

## LILYGO T-Display-S3 AMOLED

# LILYGO T-Display-S3 AMOLED Development Board User Manual

Model: T-Display-S3 AMOLED (Welded Pin Version)

## 1. INTRODUCTION

The LILYGO T-Display-S3 AMOLED is an advanced development board featuring the ESP32-S3 microcontroller and a vibrant 1.91-inch RM67162 AMOLED display. This board is designed for a wide range of applications requiring wireless connectivity (Wi-Fi and Bluetooth 5 LE) and a high-quality visual interface. It serves as an excellent platform for embedded system development, IoT projects, and custom display solutions.

This manual provides essential information for setting up, operating, maintaining, and troubleshooting your T-Display-S3 AMOLED development board.

## 2. SAFETY INFORMATION

- **Electrostatic Discharge (ESD) Precautions:** Always handle the board by its edges and use anti-static measures (e.g., anti-static wrist strap, mat) to prevent damage from static electricity.
- **Power Supply:** Use only appropriate power sources (e.g., USB-C port, battery connector) within the specified voltage range. Incorrect voltage can damage the board.
- **Environmental Conditions:** Avoid exposing the board to extreme temperatures, humidity, dust, or corrosive substances. Operate within recommended temperature and humidity ranges.
- **Physical Handling:** Do not apply excessive force to the board or its components. Avoid bending or dropping the board.
- **Soldering:** If soldering is required (for unwelded pin versions or custom connections), ensure proper ventilation and use appropriate safety equipment.

## 3. PACKAGE CONTENTS

Verify that all items are present in your package:

- 1 x LILYGO T-Display-S3 AMOLED Development Board

- 2 x 14-pin Headers (for welded pin version, these are pre-soldered)
- 1 x Power Cable (JST-SH 1.0mm 4-Pin)

