

TEST REPORT OF ETSI EN 300 328 for

OBD Automobile Malfunction Tester

Shenzhen Jiawei Hengxin Electronic Technology CO.,LTD

Prepared for : Shenzhen Jiawei Hengxin Electronic Technology CO.,LTD
Address : 4/F, Building 6, No.49 Education North Road, Gaoqiao Community,
Pingdi Street, Longgang District, Shenzhen, China

Prepared by : Shenzhen TCD Testing Technology Co.,LTD
Address : 4/F,B2 Building,Chuangke Business Center,Gushu Hongwan,
Baoan District,Shenzhen, China

Tel : (+86)755-29760321
Fax : (+86)755-29781725
Web : www.tcd-cert.com

Date of receipt of test sample : March 26, 2019
Number of tested samples : 1
Serial number : Prototype
Date of Test : March 26, 2019 - April 04, 2019
Date of Report : April 04, 2019

Tested By Jack Li
(Jack Li)

Reviewed By (Levis Li)



The results detailed in this test report relate only to the specific sample(s) tested. It is the Application's responsibility to ensure that all production units are manufactured with equivalent RF characteristics. This report is not to be reproduced except in full, without written approval from TCD Testing Technology.

Table of Contents

1.0 General Information	3
1.1 Client Information	3
1.2 General Description of E.U.T.	3
1.3 Test Facility	4
1.4 Test Standards	4
1.5 Configuration of the E.U.T.	5
1.6 E.U.T. Modifications	5
1.7 Measurement Uncertainty (95% confidence levels, k=2)	5
2.0 Technical Test	6
2.1 Summary of Test Results	6
2.2 Test Information	6
2.3 Test Report Reference	7
Clause 4.3.1 Effective Isotropic Radiated Power (Conducted)	8
Clause 4.3.2 Peak Power Density (Conducted)	10
Clause 4.3.3 Frequency Range	12
Clause 4.3.4 Frequency Hopping Requirements	14
Clause 4.3.5 Medium Access Protocol	14
Clause 4.3.6 Transmitter Spurious Emissions (Radiated)	14
Clause 4.3.7 Receiver Spurious Emissions (Radiated)	17
3.0 Product Labeling	18
4.0 Photographs – E.U.T.	19

1.0 General Information

1.1 Client Information

Application:	Shenzhen Jiawei Hengxin Electronic Technology CO.,LTD
Address of Application:	4/F, Building 6, No.49 Education North Road, Gaoqiao Community, Pingdi Street, Longgang District, Shenzhen, China
Manufacturer:	Shenzhen Jiawei Hengxin Electronic Technology CO.,LTD
Address of Manufacturer:	4/F, Building 6, No.49 Education North Road, Gaoqiao Community, Pingdi Street, Longgang District, Shenzhen, China

1.2 General Description of E.U.T.

Product Name:	OBD Automobile Malfunction Tester
Model:	KW901
Additional Model:	KW901,KW902,KW903,KW904,KW905,KW906,KW907,KW908 KW909,KW910,KW912,KW913,KW915,KW916,KW918,KW919 KW920,KW921,KW922,KW923,KW925,KW926,KW928,KW929 KW930,KW931,KW932,KW933,KW935,KW936,KW938,KW939 KW942,327A,327B,327C,327D,327E,327F,327L,327M,327USB,327USB-B
Modulation:	GFSK, $\pi/4$ -DQPSK, 8-DPSK
Trade Mark:	KONNWEI
Operating Frequency Range:	2402~2480MHz
Rates:	DC 12.0 V from battery
Model Difference:	The model in the model family (KW901,KW902,KW903,KW904,KW905,KW906, KW920,KW921,KW922,KW923,KW925,KW926,KW928,KW929,KW930,KW931, KW932,KW933,KW935,KW936,KW938,KW939,KW942,327A,327B,327C,327D, 327E,327F,327L,327M,327USB,327USB-B are identical on hardware & Software version except model designation, shapes and size.

Remark: In this report, N.A. means Not Applicable;

E.U.T. means Equipment Under Test;

N.R.R. means No Reaction Recognized.

