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FCC Part 15 Subpart B Test Report

FCC PART 15 Subpart B Class B

Report Reference No.	**CTL1611308401-F**
Compiled by (position+printed name+signature)..	File administrators Caroline Yuan
Name of the organization performing the tests (position+printed name+signature)..	Test Engineer Jacky Chen
Approved by (position+printed name+signature)..	Manager Tracy Qi
Date of issue	Dec. 9, 2016
Representative Laboratory Name	**Shenzhen CTL Testing Technology Co., Ltd.**
Address	Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
Test Firm	**Shenzhen CTL Testing Technology Co., Ltd.**
Address	Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
Applicant's name	**Auto Watchdog Electronics Co.,Ltd**
Address	502, Block A, Dawan Square, BYD Road, Pingshan, Shenzhen, Guangdong, 518118, China
Test specification:	
Standard	**FCC PART 15 Subpart B Class B**
TRF Originator	Shenzhen CTL Testing Technology Co., Ltd.
Master TRF	Dated 2011-01

Test item description	**Bus Passenger Counter**
Trade Mark	N/A
Model/Type reference	BPC-V2
Listed Models	BPC-V1
Power Supply	DC 9-36V
Result	**Positive**

FCC Test Report

Test Report No. :	CTL1611308401-F	Dec. 9, 2016 Date of issue

Equipment under Test	:	Bus Passenger Counter
Type / Model	:	BPC-V2
Listed Models	:	BPC-V1
Applicant	:	**Auto Watchdog Electronics Co.,Ltd**
Address	:	502, Block A, Dawan Square, BYD Road, Pingshan, Shenzhen, Guangdong, 518118, China
Manufacturer	:	**Auto Watchdog Electronics Co.,Ltd**
Address	:	502, Block A, Dawan Square, BYD Road, Pingshan, Shenzhen, Guangdong, 518118, China

Test Result according to the standards on page 5:	**Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

History of this test report

Report No.	Version	Description	Issued Date
CTL1611308401-F	V1.0	Initial Issued Report	Dec. 9, 2016

Content

1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15 Subpart B - Unintentional Radiators

ANSI C63.4-2003

2 . SUMMARY

2.1. General Remarks

Date of receipt of test sample : Dec. 3, 2016

Testing commenced on : Dec. 3, 2016

Testing concluded on : Dec. 9, 2016

2.1. Equipment Under Test

Power supply system utilised

Power supply voltage : o 120V / 60 Hz o 115V / 60Hz
o 12 V DC o 24 V DC
■ Other (specified in blank below)

DC 9-36V

2.1. Short description of the Equipment under Test (EUT)

Bus Passenger Counter.

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

2.1. EUT operation mode

The EUT has been tested under typical operating condition.

2.1. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

o - supplied by the lab

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

This test report is intended for BPC-V2 filing to comply with the FCC Part 15, Subpart B Rules.

2.1. Modifications

No modifications were implemented to meet testing criteria.

2.1. Test Result Summary

Test Item	Test Requirement	Standard Paragrph	Result
Radiated Emission	FCC PART 15 Subpart B Class B	Section 15.109	PASS
Conducted Emission	FCC PART 15 Subpart B Class B	Section 15.107	PASS

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

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 22/EN 55022 requirements.

3.2. Test Facility

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

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

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 970318, December 19, 2013.

3.3. Environmental conditions

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

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. 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	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	±3.56dB	(1)
Radiated Emission	1~12.75GHz	±4.32dB	(1)
Conducted Emission	0.15~30MHz	±2.66dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.5. Equipments Used during the Test

Radiated Emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	ULTRA-BROADBAND ANTENNA	Sunol Sciences Corp.	JB1 Antenna	A061713	2016/06/01	2017/05/31
2	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2016/06/01	2017/05/31
3	Horn Antenna	Sunol Sciences Corp	DRH-118	A062013	2016/06/01	2017/05/31

