INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

T.22

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(03/93)

TERMINAL EQUIPMENT AND PROTOCOLS FOR TELEMATIC SERVICES

STANDARDIZED TEST CHARTS FOR DOCUMENT FACSIMILE TRANSMISSIONS

ITU-T Recommendation T.22

(Previously “CCITT Recommendation”)

FOREWORD

The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the International Telecommunication Union. 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, established the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

ITU-T Recommendation T.22 was prepared by the ITU-T Study Group VIII (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

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

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STANDARDIZED TEST CHARTS FOR DOCUMENT FACSIMILE TRANSMISSIONS

(Helsinki, 1993)

The ITU-T,

considering

(a) that a standardized test chart to check the quality of document facsimile transmissions will have great advantages. The advancing technology of document facsimile has brought forth monochrome testing requirements that cannot be adequately met with current test charts. New higher resolution needs and transmission of high quality continuous tone gray scale must be taken into consideration;

(b) that conflicting test chart reproduction requirements for black-white patterns and continous tone has led to the definition of two new test charts:

- one, high contrast "facsimile test chart" for evaluating the technical quality of the page and the legibility of the text;
- the other, "continuous tone addendum" for the evaluation of the technical quality of continous tone information,

unanimously adopts the view

(1) that tests of document facsimile transmission quality should be carried out in the international service using the ITU-T standardized test charts;

(2) that these test charts should be produced by the ITU under the supervision of the ITU-T and should be offered for sale by the ITU. There are two types of charts:

- Test chart No. 4: "Facsimile test chart" intended for the general evaluation of technical quality;
- Test chart No. 5: "Continuous tone addendum" intended to check tonal quality.

The charts are described in Annex A; the specimens printed in Annex A cannot be used for measurements;

(3) that the charts should be used with electronic document storage facilities, electronic document transmission facilities, and facsimile apparatus in accordance with appropriate T-Series Recommendations.

Annex A

Description of the standardized document facsimile test charts

(This annex forms an integral part of this Recommendation)

A.1 Dimensions of the test charts

	Test chart No. 4	Test chart No. 5
–	length: 302 mm	279 mm
–	width: 222 mm	216 mm

They are divided into sections numbered:

- 1-17 on test chart No. 4 for resolution testing,
- 1-6 on test chart No. 5 for tonal quality testing.

A test-chart section number is also the last part of a subclause number denoting the subclause, in A.2 and A.3 below, which describe in detail the given section of the test chart.

A.2 Test chart No. 4 – Black-white facsimile test chart BW01

This monochrome test chart has black-white patterns, text and line work printed on high gamma photographic paper for optimum sharpness and high contrast without fogging the white areas next to black markings. The overall size of the printed chart is 222 × 302 mm (8 3/4 × 11 7/8 inches) to allow for maximum paper size tolerances.

Pattern descriptions

The overall size of the printed chart is 222 × 302 mm. The patterns that make up the chart are defined below. Refer to the corresponding numbers on the test chart 4 pattern arrangement.

A.2.1 Pattern 1 – ITU-T border of 4 scales (between arrowheads) with inch and millimeter markings

The 5 and 10 mm lines are extended. The arrows near the ends (and pointing vertically downwards) are 8 1/2 inches apart and centered on the page.

A.2.2 Pattern 2 – Black bar across full page width, and a scale in inches across the top and along the left side

Markings start from 0 in the middle of the page with 0.1 inch scale. The vertical border at the left side of the chart is marked in inches.

A.2.3 Pattern 3 – Four patterns of truncated fan-type multiple-line pattern with low taper rate

The larger patterns are calibrated in black plus white lines per inch, and the smaller ones are calibrated in microns.

A.2.4 Pattern 4 – Gurley type Pestrecov star pattern with circles of 50, 100 and 200 lines per 25.4 mm

This pattern is better for detecting some moire phenomena than pattern 3.

A.2.5 Pattern 5 – Alternating black and white lines

Upper pattern is 150 lines per 25.4 mm, inclined at 3 degrees from vertical. The lower pattern is 200 lines per 25.4 mm, inclined at 2 degrees from vertical. The angle is to allow the lines to drift through a match and a mismatch with the photosensor array elements.

