

電容觸控式螢幕規格承認書  
Capacitive Touch Panel Specification

品名 Product Name	21.5 寸電容式觸控式螢幕
機種名 Product Model	GT-CTP-Y215A-1
客戶名稱 Customer Name	
製造商 Manufacturers	深圳市格林兴显示科技有限公司
版本號 Revision No	Ver. 1.0
日期 Date	2017-11-08

ATC 製作 Edit		客戶研發確認 Customer R&D Approve	
ATC 檢查 Check		客戶品管確認 Customer QC Approve	
ATC 審核 Approve		客戶承認 Customer Approve	

## Revision Sheet 變更單

Revision No. 版本號	Date 日期	Content 變更內容	Reason 變更原因	Signature 簽名
Ver.1	2017-11-08	初版發行		

Remark/備註：

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## Warranty

Products manufactured to these specifications shall be capable of meeting all characteristics from ATC'S delivery onwards or for a minimum period of 1 year of the customer received when stored and used as specified under normal conditions within the contents of these sheets.

### 保質期

此規格觸控式螢幕，從 ATC 出貨之日起，至少一年內應符合下列正常條件下的儲存和使用規格。

## 1 Sample Specification 樣品規格

### 1.1 Product Name Code No.: Capacitive Transparent Touch Panel

品名編號：電容性的透明輕觸面板

### 1.2 Scope 適用範圍

The purpose of this specification is to define the general provisions and quality requirements that apply to the supply of capacitive-type multi-touch function touch sensor module. This document, together with the Module Assembly Drawing, is the highest-level specification for this product. It describes the product, identifies supporting documents and contains specifications.

這份說明書的目的就是為multi-touch功能的觸摸感應模組提供常規規定和品質需求。這份檔和模組裝配圖紙是該產品的最高等級說明書，它包括產品介紹、支援檔和規格。

### 1.3 Function 功能

Touch sensor module is a capacitive-type that customer uses to compliance with flat panel display like TFT-LCD. Once user touches it by finger, the circuitry for this touch sensor indicates coordinates point at the contact point.

消費者將電容式觸摸感應模組用於類似 TFT-LCD 的平面顯示器上，當使用者用手指觸摸時，TOUCH SENSOR 電路就顯示出與觸摸位置對應的點。

### 1.4 Construction 結構

Construction 結構	Materials used 所用材料	Code No. 編號	Comment 注釋
Cover lens 面版	toughened glass 鋼化玻璃	1.1	Thickness : 1.1mm 厚度:1.1mm
Graphic overlay OCA 透明膠	Adhesive 粘膠	0.2	Thickness : 0.2mm 厚度: 0.2mm
sensor 传感器	Conductive glass 导电玻璃	1.1	Conductive glass ; Thickness: 1.1mm 导电玻璃 ; 厚度 : 1.1mm

## 1.5 Environment Conditions 環境參數

Items 項目	Value 值
Operating temperature & Humidity 工作溫濕度範圍	-20℃ ~ +70℃: 45% ~ 85%RH
Storage temperature & Humidity 儲存溫濕度範圍	-30℃ ~ +80℃: 45% ~ 85%RH

## 1.6 Optical Characteristics 光學特徵

Items 項目	Value 值
Optical Characteristics 光學特性	Transparency > 82% 透明度大於 82%
Hardness 表面硬度	≥ 6H

## 1.7 Mechanical Characteristics 機械特徵

Item 項目	Description 描述	Unit 單位
Touch Sensor Size 屏體尺寸	496.42 (L) × 287.43 (W)	mm
Outline Size 外形尺寸	532.50 (L) × 325.60 (W) × 2.4 (T)	mm
View Area 可視區	475.50 (L) × 266.60 (W)	mm
Sensor Area 功能區	480.64 (L) × 271.91 (W)	mm
Input Type 輸入方式	USB	
Aspect Ratio 比例	16:9	

