

## < What's New > ITE Test Chart

ITE : Institute of Image Information and Television Engineers

**DNP**

29th Mar. '22  
Fine Optorionics Operations  
Dai Nippon Printing Co., Ltd

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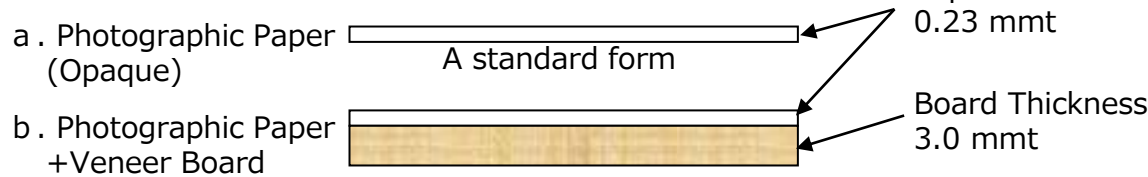
# Test Chart Forms

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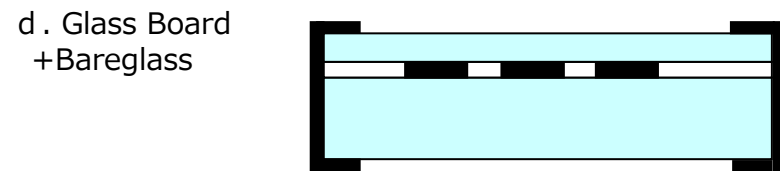
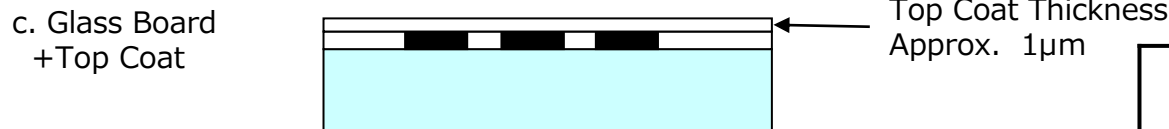
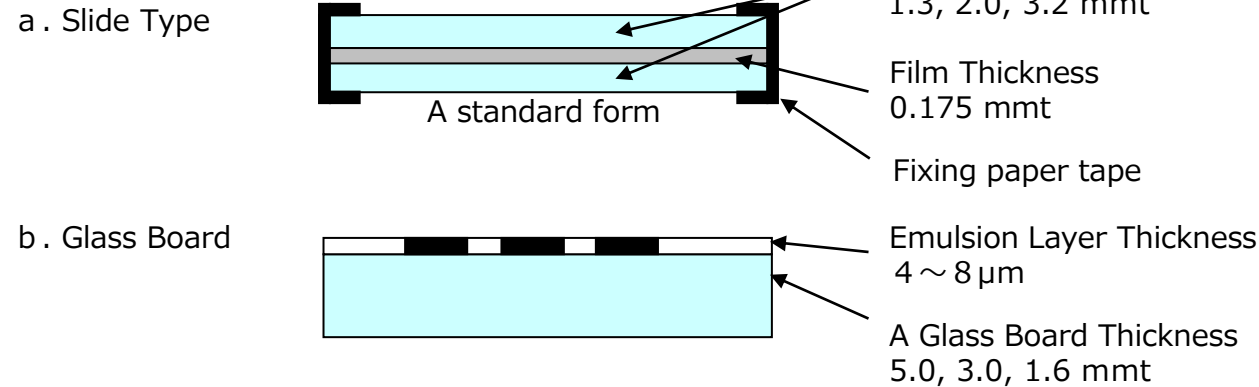
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## Sectional Views

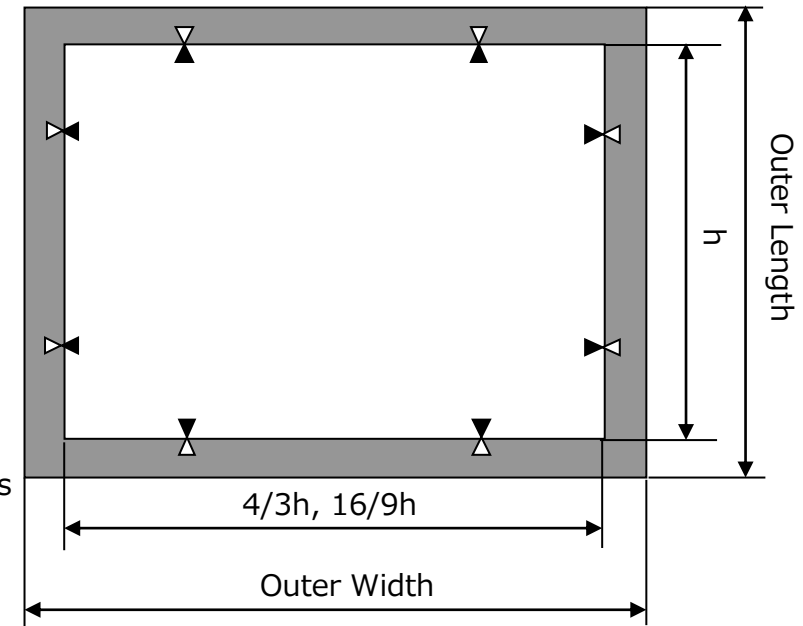
### 1) Reflection Type



### 2) Transmission Type



## Chart Overall Size

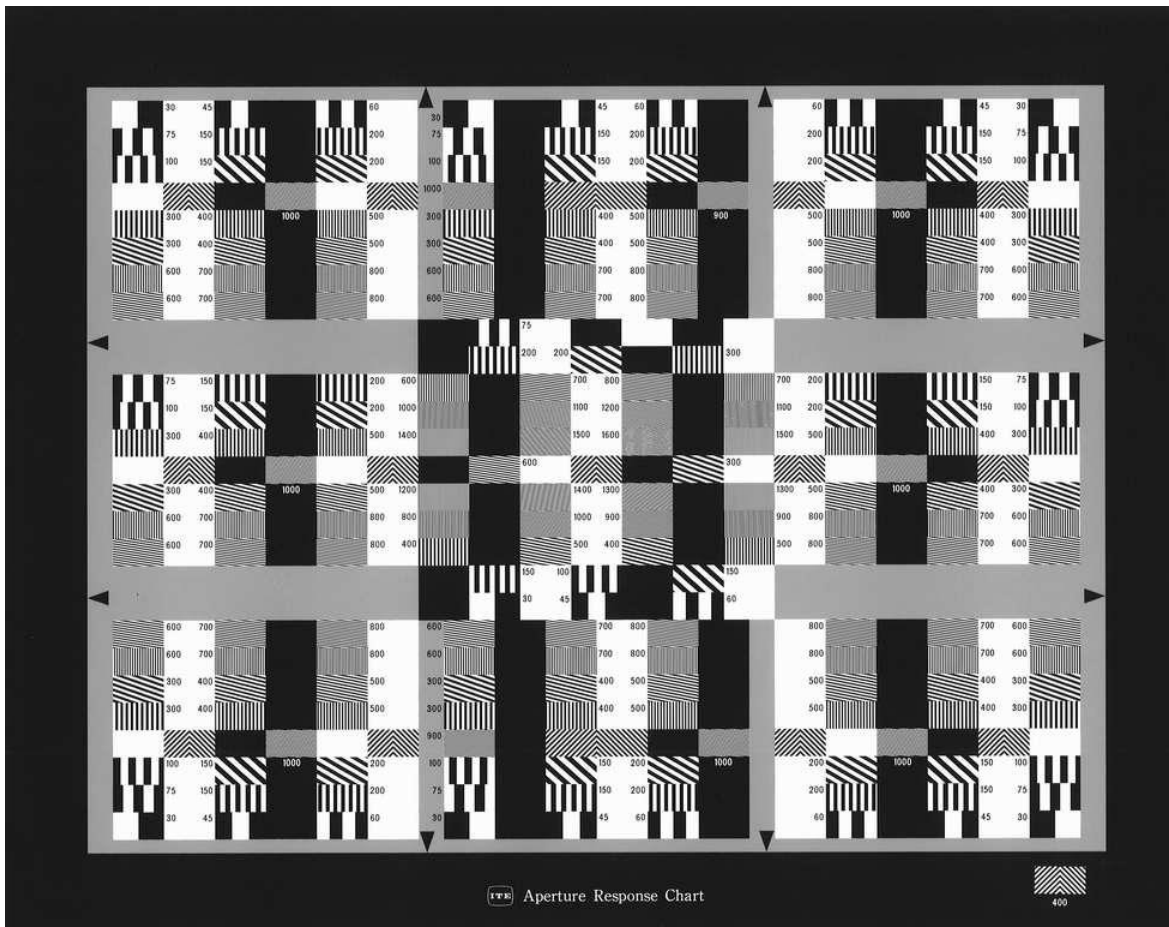


	Aspect ratio	Valid area	Outer size
Reflection Type	4 : 3	180×240	220×280
	16 : 9	288×512	350×570
Transmission Type	4 : 3	180×240	290×320
	16 : 9	153×272	200×310