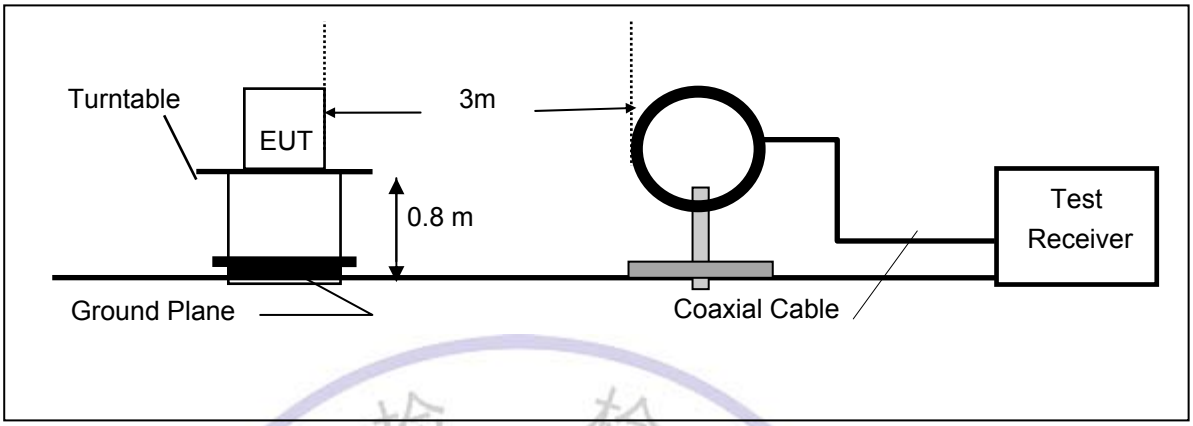
Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2016/06/01	2017/05/31
2	LISN	ROHDE & SCHWARZ	ESH2-Z5	860014/010	2016/06/01	2017/05/31

4 TEST CONDITIONS AND RESULTS

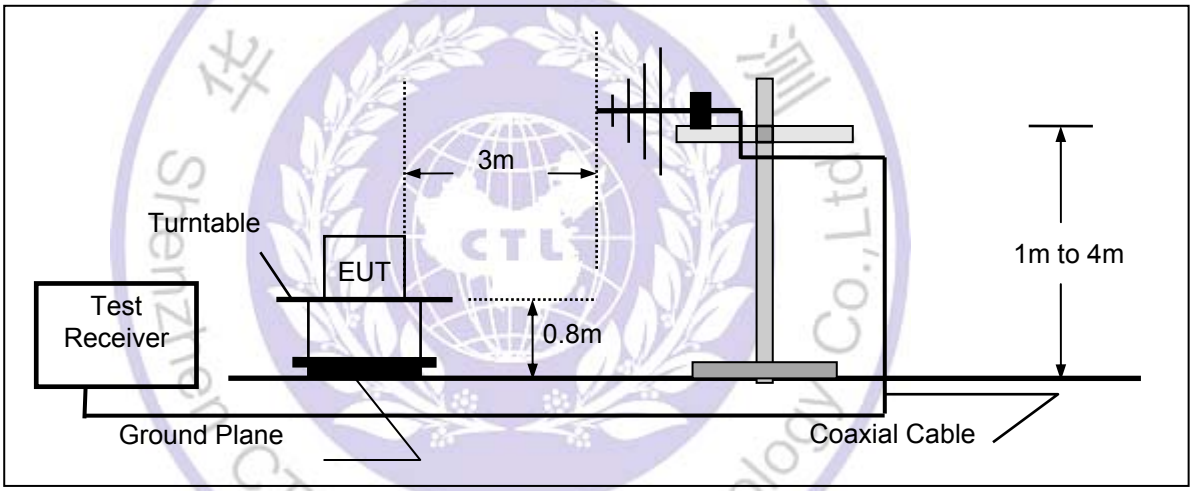
4.1. Radiated Emission Test

TEST CONFIGURATION

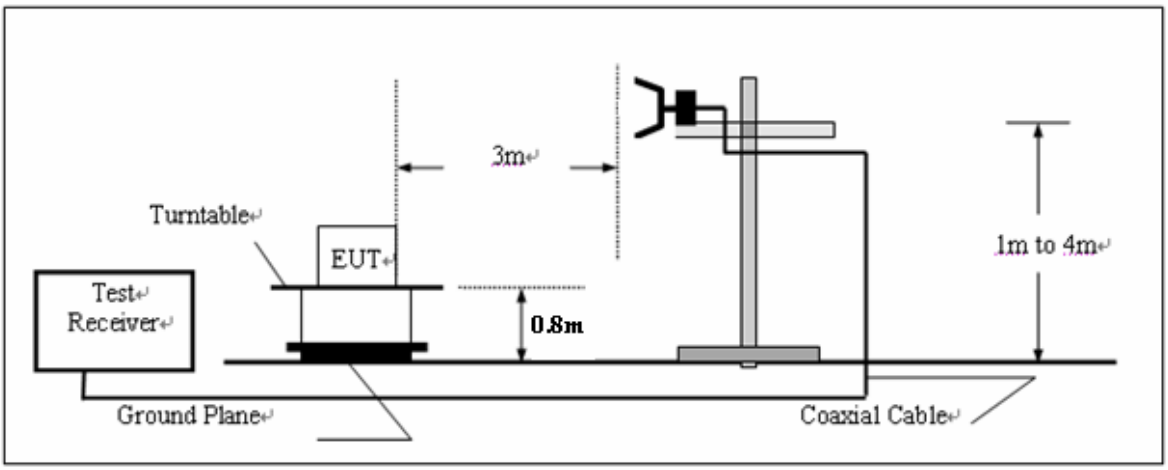
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