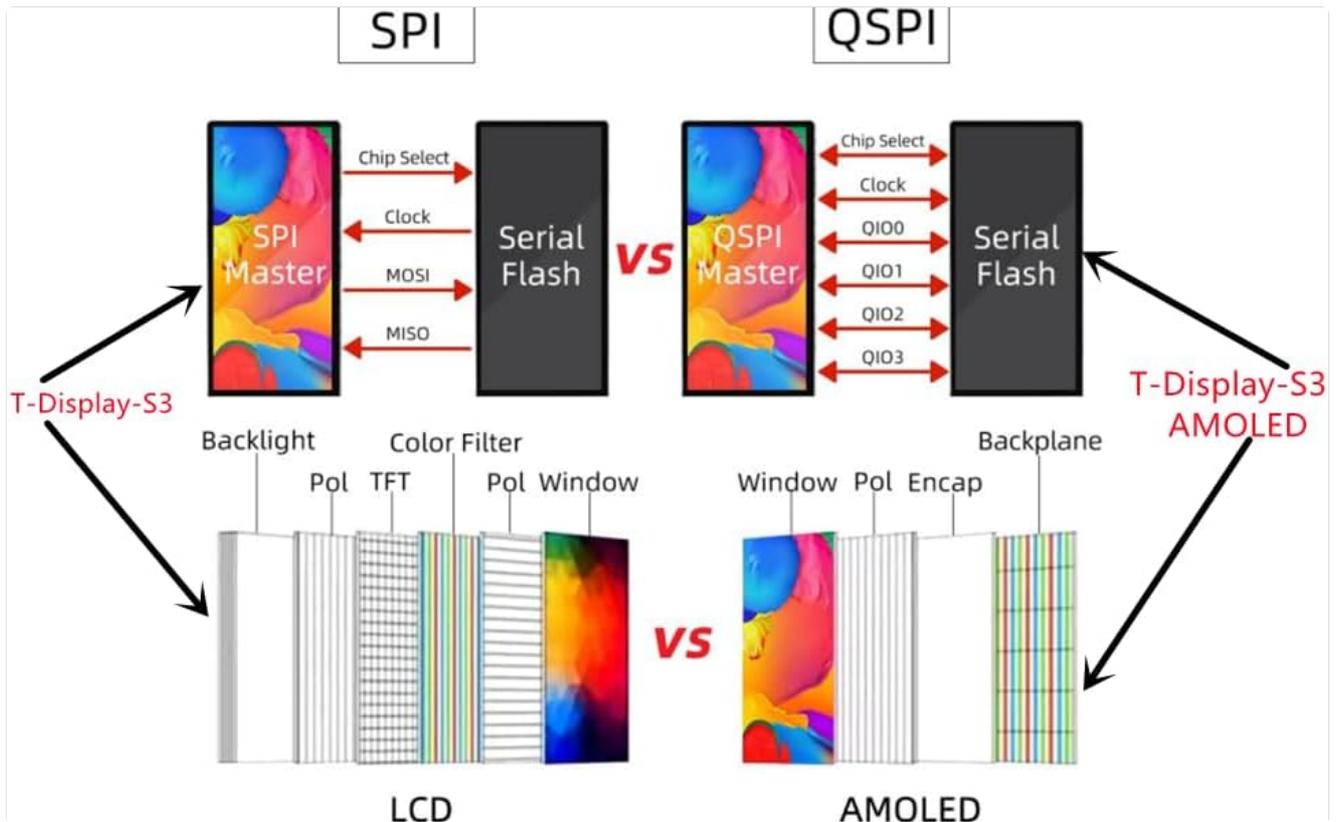


Image: Contents of the LILYGO T-Display-S3 AMOLED package.

## 4. PRODUCT OVERVIEW

The T-Display-S3 AMOLED integrates an ESP32-S3R8 dual-core LX7 microprocessor with a 1.91-inch AMOLED display. Key features include:

- **Upgraded Display:** Transition from LCD to AMOLED for superior color, contrast, and power efficiency.
- **Faster Interface:** Upgraded from SPI to QSPI for improved display data transfer speeds.
- **Enhanced Wireless:** Features a 3D antenna for better Wi-Fi and Bluetooth signal reception compared to onboard antennas.
- **Onboard Functions:** Includes Boot (IO0), Reset, and IO21 buttons for easy interaction and programming.
- **Battery Management:** Supports battery voltage detection (IO04) and includes a JST-SH 1.0mm 4-Pin connector for external battery.



Image: Front view of the T-Display-S3 AMOLED.

