

# I I E E J F a c s i m i l e T e s t C h a r t s

The IIEEJ Facsimile Test Charts are designed to provide a mean of accessing reproduction performance in facsimile system.

## IIEEJ Test Chart No.1

### 1. Preamble

IIEEJ Test Charts No.1 was designed in 1968 to provide a means of assessing transmission performance in photograph telecommunications, regardless of the telephoto reproduction system on reception site.

The Test Chart No.1 was revised to " IIEEJ Test Chart No.1 WP " in 1986, in accordance with the introduction of the waterproof type photographic paper.

### 2. Special Features of Test Chart No.1 WP

#### 2.1 The dimensions of the Test Chart No.1 WP

Paper size:

--- 297mm (Length) × 270mm (Width)

Image area

--- 270mm (Length) × 230mm (Width)

#### 2.2 The specification of paper

Weight :  $240 \pm 5 \text{ g / m}^2$

Thickness:  $0.225 \pm 0.01 \text{ mm}$

Smoothness: better than 1,000 sec

Gloss:  $95 \pm 5\%$  (Gloss meter)

Extensional ratio: Virtual: 0.03 %

Horizontal: 0.06% (When relative humidity changes from 30% to 70 %)

#### 2.2 Preciseness of pattern size

Tolerance: less than 10%

#### 2.3 Density and reflectance

	Density	Reflectance
Paper:	0.045 ~ 0.06	87.1 ~ 90.1 %
Black portion:	more than 1.69	less than 2.04 %

### 3. Explanation of Patterns

#### 3.1 Frame region

Line work patterns in the frame region are useful to position the Test Chart correctly on the scanning device and/or to investigate the synchronization between transmission site and reception site.

#### 3.2 Inner frame patterns: Facsimile Test Chart No.1-R

The Facsimile Test Chart No.1-R consists of various synthetic patterns and its layout is perfectly the same as that of the Facsimile Test Chart No.2-R.

[1] Repetition of black and white (Width of each line: 5mm)

[2] Repetition of black and white (Width of each line: 0.5mm)

[3] Repetition of black and white (Width of each line: 0.25mm)

[4] Variable black/white ratio pattern (Period: 10mm, Minimum width:0.2 mm, Maximum width: 5.0mm)

[5] 3 blocks of 5 lines pattern (Line width in mm: 1.0, 0.5, 0.33, 0.25, 0.2, 0.166,0.125, 0.1 and 0.05)

[6] Radial grating (Siemens-stars) and hook-shaped lines with various widths pattern:

By using these patterns, we can find the resolution limit at which the reproduction becomes entirely

black or entirely white.

- [7] Octagonal rings with 5 line widths (Line width in mm: 1.0, 0.5, 0.33, 0.25 and 0.2)
- [8] 5-steps gray squares: Each reflectance is specified as follows; 0%(+1,-0%), 20%(± 5%), 40%(± 5%), 60%(± 7%), 80%(± 5%)
- [9] Checker wise pattern: Scale factors in x and y directions are 0.5, 0.33, 0.25, 0.2, 0.166, 0.125, and 0.1 in mm.
- [10] [12] Wedge-shaped pattern: The figures alongside these patterns indicate the width in mm of the lines reproduced.
- [11] Cross lines pattern: Scale factors in x and y directions are 0.5, 0.33, 0.25, 0.2, 0.166, 0.125, and 0.1 in mm.
- [13] V-shaped pattern: Width of open side: 2.0 mm, Depth of pattern: 50 mm, Line width: 0.1 mm
- [14] “TANZAKU” pattern: The continuity of white line in black area and black line in white area on the reproduction indicates the analogue transient characteristics of scanners and the level of white/black decision threshold in digital machine.

### 3.3 Inner frame pattern: Facsimile Test Chart No.1-L

The area of the Facsimile Test Chart No.1-L includes the portrait, gray scale, resolution patterns and various characters.

The densitometric information of this region is attached on the reverse side of this Chart.

