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RF Exposure evaluation

Report Reference No. : CTL2503262191-WFH

Compiled by:
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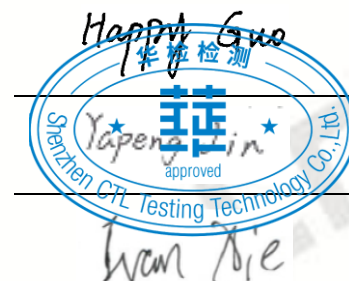
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Product Name : Bluetooth Vehicle fault tester

Model/Type reference : ECHO

List Model(s)..... : ECHO Plus, ECHO Pro, ECHO Elite

Trade Mark..... : Ancel

FCC ID..... : 2ASC7-ANECHO

Applicant's name : OBDSpace Technology Co.,Ltd

Address of applicant : Room D03, Building A, No.973, MinZhi Avenue LongHua district,
Shenzhen City, China

Test Firm..... : Shenzhen CTL Testing Technology Co., Ltd.

Address of Test Firm : Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road,
Nanshan District, Shenzhen, China 518055

Test specification..... :

47CFR §1.1310

Standard : 47CFR §2.1091

KDB447498 D01 General RF Exposure Guidance v06

TRF Originator : Shenzhen CTL Testing Technology Co., Ltd.

Master TRF..... : Dated 2017-01

Date of receipt of test item : Apr. 07, 2025

Date of Test : Apr. 07, 2025-Apr. 21, 2025

Date of Issue : Apr. 22, 2025

Result..... : Pass

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TEST REPORT

Test Report No. :	CTL2503262191-WFH	Apr. 22, 2025
		Date of issue

Product Name : Bluetooth Vehicle fault tester

Sample No : CTL2503262191

Model /Type : ECHO

Listed Models : ECHO Plus, ECHO Pro, ECHO Elite

Applicant : **OBDSPACE TECHNOLOGY CO.,LTD**

Address : Room D03, Building A, No.973, MinZhi Avenue LongHua district, Shenzhen City, China

Manufacturer : **OBDSPACE TECHNOLOGY CO.,LTD**

Address : Room D03, Building A, No.973, MinZhi Avenue LongHua district, Shenzhen City, China
ECHO Plus, ECHO Pro, ECHO Elite

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

** Modified History **

[illegible]

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1 GENERAL INFORMATION

1.1 Environmental conditions

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

Normal Temperature:	25°C -35°C
Relative Humidity:	35%-55 %
Air Pressure:	101 KPa

1.2 Product Description

Product Name:	Bluetooth Vehicle fault tester
Model/Type reference:	ECHO
Power supply:	DC12V DC power supply
Bluetooth:	
Version:	Supported BR/EDR
Modulation:	GFSK, Pi/4DQPSK, 8DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	PIFA Antenna
Antenna gain:	2.18dBi
Bluetooth Low Energy	
Supported type:	Bluetooth Low Energy
Modulation:	GFSK
Operation frequency:	2402MHz to 2480MHz
Channel number:	40
Channel separation:	2MHz
Antenna type:	PIFA Antenna
Antenna gain:	2.18dBi

Note 1: For more details, refer to the user's manual of the EUT.

Note 2: Antenna gain and cable loss provided by the applicant.

1.3 Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.

Floor 1-A, Baisha Technology Park, No.3011, Shahe Road, Nanshan District, Shenzhen, China 518055

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 32/EN 55032 requirements.

1.3.2 Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L7497

Shenzhen CTL Testing Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 4343.01

Shenzhen CTL Testing Technology Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: 9618B

CAB identifier: CN0041

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with Registration No.: 9618B.

FCC-Registration No.: 399832

Designation No.: CN1216

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 399832.

1.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	± 1.18 dB	(1)

Note 1: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

2 METHOD OF MEASUREMENT

2.1 Applicable Standard

[ANSI C95.1–1999](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

[FCC KDB447498 D01 General RF Exposure Guidance v06](#): Mobile and Portable Device, RF Exposure, Equipment Authorization Procedures.

