets" "control character sets"	4.4	non-basic document characteristics DELETED DELETED	T.414, 5.3.7
"page dimensions"		"page dimensions"	T.414,5.3.7.4.1
"coding attributes"		"coding attributes" 'raster graphics coding attributes'	T.414, 5.3.7.5
"presentation attributes"		"character presentation features" "raster graphics presentation features"	T.414, 5.3.7.6
non-basic structural capabilities "number of objects per page"	4.4	non-basic structure characteristics "number of objects per page"	T.414, 5.3.8 T.414, 5.3.8.1
Conventions: - names of attributes in double quotation marks; - names of attributes values in single quotation marks.			

B.4.2 Protocol elements according to CCITT Recommendation T.73 and the T.400/T.500 series of CCITT Recommendations

This subclause gives the Abstract Syntax Notation No. 1 (ASN.1) description of protocol elements:

- according to CCITT Recommendation T.73 (1984);
- according to the T.400/T.500 series of CCITT Recommendations (1988).

In order to facilitate the comparison, protocol elements of the same significance have been tabulated next to each other, even if they do not have the same names/attribute names (see subclause B.4.1).

ASN.1 DESCRIPTION OF PROTOCOL ELEMENTS ACCORDING TO T.73 (1984)

```

ProtocolElement ::= CHOICE {
    documentProfileDescriptor [0] IMPLICIT DocumentProfileDescriptor
    specificLayoutDescriptor [2] IMPLICIT LayoutDescriptor
    textUnit [3] IMPLICIT TextUnit
    presentationCapabilitiesDescriptor [4] IMPLICIT Presentationcapabilities }

DocumentProfileDescriptor ::= SET {
    referenceToSpecificLayoutStructure [1] IMPLICIT ObjectReferencename OPTIONAL
    presentationCapabilities [2] IMPLICIT PresentationCapabilities
                                OPTIONAL }

PresentationCapabilities ::= SET {
    basicTerminalCharacteristics [0] IMPLICIT BasicTerminalCharacteristics
    interchangeFormat [1] IMPLICIT InterchangeFormat
    nonBasicTerminalCapabilities [2] IMPLICIT NonBasicTerminalCapabilities
                                OPTIONAL }

BasicTerminalCharacteristics ::= OCTET STRING
    -- each octet has value 2
    -- indicates Facsimile according to T.5 and T.6

```

ASN.1 DESCRIPTION OF PROTOCOL ELEMENTS ACCORDING TO T.400/T500 SERIES (1988)

```

Interchange-Data-Element ::= CHOICE {
    document-profile [0] IMPLICIT Document-Profile-Descriptor
    layout-object [2] IMPLICIT Layout-Object-Descriptor
    content-portion [3] IMPLICIT Text-Unit }

Document-Profile-Descriptor ::= SET {
    specific-layout-structure [1] IMPLICIT NumericString
    document-characteristics [2] IMPLICIT Document-Characteristics }

Document-Characteristics ::= SET {
    -- for the TRANSFER Service
    document-application-profile [0] IMPLICIT INTEGER { group-4-facsimile (2) }
    -- 2 indicates G4 facsimilé according to T.503
    document-architecture-class [1] IMPLICIT INTEGER { formatted (0) }
    -- value 0 indicates formatted FDA
    non-basic-doc-characteristics [2] IMPLICIT Non-Basic-Doc-Characteristics
                                OPTIONAL
    content-architecture-classes [5] IMPLICIT SET OF OBJECT IDENTIFIER
    -- implicit raster graphics
    interchange-format-class [6] IMPLICIT INTEGER { if-b (1) }
    -- value 1 indicates format B of ODIF }