RADIATION LIMIT

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values：

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

Radiation Test Results

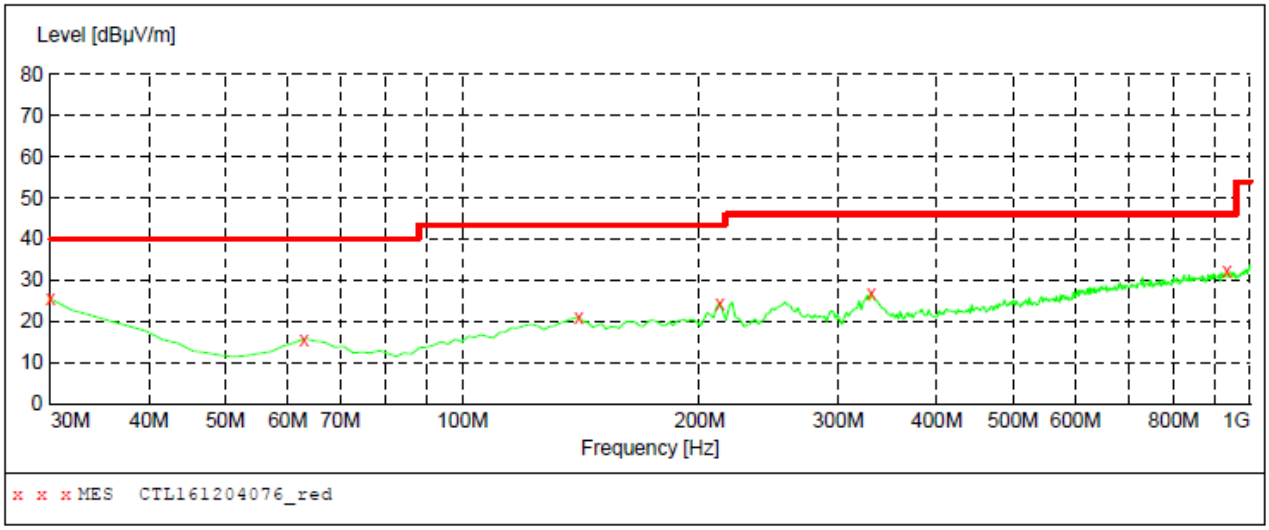
Shenzhen CTL Testing Technology Co.,Ltd

Radiation Emission Test FCC PART 15 B

```
EUT:                    BPC-V2
Manufacturer:           AUTO WATCHDOG ELECTRONICS CO.,LTD
Operating Condition:    ON
Test Site:              3M Chamber
Operator:               KAI
Test Specification:     AC 120V/50HZ
Comment:
Start of Test:          12/4/2016 / 10:14:27PM
```

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



MEASUREMENT RESULT: "CTL161204076_red"

12/4/2016 10:17PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	25.40	20.8	40.0	14.6	---	0.0	0.00	HORIZONTAL
62.980000	15.70	8.1	40.0	24.3	---	0.0	0.00	HORIZONTAL
140.580000	21.00	14.3	43.5	22.5	---	0.0	0.00	HORIZONTAL
212.360000	24.50	14.0	43.5	19.0	---	0.0	0.00	HORIZONTAL
330.700000	26.60	16.1	46.0	19.4	---	0.0	0.00	HORIZONTAL
935.980000	32.10	26.3	46.0	13.9	---	0.0	0.00	HORIZONTAL

