Date: December. 21th, 2021

Specification for Approval

Product Name : 13.3" UHD AMOLED

Model Code : ATNA33TP11

H/W Code : -1

Description : 13.3" UHD (3840*2160) 1,074M Color

Proposed by			Customer's Approval
Designed	Checked	Approved	
KS KIM	YH KIM	GK SONG	

The specification on this document is going to apply to Mass production according to an agreement which Customer and SDC make through the signature on the document

This signature on this document indicates that Customer and SDC confirm all items specified in this document have been verified under Display Module as well as Notebook condition at both sides.

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REVISION HISTORY

Date.	Rev.No.	Page	Revision Description
20/03/05	000	All	Initial Release - preliminary
20/04/13	001	Page 4 Page 6 Page 14	Mechanical information Electrical absolute ratings Outline dimension
20/05/13	002	Page 4 Page 10 Page 17 Page 29	Mechanical information- weight Electrical characteristics – current, consumption Product label EDID update-model name
20/08/05	003	Page 1 Page 4 Page 17 Page 27,29	H/W Code Description Product label EDID
20/08/19	004	Page 1 Page 7	Customer name Optical characteristics
21/12/21	005	Page 4 Page 14 Page 17~20 Page 24 Page 26	Add panel warpage Update Outline dimension / Reliability test Revise packing information Add Warranty Change Inspection Specification

1. GENERAL DESCRIPTION

DESCRIPTION

The ATNA33TP11-1 uses an organic light emitting diode display (OLED) that uses low temperature poly silicon TFTs as switching components. This model is composed of a TFT OLED panel, a driver circuit.
This 13.3" model has a resolution of 3840 x 2160 pixels and can display up to 1,074M colors.

FEATURES

OLED Display
High contrast ratio & Fast Response
UHD(3840 x 2160 pixels) resolution
eDP(V1.4b)

APPLICATIONS

Tablet PC
Notebook PC
If the intent to use this product is for other purpose, please contact Samsung Display.

GENERAL INFORMATION

Item	Specification	Unit	Note
Active area	293.76 (H) x 165.24 (V) (13.3"diagonal)	mm	
Driver Element	LTPS TFT active matrix		
Display colors	1,074M(RGB 8bit+2FRC)		
Number of pixel	3840 * 2160 (UHD)	Pixel	16:9
Pixel Arrangement	RGB Stripe Type		
Pixel pitch	76.5 x 76.5, Sub Pixel : 25.5 x 76.5	um	
Display Mode	OLED		
Thickness of glass	0.716	mm	
Surface treatment	Glare		
Environmental safe regulation	Pb Free, Halogen Free		

MECHANICAL INFORMATION

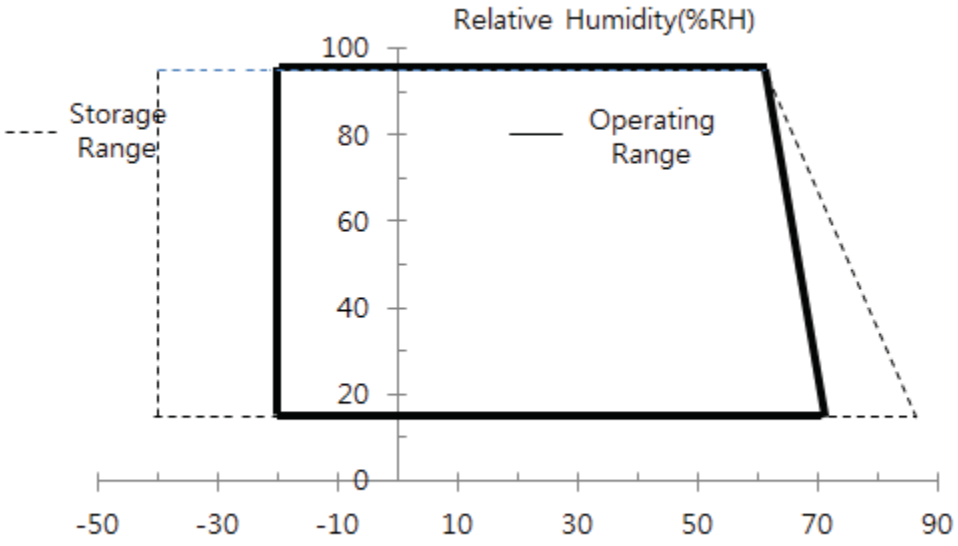
Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal (H)	297.63	297.76	297.89	mm	-
	Vertical (V)			186.34	mm	Flat type
	Depth (D)	-		1.269	mm	Panel Area w/o Pol & Cover Panel protective film
				2.495	mm	PCB Area(C-IC to C- IC) ※ Only for design spec
Weight		-	-	154	g	w/o Cover Panel Protective Film
Panel warpage				2.0	mm	25±5°C, 50±10% (Max storage 9months)

2. ABSOLUTE MAXIMUM RATINGS

2.1 ENVIRONMENTAL ABSOLTE RATINGS

Item	Symbol	Min.	Max.	Unit	Note
Storage temperature	TSTG	-40	85	°C	(1)
Operating temperature (Temperature of Environment)	TOPR	-20	70	°C	(1)

Note (1) The range of temperature and relative humidity are shown in the graph below 93% RH.



2.2 ELECTRICAL ABSOLUTE RATINGS

(1) OLED MODULE

V_{SS} = GND = 0V

Item		Symbol	Min.	Max.	Unit	Note
Supply Voltage	System	VDD_3.3V	-0.3	+4.6	V	(1), (2)
	EL Power	VBAT	+6.0	+21.0	V	(1), (2)
Signal Input Voltage		System_I/O	-0.3	VDD_1.8V+0.2	V	(2)

Note 1) VDD_3.3V, VBAT should satisfy the condition of VDD_3.3V, VBAT > VSS(AGND).

Note 2) If the supplied voltage exceeds the maximum limitation, D-IC can be damaged permanently. Therefore, while operating, it's recommended to use D-IC within the maximum electrical limitation. If not, D-IC can cause decreased reliability or operational problems.

Note 3) Temperature should not exceed 29℃ and there should be no condensation.

2.3 THE OTHERS

(1) STATIC ELECTRICITY PRESSURE RESISTANCE

Item	Test Conditions	Remark
CONTACT DISCHARGE	±8kV,150pF, 330Ω, Front 13point	Non-Operating
AIR DISCHARGE	±10kV, 150pF, 330Ω, Front 13point	Non-Operating

3. OPTICAL CHARACTERISTICS

The following items are measured under the stable conditions.* The optical characteristics should be measured in the dark room or the equivalent environment by the methods shown in the Note (5).
Measuring equipment : TOPCON SR-3

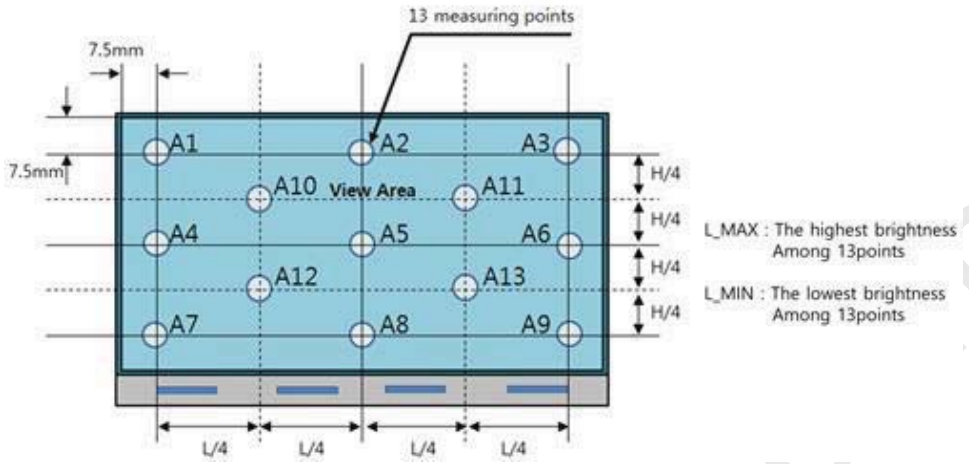
Ta = 25 ± 2 °C, V_{LCD_VCC} =3.3V, fv= 60Hz