- [15] 15-steps gray scale: The size of each patch is 10mm × 12mm. The size of white lines in the center region is 0.5 mm (width) × 4.0 mm (length). Densities are specified as follows:

Step No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Density	0.00	0.02	0.05	0.10	0.20	0.30	0.44	0.60	0.74	0.89	1.05	1.22	1.42	1.61	>1.74
Tolerance	± 0.01	+0.02	+0.03		± 0.05					± 0.06				± 0.05	
		-0.01	-0.02												

- [16] Portrait: Densities of dark gray in background and white of lady’s collar are controlled within the pertinent variation tolerance in the production process.
- [17][19] Radial grating: The figures alongside the bundles of lines indicate the line widths in mm at those positions.
- [18] Circles pattern: It can detect the difference of cooperation index between scanner and recorder.
- [20] Characters in 4 sizes: 3 types of black characters are disposed. Readability can be measured objectively by the character orientation detection test.
- [21] Periodic gray lines: Alternative lines having densities of No.10 and of No.5 in [15] are arranged periodically. Width of each line is 0.25mm and length is 5.0mm.
- [22] Periodic rectangles: Width of each rectangle is 2.5mm and length is 5.0mm.  
By observing the scanned waveform, the modulation characteristics and judder characteristics can be investigated.

## IIEEJ Test Chart No.2

### 1. Preamble

IIEEJ Facsimile Test Charts No.2 was designed in 1968 to provide a means of assessing transmission performance in document facsimile communications, regardless of the reproduction system of the document on reception.

The pertinent patterns for the investigation of black and white reproduction system are printed on the cast-coated paper by using the offset printing process.

### 2. Special Features of the Facsimile Test Chart No.2

Various marks , , in the outer frame region, indicate positions corresponding to various domestic standard paper sizes. Also, center positions of horizontal and vertical directions are shown by distinct marks.

#### 2.4 Dimensions of the Facsimile Test Chart No.2

Paper size:

--- 297mm (Length) × 270mm (Width)

Image area

--- 270mm (Length) × 230mm (Width)

#### 2.5 Specifications of cast-coated paper

Weight : 132 g / m<sup>2</sup>

Thickness: 0.12 ± 0.01mm

Smoothness: less than 42 (Smoothness tester)

Gloss: 49 ± 4% (Gloss meter)

Extensional ratio: Virtual: 0.12 %

Horizontal: 0.46% (Relative humidity:50% ~ 70 %)

#### 2.6 Preciseness of pattern size

Tolerance: less than 1.0 ± 0.01 % (Relative humidity : 60 ± 5 %)

#### 2.7 Density and reflectance

	Density	Reflectance
Paper:	0.05 ~ 0.07	85.1 ~ 89.1 %
Solid:	more than 1.7	less than 2.0 %

### 3. Explanation of Patterns

#### 3.1 Frame region

These line work patterns in the frame region are useful to position the Facsimile Test Chart No.2 correctly on the scanning device and/or to investigate the synchronization between transmission site and reception site.

#### 3.2 Inner frame patterns: Facsimile Test Chart No.2-R

The area of Facsimile Test Chart No.2-R consists of various synthetic patterns and its layout is perfectly the same as that of the Facsimile Test Chart No.1-R.

The following elements are included.

[1] Repetition of black and white (Width of each line: 5mm)

[2] Repetition of black and white (Width of each line: 0.5mm)

[3] Repetition of black and white (Width of each line: 0.25mm)

[4] Variable black/white ratio pattern (Period: 10mm, Minimum width:0.2 mm, Maximum width: 5.0mm)

[5] 3 blocks of 5 lines pattern (Line width in mm: 1.0, 0.5, 0.33, 0.25, 0.2, 0.166,0.125, 0.1 and 0.05)

- [6] Radial grating (Siemens-stars) and hook-shaped lines with various widths pattern:  
By using these patterns, one can find the resolution limit at which the reproduction becomes entirely black or entirely white.
- [7] Octagonal rings with 5 line widths (Line width in mm: 1.0, 0.5, 0.33, 0.25 and 0.2)
- [8] 5-steps gray squares: Each reflectance is specified as follows; 0%(+1,-0%), 20%(± 5%), 40%(± 5%), 60%(± 7%), 80%(± 5%)
- [9] Checker wise pattern: Scale factors in x and y directions are 0.5, 0.33, 0.25, 0.2, 0.166, 0.125, and 0.1 in mm.
- [10] [12] Wedge-shaped pattern: The figures alongside these patterns indicate the width in mm of the lines reproduced.
- [11] Cross lines pattern: Scale factors in x and y directions are 0.5, 0.33, 0.25, 0.2, 0.166, 0.125, and 0.1 in mm.
- [13] V-shaped pattern: Width of open side: 2.0 mm, Depth of pattern: 50 mm, Line width: 0.1 mm
- [14] “TANZAKU” pattern: The continuity of white line in black area and black line in white area on the reproduction indicates the analogue transient characteristics of scanners and the level of white/black decision threshold in digital machine.

