

Incoming Inspection Standard

Color TFT-LCD Module for PD applications

Inch : 15” ~ 88”

Public Display

Customer :

Customer's Approval

Reviewed & Approved by

(NAME)

(TITLE)

(Signature)

(Date) (MM)/ (DD)/ (YY)



Please return this standard with your signature for approval

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1.0	All	Originated by HK Bae	Oct. 11 th , 2017

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1.0 Introduction

1.1. Scope

This Incoming Inspection Standard shall be applied to TFT-LCD modules (hereafter called the "LCMs") supplied by LG Display (hereafter called the "Supplier") to its Customer.

1.2. Incoming inspection Right

The Customer shall have the right to conduct at its own cost and expense, an incoming inspection of the LCMs at the destination specified in the relevant B/L(Bills of Lading) in accordance with the LCM's specifications separately agreed upon and the inspection criteria set forth in this article.

The Customer shall notify the Supplier in writing of the inspection results (acceptance or reject) in accordance with the said Incoming Inspection Standard within 40 days from the date of the B/L.

Should the Customer fail to notify the results to Supplier within 40 days period, the right to reject the LCMs shall then lapse, and the said LCMs shall be deemed to have been accepted by the Customer.

1.3. Handling Precautions

- LCM Devices are made of fragile material such as Glass and plastic and may be broken or cracked if dropped it, so **PLEASE** handle them with care.
- **DO NOT** press the area covered with PET or such materials. These are weak point of LCMs since of TCPs(Driver ICs) and PWBs.
- **PLEASE** support the Bezel with your finger when connecting the interface cable.
- Please **DO NOT** touch the surface of the Glass(Polarizer).
- **PLEASE** wear the Wrist Strap when handling.
Semiconductive devices are included in the LCMs and they should be handled with care to prevent any electrostatic discharge(ESD).
- **PLEASE** keep the LCMs in the specified, original packing boxes when storage.
- **DO NOT** stack the LCMs too high without wrapping material such as AIR CAP.
- Before use the LCMs, **PLEASE** check the Engineering specification.
- LCMs contain a small amount of Liquid Crystal and Mercury. **PLEASE** follow local ordinances or regulations for disposal.

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2.0 Generals

2.1. Sampling Method

Unless otherwise agreed upon in writing, the sampling inspection shall be applied to the Customer's incoming inspection.

- 2.1.1. Lot size : Quantity per shipment lot (minimum lot size : 100 pieces)
- 2.1.2. Sampling type : Normal inspection, Single sampling
- 2.1.3. Inspection level : II
- 2.1.4. Sampling table : ANSI Z 1.4

2.2. Acceptable Quality Level(AQL)

The AQL for major and minor defects shall be respectively set forth below.

- 2.2.1. Major =0.65 %
- 2.2.2. Minor =1.5 %

2.3. Classification of defects

Defects are classified as either a major defect or a minor defect based on the degree of defect defined herein.

2.2.1. Major defect

The major defect is a defect that is likely to result in product failure, or reduction in the product's intended usage.

2.2.2. Minor defect

The minor defect is a defect that has little bearing on the effective use or operation of the product.

Specific criteria of judgment of major and/or minor defects or other related issues shall be in accordance with the Appendix A, "Classification of Defects".

2.4. Determination of acceptability and subsequent disposal

If the number of defects found in the LCM sampling lot is equal to or less than the AQL(Acceptable Quality Level), the lot shall be accepted.

If the number of defects found in the LCM sampling lot is greater than the AQL, the lot shall be rejected. The Customer shall inform the Supplier of the results of such inspection detailly within the time period stipulated in chapter 1.2. "Incoming inspection Right".

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2.4.1. Accepted lot

An acceptance under the above incoming inspection shall constitute an acceptance by the Customer of such lot of the LCMs in terms of the landed quality thereof.

2.4.2. Rejected lot

If a shipment lot of products is rejected under the above incoming inspection due to any defects of which the Supplier is responsible and such a fact is clearly confirmed by the Supplier through a separate inspection or as otherwise decided, the Supplier shall choose one of the following three options which must be determined by mutual consent.

The Supplier shall advise the Customer of its choice not later than 10 working days(Monday through Friday) of receipt of the "Customer's notification of rejected lot" :

- a. The Customer shall return the rejected lot to the place to be designated by the Supplier and the Supplier shall screen all of the products in the lot and repair or replace the defective LCMs.
- b. The Supplier shall screen all of the LCMs in the lot and repair or replace the defective LCMs within a reasonable time period at the Customer's facility.
- c. The Customer shall screen the entire lot of LCMs at the expense of Supplier's, and the expense must be agreed by the Supplier. The rejected LCMs shall be returned to the place designated by the Supplier.