```

```

InterchangeFormat ::= OCTET STRING
                    -- each octet has value 0
                    -- 0 indicates TIF.0

documentArchitectureClass [1] IMPLICIT INTEGER OPTIONAL
nonBasicDocCharacteristics [2] IMPLICIT Non-Basic-Doc-Characteristics
                               OPTIONAL }

NonBasicTerminalCapabilities ::= SET {
    pageDimensions [2] IMPLICIT SEQUENCE OF MeasurePair OPTIONAL
    codingAttributes [3] IMPLICIT SEQUENCE OF CodingAttribute
                               OPTIONAL
    presentationAttributes [4] IMPLICIT SEQUENCE OF PresentationAttribute
                               OPTIONAL }

MeasurePair ::= SEQUENCE { Measure , Measure }

Measure ::= CHOICE {
    fixedMeasure [0] IMPLICIT INTEGER
    variableMeasure [1] IMPLICIT INTEGER }

CodingAttribute ::= CHOICE {
    compression [0] IMPLICIT Compression }

Application-Capabilities ::= SET {
    -- for the CAPABILITY Service
    documentApplicationProfileT73 [0] IMPLICIT INTEGER OPTIONAL
                                   { group-4-facsimile (2) }
                                   { formatted (0) }

    Non-Basic-Doc-Characteristics ::= SET {
        page-dimensions [2] IMPLICIT SET OF Dimension-Pair OPTIONAL
        ra-gr-coding-attributes [3] IMPLICIT SET OF Ra-Gr-Coding-Attribute
                                   OPTIONAL
        ra-gr-presentation-features [4] IMPLICIT SET OF Ra-Gr-Presentation-Feature
                                   OPTIONAL }

    Dimension-Pair ::= SEQUENCE {
        horizontal [0] IMPLICIT INTEGER
        vertical CHOICE {
            fixed [0] IMPLICIT INTEGER
            variable [1] IMPLICIT INTEGER } }

    Ra-Gr-Coding-Attribute ::= {
        compression [0] IMPLICIT Compression }
}

```

Compression ::= INTEGER { uncompressed (0) , compressed (1) }

PresentationAttribute ::= CHOICE {
pelPath [9] IMPLICIT OneOfFourAngles OPTIONAL
photogrphicLineProgression [10] IMPLICIT OneOfTwoAngles OPTIONAL
pelTransmissionDensity [11] IMPLICIT PelTransmissionDensity OPTIONAL }

LayoutDescriptor ::= SEQUENCE {
layoutObjectType LayoutObjectType
layoutDescriptorBody LayoutDescriptorBody OPTIONAL }

LayoutObjectType ::= INTEGER { document (0), page (2) }

object-identifier Object-or-Class-Identifier OPTIONAL
content-portion [1] IMPLICIT SEQUENCE OF NumericString OPTIONAL
-- only applicable for page
dimensions [4] IMPLICIT Dimension-Pair OPTIONAL
presentation-attributes [6] IMPLICIT Presentation-Attributes OPTIONAL
default-value-lists [7] IMPLICIT Default-Value-Lists-Layout OPTIONAL
-- only applicable for document layout root }

Compression ::= INTEGER { uncompressed (0) , compressed (1) }

Ra-Gr-Presentation-Feature ::= CHOICE {
pel-path [9] IMPLICIT One-Of-Four-Angles
line-progression [10] IMPLICIT One-Of-Two-Angles
pel-transmission-density [11] IMPLICIT Pel-Transmission-Density }

Layout-Object-Descriptor ::= SEQUENCE {
object-type Layout-Object-Type
descriptor-body Layout-Object-Descriptor-Body OPTIIONAL }

