



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

T.23

(04/94)

TELEMATIC SERVICES

**TERMINAL EQUIPMENTS AND PROTOCOLS
FOR TELEMATIC SERVICES**

**STANDARDIZED COLOUR TEST CHART
FOR DOCUMENT FACSIMILE
TRANSMISSIONS**

ITU-T Recommendation T.23

(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.23 was prepared by ITU-T Study Group 8 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 7 April 1994.

NOTE

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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SUMMARY

This Recommendation defines the high resolution colour test chart. Included is a black/white photocopy of the latest revision of the colour chart (the colour chart is available from ITU Sales Department). This full-colour chart was printed from 4-colour separation negatives in order to provide low cost colour reproduction. The chart includes a Pestrecov Star, various line patterns and colour patches, text, solid colour blocks, screened grey scales, a colour photograph and two computer-generated images. The purpose of the chart is to satisfy colour testing requirements that cannot be adequately met with current test charts. The chart can be used with electronic document storage facilities, electronic document transmission facilities, and facsimile apparatus.

Recommendation T.23

STANDARDIZED COLOUR TEST CHART FOR DOCUMENT FACSIMILE TRANSMISSIONS

(Geneva, 1994)

The ITU-T,

considering

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

(b) that the requirement for low cost colour reproduction has led to the definition of a new colour test chart for evaluating the technical quality of the page and the legibility of the text,

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 chart;

(2) that the test chart should be produced under the supervision of the ITU-T and should be offered for sale by the ITU. The chart is described in Annex A; the specimen printed in Annex A cannot be used for measurements;

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

Annex A

Description of the standardized facsimile colour test chart

(This annex forms an integral part of this Recommendation)

A.1 Dimensions of the test chart

- length: 302 mm,
- width: 222 mm.

It is divided into subclauses marked A.2.1 to A.2.13.

These subclauses markings are also used to designate the following clause and subclauses which describe the given clause.

A.2 Test Chart 6 – 4-Colour Printing Facsimile Test Chart 4CP01

This full-colour chart was printed from 4-colour separation negatives. (See Figure A.1 for a black and white copy of the chart.) Some of the patterns are the same as Test Chart No. 4 (black/white test chart), or modifications thereof to print with colour primaries rather than black. 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.

