

Recommendation T.563

TERMINAL CHARACTERISTICS FOR GROUP 4 FACSIMILE APPARATUS

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

Appendix I - Communication environment establishment

The CCITT,
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 document;
- (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. Other image types, e.g. grey scale image or colour image 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 document (in accordance with the Recommendations T.6, T.503 and T.521), teletex coded document (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 Recommendation T.6.

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.

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 has 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 § 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, layout 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 CCITT 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 to this Recommendation.

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/T.563.

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

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/T.563 and 2b/T.563 for all the Group 4 resolutions for ISO A4, North American, ISO B4, ISO A3, Japanese legal and Japanese letter paper.

TABLE 2a/T.563

Number of pels and scan line length for different paper sizes

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

TABLE 2b/T.563

Nominal number of scan lines for different paper sizes

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

Table 3/T.563 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/T.563 illustrates the blanking procedure for ISO A4 and North American paper. The same procedure is used for the other paper formats.

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	200 × 200	1728	1654	(B)		
	240 × 240	2074	1984	37	(38.1)	219.46
	300 × 300	2592	2480	45	(46.1)	219.46
	400 × 400	3456	3308	56	(57.1)	219.46
				74	(75.1)	219.46
North American	200 × 200	1728	1700	(A)		
	240 × 240	2074	2040	14	(15.1)	219.46
	300 × 300	2592	2550	17	(18.1)	219.46
	400 × 400	3456	3400	21	(22.1)	219.46
				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
North American	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

Note - The pels as defined in the blanking margin section (blanking margin A and B in Figure 1/T.563) are equivalent to the discarded pels defined in Recommendation T.501.

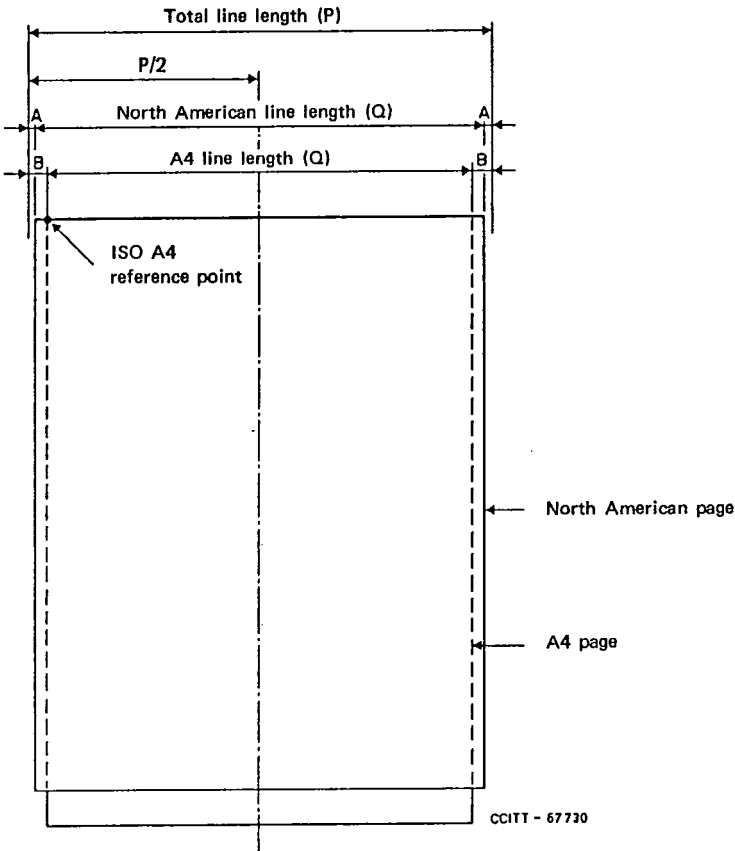


FIGURE 1/T.563

Reference point and blanking margins

The raster point is 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/T.563.

3.2.8 Group 4 facsimile class structure

Table 4/T.563 shows the class structure of Group 4 facsimile apparatus.