Item		Symbol	Temp	Condition	Min.	Typ.	Max.	Unit	Note
Brightness (@OPR50%)			25℃	Normal (White Mode)	396	440	484	cd/m²	(1)
Brightness (@OPR100%)			25℃	Normal (White Mode)	352	400	448	cd/m²	(6)
Uniformity			25℃	Normal (White Mode)	75	85	-	%	(2)
Contrast ratio		K	25℃	Φ=0°,θ=0°		100,000	-	-	(3)
Color of CIE coordinate	White	x	25℃	Φ=0° θ=0°, 440nit(OPR50%)	0.293	0.313	0.333	-	(1),(3),(4),(5)
		y			0.309	0.329	0.349	-	
	Red	x			0.650	0.680	0.710	-	
		y			0.289	0.319	0.349	-	
	Green	x			0.182	0.232	0.282	-	
		y			0.669	0.719	0.769	-	
	Blue	x			0.110	0.140	0.170	-	
		y			0.010	0.044	0.074	-	
Color Gamut			25℃	DCI P3	90	100	-	%	(1), (4), (5)
White Temperature °K			25℃	Φ=0° θ=0°, 440nit(OPR50%)	-	6500	-		(1), (4), (5)
GAMMA			25℃	Φ=0° θ=0°, (OPR10%)	2.0	2.2	2.4	-	(1), (4), (5)
Response Time			25℃	On/Off	-	1	-	ms	(1), (4), (5)
View angle			25℃	Upper/Down/Right/Left Contrast Ratio ≥10	Over 85°				(4)
WAD		Δuv	25℃	Φ=45°	0.025				(5)

NOTE (1)
Brightness follows MicroSoft brightness3 (Based on OPR 50%)
※Only Gamma should be measured @OPR 10%

NOTE (2) Uniformity measuring point

Uniformity = Lmin / Lmax * 100 [%]



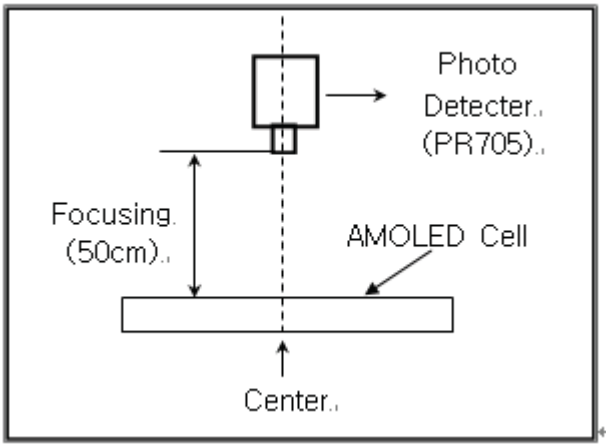
Note (3) Definition of contrast ratio (K)

$$\text{Contrast Ratio(K)} = \frac{\text{Brightness of selected dot (White patterned area) at 440cd/m}^2}{\text{Brightness of non-selected dot (Black patterned area) at 440cd/m}^2}$$

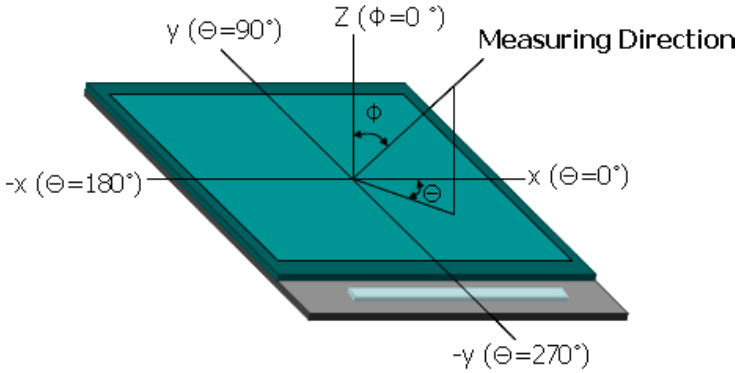
Note (4) Optical measuring system, temperature regulated chamber

external Light : dark state .

Test angle is +80~-80 degrees due to measuring system limitation.



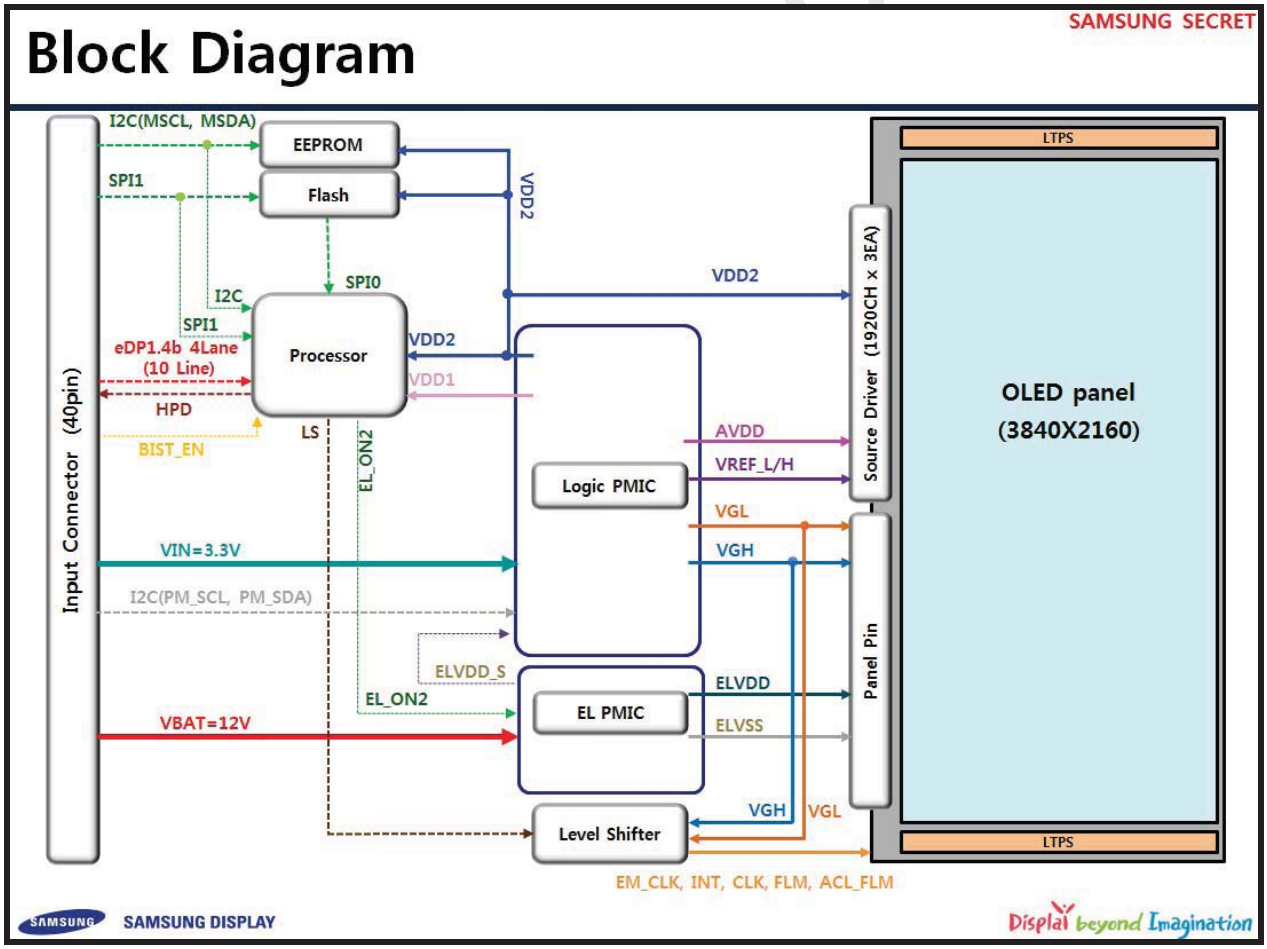
Note (5) Definition of Φ, θ



Note (6)

Full White Luminance 440nit @OPR50% is same as 400nit @OPR100%

4. BLOCK DIAGRAM



5. ELECTRICAL CHARACTERISTICS

5.1 OLED MODULE

(Tamb=-20 to 60℃)

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
System	Analog/ Logic Vol.	VDD_3.3V	-	3.0	3.3	3.6	VDC	
Panel	Analog Vol.	VBAT	-	6.0	-	19.5	VDC	
Input Voltage	H-level	VIH	-	0.7xVDD_1.8	-	VDD_1.8	VDC	
	L-level	VIL	-	Vss	-	0.3xVDD_1.8	VDC	
Output Voltage	H-level	VOH	IOH = -2/4/8/12mA	0.8xVDD_1.8	-	VDD_1.8	VDC	
	L-level	VOL	IOH = -2/4/8/12mA	Vss	-	0.2xVDD_1.8	VDC	
Current	Logic	VDD_3.3V	Full White VDD_3.3V= 3.3V VBAT=10V	472	555	638	mA	(1) (2)
	Panel	IVBAT		565	665	764		
Consumption	Logic	VDD_3.3V		1.56	1.83	2.11	W	(1)
	Panel	PVBAT		5.65	6.65	7.64		
Frame Frequency		fFRM	-	-	60	-	Hz	

Note(1) : VDD_3.3V=3.3(V), Full White pattern. Temperature = 22±3℃ Room Temperature

Note(2) : Measured using SDC Standard Operating Circuit

Current Consumption could be different under customer's DC-DC circuit design.