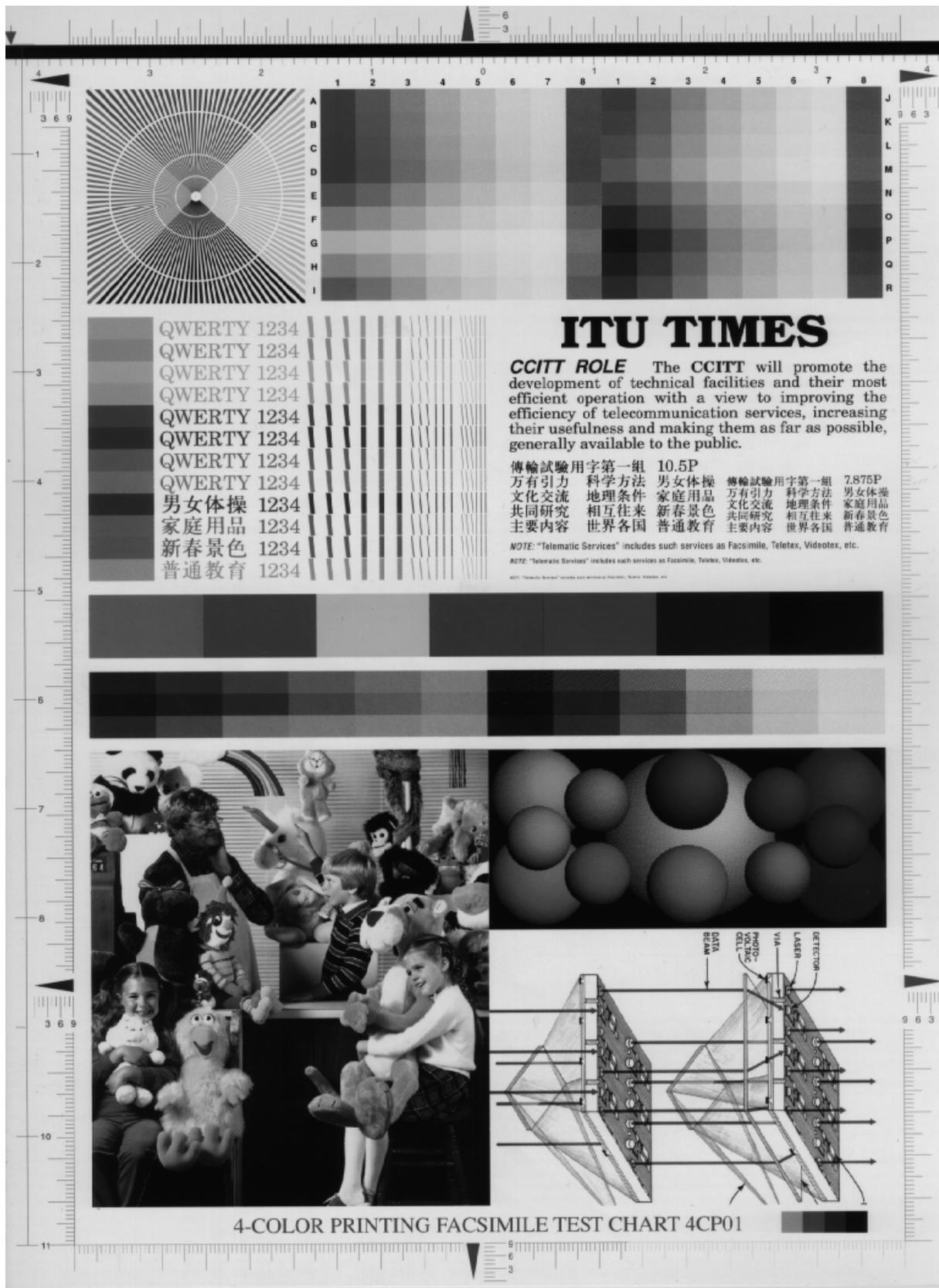


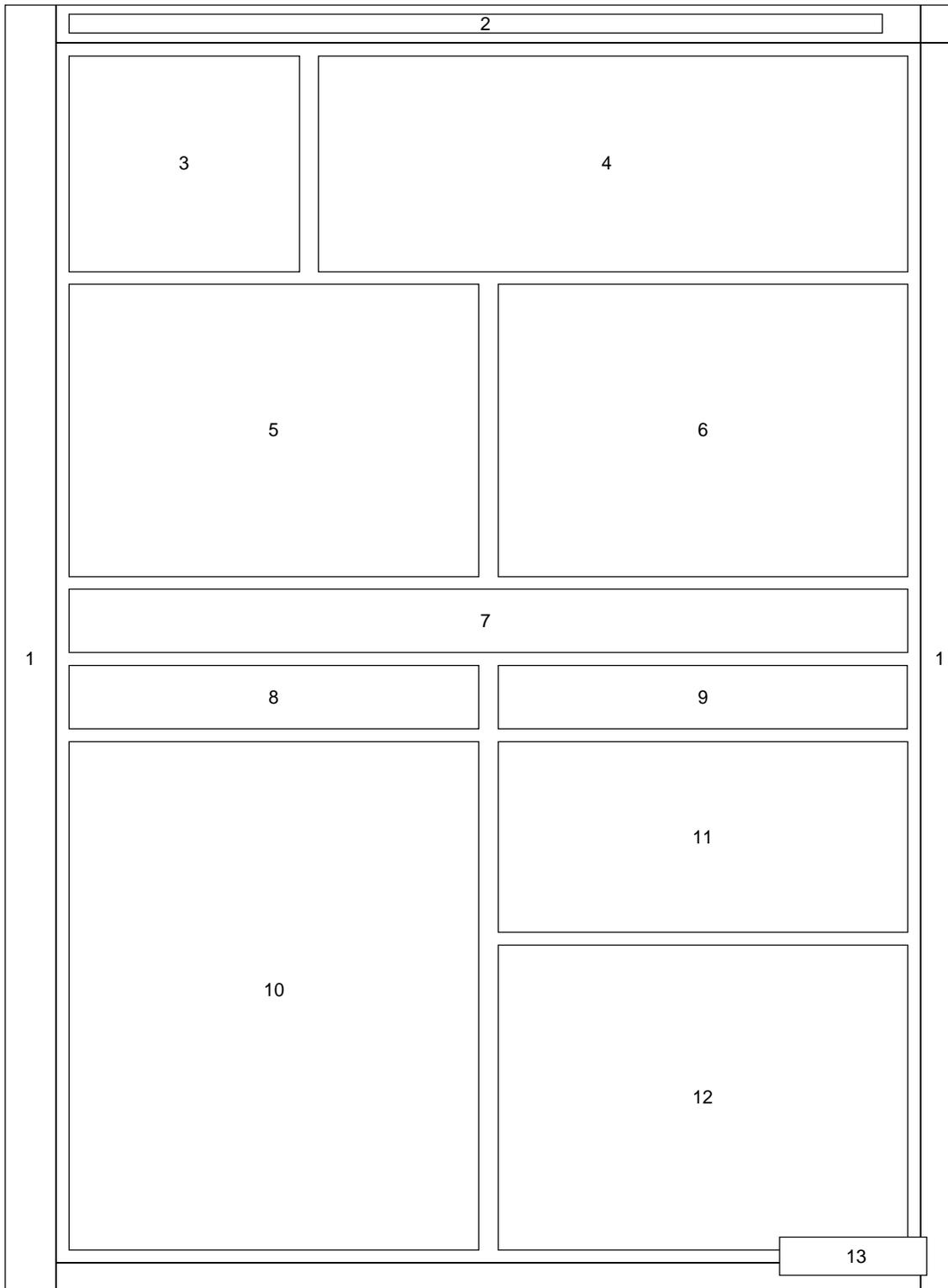
FIGURE A.1/T.23

T0818710-94/d01

4-Colour Printing Facsimile Test Chart 4CP01
(The colour chart is available from ITU Sales Service.)

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 No. 6 pattern arrangement (see Figure A.2).



T0818690-94/d02

FIGURE A.2/T.23
Pattern arrangement

A.2.1 Pattern 1 – ITU-T border of four scales with inch and millimetre markings

A border consisting of four scales with millimetre markings, one scale per side. On the scales, the 5 and 10 mm lines are extended. The red arrows at the top of the chart are 8 1/2 inches apart. The top border is red (solid magenta and yellow printing). The right border is green (solid yellow and cyan printing). The left border, also marked in inches, is blue (solid cyan and magenta printing). The bottom border consists of three differently coloured segments. Its colours are, from left to right, cyan, magenta and yellow.

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

A black bar at the top of the chart. The bar starts on the left chart edge and ends on the right chart edge. There is a red scale under it. This scale is in inches. It starts with 0 in the middle of the page and has .1" scale markings. Inch markings are slightly extended and are labelled.

A.2.3 Pattern 3 – Gurley type Pestrecov Star pattern with circles of 50, 100 and 200 lines per 25.4 mm

A Gurley type Pestrecov Star of solid, non-screened, tapered-width lines with three solid-white concentric circles. The pattern is divided into four segments. Clockwise from left, the patterns are cyan, magenta, yellow, and black. The circles, from the outermost to the innermost, have line widths of 50, 100, and 100 pels/inch, respectively. The pattern is printed at full contrast, with the colour line width the same as the white spaces between lines.

A.2.4 Pattern 4 – Colour patches

Eighteen colours with eight intensities for each colour, for a total of 144 different colour patches. The printing colour primary magenta is row A (left half). Yellow is row G (left half). Cyan is row M (right half). Of the two-colour primaries, red (magenta and yellow) is row D (left half). Green is row J (right half). Blue is row P (right half). Each row between the primaries has a fixed ratio of two printing primaries as the screen dot percentages decrease in steps. Column 8 of each set has 25 per cent black added to the printing ink combinations of column 3 to give warmer tones. The screen ruling is 175 lines/inch. Table A.1 shows the colour combinations of each colour patch in per cent screen dot density.