# ITE Aperture Response Chart

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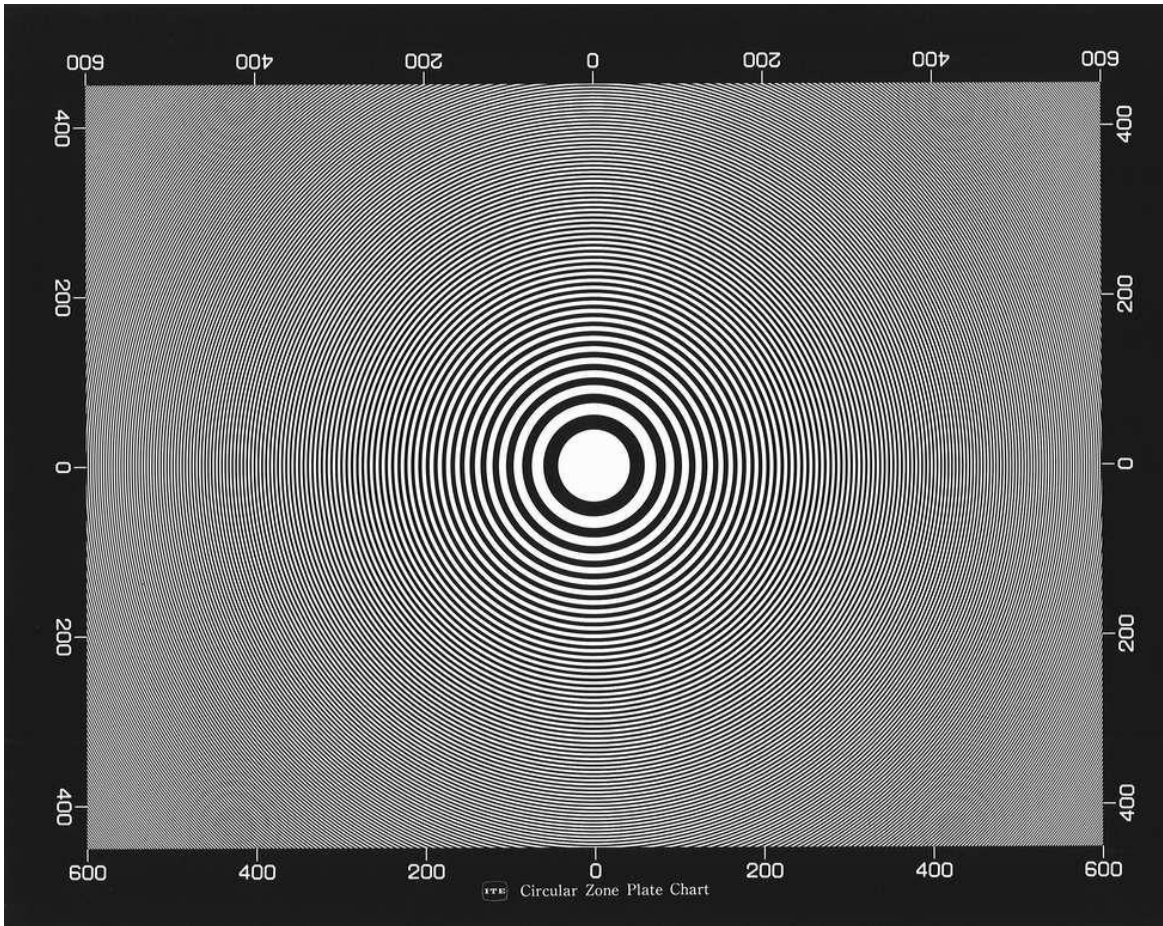
	Valid area	Outer size
Transmission Type	180×240	290×320
Reflection Type	180×240	220×280

1. Modulation Transfer Function(MTF) is applied to image assessment for an imaging device. The MTF resolution is given by the product of the MTF of each separate module (I.e. contrast, lens, imaging device and amplifier).
2. Resolution of imaging device on using a square-wave chart is generally expressed with Amplitude Response(AR).
3. This is a Chart for evaluation of astigmatic effect of AR and Resolution Aperture.

# ITE Circular Zone Plate Chart

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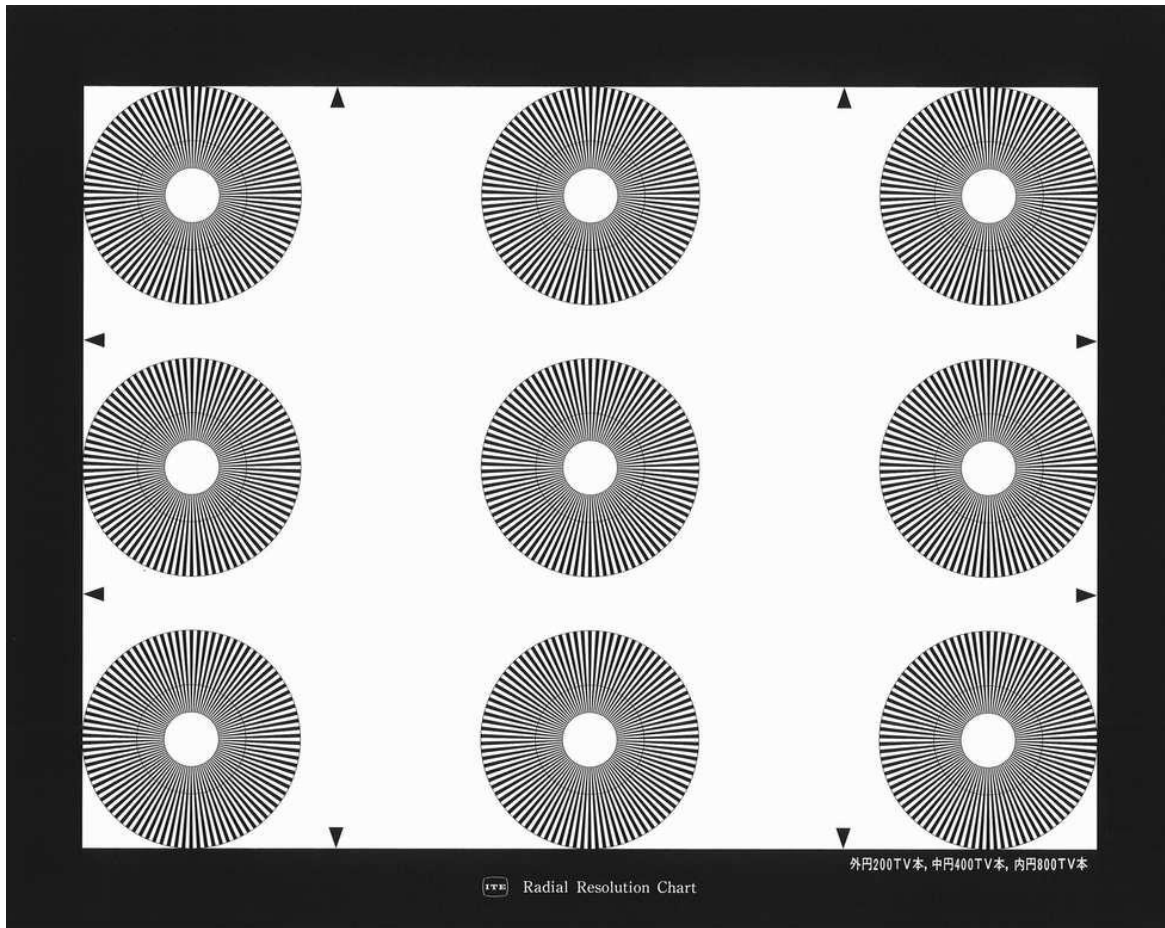
	Valid area	Outer size
Transmission Type	180×240	290×320
Reflection Type	180×240	220×280

1. When Circular Zone Plate Chart (CZP) is taken from a widely extended field-angle, liner-sweep is 600TV of horizontal resolution and 450TV of vertical resolution.  
You can evaluate (1) Resolution (AR)  
(2) Sampling characteristics

# ITE Radial Resolution Chart

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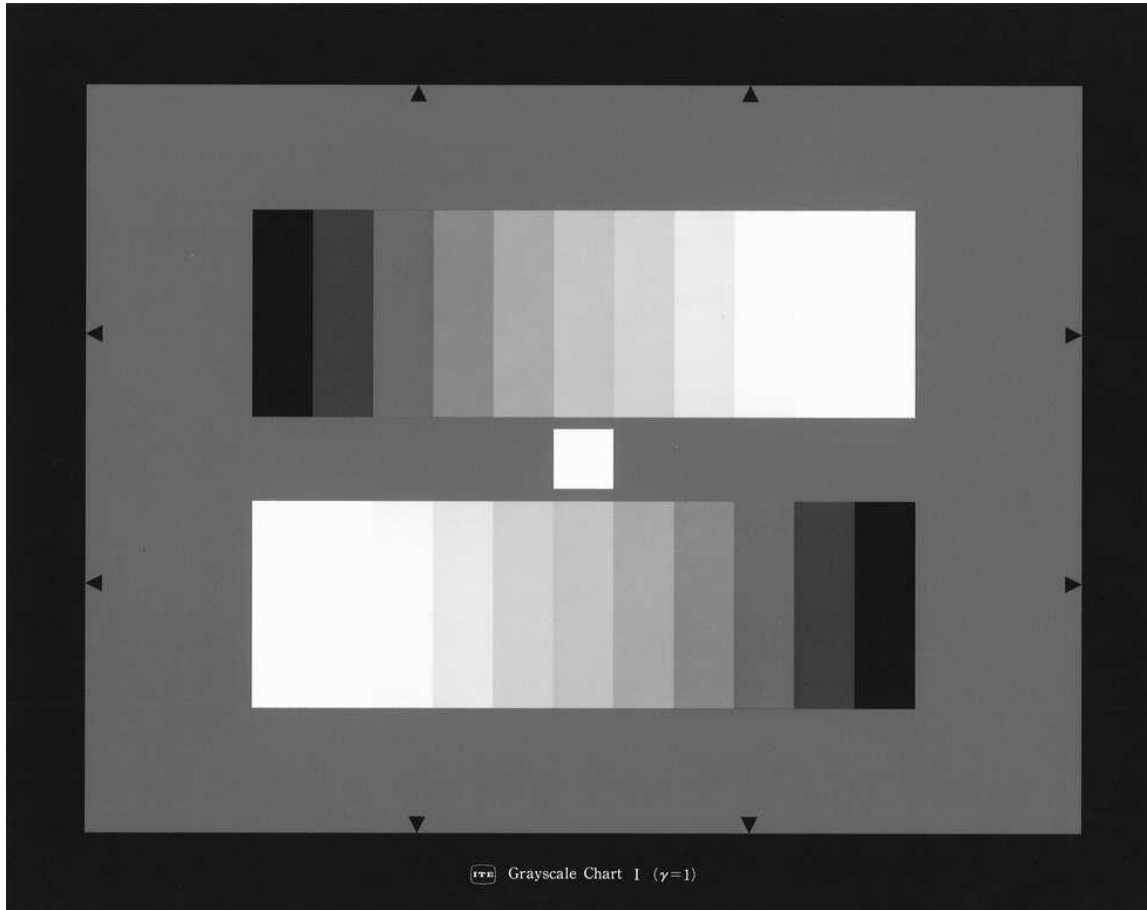
	Valid area	Outer size
Transmission Type	180×240	290×320
Reflection Type	180×240	220×280

1. Sometimes slope of stripes causes a difference in resolving power of imaging device, especially pick up tube though the same number of TVs in a image. This is a phenomenon caused by an elliptic imaging aperture.
2. In this Chart, wedge-shaped fringes are circularly arranged alternately with white and black. The circles drawn by the line width  $1/1500 h$  are located in 200TV, 400TV and 800TV. (  $h$  is a height of a Chart)

# ITE Grayscale Chart I ( $\gamma = 1.0$ )

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	Valid area	Outer size
Transmission Type	180×240	290×320
Reflection Type	180×240	220×280

## 1. Reflectance and Concentration of Grayscale.

Step Number	1	2	3	4	5	6	7	8	9	10	11	Background
Reflectance (%)	83.0	74.9	66.8	58.7	50.6	42.5	34.4	26.3	18.2	10.1	2.0	18.0
Concentration	0.08	0.13	0.18	0.23	0.30	0.37	0.46	0.58	0.74	1.00	1.70	0.74