Layout-Object-Type ::= INTEGER { document-layout-root (0) , page (2) }

Layout-Object-Descriptor-Body ::= SET {

```

LayoutDescriptorBody ::= SET {
  objectIdentifier      ObjectReferenceName OPTIONAL
  referencesTo          CHOICE {
    subordinateObjects  [0] IMPLICIT SEQUENCE OF NumericString
    contentPortions     [1] IMPLICIT SEQUENCE OF NumericString}OPTIONAL
  dimensions            [4] IMPLICIT MeasurePair OPTIONAL
  presentationAttributes [6] IMPLICIT PresentationAttributes OPTIONAL
  defaultValueLists    [7] IMPLICIT SEQUENCE OF DefaultValueList
                        OPTIONAL }

ObjectReferenceName ::= [APPLICATION 1] IMPLICIT PrintableString
                    -- digits 0 to 9 with space as a delimiter

DefaultValueList ::= CHOICE {
  pageAttributes [2] IMPLICIT PageAttributes }

PageAttributes ::= SET {
  dimensions < Attribute OPTIONAL
  presentationAttributes < Attribute OPTIONAL }

Attribute ::= CHOICE {
  dimensions [1] IMPLICIT Measure-Pair
  presentation-attribute [3] IMPLICIT Presentation-Attributes }

Presentation-Attributes ::= SET {
  content-type Content-Type OPTIONAL
  raster-graphics-attributes [1] IMPLICIT Raster-Graphics-Attributes OPTIONAL}

Content-Type ::= [APPLICATION 2] IMPLICIT INTEGER
              { formatted-raster-graphics (1) }

Object-or-Class-Identifier ::= [APPLICATION 1] IMPLICIT PrintableString

Default-Value-List-Layout ::= {
  page-attributes [2] IMPLICIT Page-Attributes OPTIONAL }

```


PresentationAttributes	::= SET {			Raster-Graphics-Attributes	::= SET {
contentType	ContentType OPTIONAL			pel-path	[0] IMPLICIT One-Of-Four-Angles OPTIONAL
photographicAttributes	[1] IMPLICIT PhotographicAttributes OPTIONAL }			line-progression	[1] IMPLICIT One-Of-Two-Angles OPTIONAL
				pel-transmission-density	[2] IMPLICIT Pel-Transmission-Density OPTIONAL}
ContentType	::= [APPLICATION 2] IMPLICIT INTEGER			One-Of-Four-Angles	::= INTEGER { d0 (0) }
	{ photographic (1) }			One-Of-Two-Angles	::= INTEGER { d270 (1) }
PhotographicAttributes	::= SET {			Pel-Transmission-Density	::= INTEGER {
pelPath	[0] IMPLICIT OneOfFourAngles OPTIONAL			p6 (1) -- 6 BMU 200 ppi	
lineProgression	[1] IMPLICIT OneOfTwoAngles OPTIONAL			p5 (2) -- 5 BMU 240 ppi	
pelTransmissionDensity	[2] IMPLICIT PelTransmissionDensity OPTIONAL }			p4 (3) -- 4 BMU 300 ppi	
OneOfFourAngles	::= INTEGER { d0 (0) }			p3 (4) -- 3 BMU 400 ppi	
OneOfTwoAngles	::= INTEGER { d270 (3) }			p2 (5) -- 2 BMU 600 ppi	
				p1 (6) -- 1 BMU 1200ppi }	

```

PelTransmissionDensity ::= INTEGER { p180 (0) ,
                                   p200 (1) ,
                                   p240 (2) ,
                                   p300 (3) ,
                                   p400 (4) ,
                                   p600 (5) ,
                                   p1200 (6) }

Measure-Pair ::= SEQUENCE {
    horizontal [0] IMPLICIT INTEGER
    vertical [0] IMPLICIT INTEGER }

Text-Unit ::= SEQUENCE {
    content-portion-attributes Content-Portion-Attributes OPTIONAL
    content-information Content-Information }

Content-Portion-Attributes ::= SET {
    content-identifier-layout Content-Portion-Identifier OPTIONAL
    type-of-coding Type-Of-Coding OPTIONAL
    raster-gr-coding-attributes [2] IMPLICIT Raster-Gr-Coding-Attributes OPTIONAL}

TextUnit ::= SEQUENCE {
    contentPortionAttributes ContentPortionAttributes OPTIONAL
    textInformation TextInformation }

ContentPortionAttributes ::= SET {
    contentPortionIdentifier PortionReferenceName OPTIONAL
    typeOfCoding [0] IMPLICIT TypeOfCoding OPTIONAL
    codingAttributes CHOICE {
        t6Attributes [2] IMPLICIT T6Attributes } OPTIONAL }

PortionReferenceName ::= [APPLICATION 0] IMPLICIT PrintableString
-- digits 0 to 9 with space as a delimiter

TypeOfCoding ::= INTEGER { t6 (1) }

Content-Portion-Identifier ::= [APPLICATION 0] IMPLICIT PrintableString

Type-Of-Coding ::= [0] IMPLICIT INTEGER { T6 (1) }

Raster-Gr-Coding-Attributes ::= SET {
    number-of-pels-per-line [0] IMPLICIT INTEGER OPTIONAL
    compression [2] IMPLICIT Compression OPTIONAL
    number-of-discarded-pels [3] IMPLICIT INTEGER OPTIONAL }

Content-Information ::= OCTET STRING