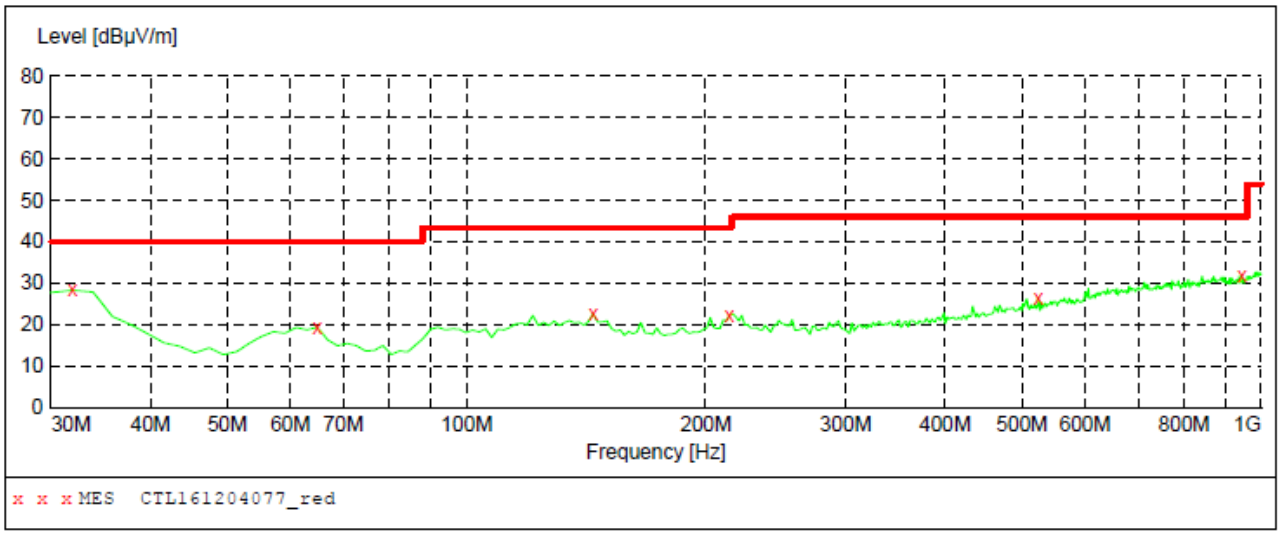
Shenzhen CTL Testing Technology Co.,Ltd

Radiation Emission Test FCC PART 15 B

```
EUT:                  BPC-V2
Manufacturer:         AUTO WATCHDOG ELECTRONICS CO.,LTD
Operating Condition:  ON
Test Site:            3M Chamber
Operator:             KAI
Test Specification:   AC 120V/50HZ
Comment:
Start of Test:        12/4/2016 / 10:17:50PM
```

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



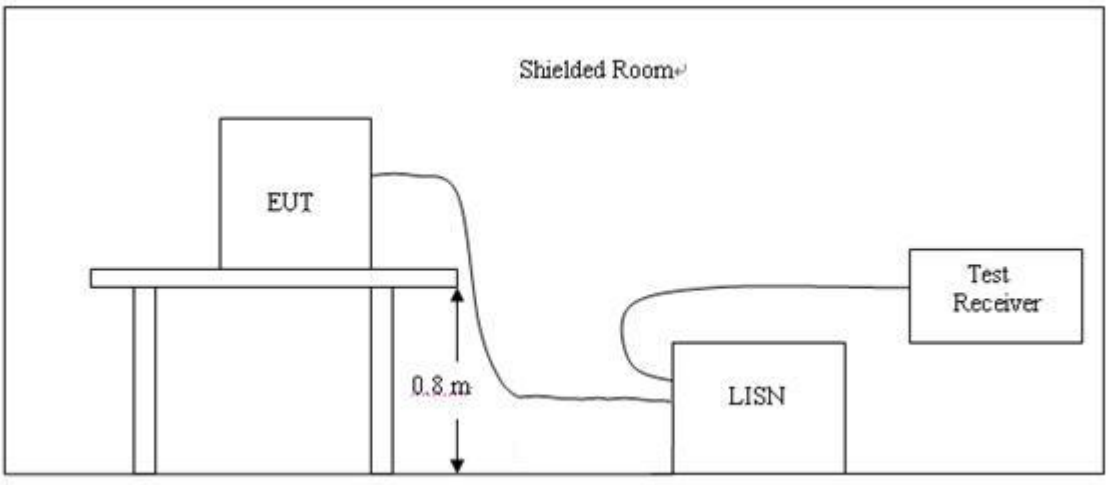
MEASUREMENT RESULT: "CTL161204077_red"

12/4/2016 10:19PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.940000	28.30	19.2	40.0	11.7	---	0.0	0.00	VERTICAL
64.920000	19.30	8.1	40.0	20.7	---	0.0	0.00	VERTICAL
144.460000	22.50	14.1	43.5	21.0	---	0.0	0.00	VERTICAL
214.300000	22.00	14.0	43.5	21.5	---	0.0	0.00	VERTICAL
524.700000	26.50	20.4	46.0	19.5	---	0.0	0.00	VERTICAL
945.680000	31.90	26.5	46.0	14.1	---	0.0	0.00	VERTICAL

