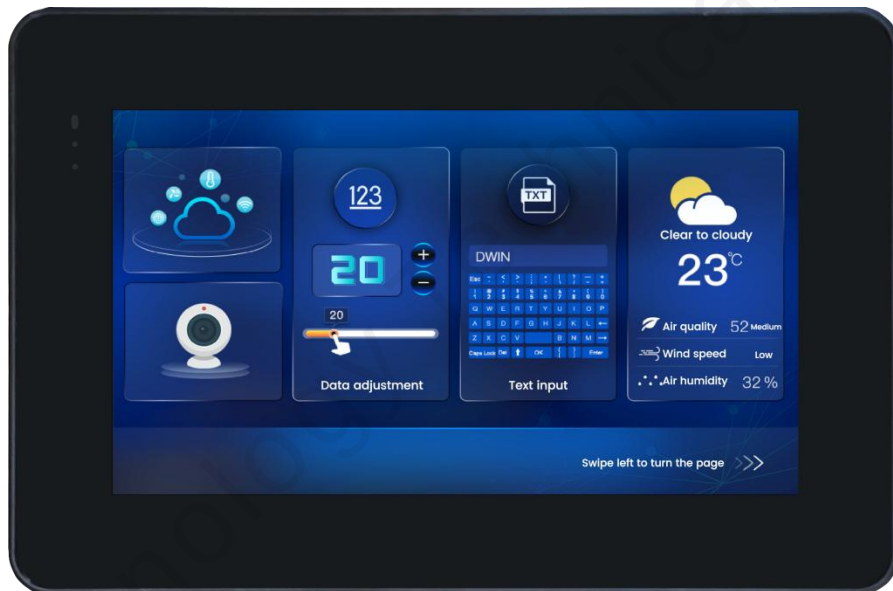


# DT322X220034Z240902B

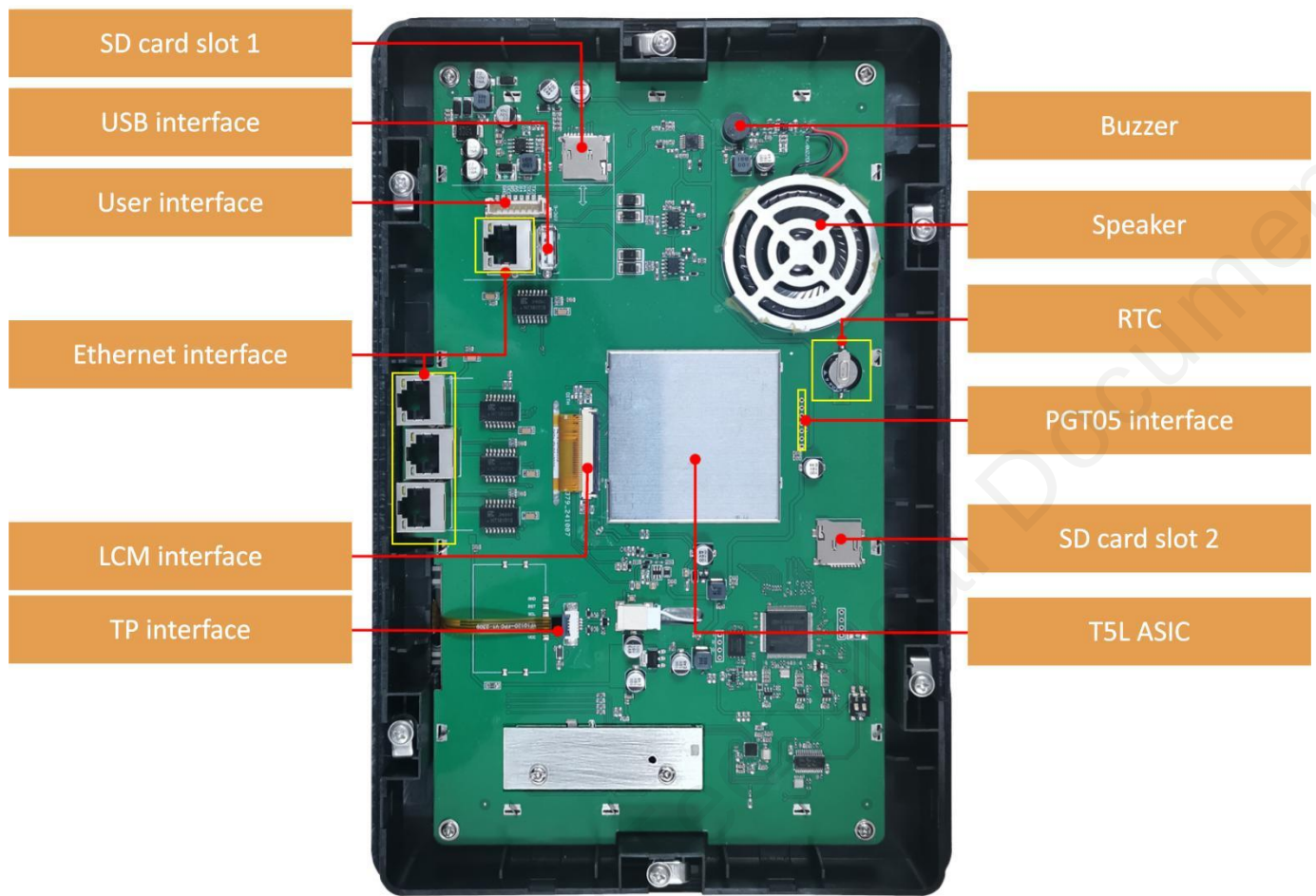
## Features:

- Powered by T5L2 ASIC, running DGUS II HMI platform, industrial-grade smart LCM.
- 10.1 inch, 1024\*600 resolution, IPS-TFT LCD.
- Reliable resistive touch panel.
- With enclosure, anti-UV, and conformal coating.