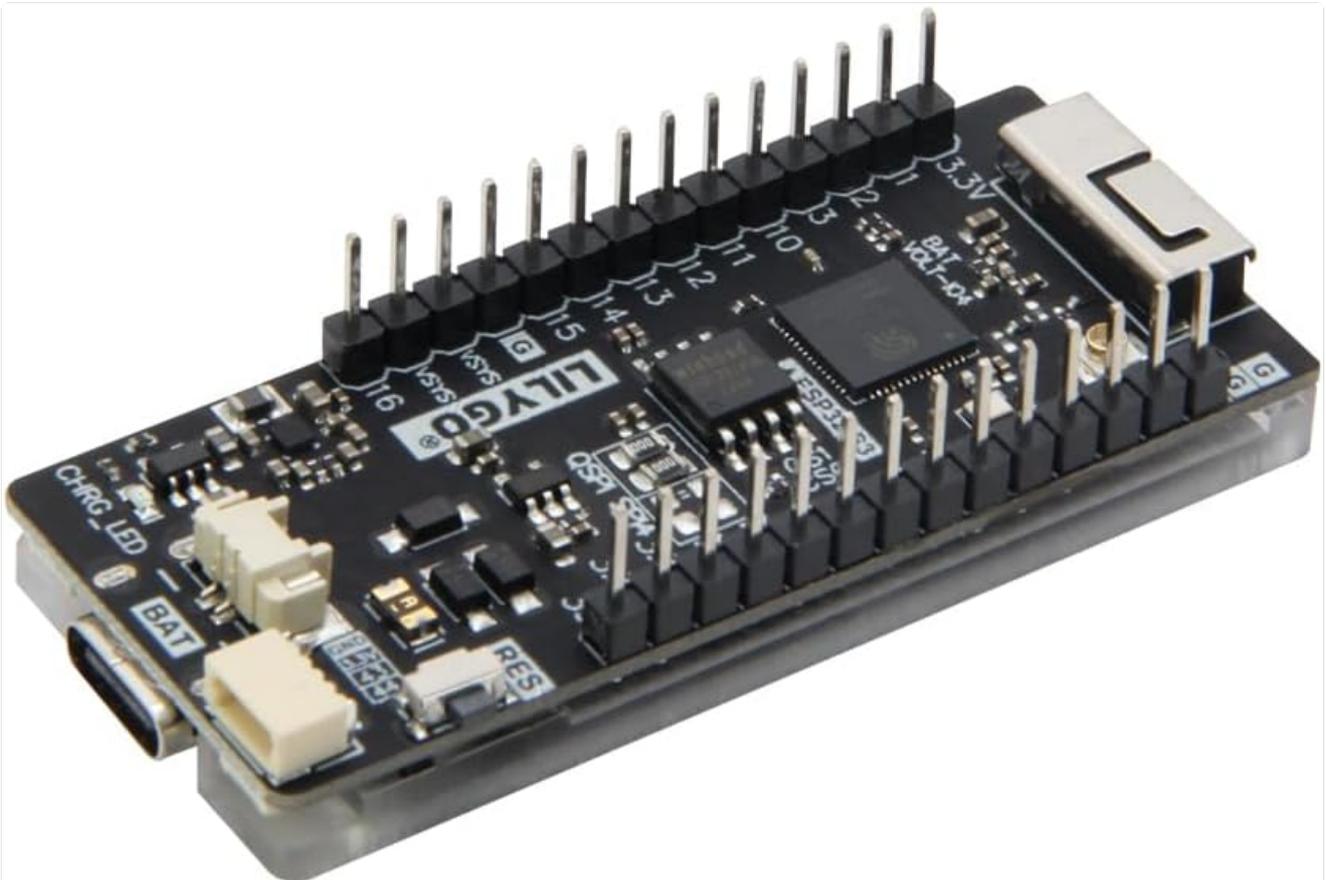
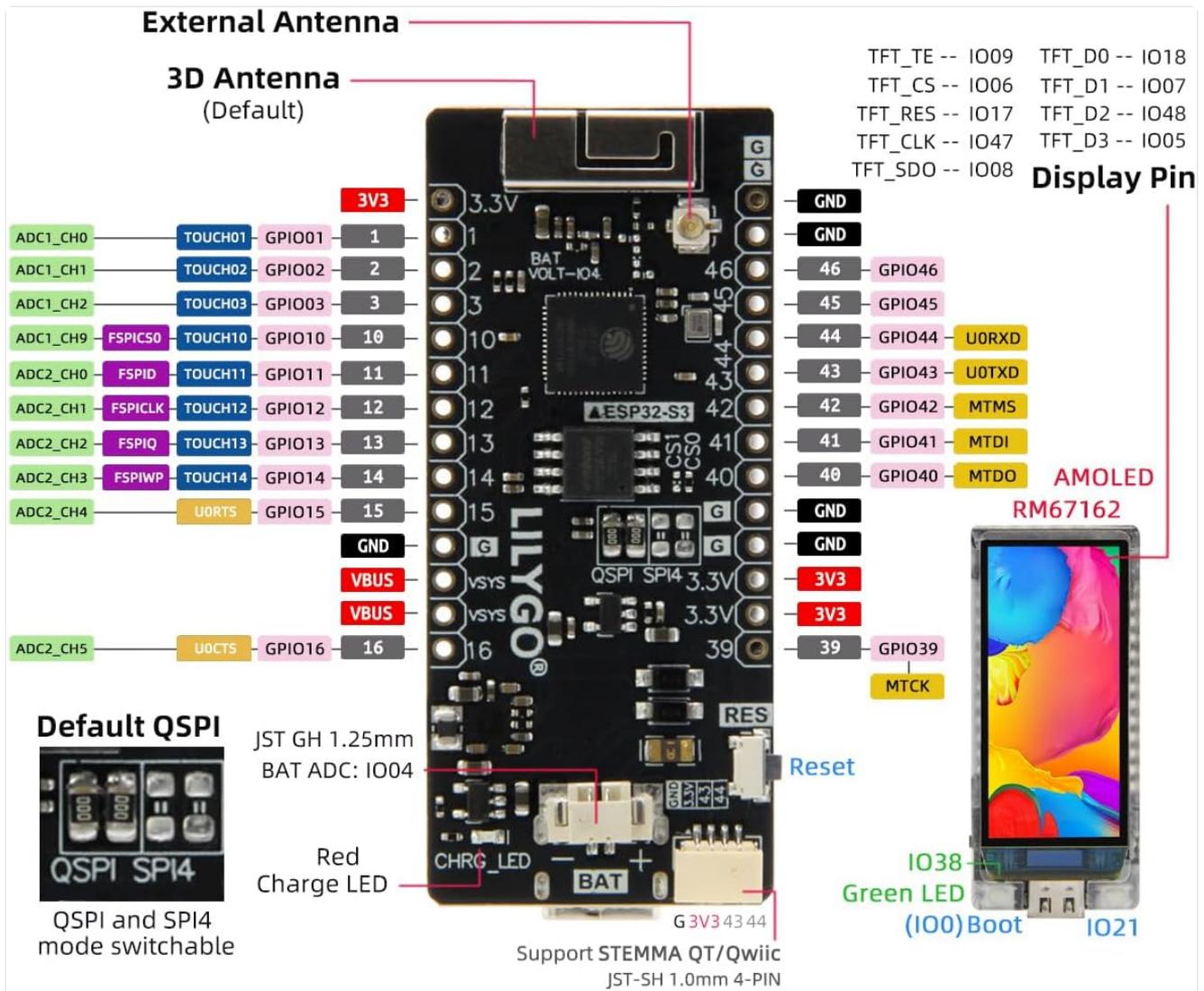