### 3.3 Inner frame pattern: Facsimile Test Chart No.2-L

- [15] **Characters: 5 sizes of Kanji and 4 types of script are used. Readability can be measured objectively by reproduced images.**
- [16] **Weather map: This is the typical weather map of a typhoon having the size of 80mm × 80mm. The widths of lines used in the map are 0.14(longitude and latitude), 0.15, 0.25, 0.35 and 0.4 in mm.**
- [17] **Gray alpha- numeric letters: Reflectance values of these gray letters are as follows:**

No.	1	2	3	4	5
Aim values	0%	20%	40%	60%	80%

## Test Chart No.3

### 1. Preamble

The IIEEJ Facsimile Test Charts No.3 was designed in 1978 to provide a means of assessing the performance of digital document facsimile communications, regardless of the reproduction system of the document on reception site.

The pertinent patterns for investigating the digitalizing functions are printed on the cast-coated paper by using the offset printing process.

It is preferable to use the Facsimile Test Chart No.3 together with the Facsimile Test Chart No.2.

### 2. Special Features of the Facsimile Test Chart No.3

Various marks , , , , printed in the top and bottom portions indicate positions corresponding to various domestic standard paper sizes.

#### 2.1 The dimensions of the Facsimile Test Chart No.3

Paper size:

--- 297mm (Length) × 270mm (Width)

Image area: same as paper size.

--- 297mm (Length) × 270mm (Width)

#### 2.2 The specification of cast-coated paper

Weight : 128 g / m<sup>2</sup>

Thickness: 0.105 ± 0.01mm

Smoothness: Mean value: 750sec, Max. 930sec, Min. 650sec (by Bekk Smoothness Tester)

Gloss: 68 ± 4% (Gloss meter)

Extensional ratio: Virtual: 0.04 %

Horizontal: 0.32% (Relative humidity changed from 20 , 50% to 20 , 70 %.)

#### 2.3 Preciseness of pattern size

Tolerance: ± (1.0% ± 0.01)mm (Relative humidity : 60 ± 5 %)

#### 2.4 Density and reflectance

	Density	Reflectance
Paper:	0.05 ~ 0.07	85.1 ~ 89.1 %
Solid:	more than 1.7	less than 2.0 %

### 3. Explanation of Patterns

#### 3.1 Top and bottom region

Black parallel lines and various marks, , , , , are printed in this area. Width of black line is 0.25 mm and the period is 2.0 mm.

#### 3.2 Black bar pattern having 5.0 mm width.

#### 3.3 Three types of resolution charts: Black/white repetitions are 0.25 mm, 0.167 mm and 0.125 mm.

#### 3.4 Saw-teeth pattern: Triangles are arranged in 2.0 mm period and 40 mm height. Three horizontal lines are drawn at the positions of 10mm, 20mm and 30mm.

From the distorted shapes of triangles and the moiré patterns generated by raster scan, one can obtain information about black/white threshold, scanning aperture or sampling pitch.

#### 3.5 Inclined bar pattern: Malfunction of multi-channel scanning or recording can be detected from the recorded images. Horizontal width of black is 8.0mm and width of white is 12mm and rational tangent is 3/4. Width of this zone is 15mm.

#### 3.6 Five steps gray rectangles: This pattern contains 10 blocks of 5 steps rectangles.

Reflectance values of rectangles are 40 ± 4%, 50 ± 4%, 60+5% -4%, 70+5 -4% or 100%(white) respectively.

- 3.7 Saw-teeth pattern sandwiched in between vertical parallel white lines in black area and black line in white area: Line width of parallel line pattern is 0.25mm and the period is 2.0mm
- 3.8 Characters in 3 sizes: These characters contain two types of fonts, Mincho and Gothic.  
Alpha-numeric characters aligned in the upper line are stroke letters and in lower lines are dot matrix letters composed by  $5 \times 7$  dots.
- 3.9 Three geometric line works: Reproducibility of these geometric shapes bring us information about synchronization, cooperation index, linearity of sampling mechanism etc.. Line width is 5,0mm.

#### **IIEEJ Test Chart No.4**

**The IIEEJ Test Chart No.4 has characters and lineworks for assessing the coding function of G3 type facsimile device.**

**The layout is arranged in order to transmit the chart less than one minute when the coding function works normally.**