A.2.5 Pattern 5 – Colour patches, text and line patterns

Twelve light colour patches selected from the Macbeth colour chart, plus text and isolated line patterns in the same colour. The patches, text, and line patterns (see Figure A.3) are organized from left to right, respectively. The line patterns have line widths of .04, .01 and .005 inches (1.016, .254 and .127 mm). Half of the lines are slanted 1 in 10 to provide random matches between the scanning line sample and the pattern. The text's typeface edges provide a similar function. Kanji characters from the BW01 Test Chart substitute for the "QWERTY" in lines 9 through 12. The screen ruling is 175 lines/inch.

A.2.6 Pattern 6 – Text

Black text that simulates magazine text that might be on the same page as a screened colour photo. The text consists of four postscript fonts: headline – Bookman .40" bold, heading – Helvetica .18", first paragraph – New Century Schoolbook .13", and the footnote – Helvetica Narrow .09". The note is repeated in four point type and two point type. The second paragraph consists of characters of the Ming Dynasty in point sizes 10.5 and 7.875.

A.2.7 Pattern 7 – Solid colour blocks

Seven solid unscreened blocks of printing ink colours. These are solid patches of the primary printing ink colours, two-colour combinations, plus black. Starting at the left, the colours are cyan, magenta, yellow, red (magenta and yellow), green (yellow and cyan), blue (cyan and magenta), and black.

TABLE A.1/T.23

Colour combinations (screen dot density in percent)

ROW		COLUMN								BLACK
		1	2	3	4	5	6	7	8	
M	M Y	100 0	75 0	50 0	30 0	20 0	12 0	8 0	50 0	25
B	M Y	100 33	75 25	50 17	30 10	20 6	12 4	8 3	50 16	25
C	M Y	100 67	75 50	50 33	20 20	20 13	12 8	8 5	50 33	25
D	M Y	100 100	75 75	50 50	30 30	20 20	12 12	8 8	50 50	25
E	M Y	67 100	50 75	33 50	20 30	13 20	8 12	5 8	33 50	25
F	M Y	33 100	25 75	17 50	10 30	6 20	4 12	3 8	16 50	25
G	M/C Y	0 100	0 75	0 50	0 30	0 20	0 12	0 8	0 50	25
H	C Y	33 100	25 75	17 50	10 30	6 20	4 12	3 8	16 50	25
I	C Y	67 100	50 75	33 50	20 30	13 20	8 12	5 8	33 50	25
J	C Y	100 100	75 75	50 50	30 30	20 20	12 12	8 8	50 50	25
K	C Y	100 67	75 50	50 33	30 20	20 13	12 8	8 5	50 33	25
L	C Y	100 33	75 25	50 17	30 10	20 6	12 4	8 3	50 16	25
M	C M/Y	100 0	75 0	50 0	30 0	20 0	12 0	8 0	50 0	25
N	C M	100 33	75 25	50 17	30 10	20 6	12 4	8 3	50 16	25
O	C M	100 67	75 50	50 33	30 20	20 13	12 8	8 5	50 33	25
P	C M	100 100	75 75	50 50	30 30	20 20	12 12	8 8	50 50	25
Q	C M	67 100	50 75	33 50	20 30	13 20	8 12	5 8	33 50	25
R	C M	33 100	25 75	17 50	10 30	6 20	4 12	3 8	16 50	25
NOTE – Column 8 has 25% black added to CMY.										

