

# RF EXPOSURE Test Report

**Product:** Automotive Diagnostic Dongle

**Trade Mark:** THINKCAR, XHINKCAR, MUCAR

**Model Number:** TKVCIR

**FCC ID:** 2AUARTKTV CIR

**Prepared for**

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2606, building 4, phase II, TiananYungu, Gangtou community, Bantian,  
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**Prepared by**

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## TEST RESULT CERTIFICATION

**Applicant's Name**..... : THINKCAR TECH CO., LTD.  
**Address** ..... : 2606, building 4, phase II, TiananYungu, Gangtou community,  
Bantian, Longgang District, Shenzhen, China  
**Manufacturer's Name** ..... : THINKCAR TECH CO., LTD.  
**Address** ..... : 2606, building 4, phase II, TiananYungu, Gangtou community,  
Bantian, Longgang District, Shenzhen, China

### Product description

**Product name** ..... : Automotive Diagnostic Dongle  
**Model Number** ..... : TKVCIR

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

**Test procedure**..... : KDB 447498 D01 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**..... : September 12, 2023 ~ October 11, 2023

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

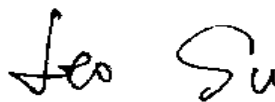
**Testing Engineer** :

  
( Z o e S u )

**Technical Manager** :

  
( G a r y L u )

**Authorized Signatory** :

  
( L e o S u )

[illegible]

# 1 General Description

## 1.1 Description of EUT

|                            |                              |
|----------------------------|------------------------------|
| Product name:              | Automotive Diagnostic Dongle |
| Model name:                | TKVCIR                       |
| Series Model:              | /                            |
| Different of series model: | N/A                          |
| Operation frequency:       | 2402-2480MHz                 |
| Modulation type:           | GFSK, $\pi/4$ -DQPSK, 8DPSK  |
| Bit Rate of transmitter:   | 1 Mbps, 2Mbps, 3Mbps         |
| Antenna type:              | FPCB Antenna                 |
| Antenna gain:              | 4.23dBi                      |
| Max. output power:         | -5.59dBm                     |
| Hardware version:          | V1.0                         |
| Software version:          | V1.0                         |
| Power supply:              | DC 9~18V                     |
| Adapter information:       | N/A                          |

## 1.2 Test Mode

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

## 1.3 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                                                                                                                                |
| 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 %.

| Measurement Frequency Range      | $U$ , (dB)         | Note |
|----------------------------------|--------------------|------|
| RF frequency                     | $2 \times 10^{-5}$ |      |
| RF power, conducted              | $\pm 0.57$ dB      |      |
| Conducted emission(150kHz~30MHz) | $\pm 2.5$ dB       |      |
| Radiated emission(30MHz~1GHz)    | $\pm 4.2$ dB       |      |
| Radiated emission (above 1GHz)   | $\pm 4.7$ dB       |      |
| Temperature                      | $\pm 1$ degree     |      |
| Humidity                         | $\pm 5$ %          |      |

### 2.4 Test Software

| Software name         | Manufacturer | Model    | Version |
|-----------------------|--------------|----------|---------|
| Conducted test system | MWRF-test    | MTS 8310 | V2.0.0  |

### 3 List of Test Equipment

| RF   |               |                                              |              |                |            |                  |            |
|------|---------------|----------------------------------------------|--------------|----------------|------------|------------------|------------|
| Item | Equipment No. | Equipment name                               | Manufacturer | Model          | Serial No. | Calibration date | Due date   |
| 1    | HB-E041       | MXG Anaio<br>Signal Generator                | Agilent      | N5181A         | MY47070421 | 2023-05-11       | 2024-05-10 |
| 2    | HB-E042       | WIDEBAND<br>RADIO<br>COMMUNICATION<br>TESTER | R&S          | CMW500         | 132108     | 2023-05-11       | 2024-05-10 |
| 3    | HB-E043       | MXG Anaio<br>Signal Generator                | Agilent      | N5182A         | US46240335 | 2023-05-11       | 2024-05-10 |
| 4    | HB-E044       | Signal &<br>spectrum<br>Analyzer             | R&S          | FSV3044        | 101264     | 2023-05-11       | 2024-05-10 |
| 5    | HB-E045       | RF Control<br>Box                            | Noyetec      | NY100-R<br>FCB | N/A        | /                | /          |
| 6    | HB-E058       | Thermometer<br>Clock<br>Humidity<br>Monitor  | N/A          | HTC-1          | N/A        | /                | /          |

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

3.0 for 1g SAR.

#### 4.1.2. Test Procedures

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition(s), listed below, is (are) satisfied.

These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

The minimum test separation distance defined in 4.1 f) is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander.

To qualify for SAR test exclusion, the test separation distances applied must be fully explained and justified, typically in the SAR measurement or SAR analysis report, by the operating configurations and exposure conditions of the transmitter and applicable host platform requirements, according to the required published RF exposure KDB procedures.

When no other RF exposure testing or reporting are required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for SAR test exclusion.

When required, the device specific conditions described in the other published RF exposure KDB procedures must be satisfied before applying these SAR test exclusion provisions.

- a) For 100 MHz to 6 GHz and test separation distances  $\leq 50$  mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$$\left[ \frac{\text{(max. power of channel, including tune-up tolerance, mW)}}{\text{(min. test separation distance, mm)}} \right] \cdot \sqrt{f(\text{GHz})} \leq 3.0 \text{ for 1-g SAR, and } \leq 7.5 \text{ for 10-g extremity SAR, where}$$

- $f_{(\text{GHz})}$  is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- The values 3.0 and 7.5 are referred to as *numeric thresholds* in step b) below

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

- b) For 100 MHz to 6 GHz and test separation distances  $> 50$  mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following (also illustrated in Appendix B):

- 1)  $\{[\text{Power allowed at } \textit{numeric threshold} \text{ for } 50 \text{ mm in step a)}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot (f(\text{MHz})/150)]\}$  mW, for 100 MHz to 1500 MHz
- 2)  $\{[\text{Power allowed at } \textit{numeric threshold} \text{ for } 50 \text{ mm in step a)}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot 10]\}$  mW, for  $> 1500$  MHz and  $\leq 6$  GHz

- c) For frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C):

- 1) For test separation distances > 50 mm and < 200 mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by  $[1 + \log(100/f(\text{MHz}))]$
- 2) For test separation distances  $\leq 50$  mm, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by  $\frac{1}{2}$
- 3) SAR measurement procedures are not established below 100 MHz.

When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any SAR test results below 100 MHz to be acceptable.

#### 4.1.3. Test Result

We use 5mm as separation distance to calculated.

Bluetooth DSS:

| Transmit Frequency (GHz) | Mode  | Measured Power (dBm) | Tune-up power (dBm) | Max tune-up power(dBm) | Result calculation | 1g SAR |
|--------------------------|-------|----------------------|---------------------|------------------------|--------------------|--------|
| 2.441                    | 8DPSK | -5.59                | -5 $\pm$ 1          | -4                     | 0.124989           | 3      |

Bluetooth DTS:

| Transmit Frequency (GHz) | Mode | Measured Power (dBm) | Tune-up power (dBm) | Max tune-up power(dBm) | Result calculation | 1g SAR |
|--------------------------|------|----------------------|---------------------|------------------------|--------------------|--------|
| 2.440                    | GFSK | -6.16                | -6 $\pm$ 1          | -5                     | 0.099971           | 3      |

#### Conclusion:

For the max result:  $0.124989 \leq 3.0$  for 1g SAR, No SAR is required.

Note: The Bluetooth BR+EDR and Bluetooth BLE not transmit at the same time.

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