# ITE Grayscale Chart II ( $\gamma=0.45$ )

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	Valid area	Outer size
Transmission Type	180×240	290×320
Reflection Type	180×240	220×280

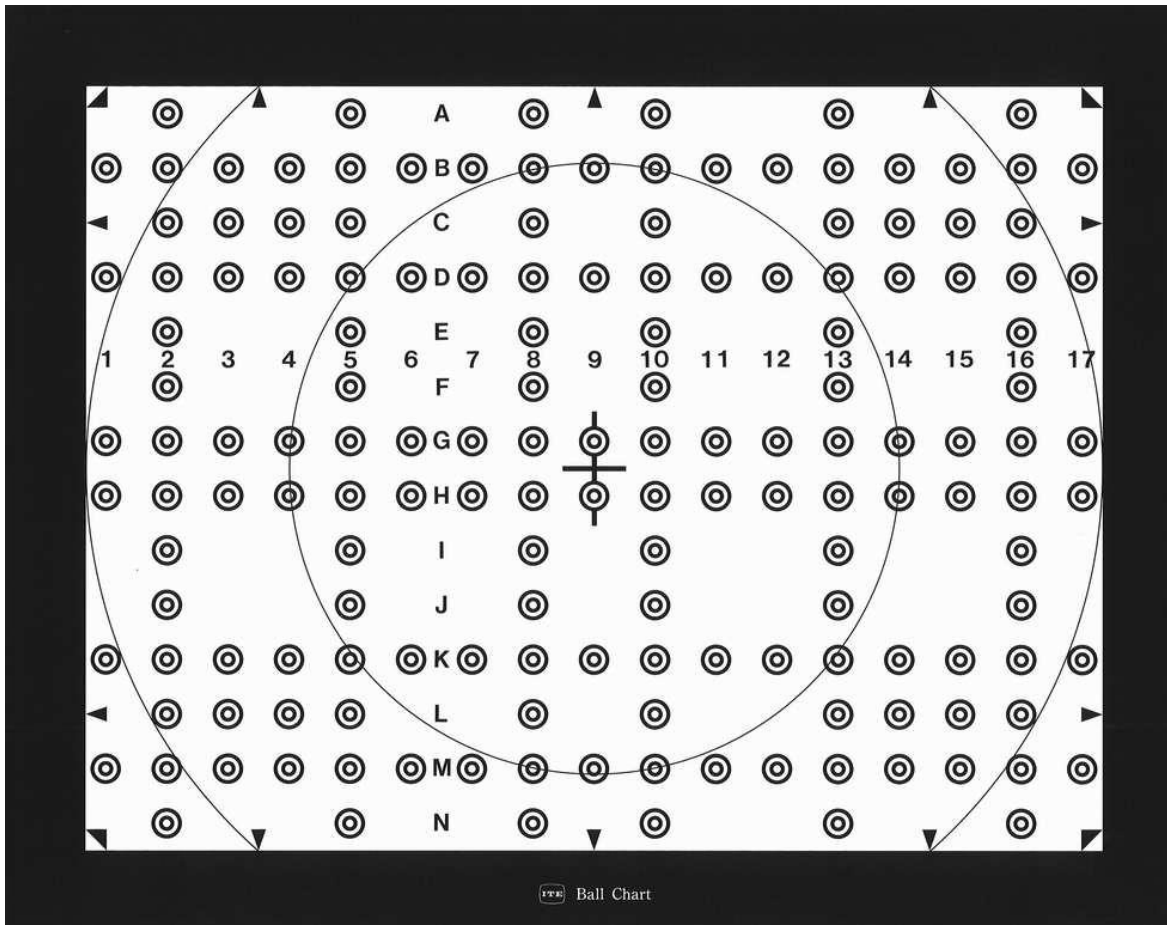
## 1. Reflectance and Concentration of Grayscale.

Step Number	1	2	3	4	5	6	7	8	9	10	11	Back-ground
Reflectance (%)	83.0	71.0	57.0	46.0	37.0	27.4	19.5	13.4	8.3	4.75	2.0	18.0
Concentration	0.08	0.15	0.24	0.34	0.43	0.56	0.71	0.87	1.08	1.32	1.70	0.74

# ITE Ball Chart

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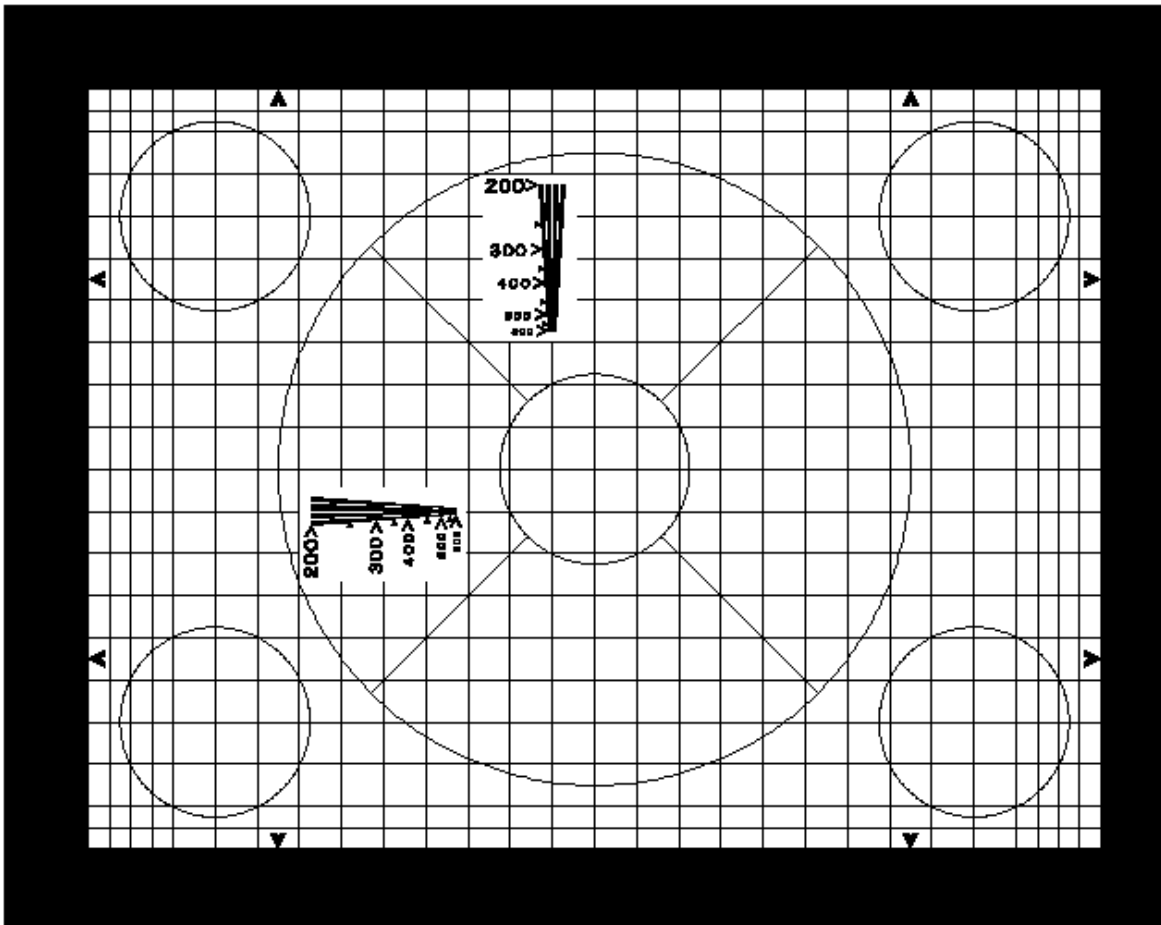
	Valid area	Outer size
Transmission Type	180×240	290×320
Reflection Type	180×240	220×280

1. This Chart is used for strain measurement of a TV camera's geometric image.
2. This Chart has 158 double rings which are arranged in 14 rows and 17 columns. The vertical spacing is  $1/14 h$  and the horizontal spacing is  $2/25 h$ .
3. The Radii of the double rings are stated as follows
  - (1) Outer rings      Outer circle :  $2/100 h$  (2%) 、 Inner circle :  $1.5/100 h$  (1.5%)
  - (2) Inner rings      Outer circle :  $1/100 h$  (1%) 、 Inner circle :  $0.5/100 h$  (0.5%)

# ITE Registration Chart

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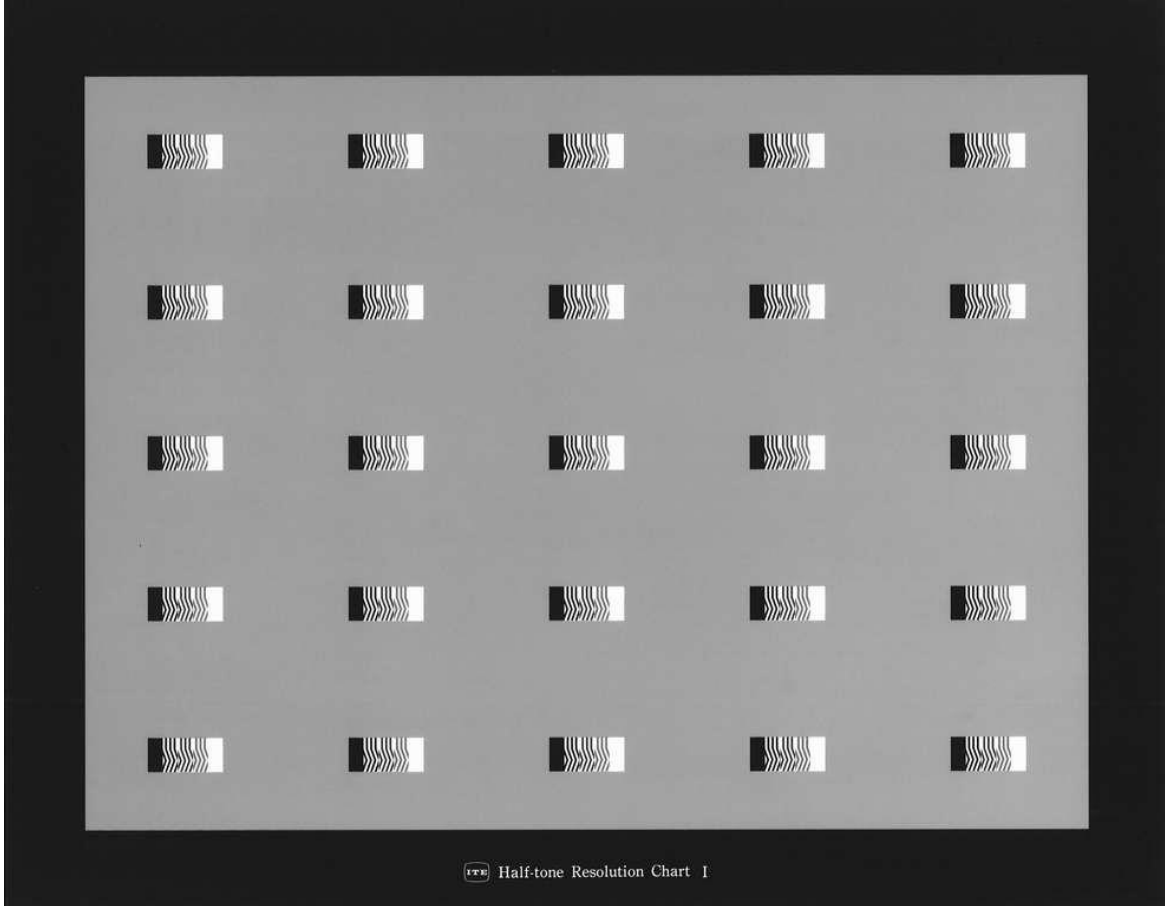
	Valid area	Outer size
Transmission Type	180×240	290×320
Reflection Type	180×240	220×280

