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TERMINALS FOR TELEMATIC SERVICES

TERMINAL CHARACTERISTICS FOR GROUP 4 FACSIMILE APPARATUS

ITU-T Recommendation T.563

(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 Recommendation T.563 was revised by ITU-T Study Group 8 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 11th of November 1994.

NOTE

this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

CONTENTS

SUMMARY

This Recommendation defines the terminal characteristics for G4 facsimile apparatus. The descriptions of the terminal characteristics for colour extension are added as an option by this amendment. The coding schemes for colour image type and optional functions for colour facsimile are mainly defined.

Recommendation T.563

TERMINAL CHARACTERISTICS FOR GROUP 4 FACSIMILE APPARATUS

(revised 1994)

The ITU-T,

considering

(a) that Recommendation T.2 refers to Group 1 type apparatus for ISO A4 document transmission over a telephone-type circuit in approximately six minutes;

(b) that Recommendation T.3 refers to Group 2 type apparatus for ISO A4 document transmission over a telephone-type circuit in approximately three minutes;

(c) that Recommendation T.4 refers to Group 3 type apparatus for ISO A4 document transmission over a telephone-type circuit in approximately one minute;

(d) that there is a demand for Group 4 apparatus which incorporates means for reducing the transmission time and assures essentially error-free reception of the documents;

(e) that telematic terminals including Group 4 facsimile apparatus are to be standardized, taking into account the commonality among these terminals;

(f) that there is a demand for mixed mode of operation where both facsimile coded information and character coded information can be treated within a page by the same apparatus,

unanimously declares

that Group 4 facsimile apparatus as defined in Recommendation T.0 should be designed and operated according to the following standard.

1 General

1.1 Group 4 facsimile apparatus is used mainly on public data networks (PDN) including circuit-switched, packet-switched, and the integrated services digital network (ISDN). The apparatus may be also used on the public switched telephone network (PSTN) where an appropriate modulation process will be utilized.

1.2 The procedures used with Group 4 facsimile apparatus enable it to transmit and reproduce image coded information essentially without transmission errors.

1.3 Group 4 facsimile apparatus has the means for reducing the redundant information in facsimile signals prior to transmission.

1.4 The basic image type of the Group 4 facsimile apparatus is black and white. Continuous tone gray scale and colour image type of G4 facsimile apparatus are optional.

Other image types are for further study.

1.5 There are three classes of Group 4 facsimile terminals:

- *Class I* – Minimum requirement is a terminal able to send and receive documents containing facsimile encoded information (in accordance with Recommendations T.6, T.503 and T.521).
- *Class II* – Minimum requirement is a terminal able to transmit documents which are facsimile encoded (in accordance with Recommendations T.6, T.503 and T.521). In addition, the terminal must be capable of receiving documents which are facsimile coded (in accordance with Recommendations T.6, T.503 and T.521). Teletex coded (in accordance with the basic coded character repertoire as defined in Recommendations T.60 and T.61), and also mixed-mode documents (in accordance with Recommendation T.561).

– *Class III* – Minimum requirement is a terminal which is capable of generating, transmitting and receiving facsimile coded documents (in accordance with the Recommendations T.6, T.503 and T.521), Teletex coded documents (in accordance with the basic coded character repertoire as defined in Recommendations T.60 and T.61), and mixed-mode documents (in accordance with Recommendation T.561), see Note.

NOTE – The above definitions are extracted from Study Group I where "terminal" is used instead of "apparatus".

2 Scope of Recommendations concerning Group 4 facsimile apparatus

2.1 This Recommendation defines the general aspects of Group 4 facsimile apparatus.

2.2 The rules to be followed in the Group 4 facsimile services are defined in Recommendation F.184.

2.3 The Group 4 facsimile coding scheme and facsimile control functions are defined in Recommendations T.6, T.81 and T.82.

2.4 Terminal supporting Group 4 facsimile mode of operation communicates with unique procedures that are described as follows:

a) the interface to the physical network is defined in this Recommendation, see Note;

b) the transport end-to-end control procedure is defined in Recommendation T.70;

c) Group 4 facsimile control procedures are defined in Recommendation T.62;

d) Group 4 facsimile communication application profile is defined in Recommendation T.521;

e) Group 4 facsimile document application profile is defined in Recommendation T.503.

NOTE – Recommendation T.71 may be applicable for PSTN operation.

2.5 When operating as mixed-mode terminals, Recommendation T.561 applies.

2.6 When operating as basic Teletex terminals, Recommendations T.60 and T.61 apply.

2.7 For the continuous tone colour image, the continuous tone colour representation method for G4 facsimile is defined in Recommendation T.42.

3 General characteristics of the apparatus

3.1 Basic characteristics

3.1.1 The Group 4 facsimile apparatus provides the means for direct document transmission from any subscriber to any other subscriber.

3.1.2 All apparatus participating in the international Group 4 facsimile service have to be compatible with each other at the basic level defined in this Recommendation. Additional operational functions may be invoked.

3.1.3 The range of data rates is described in clause 6. Detailed arrangements on a national level are left to the Administrations concerned, as it is recognized that national implementation of the Group 4 facsimile service on various types of network may involve national operation at different data throughput rates.

3.1.4 The page is the basis for facsimile message formatting and transmission. Both A4 and North American paper formats are taken into account.

3.1.5 Facsimile coding schemes are applied in order to reduce the redundant information in facsimile signals prior to transmission.

3.1.6 The apparatus must have the ability to reproduce facsimile messages. The content, layer and format of facsimile messages must be identical at the transmitting and receiving apparatus.

3.1.7 The reproducible area is defined within which facsimile messages are assured to be reproduced. (See 3.2.6.)

3.1.8 The Group 4 facsimile apparatus should provide means for automatic reception. In addition, Class II/III apparatus should provide means for automatic reception of Teletex and mixed mode documents.

3.1.9 All classes of Group 4 facsimile apparatus shall incorporate the functions defined as basic for the Group 4 facsimile service in 3.2 below. In addition, optional functions can be incorporated. In this Recommendation, the optional functions are divided into ITU-T standardized options and nationally and/or privately specified options.

3.2 Basic functions

3.2.1 Group 4 facsimile mode of operation shall be capable of handling:

a) communication application profile as defined in Recommendation T.521;

b) document application profile as defined in Recommendation T.503;

c) the basic facsimile coding scheme as defined in Recommendation T.6;

d) the control function associated with the basic facsimile coding scheme as defined in Recommendation T.6.

3.2.2 All classes of Group 4 apparatus shall have the following provisions for facsimile messages:

a) provision for scanning the documents to be transmitted (see 3.2.5);

b) provision for receiving and presenting hard or soft copies of the documents.

3.2.2.1 In addition, Group 4 Class II apparatus shall have provision for receiving and displaying basic Teletex and mixed mode documents.

3.2.2.2 In addition to the requirements for Group 4 Class II apparatus, Class III apparatus shall have provisions for generating and transmitting basic Teletex and mixed mode documents.

3.2.3 Basic page formatting functions are as follows:

a) vertical page orientation;

b) paper size of ISO A4;

c) reproducible area/printable area is defined, taking into account ISO A4 and North American paper formats and ISO standard 3535.

3.2.4 Terminal identification

Each Group 4 facsimile apparatus should be equipped with a unique identification. Details of the identification are given in Recommendation F.184.

3.2.5 Scanning

The message area should be scanned in the same direction in the transmitter and receiver. Viewing the message area in a vertical plane, the picture elements shall be processed as if the scanning direction were from left to right with subsequent scans adjacent to and below the previous scan.

