

Cosmetic Outgoing Inspection Specification

(Wide TFT-LCD)

Customer _____

Samsung  _____

W. Y. Chung

Senior Manager, LCD CS2 Group

TCS Team
LCD Business
SAMSUNG Electronics Co., Ltd.

Address : #200 Myeongam-Ri, Tangeong-Myeon, Asan-City, Chungnam-Do, Korea

1. Inspection Introduction

1.1. Conditions

viewing distance	100 ~ 120 cm
ambient illumination	300 ~ 700 Lux (nominal 500 Lux)
ambient temperature	25 + - 5 'C
viewing angle	The surface of the module and the inspector's line of view shall be at 90 degrees. (left 45'/right 45')
display pattern	Pure R, G, B, Black and White
inspection area	active area

1.2. Defect Modes

dark / bright spots

points on the display which appear dark / bright and remain unchanged in size

dark / bright lines

lines on the display which appear dark / bright and remain unchanged in size

polarizer scratch

when the unit is lit a light, line is seen across a darker background; line does not vary in size

polarizer dent

when the unit is lit a light, light(white) spots appear against a darker background, and do not vary in size

bright / dark dot

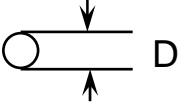
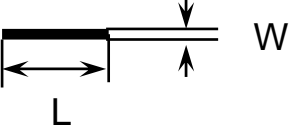
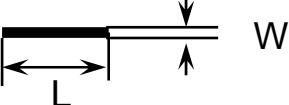
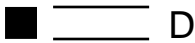
A sub-pixel (R, G, B dot) stuck off / on

2. Mechanical Inspection

Chassis Gap	max. 1.5mm
Silicone Gasket (Glue)	silicone material shall not be exposed beyond the metal frame edge into the view area.
Light Leakage	there shall be no visible light around the edges of the screen.

- * If there is none identified criteria in this specification, Samsung will refer production specification that Customer and Samsung agreed.
- * If there is mechanical dimension issue which has no designated tolerance, Samsung will apply natural tolerance.

3. Visual Inspection

Defect Type	Count (mm)	Reject (mm)
Dark / bright spot (foreign material, Stain, Dust) 	$0.1 < D \leq 2.0$ $N \leq 5$	$D > 2.0$ $N > 5$
Bright line (light lint), or dark line (dark lint / hair) 	$0.01 < W \leq 0.4$ $0.3 < L \leq 6.0$ $N \leq 5$	$W > 0.4$ $L > 6.0$ $N > 5$
Polarizer scratch 	$0.04 < W \leq 0.4$ $0.01 < L \leq 15.0$ $N \leq 10$	$W > 0.4$ $L > 15.0$ $N > 10$
Polarizer dent/bubble 	$D \leq 2.0$ $N \leq 10$	$D > 2.0$ $N > 10$
Maximum allowable number of defects	$N \leq 15$	$N > 15$

[D : diameter, W : width, L : length, N : count]

4. Electrical Inspection

Defect Type	Accept	Reject
Bright dot		
random	$N \leq 1$	$N > 1$
two adjacent	$N \leq 0$	$N > 0$
three adjacent	$N \leq 0$	$N > 0$
Dark dot		
random	$N \leq 8$	$N > 8$
two adjacent (Fig. 3)	$N \leq 2$	$N > 2$
three adjacent	$N \leq 0$	$N > 0$
Low dot (Fig. 2)		
random	$N \leq 8$	$N > 8$
Maximum allowable number of dot defect (Bright dot and Dark dot)	$N \leq 10$	$N > 10$
Minimum distance between defects,(Fig. 1)		
Dark dot - to - dark dot	$L \geq 5\text{mm}$	$L < 5\text{mm}$
Low dot - to - low dot	$L \geq 5\text{mm}$	$L < 5\text{mm}$

[L : length, N : count]

Definitions/ Notes;

- A bright dot : any Red, Green, or Blue pixel stuck in the “On” mode.
- A dark dot : any Red, Green, or Blue pixel stuck in the “Off” mode.
- Low dot : Reference (Fig. 2)
- Mutually agreed limit sample can be applied as a criterion to judge uniformity quality. Otherwise, SEC will apply internal criteria.

Fig. 1. Minimum distance between dot defects

【 Dark dot - to - Dark dot or Low dot – to Low dot】

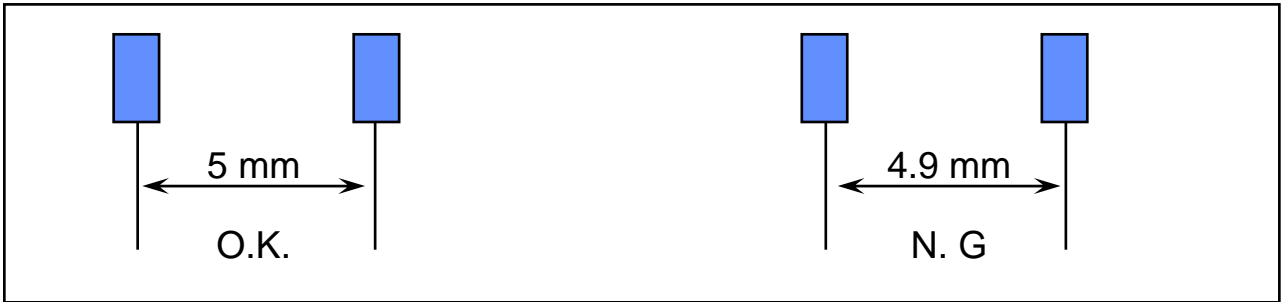
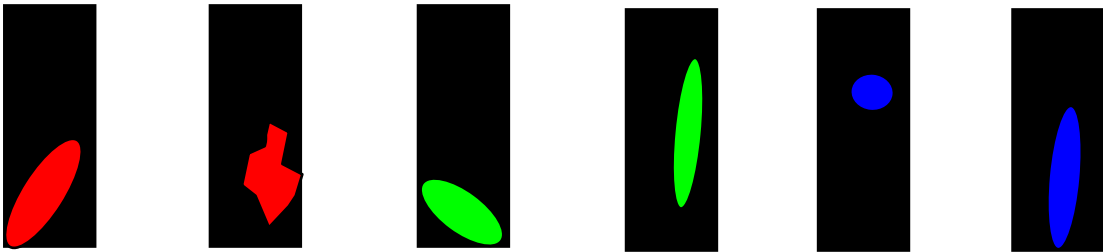


Fig. 2. Low dot Spec

Low dots are seen on a Black or Gray patterns.

The shape of the low dots are not defined but mostly they are shown as below.



The criteria of low dot is defined by its brightness and specified as below.

- R, G, B dot : at 32/64 Gray Pattern
Invisible → Low dot , visible → High dot
 - No count dot : at 16/64 Gray Pattern
Invisible → No count, visible → Low dot
- * In this case, Full White pattern is 64 Gray.

Fig. 3. Two Adjacent

【two adjacent Dark Dot】