## 2 Appearance Limit Standard 外觀檢驗標準

### 2.1 Scope 範圍

Touch panel visible side. 產品的可視區

### 2.2 Inspection Conditions 檢測條件

(1) The brightness in text site:800-1200LUX

光照條件:800-1200LUX

(2) Inspection distance: 25-35cm

檢測距離:25-35cm

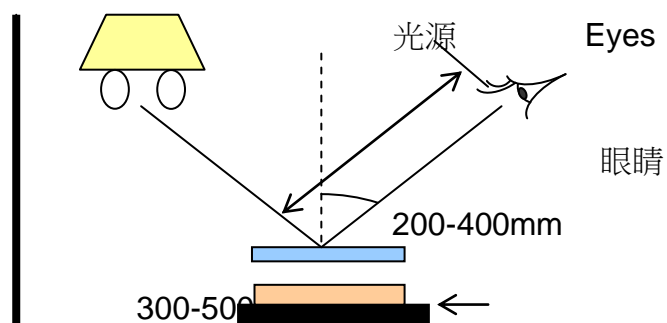
(3) Visual angle:>45 度

檢測角度: >45 度

(4) Light source: 40W natural light

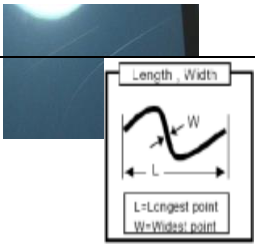
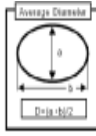

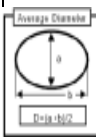


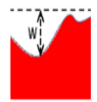






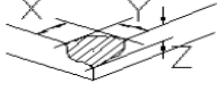
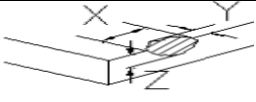
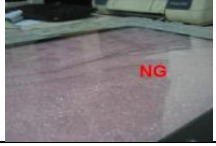
電源強度: 40W

A source of light ( 12-20W )



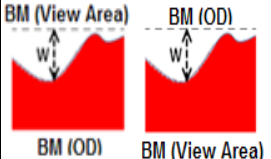



( Remark: D=diameter 直徑 ; L=length 長度 ; W=width 寬 ; GT=glass thickness 玻璃總厚 )