3.2.6 Page size and reproducible area

3.2.6.1 Sometimes paper length may not be specified, because the paper end is detected by paper scanning.

3.2.6.2 The size of the guaranteed reproducible area for ISO A4 paper size is shown in Annex A.

3.2.7 Group 4 facsimile transmission pel density (resolution) requirements

The Group 4 facsimile resolution requirements and their tolerances are given in Table 1.

TABLE 1/T.563

Resolution (pels/25.4 mm)	Horizontal and vertical tolerance (%)
200 × 200	± 1
240 × 240	± 1
300 × 300	± 1
400 × 400	± 1

Lower resolution for continuous tone gray scale and colour image is for further study.

Centre line referencing will be used for paper positioning. Each page will be positioned on the scanner so that the centre line is in registration with the value: (number of pels/line)/2. (For further study.)

Specific values for the number of pels per line, scan line length and nominal number of scan lines per page are given in Tables 2a and 2b for all the Group 4 resolutions for ISO A4, North American Letter, ISO B4, ISO A3, Japanese Legal, Japanese Letter, North American Legal and North American Ledger paper.

Table 3 specifies the blanking procedure for all of the Group 4 paper sizes. An equal number of pels on the left and right side of the page are set to white to fit the paper format. Figure 1 illustrates the blanking procedure for ISO A4 and North American Letter paper. The same procedure is used for the other paper formats.

The raster point in the upper left corner of an ISO page is used as a reference for portrait mode character printing. This raster point, termed the (1.1) raster reference point, is used as a starting point for determining character margins and positions. This is also illustrated in Figure 1.

3.2.8 Group 4 facsimile class structure

Table 4 shows the class structure of Group 4 facsimile apparatus.

3.2.9 Facsimile coding schemes

3.2.9.1 In order to reduce the redundant information in facsimile signals, the basic facsimile coding scheme is defined in Recommendation T.6. This coding scheme is used assuming that transmission errors are corrected by control procedures in lower levels.

3.2.9.2 On an optional basis, an apparatus can use other ITU-T standardized coding schemes defined in Recommendation T.6.

3.2.9.3 When the encoded bit string based on T.6 is arranged in the octet string of ASN.1, the first bit of encoded image should be placed in LSB of octet. The successive bits are placed in the direction of LSB to MSB of octet.

3.2.9.4 For colour facsimile of continuous tone image as described in 3.3.5 b) with more than one colour component, the coding scheme defined in Recommendation T.81 shall be used and the coding scheme defined in Recommendation T.82 is for further study. For colour facsimile of multi-colour image, the coding scheme defined in Recommendation T.82 is applicable. The colour facsimile of multi-colour is reserved for further study.

3.3 ITU-T-standardized optional functions of Group 4 facsimile mode of operation

3.3.1 The possibility of using optional functions can be negotiated during a handshaking procedure in the communication application profile (see Recommendation T.521).

3.3.2 The optional functions are invoked by the communication application profile (see Recommendation T.521).

TABLE 2a/T.563

Number of pels and scan line length for different paper sizes

		ISO A4	North American Letter	ISO B4	ISO A3	Japanese Legal	Japanese Letter	North American Legal	North American Ledger
Number of picture elements along a scan line	Resolution (pels/25.4 mm)								
	200	1728	1728	2048	2432	2048	1728	1728	2432
	240	2074	2074	2458	2918	2458	2074	2074	2918
	300	2592	2592	3072	3648	3072	2592	2592	3648
	400	3456	3456	4096	4864	4096	3456	3456	4864
Scan line length (mm) (P)		219.46	219.46	260.10	308.86	260.10	219.46	219.46	308.86
Paper width (mm) (Q)		210	215.9	250	297	257	182	215.9	279.4
P – Q		9.46	3.56	10.10	11.86	3.10	37.46	3.56	29.46

TABLE 2b/T.563

Nominal number of scan lines for different paper sizes

		ISO A4	North American Letter	ISO B4	ISO A3	Japanese Legal	Japanese Letter	North American Legal	North American Ledger
Nominal number of scan lines per page for each pel-transmission density	Resolution (pels/25.4 mm)								
	200	2339	2200	2780	3307	2866	2024	2800	3400
	240	2806	2640	3335	3969	3439	2428	3360	4080
	300	3508	3300	4169	4961	4299	3035	4200	5100
	400	4677	4400	5559	6614	5732	4047	5600	6800
Nominal paper length (mm)		297	279.4	353	420	364	257	355.6	431.8

TABLE 3/T.563

Blanking and address reference point for different paper sizes

Paper size	Resolution (pels/25.4 mm)	Pels per line	Pels per each paper size line	Blanking margin (pels)	Reference point	Total line length (mm)
ISO A4				(B)		
	200 × 200	1728	1654	37	(38.1)	219.46
	240 × 240	2074	1984	45	(46.1)	219.46
	300 × 300	2592	2480	56	(57.1)	219.46
	400 × 400	3456	3308	74	(75.1)	219.46
North American Letter				(A)		
	200 × 200	1728	1700	14	(15.1)	219.46
	240 × 240	2074	2040	17	(18.1)	219.46
	300 × 300	2592	2550	21	(22.1)	219.46
	400 × 400	3456	3400	28	(29.1)	219.46
ISO B4	200 × 200	2048	1968	40	(41.1)	260.10
	240 × 240	2458	2362	48	(49.1)	260.10
	300 × 300	3072	2952	60	(61.1)	260.10
	400 × 400	4096	3936	80	(81.1)	260.10
ISO A3	200 × 200	2432	2338	47	(48.1)	308.86
	240 × 240	2918	2806	56	(57.1)	308.86
	300 × 300	3648	3508	70	(71.1)	308.86
	400 × 400	4864	4676	94	(95.1)	308.86
Japanese Legal	200 × 200	2048	2024	12	(13.1)	260.10
	240 × 240	2458	2428	15	(16.1)	260.10
	300 × 300	3072	3036	18	(19.1)	260.10
	400 × 400	4096	4048	24	(25.1)	260.10
Japanese Letter	200 × 200	1728	1434	147	(148.1)	219.46
	240 × 240	2074	1720	177	(178.1)	219.46
	300 × 300	2592	2150	221	(222.1)	219.46
	400 × 400	3456	2868	294	(295.1)	219.46
North American Legal	200 × 200	1728	1700	14	(15.1)	219.46
	240 × 240	2074	2040	17	(18.1)	219.46
	300 × 300	2592	2550	21	(22.1)	219.46
	400 × 400	3456	3400	28	(29.1)	219.46
North American Ledger	200 × 200	2432	2200	116	(117.1)	308.86
	240 × 240	2918	2640	139	(140.1)	308.86
	300 × 300	3648	3300	174	(175.1)	308.86
	400 × 400	4864	4400	232	(233.1)	308.86

NOTE – The pels as defined in the blanking margin section (blanking margin A and B are shown in Figure 1) are equivalent to the discarded pels defined in Recommendation T.503.