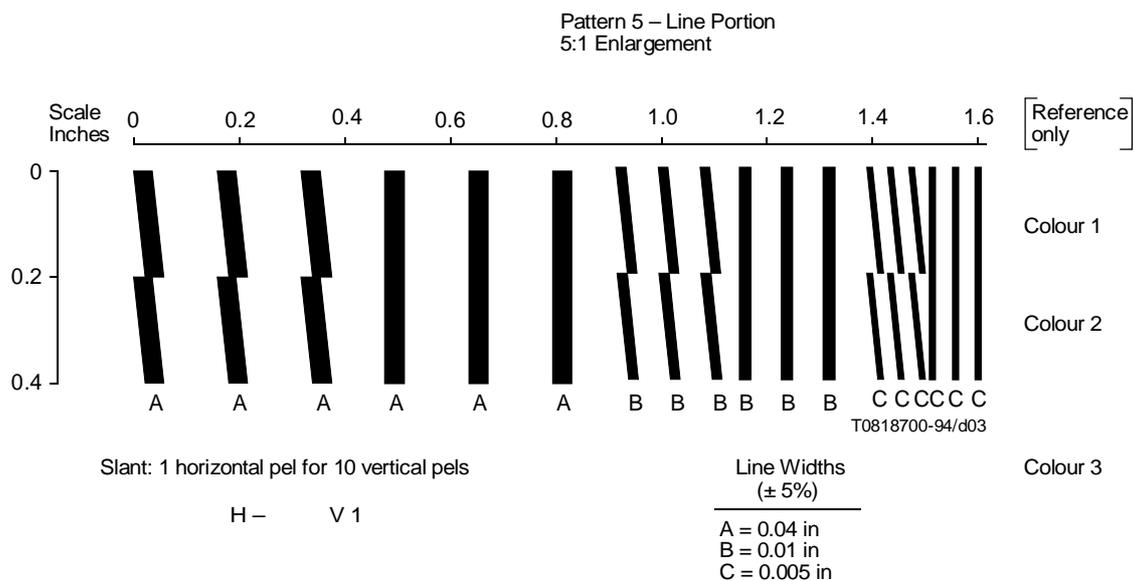


FIGURE A.3/T.23
Line enlargement

A.2.8 Pattern 8 – Eighteen colour patches

Eighteen colour patches that combine black and each of the printing colour primaries. These patches show colours not covered elsewhere in the chart. The first row of six patches uses the cyan primary. The second row uses magenta, and the bottom row uses yellow. These patches were chosen to give good steps to the eye. The left three patches of each row are 100 per cent primary overprinted by 60, 40, and 20 per cent black dots from left to right, respectively. The next three patches are primary/black combinations of 60/20, 40/20 and 20/20 per cent dots. The screen ruling is 175 lines/inch.

A.2.9 Pattern 9 – Screened grey scales

Three rows of screened grey scales consisting of patches with 90, 75, 50, 25, 10 and 5 per cent dots. The first row is 85 line screen. The second row is 175 and the bottom row is 133 line screen.

A.2.10 Pattern 10 – Photograph

A photograph, called Toys, that has a 175 line screen. It shows higher sharpness for fine detail in the stuffed animals and the faces, and provides a range of textures and patterns. Compare the fuzziness of the stuffed animals to repetitiveness of the blinds to the colour combinations present in the man's shirt. The presence of both bright and pastel colours provide widespread variations in luminance, hue and saturation. In addition, the image is rich in slowly varying colour textures mixed with sharp colour boundaries. For example, note the slowly varying pink of the panther's leg next to the plaid of the girl's skirt.

A.2.11 Pattern 11 – Computer-generated image

A computer generated simulation of spheres with shadings for a 3-dimensional effect. It shows various-sized differently-coloured spheres on a black background. Its 85 line screen represents the low end of colour photos in publications like business magazines. Plus, it provides a wide range of colour shadings with distinct edges. In general, each sphere is one colour, shaded to give a three dimensional appearance. The gradual transition in colour of each sphere's shading provides an excellent medium for discerning possible contouring effects. If contouring is present, it will usually manifest itself as a series of concentric circles with slightly different colours. The spheres' edges also provide sharp boundaries against both the black background and other spheres.

A.2.12 Pattern 12 – Magazine cover

A graphics image from a magazine cover that has a 150 line screen and exhibits a 3-dimensional effect. It uses pastel colours to denote surfaces and fine black lines to enhance details. It contains a number of repetitive patterns coupled with sharp boundaries between various colours. The white background contains many very small isolated and clumped dots of each primary printing colour. Many of these dots are smaller than those used in standard printing processes, providing an additional test target.

A.2.13 Pattern 13 – CMY grey scale

Following the title, a 5-step CMY grey scale that may be used to check colour balance of the printing inks.