Image: Back view of the T-Display-S3 AMOLED.



# LILYGO T-Display-S3 AMOLED

ESP32-S3 + 1.91 inch 240\*536 IPS AMOLED Display

Image: Pinout diagram of the T-Display-S3 AMOLED.



## 6. SETUP GUIDE

### 6.1 Initial Connection

1. Connect the T-Display-S3 AMOLED to your computer using a USB-C cable. The board should power on, and the display may show a default test pattern or remain blank if no firmware is loaded.
2. If using an external battery, connect it to the JST-SH 1.0mm 4-Pin battery connector. Ensure correct polarity.

### 6.2 Software Environment Setup

The LILYGO T-Display-S3 AMOLED can be programmed using various development environments. The most common are Arduino IDE, PlatformIO, and Micropython.

- **Arduino IDE:** Install the ESP32 board package and necessary libraries (e.g., TFT\_eSPI). Refer to the official LILYGO GitHub repository for specific board definitions and example code.
- **PlatformIO:** Set up your PlatformIO environment and configure it for the ESP32-S3 board. Example projects are available on the LILYGO GitHub.
- **Micropython:** Flash the Micropython firmware to the ESP32-S3 and use a serial terminal or IDE (like Thonny) to interact with the board.

**Important:** For detailed setup instructions, driver installation, and example code, always refer to the official LILYGO GitHub repository: [github.com/Xinyuan-LilyGO/T-Display-S3-AMOLED](https://github.com/Xinyuan-LilyGO/T-Display-S3-AMOLED)

## 7. OPERATING INSTRUCTIONS

### 7.1 Uploading Firmware

Once your development environment is set up, you can upload your custom code or example sketches to the board.

1. Select the correct board (ESP32-S3 Dev Module) and COM port in your IDE.
2. Compile your code.
3. Press the "Upload" button in your IDE. You may need to press and hold the **Boot (IO0)** button while pressing and releasing the **Reset** button to put the ESP32-S3 into download mode, then release the Boot button.

### 7.2 Using the AMOLED Display

The 1.91-inch AMOLED display offers vibrant colors and deep blacks. Libraries like TFT\_eSPI are commonly used for graphics operations. Refer to the library documentation and LILYGO examples for drawing text, shapes, images, and managing display updates.

### 7.3 Wireless Connectivity

The ESP32-S3 supports 2.4 GHz Wi-Fi and Bluetooth 5 (LE). You can integrate network functionalities into your projects, such as connecting to Wi-Fi networks, hosting web servers, or communicating with Bluetooth devices. Standard ESP-IDF or Arduino Wi-Fi/Bluetooth libraries are compatible.

### 7.4 Onboard Buttons

- **Boot (IO0):** Used to put the ESP32-S3 into firmware download mode.
- **Reset:** Restarts the board.

- **IO21:** A general-purpose input/output button that can be programmed for various functions within your application.