## 2.3 Appearance Limit Standard 外觀檢驗標準

Type	Criteria on View Area (VA)	Criteria on Deco Area (BM)	
線缺陷 (不可擦試異物, 刮傷) Line Shape Defeat (Threadlike / Scratch / Lint/ Fiber)	$W \leq 0.1\text{mm}$ : Ignore $0.1\text{mm} < W \leq 0.2\text{mm}$ , $L \leq 10\text{mm}$ : $N \leq 3$ $0.2\text{mm} < W$ or $L > 10\text{mm}$ : $N=0$ (Distance between defeats: $> 10\text{mm}$ )	$W \leq 0.1\text{mm}$ : Ignore $0.1\text{mm} < W \leq 0.2\text{mm}$ , $L \leq 10\text{mm}$ : $N \leq 3$ $0.2\text{mm} < W$ or $L > 10\text{mm}$ : $N=0$ (Distance between defeats: $> 10\text{mm}$ )	
點缺陷 (汽泡/凹凸點/異色點) Dot Shape Defeat (Polarizer contamination Bubble / Dent / Dust / Stain)	$D \leq 0.25\text{mm}$ : Ignore $0.25\text{mm} < D \leq 0.4\text{mm}$ : $N \leq 4$ $0.4\text{mm} < D$ : $N=0$ (Distance between defeats: $> 10\text{mm}$ )	$D \leq 0.3\text{mm}$ : Ignore $0.3\text{mm} < D \leq 0.5\text{mm}$ : $N \leq 4$ $0.5\text{mm} < D$ : $N=0$ (Distance between defeats: $> 10\text{mm}$ )	 
點缺陷 (不可擦試異物, 刮傷) Dot Shape Defeat (Non-removable fiber, Scratch)	$D \leq 0.25\text{mm}$ : Ignore $0.25\text{mm} < D \leq 0.4\text{mm}$ : $N \leq 4$ $0.4\text{mm} < D \leq 0.5\text{mm}$ : $N \leq 2$ $0.5\text{mm} < D$ : $N=0$	$D \leq 0.25\text{mm}$ : Ignore $0.25\text{mm} < D \leq 0.4\text{mm}$ : $N \leq 4$ $0.4\text{mm} < D \leq 0.5\text{mm}$ : $N \leq 2$ $0.5\text{mm} < D$ : $N=0$	 
Light Sensor / Camera hole 點狀不良 Dot Defeat on Light Sensor / Camera hole	N/A	$D \leq 0.1\text{mm}$ : Ignore $0.1\text{mm} < D \leq 0.15\text{mm}$ : $N \leq 2$ $0.15\text{mm} < D$ : $N=0$	
Light Sensor / Camera hole 面內漏缺墨 Ink Defeat on Light Sensor / Camera hole	N/A	$W \leq 0.1\text{mm}$ , Length Ignore	
油墨區針孔 Dot-Type Light Leakage on BM	N/A	$D \leq 0.2\text{mm}$ : Ignore $0.2\text{mm} < D$ : Allowed to re-work with ink pen	Inspect under WHITE background 超過則允許補墨 
油墨區線狀漏光 Line-Type Light Leakage on BM	N/A	$W < 0.1\text{mm}$ , Length Ignore $W \leq 0.15\text{mm}$ , $L \leq 20\text{mm}$ , Ignore $W > 0.15\text{mm}$ and $L > 20\text{mm}$ , allowed to re-work with ink pen	Inspect under WHITE background 超過則允許補墨 
Logo Artwork 內點狀不良 Logo Artwork - Dot Defect	N/A	$D \leq 0.1\text{mm}$ , Ignore $0.1\text{mm} < D \leq 0.15\text{mm}$ , 1EA/Letter $D > 0.15\text{mm}$ , Reject	
Logo Artwork 鋸齒狀不良 Logo Artwork - Saw Edge	N/A	$W \leq 0.3\text{mm}$ , Length Ignore	
Fish Eye (Pit)	N/A	$D \leq 0.2\text{mm}$ : Ignore $0.2\text{mm} < D \leq 0.3\text{mm}$ : $N \leq 3$ $0.3\text{mm} < D \leq 0.4\text{mm}$ : $N \leq 2$ $0.4\text{mm} < D \leq 0.5\text{mm}$ : $N \leq 1$ $0.5\text{mm} < D$ : $N=0$	 
Corner Chipping	N/A	$Y \leq 0.1\text{mm}$ , $X < 0.5\text{mm}$ , ignore $0.1\text{mm} < Y < 0.3\text{mm}$ , $X < 1.5\text{mm}$ , 2EA/Edge	
Side Chipping	N/A	$Y \leq 0.1\text{mm}$ , $X < 0.5\text{mm}$ , ignore $0.1\text{mm} < Y < 0.3\text{mm}$ , $X < 1.5\text{mm}$ , 2EA/Edge	
保護膜皺折(背面) Protective Film - Winkle (Back side)	Not Allowed	Not Allowed	

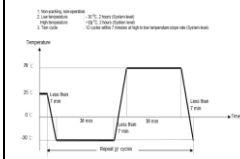


Protective Film – Bubble (Front & Back side)	D ≤ 10mm : Ignore 10mm < D : N=0	N/A	
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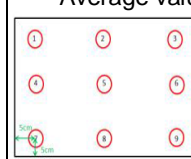
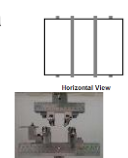