1. Cell's width :  $1/18 h$       circumference  $1/36 h$
2. Diameter of the big circle :  $5/6 h$       circle's center is the center of this chart
3. Diameter of the small circle :  $1/4 h$       circle's center is  $3/18 h$  from corner
4. Line width :  $1/576 h$

# ITE Half-tone Resolution Chart I

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	Valid area	Outer size
Transmission Type	180×240	290×320
Reflection Type	180×240	220×280

Concentration of black and white.

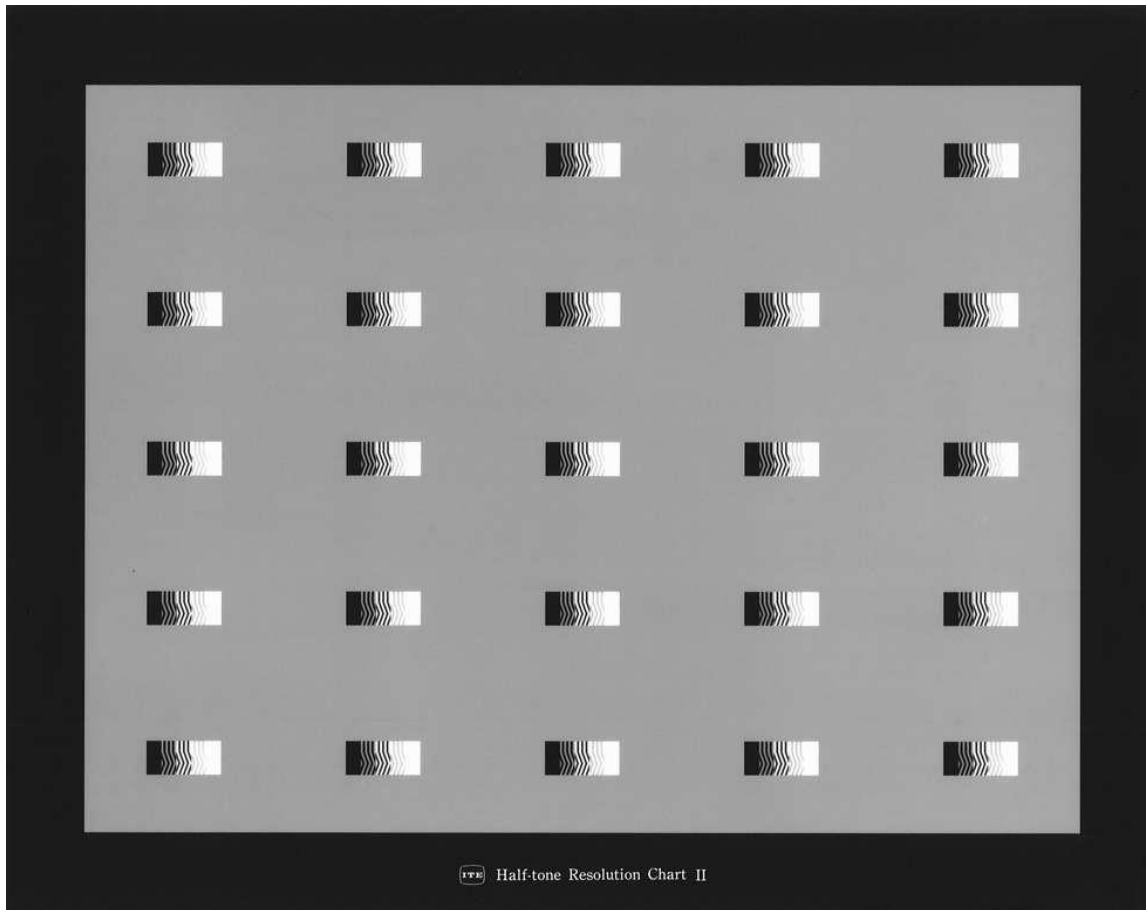
	Left	Center	Right
Black	3%	25%	37.5%
White	83%	75%	62.5%

1. Resolution property of imaging device is measured by taking the bright and dark fringes as an object. Amplitude modulation factor depends on the direction of slope of fringe and luminous energy. Also  $\gamma$  characteristic of imaging device affects it a lot. This Chart is well designed for measuring, evaluating and adjusting a signal processing circuit and an imaging device, with understanding the phenomenon stated above.
2. (1) Black and white patterns in the vertical direction.  
There are 350TV because chrominance carrier of a normal single-lumen color camera is 3.5 to 4.5Hz  
(2) Black and white patterns slope to the left and right.  
Inclined angle to left and right is  $\pm 20^\circ$  and there are 350TV

# ITE Half-tone Resolution Chart II

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	Valid area	Outer size
Transmission Type	180×240	290×320
Reflection Type	180×240	220×280

Concentration of black and white.

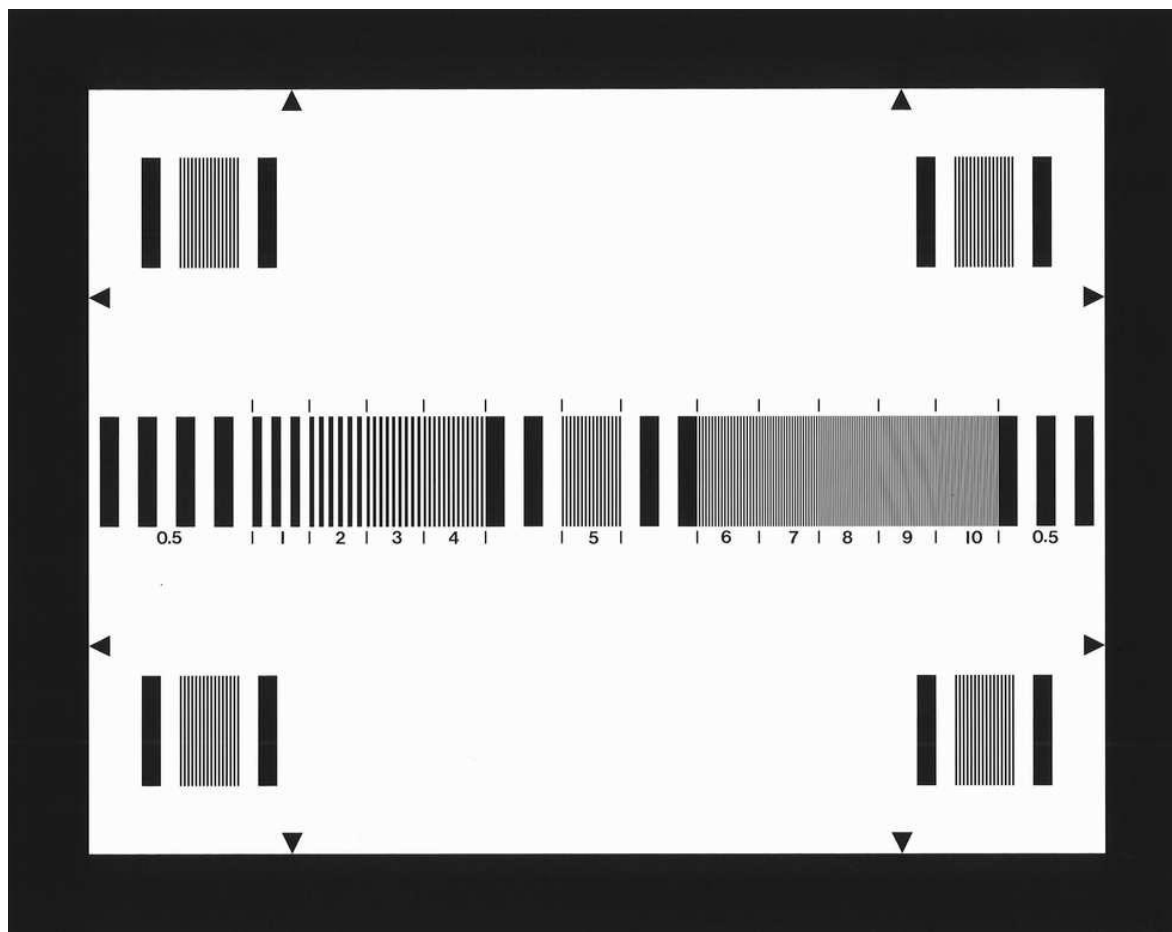
	Left	Center	Right
Black	3%	25%	50.0%
White	50%	75%	83.0%

- Resolution property of imaging device is measured by taking the bright and dark fringes as an object. Amplitude modulation factor depends on the direction of slope of fringe and luminous energy. Also  $\gamma$  characteristic of imaging device affects it a lot. This Chart is well designed for measuring, evaluating and adjusting a signal processing circuit and an imaging device, with understanding the phenomenon stated above.
- (1) Black and white patterns in the vertical direction.  
There are 350TV because chrominance carrier of a normal single-lumen color camera is 3.5 to 4.5Hz
- (2) Black and white patterns slope to the left and right.  
Inclined angle to left and right is  $\pm 20^\circ$  and there are 350TV