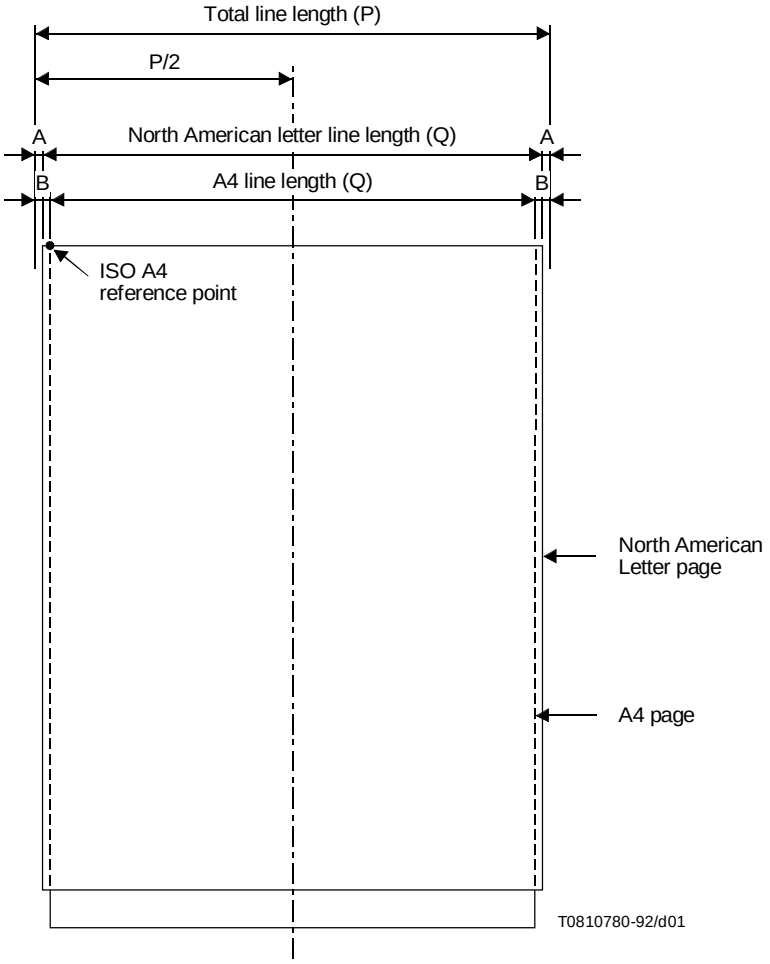


FIGURE 1/T.563

Reference point and blanking margins

TABLE 4/T.563

Class structure

Class	I (Note 1)	II (Note 1)	III (Note 1)
Standard pel transmission density (pels/25.4 mm)	200	200 and 300 (See Note 2)	200 and 300 (See Note 2)
Optional pel transmission density (pels/25.4 mm)	240 and/or 300 and/or 400	240 and/or 400 (See Note 3)	240 and/or 400 (See Note 3)
Pel conversion capability in standard	Not required	Yes	Yes
Teletex	Not required	Reception only	Yes
Mixed mode	Not required	Reception only	Yes
Page memory	Not required	Yes	Yes
Use of document application profile	See Table 5		
Use of communication application profile	See Table 5		

NOTES

1 Administrations may determine which class, with options, to be used for their national service. Standardization work has to continue with the goal of achieving a uniform standard.

2 When o perating as a mixed mode terminal per Recommendation T.561, the pel receiving density of 240 pels per 25.4 mm is required.

3 To achieve a high service quality, the pel density of the scanner and printer should be greater than or equal to the transmission pel density. This requirement is waived for a terminal which has a scanner or printer with a pel density of 240×240 pels per 25.4 mm and can communicate at 300 pels per 25.4 mm. In this case, the 240×240 pels per 25.4 mm terminal will exceptionally meet the standard Class II/III requirement.

4 When a resolution conversion is necessary, the conversion is performed by the apparatus which minimizes the transmission cost and time. An exception would be a 240×240 pels per 25.4 mm terminal transmitting to a 300×300 pels per 25.4 mm terminal which is operating at the standard transmission density.

5 Pel conversion algorithms should aim at low impairment of the quality and are for further study.

3.3.3 As the service develops, additions and changes to the ITU-T-standardized optional function listed below may be needed.

a) optional coding schemes defined in Recommendation T.6;

b) control functions associated with optional coding schemes;

c) grey scale images;

d) colour images;

e) resolution conversion algorithms.

3.3.4 Optional page formatting functions are as follows:

a) page sizes of ISO B4, ISO A3, Japanese Legal, Japanese Letter, North American Legal and North American Ledger;

b) other page formats are for further study.

3.3.5 Optional functions for gray scale and colour images

a) colour image data are expressed by direct colour expression using colour space "CIELAB";

b) the basic image mode is gray scale and the optional mode is continuous tone colour;

c) the basic value of bit per colour component is 8 bit/colour component. The optional value is 12 bit/colour component;

d) continuous tone image may be coded losslessly by the coding scheme defined in Recommendation T.81 or Recommendation T.82;

e) colour tolerance is for further study.

3.4 Optional functions of Group 4 facsimile mode of operation for national standardization or private use

The ITU-T standardization includes the necessary rules and means for indication of, or escape into, functions specified nationally or for private use (see Recommendations T.62 and T.521).

3.5 Default conditions for Group 4 facsimile mode of operation

In the absence of specific indications, the receiving apparatus shall assume the following conditions:

a) *communication* (as specified in Recommendation T.521):

- one way (calling apparatus transmitting the facsimile message);
- normal document;

b) *coding scheme:*

- basic facsimile coding scheme;

c) *image type:*

- black and white two-level image;

d) *presentation:*

- paper size of ISO A4;
- pel transmission density of 200 pels per 25.4 mm;
- number of picture elements along scan line of defined values in Table 3;
- blanking margin of defined values in Table 3;
- vertical page of orientation.

4 Mixed mode capabilities

For mixed mode of operation, requirements for Group 4 Class II and III terminals are specified in Recommendation T.561.

5 Communications

5.1 Storage

Receiving storage is not required for Group 4 Class I terminals. The minimum storage requirement for Group 4 Class II and III is 128 K octets. This value is based on a pel transmission density of 300 pels per 25.4 mm for an ISO A4 document. However, this does not cover the worst case situation for dense documents. Additional memory may be required and can be negotiated.

5.2 Call identification

The control procedures include the exchange of reference information prior to sending any document. Details of the call identification line are covered in Recommendation F.184.

Printing capability of the Call Identification Line (CIL) is mandatory. The printing of the CIL is selected by the user.

If printing is selected, the CIL is printed on a reserved area at either the top of the page or the bottom. Refer to Figure A.1. The reserved area is 4.23 mm (200 BMU) in height and 183 mm (8640 BMU) in width. The size of the basic measurement unit (BMU) is 1/1200 per 25.4 mm.

5.3 Interworking

There are three document types, namely “Facsimile”, “Mixed Mode” and “Basic Teletex”. These are shown in Table 5. A terminal can transfer one or more documents of the same type in a single association. In the case of “Facsimile” or “Mixed Mode”, the document type is indicated in D-INITIATE service primitive using the parameter “document application profile”. If the document type is not supported by the called terminal, this will be indicated by the “result” parameter of the D-INITIATE service confirmation.

TABLE 5/T.563

Document type

Document type	Group 4 facsimile	Mixed Mode	Basic Teletex
Class of Group 4 facsimile apparatus	Class I, II & III	Class II & III	Class II & III
Document Architecture Class	FDA	FDA	None (Note 2)
Document Application Profile	Rec. T.503 (Note 1)	Rec. T.501	Non-Profile (Note 2)
Communication Application Profile	Rec. T.521	Rec. T.522	Non-Profile (Note 2)

NOTES

1 When using the Group 4 facsimile mode, Document Profile Descriptor defined in Recommendation T.503 is not transmitted using session protocol data unit (SPDU).

2 Basic Teletex documents are transmitted outside DTAM application.

The negotiation and indication mechanisms are defined in Recommendation T.433. Appendix I illustrates some example of the session establishment phase. Table 6 specifies the interworking matrix among Group 4 facsimile apparatus based on negotiation result.