Type	Criteria	Note
印刷邊緣鋸齒/漏墨 (SAW/Ink Excess on Black Matrix (BM))	Near TP View Area (VA): W ≤ 0.2 mm, L ≤ 20mm: OK W > 0.2mm or L > 20mm: N=0 Near TP Outline Dimension (OD): W ≤ 0.3mm: OK W > 0.3mm: N=0	
Glass Crack	Not Allowed	
FPC -金手指 (Golden Finger)	Not allow one of the following conditions on surface (Both sides) - Scratches(刮伤) -Oxidation (氧化) -Solder wedding(沾锡) -Dirty(脏污) -Missing copper(漏铜) -Dead-foil (死折痕)	
FPC -本体(Body)	Not allow one of the following conditions on surface (Both sides) - Scratches(刮伤) -Tear-off on border edge (FPC 边缘撕裂) -Burr on FPC edge (FPC 边缘毛边) -Improper/missing printing(漏印刷、印刷錯誤或無法辨視) -Stiffener tilt from FPC(补强板翘起) -Dead-foil (死折痕)	
Dirty/Discoloration	Follow the limit sample	
Cleanable Dirty	Cleanable Dirty don't account into defect. Cleanable Dirty(Use clean room special wiper, dust-free clean cloth or dust-free cotton swab to take moderate solvent<such as: IPA or Ethanol> and other effective cleaning method can wipe the dirty) The uncleanable dirty is invisible from front side after assembly don't account into defect. Defect judge standard: The uncleanable dirty is visible from front side can judge as the dot defect specification.	
Defeat on the back side of touch screen	All the defects on the back side invisible from front side and not impact the assembly, ignore.	
Other defeats	The defects not be defined, follow limit sample	

### 3. Reliant Condition 信賴性條件

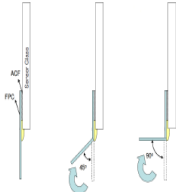
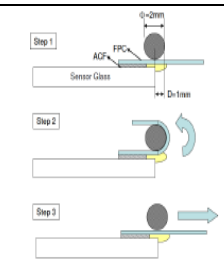

Touch Panel Reliability Test Items and Criteria				
	Test Item	Qty(pcs)	Test Criteria	Note
Storage	High Temp./ High Humidity	5	Test Conditions: - 70oC / 90%RH @ 240 hrs Pass Criterion: - No permanent cosmetic damage after test - No functional failure after test - No extremely loss of anti-blocking particles (Need OM or 2.5D inspection after test)	
	High Temperature	5	Test Conditions: - 70oC @ 240 hrs Pass Criterion: - No permanent cosmetic damage after test - No functional failure after test - No extremely loss of anti-blocking particles (Need OM or 2.5D inspection after test)	

	Low Temperature	5	Test Conditions: -30oC @ 240 hrs Pass Criterion: <ul style="list-style-type: none"> <li>- No permanent cosmetic damage after test</li> <li>- No functional failure after test</li> <li>- No extremely loss of anti-blocking particles (Need OM or 2.5D inspection after test)</li> </ul>	
	Thermal shock	5	Test Conditions: <ol style="list-style-type: none"> <li>1. -30oC, 30 min --&gt; 70oC, 30 min (Per cycle)</li> <li>2. Total: 25 cycles</li> </ol> Pass Criterion: <ul style="list-style-type: none"> <li>- No permanent cosmetic damage after test</li> <li>- No functional failure after test</li> <li>- No extremely loss of anti-blocking particles (Need OM or 2.5D inspection after test)</li> </ul>	

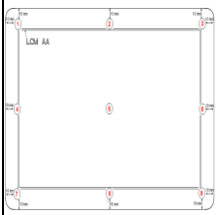
## Touch Panel Strength Test Items and Criteria