4.2. Conducted Emissions Test

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4.
2 Support equipment, if needed, was placed as per ANSI C63.4.
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4 The EUT received power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

Conducted Power Line Emission Limit

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following：

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

TEST RESULTS

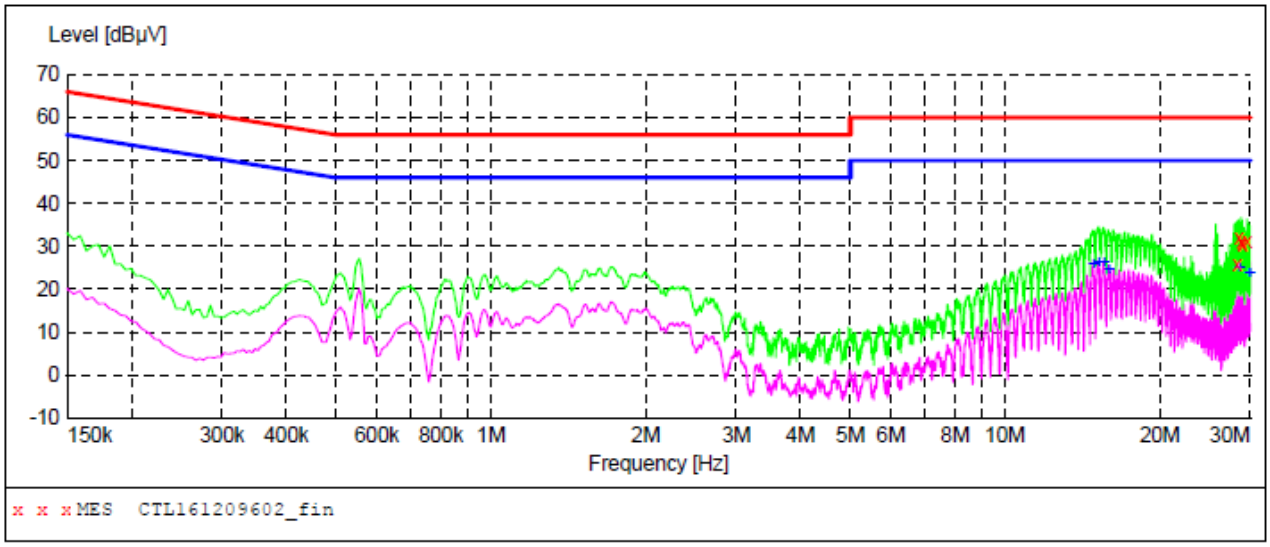
Shenzhen CTL Testing Technology Co., Ltd.

Voltage Mains Test FCC PART15 B

```
EUT:                    BPC-V2
Manufacturer:           Auto Watchdog Electronics Co.,Ltd
Operating Condition:    ON
Test Site:              /
Operator:               /
Test Specification:     AC 120V/60Hz
Comment:
Start of Test:          12/9/2016 / 4:43:48PM
```

SCAN TABLE: "Voltage (9K-30M) FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL161209602_fin"

12/9/2016 4:46PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
28.280000	25.80	11.2	60	34.2	QP	L1	GND
28.460000	31.90	11.2	60	28.1	QP	L1	GND
28.760000	31.30	11.2	60	28.7	QP	L1	GND
28.820000	30.60	11.2	60	29.4	QP	L1	GND
28.940000	30.30	11.2	60	29.7	QP	L1	GND
29.600000	31.20	11.3	60	28.8	QP	L1	GND

MEASUREMENT RESULT: "CTL161209602_fin2"

12/9/2016 4:46PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
14.864000	25.60	10.7	50	24.4	AV	L1	GND
15.200000	26.10	10.7	50	23.9	AV	L1	GND
15.572000	26.20	10.7	50	23.8	AV	L1	GND
15.902000	24.70	10.7	50	25.3	AV	L1	GND
28.580000	25.10	11.2	50	24.9	AV	L1	GND
29.960000	23.50	11.3	50	26.5	AV	L1	GND