1.3 Test Facility

Name :	Shenzhen TCD Testing Technology Co.,Ltd.
Address:	4/F,B2 Building,Chuangke Business Center,Gushu Hongwan, Baoan District,Shenzhen,China
Tel:	0755-2976 0321
Fax:	0755-2978 1725

1.4 Test Standards

ETSI EN 300 328 v 2.1.1 (2016-11)

Electromagnetic compatibility and Radio spectrum Matters(ERM);

Wideband Transmission systems;

Data transmission equipment operating in the 2.4GHz ISM band and using spread spectrum modulation techniques;

Harmonized EN covering essential requirements under article 3.2 of the RED Directive

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

1.2. Objective

This Type approval report is prepared on behalf of **NT COMPANY** . in accordance with ETSI EN 300 328 V2.1.1 (2016-11), Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

The objective is to determine compliance with ETSI EN 300 328 V2.1.1 (2016-11).

1.3. Related Submittal(s)/Grant(s)

No Related Submittals.

1.4. Test Methodology

All measurements contained in this report were conducted with ETSI EN 300 328 V2.1.1 (2016-11).

1.5 Configuration of the E.U.T.

The E.U.T. was configured according to **CISPR16**. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

AE used during the test

Equipment type	Manufacturer	Model
N.A.		
N.A.		
N.A.		

1.6 E.U.T. Modifications

No modification by Shenzhen TCD Testing Technology Co., Ltd

1.7 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	MU
1.	Radio Frequency	$\pm 1 \times 10^{-9}$
2.	Temperature	$\pm 0.1^{\circ}\text{C}$
3.	Humidity	$\pm 1.0\%$
4.	RF power, conducted	$\pm 0.34\text{dB}$
5.	RF power density, conducted	$\pm 1.45\text{dB}$
6.	Spurious emissions, conducted	$\pm 3.70\text{dB}$
7.	All emissions, radiated	$\pm 4.50\text{dB}$

2.0 Technical Test

2.1 Summary of Test Results

No deviations from the technical specification(s) were ascertained in the course of the tests Performed	
Final Verdict: (Only "Passed" if all Measurements are "Passed")	PASS

2.2 Test Information

Bluetooth mode						
Measurement method: Conducted						
		Test Result				
Rel. Humidity: 65 %		Measured	Antenna	Cable	EIRP	EIRP Limit
		Power	Gain	Loss	(dBm)	(dBm)
		(dBm)	(dB)	(dB)		
Lowest Frequency: 2402MHz						
Tnom 25 ℃	Vnom 12.0 Vdc	0.18	0	3	3.18	20
Tmin -20 ℃	Vmin 10.8 Vdc	-0.09	0	3	2.91	20
	Vmax 13.2 Vdc	0.05	0	3	3.05	20
Tmax 55 ℃	Vmin 10.8 Vdc	-0.01	0	3	2.99	20
	Vmax 13.2 Vdc	0.12	0	3	3.12	20
Middle Frequency: 2441MHz						
Tnom 25 ℃	Vnom 12.0 Vdc	0.10	0	3	3.10	20
Tmin -20 ℃	Vmin 10.8 Vdc	-0.16	0	3	2.84	20
	Vmax 13.2 Vdc	-0.03	0	3	2.97	20
Tmax 55 ℃	Vmin 10.8 Vdc	0.02	0	3	3.02	20
	Vmax 13.2 Vdc	-0.10	0	3	2.90	20
Highest Frequency: 2480MHz						
Tnom 25 ℃	Vnom 12.0 Vdc	0.09	0	3	3.09	20
Tmin -20 ℃	Vmin 10.8 Vdc	-0.12	0	3	2.88	20
	Vmax 13.2 Vdc	0.01	0	3	3.01	20
Tmax 55 ℃	Vmin 10.8 Vdc	-0.17	0	3	2.83	20
	Vmax 13.2 Vdc	0.04	0	3	3.04	20
Test Result		PASS				

Note: EIRP= Measured Power+ Antenna Gain+ Cable Loss

2.3 Test Report Reference

CLAUSE(ETSI EN 300 328)	TEST PARAMETER	RESULTS
Transmitter Parameters		
Clause 4.3.1	Effective Isotropic Radiated Power	PASS
Clause 4.3.2	Maximum e.i.r.p. spectral density	PASS
Clause 4.3.3	Frequency Range	PASS
Clause 4.3.4	Frequency hopping requirements	N.A.
Clause 4.3.5	Medium access protocol	PASS
Clause 4.3.6	Spurious Emissions	PASS
Receiver Parameters		
Clause 4.3.7	Receiver Spurious Emissions	PASS

Note: The clause numbers are referenced to ETSI EN 300 328 V 1.9.1(2015-02)

Clause 4.3.1 Effective Isotropic Radiated Power (Conducted)

A temporary antenna connector provided when this test item was done. And the E.U.T. was connected to the power meter through the connector.