TABLE 6/T.563

Interworking Matrix among Group 4 facsimile apparatus

Receiver	Sender		
	Class I	Class II	Class III
Class I	Group 4 facsimile	Group 4 facsimile	Group 4 facsimile
Class II	Group 4 facsimile	Group 4 facsimile	Group 4 facsimile Mixed Mode Basic Teletex
Class III	Group 4 facsimile	Group 4 facsimile	Group 4 facsimile Mixed Mode Basic Teletex

5.4 Communication application profile for Group 4 facsimile document

The communication application profile to be used is BT 0, specified in Recommendation T.521.

Specific parameter values to be used in the D-INITIATE and D-CAPABILITY service primitive are:

- the parameter value to represent the document application profile for Group 4 facsimile is defined in Recommendation T.503;
- the parameter value to represent the document architecture class is FDA, defined in Recommendation T.412.

6 Network-related requirements

6.1 Networks

The Group 4 facsimile transport service can be provided using a circuit-switched public data network (CSPDN), a packet-switched public data network (PSPDN), a public switched telephone network (PSTN), or an integrated services digital network (ISDN). In all types of network the Group 4 facsimile apparatus will provide automatic answering, transmission, reception and clearing.

6.2 Circuit-switched public data network (CSPDN)

a) Function and procedural aspect of the interface: Recommendation X.21.

b) With external data circuit terminating equipment (DCE) – mechanical and electrical and characteristics of the interface: Recommendation X.21.

c) Bit rates: user classes of services 4 to 7 in Recommendation X.1.

d) Link procedure: LAPB/Recommendation X.75.

6.3 Packet-switched public data network (PSPDN)

a) Function and procedural aspects of the interface: Recommendation X.25, levels 1, 2 and 3.

b) Duplex transmission.

c) Bit rates: user classes of services 8 to 11 in Recommendation X.1.

d) Number of logical channels at a time: one or more.

6.4 Public switched telephone network (PSTN)

a) Modulation/demodulation schemes are for further study.

b) Function and procedural aspects of the interface: for further study.

c) Link procedure: Recommendation T.71 may be applicable.

d) Bit rate: for further study.

e) Automatic answering: Recommendation V.25.

6.5 Integrated services digital network (ISDN)

The operations and rules of Group 4 facsimile apparatus on the ISDN are defined in Recommendation T.90. On the ISDN, Group 2/Group 3 and Group 4 facsimile functions can be implemented in Group 4 facsimile. The operations and rules of the terminal having Group 2/Group 3 and Group 4 facsimile functions are described in the Appendix I/T.90.

7 Indicators

7.1 Indicators should inform users about situations in which negative effects on the grade of service can be expected.

7.2 The following indicators are required:

a) apparatus unable to transmit (e.g. paper jam at transmitting end);

b) apparatus unable or soon unable to receive (e.g. paper jam or receiving memory nearly full);

c) operator assistance required;

d) message received in store.

8 Access to facsimile MHS

Users of Group 4 facsimile apparatus may wish to have access to the services offered by the message handling system (MHS). This requires the ability to generate control documents (see T.300-Series Recommendations). The details are left for further study.

9 Implementation of apparatus

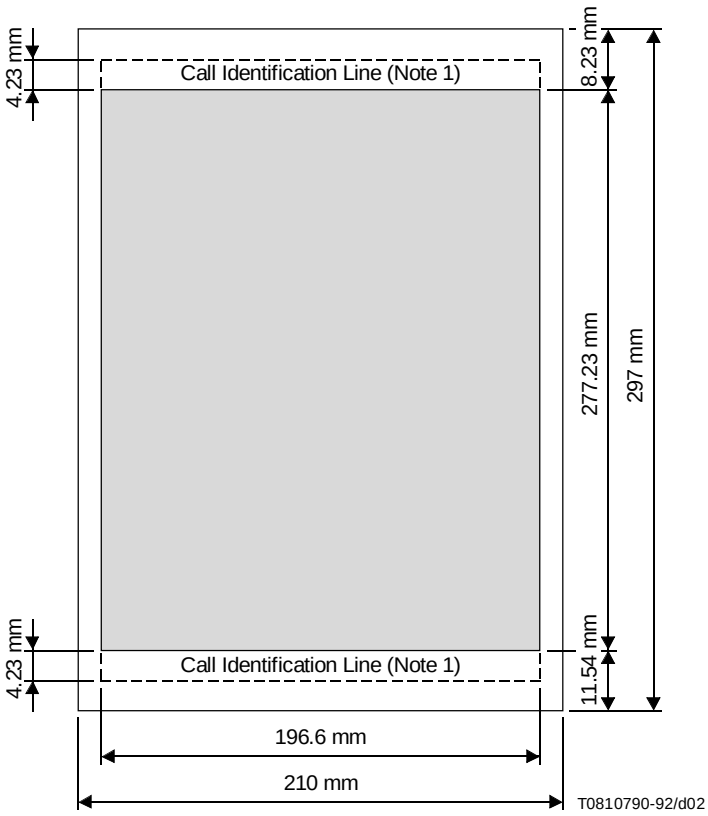
Although paper sizes are referred to, this does not always require physical paper scanner and/or printer to be implemented. Details may be defined by Administrations.

If the message is not generated from a physical scanner or displayed on paper, then the signals appearing across the network interface shall be identical to those which would be generated if paper input and/or output has been implemented.

Annex A

Guaranteed reproducible area for Group 4 apparatus conforming to Recommendation T.563

(This annex forms an integral part of this Recommendation)



NOTES

1 The Call Identification Line is printed either on top or below the guaranteed reproducible area.

2 Paper characteristics (i.e. weight) are important parameters. Lightweight paper may cause additional paper handling erros and may result in a reduced guaranteed reproducible area.

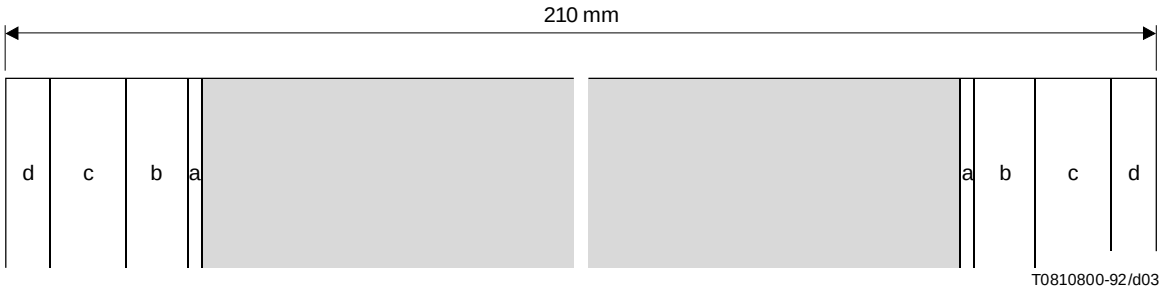
3 Sheet feed mechanisms may reduce the guaranteed reproducible area.

4 All calculations were done using worst case values. Using nominal values increases the reproducible area.

5 The exact horizontal position of this area within the ISO A4 paper size as well as sizes larger than the above are subject to national recommendations and/or definitions.