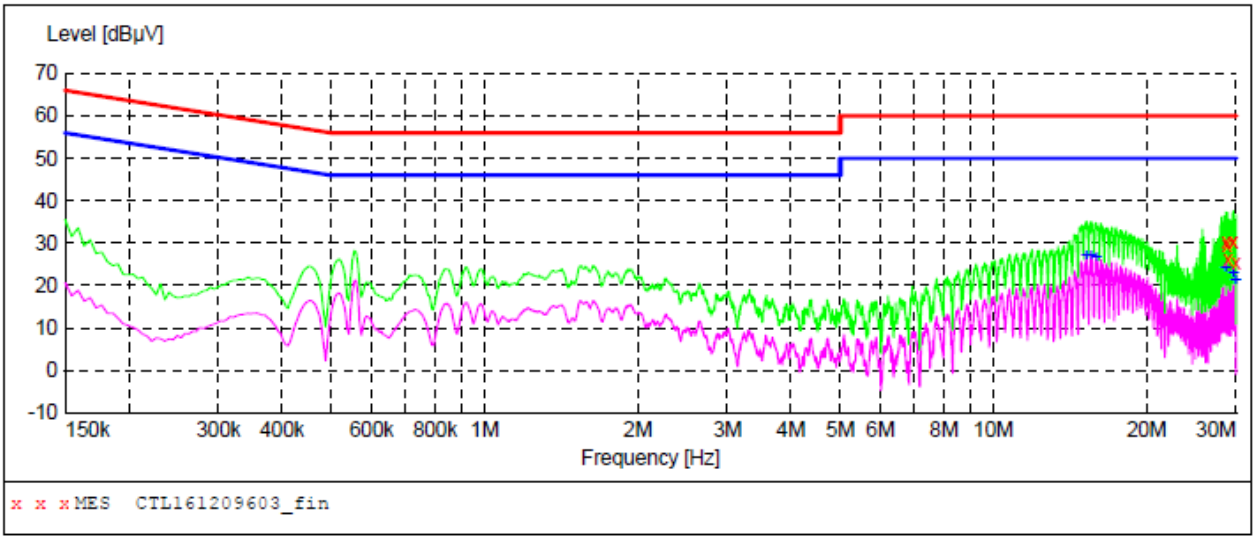
Shenzhen CTL Testing Technology Co., Ltd.

Voltage Mains Test FCC PART15 B

```
EUT:                    BPC-V2
Manufacturer:           Auto Watchdog Electronics Co.,Ltd
Operating Condition:    ON
Test Site:              /
Operator:               /
Test Specification:     AC 120V/60Hz
Comment:
Start of Test:          12/9/2016 / 4:47:27PM
```

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL161209603_fin"

12/9/2016 4:49PM

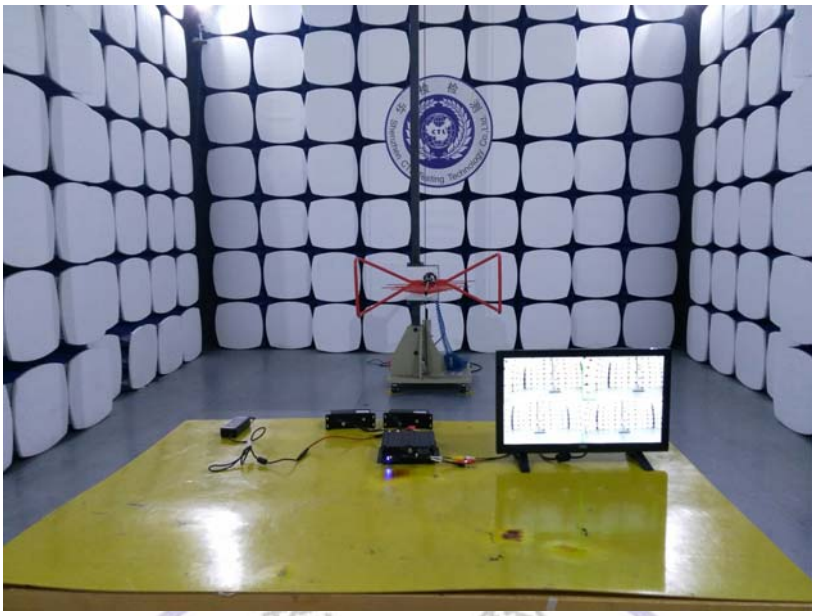
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
28.640000	30.20	11.2	60	29.8	QP	N	GND
28.700000	29.30	11.2	60	30.7	QP	N	GND
28.820000	26.20	11.2	60	33.8	QP	N	GND
29.540000	30.50	11.3	60	29.5	QP	N	GND
29.600000	30.40	11.3	60	29.6	QP	N	GND
29.966000	25.30	11.3	60	34.7	QP	N	GND