```

```
T6Attributes ::= SET {  
    numberOfPelsPerLine [0] IMPLICIT INTEGER OPTIONAL  
    compression [2] IMPLICIT Compression OPTIONAL  
    numberOfDiscardedPels [3] IMPLICIT INTEGER OPTIONAL }
```

```
TextInformation ::= CHOICE {  
    t6String OCTET STRING }
```

B.5 Comparison of ASN.1 parameter coding

This Clause makes a comparison of coding (per parameter) between CCITT Recommendation T.73 (1984) and the T.400/T.500 series of CCITT Recommendations (1988).

Parts of CCITT Recommendation T.73 (which do not refer to TIF.0) are not given.

Description of common used protocol elements, such as "Pel Transmission Density", "Compression", "Measure Pair", "Dimension Pair", etc., are not given here, to avoid duplication of well known structures, already described in subclause B.4.2.

B.5.1 Session Communication Structure (CSS)

B.5.1.1 Coding in the CCITT T.400/T.500 series of Recommendations (1988)

Session User Data, which are used by DTAM for the session communication structure (CSS), in order to identify the receiving capabilities (see CCITT Recommendation T.433 [15] section 8.2) are as follows:

```
D-INITIATE-REQ ::= CHOICE { [4] IMPLICIT Application-Capabilities
}

D-INITIATE-RESP ::= CHOICE { [4] IMPLICIT Application-Capabilities
}

Application-Capabilities ::= SET {
  documentApplicationProfileT73 [0] IMPLICIT OCTET STRING OPTIONAL
  /* MANDATORY according to T.521 */
  documentArchitectureClass [1] IMPLICIT OCTET STRING OPTIONAL
  /* MANDATORY according to T.521 */
}
```

B.5.1.2 Coding in CCITT Recommendation T.73 (1984)

Session User Data, which are used by CCITT Recommendation T.73 for the CSS, in order to identify the receiving capabilities are as follows:

```
ProtocolElement ::= CHOICE {
  presentationCapabilitiesDescriptor [4] IMPLICIT PresentationCapabilities }

PresentationCapabilities ::= SET {
  basicTerminalCharacteristics [0] IMPLICIT BasicTerminalCharacteristics
  interchangeFormat [1] IMPLICIT InterchangeFormat }
```

B.5.2 Command Document Capability List (CDCL)

B.5.2.1 Coding in the CCITT T.400/T.500 series of Recommendations (1988)

Session User Data, which are used by DTAM for the negotiation of optional receiving capabilities with Command Document Capability List (CDCL) / Response Document Capability List Positive (RDCLP), in order to identify the optional receiving capabilities (see CCITT Recommendations T.433 [15], section 8.2 and T.521 [2], table 2D) are as follows:

```

D-CAPABILITY-REQ          ::= CHOICE { [4] IMPLICIT Application-Capabilities}
D-CAPABILITY-RESP        ::= CHOICE { [4] IMPLICIT Application-Capabilities}

Application-Capabilities ::= SET {
  documentApplicationProfileT73 [0] IMPLICIT OCTET STRING OPTIONAL { group-4-facsimile (2)}
  documentArchitectureClass     [1] IMPLICIT OCTET STRING OPTIONAL { formatted (0) }
  nonBasicDocCharacteristics    [2] IMPLICIT Non-Basic-Doc-Characteristics OPTIONAL }

Non-Basic-Doc-Characteristic ::= SET {
  page-dimensions              [2] IMPLICIT SET OF Dimension-Pair OPTIONAL
  ra-gr-coding-attributes      [3] IMPLICIT SET OF Ra-Gr-Coding-Attribute OPTIONAL
  ra-gr-presentation-features [4] IMPLICIT SET OF Ra-Gr-Presentation-Feature OPTIONAL }

Ra-Gr-Coding-Attribute ::= {
  compression [0] IMPLICIT Compression }

Ra-Gr-Presentation-Feature ::= CHOICE {
  pel-transmission-density [11] IMPLICIT Pel-Transmission-Density }