5.3 eDP INTERFACE

5.3.1 Displayport Main Link Receiver Characteristics

Symbol and Parameter	Test Conditions	Min	Typ	Max	Unit
VRX-DIFFp-p: Differential peak-to-peak input voltage at package pins		100		1320	mV
Maximum adaptive/programmable equalization level at 1.35GHz			9		dB
VRX_DC_CM: Rx input DC common mode voltage			GND		V
RRX-DIFF: Differential termination resistance		80	100	120	Ω
RRX-SE: Single-ended termination resistance		40		60	Ω
IRX_SHORT: Rx short circuit current limit				20	mA

5.3.2 Displayport AUX channel Characteristics

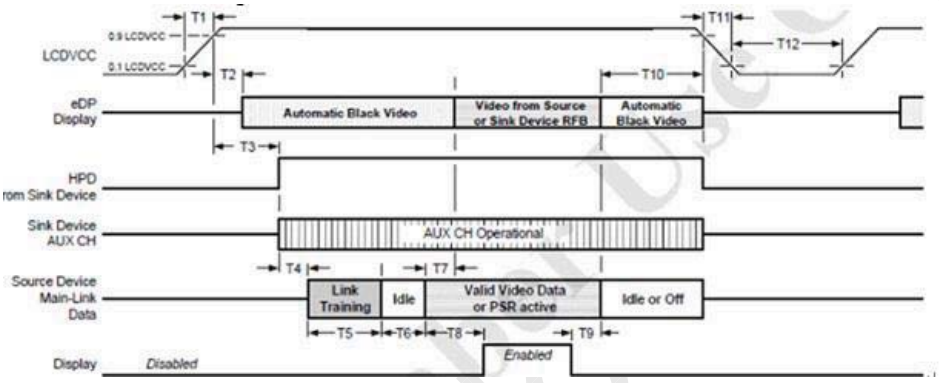
Symbol and Parameter	Test Conditions	Min	Typ	Max	Unit
UI: Unit Interval for AUX channel		0.4	0.5	0.7	μm
VAUX-DIFF-p-p: AUX differential peak-to-peak voltage at TP1 when driving the bus		180	200	800	mV
VAUX-DC-CM-RX: AUX common mode voltage when receiving			GND		V
VAUX-DC-CM-TX: AUX common mode voltage when transmitting			0.3		V
RAUX-DIFF: Differential termination resistance		80	100	120	Ω
RAUX-SE: Single-ended termination resistance		40	50	60	Ω
CAUX: AUX AC coupling capacitor		75		200	nF

5.4 INTERFACE TIMING

5.5.1 TIMING PARAMETERS

Resolution	3840(H) x 2160(V)	
eDP Speed	Typ	5.4 Gbps
Frame Freq.	Typ	60 Hz
Porch	HFP+HBP (with HS)	320
	VFP+VBP (with VS)	32

5.5 POWER ON/OFF SEQUENCE



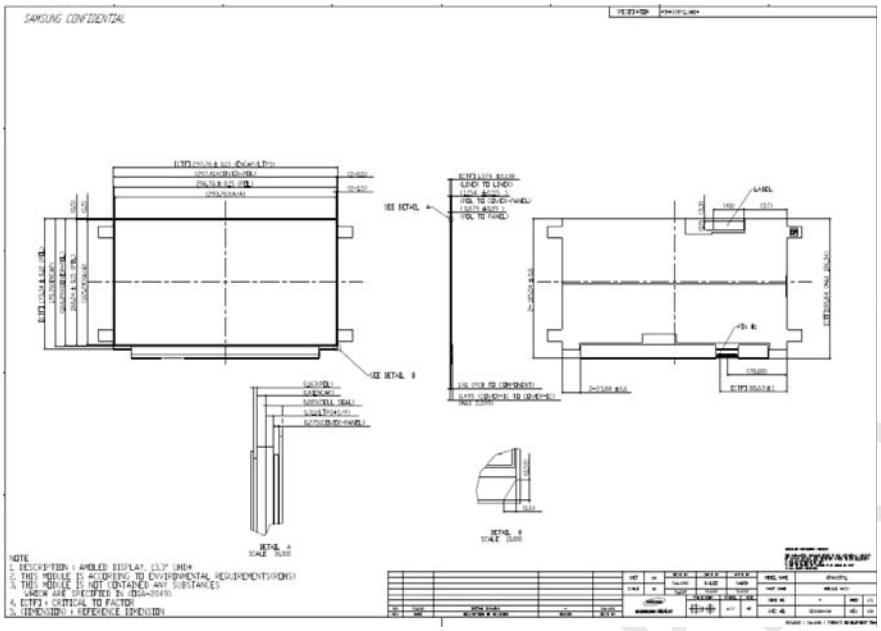
Timing Para.	Description	Min (ms)	Max (ms)	Notes
T1	Power rail rise time, 10% to 90%	0.5	10	
T2	VCC ~ Automatic Black Video	0	200	
T3	VCC ~ HPD high	0	200	
T4	HPD high ~ Link Training initialization	-	200	Control Brightness using 0x0354~0x0357 (Refer to 4.1) Automatic Display On w/ 440nit
T5	Link Training			
T6	Link idle / Tcon Ready			
T7	Valid Video Delay (or PSR active) from source to display	0	50	
T8	Valid Video ~ Display On	-	-	< Display On CMD > Intel : Automatic Sequence
T9	Display Off ~ Automatic Black Video	-	-	< Display Off CMD > Intel : 0x0600 = 0x02
T10	Automatic Black Video ~ Power Off	67	500	
T11	Power rail fall time, 90% to 10%	-	10	
T12	Power Off Time	500	-	

5.6 INPUT TERMINAL PIN ASSIGNMENT

5.6.1 INPUT SIGNAL (eDP, Connector : IPEX 20455-040E-0 Locking type)

Pin No.	Signal name	Description
1	NC (HSYNC)	Do not used. Test pin for display.
2	H_GND	eDP signal ground
3	DP_3N	eDP negative signal Lane3
4	DP_3P	eDP positive signal Lane3
5	H_GND	eDP signal ground
6	DP_2N	eDP negative signal Lane2
7	DP_2P	eDP positive signal Lane2
8	H_GND	eDP signal ground
9	DP_1N	eDP negative signal Lane1
10	DP_1P	eDP positive signal Lane1
11	H_GND	eDP signal ground
12	DP_0N	eDP negative signal Lane0
13	DP_0P	eDP positive signal Lane0
14	H_GND	eDP signal ground
15	AUX_P	eDP AUX positive signal
16	AUX_N	eDP AUX negative signal
17	H_GND	eDP signal ground
18	LOGIC_GND	Logic and driver ground
19	LOGIC_GND	Logic and driver ground
20	LOGIC_GND	Logic and driver ground
21	BIST_EN	BIST enable signal(3.3V)
22	VCC_3.3V	Logic and driver power
23	VCC_3.3V	Logic and driver power
24	VCC_3.3V	Logic and driver power
25	HPD	HPD signal
26	EL_GND	EL ground
27	EL_GND	EL ground
28	NC	NC
29	VBAT	Power for EL PMIC
30	VBAT	Power for EL PMIC
31	VBAT	Power for EL PMIC
32	NC (EEP_WP)	Do not used. Test pin for display.
33	NC (MSCL)	Do not used. Test pin for display.
34	NC (MSDA)	Do not used. Test pin for display.
35	NC (SPI_CK1)	Do not used. Test pin for display.
36	NC (SPI_CS1)	Do not used. Test pin for display.
37	NC (SPI_DO1)	Do not used. Test pin for display.
38	NC (SPI_DI1)	Do not used. Test pin for display.
39	NC (PM_SCL)	Do not used. Test pin for display.
40	NC (PM_SDA)	Do not used. Test pin for display.

