

# RF EXPOSURE Test Report

**Product:** Aftermarket Automotive Type-C HUD  
(Head-Up Display) - V Series

**Trade Mark:** VIVIHUD

**Model Number:** EW-HUDV5-Ultra

**FCC ID:** 2BVR2-EW-HUDV5

**Prepared for**

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Unit 324, Yilifang Intangible Cultural Heritage Industrial Park, Shayi  
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## Table of Contents

|          |                                                   |          |
|----------|---------------------------------------------------|----------|
| <b>1</b> | <b>GENERAL DESCRIPTION .....</b>                  | <b>5</b> |
| 1.1      | DESCRIPTION OF EUT .....                          | 5        |
| 1.2      | TEST MODE.....                                    | 6        |
| 1.3      | TEST SETUP .....                                  | 6        |
| 1.4      | ANCILLARY EQUIPMENT .....                         | 6        |
| <b>2</b> | <b>TEST FACILITIES AND ACCREDITATIONS .....</b>   | <b>7</b> |
| 2.1      | TEST LABORATORY .....                             | 7        |
| 2.2      | ENVIRONMENTAL CONDITIONS .....                    | 7        |
| 2.3      | MEASUREMENT UNCERTAINTY .....                     | 7        |
| 2.4      | TEST SOFTWARE .....                               | 7        |
| <b>3</b> | <b>LIST OF TEST EQUIPMENT .....</b>               | <b>8</b> |
| <b>4</b> | <b>RF EXPOSURE.....</b>                           | <b>9</b> |
| 4.1      | STANDALONE SAR TEST EXCLUSION CONSIDERATIONS..... | 9        |
| 4.1.1.   | <i>Limit</i> .....                                | 9        |
| 4.1.2.   | <i>Test Result</i> .....                          | 9        |

## TEST RESULT CERTIFICATION

**Applicant's Name**..... : Shenzhen Luchi Electronics Technology Co., Ltd.  
Unit 324, Yilifang Intangible Cultural Heritage Industrial Park,  
**Address** ..... : Shayi Community, Shajing Subdistrict, Bao'an District,  
Shenzhen  
**Manufacturer's Name** ..... : Shenzhen Jieshi Haoyu Technology Co., Ltd.  
Room 301, Avatar Benran Intangible Cultural Heritage Industrial  
**Address** ..... : Park, Shayi Community, Shajing Subdistrict, Bao'an District,  
Shenzhen

### Product description

**Product name** ..... : Aftermarket Automotive Type-C HUD (Head-Up Display) - V  
Series  
**Model Number** ..... : EW-HUDV5-Ultra

**Standards** ..... : FCC CFR 47 PART 1 , 1.1310

**Test procedure**..... : KDB 447498 D01 General RF Exposure Guidance v06

This device described above has been tested by Shenzhen HongBiao Certification& Testing Co., Ltd and the test results show that the equipment under test (EUT) is in compliance with the EMC requirements. And it is applicable only to the tested sample identified in the report.

**Date of Test**..... :

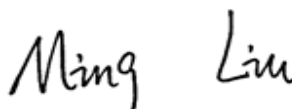
**Date (s) of performance of tests**..... : May 19, 2026~July 09, 2026

**Test Result**..... : **Pass**

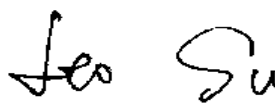
**Testing Engineer** :

  
( Z o e S u )

**Technical Manager** :

  
( M i n g L i u )

**Authorized Signatory** :

  
( L e o S u )

## Revision History

[illegible]