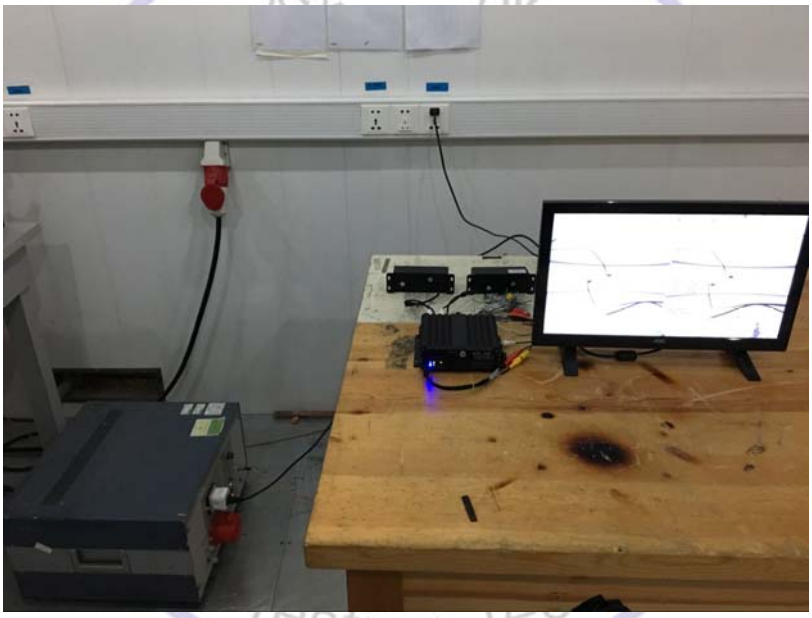
MEASUREMENT RESULT: "CTL161209603_fin2"

12/9/2016 4:49PM

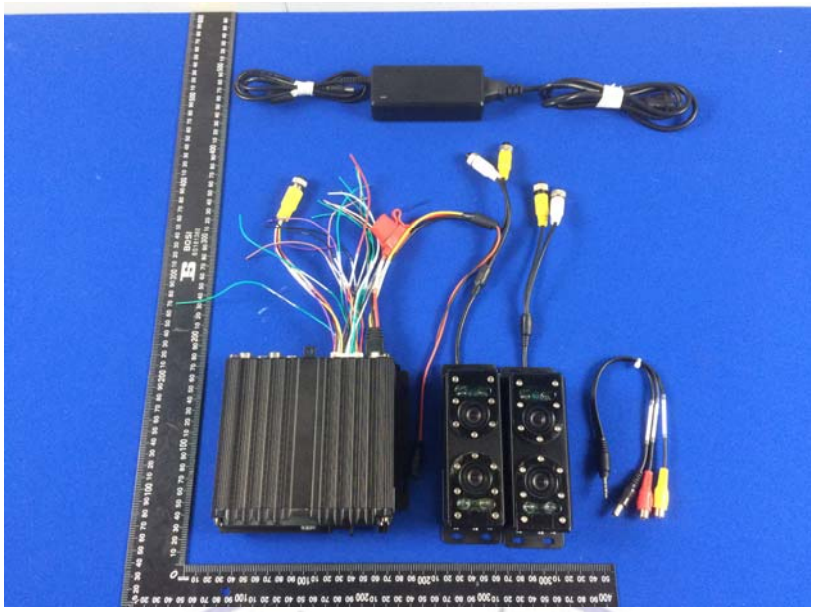
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
15.230000	26.90	10.7	50	23.1	AV	N	GND
15.554000	26.90	10.7	50	23.1	AV	N	GND
15.920000	26.50	10.7	50	23.5	AV	N	GND
28.580000	23.90	11.2	50	26.1	AV	N	GND
29.600000	22.80	11.3	50	27.2	AV	N	GND
29.960000	21.10	11.3	50	28.9	AV	N	GND