6. OUTLINE DIMENSION



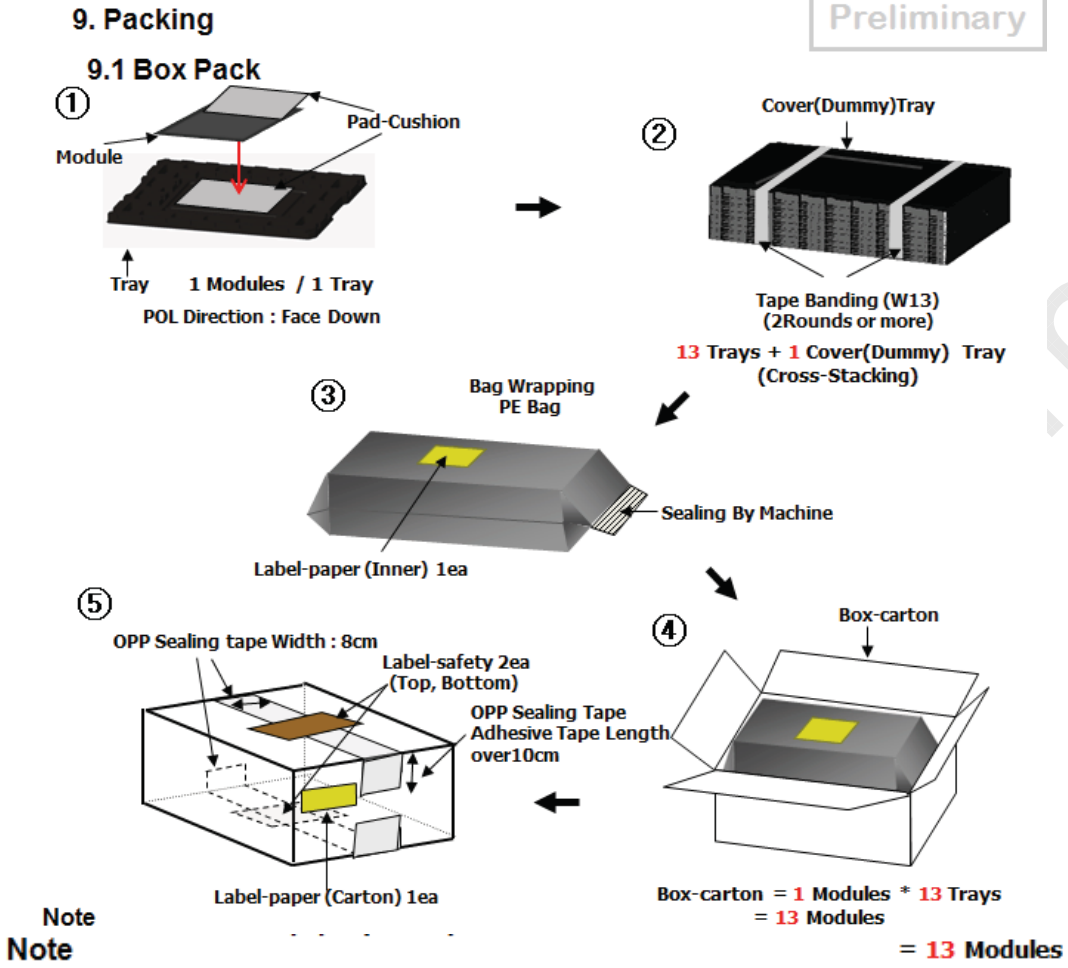
7. RELIABILITY TEST

Item		Condition	Time/Cycle
HTOL		70 ℃	240 hrs
LTOL		-20 ℃	240 hrs
HTS		85 ℃	240 hrs
LTS		-40 ℃	240 hrs
THB		60 ℃ / 93%	240 hrs
UHAST		60 ℃ / 85%	240 hrs
T/C		-40 ℃ / 85℃	100 cycles
ESD	Non Operating	Contact : ±8kV,150pF, 330Ω, Front 13point	once/point
		Air(non-contact) : ±10kV, 150pF, 330Ω, Front 13point	once/point
Box Vibration (Non-operating)		1.047Grms, 6~200Hz, X/Y/Z 1Hr	1time
Box Drop (Non-operation)		76cm, 1 corner, 3edge, 6side	1time
Charpy (Cell level)		8°	1time
Cell Gap (Cell level)		Active area, 70kgf, 9point	1time
Mount peel off Test (Cell level)		B10 ≥5.5kgf	1time
Image Sticking		ΔL<3.5% (Macbeth pattern, Max Lum, Ambient : ~25℃, Panel : ~45℃,)	3000Hr

[Result Evaluation Criteria]

Under the display quality test conditions with normal operation state, these should be no change which may affect practical display functions.

8. PACKING



Note

(1) Total :Box-carton approx. : 10kg

(2) Size : 583(L) x 388(W) x 210(H)

(3) Place the Module in the tray facing the active area direction.

(4) Stack the trays and cover (dummy) tray.

(5) Resistance of tray surface : 10^6~$10^9\Omega$

(6) Triboelectric Charge of tray surface : Max 100V

(Measurement condition : 22±3℃/50±5%, measure on antistatic mats)

(7) Wrap the PE bag by packing machine and affix the Label-Paper on Bag.

(8) Put the bag in the Box-carton .

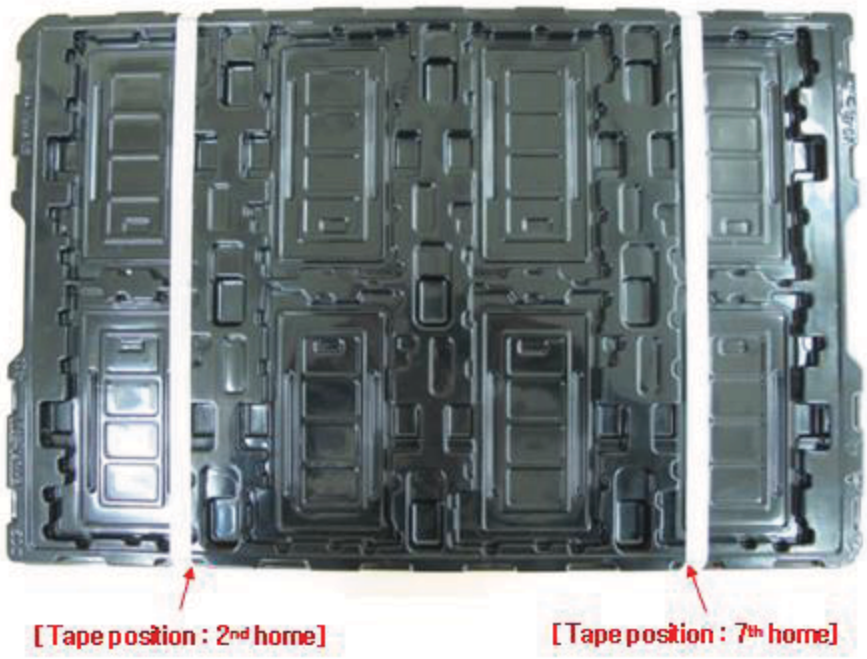
(9) Seal the Box-carton and affix the Label-safety & Label-paper.

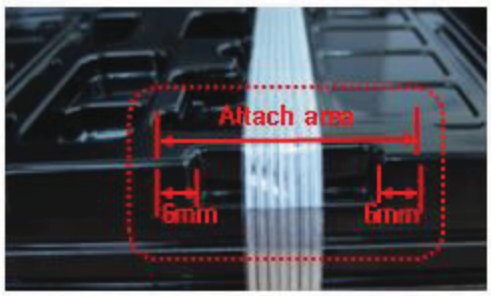
8.1 Box Pack

Tray Tape bending Spec

(1) Tape Bending Locations are 2nd and 7th home

(2) Wrap tape more than 2times when bending





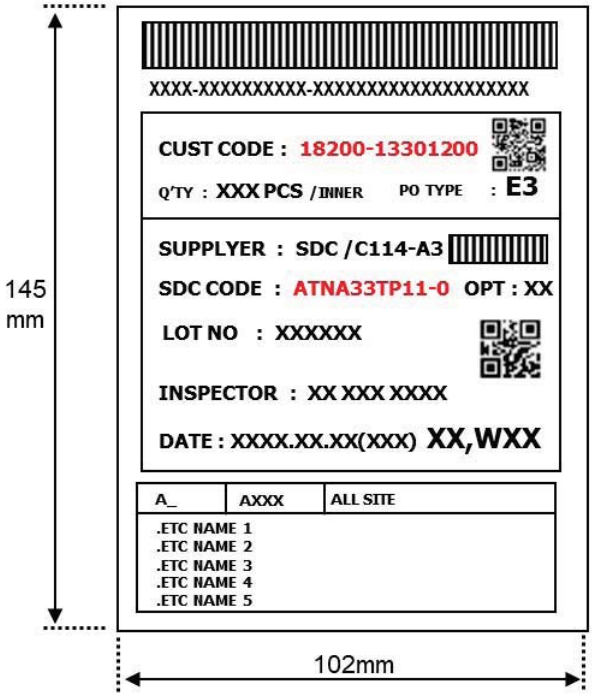
[TAPE Attach area]