```

B.5.2.2 Coding in CCITT Recommendation T.73 (1984)

Session User Data, which are used by CCITT Recommendation T.73 (1984) for the negotiation of optional receiving capabilities with CDCL/RDCLP, in order to identify the receiving capabilities (see CCITT Recommendation T.73, figure 8 and section 6.3.2) are as follows:

```

ProtocolElement          ::= CHOICE {
  presentationCapabilitiesDescriptor [4] IMPLICIT Presentationcapabilities }

PresentationCapabilities ::= SET {
  basicTerminalCharacteristics [0] IMPLICIT BasicTerminalCharacteristics
  interchangeFormat           [1] IMPLICIT InterchangeFormat
  nonBasicTerminalCapabilities [2] IMPLICIT NonBasicTerminalCapabilities OPTIONAL }

NonBasicTerminalCapabilities ::= SET {
  pageDimensions [2] IMPLICIT SEQUENCE OF MeasurePair OPTIONAL
  codingAttributes [3] IMPLICIT SEQUENCE OF CodingAttribute OPTIONAL
  presentationAttributes [4] IMPLICIT SEQUENCE OF PresentationAttribute OPTIONAL }

CodingAttribute ::= CHOICE {
  compression [0] IMPLICIT Compression }

PresentationAttribute ::= CHOICE {
  pelTransmissionDensity [11] IMPLICIT PelTransmissionDensity OPTIONAL }

```

B.5.3 Session Activity Start (CDS)

B.5.3.1 Coding in the CCITT T.400/T.500 series of Recommendations (1988)

Session User Data, which are used for the Session-Activity-Start (CDS), in order to identify the effective document characteristics (see CCITT Recommendation T.433 [15], figure 3) are as follows:

```

S-ACTIVITY-START-user-data ::= CHOICE { [4] IMPLICIT Document-Characteristics }

Document-Characteristics ::= SET {
  document-application-profileT73 [0] IMPLICIT INTEGER { group-4-facsimile (2) }
  -- value 2 indicates group 4 facsimile according to T.503
  document-architecture-class [1] IMPLICIT INTEGER { formatted (0) }
  -- value 0 indicates formatted FDA
  non-basic-doc-characteristics [2] IMPLICIT Non-Basic-Doc-Characteristics OPTIONAL }

Non-Basic-Doc-Characteristics ::= SET {
  page-dimensions [2] IMPLICIT SET OF Dimension-Pair OPTIONAL
  ra-gr-coding-attributes [3] IMPLICIT SET OF Ra-Gr-Coding-Attribute OPTIONAL
  ra-gr-presentation-features [4] IMPLICIT SET OF Ra-Gr-Presentation-Feature OPTIONAL}

Ra-Gr-Coding-Attribute ::= {
  compression [0] IMPLICIT Compression }

Ra-Gr-Presentation-Feature ::= CHOICE {
  pel-transmission-density [11] IMPLICIT Pel-Transmission-Density}

```

B.5.3.2 Coding in CCITT Recommendation T.73 (1984)