A.2.6 Pattern 6 – Black-white bar patterns

Bar Patterns of 100, 150, 200, 300, 400 and 600 lines per 25.4 mm.

A.2.7 Pattern 7 – Isolated black and white lines

The vertical pattern is inclined at 5 degrees from vertical.

A.2.8 Pattern 8 – NIST type resolution pattern

Calibrated in line pairs (black plus white) per millimeter with the smallest patterns near the center of the chart.

A.2.9 Pattern 9 – Tapered isolated black and white line patterns with the line width calibrated in microns or inches

A.2.10 Pattern 10 – Black-white bar pattern of 5 black plus white bars per 25.4 mm

A.2.11 Pattern 11 – Parallel lines inclined at 5 degrees from vertical

A.2.12 Pattern 12 – NIST type resolution pattern

Calibrated in line pairs (black plus white) per millimeter with the smallest patterns near the edge of the chart.

A.2.13 Pattern 13 – Diagonal line for checking irregularities in vertical pitch

Received lines with errors will show breaks or steps in this line.

A.2.14 Pattern 14 – ISO character hexagonal line patterns for readability testing

A.2.15 Pattern 15 – Halftone dot screens of 10, 50 and 90 percent black

The 65 and 120 are the number of dots per 25.4 mm measured at a 45 degree angle.

A.2.16 Pattern 16 – Line crossing pattern

The center to center line separation is 0.15 inches on the left end and 0.05 inches on the right end. The number of scanning line crossings of both lines multiplied by 10 is the vertical line pitch in lines per 25.4 mm.

A.2.17 Pattern 17 – Text in English, Arabic, Chinese, Russian, Spanish and French. English text is in 12, 10, 8, 6, 4 and 2 point sizes

A.3 Test Chart No. 5 – Continuous tone facsimile test chart CT01

This continuous tone test chart is printed on low gamma photographic material that preserves the complete gray scale between paper white and black for continuous tone photographs. It can be used for testing both facsimile machines with gray scale capability and those machines that are black-white only. The black-white threshold setting of the facsimile scanner can be set very accurately with this chart.

Pattern descriptions

The overall size of the printed chart is 279 × 216 mm. The patterns that make up the chart are defined below. Refer to the corresponding numbers on the test chart 5 pattern arrangement.

A.3.1 Pattern 1 – A continuous (stepless) density wedge

From black on the left to white on the right.

A.3.2 Pattern 2 – A reverse of the continuous wedge of Pattern 1

White on the left.

A.3.3 Pattern 3 – A 48-step density tablet

With 3 rows of 16 density steps from white to black**.** Steps are designed for equal-perceptibility human observers (see Table A.1).

A.3.4 Pattern 4 – A set of 16 horizontal gray scale strips

From black to white (see Table A.2).

TABLE A.1/T.22

Pattern 3 density values

	A	B	C
1	0.00	0.29	0.85
2	0.02	0.33	0.90
3	0.03	0.37	0.93
4	0.04	0.38	0.97
5	0.06	0.39	1.01
6	0.09	0.43	1.06
7	0.10	0.45	1.10
8	0.12	0.50	1.16
9	0.12	0.54	1.20
10	0.14	0.56	1.27
11	0.15	0.60	1.31
12	0.17	0.62	1.33
13	0.19	0.66	1.41
14	0.21	0.68	1.50
15	0.23	0.69	1.60
16	0.24	0.73	1.71