## 8. MAINTENANCE

- **Cleaning:** Use a soft, dry, anti-static cloth to clean the board and display. Avoid using liquids or abrasive materials.
- **Storage:** Store the board in an anti-static bag in a cool, dry place when not in use.
- **Firmware Updates:** Regularly check the LILYGO GitHub repository for updated firmware, libraries, and examples to ensure optimal performance and access to new features.
- **Protective Film:** The display may come with a thin protective plastic film. This should be carefully peeled off before use to ensure clear viewing and prevent confusion with potential "dead pixels" as noted by some users.

## 9. TROUBLESHOOTING

| Problem                                     | Possible Cause / Solution  |
|---|--|
| <b>Display is blank or shows artifacts.</b> | <ul style="list-style-type: none"> <li>• Check if the protective plastic film is still on the screen. Carefully peel it off.</li> <li>• Ensure correct display initialization code is running.</li> <li>• Verify power supply is stable.</li> <li>• Confirm correct display library and pin configurations are used in your code.</li> </ul>                     |
| <b>Cannot upload code to the board.</b>     | <ul style="list-style-type: none"> <li>• Ensure correct COM port is selected in your IDE.</li> <li>• Verify ESP32-S3 board package is installed and selected.</li> <li>• Try manually putting the board into download mode: hold <b>Boot (IO0)</b>, press and release <b>Reset</b>, then release <b>Boot</b>.</li> <li>• Check USB cable and drivers.</li> </ul> |
| <b>Wi-Fi or Bluetooth not working.</b>      | <ul style="list-style-type: none"> <li>• Ensure correct libraries are included and initialized in your code.</li> <li>• Verify antenna connection (if external). The board has a 3D antenna by default.</li> <li>• Check for proper power supply.</li> </ul>   |
| <b>Board not recognized by computer.</b>    | <ul style="list-style-type: none"> <li>• Install necessary USB-to-Serial drivers (e.g., CP210x or CH340, depending on the board's USB chip).</li> <li>• Try a different USB cable or port.</li> </ul>  |

For more specific issues or advanced debugging, consult the LILYGO GitHub repository's issues section or community forums.

## 10. WARRANTY INFORMATION

LILYGO products are typically covered by a limited manufacturer's warranty against defects in materials and workmanship. The specific terms and duration of the warranty may vary. Please retain your proof of purchase for warranty claims.

For detailed warranty information and to initiate a claim, please contact the seller or refer to the official LILYGO website.

## 11. SUPPORT

For technical support, documentation, and community resources, please visit the official LILYGO GitHub repository:

[github.com/Xinyuan-LilyGO/T-Display-S3-AMOLED](https://github.com/Xinyuan-LilyGO/T-Display-S3-AMOLED)

This repository contains:

- Example code and libraries
- Detailed schematics and datasheets
- Firmware updates
- Community discussion and issue tracking

For purchase-related inquiries, returns, or replacements, please contact Amazon customer service directly.

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This manual is subject to change without notice.

### Related Documents

|  |   |
|--|---|
| <p>T-Display-S3-AMOLED 1.43<br/>User Guide</p>  <p>Version 1.4<br/>Copyright © 2023</p> | <p><a href="#">LILYGO T-Display-S3-AMOLED 1.43 User Guide</a></p> <p>This user guide provides comprehensive instructions for setting up the development environment for the LILYGO T-Display-S3-AMOLED 1.43 board using Arduino, covering software installation, configuration, and essential commands for the ESP32-S3 module.</p> |
|--|---|

|  |  |
|--|--|
| <p>T-Display-S3<br/>User Guide</p>  <p>Version 1.0<br/>Copyright © 2022</p> | <p><a href="#">LILYGO T-Display-S3 User Guide</a></p> <p>A user guide for the LILYGO T-Display-S3 development board, covering setup, Arduino IDE usage, and basic Wi-Fi commands.</p>  |
| <p>T-BEAM-S3<br/>User Guide</p>  <p>Version 1.0<br/>Copyright © 2022</p>    | <p><a href="#">LILYGO T-BEAM-S3 User Guide: Setup and Development</a></p> <p>This user guide provides comprehensive instructions for setting up the LILYGO T-BEAM-S3 development board. Learn how to configure the software environment using Arduino IDE, connect the board, and utilize its Wi-Fi, BLE, GPS, and LoRa capabilities for IoT projects.</p> |
| <p>T-WATCH S3<br/>User Guide</p>  <p>Version 1.0<br/>Copyright © 2022</p>   | <p><a href="#">LILYGO T-WATCH S3 User Guide: Setup and Development with Arduino</a></p> <p>Learn to develop IoT applications with the LILYGO T-WATCH S3. This guide covers setting up the Arduino IDE, programming the ESP32-S3, and using SSC commands, provided by Xinyuan.</p>  |