The parameters of CCITT Recommendation T.73 (1984) are as follows:

```

ProtocolElement ::= CHOICE {
  presentationCapabilitiesDescriptor [4] IMPLICIT Presentationcapabilities }

PresentationCapabilities ::= SET {
  basicTerminalCharacteristics [0] IMPLICIT BasicTerminalCharacteristics
  interchangeFormat [1] IMPLICIT InterchangeFormat
  nonBasicTerminalCapabilities [2] IMPLICIT NonBasicTerminalCapabilities
OPTIONAL }

NonBasicTerminalCapabilities ::= SET {
  pageDimensions [2] IMPLICIT SEQUENCE OF MeasurePair OPTIONAL
  codingAttributes [3] IMPLICIT SEQUENCE OF CodingAttribute
OPTIONAL
  presentationAttributes [4] IMPLICIT SEQUENCE OF PresentationAttribute
OPTIONAL }

CodingAttribute ::= CHOICE {
  compression [0] IMPLICIT Compression }

PresentationAttribute ::= CHOICE {
  pelTransmissionDensity [11] IMPLICIT PelTransmissionDensity OPTIONAL
}

```

B.5.4 Command Document User Information (CDUI)

B.5.4.1 Coding in the CCITT T.400/T.500 series of Recommendations (1988)

Session User Data (SUD) during the document transmission according to the CCITT T.400/T.500 series of Recommendations (1988):

```

Interchange-Data-Element ::= CHOICE {
  layout-object [2] IMPLICIT Layout-Object-Descriptor
  content-portion [3] IMPLICIT Text-Unit }

Layout-Object-Descriptor ::= SEQUENCE {
  object-type Layout-Object-Type
  descriptor-body Layout-Object-Descriptor-Body OPTIONAL }

Layout-Object-Type ::= INTEGER { document-layout-root (0) ,
  page (2) }

```

/* Splitted in 'document layout root' and 'page' in the following text*/


```
Raster-Gr-Coding-Attributes      := SET {  
  number-of-pels-per-line      [0] IMPLICIT INTEGER OPTIONAL  
  compression                   [2] IMPLICIT Compression OPTIONAL  
  number-of-discarded-pels     [3] IMPLICIT INTEGER OPTIONAL  
  /* T.73 allows more values for this attribute than T.503 or T.563 */  
}  
Content-Information              := OCTET STRING
```

B.5.4.2 Coding in CCITT Recommendation T.73 (1984)

SUD during the document transmission according to CCITT Recommendation T.73 (1984):

```
ProtocolElement                 ::= CHOICE {  
  specificLayoutDescriptor     [2] IMPLICIT LayoutDescriptor  
  textUnit                     [3] IMPLICIT TextUnit }  
  
LayoutDescriptor                ::= SEQUENCE {  
  layoutObjectType             LayoutObjectType  
  layoutDescriptorBody        LayoutDescriptorBody OPTIONAL }  
  
LayoutObjectType                ::= INTEGER { document (0) ,  
                                             page      (2) }
```

/* Splitted in 'document' and 'page' in the following text*/

B.5.4.2.1 Document

```
LayoutDescriptorBody           ::= SET {  
  objectIdentifier             ObjectReferenceName OPTIONAL  
  referencesTo                 CHOICE {  
    subordinateObjects         [0] IMPLICIT SEQUENCE OF NumericString}OPTIONAL  
    defaultValueLists         [7] IMPLICIT SEQUENCE OF DefaultValueList OPTIONAL }  
  
ObjectReferenceName            ::= [APPLICATION 1] IMPLICIT PrintableString  
  -- digits 0 to 9 with space as a delimiter  
  
DefaultValueList               ::= CHOICE {  
  pageAttributes              [2] IMPLICIT PageAttributes }  
  
PageAttributes                 ::= SET {  
  dimensions                  < Attribute OPTIONAL  
  presentationAttributes      < Attribute OPTIONAL }  
  
Attribute                      ::= CHOICE {  
  dimensions                  [1] IMPLICIT MeasurePair  
  presentationAttributes      [3] IMPLICIT PresentationAttributes }  
  
PresentationAttributes         ::= SET {  
  contentType                 ContentType OPTIONAL  
  photographicAttributes      [1] IMPLICIT PhotographicAttributes OPTIONAL }  
  
ContentType                    ::= [APPLICATION 2] IMPLICIT INTEGER { photographic (1) }  
  
PhotographicAttributes         ::= SET {  
  pelPath                    [0] IMPLICIT OneOfFourAngles OPTIONAL  
  lineProgression            [1] IMPLICIT OneOfTwoAngles OPTIONAL  
  pelTransmissionDensity     [2] IMPLICIT PelTransmissionDensity OPTIONAL }
```