## 1. Hardware and interface

### 1.1 Hardware interface diagram



Hardware interface diagram

## 1.2 Hardware and interface description

| No. | Item               | Description                                                                                                                                          |
|-----|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | T5L2 ASIC          | DWIN independently developed, mass production in 2019. Dual 8051 cores, GUI and application run on separate 8051 cores.                              |
| 2   | User interface     | 8Pin_2.0mm socket for power supply and serial communication.                                                                                         |
| 3   | Flash              | 32MBytes (2*16MBytes NOR Flash) for storing UI files like fonts, images, music, with over 100,000 erase/write cycles.                                |
| 4   | Expand Flash pads  | Two expansion slots support NOR or NAND Flash(Inside the shield), up to 64MB (4x16MB NOR Flash) or 48MB+512MB (3x16MB NOR Flash + 512MB NAND Flash). |
| 5   | Buzzer             | 3V passive buzzer.                                                                                                                                   |
| 6   | Speaker            | Onboard speaker. Power: 4Ω 2W.                                                                                                                       |
| 7   | RTC                | Super-capacitor powered, accuracy: $\pm 20\text{ppm}$ @25°C, maintains operation for 7 days after power-off.                                         |
| 8   | SD card slot 1     | For DGUS project file downloads (UI, CFG files, kernel, etc.), 4 Mb/s rate.                                                                          |
| 9   | SD card slot 2     | SD card slot 2 is for flashing video module firmware.                                                                                                |
| 10  | PGT05 interface    | For programming DGUS firmware.                                                                                                                       |
| 11  | Ethernet interface | 4 interfaces, support connecting webcam.                                                                                                             |
| 12  | USB interface      | Reserved interface.                                                                                                                                  |

## 2. Specification parameters

### 2.1 Display parameters

|                               |                                                                                                                           |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>LCD Type</b>               | IPS, TFT LCD.                                                                                                             |
| <b>Viewing Angle</b>          | Wide viewing angle (85°/85°/85°/85° typical), high contrast, and good color reproduction.                                 |
| <b>Resolution</b>             | 1024x600 (support 0°/90°/180°/270°)                                                                                       |
| <b>Active Area (AA)</b>       | 222.70 (W)×125.30mm (H)                                                                                                   |
| <b>Viewing Area (VA)</b>      | 222.70 (W)×125.30mm (H)                                                                                                   |
| <b>Backlight</b>              | LED                                                                                                                       |
| <b>Backlight Service Life</b> | >30000 hours                                                                                                              |
| <b>Brightness</b>             | 200nit                                                                                                                    |
| <b>Brightness Control</b>     | 100-level brightness adjustment (Flickering may occur at 1%-30% of max brightness; not recommended for use in this range) |

Note: Use dynamic screen saver to prevent afterimages from prolonged fixed page display.

### 2.2 Touch parameters

|                            |                            |
|----------------------------|----------------------------|
| <b>Type</b>                | Resistive touch panel.     |
| <b>Structure</b>           | ITO film + ITO glass.      |
| <b>Light Transmittance</b> | >80%                       |
| <b>Life</b>                | Over 1,000,000 times touch |

## 2.3 Serial interface parameters

|                                 |                                                                                                                              |       |      |      |      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------|-------|------|------|------|
| <b>Mode</b>                     | UART2: RS232<br>UART4: RS485 (Only available after OS configuration)<br>UART5: RS485 (Only available after OS configuration) |       |      |      |      |
| <b>Voltage Level (RXD, TXD)</b> | Test Condition                                                                                                               | Min   | Typ  | Max  | Unit |
|                                 | Output 1, I <sub>out</sub> = 1mA                                                                                             | -     | -5.0 | -3.0 | V    |
|                                 | Output 0, I <sub>out</sub> = -1mA                                                                                            | 3.0   | 5.0  | -    | V    |
|                                 | Input 1, I <sub>in</sub> = 1mA                                                                                               | -15.0 | -5.0 | -    | V    |
|                                 | Input 0, I <sub>in</sub> = -1mA                                                                                              | -     | 5.0  | 15.0 | V    |
| <b>Baud Rate</b>                | 3150~3225600bps, typical value of 115200bps.                                                                                 |       |      |      |      |
| <b>Voltage Level (V_AB)</b>     | Test Condition                                                                                                               | Min   | Typ  | Max  | Unit |
|                                 | Output 1                                                                                                                     | 2.5   | 5.0  | -    | V    |
|                                 | Output 0                                                                                                                     | -     | -5.0 | -2.5 | V    |
|                                 | Input 1                                                                                                                      | 0     | 2.5  | -    | V    |
|                                 | Input 0                                                                                                                      | -     | -2.5 | -0.2 | V    |
| <b>Baud Rate</b>                | 3150~921600bps, typical value of 115200bps.                                                                                  |       |      |      |      |
| <b>Data Format</b>              | UART2: N81<br>UART4: N81/E81/O81/N82 ,4 modes (OS configuration)<br>UART5: N81/E81/O81/N82 ,4 modes (OS configuration)       |       |      |      |      |
| <b>Interface Cable</b>          | 8Pin_2.0mm                                                                                                                   |       |      |      |      |

## 2.4 Electrical specifications

|                                      |                              |                         |
|--------------------------------------|------------------------------|-------------------------|
| Rated Power                          | <7W                          |                         |
| Operating Voltage                    | 9-36V, typical value of 12V. |                         |
| Operating Current                    | 570mA                        | VCC=12V, max backlight. |
|                                      | 150mA                        | VCC=12V, backlight off. |
| Recommended power supply: 12V 1A DC. |                              |                         |

## 2.5 Operating environment

|                       |                                     |
|-----------------------|-------------------------------------|
| Operating Temperature | -20℃ to 70℃ (12V @ 60% RH)          |
| Storage Temperature   | -30℃ to 80℃                         |
| Anti-UV               | Yes                                 |
| Conformal Coating     | Yes                                 |
| Operating Humidity    | 10%-90%RH, typical value of 60% RH. |

### 3. Reliability test

#### 3.1 Electrostatic discharge test

Test temperature: 25°C. Test humidity: 50%RH.