# 1 General Description

## 1.1 Description of EUT

|                            |                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product name:              | Aftermarket Automotive Type-C HUD (Head-Up Display) - V Series                                                                                                                                                                                                                                                                                                               |
| Model name:                | EW-HUDV5-Ultra                                                                                                                                                                                                                                                                                                                                                               |
| Series Model:              | EW-HUDVXXX...                                                                                                                                                                                                                                                                                                                                                                |
| Different of series model: | All the models are the same circuit and module, except the model No. (XXX... is a variable that can be replaced with any number, letter, or symbol).                                                                                                                                                                                                                         |
| Operation frequency:       | BLE: 2402-2480MHz<br>BR&EDR: 2402-2480MHz<br>2.4GHz WIFI: IEEE 802.11b/g/n20: 2412-2472MHz<br>IEEE 802.11n40: 2422-2462MHz<br>5GHz WIFI:<br>U-NII-1: 5180-5240MHz<br>U-NII-3: 5745-5825MHz                                                                                                                                                                                   |
| Modulation type:           | BLE: GFSK<br>BR&EDR: GFSK, $\pi/4$ -DQPSK, 8DPSK<br>2.4GHz WIFI: IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)<br>IEEE 802.11g/n (HT20/H40): OFDM (BPSK, QPSK, 16QAM, 64QAM)<br>5GHz WIFI: 802.11a/n: OFDM(BPSK,QPSK,16QAM, 64QAM)                                                                                                                                                  |
| Bit Rate of transmitter:   | BLE: 1 Mbps, 2 Mbps<br>BR&EDR: 1 Mbps, 2Mbps, 3Mbps<br>2.4GHz WIFI: IEEE 802.11b: 1/2/5.5/11Mbps<br>IEEE 802.11g: 6/9/12/18/24/36/48/54Mbps<br>IEEE 802.11n(20MHz): MCS0-7, up to 150Mbps<br>IEEE 802.11n(40MHz): MCS0-7, up to 300Mbps<br>5GHz WIFI: 802.11a: 6,9,12,18,24,36,48,54Mbps<br>802.11n (20MHz): MCS0-7, up to 150Mbps<br>802.11n (40MHz): MCS0-7, up to 300Mbps |
| Antenna type:              | FPC Antenna                                                                                                                                                                                                                                                                                                                                                                  |
| Antenna gain:              | BLE: 1.93 dBi<br>BR&EDR: 1.93 dBi<br>2.4GHz WIFI: 1.93 dBi<br>5GHz WIFI:<br>U-NII-1: 4.46 dBi<br>U-NII-3: 4.46 dBi                                                                                                                                                                                                                                                           |
| Max. output power:         | BLE: 2.5 dBm<br>BR&EDR: 3.02 dBm<br>2.4GHz WIFI: 16.82 dBm<br>5GHz WIFI:<br>U-NII-1: 17.1dBm<br>U-NII-3: 17.43dBm                                                                                                                                                                                                                                                            |

|                      |                   |
|----------------------|-------------------|
| Hardware version:    | V1.0              |
| Software version:    | V1.0              |
| Battery:             | N/A               |
| Power supply:        | Input: DC 12V-15V |
| Adapter information: | N/A               |

## 1.2 Test Mode

| Pretest Test Mode | Description of Mode |
|-------------------|---------------------|
| 1                 | TX                  |
| 2                 | /                   |
| 3                 | /                   |

## 1.3 Test Setup

See photographs of the test setup in the report for the actual setup and connections between EUT and support equipment.

## 1.4 Ancillary Equipment

| Equipment | Model | S/N | Manufacturer |
|-----------|-------|-----|--------------|
| /         | /     | /   | /            |
|           |       |     |              |
|           |       |     |              |
|           |       |     |              |

## 2 Test Facilities and Accreditations

### 2.1 Test Laboratory

|                       |                                                                                                                                                   |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Site             | Shenzhen HongBiao Certification& Testing Co., Ltd                                                                                                 |
| Test Site Location    | Room 102, 201, Building 2, Yuanwanggu RFID Industrial Park, Tongguan Road, Tianliao Community, Yutang Street, Guangming District, Shenzhen, China |
| Telephone:            | (86-755) 2998 9321                                                                                                                                |
| Fax:                  | (86-755) 2998 5110                                                                                                                                |
| Designation Number:   | 848916                                                                                                                                            |
| FCC Registration No.: | CN1341                                                                                                                                            |
| A2LA Certificate No.: | 6765.01                                                                                                                                           |

### 2.2 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

|                    |              |
|--------------------|--------------|
| Temperature:       | 15°C~35°C    |
| Relative Humidity: | 20%~75%      |
| Air Pressure:      | 98kPa~101kPa |

### 2.3 Measurement Uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expended uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

The data and results quoted in this document are true and accurate values, and uncertainties are not involved in the calculations.

In addition, components and mass production processes that are similar to testing equipment may introduce additional deviations, and the manufacturer is solely responsible for the continued compliance of the equipment.

| Measurement Frequency Range | U, (dB)            | Note |
|-----------------------------|--------------------|------|
| RF frequency                | $2 \times 10^{-5}$ |      |
| RF power, conducted         | $\pm 0.57$ dB      |      |
| Temperature                 | $\pm 1$ degree     |      |
| Humidity                    | $\pm 5$ %          |      |

### 2.4 Test Software

| Software name  | Manufacturer | Model    | Version  |
|----------------|--------------|----------|----------|
| RF Test System | MWRF         | MTS 8310 | V2.0.0.0 |