EIRP is calculated by method described under sub clause 7.2.1.2, using following formulae;

$$P=A+G+10 \log (1/x);$$

Where: A=Average Power (measured)

G= Antenna Gain= 0dBi

x= Duty Cycle=1.000 (measured)

Test Packet	No. of hop measured/s	Dwell Time per hop (ms)	Maximum Accumulated Dwell Time (ms)	Limit (ms)	Result
DH1	5.31	0.391	65.608	≤400	Pass
DH3	4.02	1.652	209.857	≤400	Pass
DH5	2.75	2.889	251.054	≤400	Pass
2-DH1	5.03	0.413	65.646	≤400	Pass
2-DH3	4.11	1.681	218.322	≤400	Pass
2-DH5	2.76	2.913	254.060	≤400	Pass
3-DH1	5.02	0.429	68.053	≤400	Pass
3-DH3	3.97	1.686	211.512	≤400	Pass
3-DH5	2.58	2.927	238.632	≤400	Pass

Remark: 1. Maximum accumulated dwell time = no. of hop within the testing period x dwell time per hop
2. The test period: T= 400ms x 79 Channel = 31.6 s (for accumulated dwell time)

Hopping sequence and Hopping Channel Occupied Band						
Test mode	ISM band (MHz)	Operation band (20dB down)(MHz)	Occupied band (%)	Limit (%)	Hopping sequence	Limit
GFSK	2400-2483.5	80.083	95.85	≥70	79	≥15
π /4DQPSK		80.217	95.99		79	
8DPSK		80.104	95.87		79	
Minimum Frequency Occupation						
Frequency Occupation period		Limit			Result	
1		≥one dwell time			Pass	

Test Plots:

Test Mode:KW901 mode

Test Conditions		Mode	Test Segment (MHz)	Max. Reading (dBm)	Limit (dBm)	Result
Temp (°C)	Volt (V DC)					
Normal (25)	Vnorm: 12	GFSK	2400-2BW to 2400-BW	-70.12	-20	PASS
			2400-BW to 2400	-61.01	-10	PASS
			2483.5 to 2483.5+BW	-65.26	-10	PASS
			2483.5+BW to 2483.5+2BW	-67.76	-20	PASS
		$\pi/4$ DQPSK	2400-2BW to 2400-BW	-69.03	-20	PASS
			2400-BW to 2400	-60.98	-10	PASS
			2483.5 to 2483.5+BW	-64.71	-10	PASS
			2483.5+BW to 2483.5+2BW	-69.14	-20	PASS
		8DPSK	2400-2BW to 2400-BW	-69.85	-20	PASS
			2400-BW to 2400	-64.07	-10	PASS
			2483.5 to 2483.5+BW	-62.81	-10	PASS
			2483.5+BW to 2483.5+2BW	-67.33	-20	PASS

Test Plots:

Test Mode:KW901 mode

-20	Vmin: 10.8	GFSK	2400-2BW to 2400-BW	-71.02	-20	PASS
			2400-BW to 2400	-64.09	-10	PASS
			2483.5 to 2483.5+BW	-69.41	-10	PASS
			2483.5+BW to 2483.5+2BW	-67.92	-20	PASS
		$\pi/4$ DQPSK	2400-2BW to 2400-BW	-68.90	-20	PASS
			2400-BW to 2400	-66.53	-10	PASS
			2483.5 to 2483.5+BW	-63.72	-10	PASS
			2483.5+BW to 2483.5+2BW	-69.11	-20	PASS
		8DPSK	2400-2BW to 2400-BW	-69.93	-20	PASS
			2400-BW to 2400	-61.09	-10	PASS
			2483.5 to	-66.63	-10	PASS

Test Plots:

Test Mode:KW901 mode

-20	Vmax: 13.2		2483.5+BW			
			2483.5+BW to 2483.5+2BW	-71.00	-20	PASS
		GFSK	2400-2BW to 2400-BW	-68.53	-20	PASS
			2400-BW to 2400	-62.52	-10	PASS
			2483.5 to 2483.5+BW	-67.24	-10	PASS
			2483.5+BW to 2483.5+2BW	-68.83	-20	PASS
		$\pi/4$ DQPSK	2400-2BW to 2400-BW	-67.20	-20	PASS
			2400-BW to 2400	-64.59	-10	PASS
			2483.5 to 2483.5+BW	-66.01	-10	PASS
			2483.5+BW to 2483.5+2BW	-70.23	-20	PASS
		8DPSK	2400-2BW to 2400-BW	-68.42	-20	PASS
			2400-BW to 2400	-62.63	-10	PASS
			2483.5 to 2483.5+BW	-63.79	-10	PASS
			2483.5+BW to 2483.5+2BW	-70.05	-20	PASS