Test process: Place the product on the test bench fixture (approximately 15cm in height), and perform contact and air discharge tests on the smart LCM. Observe if any freezing, black or white screen, flickering, or rebooting occurs during the test.

Test conclusion: The product's ESD performance meets GB/T 17626.2 Class B standards.

■ Test standard : ☐ EN 61000-4-2:2009    ☐ IEC 61000-4-2:2008    ☐ GB/T 17626.2-2018  
☐ Other:

Table 1: Electrostatic Discharge Immunity (Air Discharge)

| Test Points Locations | Test Levels |      |      |      |      |      |       |       |
|-----------------------|-------------|------|------|------|------|------|-------|-------|
|                       | -2kV        | +2kV | -4kV | +4kV | -8kV | +8kV | -15kV | +15kV |
| Screen                |             |      |      |      | A    | A    |       |       |
| /                     | /           | /    | /    | /    | /    | /    | /     | /     |
| /                     | /           | /    | /    | /    | /    | /    | /     | /     |
| /                     | /           | /    | /    | /    | /    | /    | /     | /     |

Table 2: Electrostatic Discharge Immunity (Direct Contact)

| Test Points Locations | Test Levels |      |      |      |      |      |      |      |
|-----------------------|-------------|------|------|------|------|------|------|------|
|                       | -2kV        | +2kV | -4kV | +4kV | -6kV | +6kV | -8kV | +8kV |
| Ethernet interface    |             |      |      |      | A    | A    |      |      |
| /                     | /           | /    | /    | /    | /    | /    | /    | /    |
| /                     | /           | /    | /    | /    | /    | /    | /    | /    |
| /                     | /           | /    | /    | /    | /    | /    | /    | /    |

### 3.2 EFT test

Test temperature: 25°C. Test humidity: 50%RH.

Test process: Place the product flat on the test bench, power the smart LCM through the power supply coupled with an impulse generator. Observe if any reboot, abnormal display, or touch malfunction occurs during the test.

Test conclusion: The product's EFT performance meets GB/T 17626.4 Class B standards.

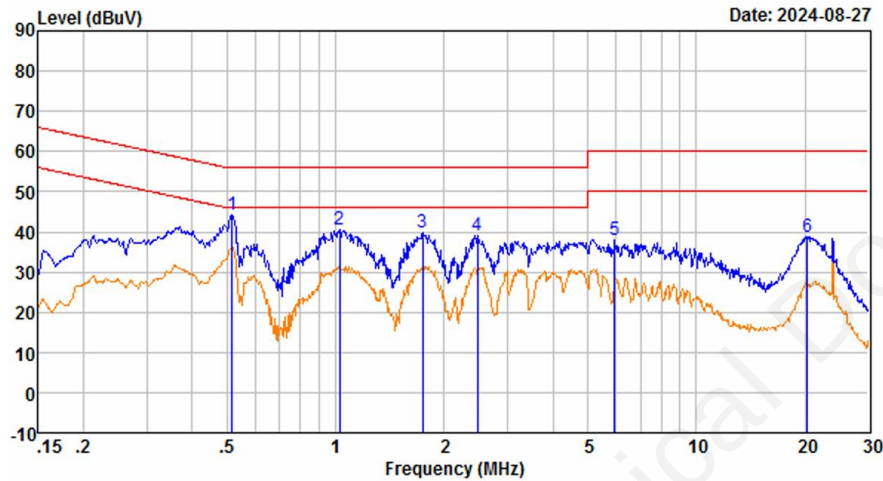
☒ Test standard : 
 ☐ EN 61000-4-4:2012 
 ☐ IEC 61000-4-4:2012 
 ☐ GB/T 17626.4-2018  
☐ Other:

| Test Points              |           | Test Levels(kV) |      |      |      |      |      |      |      |
|--------------------------|-----------|-----------------|------|------|------|------|------|------|------|
|                          |           | -0.5            | +0.5 | -1.0 | +1.0 | -2.0 | +2.0 | -4.0 | +4.0 |
| <u>DL</u><br>Power ports | L         |                 |      |      |      | 10   | 10   |      |      |
|                          | N         |                 |      |      |      | 10   | 10   |      |      |
|                          | Earth     |                 |      |      |      |      |      |      |      |
|                          | L+N       |                 |      |      |      | 10   | 10   |      |      |
|                          | L + Earth |                 |      |      |      |      |      |      |      |
|                          | N + Earth |                 |      |      |      |      |      |      |      |
|                          | L+N+Earth |                 |      |      |      |      |      |      |      |
| Signal ports             | _____     |                 |      |      |      |      |      |      |      |

### 3.3 CE test

| Test Item | Test Standard | Result           |
|-----------|---------------|------------------|
| CE        | Class B       | Normal operation |