8.2 LABEL

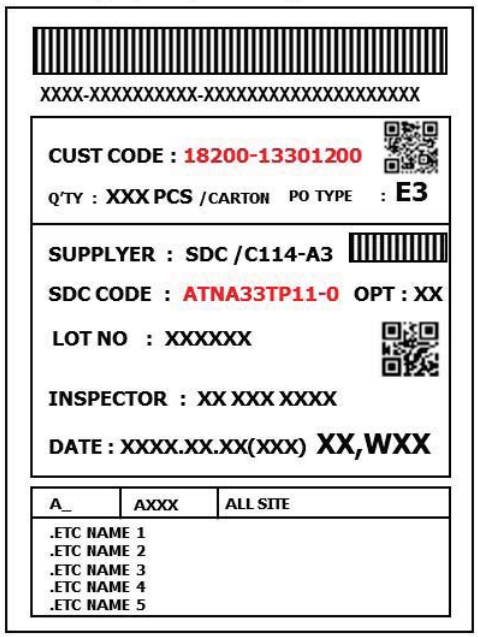
8.2.1 Product Label

8.2.2 Packing Box Label

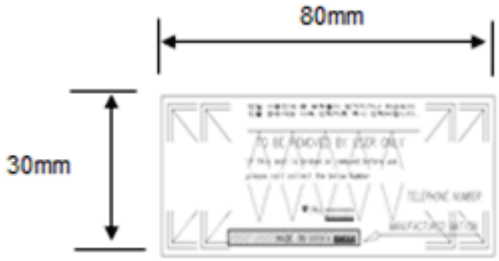
* Label-paper (Inner)



* Label-paper (Carton)

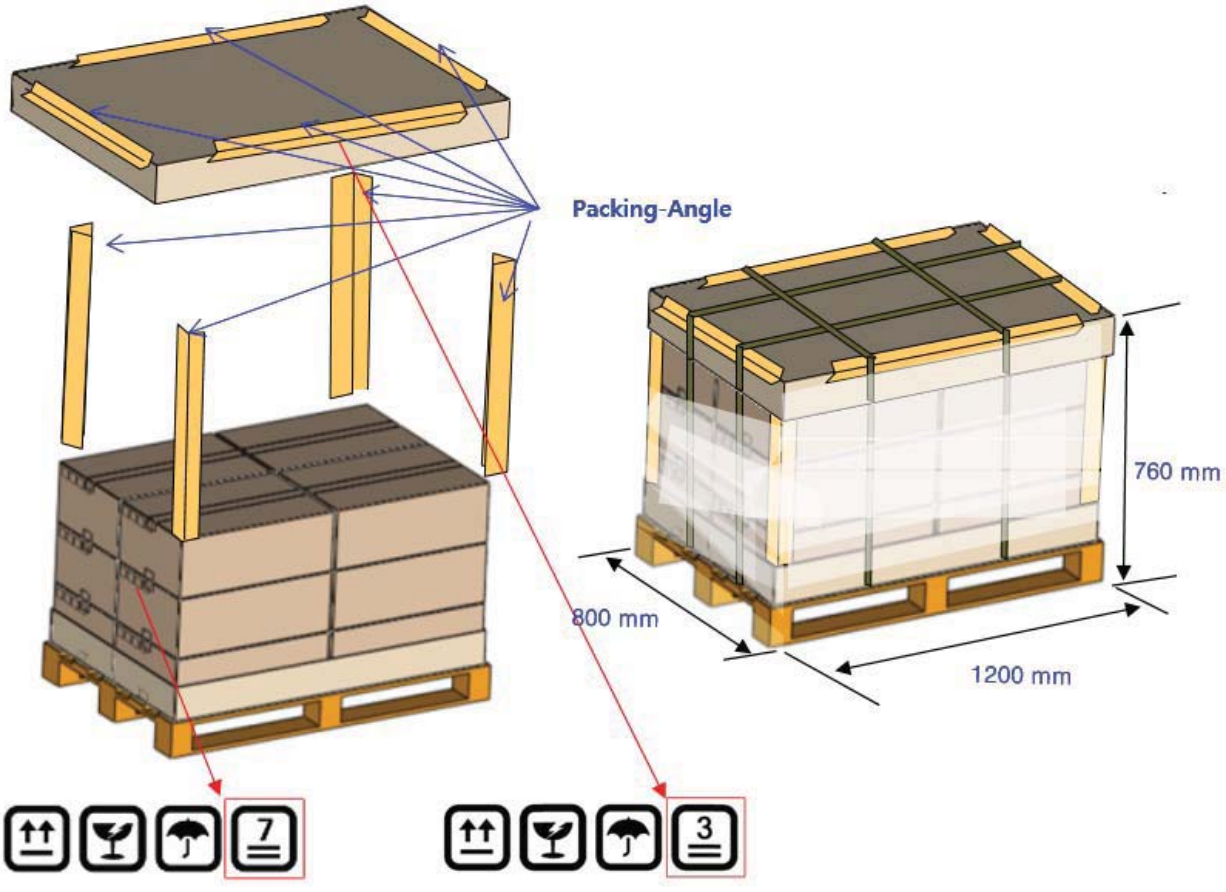


* Label-safety



8.3 OVER PACK

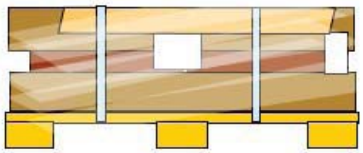
- Over Pack Attach



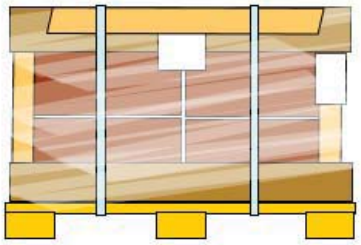
[Carton-box level : up to 7 stage load]

[Pallet level : up to 3 stage load]

※ Packing spec. for small quantities

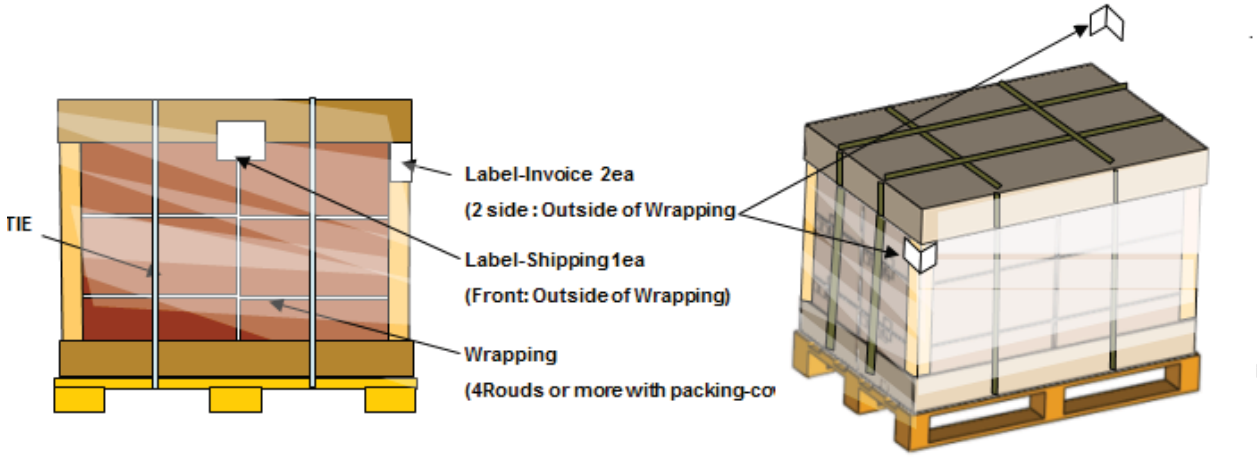


1 step
[Carton Box : 1~4 Box]

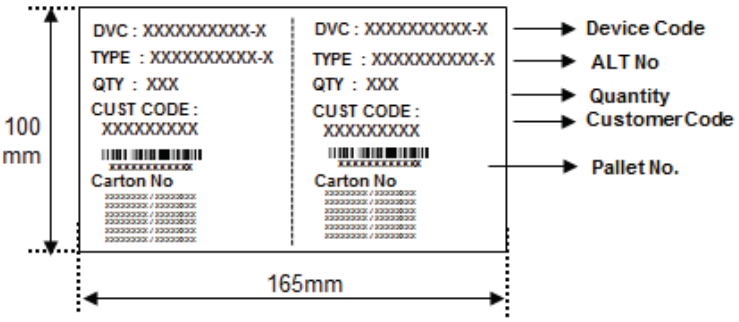


2 step
[Carton Box : 5~8 Box]

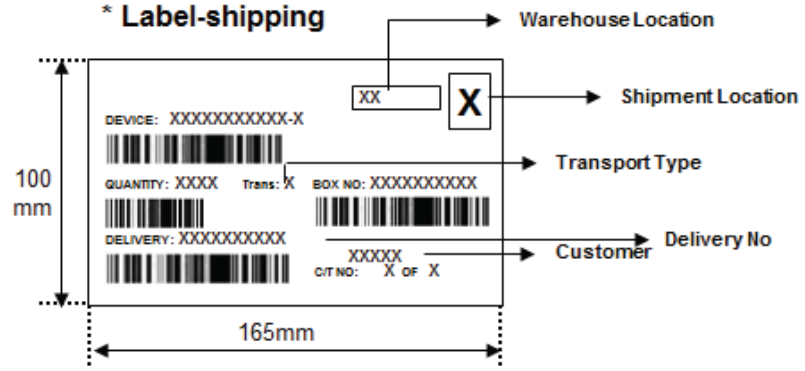
-. Small Quantities (1step ,2 step) must stack on the Top.