# Test Chart L High-class In-megacycle Chart

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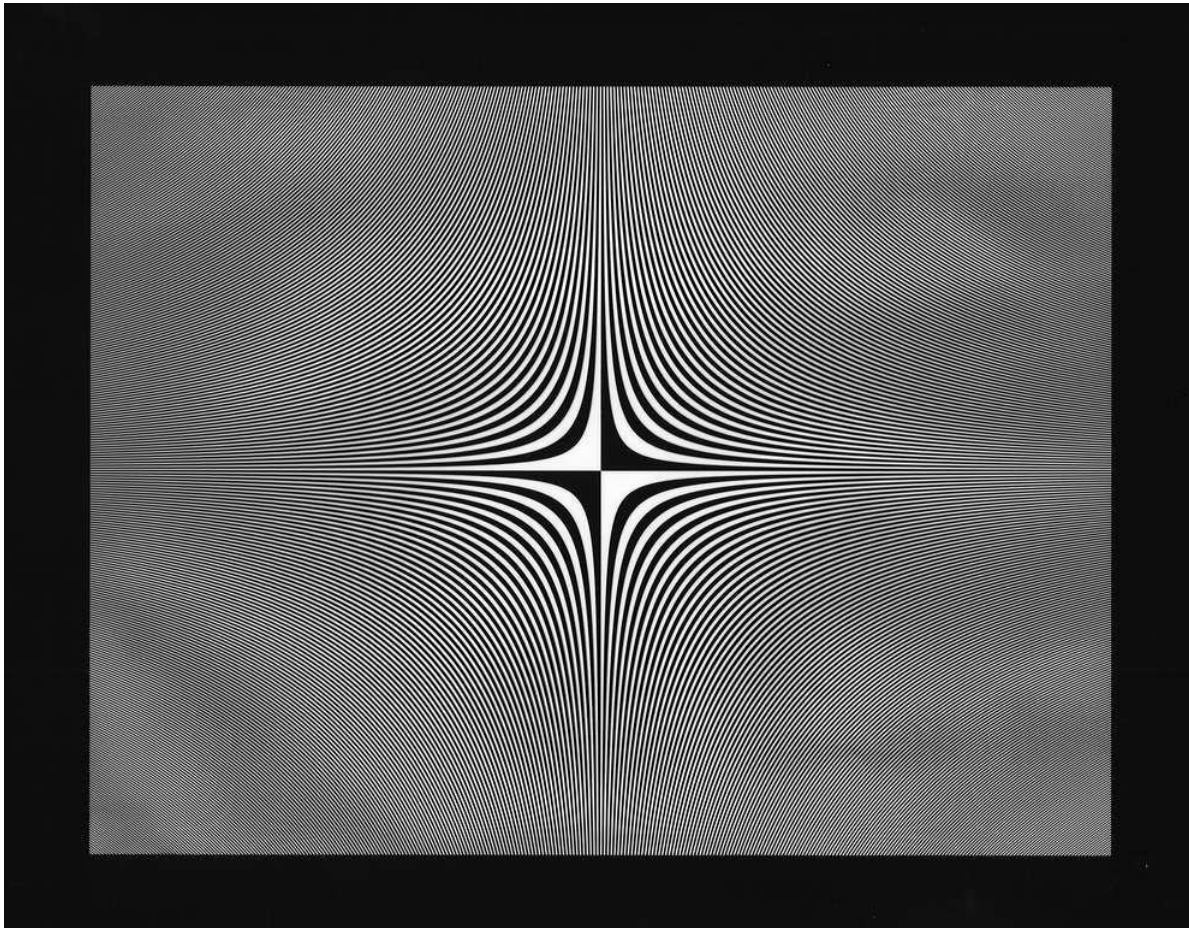
	Valid area	Outer size
Transmission Type	180×240	290×320
Reflection Type	180×240	220×280

1. This Chart is to evaluate the Horizontal Resolution of Imaging Device. In the Chart image, white and black fringes from 0.5MHz to 10MHz(800TV) in image frequency arranged vertically. Also you can measure resolution of each corner where 5MHz(400TV) of wedges are formed.
2. The background is white over 80%.

# Hyperbolic Zone Plate Chart

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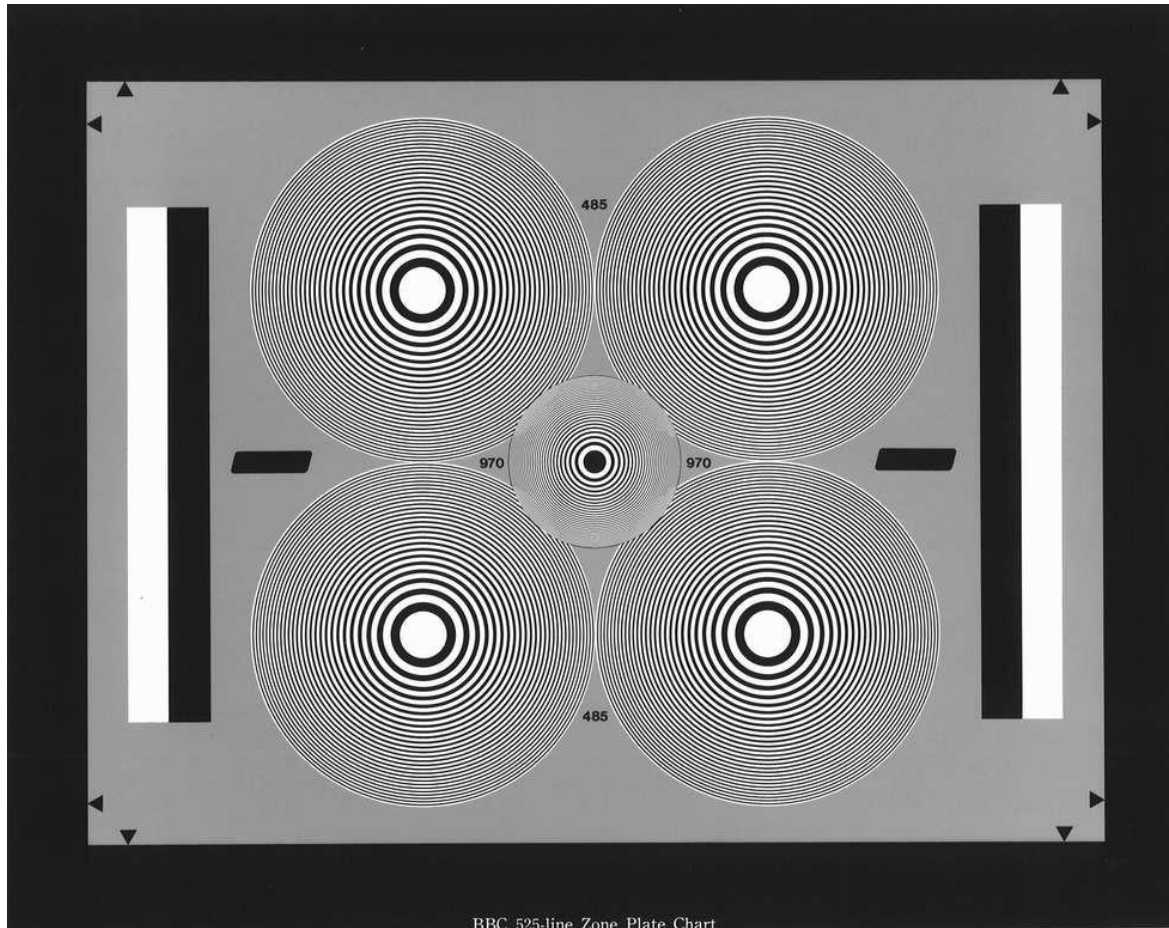
	Valid area	Outer size
Transmission Type	180×240	290×320
Reflection Type	180×240	220×280

1. The Hyperbolic Zone Plate Chart (HZP) consists of equilateral hyperbolas. Although the relationship between X and Y of HZP is opposite from that of CZP, HZP remains 2D linear-sweep.  
You can evaluate (1) Resolution (AR)  
(2) Sampling characteristics  
(3) Dynamic Resolution

# BBC Zone Plate Chart

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	Valid area	Outer size
Transmission Type	180×240	290×320
Reflection Type	180×240	220×280

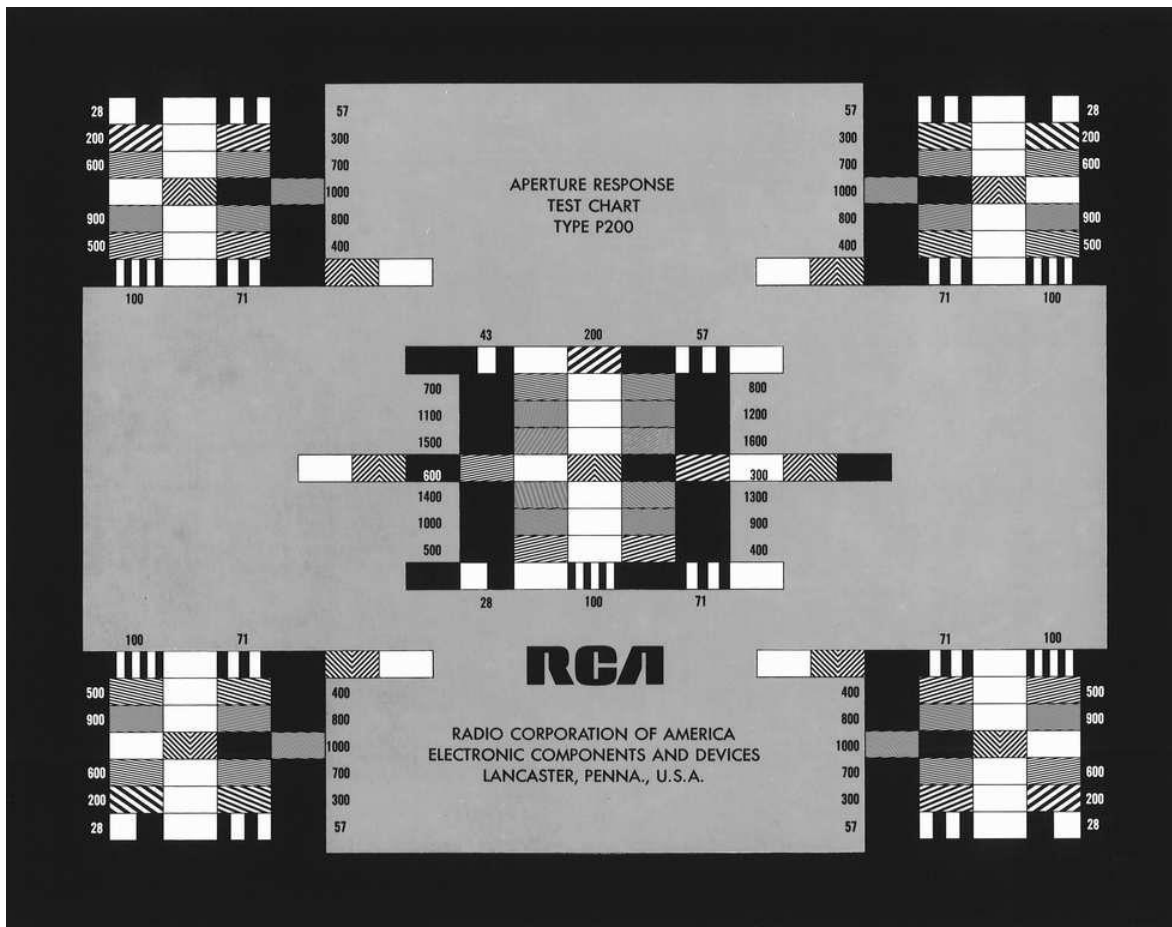
1. The Zone Plate Chart developed by the BBC(UK) is adopted 525TV form and consists of five circular patterns so as to measure the various areas of the screen. The evaluation method is the same as that of Circular Zone Plate Chart.