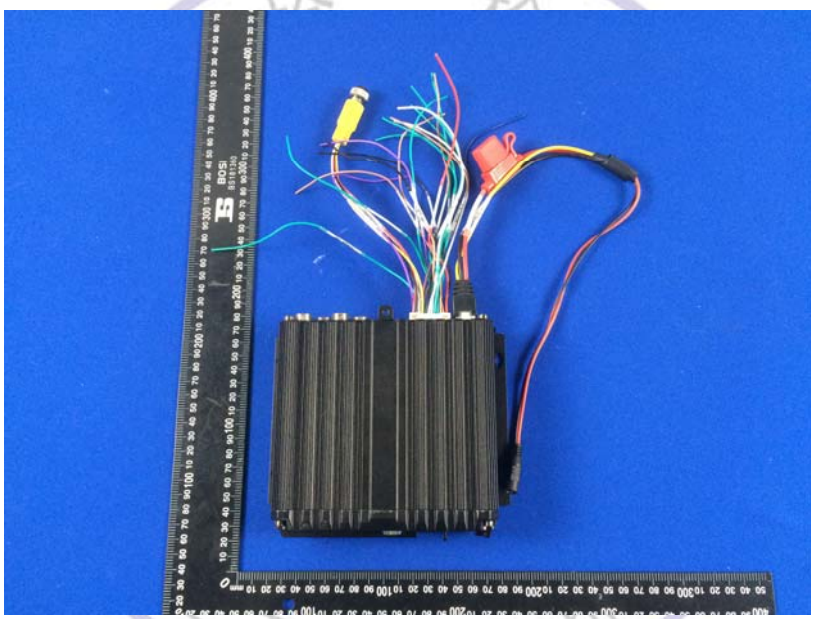
5. Test Setup Photos of the EUT



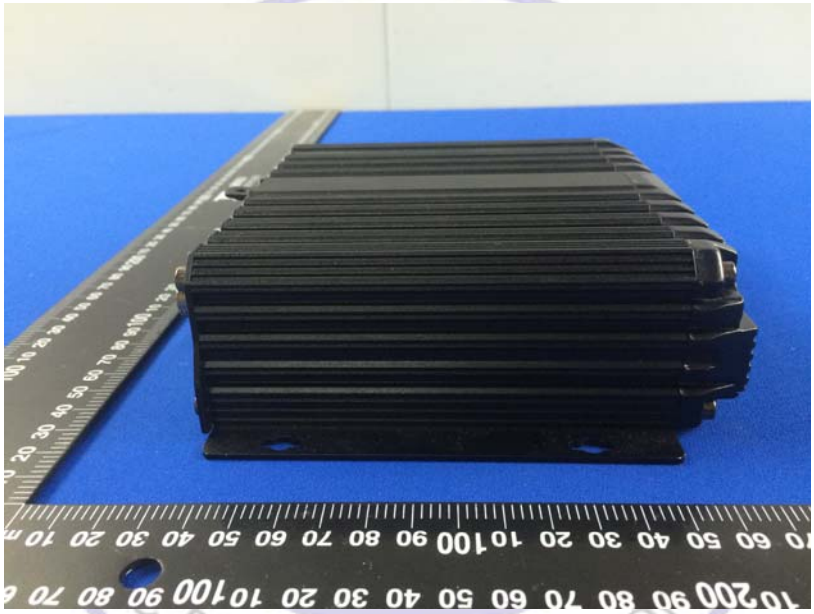


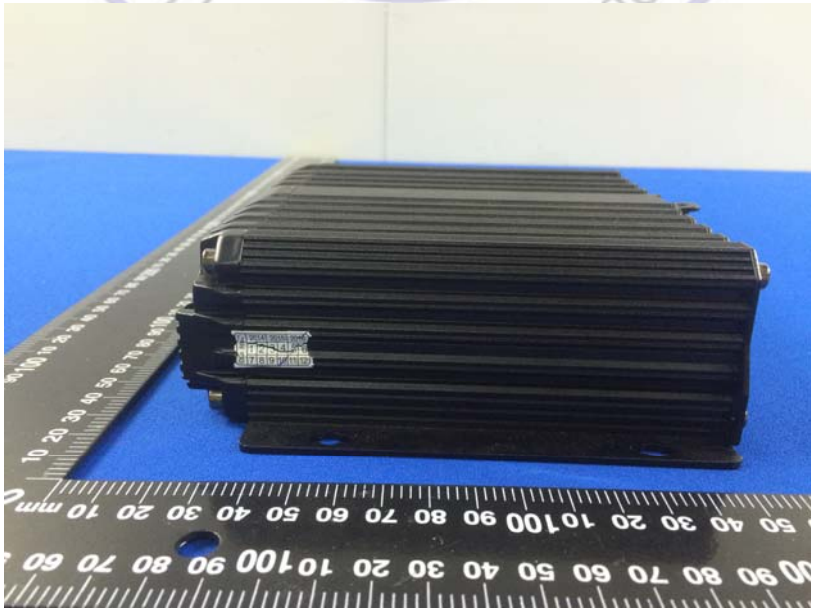
6. Photos of the EUT






3G/4G
WIFI-2
WIFI-1
GPS
CAM3
CAM1
POWER
I/O&RS485&RS232
AV-OUT
RJ45
MCU
CAM4
CAM2





.....End of Report.....