* Label-invoice



* Label-shipping



* Reference Image (Except Label and Wrap)

Carton Box		
Pallet		

Caution

For keeping Safe quality from outer exposure or contamination, modules should be consumed with in 2 months after unpacking.

8.4 MODULE Picture

< Front Side >

< Rear Side >

9. GENERAL PRECAUTIONS

9.1 Mounting Method

The AMOLED Panel of SAMSUNG Display CO.,LTD. module consists of two slim glasses with polarizer which can easily get damaged. Since the module is constructed as to be fixed by utilizing fitting holes in the printed circuit board. Extreme care should be used when handling the AMOLED modules.

9.2 Caution of AMOLED Handling and Cleaning

When cleaning the display surface, use soft cloth solvent as recommended below and wipe gently.

◎ Isopropyl alcohol
◎ Ethyl alcohol
◎ Trichlorotriflorothane

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.
Do not use the following solvent.

◎ Water
◎ Ketone
◎ Aromatics

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns.
Do not use the following solvent on the pad and prevent it from being contaminated.

◎ HCFC
◎ Soldering flux
◎ Chlorine(Cl), Sulfur(S)
◎ Spittle, Fingerprint

If the product is not wrapped with a desiccant added pad, ITO pattern can be damaged by corrosion. SAMSUNG Display CO,.LTD. suggests wrapping a product with a desiccant unless customers particularly indicate that they do not want it. In case ITO pattern corrodes due to the usage of chlorine, sulfur or customer's mishandling of the product, the responsibility lies with the customer.

9.3 Caution Against Static Charge

For AMOLED module, use C-MOS LSI drivers, therefore we recommend that you ;
Connect any unused input terminal to VDD or VSS, do not input any signals before power is turned on, and ground your body, work/assembly areas, assembly equipment to protect against static electricity. It could occur static electricity when taping off the film which protects AMOLED.
Against static charge, you should make sure that the product is safe or not by experiment in advance.

9.4 Packing

◎ The packing principle is that AMOLED module should keep its packing condition at the time of delivery. When storing the AMOLED after unpacking, note the followings.
◎ AMOLED module is consisted of GLASS and assemblies. It should avoid pressure, strong impact, and being dropped from a height.
◎ To prevent modules from degradation, do not operate or store them in a place where they are directly exposed to sunlight or high temperature/humidity.

9.5 Caution for Operation

◎ If you do not follow normal POWER ON , OFF sequence or abnormal operating, then AMOLED module can be damaged Electro-optically and does not recover.
◎ Response time may extremely delay at a temperature lower than operating range, AMOLED does not normally operate at a high temperature. But this may recover at a proper temperature.
◎ When you set optimal operating voltage to AMOLED module, you can see the optimal contrast of AMOLED. So, add voltage controllable function at SET Module.
◎ AMOLED module may not display normally when twisting power or pressing power is added. Therefore you should secure AMOLED module maximum thickness at set assembly not to have any pressure affect AMOLED module.
◎ Electro-chemical reaction may occur when there is humidity on pad, therefore, you should use AMOLED Module below maximum operating humidity.
◎ AMOLED Module Power Vdd should be designed to protect surge current at SET Module.
◎ You should not damage connector and cable for AMOLED module assembly by force folding or by applying extreme power.
◎ AMOLED may not display normally when it is interfered by surrounding elements, therefore you should consider setting design not to damage AMOLED module by surrounding elements.
◎ To satisfy EMI standards, you should plan your design after considering emitting energy.
◎ We cannot guarantee display characteristics outside viewing area, therefore your set window should be fixed into viewing area.
◎ Image-sticking may occur if AMOLED displays same image for a long time, so you need to make a pattern change for AMOLED.,

9.6 Storage

◎ Place in a dark place where neither exposure to direct sunlight or any fluorescent light is permitted and keep at room temperature & room humidity.
◎ Store with no contact with polarizer surface.
It is recommended to store them as they have been contained in the inner container when we delivered them.

9.7 Safety Precautions

◎ Disassembly or modification may cause electric shock, damages to sensitive part inside of the AMOLED module, dust adhesion, or scratches on the display part.
◎ In the event that the contents of AMOLED module are on skin, wipe them with a paper towel or gauge and wash the part well, and receive medical attention if necessary.
◎ Do not use the AMOLED module for the Special purpose besides display units.
◎ Be careful of the glass chips that may cause injury to fingers of skin, when the display part is broken.

9.8 Precautions before Use

You should discuss the following case with SAMSUNG Display CO.,LTD.
◎ in case of any questions about contents of this "Specification For Approval".
◎ in case of occurring new problems not mentioned at this "Specification For Approval".
◎ in case of your request about income inspection Specification change.
◎ in case of occurring new problem at your driving test.

※ If SDC has to change the conditions Specified in the Specification, previously the negotiation shall be held and decided.

10. Warranty

Basically, warranty term is 18months of reliability characteristics of quality level after the arrival date in customer and supplier should compensate for defectives which happens within warranty term under condition that the products should be stored or be used as specified under normal condition within the contents of specification.
And after 18months of warranty term, all replacements for defectives will be charged.

11. COSMETIC (Inspection Specification)

- Inspection Condition

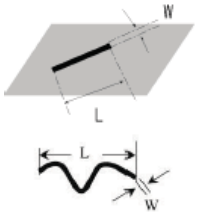
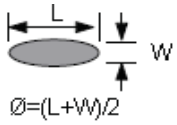
. Viewing distance : 35~60 cm

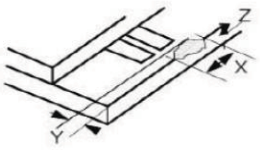
. Ambient luminance : Function :150~200 Lux / Appearance : 800 ± 200 Lux

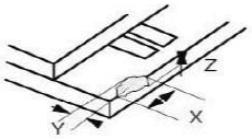
. Viewing angle: 90° ± 30°(Up/Down/Left/Right), Judged by right angle (90deg) to the OLED module surface

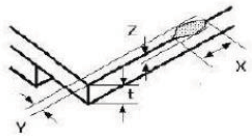
. All Items are inspected with Polarizer Protect Film

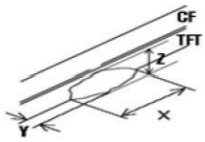
① Display (Visual Defect & Cosmetic Defect)

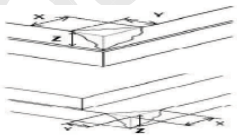
<table>
<tr><th>No.</th><th>Item</th><th>Criterion for Defect</th><th>Defect Type</th></tr>
<tr><td>1</td><td>No Display</td><td>Disallowance</td><td>Major</td></tr>
<tr><td>2</td><td>Irregular Display</td><td>Disallowance</td><td>Major</td></tr>
<tr><td>3</td><td>Line Defect</td><td>Disallowance (Vertical line / Horizontal line / Periodical line)</td><td>Major</td></tr>
<tr><td>4</td><td>Dot Defect</td><td>
<table>
<tr><th colspan="2">Acceptable number</th></tr>
<tr><th>Dark Dot</th><th>Bright Dot</th></tr>
<tr><td>5</td><td>0</td></tr>
</table>
- Dark dot number should be counted on R,G,B pattern.
- 2 adjacent dark dot : n ≤ 1
- Dark dot G-G or R-R : Distance ≥ 20mm
Other case : No distance limitation
</td><td>Minor</td></tr>
<tr><td>5</td><td>Scratch/
Line type Defect
(Pol)
 
</td><td>
<table>
<tr><th>Width (㎜)</th><th>Length (㎜)</th><th>Acceptable number</th></tr>
<tr><td>W<0.05</td><td>Ignore</td><td>Ignore</td></tr>
<tr><td>0.05≤W<0.1</td><td>0.3≤L≤3.0</td><td>4</td></tr>
<tr><td colspan="2">0.1≤W or 3.0<L</td><td>0</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>6</td><td>Circle type Defect
(Pol)
 
</td><td>
<table>
<tr><th>Size Ø (mm)</th><th>Acceptable number</th></tr>
<tr><td>Ø < 0.2</td><td>Ignore</td></tr>
<tr><td>0.2 ≤ Ø < 0.5</td><td>5</td></tr>
<tr><td>0.5≤Ø</td><td>0</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>7</td><td>Color Difference(@127)</td><td>If needed, judged by limit samples</td><td>Minor</td></tr>
</table>