FIGURE A.1/T.563

Guaranteed reproducible area for Group 4 apparatus for use on facsimile services referring to ISO A4 paper size



a Printer/scanner tolerances
b Loss caused by the enlarging effect due to TLL tolerance
c Loss caused by skew
d Record medium positioning errors

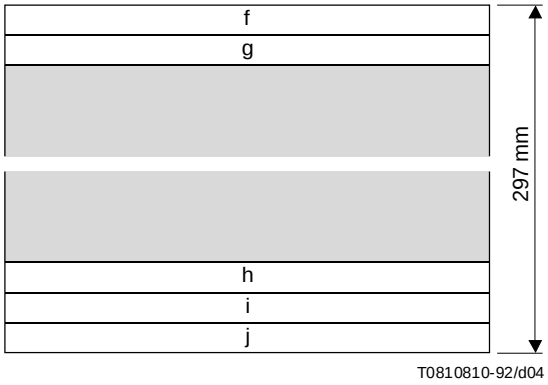
FIGURE A.2/T.563

Horizontal loss

TABLE A.1/T.563

Horizontal losses

Printer/Scanner	a	± 0.5 mm
Enlarging	b	± 2.1 mm
Skew	c	± 2.6 mm
Positioning errors	d	± 1.5 mm



f Paper insertion loss
g Loss caused by CIL printing at the top of the page
h Loss caused by skew
i Scanning density tolerance
j Gripping loss

FIGURE A.3/T.563

Vertical loss

TABLE A.2/T.563

Vertical losses

Papel insertion	f	4.0 mm
CIL printing	g	4.23 mm
Skew	h	± 1.8 mm
Scan line tolerance (Note)	i	± 2.97 mm
Gripping loss	j	2.0 mm
NOTE – Scanning density tolerance will reduce to 0 mm on roll-fed machines.		

Appendix I

Communication environment establishment

(This appendix does not form an integral part of this Recommendation)

I.1 Table I.1 summarizes the selection of communication application profile and initial session command exchange.

TABLE I.1/T.563

Selection of communication application profile

Calling	Called			
	Class I, G4	Class II, G4	Class III, G4	Basic teletex
Class I, G4	T.521 CSS/RSSP	T.521 CSS/RSSP	T.521 CSS/RSSP	T.521 CSS/RSSP (no SUD) (Calling terminal: Disconnect)
Class II, G4	T.521 CSS/RSSP	T.521 CSS/RSSP	T.521 CSS/RSSP	T.521 CSS/RSSP (no SUD) (Calling terminal: Disconnect)
Class III, G4	T.522 CN[a)]/RSSP T.521 selection (fall back)	T.522 CN/AC	T.522 CN/AC	T.522 CN[a)]/RSSP T.62 selection
Basic teletex	T.62 (no SUD) CSS/RSSN (Calling terminal: Disconnect)	T.62 (no SUD) CSS/RSSP	T.62 (no SUD) CSS/RSSP	T.62 (no SUD) CSS/RSSP

a) When interworking with T.62 based equipment, Service Identifier parameter defined in Recommendation T.62 is present in the CONNECT SPDU.

CN CONNECTION SPDU defined in Recommendation X.225.

AC ACCEPT SPDU defined in Recommendation X.225.

I.2 Some examples of the session establishment phase are as follows:

I.2.1 In case of Group 4 Class I terminal calling

See Figure I.1.

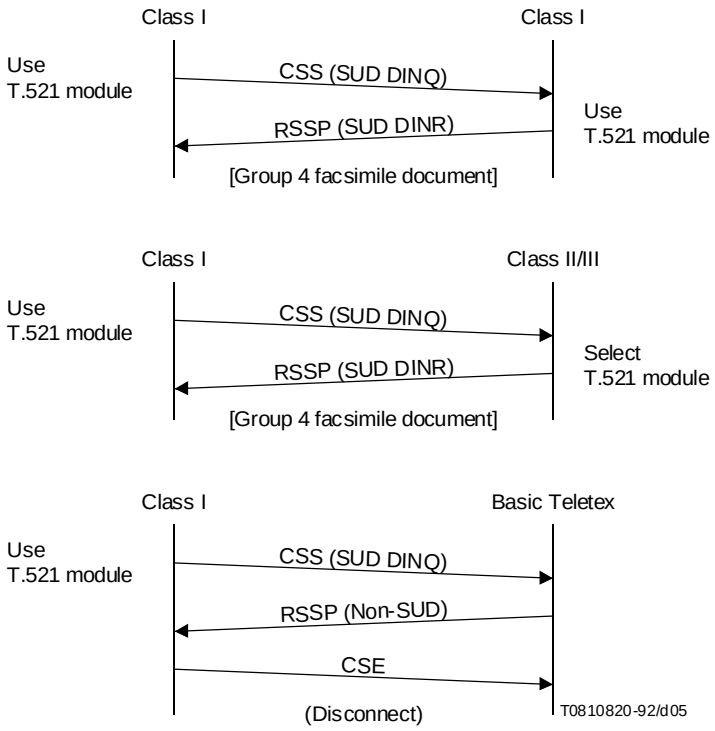


FIGURE I.1/T.563

I.2.2 In case of Group 4 Class II terminal calling

See Figure I.2.

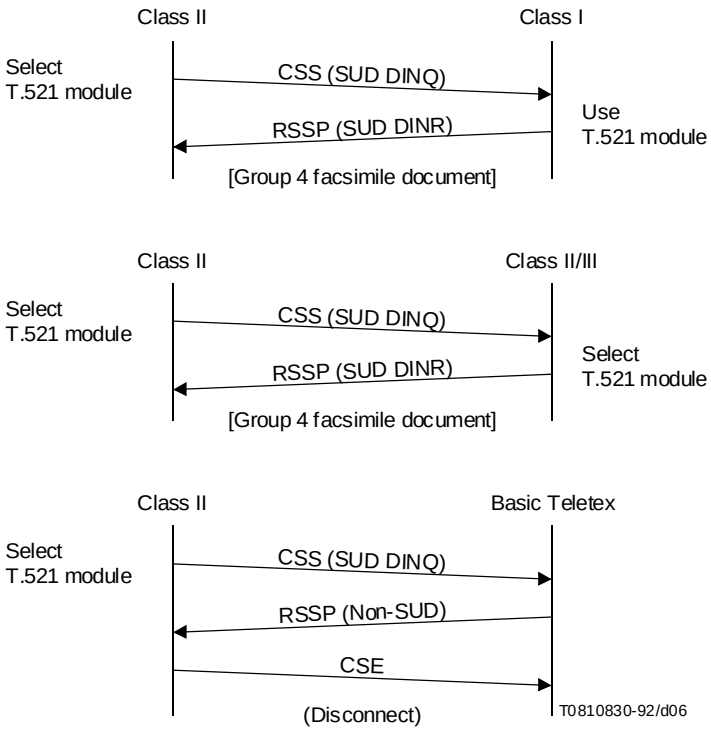


FIGURE I.2/T.563

I.2.3 In case of Group 4 Class III terminal calling

See Figure I.3.