	Test Item	Qty (pcs)	Test Criteria	Note
Glass Strength	Ball-drop Test	5 ~ 10	Test Condition: <ol style="list-style-type: none"> <li>1. Test on touch panel only (W/O LCM)</li> <li>2. Steel ball weight: 130g</li> <li>3. Ball-drop start from 20cm, follow sequence to drop each test point</li> <li>4. If all 5 point didn't cause TP break, increase 10 cm and repeat step 2 until broken</li> </ol> Pass Criterion: <ul style="list-style-type: none"> <li>- Affordable impact <math>\geq 20</math> cm</li> </ul>	Need to provide real test data <ul style="list-style-type: none"> <li>- Per pcs</li> <li>- Average value</li> </ul> 
	4-point Bending Test	5 ~ 10	Test Condition: <ol style="list-style-type: none"> <li>1. Test on touch panel only (W/O LCM)</li> <li>2. Speed = 10 mm / min</li> <li>3. Copper Stick Diameter: 6 mm</li> <li>4. Test method: 54 mm / 108 mm (Horizontal)</li> </ol> Pass Criterion: <ul style="list-style-type: none"> <li>- Affordable DOL: <math>\geq 200</math> Mpa</li> </ul>	Need to provide real test data <ul style="list-style-type: none"> <li>- Per pcs</li> <li>- Average value</li> </ul> 
	Display Hardness Test	5	Test Conditions: Refer to ASTM D3363 Standard Test Method <ol style="list-style-type: none"> <li>1. Test Material:               <ul style="list-style-type: none"> <li>- Pencil classification: 7H~6B</li> <li>- Sandpaper: #400 grid</li> </ul> </li> <li>2. Test Condition:               <ul style="list-style-type: none"> <li>- Loading: 750g, - Angle: 45°</li> <li>- Position: VA area of test samples</li> <li>- length of the stroke: 6.5mm</li> </ul> </li> </ol> Pass Criterion: <ul style="list-style-type: none"> <li>Glass <math>\geq 7H</math> after test (W/O any scratch)</li> <li>PMMA <math>\geq 3H</math> after test (W/O any scratch)</li> </ul>	
AF Coating (For touch panel equip with Anti-finger coating only)	Water Contact angel Validation Test	5	Test Liquid: Pure water Test Conditions: <ol style="list-style-type: none"> <li>1. Before abrasion test: Measure contact angle</li> <li>2. Then abress surface with AF coating               <ul style="list-style-type: none"> <li>- Material: Steel wool #0000</li> <li>- Test area: 20mm x 20mm</li> <li>- Loading: 500g, - Test times: 40 cycles/min</li> </ul> </li> </ol> Pass Criterion: <ul style="list-style-type: none"> <li>- Contact angle <math>&gt;105^\circ</math> (Before 2000-cycle abrasion test)</li> <li>- Contact angle <math>&gt;100^\circ</math> (After 2000-cycle abrasion test)</li> </ul>	Need to provide real test data

	Oleic Contact angel Validation Test	5	<p>Test Liquid:</p> <ul style="list-style-type: none"> <li>- Oleic acid (18:1)</li> <li>- IUPAC name: (Z)-Octadec-9-enoic acid</li> <li>- Formula: <math>C_{18}H_{34}O_2</math></li> </ul> <p>Test Conditions:</p> <ol style="list-style-type: none"> <li>1. Before abrasion test: Measure contact angle</li> <li>2. Then abress surface with AF coating <ul style="list-style-type: none"> <li>- Material: Steel wool #0000</li> <li>- Test area: 20mm x 20mm</li> <li>- Loading: 500g, - Test times: 40 cycles/min</li> </ul> </li> </ol> <p>Pass Criterion:</p> <ul style="list-style-type: none"> <li>- Contact angle &gt;65° (Before 2000-cycle abrasion test)</li> <li>- Contact angle &gt;60° (After 2000-cycle abrasion test)</li> </ul>	Need to provide real test data
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Touch Panel FPC Test Items and Criteria				
	Test Item	Qty (pcs)	Touch Panel FPC Test Items and CriteriaTest Criteria	Note
	Direct Pulling Test	5	<p>Test Conditions:</p> <ol style="list-style-type: none"> <li>1. Pulling weight: 500g.</li> <li>2. Pulling speed: 25 mm/min</li> <li>3. Pulling angle: 90o</li> <li>4. After test, verify touch panel functionality via test jig</li> </ol> <p>Pass Criterion:</p> <ul style="list-style-type: none"> <li>- No damage of FPC itself</li> <li>- No any peeling on FPC located on bonding pad area</li> <li>- No functional failure after test</li> </ul>	
	Bending test	5	<p>Test Conditions:</p> <ol style="list-style-type: none"> <li>1. 45 degree bending: 100 times</li> <li>2. 90 degree bending: 200 times</li> <li>3. After test, verify touch panel functionality via test jig</li> </ol> <p>Pass Criterion:</p> <ul style="list-style-type: none"> <li>- No damage of FPC itself</li> <li>- No any peeling on FPC located on bonding pad area</li> <li>- No functional failure after test</li> </ul>	
		5	<p>Test Conditions:</p> <ol style="list-style-type: none"> <li>1. Flex bending: 30 cycles (Each cycle: 0o -&gt; 180o --&gt; 0o)</li> <li>2. After test, verify touch panel functionality via test jig</li> <li>3. bending <math>\phi=1</math> mm</li> </ol> <p>Pass Criterion:</p> <ul style="list-style-type: none"> <li>- No damage of FPC itself</li> <li>- No any peeling on FPC located on bonding pad area</li> <li>- No functional failure after test</li> </ul>	