### 3 List of Test Equipment

| RF   |               |                                     |              |             |            |                  |            |
|------|---------------|-------------------------------------|--------------|-------------|------------|------------------|------------|
| Item | Equipment No. | Equipment name                      | Manufacturer | Model       | Serial No. | Calibration date | Due date   |
| 1    | HB-E041       | MXG Anaioog Signal Generator        | Agilent      | N5181A      | MY47070421 | 2026-04-27       | 2027-04-26 |
| 2    | HB-E042       | WIDEBAND RADIO COMMUNICATION TESTER | R&S          | CMW500      | 132108     | 2026-04-27       | 2027-04-26 |
| 3    | HB-E043       | MXG Anaioog Signal Generator        | Agilent      | N5182A      | US46240335 | 2026-04-28       | 2027-04-27 |
| 4    | HB-E044       | Signal& spectrum Analyzer           | R&S          | FSV3044     | 101264     | 2026-04-28       | 2027-04-27 |
| 5    | HB-E045       | RF Control Box                      | Noyetec      | NY100-R FCB | N/A        | 2026-04-28       | 2027-04-27 |
| 6    | HB-E058       | Thermometer Clock Humidity Monitor  | N/A          | HTC-1S      | N/A        | 2026-04-30       | 2027-04-29 |

Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

## 4 RF Exposure

### 4.1 Standalone SAR test exclusion considerations

#### 4.1.1. Limit

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) Radiation as specified in §1.1307(b).

Maximum Permissible Exposure (MPE)

| Frequency range (MHz)                                          | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|----------------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| <b>(A) Limits for Occupational/Controlled Exposure</b>         |                               |                               |                                     |                          |
| 0.3-3.0                                                        | 614                           | 1.63                          | *100                                | 6                        |
| 3.0-30                                                         | 1842/f                        | 4.89/f                        | *900/f <sup>2</sup>                 | 6                        |
| 30-300                                                         | 61.4                          | 0.163                         | 1.0                                 | 6                        |
| 300-1,500                                                      |                               |                               | f/300                               | 6                        |
| 1,500-100,000                                                  |                               |                               | 5                                   | 6                        |
| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                               |                               |                                     |                          |
| 0.3-1.34                                                       | 614                           | 1.63                          | *100                                | 30                       |
| 1.34-30                                                        | 824/f                         | 2.19/f                        | *180/f <sup>2</sup>                 | 30                       |
| 30-300                                                         | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300-1,500                                                      |                               |                               | f/1500                              | 30                       |
| 1,500-100,000                                                  |                               |                               | 1.0                                 | 30                       |

f = frequency in MHz \* = Plane-wave equivalent power density

#### MPE Calculation Method

Friis transmission formula:  $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

$P_d$  = Power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

$G$  = Numeric gain of the antenna relative to isotropic antenna

$\pi$  = 3.1415926

$R$  = distance between observation point and center of the radiator in cm(20cm)

$P_d$  the limit of MPE, 1mW/cm<sup>2</sup>.

If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

#### 4.1.2. Test Result

##### BLE:

Operation Frequency: 2402-2480MHz,

Power density limited: 1mW/ cm<sup>2</sup>

##### BR&EDR:

Operation Frequency: 2402-2480MHz,

Power density limited: 1mW/ cm<sup>2</sup>

##### 2.4GHz WIFI:

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz,

802.11n HT40: 2422-2452MHz,

Power density limited: 1mW/ cm<sup>2</sup>

##### 5GHz WIFI:

802.11a: 20 MHz

802.11n: 20 MHz, 40 MHz

Antenna Type: FPC Antenna;  
WIFI antenna gain: 4.46dBi  
R=20cm  
 $mW=10^{(dBm/10)}$   
antenna gain Numeric= $10^{(dBi/10)}=10^{(4.46/10)}=2.79$

BLE(Worst):

| Chann<br>el Freq.<br>(MHz) | modulation | conductive<br>d power | Tune-u<br>p<br>power<br>(dBm) | Max           |       | Antenna |             | Evaluation<br>result  | Power<br>density<br>Limits |
|----------------------------|------------|-----------------------|-------------------------------|---------------|-------|---------|-------------|-----------------------|----------------------------|
|                            |            | (dBm)                 |                               | tune-up power |       | Gain    |             | (mW/cm <sup>2</sup> ) | (mW/cm <sup>2</sup> )      |
|                            |            |                       |                               | (dBm)         | (mW)  | (dBi)   | Num<br>eric |                       |                            |
| 2402                       | GFSK(2M)   | 2.5                   | 2±1                           | 3             | 1.995 | 1.93    | 1.56        | 0.0006                | 1                          |