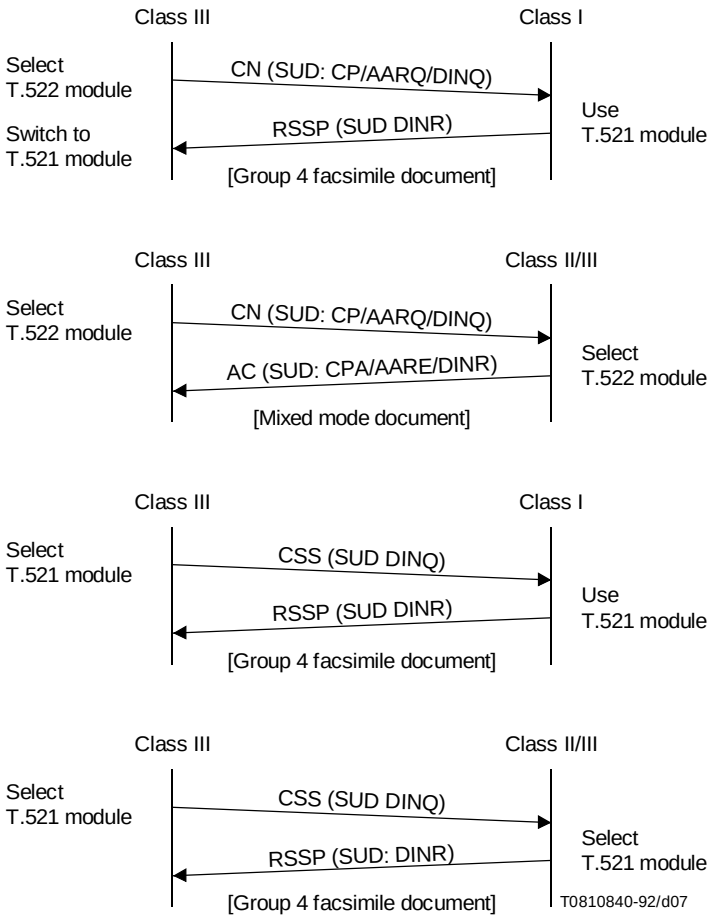


FIGURE I.3/T.563

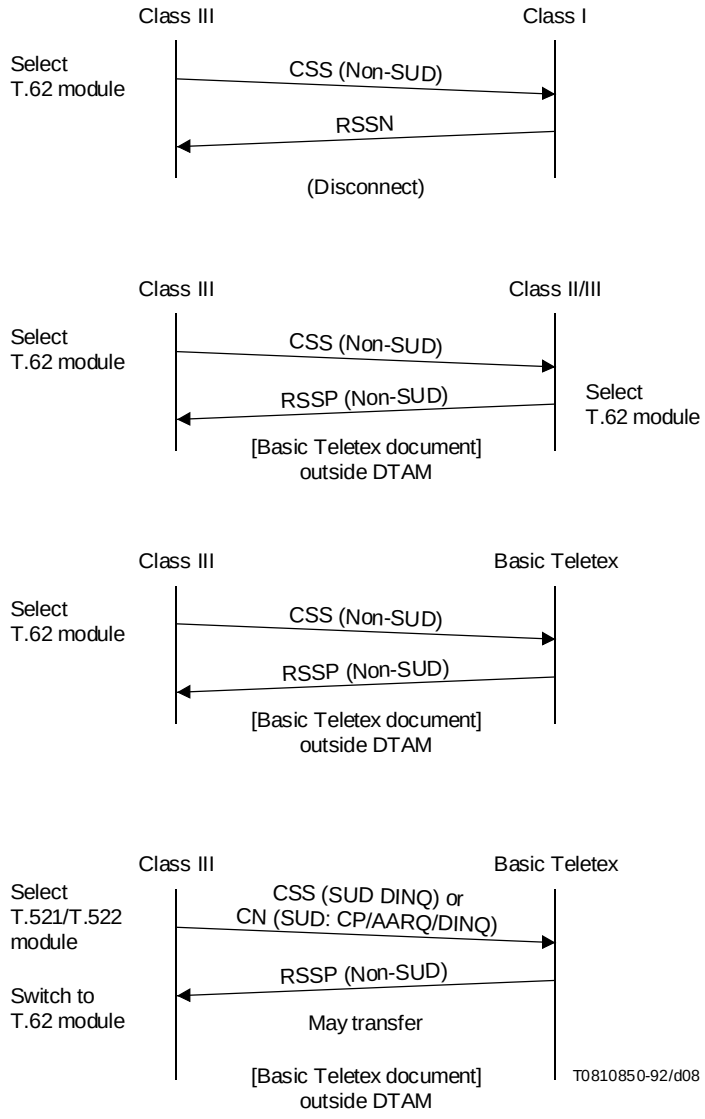


FIGURE I.3/T.563 (*end*)

I.2.4 In case of basic Teletex terminal calling

See Figure I.4.

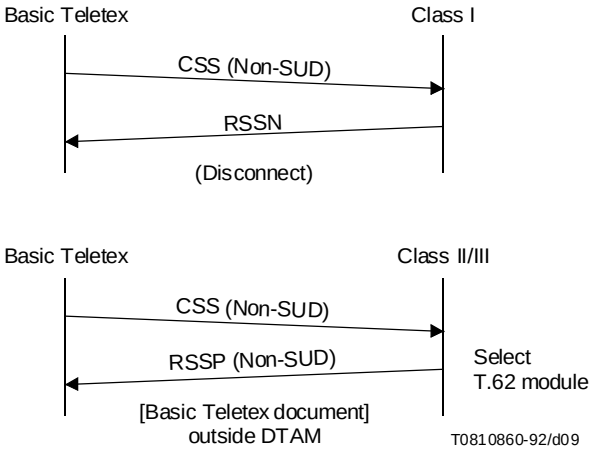


FIGURE I.4/T.563

Appendix II
Implementation Guide of Group 4 Class 1 Facsimile
(informative)

(This appendix does not form an integral part of this Recommendation)

This appendix is a summary of Group 4 Class 1 related parts of T.400- and T.500-Series Recommendations as an implementation guide. This appendix is composed of the following subclauses:

1) Document architecture;

2) ASN.1 definition of user data conveyed by session PDU;

3) Communication concepts.

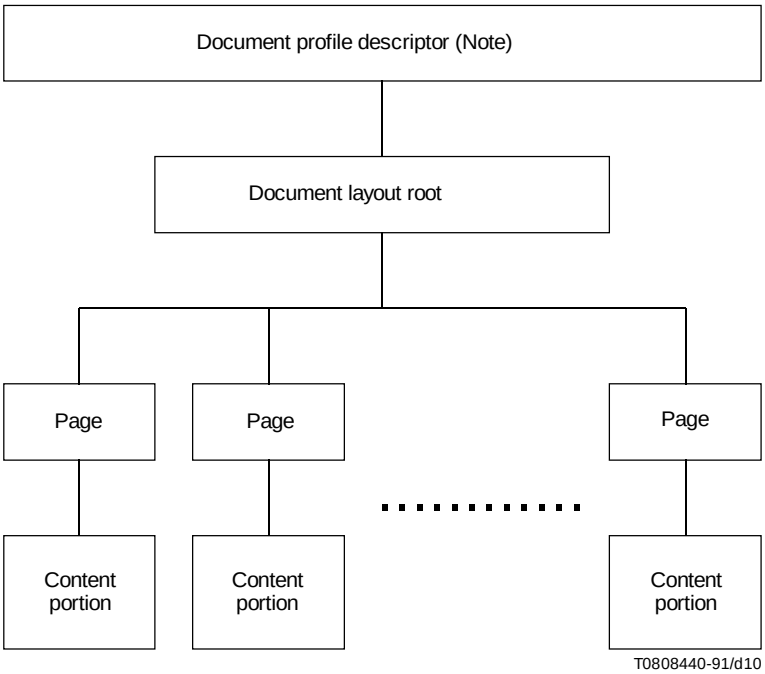
The references to T.400- and T.500-Series Recommendations are based on the *Blue Book* (1988).

II.1 Document architecture

Among document constituents defined by T.410-Series Recommendations (ODA/ODIF), four constituents are applied to Group 4, Class 1 facsimile document. Figure II.1 illustrates the hierarchical structure of the Group 4 document

II.2 ASN.1 definition of user data conveyed by session PDU

Abstract syntax definition of user data conveyed by session PDU applicable to Group 4, Class 1 and encoding examples are described in this subclause. Each ASN.1 definition is composed of the Group 4, Class 1 related parts which are defined in T.400 and T.500-Series Recommendations.