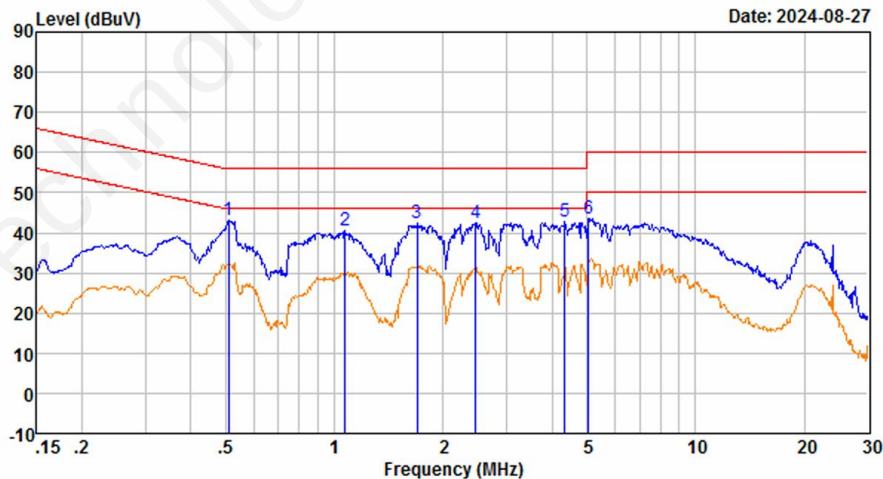
#### LINE



| Freq<br>MHz | Reading<br>level<br>dBuV | LISN/ISN<br>factor<br>dB | Cable<br>loss<br>dB | Result<br>level<br>dBuV | Limit<br>level<br>dBuV | Over<br>limit<br>dB | Remark |
|-------------|--------------------------|--------------------------|---------------------|-------------------------|------------------------|---------------------|--------|
| 0.516       | 34.44                    | 9.75                     | 0.02                | 44.21                   | 56.00                  | -11.79              | Peak   |
| 1.027       | 30.78                    | 9.71                     | 0.03                | 40.52                   | 56.00                  | -15.48              | Peak   |
| 1.744       | 30.22                    | 9.71                     | 0.04                | 39.97                   | 56.00                  | -16.03              | Peak   |
| 2.474       | 29.26                    | 9.72                     | 0.04                | 39.02                   | 56.00                  | -16.98              | Peak   |
| 5.929       | 28.07                    | 9.84                     | 0.06                | 37.97                   | 60.00                  | -22.03              | Peak   |
| 20.270      | 28.47                    | 10.07                    | 0.11                | 38.65                   | 60.00                  | -21.35              | Peak   |

Remarks: Result Level = Reading level + LISN/ISN factor + Cable loss

#### NEUTRAL



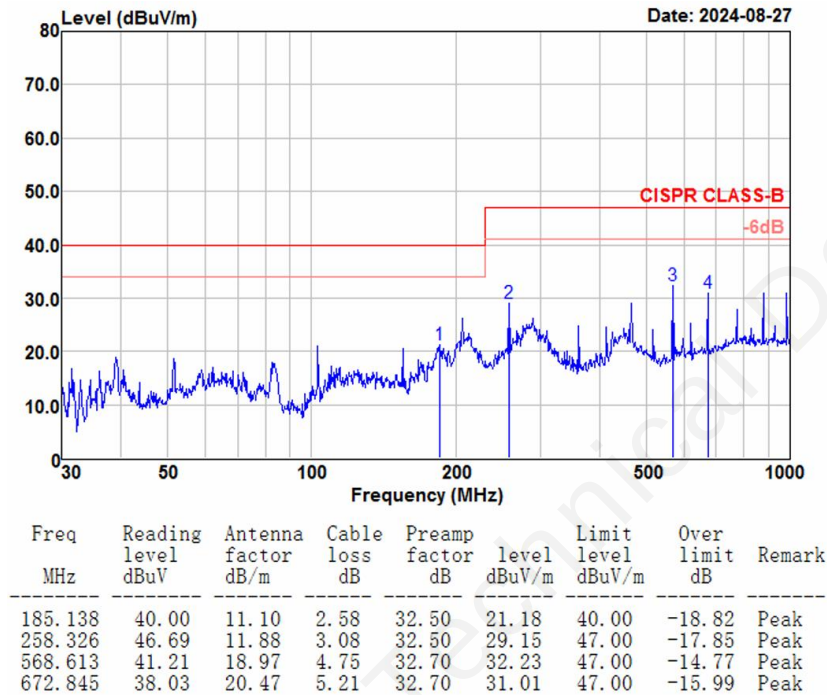
| Freq<br>MHz | Reading<br>level<br>dBuV | LISN/ISN<br>factor<br>dB | Cable<br>loss<br>dB | Result<br>level<br>dBuV | Limit<br>level<br>dBuV | Over<br>limit<br>dB | Remark |
|-------------|--------------------------|--------------------------|---------------------|-------------------------|------------------------|---------------------|--------|
| 0.510       | 33.52                    | 9.60                     | 0.02                | 43.14                   | 56.00                  | -12.86              | Peak   |
| 1.071       | 30.73                    | 9.61                     | 0.03                | 40.37                   | 56.00                  | -15.63              | Peak   |
| 1.698       | 32.65                    | 9.61                     | 0.03                | 42.29                   | 56.00                  | -13.71              | Peak   |
| 2.461       | 32.90                    | 9.62                     | 0.04                | 42.56                   | 56.00                  | -13.44              | Peak   |
| 4.338       | 32.98                    | 9.67                     | 0.05                | 42.70                   | 56.00                  | -13.30              | Peak   |
| 5.058       | 33.89                    | 9.69                     | 0.06                | 43.64                   | 60.00                  | -16.36              | Peak   |