2.5. Inspection Method

2.5.1. Ambient conditions

- a. Temperature : 20 ~25 °C
- b. Humidity : 65 ± 5 % RH
- c. Illumination : Single 20W fluorescent lamp non-directive (300 to 700 Lux)

2.5.2. Viewing distance

Minimum 4 * Height of panel

2.5.3. Viewing Angle

The inspection shall be conducted within normal viewing angle range.
※ Refer to the CAS for viewing angle.

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3.0 Inspection Criteria

3.1. Dot Defect

3.1.1. Bright Dot

Dots (sub-pixels) which appeared brightly in the screen when the LCM displayed with dark pattern.

Item	15"~26"	32"~47"	49"~55"	60"~72"	79"~88"
R,G or B 1 dot	Max 1	Max 1	Max 2	Max 3	Max 4
Adjacent 2 dots	0	0	0	1	2
Adjacent 3 dots	0	0	0	0	0
Total amount of Bright dots	Max 1	Max 1	Max 2	Max 3	Max 4

3.1.2. Partial Bright Dot

Among Bright dots, the size of Dots(sub-pixels) which appeared less than half size of sub-pixel is defined as partial bright dot.

Item	15"~55"	60"~72"	79"~88"
Inspection Pattern	64gray		
Q'ty	Max 10	Max 15	Max 30

3.1.3. Dark Dot

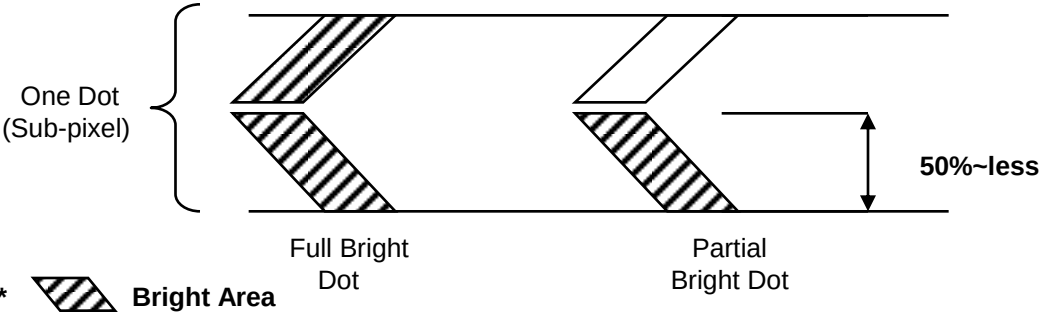
Dots (sub-pixels) which appeared darkly in the screen when the LCM displayed with bright pattern.

Item	15"~26"	32"~47"	49"~55"	60"~72"	79"~88"
1 dot	Max 5	Max 8	Max 10	Max 12	Max 15
Adjacent 2 dots	Max 1	Max 1	Max 2	Max 4	Max 6
Adjacent 3 dots	0	0	0	0	0
Min. distance between dark dots	20mm	20mm	20mm	20mm	20mm
Total amount of Dark dot	Max 5	Max 8	Max 10	Max 13	Max 16

3.1.4. Total amount of Dot Defects (Combination)

Item	15"~26"	32"~47"	49"~55"	60"~72"	79"~88"
Q'ty	Max 6	Max 9	Max 12	Max 15	Max 20

- Note) a. Every dot herein means Sub-Pixel(Each Red,Green, or Blue Color)
- b. Dots smaller than half sub-pixel are not counted as a defect dots.
- c. The Dot defect is inspected on Red , Green, Blue , white, or Black pattern
- d. Defects which is on the Black Matrix (outside of Active Area) are not considered as a defect.



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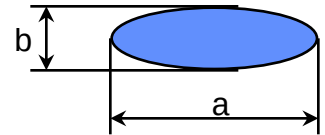
3.2. Polarizer Defects

Item	15"~26"		32"~47"		49"~55"		60"~72"		79"~88"	
	Size	Q'ty	Size	Q'ty	Size	Q'ty	Size	Q'ty	Size	Q'ty
Line Shape Scratch	$0.02 \leq W \leq 0.1$ $0.3 \leq L \leq 5.0$	N≤5	$0.05 \leq W \leq 0.2$ $0.5 \leq L \leq 10.0$	N≤5	$0.05 \leq W \leq 0.2$ $0.5 \leq L \leq 10.0$	N≤6	$0.05 \leq W \leq 0.2$ $0.5 \leq L \leq 12.0$	N≤8	$0.05 \leq W \leq 0.3$ $0.5 \leq L \leq 15.0$	N≤10
Dot Shape Scratch	$0.3 \leq D \leq 0.8$	N≤5	$0.5 \leq D \leq 1.0$	N≤5	$0.5 \leq D \leq 1.0$	N≤6	$0.5 \leq D \leq 1.2$	N≤8	$0.5 \leq D \leq 1.8$	N≤10

Where, W : Width
L : Length
D : Average diameter $= (a+b)/2$

Note)

- 1.Linear : $a > 2b$, Circular : $a \leq 2b$
- 2.Extraneous substances which can be wiped out, like Finger Print, Particles are not considered as a defect.
- 3.Defects which is on the Black Matrix (outside of Active Area) are not considered as a defect.



