

File No.	LDI-150XRA01
----------	--------------

To : SMA

**Incoming Inspection Standards**

Product: TFT-LCD Module

Model: L Q 1 5 0 X 1 L G N 2 E

\* This standards is composed of six pages including the cover, the attached document, and so on.

CUSTOMER'S APPROVAL

DATE

\_\_\_\_\_

BY

\_\_\_\_\_

PRESENTED

BY

*K. Isaka*

\_\_\_\_\_

K.Isaka  
Department General Manager  
Quality Assurance Control Dept. 3  
Mobile Liquid Crystal Display Group  
SHARP CORPORATION

## Records of Revision

Revision Date	Rev. Mark	Contents of Revision	Check & Approval
31-Mar-06		-First edition Standards No:LDI-150XRA01	Isaka

## Incoming Inspection for TFT-LCD Module

### 1. Scope

- These incoming inspection standards shall apply to TFT-LCD modules supplied by Sharp Corporation to SMA.

### 2. Inspection lot

- Quantity per shipment lot is 1 inspection lot.

### 3. Incoming inspection condition

#### 3.1 Lot judge condition

Lot determination condition is determined pass or fail using the following apply standard  
[Application standard: ISO 2859-1]

Sampling type : Single sampling type, Inspection level :

Lot pass standard : AQL level: Major --- 0.4

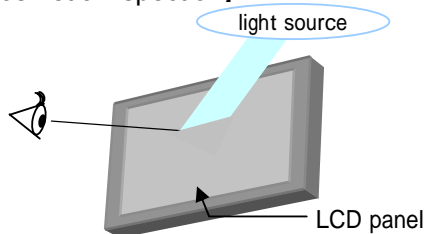
Minor --- 1.0

- As for the sorting of major or minor, it shall be accordance with item 'defect/determination standard'

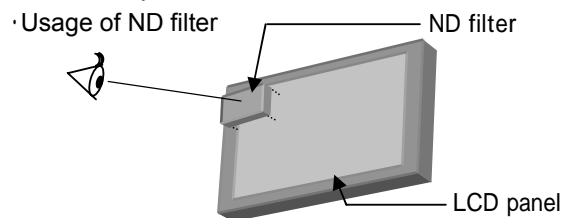
#### 3.2 Condition of lighting inspection

Items	Condition of inspection
External illuminance on the panel surface	300 ~ 700Lx (Standard 500Lx)
Distance between the surface of panel and the inspector's eye	350mm (Check from front [ $\theta = 0^\circ$ ])
Judge display for bright dot	Black pattern
Judge display for black dot	Red, Green, Blue and/or White pattern
Ambient temperature	Normal temperature (20 ~ 25 )
Ambient humidity	Normal humidity (65 ± 5%RH)
Usage of ND filter	As mentioned in the following

[Cosmetic inspection]



[Cosmetic inspection]



### 4. Criterion of Appearance Quality

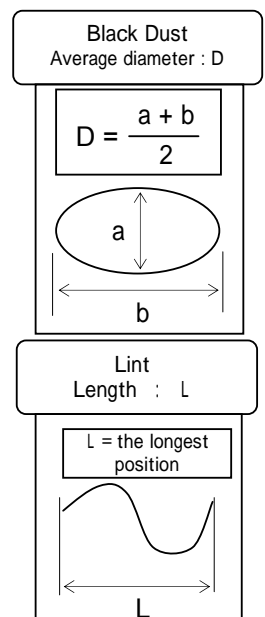
[ Permissible quantity: N, Average diameter: D (mm), Length: L (mm) ]

Item	Determination standard	Remarks
Foreign material (in the polarizer/ backlight cell)	<b>Black Dust</b> 0.1 D 0.5, N 3	*1
	<b>Lint</b> L 3.0, N 3	
<b>Scratches on the polarizer/glass</b>	L 10.0, N 4	*2
<b>Dents on the polarizer/glass</b>	0.1 D 0.5, N 4	*2

\*1 In the normal inspection condition, the distance between the module and the eyes of the inspector shall be 35cm or more.

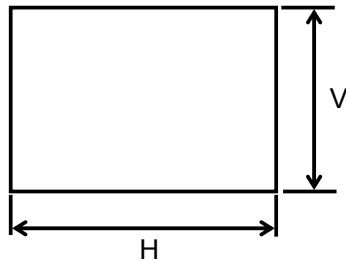
\*2 The inspection shall be conducted by using a single 20W fluorescent lamp from 50cm top of the workbench the distance between the module and the eyes of the inspector shall be 35cm or more. (Condition of no-operation)

[ Note ] External inspection apply range is by 1.0mm width of the effective display area



## 5. Standards for Display Quality Investigation

### 5.1 : Zone



Shall be accordance with the effective display area (the active area)of specification as for H and V.