Remarks: Result Level = Reading level + LISN/ISN factor + Cable loss

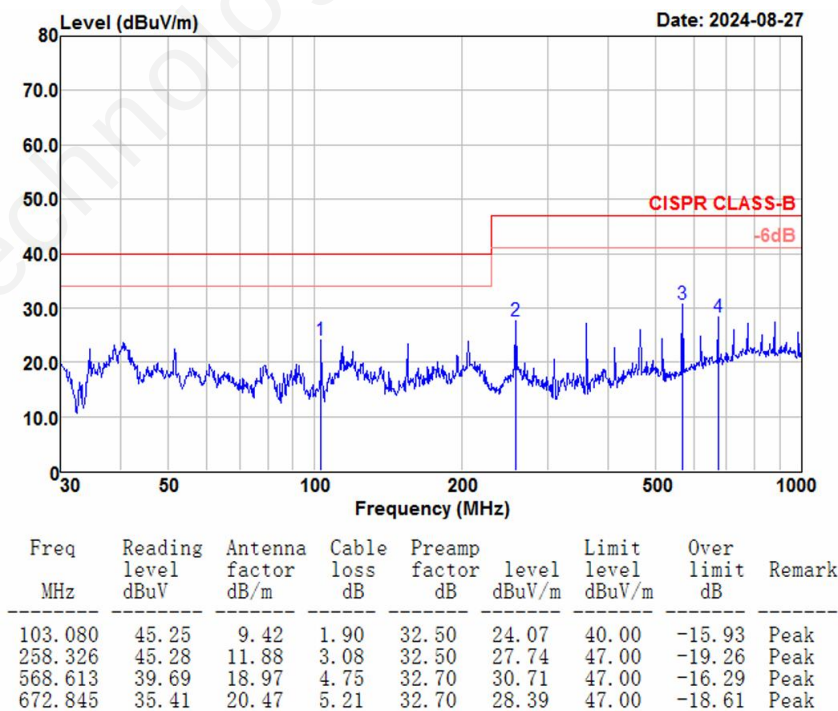
### 3.4 RE test

| Test Item | Test Standard | Result           |
|-----------|---------------|------------------|
| RE        | Class B       | Normal operation |

#### HORIZONTAL



#### VERTICAL



### 3.5 CS test

- ☒ Test standard : ☐ EN 61000-4-6:2014 ☐ IEC 61000-4-6:2013 ☐ GB/T 17626.6-2017  
☐ Other:  
☒ Modulation: ☒ Amplitude 80%,1kHz sine wave ☐ Amplitude 80%,2Hz sine wave ☐ Other:  
☒ Dwell time: ☒ 1s ☐ 3s ☐ other:  
☒ Frequency Step Size : ☒ 1 % of preceding frequency value ☐ other:

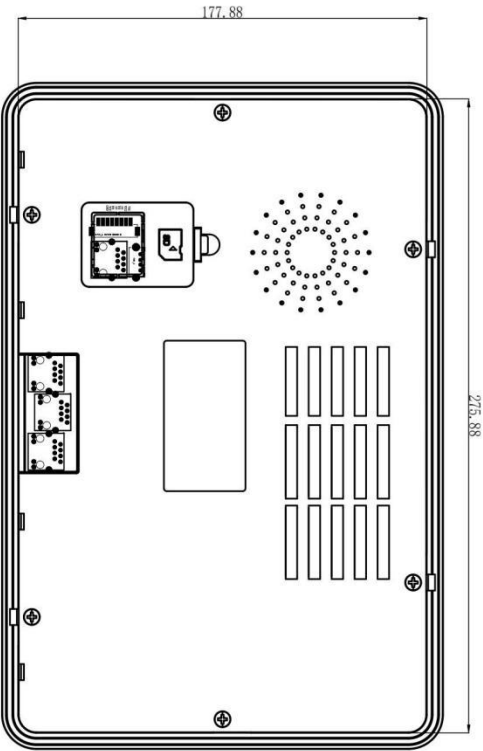
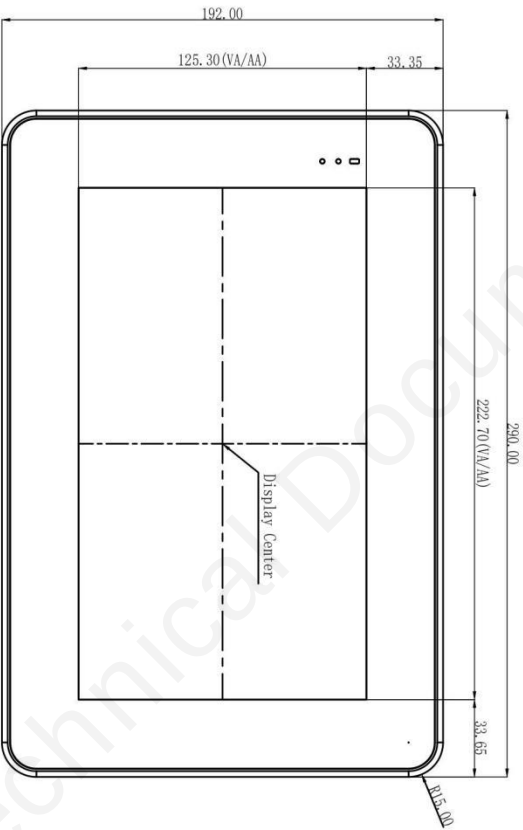
| Coupling Line | Frequency Range<br>(MHz) | Voltage Level(e.m.f.)<br>(V) | Result |
|---------------|--------------------------|------------------------------|--------|
| DC power line | 0.15 ~ 80                | 10                           | 10     |
|               |                          |                              |        |
|               |                          |                              |        |

#### Performance Criterion:

- A. Normal performance within limits specified by the manufacturer, requestor or purchaser;
- B. Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention;
- C. Temporary loss of function or degradation of performance, the correction of which requires operator intervention;
- D. Loss of function or degradation of performance which is not recoverable, due to damage to hardware or software, or loss of data.