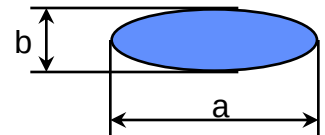
3.3 Foreign Material

Item	15"~26"		32"~47"		49"~55"		60"~72"		79"~88"	
	Size	Q'ty	Size	Q'ty	Size	Q'ty	Size	Q'ty	Size	Q'ty
Linear	$0.02 \leq W \leq 0.2$ $0.3 \leq L \leq 2.0$	N≤5	$0.05 \leq W \leq 0.3$ $0.5 \leq L \leq 3.0$	N≤5	$0.05 \leq W \leq 0.3$ $0.5 \leq L \leq 4.0$	N≤6	$0.05 \leq W \leq 0.3$ $0.5 \leq L \leq 6.0$	N≤8	$0.05 \leq W \leq 0.3$ $0.5 \leq L \leq 8.0$	N≤10
Circular	$0.3 \leq D \leq 0.8$	N≤5	$0.5 \leq D \leq 1.0$	N≤5	$0.5 \leq D \leq 1.0$	N≤6	$0.5 \leq D \leq 1.5$	N≤8	$0.5 \leq D \leq 1.8$	N≤10

Where, W : Width
L : Length
D : Average diameter $= (a+b)/2$

Note)

- 1.Linear : $a > 2b$, Circular : $a \leq 2b$
- 2.Extraneous substances which can be wiped out, like Finger Print, Particles are not considered as a defect.
- 3.Defects which is on the Black Matrix (outside of Active Area) are not considered as a defect.



* Total of Foreign material and Polarizer defect : Max. 10

3.4. Line Defect

All kinds of line defects such as vertical, horizontal or cross are not allowed.

3.5. Bezel Appearance

Scratches, minor bents, stains, particles on the Bezel frame are not considered as a defect.

3.6. Others

Issues which is not defined in this criteria shall be discussed with both parties, Customer and Supplier, for better solution.

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4.0 RMAs

4.1. Verification

The Supplier can verify the defective LCMs to segregate the responsibilities at Customer’s facility or can request the Customer to ship the defective LCMs to assigned place for verification

This verification result shall be agreed mutually by the Customer and Supplier. This result can be corrected/changed after detail failure analysis at Supplier’s facilities.

4.2. Supplier Induced Defects

All of the Supplier induced defective LCMs shall be returned to the Supplier for repair or replacement.

Before return the defective LCMs, the Customer needs Supplier’s confirmation with RMA Number.

All of the returned LCMs shall be returned to the Customer within agreed time period.

4.3. Customer Induced Defects

The Customer can return the customer induced defective LCMs to the Supplier for repair.

The repair cost for Customer induced defective LCMs shall be agreed with both parties, Customer and Supplier.

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5.0 Warranty

5.1. Warranty Period

The In-warranty is eighteen (18) Months from manufacturing month. Details on the warranty execution will be settled on a regional basis.

Note) The manufacturing Month is on the LCMs as Supplier’s serial No.

5.2. Repair Warranty

Repair warranty is **Twelve(12)** Months from repaired month for repaired LCMs.

Note) The Label for repair will be added after repairing.

5.3. Warranty avoidance

The warranty will be avoided in cases of below,

- a. When the warranty period is expired
- b. The Customer induced defective LCMs
- c. When the LCMs were repaired by 3rd party without Supplier’s approval.
- d. When the LCMs were treated like Disassemble and Rework by the Customer and/or Customer’s representatives without Supplier’s approval.

6. Others

If any problems arise with the LCMs supplied by supplier, the Customer and Supplier will cooperate and make efforts to solve it with mutual confidence and respect.

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Appendix A. Classification of Defects

Defect Mode	Criterion for Defect	Class
Operating Frequency	Specified range in the CAS	Major
Power Consumption	Specified range in the CAS	Major
No Display	Not allowed	Major
Contrast Ratio	Specified range in the CAS	Major
Broken	Not allowed broken glass, PWB, Back Light wire, Connector	Major
Line Defect	Not allowed any Vertical,Horizontal,and Cross line	Major
Mottling(Mura)	Not visible through 5% ND filter in 50% Gray pattern or judge by limited sample if necessary	Minor
Polarizer Defects	Shall be accordance with the item 3.0 "Inspection Criteria" in this standard	Minor
Extraneous Substance	Shall be accordance with the item 3.0 "Inspection Criteria" in this standard	Minor
Dot Defect	Shall be accordance with the item 3.0 "Inspection Criteria" in this standard	Minor
Bezel Claw Forming	The bezel claw is not formed sufficiently	Minor

Mottling(Mura) limited sample



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