TABLE A.2/T.22

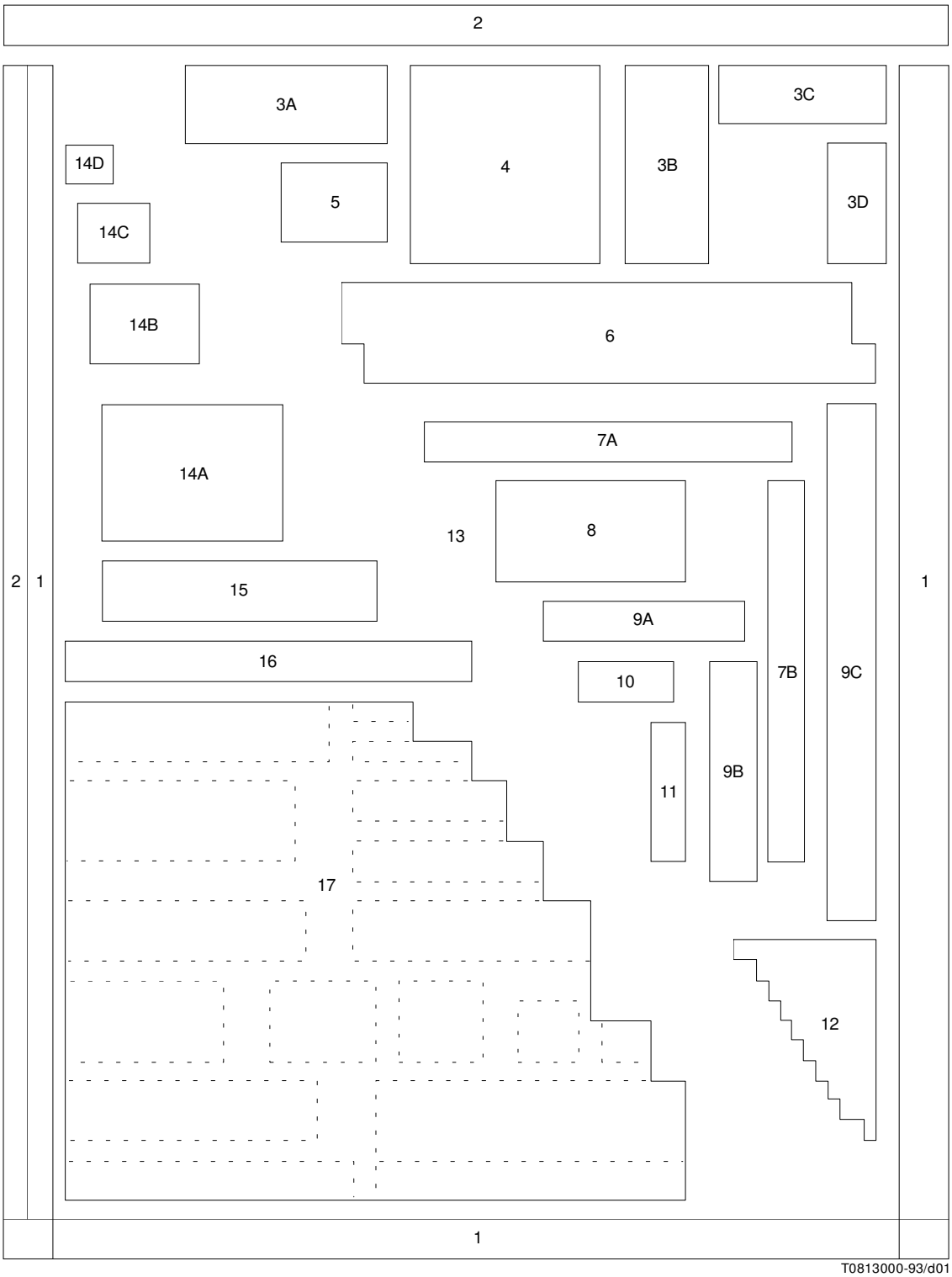
Pattern 4 density values

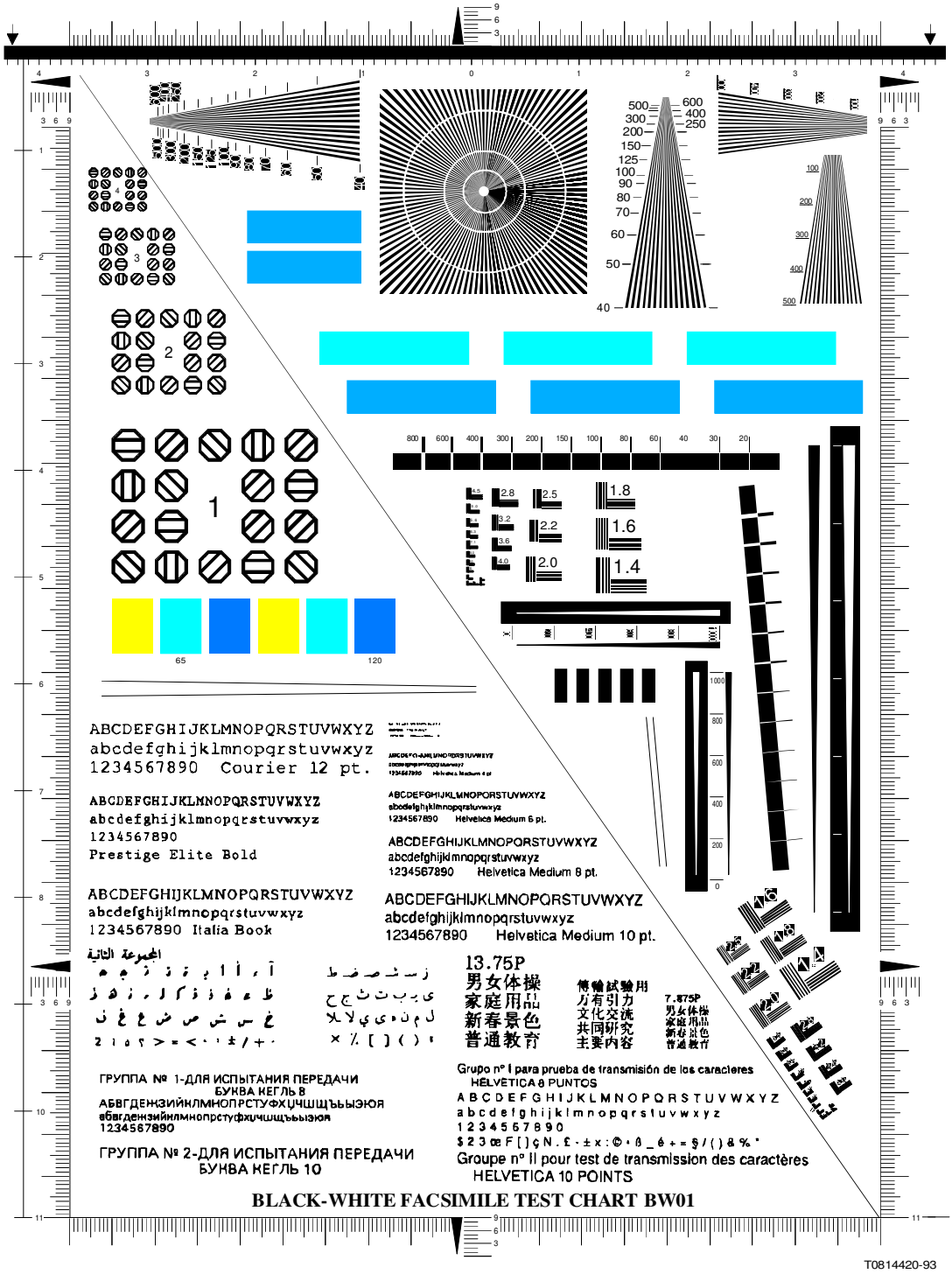
Strip	Density	Strip	Density
1	1.937	9	0.937
2	1.812	10	0.812
3	1.687	11	0.687
4	1.562	12	0.562
5	1.437	13	0.437
6	1.312	14	0.313
7	1.187	15	0.187
8	1.062	16	0.062