NOTE – Document profile descriptor is not transmitted using session PDU. The responding DTAM-PM may re-generate the document profile descriptor based on the user data conveyed by SUD in CDS.

FIGURE II.1/T.563

II.2.1 User data conveyed by SUD in CSS/RSSP

```
APDU                          ::= CHOICE {                                  -- see 8.2/T.433
                                  [4] IMPLICIT ApplicationCapabilities }

ApplicationCapabilities       ::= SET {                                     -- see 8.2/T.433
    documentApplicationProfile    [0] IMPLICIT OCTET STRING,
                                  -- '02'H document application profile T.503
    documentArchitectureClass     [1] IMPLICIT OCTET STRING,
                                  -- '00'H FDA }

Example ----------------------------------------------------------------------
    A4 06       ApplicationCapabilities
        80 01 02    documentApplicationProfile = T.503
        81 01 00    documentArchitectureClass = FDA
-------------------------------------------------------------------------------
```

II.2.2 User data conveyed by SUD in CDCL/RDCLP

```
APDU                          ::= CHOICE {                                  -- see 8.2/T.433
                                  [4] IMPLICIT ApplicationCapabilities }

ApplicationCapabilities       ::= SET {                                     -- see 8.2/T.433
    documentApplicationProfile    [0] IMPLICIT OCTET STRING,
                                  -- '02'H document application profile T.503
    documentArchitectureClass     [1] IMPLICIT OCTET STRING,
                                  -- '00'H FDA
    nonBasicDocCharacteristics    [2] IMPLICIT NonBasicDocCharacteristics OPTIONAL }
```

```
NonBasicDocCharacteristics    ::= SET {                                          -- see 5.6/T.415
    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 {                                     -- see 5.8/T.415
    horizontal                    [0] IMPLICIT INTEGER,
    vertical                      CHOICE {
        fixed                         [0] IMPLICIT INTEGER,
        variable                      [1] IMPLICIT INTEGER } }
                                  -- North American Letter   = {10200,13200 fixed or variable}
                                  -- ISO B4                  = {11811,16677 fixed or variable}
                                  -- ISO A3                  = {14030,19840 fixed or variable}
                                  -- Japanese Legal          = {12141,17196 fixed or variable}
                                  -- Japanese Letter         = {8598,12141 fixed or variable}
                                  -- North American Legal    = {10200,16800 fixed or variable}
                                  -- North American Ledger   = {13200,20400 fixed or variable}
                                  -- ISO A4                  = {9920,14030 fixed or variable}
            -- default value is       ISO A4                  = {9920,14030 fixed}
            -- basic value is         ISO A4                  = {9920,14030 fixed or variable}

Ra-Gr-Coding-Attribute        ::= CHOICE {                                       -- see 8.4/T.417
    compression                   [0] IMPLICIT Compression }

Compression                   ::= INTEGER {uncompressed (0),                     -- see 8.3/T.417
                                           compressed (1) }
-- default and basic value is compressed (1)

Ra-Gr-Presentation-Feature    ::= CHOICE {                                        -- see 8.4/T.417
    pel-transmission-density      [11] IMPLICIT Pel-Transmission-Density }

Pel-Transmission-Density      ::= INTEGER {p6 (1),   -- 6 BMU (200pels/25.4mm)   -- see 8.2/T.417
                                           p5 (2),   -- 5 BMU (240pels/25.4mm)
                                           p4 (3),   -- 4 BMU (300pels/25.4mm)
                                           p3 (4),   -- 3 BMU (400pels/25.4mm) }
-- default and basic value is p6 (1)

Example ----------------------------------------------------------------------------
    A4 35      ApplicationCapabilities
        80 01 02     documentApplicationProfile = T.503
        81 01 00     documentArchitectureClass = FDA
        A2 2D        nonBasicDocCharacteristics
            A2 1E        page-dimensions
                30 08            SEQUENCE
                  80 02 2F6D     horizontal = 12141 BMU
                  80 02 432C     vertical = variable 17196 BMU (Japanese Legal)
                30 08            SEQUENCE
                  80 02 36 CE    horizontal = 14030 BMU
                  81 02 4D80     vertical = variable 19840 BMU (ISO A3 variable)
                30 08            SEQUENCE
                  80 02 2E23     horizontal = 11811 BMU
                  81 02 4125     vertical = variable 16677 BMU (ISO B4 variable)
            A3 03        ra-gr-coding-attributes
                80 01 00         compression = 0 (uncompressed)
            A4 06        ra-gr-presentation-features
                8B 01 03         pel-transmission-density = 3 (4 BMU)
                8B 01 04         pel-transmission-density = 4 (3 BMU)
-------------------------------------------------------------------------------------
```

II.2.3 User data conveyed by SID in CDS

```
S-ACTIVITY-START-user-data ::= CHOICE {                                  -- see 7.2.4.1.4/T.433
                                   [4] IMPLICIT DocumentCharacteristics }
```

```
DocumentCharacteristics      ::= SET {                                    -- see 7.2.4.1.4/T.433
    documentApplicationProfile    [0] IMPLICIT OCTET STRING,
                                  -- '02'H document application profile T.503
    documentArchitectureClass     [1] IMPLICIT OCTET STRING,
                                  -- '00'H FDA
    nonBasicDocCharacteristics    [2] IMPLICIT NonBasicDocCharacteristics OPTIONAL
                                  -- see II.2.2 }

Example ----------------------------------------------------------------------------
    A4 26       DocumentCharacteristics
        80 01 02      documentApplicationProfile = T.503
        81 01 00      documentArchitectureClass = FDA
        A2 1E         nonBasicDocCharacteristics
            A2 14         page-dimensions
                30 08             SEQUENCE
                    80 02 2F6D    horizontal = 12141 BMU
                    80 02 432C    vertical = variable 17196 BMU (Japanese Legal variable)
                30 08             SEQUENCE
                    80 02 36 CE   horizontal = 14030 BMU
                    81 02 4D80    vertical = variable 19840 BMU (ISO A3 variable)
            A4 06         ra-gr-presentation-features
                8B 01 03      pel-transmission-density = 3 (4 BMU)
                8B 01 04      pel-transmission-density = 4 (3 BMU)
-------------------------------------------------------------------------------------
```

II.2.4 Layout Object Descriptor (document layout root) conveyed by CSUI/CDUI

```
Interchange-Data-Element     ::= CHOICE {                                 -- see 5.5/T.415
    layout-object                 [2] IMPLICIT Layout-Object-Descriptor }

Layout-Object-Descriptor     ::= SEQUENCE {                               -- see 5.8/T.415
    object-type                   Layout-Object-Type,
    descriptor-body               Layout-Object-Descriptor-Body OPTIONAL }

Layout-Object-Type           ::= INTEGER {document-layout-root (0) }      -- see 5.8/T.415

Layout-Object-Descriptor-Body ::= SET {                                   -- see 5.8/T.415
    object-identifier             Object-or-Class-Identifier OPTIONAL,
    subordinates                  [0] IMPLICIT SEQUENCE OF NumericString OPTIONAL,
    default-value-lists           [7] IMPLICIT Default-Value-Lists-Layout OPTIONAL }

Object-or-Class-Identifier   ::= [APPLICATION 1] IMPLICIT PrintableString -- see 5.7/T.415
                                  -- only digits and space are used in the present version
                                  -- of the standard; other characters are reserved for extensions;
                                  -- a "null" value is represented by empty string.

Default-Value-Lists-Layout   ::= SET {                                    -- see 5.11/T.415
    page-attributes               [2] IMPLICIT Page-Attributes OPTIONAL }

Page-Attributes              ::= SET {                                    -- see 5.11/T.415
    dimensions                    < Attributes OPTIONAL,
    presentation-attributes       < Attributes OPTIONAL }

Attributes                   ::= CHOICE {
    dimensions                    [1] IMPLICIT Dimension-Pair,
                                  -- see II.2.2
    presentation-attributes       [3] IMPLICIT Presentation-Attributes
                                  -- see II.2.5 }

Example ----------------------------------------------------------------------------
    A2 03       Layout-Object-Descriptor
        01 01 00      INTEGER = document-layout-root
-------------------------------------------------------------------------------------
```