Documents - LILYGO – T-Display-S3 AMOLED



**BACL** **NVLAD**

**TEST REPORT**

Applicant Name: Shenzhen Xin Yuan Electronic Technology Co., Ltd.  
Address: Room 801-803, Yousuowei Building, No.2000, JiaXian Road, Bantian Street, Longgang District, Shenzhen, Guangdong, China

Report Number: 2401Z59114E\_RF\_00A  
FCC ID: 2401Z59114E\_RF\_00A  
2401Z59114E\_RF\_00A

Test Standard(s): FCC PART 15.247

Sample Description: T-Display-S3-AMOLED  
Product Type: T-Display-S3-AMOLED  
Model No.: T-Display-S3-AMOLED 1.43  
Multiple Model(s) No.: T-Display-S3-AMOLED 1.75, T-Display-S3-AMOLED 1.75  
Trade Mark: LILYGO  
Date Received: 2024-11-22  
Issue Date: 2025-03-14

Test Results: Pass

Prepared and Checked By: Gela Liu, RF Engineer  
Approved By: Michelle Zeng, RF Supervisor

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Tel: +86 755 83222222 Fax: +86 755 83222222

TR-024-01/2022 Page 1 of 78 Version 4.0

[pdf] Test Report

Microsoft Word 2401Z59114E RF 00A FCC Part 15 247 BLE Report ok 2003 winnie xiao Test Shenzhen Xin Yuan Electronic Technology Co Ltd TDISS3 AMOLED T Display S3 2ASYE 2ASYETDISS3AMOLED tdiss3 amoled

Applicant Name: Address: Report Number: FCC ID: Test Standard s FCC PART 15.247 Sample Description Product Type: Model No.: Multiple Model s No.: Trade Mark: Date Received: Issue Date: TEST REPORT Shenzhen Xin Yuan Electronic Technology Co., Ltd. Room 801-803, Yousuowei Building, No.2000, JiaXia... lang:en score:18 filesize: 2.93 M page\_count: 78 document date: 2025-03-14

**BACL** **INVLAP**

### TEST REPORT

**Applicant Name:** Shenzhen Xin Yuan Electronic Technology Co., Ltd.  
**Address:** Room 801-803, Yousuwei Building, No.2000, JiaXian Road, Bantian Street, Longgang District, Shenzhen, Guangdong, China  
**Report Number:** 2401Z59114E-RF-00B  
**FCC ID:** 245RE-TDISS3-AMOLED

**Test Standard(s):** FCC PART 15.247

**Sample Description:**  
**Product Type:** T-Display-S3-AMOLED  
**Model No.:** T-Display-S3-AMOLED 1.03  
**Multiple Model(s) No.:** T-Display-S3-AMOLED 1.75, T-Display-S3-AMOLED 1.75  
**Trade Mark:** LANSIQI  
**Date Received:** 2024-11-22  
**Issue Date:** 2025-03-14

**Test Result:** Pass

**Prepared and Checked By:** Gela Liu, Li  
**Approved By:** Michelle Zeng

**RF Engineer:** Gela Liu  
**RF Supervisor:** Michelle Zeng

China Certification & Inspection Co., Ltd. (CIC) is a member of the laboratory network of the International Laboratory Accreditation Cooperation (ILAC) and the Asia Pacific Economic Cooperation (APEC) Mutual Recognition Arrangement (MRA). The laboratory is also a member of the International Laboratory Accreditation Cooperation (ILAC) and the Asia Pacific Economic Cooperation (APEC) Mutual Recognition Arrangement (MRA). The laboratory is also a member of the International Laboratory Accreditation Cooperation (ILAC) and the Asia Pacific Economic Cooperation (APEC) Mutual Recognition Arrangement (MRA).