A.3.5 Pattern 5 – An architectural photo showing fine detail

A.3.6 Pattern 6 – Portrait

Test chart 4 – Pattern arrangement

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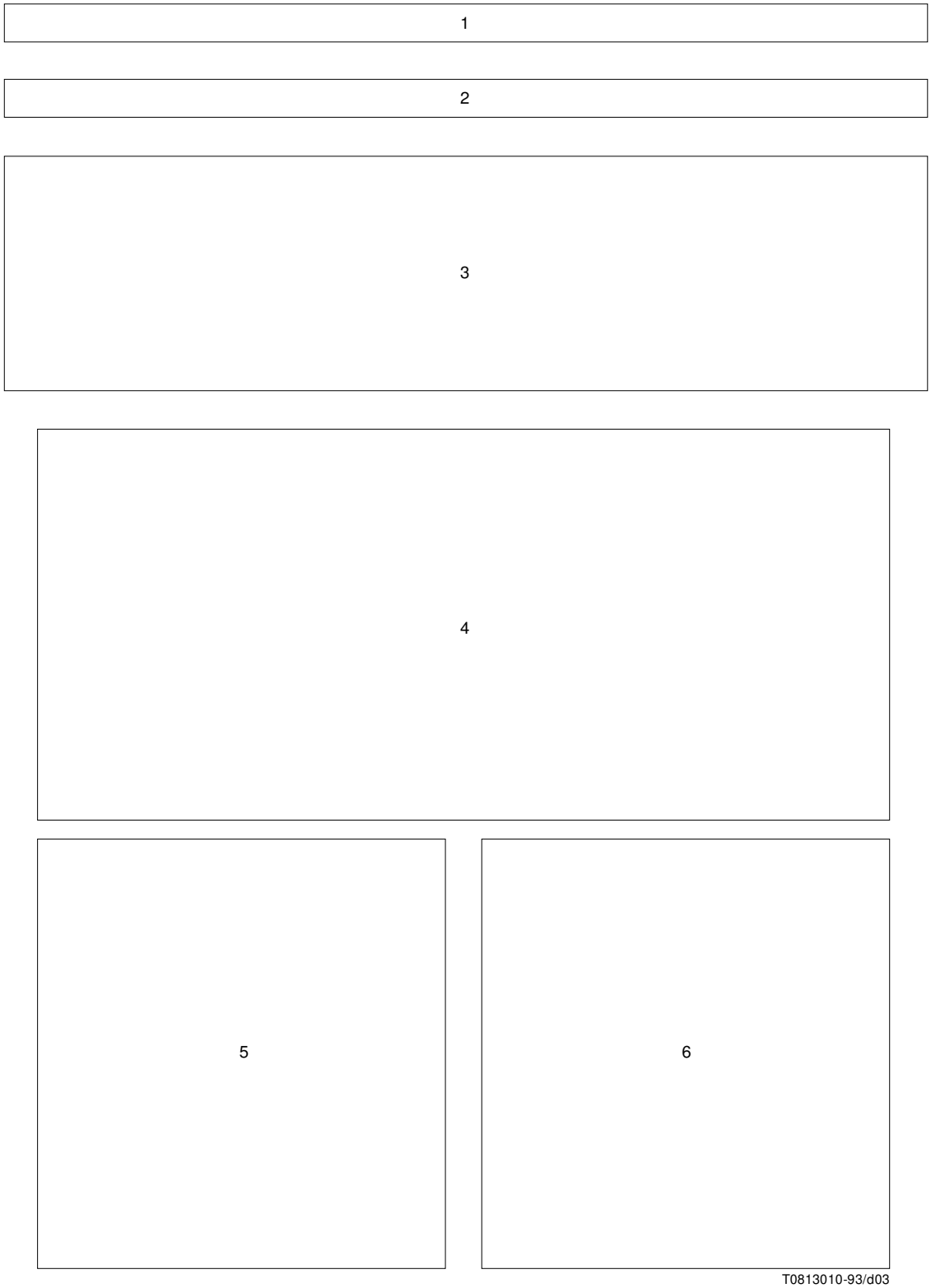
13.75P
7.875P
ГРУППА № 1-ДЛЯ ИСПЫТАНИЯ ПЕРЕДАЧИ
БУКВА КЕГЛЬ 8
АБВГДЕЖЗИЙКЛМНОПРСТУФХЦЧШЩЪЫЬЭЮЯ
абвгдежзийклмнопрстуфхцчшщъыьэюя
1234567890
ГРУППА № 2-ДЛЯ ИСПЫТАНИЯ ПЕРЕДАЧИ
БУКВА КЕГЛЬ 10
Grupo nº I para prueba de transmisión de los caracteres
HELVETICA 8 PUNTOS
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
1 2 3 4 5 6 7 8 9 0
Groupe nº II pour test de transmission des caractères
HELVETICA 10 POINTS
BLACK-WHITE FACSIMILE TEST CHART BW01
T0814420-93