Test Plots:

Test Mode:KW901 mode

55	Vmin: 10.8	GFSK	2400-2BW to 2400-BW	-71.52	-20	PASS
			2400-BW to 2400	-62.44	-10	PASS
			2483.5 to 2483.5+BW	-64.63	-10	PASS
			2483.5+BW to 2483.5+2BW	-70.39	-20	PASS
		$\pi/4$ DQPSK	2400-2BW to 2400-BW	-71.14	-20	PASS
			2400-BW to 2400	-65.83	-10	PASS
			2483.5 to 2483.5+BW	-68.36	-10	PASS
			2483.5+BW to 2483.5+2BW	-72.25	-20	PASS
		8DPSK	2400-2BW to 2400-BW	-69.11	-20	PASS
			2400-BW to 2400	-62.36	-10	PASS
			2483.5 to 2483.5+BW	-65.58	-10	PASS
			2483.5+BW to	-71.64	-20	PASS

Test Plots:

Test Mode:KW901 mode

			2483.5+2BW			
55	Vmax: 13.2	GFSK	2400-2BW to 2400-BW	-67.26	-20	PASS
			2400-BW to 2400	-66.01	-10	PASS
			2483.5 to 2483.5+BW	-66.57	-10	PASS
			2483.5+BW to 2483.5+2BW	-69.48	-20	PASS
		$\pi/4$ DQPSK	2400-2BW to 2400-BW	-72.62	-20	PASS
			2400-BW to 2400	-63.21	-10	PASS
			2483.5 to 2483.5+BW	-65.39	-10	PASS
			2483.5+BW to 2483.5+2BW	-69.26	-20	PASS
		8DPSK	2400-2BW to 2400-BW	-72.57	-20	PASS
			2400-BW to 2400	-62.83	-10	PASS
			2483.5 to 2483.5+BW	-65.36	-10	PASS
			2483.5+BW to 2483.5+2BW	-68.18	-20	PASS

Clause 4.3.4 Frequency Hopping Requirements

This test item is applicable to FHSS system only.

Clause 4.3.5 Medium Access Protocol

A medium access protocol is a mechanism designed to facilitate spectrum sharing with other devices in a wireless network.

The protocol of the equipment fulfil Medium Access Protocol

Clause 4.3.6 Transmitter Spurious Emissions (Radiated)

Limits Clause 4.3.6.2

Frequency Range	Narrowband Spurious Emissions		Wideband Spurious Emissions	
	Limit When Operating	Limit When in Standby	Limit When Operating	Limit When in Standby
30MHz-1GHz	-36 dBm	-57 dBm	-86 dBm/Hz	-107 dBm/Hz
Above 1GHz-12.75GHz	-30 dBm	-47 dBm	-80 dBm/Hz	-97 dBm/Hz
1.8GHz-1.9GHz 5.15GHz-5.3GHz	-47 dBm	-47 dBm	-97 dBm/Hz	-97 dBm/Hz

Note:

1. According to the requirements, measurements were conducted on low & high channels only.
2. The emission is a narrowband emission, and the level is measured and recorded.

Test Plots:

Test Mode:KW901 mode

Frequency (MHz)	Polarization (H/V)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector
Channel 00(2402)					
149.1	H	-73.62	-36	37.62	PK
148.5	V	-70.51	-36	34.51	PK
501.7	H	-65.11	-54	11.11	PK
503.4	V	-64.08	-54	10.08	PK
4803.8	H	-48.89	-30	18.89	PK
4803.4	V	-42.26	-30	12.26	PK
7206.2	H	-56.15	-30	26.15	PK
7206.1	V	-57.06	-30	27.06	PK
Channel 78 (2480)					
203.3	H	-72.54	-54	18.54	PK
202.8	V	-69.72	-54	15.72	PK
439.8	H	-64.98	-36	28.98	PK
439.5	V	-63.60	-36	27.6	PK
4959.8	H	-45.59	-30	15.59	PK
4959.6	V	-42.99	-30	12.99	PK
7440.2	H	-59.03	-30	29.03	PK
7440.1	V	-55.14	-30	25.14	PK

