INNOLUX CORPORATION

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# LCD Panel Inspection Specification

## Model No.: R213UCE-L01

| Customer: 鈺緯 |
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| Approval By  |



| Approved By |
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## Revision History

| Version | Date | Page | Section | Description |
|---|---|---|---|---|
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# Inspection Standards for LCD Modules

## 1.Description

These inspection standards shall be applied to LCD Module supplied by INNOLUX Corporation.

This model is only used for Medical product. If there are any other product applications such as touch function, handwriting recognition, Industrial use, Aerospace use and so on, the specification should be negotiated separately.

## 2.The environmental condition of inspection

The environmental condition and visual inspection shall be conducted as below.

(1) Ambient temperature : 20~30℃

(2) Humidity: 25~75 %RH

(3) External appearance inspection shall be conducted by using a single 20W fluorescent lamp or equivalent illumination.

(4) Basic Conditions:

(a) Viewing Distance:

350 to 500 mm

(b) Ambient Illumination:

100 to 200 lux for light on inspection

(c) Ambient Illumination:

300 to 700 lux for external appearance inspection

(d) Viewing Angle:

±40 degree to the front surface of display panel in vertical and horizontal direction when power ON.

## 3.Classification of defects

Defects are classified two types, major defect and minor defect according to the defect. And, the definition of defects is classified as below.

(1) Major defect

Any defect may result in functional failure, or reduce the usability of product for its purpose. For example, electrical failure, deformation and etc..

(2) Minor defect

A defect that is not to reduce the usability of product for its intended purpose and un-uniformity, dot defect and etc..

The criteria on major and/or minor judgement will be according with the classification of defects.



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## 4.Inspection Criteria

(1) Definition of dot defect induced from the panel inside

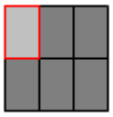
a) Bright dot：Dots appear bright and unchanged in size in which module is displaying under black pattern.

b) Dark dot：Dots appear dark and unchanged in size in which module is displaying under pure red, green, blue, white picture.

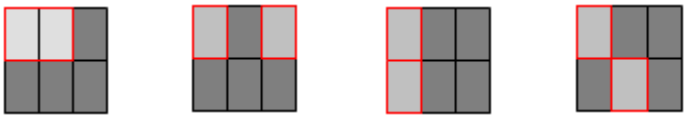
c) 2 Full dot adjacent = 1pair.

d) Picture：

(a) Full dot



(b) 2 Full dot adjacent



(c) Spot defect





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(2) Display Inspection standards when power on

| Items | | Acceptable count |
|---|---|---|
| Full Bright dot | Random | N≦0 |
| | 2 dots adjacent | N≦0 |
| | 3 dots adjacent or more | N≦0 |
| Full Dark dot | Random | N≦5 |
| | 2 dots adjacent | N≦2 |
| | 3 dots adjacent or more | N≦0 |
| Total full bright and full dark dot | | N≦5 |
| Distance | Minimum Distance Between Full Bright dots | L≧10mm |
| | Minimum Distance Between Full Dark dots | L≧10mm |
| Partial bright dot<br>Bright spot | | (1)3%ND NG<br>D＜0.15 mm → Ignore<br>D＜1 dot or 0.15≦D≦0.5mm → N≦8<br>(2)3%ND OK → Ignore<br>(3)Except (1),(2) → N=0 |
| Foreign Black/White Spot | | D≦0.15mm, Ignore<br>0.15＜D≦0.5 mm, N≦4 |
| Foreign Black/White/Bright Line | | (1)W≦0.05mm & L≦0.5mm → Ignore<br>(2)0.05＜W≦0.1 mm & L≦0.5mm → N1<br>W≦0.05mm & 0.5＜L≦5.0 mm → N2<br>0.05＜W≦0.1 mm & 0.5＜L≦5.0 mm → N3<br>N1+N2+N3≦4<br>(3) Excep (1),(2) → N=0 |
| Display failure (V-line/H-line/Cross line etc.) | | Not allowable |
| Mura | Not visible through 6% ND filter in 50% gray or judge by limit sample if necessary | |