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[pdf] Test Report

Microsoft Word 2401Z59114E RF 00B FCC Part 15 247 2 4G Wi Fi Report 2003 winnie xiao Test Shenzhen Xin Yuan Electronic Technology Co Ltd TDISS3 AMOLED T Display S3 2ASYE 2ASYETDISS3AMOLED tdiss3 amoled

Applicant Name: Address: Report Number: FCC ID: Test Standard s FCC PART 15.247 Sample Description Product Type: Model No.: Multiple Model s No.: Trade Mark: Date Received: Issue Date: TEST REPORT Shenzhen Xin Yuan Electronic Technology Co., Ltd. Room 801-803, Yousuwei Building, No.2000, JiaXia... lang:en score:17 filesize: 4.32 M page\_count: 105 document date: 2025-03-14

**中认信通** **ACCREDITED**

### TEST REPORT

**Applicant:** Shenzhen Xin Yuan Electronic Technology Co., Ltd.  
**Address:** Room 801-803, Yousuwei Building, No.2000, JiaXian Road, Bantian Street, Longgang District, Shenzhen, Guangdong, China  
**FCC ID:** 2ASYE-T-DISPLAY-191  
**Product Name:** T-Display-S3 AMOLED 1.91  
**Standard(s):** 47 CFR Part 15, Subpart C(15.247)  
**ANSI C63.18-2013**  
**KDB 588074 D01 15.247 Meas Guidance v05d2**

**Report Number:** CR231167869-00A  
**Date Of Issue:** 2024.11.10  
**Reviewed By:** Calvin Chen  
**Approved By:** Sun Zhang

**Test Laboratory:** China Certification & Inspection Co., Ltd. (Dongguan)  
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 Tel: +86-769-22102888

[pdf] Test Report

Microsoft Word CR231167869 00A BLE Report winnie xiao Test Report1 Shenzhen Xin Yuan Electronic Technology Co Ltd T DISPLAY 19 2ASYE 2ASYETDISPLAY19 t display

TEST REPORT Applicant: Shenzhen Xin Yuan Electronic Technology Co., Ltd. Address: Room 801-803, Yousuwei Building, No.2000, JiaXian Road, Bantian Street, Longgang District, Shenzhen, Guangdong, China FCC ID: 2ASYE-T-DISPLAY-191 Product Name: T-Display-S3 AMOLED 1.91 Standard s : 47 CFR Part 15... lang:en score:13 filesize: 972.87 K page\_count: 58 document date: 2024-03-19

**中认信通** **ACCREDITED**

### TEST REPORT

**Applicant:** Shenzhen Xin Yuan Electronic Technology Co., Ltd.  
**Address:** Room 801-803, Yousuwei Building, No.2000, JiaXian Road, Bantian Street, Longgang District, Shenzhen, Guangdong, China  
**FCC ID:** 2ASYE-T-DISPLAY-191  
**Product Name:** T-Display-S3 AMOLED 1.91  
**Standard(s):** 47 CFR Part 15, Subpart C(15.247)  
**ANSI C63.18-2013**  
**KDB 588074 D01 15.247 Meas Guidance v05d2**

**Report Number:** CR231167869-00B  
**Date Of Issue:** 2024.11.10  
**Reviewed By:** Calvin Chen  
**Approved By:** Sun Zhang

**Test Laboratory:** China Certification & Inspection Co., Ltd. (Dongguan)  
 No. 115, Pingfang Road, Dongfang Town, Dongguan, Guangdong, China  
 Tel: +86-769-22102888

[pdf] Test Report

Microsoft Word CR231167869 00B WiFi Report winnie xiao Test Report2 Shenzhen Xin Yuan Electronic Technology Co Ltd T DISPLAY 19 2ASYE 2ASYETDISPLAY19 t display

TEST REPORT Applicant: Shenzhen Xin Yuan Electronic Technology Co., Ltd. Address: Room 801-803, Yousuwei Building, No.2000, JiaXian Road, Bantian Street, Longgang District, Shenzhen, Guangdong, China FCC ID: 2ASYE-T-DISPLAY-191 Product Name: T-Display-S3 AMOLED 1.91 Standard s : 47 CFR Part 15... lang:en score:11 filesize: 1.35 M page\_count: 70 document date: 2024-03-19