Test Result

Bluetooth mode:				
		Measurement method: EIRP(Radiated)		
		Highest power RX mode		
Rel. Humidity: 65 %		Ambient Temp.: 25 °C		
Lowest Frequency: 2402MHz		Test Result		
Frequency range (MHz)	Res. Bandwidth (kHz)	Maximum Emission Observed (MHz)	Limit (dBm)	Margin (dB)
30 ~ 1000	100	-73.08	-57	16.08
1000 ~ 12750	1000	-54.41	-47	9.41
Highest Frequency: 2480MHz				
30 ~ 1000	100	-72.76	-57	15.76
1000 ~ 12750	1000	-55.34	-47	8.34
Test Result		Pass		

Transmitter in Standby mode

Lowest Frequency (2412MHz)			Highest Frequency (2472MHz)		
f(MHz)	Band-Width (kHz)	Level (dBm)	f(MHz)	Band-Width (kHz)	Level (dBm)
NF			NF		
NF			NF		
NF			NF		
NF			NF		
NF			NF		
NF			NF		
NF			NF		
NF			NF		
NF			NF		
NF			NF		

Note: NF=No Significant Peak was Found

Clause 4.3.7 Receiver Spurious Emissions (Radiated)

Note:

1. According to the requirements, measurements were conducted on low & high channels only.
2. The emission is a narrowband emission, and the level is measured and recorded.

Lowest Frequency			Highest Frequency		
f(MHz)	Band-Width (kHz)	Level (dBm)	f(MHz)	Band-Width (kHz)	Level (dBm)
NF			NF		
NF			NF		
NF			NF		
NF			NF		
NF			NF		
NF			NF		
NF			NF		
NF			NF		
NF			NF		
NF			NF		

NF=No significant peak noise was found

Limits Clause 4.3.7.2

Frequency Range	Narrowband Spurious Emissions	Wideband Spurious Emissions
30MHz-1GHz	-57 dBm	-107 dBm/Hz
Above 1GHz-12.75GHz	-47 dBm	-97 dBm/Hz

3.0 Product Labeling

CE Mark label specification

Text of the mark is black or white in colour and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT or silk-screened onto the EUT.



Mark Location: Rear enclosure

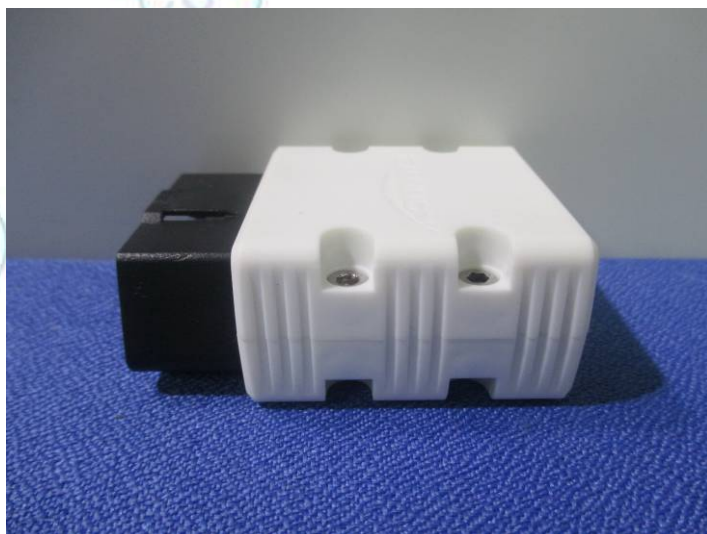
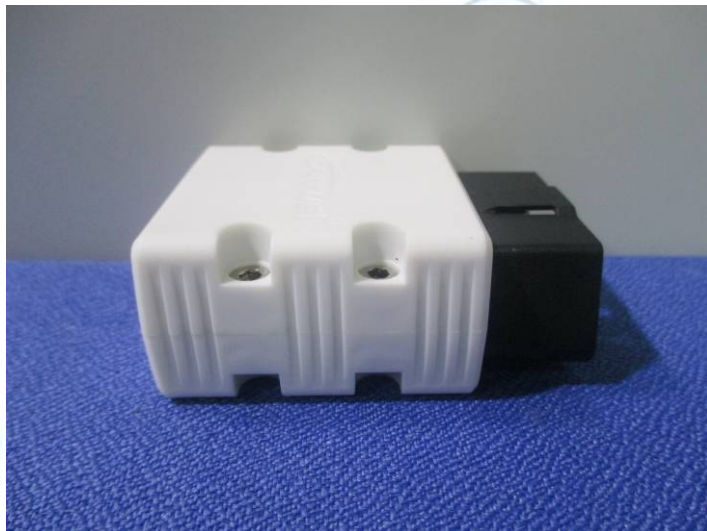
4.0 Photographs – E.U.T.