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## 5.External Appearance Inspection Criteria

| Item | Contents | |
|---|---|---|
| Screw | Parts mounting, incomplete assembly, deformation, oxidized, crooked or rusty is not permitted. | |
| CCFL cable (for CCFL Model) | Cable not continuous、Break-off 、Connector Burn-off /Break-off | |
| Metal frame (Bezel) | Scratch | *Noticeable scratch and exfoliation coating are not permitted.<br>*The oxidized metal is not permitted. |
| | Incomplete assembly is not permitted. | |
| Backlight | Scratch | The scratch which may causes a problem in practical use is not permitted. |
| | Break-off | Breaking off is not permitted. |
| | Crack | The crack is not permitted. |
| Polarizer | Scratches | (1)W≦0.05mm & L≦0.5mm → Ignore<br>(2)0.05＜W≦0.1 mm & L≦0.5mm → N1<br>W≦0.05mm & 0.5＜L≦5.0 mm → N2<br>0.05＜W≦0.1 mm & 0.5＜L≦5.0 mm → N3<br>N1+N2+N3≦4<br>(3) Excep (1),(2) → N=0 |
| | Dent/Bubble | D≦0.15mm, Ignore<br>0.15＜D≦0.5 mm, N≦4 |
| | Stain | The stain on polarizer, which can't be wiped off, is not permitted. |
| Stain on Polarizer | The stain which can't be wiped off is not permitted. | |
| Tape/Label | Incorrect position, missed label is not permitted. | |
| Connector | Oxidized/rusty connector is not permitted. | |
| Outline size | Spec. out is not permitted. | |

*Note: If any specific defect is not included in the above defect table, this defect should be judged by INX/ODM/Brand customer discussion


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## 6.Classification of defects

| Inspection Item | Criteria and Description | Defect type |
|---|---|---|
| Vertical line | Signal input, vertical line off or irregular V-line appears | Not permit |
| Horizontal line | Signal input, horizontal line off or irregular H-line appears | Not permit |
| Cross line | Pattern signal input, a correct display is not obtained | Not permit |
| No display | Signal input, display is dead | Not permit |
| Irregular display | Pattern signal input, a correct display is not obtained | Not permit |
| Display defect | Exceed specified standards | 4-(2) |
| Appearance defect. | Exceed specified standards | 4-(2) |
| Mura | Not visible through 6% ND filter or judge by limit sample | ND filter or Limit sample |


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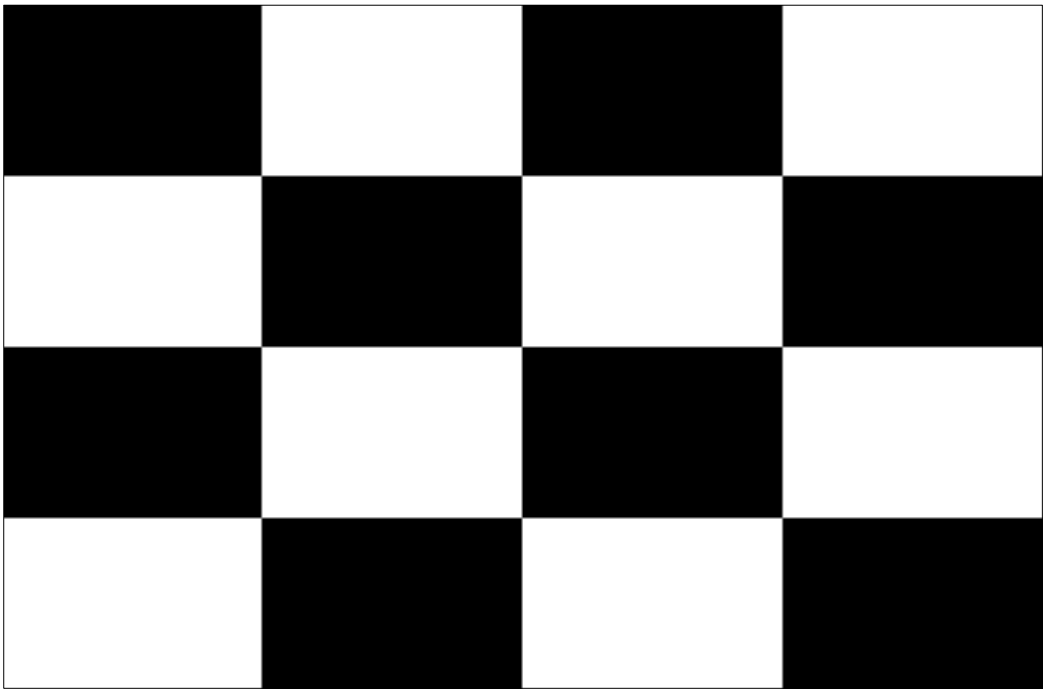
### 7.Image Retention

The panel spec of image retention is as follows.

Test method: The L0/L255 Mosaic pattern below is displayed for the display time
Then, change the pattern to L128 all gray pattern and count the time

Spec for Image retention time is below,

| Display Time | 5sec | 60sec | 5min |
|---|---|---|---|
| Time until disappearing | **10sec** | **30sec** | **45sec** |



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