Test chart 5 – Pattern arrangement



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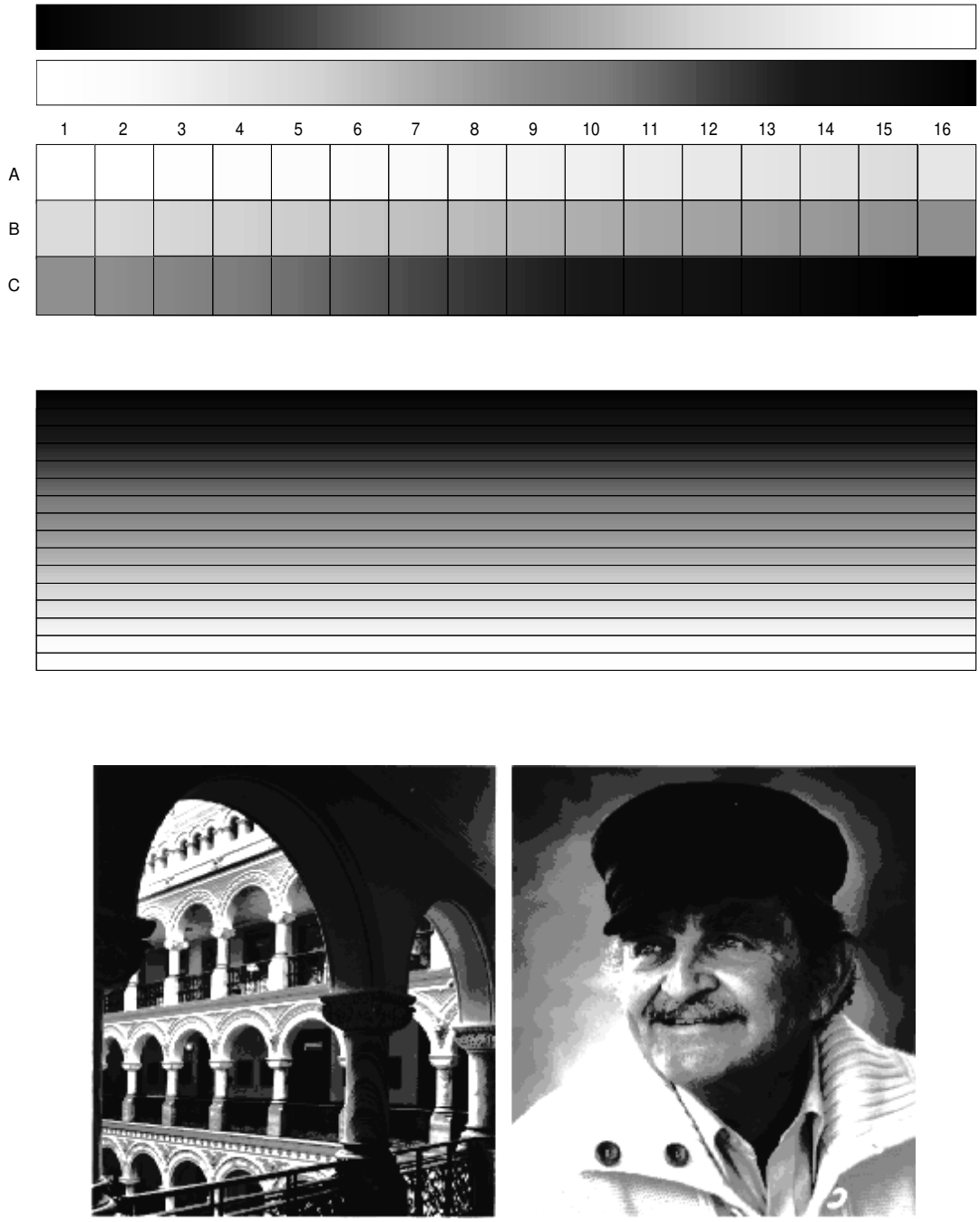

Continuous tone facsimile test chart CT01