### 5.2 : Definition

#### a. Bright dot

Full-time bright dot in the black display

- Visible through 5% transparency of filter. : Count
- Not visible through 5% transparency of filter. : No count

#### b. Black dot

When the MODULE lights, dots appear black in display at Red, Green, Blue and White picture position.

#### c. Scratches on the color filter

Dot seems to be bright-dot shape in the black display.

- Visible over the half of a dot : Count
- Visible under the half of a dot less than 100µm scratches : No count

#### d. Scratches on the black mask

White dot around dot(black mask part) in the black display

- Torn over 50µmφ : Count
- Torn under 50µmφ : No count

#### e. Line defect (vertical• horizontal)

When the MODULE lights, Vertical or Horizontal lines don't light up.

#### f. Display non-uniformity

Non-uniformity of display brightness.

### 5.3 :Bright dot

Check pattern	Total number of Bright dot
Black pattern	4 MAX

- Green Bright dots : 2 dots MAX
- Joined 2 Bright dots : 1 pairs MAX
- Joined 3 or more Bright dots must be nil.

### 5.4 :Black dot

Check pattern	Total number of Black dot
Red pattern	4 MAX
Green pattern	4 MAX
Blue pattern	4 MAX
White pattern	Total number of black dot 4 MAX

- Joined 2 Black dots are considered as 1 defect dot.
- Joined 3 or more Black dots must be nil.

### 5.5 Distance of missed dots

- Distance of brightn dots : More than 15mm
- Distance of black dots : More than 15mm

## 6.Others

In case any doubts arise on the items , both Parties shall cooperate in an effort to settle it down.

## 7. Criteria of defects /determinations

Classification	Inspection item	Criterion for defects /determinations	Defect type			
Characteristic of electricity and mechanical	<b>A power supply voltage is counted by the standard value described in the spec.</b>					
	In danger of Smoke/Fire/Electric shock			Criminal defect		
	Operating frequency	(1) Does not meet specified range in the spec	Major			
	Current consumption	(2) Does not meet specified range in the spec	Major			
	Contrast ratio	(3) Does not meet specified range in the spec	Major			
	Display-on Inspection	(4) With the following display pattern input, a correct display pattern is not obtained. a) All dots light up or all dots don't light up b) For each line, the alternate light up or alternate lines light up c) Predetermined figure and character pattern		Major		
		(5) Vertical line defect		Major		
		(6) Horizontal line defect		Major		
		(7) Cross line defect	Major			
Criterion of appearance quality	Scratches and dent on the polarizer	(8) Shall be accordance with the item 'external inspection'		Minor		
	Adhesive/bubbles in the polarizer	(9) Shall be accordance with the item(8)scratch and dent on the polarizer' for the defect which has bubbles between glass and polarizer in LCD panel		Minor		
	Black dot by Foreign material	(10) Shall be accordance with the item (8)scratch and dent on the polarizer' for the defect which has black dot and/foreign material in LCD panel		Minor		
	Bezel appearance	(11) irregular plating/irregular coating/rust on the edge are ignored		Minor		
	Damaged parts	(12) a) Part lead wire is broken. b) The part lead wire is not yet broken, but is damaged. c) Failure is found concerning function or performance, or product value is impaired in appearance.		Major	Minor	
				Major		
Bezel claw	(13) a) Bezel claw missing or not bent b) The bezel claw is not bent sufficiently.		Major	Minor		
Criterion of display quality	Bright dot	(14) Exceed permissible numerical value (Flickering dot is bright dot)		Minor		
	Torn color filter	(15) Exceed permissible numerical value		Minor		
	Torn black mask	(16) Exceed permissible numerical value		Minor		
	Black dot	(17) Exceed permissible numerical value (Flickering dot is black dot)		Minor		
	Display Non-uniformity	(18) There should be no non-uniformity through 3% transparency of filter.		Minor		
	Longterm afterimage	(19) When a pattern having been displayed for 30 minutes is switched to another pattern, an afterimage of the former pattern shall disappear within 10 seconds.		Minor		
	Defect distance	(20) In the permissible distance · Torn dot / Torn black mask should be judged in the same way.		Minor		

# SHARP

Classification	Inspection item	Criterion for defects /determinations	Defect type	
Others	Unit outline demensions	(21) Does not meet specified range in the spec	Major	
	Weight	(22) Does not meet specified range in the spec	Major	
	Label display (Sealing/Display label)	(23) a) There should be no forgetfulness, misprinting, not-readable one. (Readable one should be a good one.) b) As for the display label, peel-off should be within the degree of 1/10 of total area . (except for legible one among discoloration of display label.)	Major	Minor
	Gap of adjustment	(24) a) Non re-adjustable b) Re-adjustable	Major	Minor

(Note)Regarding the items to use limit samples, limit samples should have priority over others