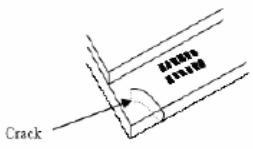
<table>
<tr><td>8</td><td>Color Difference(@255)</td><td></td><td>Minor</td></tr>
<tr><td>9</td><td>ELA Line stain</td><td rowspan="2">If needed, judged by limit samples @ 127/255 gray level</td><td>Minor</td></tr>
<tr><td>10</td><td>Random Mura</td><td>Minor</td></tr>
<tr><td>11</td><td>Panel Chipping
(Pattern Area)</td><td> 

<table>
<tr><th>Z</th><th>X</th><th>Y</th></tr>
<tr><td><0.4mm</td><td>≤5.0mm</td><td>≤0.4mm</td></tr>
</table></td><td>Minor</td></tr>
<tr><td>12</td><td>Panel Chipping
(No Pattern Area)</td><td> 

<table>
<tr><th>Z</th><th>X</th><th>Y</th></tr>
<tr><td><0.4mm</td><td>≤5.0mm</td><td>≤0.6mm</td></tr>
</table></td><td>Minor</td></tr>
<tr><td>13</td><td>Panel Chipping
(Rear side of Pattern Area)</td><td> 

<table>
<tr><th>Z</th><th>X</th><th>Y</th></tr>
<tr><td><0.4mm</td><td>≤5.0mm</td><td>≤0.5mm</td></tr>
</table></td><td>Minor</td></tr>
<tr><td>14</td><td>Panel Chipping
(Side area)</td><td> 

<table>
<tr><th>Z</th><th>X</th><th>Y</th></tr>
<tr><td><0.4mm</td><td>≤3.0mm</td><td>≤0.4mm</td></tr>
</table></td><td>Minor</td></tr>
<tr><td>15</td><td>Panel Chipping
(Corner)</td><td> 

<table>
<tr><th>Area</th><th>Z</th><th>X</th><th>Y</th></tr>
<tr><td>No pad area</td><td><0.4mm</td><td>≤1.0mm</td><td>≤1.0mm</td></tr>
<tr><td>Pad area</td><td><0.4mm</td><td>≤2.0mm</td><td>≤1.2mm</td></tr>
</table></td><td>Minor</td></tr>
<tr><td>16</td><td>Panel Crack</td><td> 

Disallowance</td><td>Minor</td></tr>
</table>

17	Surface Contamination & Foreign material	Ignore if defect is removable by soft cloth or, blower and brush or etc.	Minor
18	Cover PNL (Bubble, Dent, Foreign material, Protrusion, Wrinkle, etc.)	Ignore if defect is not visible on the front side.	Minor
19	Polarizer & Cover Panel Protect Film	Ignore. Bubble, Dent, Foreign material, Protrusion, Wrinkle, etc.	Minor
20	Cover IC tape appearance	Ignore if tape appearance has wrinkle or bubble (Except for tear) Tape has to cover a source IC & PCB and contact a Cover panel. (Do Not exceed POL upper & PCB area)	Minor

12.EDID_VER 200803

This cell color is fill in data for LCD Supplier. **Please input two words for Hex value.**
This cell color is auto Calculation.
This cell color is Fixed data.
This cell color is Blank data.

Samsung Display Co., Ltd.
ATNA33TP11
200803

Byte# (Dec)	Byte# (Hex)	Field Name and Comments	Value (Hex)	Value (Dec)	Value (Binary)	Remarks (Can not edit cell by protected)	Remarks (Free space)
0	00	Header	00	0	00000000		
1	01		FF	255	11111111		
2	02		FF	255	11111111		
3	03		FF	255	11111111		
4	04		FF	255	11111111		
5	05		FF	255	11111111		
6	06		FF	255	11111111		
7	07		00	0	00000000		
8	08	ID Manufacturer Name	4C	76	01001100	SDC	
9	09		83	131	10000011		
10	0A	ID Product Code	47	71	01000111		
11	0B		41	65	01000001		
12	0C	ID Serial Number (32-bit serial number)	00	0	00000000	# 0	
13	0D		00	0	00000000		
14	0E		00	0	00000000		
15	0F		00	0	00000000		
16	10	Manufacture week (1-53) & Model year Flag (FFh)	26	38	00100110	38	
17	11	Manufacture or Model year (year -1990)	1D	29	00011101	2019	
18	12	EDID Structure version	01	1	00000001	1.4	
19	13	EDID Revision	04	4	00000100		
20	14	Video Input Definition	B5	181	10110101	Digital, 10 Bits per Primary Color, DisplayPort	
21	15	H screen size (cm) or Aspect Ratio	1D	29	00011101	29cm	
22	16	V screen size (cm) or Aspect Ratio	11	17	00010001	17cm	
23	17	Display gamma (gamma x 100)-100	78	120	01111000	2.20	
24	18	Feature support(DPMS)	02	2	00000010	Standby Mode is not supported. Suspend Mode is not supported. Active Off = Very Low Power is not supported. RGB 4:4:4. sRGB is not default. Preferred Timing is native. Point scan Display.	
25	19	Red/Green Low Bits	38	56	00111000	Gamut 107.1 %	
26	1A	Blue/White Low Bits	D1	209	11010001		
27	1B	Red x	AE	174	10101110	0.680	
28	1C	Red y	51	81	01010001	0.319	
29	1D	Green x	3B	59	00111011	0.232	
30	1E	Green y	B8	184	10111000	0.719	
31	1F	Blue x	23	35	00100011	0.140	
32	20	Blue y	0B	11	00001011	0.044	
33	21	White x	50	80	01010000	0.313	
34	22	White y	54	84	01010100	0.329	
35	23	Established Timing 1	00	0	00000000		
36	24	Established Timing 2	00	0	00000000		
37	25	Manufacturer's Timings	00	0	00000000		
38	26	Standard Timing Identification #1	01	1	00000001	Unused	
39	27		01	1	00000001	Unused	
40	28	Standard Timing Identification #2	01	1	00000001	Unused	
41	29		01	1	00000001	Unused	
42	2A	Standard Timing Identification #3	01	1	00000001	Unused	
43	2B		01	1	00000001	Unused	
44	2C	Standard Timing Identification #4	01	1	00000001	Unused	
45	2D		01	1	00000001	Unused	

46	2E	Standard Timing Identification #5	01	1	00000001	Unused	
47	2F		01	1	00000001	Unused	
48	30	Standard Timing Identification #6	01	1	00000001	Unused	
49	31		01	1	00000001	Unused	
50	32	Standard Timing Identification #7	01	1	00000001	Unused	
51	33		01	1	00000001	Unused	
52	34	Standard Timing Identification #8	01	1	00000001	Unused	
53	35		01	1	00000001	Unused	
54	36	Pixel Clock/10,000 (LSB)	B9	185	10111001	547.13MHz	
55	37	Pixel Clock/10,000 (MSB) /	D5	213	11010101	(FV 60.00 Hz, FH 131.52 kHz)	
56	38	Horizontal Active	00	0	00000000	3840 pixels	
57	39	Horizontal Blanking	40	64	01000000	320 pixels	
58	3A	Horizontal Active : Horizontal Blanking	F1	241	11110001	(Hbp= 240 pixels)	
59	3B	Vertical Active	70	112	01110000	2160 lines	
60	3C	Vertical Blanking	20	32	00100000	32 lines	
61	3D	Vertical Active : Vertical Blanking	80	128	10000000	(Vbp= 16 lines)	
62	3E	Horizontal Sync. Offset	30	48	00110000	48 pixels	
63	3F	Horizontal Sync Pulse Width	20	32	00100000	32 pixels	
64	40	Vertical Sync Offset : Sync Width	88	136	10001000	8 lines / 8 lines	
65	41	Horizontal Vertical Sync Offset/Width	00	0	00000000		
66	42	Horizontal Image Size	26	38	00100110	294 mm	
67	43	Vertical Image Size	A5	165	10100101	165 mm	
68	44	Horizontal & Vertical Image Size	10	16	00010000		
69	45	Horizontal Border	00	0	00000000	0 pixels	
70	46	Vertical Border	00	0	00000000	0 lines	
71	47	Flags	1B	27	00011011	Non-interlaced , Normal display, no stereo , Digital separate , Vertical Polarity Negative , Horizontal Polarity Positive	
72	48	Pixel Clock/10,000 (LSB) (Slow Refresh rate)	B9	185	10111001	547.13MHz	
73	49	Pixel Clock/10,000 (MSB) / (Slow Refresh rate)	D5	213	11010101	(FV 60.00 Hz, FH 131.52 kHz)	
74	4A	Horizontal Active	00	0	00000000	3840 pixels	
75	4B	Horizontal Blanking	40	64	01000000	320 pixels	
76	4C	Horizontal Active : Horizontal Blanking	F1	241	11110001	(Hbp= 240 pixels)	
77	4D	Vertical Active	70	112	01110000	2160 lines	
78	4E	Vertical Blanking	20	32	00100000	32 lines	
79	4F	Vertical Active : Vertical Blanking	80	128	10000000	(Vbp= 16 lines)	
80	50	Horizontal Sync. Offset	30	48	00110000	48 pixels	
81	51	Horizontal Sync Pulse Width	20	32	00100000	32 pixels	
82	52	Vertical Sync Offset : Sync Width	88	136	10001000	8 lines / 8 lines	
83	53	Horizontal Vertical Sync Offset/Width	00	0	00000000		
84	54	Horizontal Image Size	26	38	00100110	294 mm	
85	55	Vertical Image Size	A5	165	10100101	165 mm	
86	56	Horizontal & Vertical Image Size	10	16	00010000		
87	57	Horizontal Border	00	0	00000000	0 pixels	
88	58	Vertical Border	00	0	00000000	0 lines	
89	59	Flags	1B	27	00011011	Non-interlaced , Normal display, no stereo , , Vertical Polarity Negative , Horizontal Polarity Positive	
90	5A	Flag	00	0	00000000		
91	5B	Flag	00	0	00000000		
92	5C	Flag	00	0	00000000		
93	5D	Data Type Tag	0F	15	00001111	Description defined by manufacture	
94	5E	Flag	00	0	00000000		
95	5F	(Horizontal active pixel /8)-31	FF	255	11111111	2288 pixel	
96	60	Image Aspect Ratio	09	9	00001001	16 : 9	
97	61	Middle Refresh Rate	3C	60	00111100	60 Hz	
98	62	(Horizontal active pixel /8)-31	FF	255	11111111	2288 pixel	