#### 4. Packaging & dimensions

|                         |                                                   |       |                |               |
|-------------------------|---------------------------------------------------|-------|----------------|---------------|
| Form Factor             | 290.00mm (W)×192.00mm (H) ×29.75mm (T)            |       |                |               |
| Installation Dimensions | Positioning hole: 275.88 (+0.3mm)×177.88 (+0.3mm) |       |                |               |
| Net Weight              | 1080g                                             |       |                |               |
| Packaging Standards     |                                                   |       |                |               |
| Model                   | Dimensions                                        | Layer | Quantity/Layer | Quantity(Pcs) |
| Carton1:                | 220mm(L)×160mm(W)×47mm (H)                        | -     | -              | -             |
| Carton2:                | 250mm(L)×200mm(W)×80mm (H)                        | -     | -              | -             |
| Carton3:                | 320mm(L)×270mm(W)×80mm (H)                        | 1     | 1              | 1             |
| Carton4:                | 525mm(L)×330mm(W)×80mm (H)                        | 1     | 5              | 5             |
| Carton5:                | 570mm(L)×340mm(W)×385mm (H)                       | 1     | 8              | 8             |



| Definition | Pin# | Type | Description      |
|------------|------|------|------------------|
| TX2        | 1    | 0    | UART2 Output     |
| RX2        | 2    | I    | UART2 Output     |
| A4         | 3    | A    | RS485+           |
| B4         | 4    | B    | RS485-           |
| A5         | 5    | A    | RS485+           |
| B5         | 6    | B    | RS485-           |
| VCC        | 7    | P    | 电源输入 Power Input |
| GND        | 8    | P    | 公共接地 GND         |