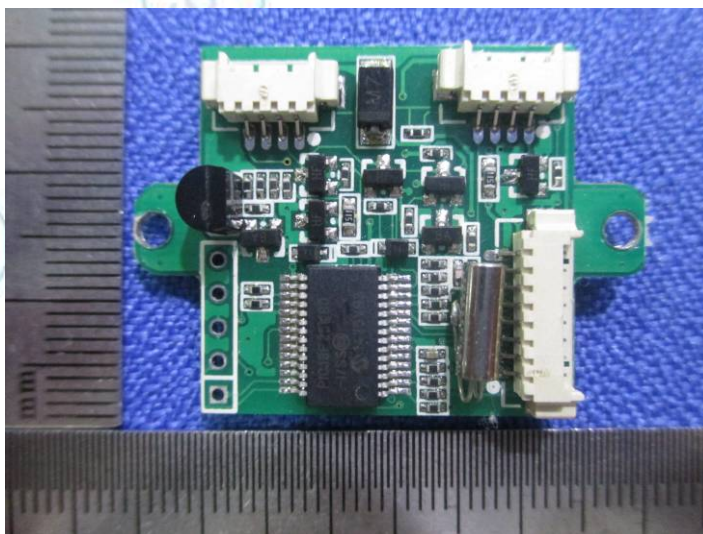
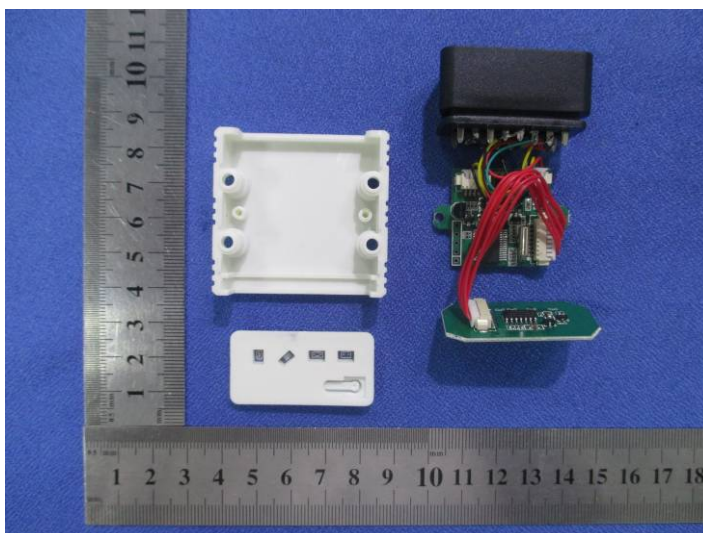
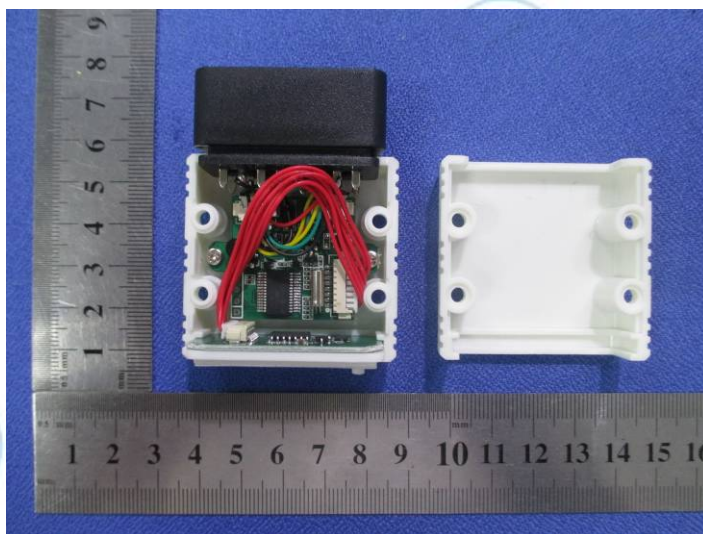
Appearance Photograph of EUT



Appearance Photograph of EUT



Appearance Photograph of EUT



Appearance Photograph of EUT