# RCA P-200 Chart

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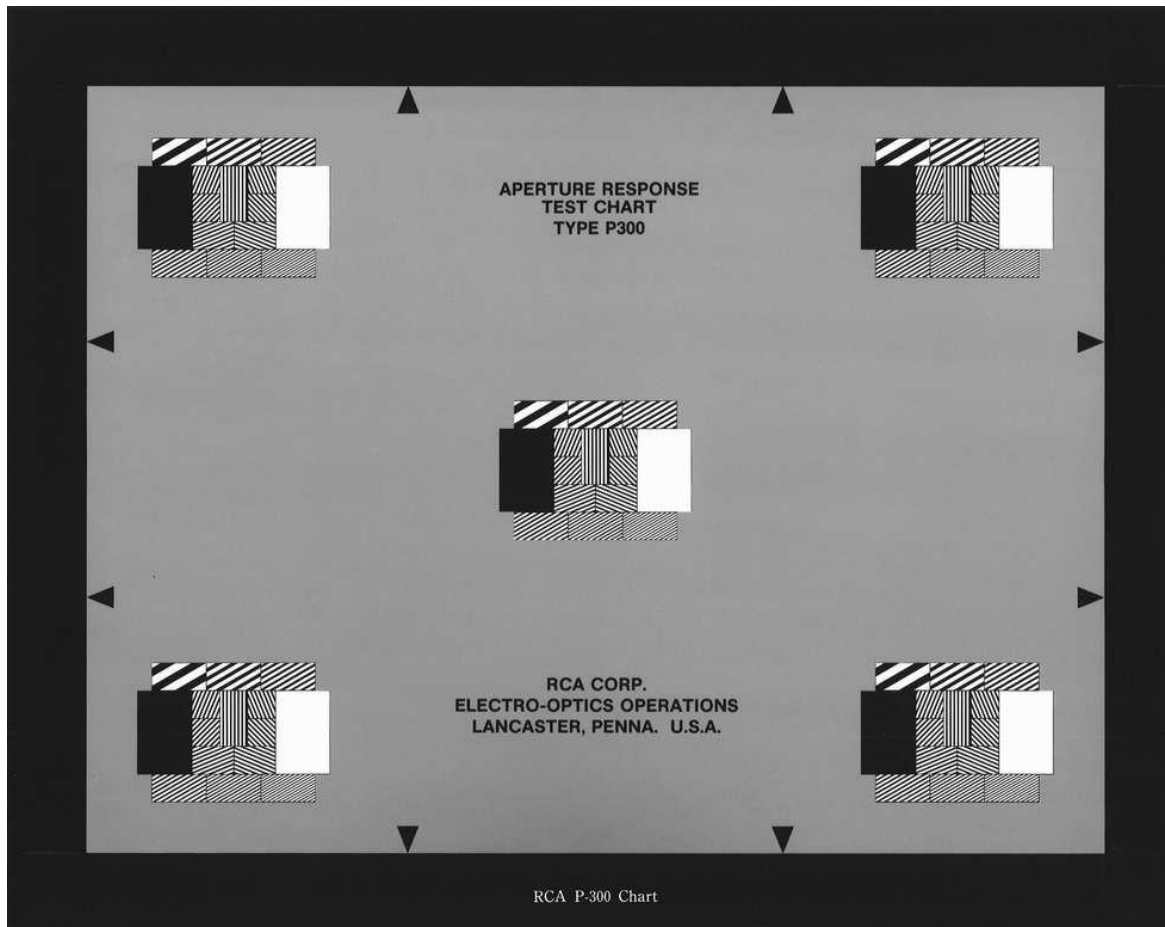
	Valid area	Outer size
Transmission Type	180×240	290×320
Reflection Type	180×240	220×280

1. Radio Corporation of America(RCA) proposed a method to define resolution by three parameters, effective amplitude response, asymmetry postulate and MTF index, with measuring the shape of resolution aperture of pick up tube.
2. This Chart consists of sloped fringes to find MTF index 'K' and sloped fringes to find resolution aperture. The sloped fringes to find MTF index 'K' are equivalent to fringes of 28 to 1500TV MTF.

# RCA P-300 Chart

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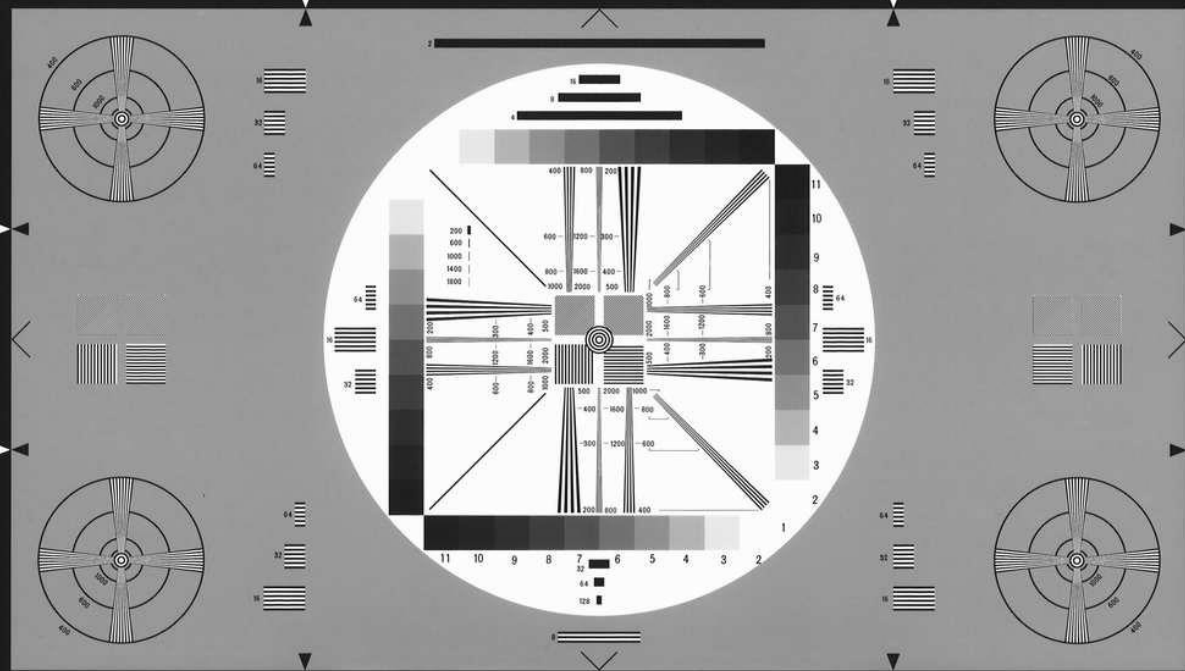
	Valid area	Outer size
Transmission Type	180×240	290×320
Reflection Type	180×240	220×280

1. Radio Corporation of America(RCA) proposed a method to define resolution by three parameters, effective amplitude response, asymmetry postulate and MTF index, with measuring the shape of resolution aperture of pick up tube.
2. This Chart consists of sloped fringes to find MTF index 'K' and sloped fringes to find resolution aperture. The sloped fringes to find MTF index 'K' are equivalent to fringes of 100 to 600TV MTF. Also, the sloped fringes to find resolution aperture are equivalent to fringes of 400TV inclined at  $\pm 22.5$  degrees,  $\pm 45$  degrees,  $\pm 67.5$  degrees and 90 degrees with respect to scan line direction.

# ITE Resolution Chart for HD TV

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Resolution Chart for High-Definition TV (Hi-Vision) Systems

	Valid area	Outer shape
Transmission Type	153×272	200×310
Reflection Type	288×512	350×570

Transmittance or Reflectance of main area is stated as follows;  
 (1) Inside white area of the big circle is 83.0% or more.  
 (2) Outside background of the big circle is 26.0%.  
 (3) Please refer to the list of Factor of Grayscale Chart

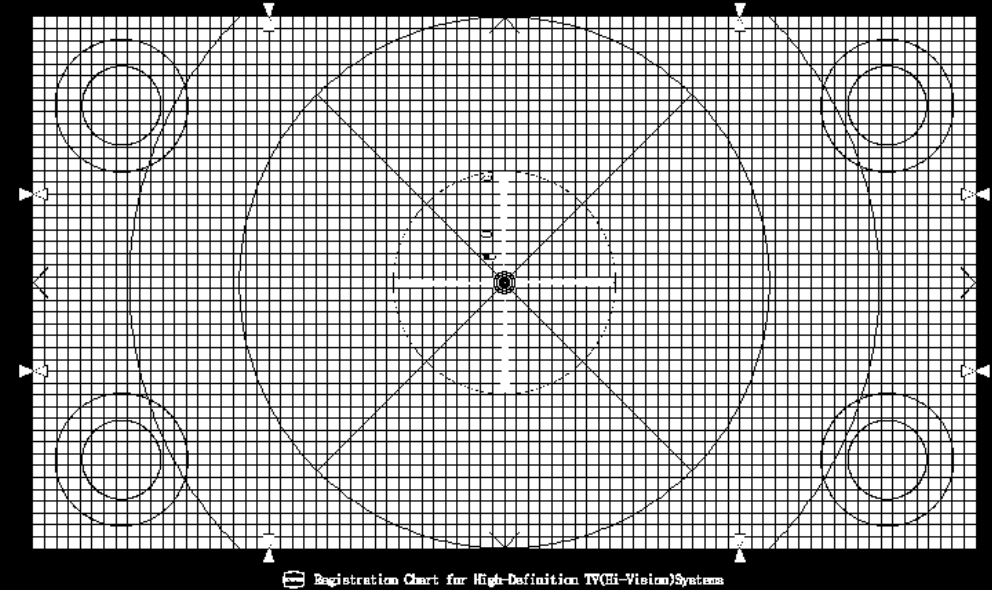
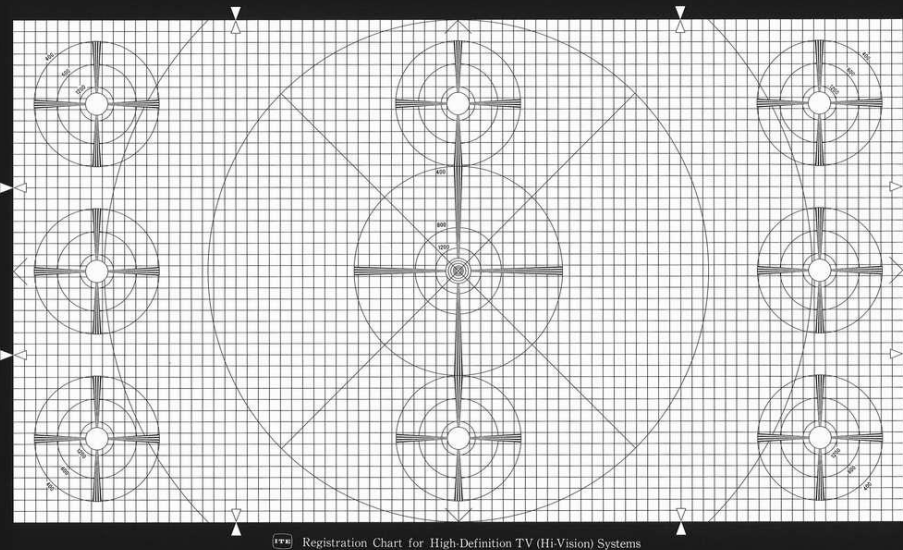
1. Specification of this Chart is the same as that of ITE Resolution Chart(4:3type). Also, the usage is the same. This Chart is designed to evaluate 200~2000TV of wedges for image assessment.
2. You can evaluate ... ( 1 )Resolution ( 2 )Streaking ( 3 )Linking ( 4 )Interlace scan ( 5 )Shading ( 6 )Linearity of scan ( 7 )Aspect ratio of scan ( 8 )Alignment ( 9 )Graduation sequence