BR&EDR:

| Chann<br>el Freq.<br>(MHz) | modulation | conductive<br>d power | Tune-u<br>p<br>power<br>(dBm) | Max           |       | Antenna |             | Evaluation<br>result  | Power<br>density<br>Limits |
|----------------------------|------------|-----------------------|-------------------------------|---------------|-------|---------|-------------|-----------------------|----------------------------|
|                            |            | (dBm)                 |                               | tune-up power |       | Gain    |             | (mW/cm <sup>2</sup> ) | (mW/cm <sup>2</sup> )      |
|                            |            |                       |                               | (dBm)         | (mW)  | (dBi)   | Num<br>eric |                       |                            |
| 2402                       | 8DPSK      | 3.02                  | 3±1                           | 4             | 2.512 | 1.93    | 1.56        | 0.0008                | 1                          |

2.4GHz WIFI:

| Chann<br>el Freq.<br>(MHz) | modulation | conductive<br>d power | Tune-up<br>power<br>(dBm) | Max           |        | Antenna |             | Evaluation<br>result  | Power<br>density<br>Limits |
|----------------------------|------------|-----------------------|---------------------------|---------------|--------|---------|-------------|-----------------------|----------------------------|
|                            |            | (dBm)                 |                           | tune-up power |        | Gain    |             | (mW/cm <sup>2</sup> ) | (mW/cm <sup>2</sup> )      |
|                            |            |                       |                           | (dBm)         | (mW)   | (dBi)   | Num<br>eric |                       |                            |
| 2462                       | 802.11n20  | 16.82                 | 16±1                      | 17            | 50.119 | 1.93    | 1.56        | 0.0155                | 1                          |

5GHz WIFI:

| Chann<br>el Freq.<br>(MHz) | modulation | conductive<br>d power | Tune-u<br>p<br>power<br>(dBm) | Max           |        | Antenna |             | Evaluation<br>result  | Power<br>density<br>Limits |
|----------------------------|------------|-----------------------|-------------------------------|---------------|--------|---------|-------------|-----------------------|----------------------------|
|                            |            | (dBm)                 |                               | tune-up power |        | Gain    |             | (mW/cm <sup>2</sup> ) | (mW/cm <sup>2</sup> )      |
|                            |            |                       |                               | (dBm)         | (mW)   | (dBi)   | Num<br>eric |                       |                            |
| 5795                       | 802.11n40  | 17.43                 | 17±1                          | 18            | 63.096 | 4.46    | 2.79        | 0.0351                | 1                          |

**Conclusion:**

| NO | Maximum MPE Value            |                                 |                                      |                                    | Limits<br>(mW/cm <sup>2</sup> ) |
|----|------------------------------|---------------------------------|--------------------------------------|------------------------------------|---------------------------------|
|    | BLE<br>(mW/cm <sup>2</sup> ) | BR&EDR<br>(mW/cm <sup>2</sup> ) | 2.4GHz WIFI<br>(mW/cm <sup>2</sup> ) | 5GHz WIFI<br>(mW/cm <sup>2</sup> ) |                                 |
| 1  | 0.0006                       | 0.0008                          | 0.0155                               | 0.0351                             | 1                               |

**Simultaneous transmit:**

| NO | Configurations                                  | Maximum MPE Value            |                                 |                                      |                                    |                            | Limits<br>(mW/cm <sup>2</sup> ) |
|----|-------------------------------------------------|------------------------------|---------------------------------|--------------------------------------|------------------------------------|----------------------------|---------------------------------|
|    |                                                 | BLE<br>(mW/cm <sup>2</sup> ) | BR&EDR<br>(mW/cm <sup>2</sup> ) | 2.4GHz WIFI<br>(mW/cm <sup>2</sup> ) | 5GHz WIFI<br>(mW/cm <sup>2</sup> ) | Transmit<br>simultaneously |                                 |
| 1  | BLE +<br>BR&EDR +<br>2.4GHz WIFI<br>+ 5GHz WiFi | 0.0006                       | 0.0008                          | 0.0155                               | 0.0351                             | 0.052                      | 1                               |

**Note:**

According to KDB 447498 D01 General RF Exposure Guidance v06, At the transmit simultaneously calculation method is as follows:

Transmit simultaneously MPE =  $\Sigma$  of MPE ratios

MPE ratios = Field strengths or power density / MPE limit at the test frequency

For the max result:  $0.052 \leq 1.0$  SAR, No SAR is required.

**\*\*\*\*\* END OF REPORT \*\*\*\*\***