[FCC CFR 47 part1 1.1310](#): Radiofrequency radiation exposure limits.

[FCC CFR 47 part2 2.1091](#): Radiofrequency radiation exposure evaluation: mobile devices

2.2 Evaluation Method and Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	(900/f ²)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	(180/f ²)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	/	/	f/1500	30
1500 – 100,000	/	/	1.0	30

F=frequency in MHz

*=Plane-wave equivalent power density

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S=PG/4\pi R^2$$

Where: S=power density

P=power input to antenna

G=power gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the center of radiation of the antenna

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

In accordance with KDB447498D01 for Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modelled or measured field strengths or power density, is ≤ 1.0 . The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios. Spatial averaging does not apply when MPE is estimated using simple calculations based on far-field plane-wave equivalent conditions. The antenna installation and operating requirements for the host device must meet the minimum test separation distances required by all antennas, in both standalone and simultaneous transmission operations, to satisfy compliance.

3 Conducted Power Results

Bluetooth

Mode	Frequency (MHz)	Peak Conducted Output Power (dBm)
GFSK	2402	0.01
	2440	0.20
	2480	-0.56
Pi/4DQPSK	2402	0.93
	2440	0.92
	2480	0.07
8DPSK	2402	1.14
	2440	1.16
	2480	0.27

Bluetooth Low Energy

Mode	Frequency (MHz)	Peak Conducted Output Power (dBm)
BLE 1M	2402	0.63
	2440	1.79
	2480	2.04
BLE 2M	2402	0.76
	2440	1.99
	2480	2.26

4 Manufacturing Tolerance

Bluetooth

GFSK			
Channel	Channel 0	Channel 39	Channel 79
Target (dBm)	0.0	0.0	-1.0
Tolerance \pm (dB)	1.0	1.0	1.0
Pi/4DQPSK			
Channel	Channel 0	Channel 39	Channel 79
Target (dBm)	1.0	1.0	0.0
Tolerance \pm (dB)	1.0	1.0	1.0
8DPSK			
Channel	Channel 0	Channel 39	Channel 79
Target (dBm)	1.0	1.0	0.0
Tolerance \pm (dB)	1.0	1.0	1.0

Bluetooth Low Energy

BLE 1M (Peak)			
Channel	Channel 0	Channel 19	Channel 39
Target (dBm)	1.0	2.0	2.0
Tolerance \pm (dB)	1.0	1.0	1.0
BLE 2M (Peak)			
Channel	Channel 0	Channel 19	Channel 39
Target (dBm)	1.0	2.0	2.0
Tolerance \pm (dB)	1.0	1.0	1.0

5 Evaluation Results

5.1 Standalone Evaluation

Bluetooth

Mode	f (GHz)	Antenna Distance (cm)	RF output power		G (Num.)	Result	SAR Test Exclusion
			dBm	mW			
GFSK	2.441	20	1	1.26	1.6520	0.0004 < 1.0	Yes
Pi/4DQPSK	2.441	20	2	1.58	1.6520	0.0005 < 1.0	Yes
8DPSK	2.441	20	2	1.58	1.6520	0.0005 < 1.0	Yes

Bluetooth Low Energy

Mode	f (GHz)	Antenna Distance (cm)	RF output power		G (Num.)	Result	SAR Test Exclusion
			dBm	mW			
BLE 1M	2.480	20	3	2.00	1.6520	0.0007 < 1.0	Yes
BLE 2M	2.480	20	3	2.00	1.6520	0.0007 < 1.0	Yes

Remark:

1. Output power including tune up tolerance;
2. When the minimum test separation distance is < 20cm, In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091

6 Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure and SAR Exclusion Threshold per KDB447498 D01 General RF Exposure Guidance v06, No SAR is required.

*****THE END*****