Step Number	1	2	3	4	5	6	7	8	9	10	11
Transmittance / Reflectance (%)	Over 83.0	68.7	56.0	44.6	34.6	26.0	18.8	12.8	8.0	4.5	2.0

# ITE Registration Chart for HD TV

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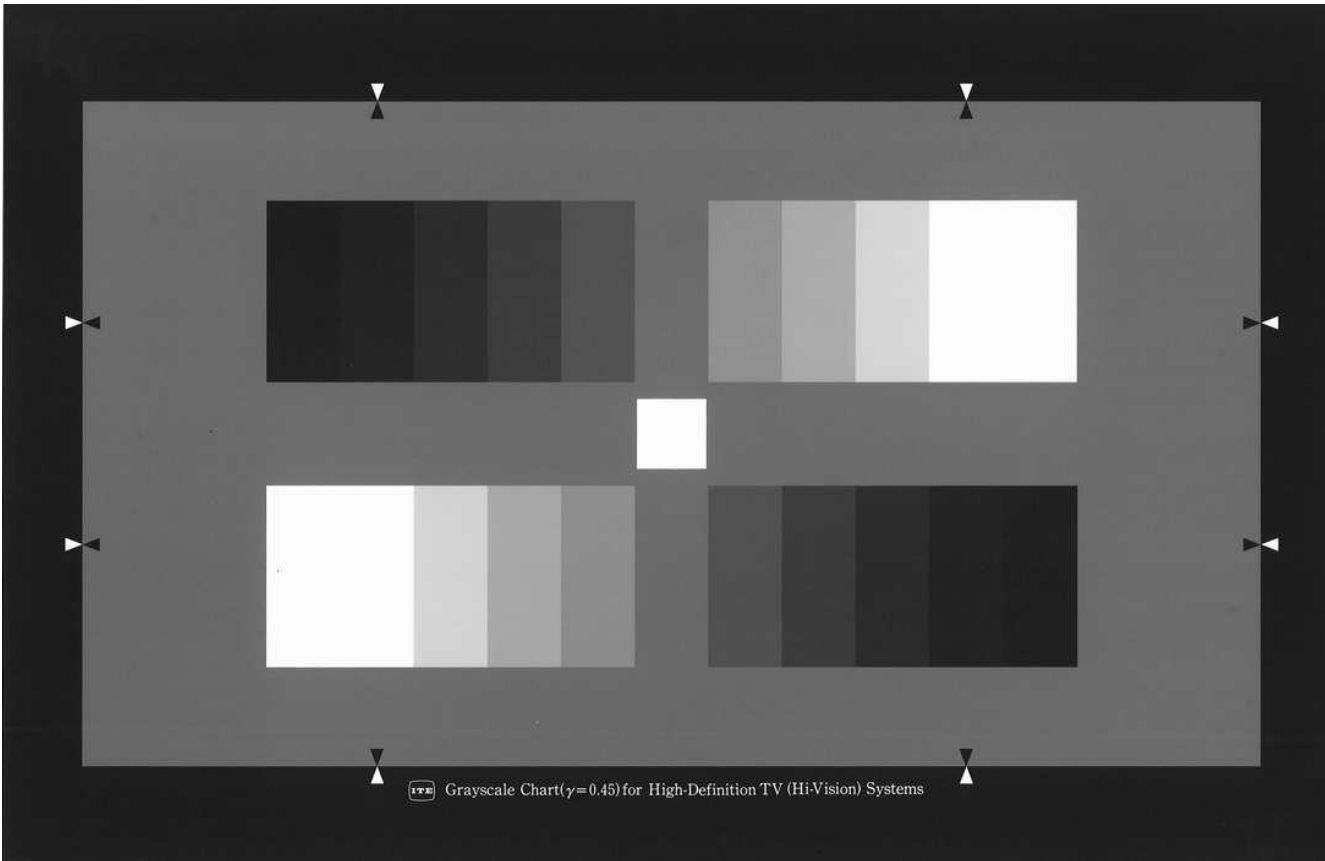
1. This Chart is used for registration of TV systems which needs high-accuracy registration and high resolution needed by HD TV. Horizontal and vertical spacing in line is  $h/45$  and the diameters of the circles are  $\sqrt{2}h$ ,  $h$ ,  $5h/12$ , and  $h/4$  in the Chart which consists of 400TV to 1600TV of fringes.

	Valid area	Outer shape
Transmission Type	153×272	200×310
Reflection Type	288×512	350×570

# ITE Grayscale Chart for HD TV ( $\gamma=0.45$ )

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	Valid area	Outer size
Transmission Type	153×272	200×310
Reflection Type	288×512	350×570

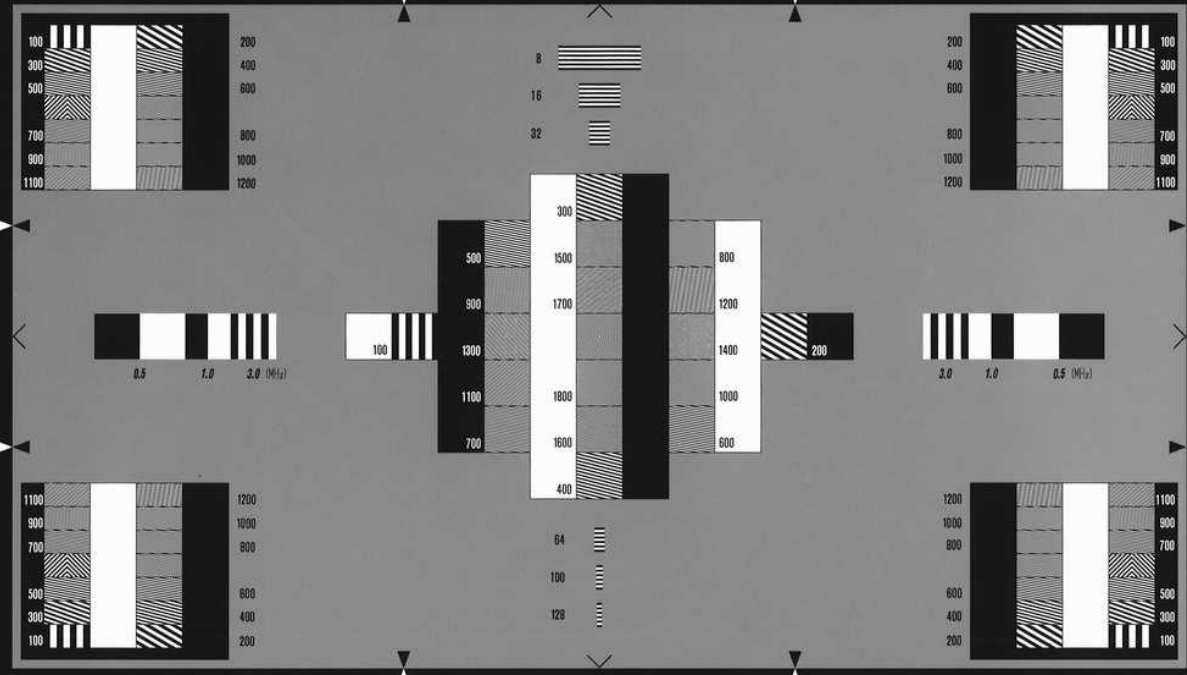
1. Grayscale of Reflection Type Chart is made by not a halftone dot method but a paint method.
2. Factor (Transmittance or Reflectance) of Grayscale.