Touch Panel EMC Test Item and Criteria				
	Test Item	Qty (pcs)	Test Criteria	Note
	ESD on Touch Panel	1	<p>Test Condition:</p> <p>Normal</p> <ul style="list-style-type: none"> <li>- Air discharge: <math>\pm 10KV</math> (<math>\pm 2KV</math>, <math>\pm 4KV</math>, <math>\pm 8KV</math>, <math>\pm 10KV</math>)</li> <li>- Contact discharge: <math>\pm 8KV</math> (<math>\pm 2KV</math>, <math>\pm 4KV</math>, <math>\pm 6KV</math>, <math>\pm 8KV</math>)</li> </ul> <p>Marginal (For reference only)</p> <ul style="list-style-type: none"> <li>- Air discharge: <math>\pm 20KV</math> (<math>\pm 12KV</math>, <math>\pm 14KV</math>, <math>\pm 16KV</math>, <math>\pm 18KV</math>, <math>\pm 20KV</math>)</li> <li>- Contact discharge: <math>\pm 10KV</math></li> </ul> <p>Test Procedure:</p> <ul style="list-style-type: none"> <li>- Test on front surface of touch panel only (No need to connect to TP controller board)</li> <li>- Test Point: 9 (Face to user side) <ul style="list-style-type: none"> <li>- Each test point aware of TP OD 10 mm</li> <li>- Each test point hit ESD 10 times</li> </ul> </li> </ul>	<p>2 pcs for ESD air discharge test</p> <p>2 pcs for ESD contact discharge</p>

			Validation: - After ESD test, connect tested TP into test jig and run test program to verify TP function Pass Criterion: - No ITO pattern, metal trace or metal bridge broken after test - No functional failure after test	test 
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Touch Panel Carton/Package Test Items and Criteria				
	Test Item	Qty (pcs)	Test Criteria	Note
	Simulation Vibration Test	1	Test Conditions: 1. Truck mode: 0.52G/rms, 20 mins/axis (X/Y/Z axis) 2. Rail mode: 0.29G/rms, 20 mins/axis (X/Y/Z axis) 3. Air mode: 1.05G/rms, 20 mins/axis (X/Y/Z axis) Pass Criterion: - No visible damage to the sample - Product has to pass all the functional check after the completion of the test - Control board and FPC connection is kept in package	
	Vibration Test	1	Test Conditions: 1. Acceleration: 14.7 m/sec (1.5G) 2. Frequency: 5 - 500 Hz 3. Duration: 15 minutes Pass Criterion: - No visible damage to the sample - Product has to pass all the functional check after the completion of the test - Control board and FPC connection is kept in package	
	Drop Test With Package	1	Test Conditions: 60 cm, 1 corner, 3 edges, 6 faces Pass Criterion: - No visible damage to the sample - Product has to pass all the functional check after the completion of the test - Control board and FPC connection is kept in package	

Touch Panel Optical Test Items and Criteria				
	Test Item	Qty (pcs)	Test Criteria	Note
	Transmittance and color shift on Touch panel Active Area	1	Refer to ASTM C1649: - 08 Standard Practice for Instrumental Transmittance Measurement Pass Criterion: 1. CCT +/- 100K or 2. Reflection  a*  <= 0.5 Reflection  b*  <= 3.0	
	Haze (Active Area)		Pass Criterion: <= 2.5 %	

#### 4. Attachment 附件

##### 4.1 Engineering Drawing 工程圖