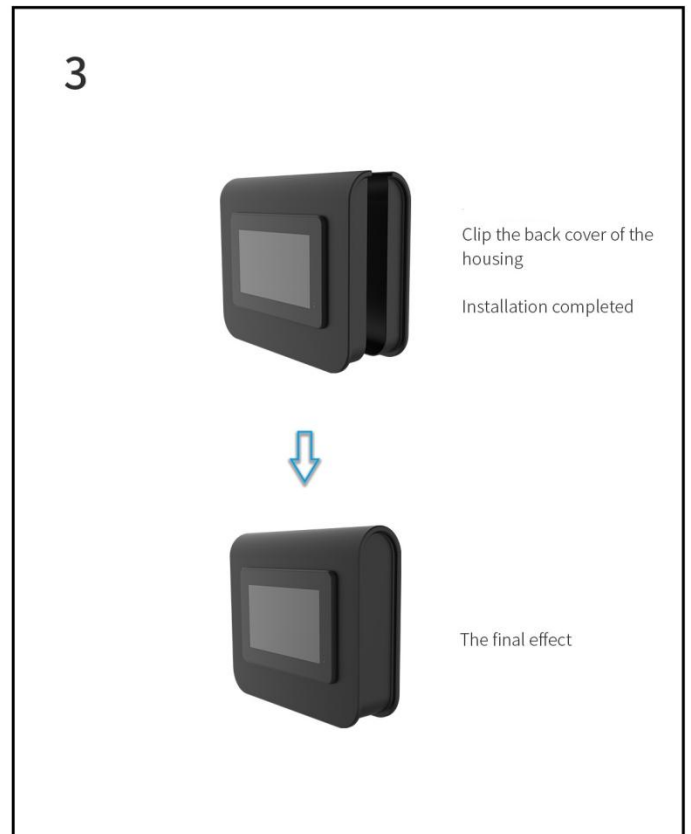
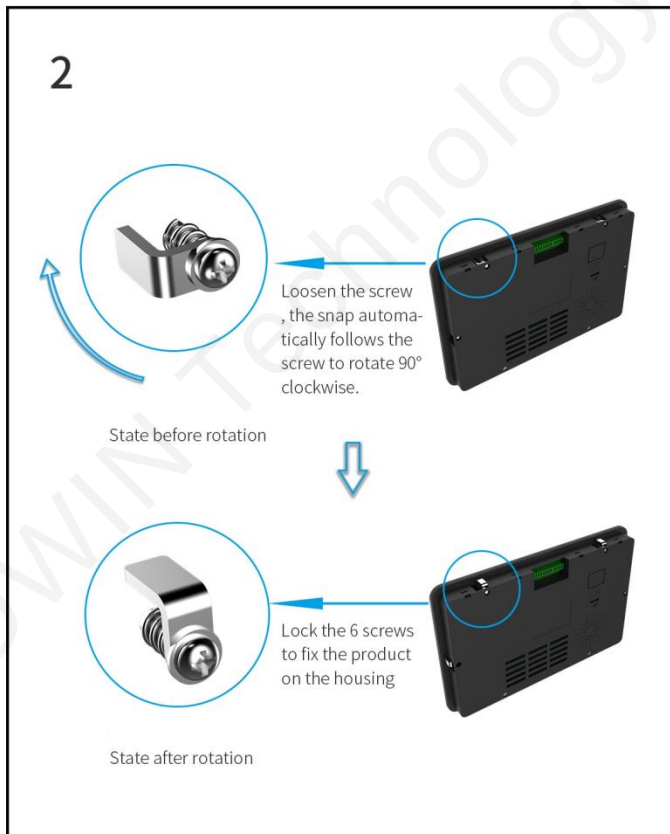
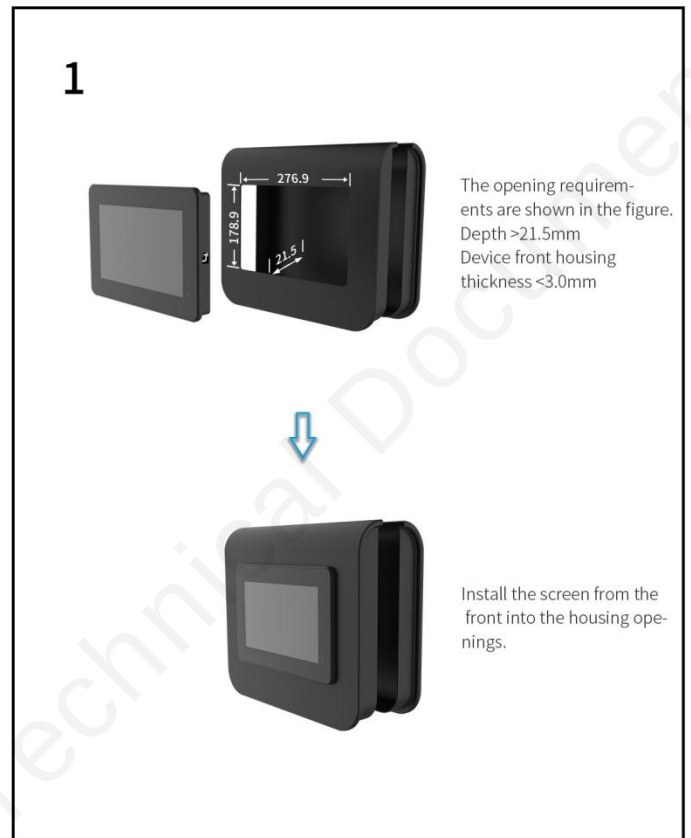
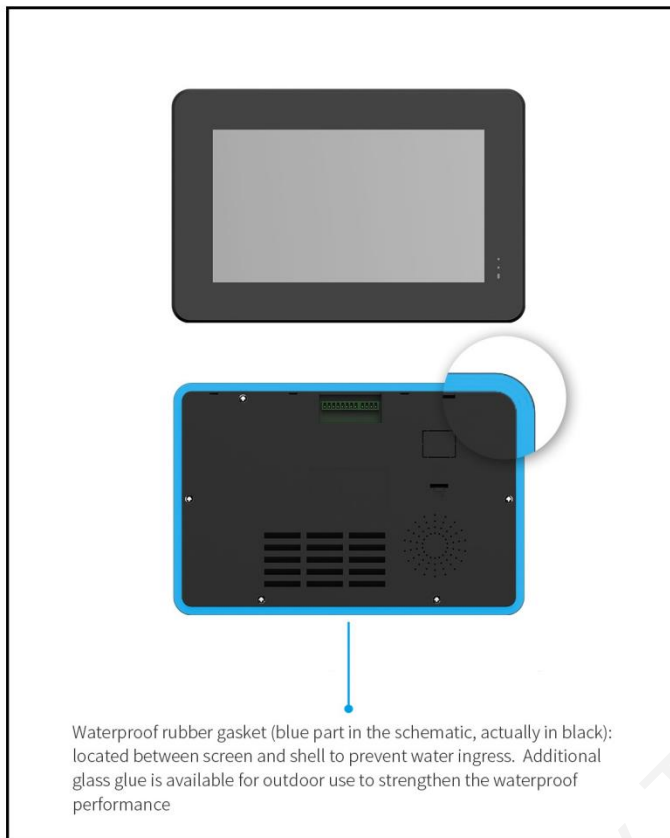
1. Location hole is used as position reference.