99	63	Image Aspect Ratio	09	9	00001001	16 : 9	
100	64	Low Refresh Rate	3C	60	00111100	60 Hz	
101	65	Brightness(1/10nit)	2C	44	00101100	440 nit	
102	66	Feature flag	80	128	10000000	Privacy Gurard Display	
103	67	Reserved	00	0	00000000		
104	68	LCD Supplier manufacture Code(3 character ID)	00	0	00000000	#N/A	
105	69		00	0	00000000		
106	6A	LCD Supplier Product code	00	0	00000000		
107	6B	LCD Supplier Product code	00	0	00000000		
108	6C	Flag	00	0	00000000		
109	6D	Flag	00	0	00000000		
110	6E	Flag	00	0	00000000		
111	6F	Data Type Tag	FE	254	11111110	ASCII String	
112	70	Flag	00	0	00000000		
113	71	FW Rev.	41	65	01000001	[A]	
114	72	Mass Product Flag	54	84	01010100	[T]	
115	73	Model Name	4E	78	01001110	[N]	
116	74	Model Name	41	65	01000001	[A]	
117	75	Model Name	33	51	00110011	[3]	
118	76	Model Name	33	51	00110011	[3]	
119	77	Model Name	54	84	01010100	[T]	
120	78	Model Name	50	80	01010000	[P]	
121	79	Model Name	31	49	00110001	[1]	
122	7A	Model Name	31	49	00110001	[1]	
123	7B	Model Name	2D	45	00101101	[-]	
124	7C	Model Name	31	49	00110001	[1]	
125	7D	Model Name	20	32	00100000	[ ]	
126	7E	Extension flag	01	1	00000001	Extention EDID	
127	7F	Checksum	A3	163	10100011		
127	**7F**	**Checksum (Auto calc from 00h - 7Eh)**	**A3**	163	10100011		

Extension Data for HDR

128	80	Tag	02	2	00000010		
129	81	Revision Number	03	3	00000011		
130	82	Length of Info Frame	0F	15	00001111		
131	83	Global Declarations	00	0	00000000		
132	84	Tag Code [7:5], Length of data [4:0]	E3	227	11100011	Colorimetry Data Block , 3 Byte	
133	85	Extended Tag Code	05	5	00000101	Colorimetry Data Block	
134	86	Colorimetry Support Flags	80	128	10000000	BT2020RGB	
135	87	Colorimetry Metadata Support Flags	00	0	00000000		
136	88	Tag Code [7:5], Length of data [4:0]	E6	230	11100110	Colorimetry Data Block , 6 Byte	
137	89	Extended Tag Code	06	6	00000110	HDR Static Metadata Data Block	
138	8A	Supported Electro-Optical Transfer Function	05	5	00000101	Traditional gamma SDR, SMPTE ST 2084 [2],	
139	8B	SM_0 =1: Static Metadata Type 1	01	1	00000001	Static Metadata Type 1,	
140	8C	Desired Content Max Luminance data	73	115	01110011	603.67 nit	
141	8D	Desired Content Max Frame-average Luminance data	6D	109	01101101	530.09 nit	
142	8E	Desired Content Min Luminance data	07	7	00000111	0.0046 nit	
143	8F		00	0	00000000		
144	90		00	0	00000000		
145	91		00	0	00000000		
146	92		00	0	00000000		
147	93		00	0	00000000		
148	94		00	0	00000000		
149	95		00	0	00000000		
150	96		00	0	00000000		

151	97		00	0	00000000		
152	98		00	0	00000000		
153	99		00	0	00000000		
154	9A		00	0	00000000		
155	9B		00	0	00000000		
156	9C		00	0	00000000		
157	9D		00	0	00000000		
158	9E		00	0	00000000		
159	9F		00	0	00000000		
160	A0		00	0	00000000		
161	A1		00	0	00000000		
162	A2		00	0	00000000		
163	A3		00	0	00000000		
164	A4		00	0	00000000		
165	A5		00	0	00000000		
166	A6		00	0	00000000		
167	A7		00	0	00000000		
168	A8		00	0	00000000		
169	A9		00	0	00000000		
170	AA		00	0	00000000		
171	AB		00	0	00000000		
172	AC		00	0	00000000		
173	AD		00	0	00000000		
174	AE		00	0	00000000		
175	AF		00	0	00000000		
176	B0		00	0	00000000		
177	B1		00	0	00000000		
178	B2		00	0	00000000		
179	B3		00	0	00000000		
180	B4		00	0	00000000		
181	B5		00	0	00000000		
182	B6		00	0	00000000		
183	B7		00	0	00000000		
184	B8		00	0	00000000		
185	B9		00	0	00000000		
186	BA		00	0	00000000		
187	BB		00	0	00000000		
188	BC		00	0	00000000		
189	BD		00	0	00000000		
190	BE		00	0	00000000		
191	BF		00	0	00000000		
192	C0		00	0	00000000		
193	C1		00	0	00000000		
194	C2		00	0	00000000		
195	C3		00	0	00000000		
196	C4		00	0	00000000		
197	C5		00	0	00000000		
198	C6		00	0	00000000		
199	C7		00	0	00000000		
200	C8		00	0	00000000		
201	C9		00	0	00000000		
202	CA		00	0	00000000		
203	CB		00	0	00000000		
204	CC		00	0	00000000		
205	CD		00	0	00000000		
206	CE		00	0	00000000		

207	CF		00	0	00000000		
208	D0		00	0	00000000		
209	D1		00	0	00000000		
210	D2		00	0	00000000		
211	D3		00	0	00000000		
212	D4		00	0	00000000		
213	D5		00	0	00000000		
214	D6		00	0	00000000		
215	D7		00	0	00000000		
216	D8		00	0	00000000		
217	D9		00	0	00000000		
218	DA		00	0	00000000		
219	DB		00	0	00000000		
220	DC		00	0	00000000		
221	DD		00	0	00000000		
222	DE		00	0	00000000		
223	DF		00	0	00000000		
224	E0		00	0	00000000		
225	E1		00	0	00000000		
226	E2		00	0	00000000		
227	E3		00	0	00000000		
228	E4		00	0	00000000		
229	E5		00	0	00000000		
230	E6		00	0	00000000		
231	E7		00	0	00000000		
232	E8		00	0	00000000		
233	E9		00	0	00000000		
234	EA		00	0	00000000		
235	EB		00	0	00000000		
236	EC		00	0	00000000		
237	ED		00	0	00000000		
238	EE		00	0	00000000		
239	EF		00	0	00000000		
240	F0		00	0	00000000		
241	F1		00	0	00000000		
242	F2		00	0	00000000		
243	F3		00	0	00000000		
244	F4		00	0	00000000		
245	F5		00	0	00000000		
246	F6		00	0	00000000		
247	F7		00	0	00000000		
248	F8		00	0	00000000		
249	F9		00	0	00000000		
250	FA		00	0	00000000		
251	FB		00	0	00000000		
252	FC		00	0	00000000		
253	FD		00	0	00000000		
254	FE		00	0	00000000		
255	FF	Checksum	AB	171	10101011		
255	**FF**	**Checksum (Auto calc from 80h - 7Eh)**	**AB**	171	10101011		