II.2.5 Layout Object Descriptor (page) conveyed by CSUI/CDUI

```
Interchange-Data-Element     ::= CHOICE {                                 -- see 5.5/T.415
    layout-object                 [2] IMPLICIT Layout-Object-Descriptor }
```

```
Layout-Object-Descriptor        ::= SEQUENCE {                                  -- see 5.8/T.415
    object-type                     Layout-Object-Type,
    descriptor-body                 Layout-Object-Descriptor-Body OPTIONAL }

Layout-Object-Type              ::= INTEGER {page (2) }                         -- see 5.8/T.415

Layout-Object-Descriptor-Body   ::= SET {                                       -- see 5.8/T.415
    object-identifier               Object-or-Class-Identifier OPTIONAL,
    content-portions                [1] IMPLICIT SEQUENCE OF NumericString OPTIONAL,
    dimensions                      [4] IMPLICIT Dimension-Pair OPTIONAL,
                                    -- see II.2.2
    presentation-attributes         [6] IMPLICIT Presentation-Attributes OPTIONAL }

Object-or-Class-Identifier      ::= [APPLICATION 1] IMPLICIT PrintableString
                                    -- see II.2.4

Presentation-Attributes         ::= SET {                                       -- see 5.10/T.415
    content-type                    Content-Type OPTIONAL,
    raster-graphics-attributes      [1] IMPLICIT Raster-Graphics-Attributes OPTIONAL }

Content-Type                    ::= [APPLICATION 2] IMPLICIT INTEGER            -- see 5.10/T.415
                                        {formatted-raster-graphics (1) }

Raster-Graphics-Attributes      ::= SET {                                       -- see 8.2/T.417
    pel-path                        [0] IMPLICIT One-of-Four-Angles OPTIONAL,
    line-progression                [1] IMPLICIT One-of-Two-Angles OPTIONAL,
    pel-transmission-density        [2] IMPLICIT Pel-Transmission-Density OPTIONAL
                                    -- see II.2.2

One-of-Four-Angles              ::= INTEGER { d0 (0) --- 0 }                    -- see 8.2/T.417
                                    -- default and basic value is d0 (0)

One-of-Two-Angles               ::= INTEGER { d270 (3) --- 270 }                -- see 8.2/T.417
                                    -- default and basic value is d270 (3)
```

Example 1 ----------

```
A2 03       Layout-Object-Descriptor
    02 01 02    INTEGER = page
                -- This means ISOA4 fixed and 200pels/25.4mm
```

Example 2 ----------

```
A2 16       Layout-Object-Descriptor
    02 01 02    INTEGER = page
    31 11       SET
        A4 08       dimensions
            80 02 26CO  horizontal = 9920 BMU
            81 02 36CE  vertical = 14030BMU (ISO A4 variable)
        A6 05       presentation-attributes
            A1 03           raster-graphics-attributes
                82 01 04        pel-transmission-density = 400pels/25.4mm
```

II.2.6 Content Portion conveyed by CSUI/CDUI

```
Interchange-Data-Element        ::= CHOICE {                                    -- see 5.5/T.415
    content-portion                 [3] IMPLICIT Text-Unit }

Text-Unit                       ::= SEQUENCE {                                  -- see 5.12/T.415
    content-portion-attributes      Content-Portion-Attributes OPTIONAL,
    content-information             Content-Information }

Content-Portion-Attributes      ::= SET {                                       -- see 5.12/T.415
    content-identifier-layout       Content-Portion-Identifier OPTIONAL,
    type-of-coding                  Type-of-coding OPTIONAL,
    coding-attributes               CHOICE {
        raster-gr-coding-attributes     [2] IMPLICIT Raster-Gr-Coding-Attributes} OPTIONAL }
```

Content-Portion-Identifier ::= [APPLICATION 0] IMPLICIT PrintableString -- *see 5.7/T.415*
-- *only digits and space are used in the present version*
-- *of the Recommendation; other characters are reserved for extensions*

Type-of-Coding ::= CHOICE { -- *see 5.12/T.415*
[0] IMPLICIT INTEGER { t6 (1) }
-- *default and basic value is t.6 (1)* **}**

Raster-Gr-Coding-Attributes ::= SET { -- *see 8.3/T.417*
number-of-pels-per-line [0] IMPLICIT INTEGER OPTIONAL,
-- *see Table 3*
compression [2] IMPLICIT Compression OPTIONAL,
-- *see II.2.2*
number-of-discarded-pels [3] IMPLICIT INTEGER OPTIONAL
-- *see Table 3* **}**

Content-Information ::= OCTET STRING
-- *basic value is t.6 string*

Example 1 ----------
A3 LI Text-Unit
04 LI XXXXXXXXXXX(t.6 string)XXXXXXXXXXX OCTET STRING (primitive)

Example 2 ----------
A3 80 Text-Unit
31 0A content-portion-attributes
A2 08 coding-attributes
80 02 0800 number-of-pels-per-line = 2048
83 02 000C number-of-discarded-pels = 12
24 80 OCTET STRING (constructed)
04 LI XXXXXXXXX(t.6 string)XXXXXXXXXX OCTET STRING (primitive)
04 LI XXXXXXXXX(t.6 string)XXXXXXXXXX OCTET STRING (primitive)
0000 EDC
0000 EDC

II.3 Communication concepts

II.3.1 General

A group facsimile may negotiate the capability to use the document application profile and the document architecture class within a session. This negotiation is accomplished with the CSS/RSSP and CDCL/RDCLP exchanges during the session establishment phase. However, only one type of document may be invoked at any given time during the document transfer phase. The negotiation and invocation are described below.

II.3.2 Negociation

The application capabilities are negotiated as follows:

- For CSS, RSSP the application capabilities indicated within the session user data (SUD) parameter shall only indicate which document application profile(s) and document architecture class(es) are available as receiving capabilities of the sender of the command/response.
- For CDCL, the application capabilities indicated within the SUD should include a list of non-basic document characteristics that may be needed at the receiver by the sender of this command.
- For RDCLP, the non-basic document characteristics available should be indicated. The non-basic document characteristics are conveyed in the SUD using the application capabilities protocol element.

II.3.3 Invocation

For CDS/CDC, the document characteristics indicated within the SUD should include the non-basic document characteristics which are required for the document. The non-basic document characteristics are conveyed in the SUD, using the document characteristics protocol element. The document sender only sends document which the sink has indicated it is capable of handling.

II.3.4 Data transfer

The layout object descriptors and the text units are carried inside the session service data units (CSUI-CDUI T.62 commands). Within the data stream, the interchange data elements are ordered in accordance with "interchange format class B", as defined in Recommendation T.415. Every text unit follows immediately the descriptor of the associated lowest-level object.

When a document is transmitted, a synchronization point is set at each page boundary of the specific structure.

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