2. Unmarked Tolerance is +/-0.3mm

Note: Active area is marked in Dash lines

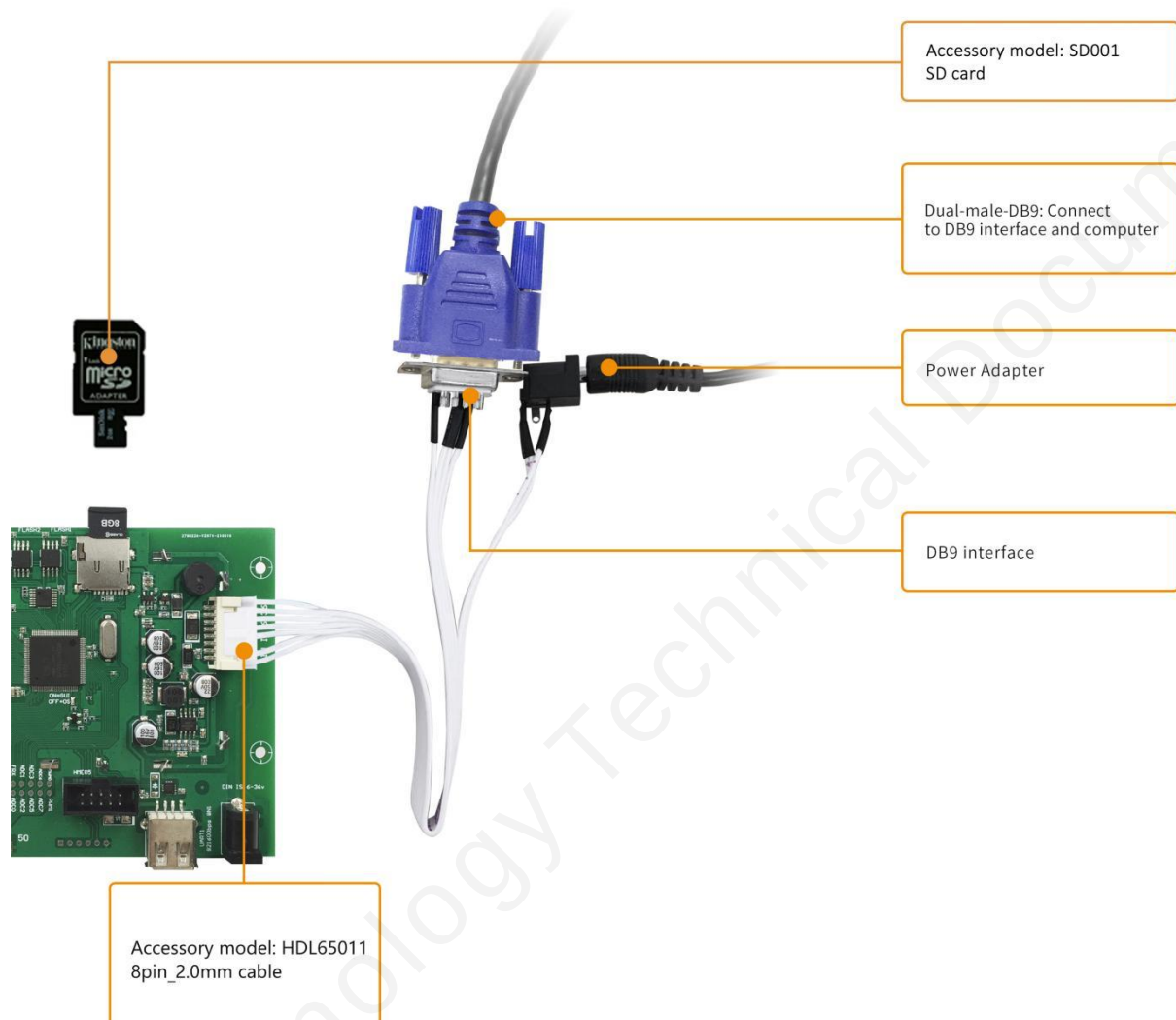
|         |                      |          |      |      |                 |  |  |  |
|---------|----------------------|----------|------|------|-----------------|--|--|--|
| Model   | DT322X220034Z240902B |          |      |      | DWIN Technology |  |  |  |
| Drawing | A 4                  | Drawn    | G. Y | Date |                 |  |  |  |
| Scale   | 1:1                  | Review   |      | Date |                 |  |  |  |
| Unit    | MM                   | Approval |      | Date |                 |  |  |  |

# Installation Schematic



## 5. Debug tools

It is recommended for new users of DWIN smart LCMs to purchase official accessories. For more details, please refer to customer service center.



## 6. T5L series IC features

- (1) Mature and stable 8051 core which is the most widely used with the maximum operating frequency of T5L is up to 250MHz, 1T(single instruction cycle)high speed operation.
- (2) Separate GUI CPU Core running DGUS II System:
  - High-speed display memory, 2.4GB/S bandwidth.
  - 2D hardware acceleration, the decompression speed of JPEG is up to 200fps@1280\*800 and the UI with animation and icons as its main feature is extremely cool and smooth.
  - Images and icons stored in JPEG format. Adopt Low-cost 16Mbytes SPI Flash.
  - Support CTP or RTP with adjustable sensitivity and maximum 400 Hz touch frequency.
  - 1-way 15bit 32Ksps PWM digital power amplifier driver loudspeaker, save power amplifier cost and achieve high signal-to-noise ratio and sound quality restoration.
  - 128Kbytes variable storage space for exchanging data with OS CPU Core and memory.
  - Support DGUS development and simulation on PC. Support background remote upgrade.
- (3) Separate CPU (OS CPU) core runs user 8051 code or DWIN OS system and user CPU is omitted in practical application:
  - Standard 8051 architecture and instruction set, 64Kbytes code space, 32Kbytes on-chip RAM.
  - 64 bit integer mathematical operation unit (MDU), including 64 bit MAC and 64 bit divider.
  - 28 IOs, 4-channel UARTs, 1-channel CAN, up to 8-channel 12-bit A/Ds and 2-channle 16-bit PWM of adjustable resolution.
  - Support IAP on-line simulation and debugging with unlimited number of breakpoints.
  - Upgrade code online through DGUS system.
- (4) 1Mbytes on-chip Flash with DWIN patent encryption technology ensure code and data security.
- (5) Operating temperature ranges from -40°C to +85°C(IC operating temperature customizable from -55°C to 105°C).

**DWIN encourages users to design your own customized product based on T5L**

## 7. Revision records

| Rev | Revise Date | Content       | Editor  |
|-----|-------------|---------------|---------|
| 00  | 2024-10-25  | First Edition | Xu Ying |

Please contact us if you have any questions about the use of this document or our products, or if you would like to know the latest information about our products:

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- Customer service email: [dwinhmi@dwin.com.cn](mailto:dwinhmi@dwin.com.cn)
- DWIN Developer Forum: <https://forums.dwin-global.com/>

Thank you all for continuous support of DWIN, and your approval is the driving force of our progress!

## Important Disclaimer

DWIN reserves the right to make any changes to product designs without prior notice.

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