B.5.4.2.2 Page

```

LayoutDescriptorBody ::= SET {
  objectIdentifier
  referencesTo
  contentPortions
  dimensions
  presentationAttributes
} ::= SET {
  ObjectReferenceName OPTIONAL
  CHOICE {
    [1] IMPLICIT SEQUENCE OF NumericString} OPTIONAL
    [4] IMPLICIT MeasurePair OPTIONAL
    [6] IMPLICIT PresentationAttributes OPTIONAL }

ObjectReferenceName ::= [APPLICATION 1] IMPLICIT PrintableString
-- digits 0 to 9 with space as a delimiter

PresentationAttributes ::= SET {
  contentType
  photographicAttributes
} ::= SET {
  ContentType OPTIONAL
  [1] IMPLICIT PhotographicAttributes OPTIONAL }

ContentType ::= [APPLICATION 2] IMPLICIT INTEGER { photographic (1) }

PhotographicAttributes ::= SET {
  pelPath
  lineProgression
  pelTransmissionDensity
} ::= SET {
  [0] IMPLICIT OneOfFourAngles OPTIONAL
  [1] IMPLICIT OneOfTwoAngles OPTIONAL
  [2] IMPLICIT PelTransmissionDensity OPTIONAL }

```

B.5.4.2.3 Text unit

```

TextUnit ::= SEQUENCE {
  contentPortionAttributes
  textInformation
} ::= SEQUENCE {
  ContentPortionAttributes OPTIONAL
  TextInformation }

ContentPortionAttributes ::= SET {
  contentPortionIdentifier
  typeOfCoding
  codingAttributes
  t6Attributes
} ::= SET {
  PortionReferenceName OPTIONAL
  [0] IMPLICIT TypeOfCoding OPTIONAL
  CHOICE {
    [2] IMPLICIT T6Attributes } OPTIONAL }

PortionReferenceName ::= [APPLICATION 0] IMPLICIT PrintableString
-- digits 0 to 9 with space as a delimiter

TypeOfCoding ::= INTEGER { t6 (1) }

T6Attributes ::= SET {
  numberOfPelsPerLine
  compression
  numberOfDiscardedPels
} ::= SET {
  [0] IMPLICIT INTEGER OPTIONAL
  [2] IMPLICIT Compression OPTIONAL
  [3] IMPLICIT INTEGER OPTIONAL }

TextInformation ::= CHOICE {
  t6String
} ::= CHOICE {
  OCTET STRING }

```

B.6 Conclusion

The full compatibility between CCITT Recommendation T.73 (1984) and the CCITT T.400/T.500 series of Recommendations (1988) was shown under the following conditions:

- in CCITT Recommendation T.73 (1984) the width of a page is considered as a fixed value;
- a small modification is done in the CCITT T.400/T.500 series of Recommendation (1988) to the coding of the attributes.

The other presentations attributes and coding attributes were found to be identical.

Annex C (informative): Bibliography

For the purposes of this ETS, the following informative references have been given.

- 1) CCITT Recommendation T.73 (1984): "Document interchange protocol for the telematic services".
- 2) CCITT Recommendation T.5 (1984): "General aspects of group 4 facsimile apparatus".
- 3) CCITT Recommendation X.215 (1988): "Session service definition for Open Systems Interconnection for CCITT applications".
- 4) CCITT Recommendation X.225 (1988): "Session protocol specification for Open Systems Interconnection for CCITT applications".
- 5) ISO/IEC 8613: "Information processing - Text and office system - Office document architecture (ODA) and interchange format".
- 6) ISO IS 9646: "Information technology - OSI conformance testing methodology and framework".

History

Document history	
May 1994	First Edition
January 1996	Converted into Adobe Acrobat Portable Document Format (PDF)