Step Number	1	2	3	4	5	6	7	8	9	10	11	Back-ground
Factor (%)	83.0	68.7	56.0	44.6	34.6	26.0	18.8	12.8	8.0	4.5	2.0	26.0
Concentration	0.08	0.16	0.25	0.35	0.46	0.59	0.73	0.89	1.10	1.35	1.70	0.59

# ITE Aperture Response Chart for HD TV

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Aperture Response Chart for High-definition TV(Hi-Vision)Systems

This Chart is only Transmission Type

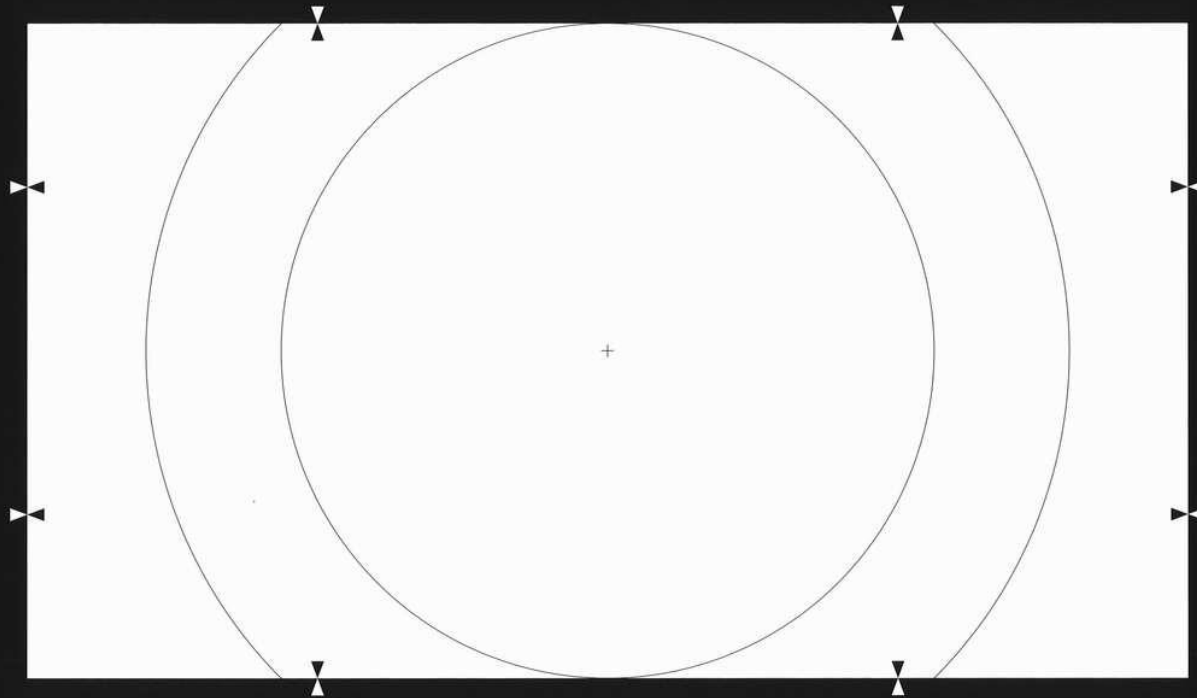
	Valid area	Outer size
Transmission Type	153×272	200×310

1. Modulation Transfer Function(MTF) is applied to image assessment for an imaging device. The MTF resolution is given by the product of the MTF of each separate module (I.e. contrast, lens, imaging devise and amplifier).
2. Resolution of imaging devise on using a square-wave chart is generally expressed with Amplitude Response(AR).
3. Aperture Response Chart is a Chart for evaluation of astigmatic effect of AR and Resolution Aperture.

# ITE Picture Blemish Chart for HD TV

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ITE Picture Blemish Zone Chart for High-definition TV (Hi-Vision) Systems

This Chart is  
only Transmission Type

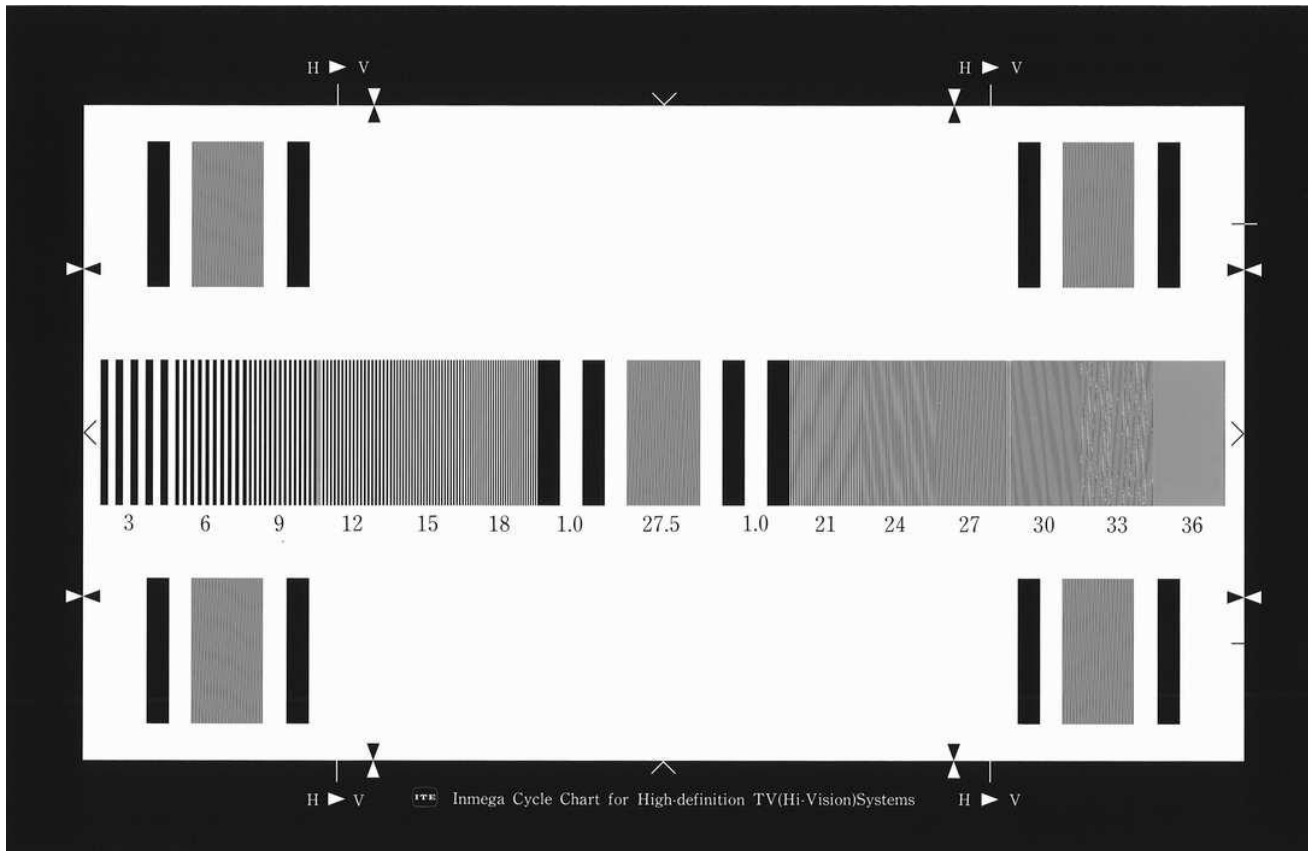
	Valid area	Outer size
Transmission Type	153×272	200×310

1. This Chart is used for flaw detection.
2. This Chart is distinguished into 3 parts as follows:
  - (1) Area I is inside of the circle 'h' in diameter.
  - (2) Area II is inside of the circle ' $\sqrt{2}h$ ' in diameter.
  - (3) Area III is rest of the image.
3. The thinnest line is used for separator line.

# ITE In-megacycle Chart for HD TV

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This Chart is  
only Transmission Type

	Valid area	Outer size
Transmission Type	153×272	200×310

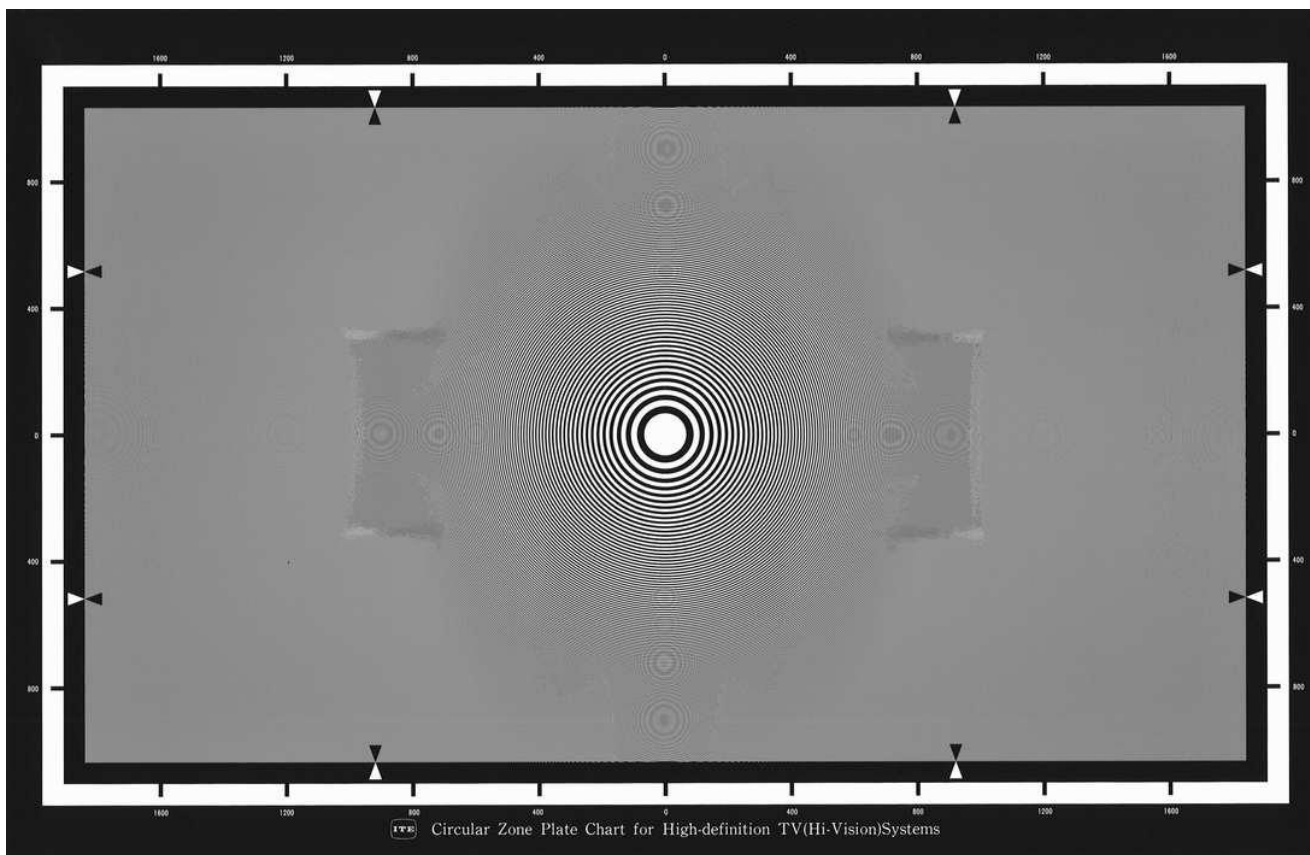
1. This Chart is used to evaluate the Horizontal Resolution of an imaging device. In the Chart image, white and black fringes from 1MHz to 36MHz in image frequency arranged vertically.  
800TV(27.5MHz) of wedges are formed at the center and at each corner.



# ITE Circular Zone Plate Chart for HD TV

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This Chart is  
only Transmission Type

	Valid area	Outer size
Transmission Type	153×272	200×310

1. 1035TV of space frequency on horizontal edges is the same number of effective scanning lines as ITU-R709 standard.
2. The number of space frequency on vertical edges is 1840TV calculated by aspect ratio of High-vision, 16 : 9.
3. To find the number of space frequency easily in a certain area, a mark of 400TV each is indicated outside of the frame.