



# FCC Part 15B Test Report

## FCC ID: 2ALXUV1

Product Name:	Commander Goggles V1
Trademark:	N/A
Model Name :	Commander Goggles V1 Commander Goggles V2, Commander Goggles V3, Commander Goggles V4
Prepared For :	Shenzhen Aomway Science and Technology Co., Ltd.
Address :	501, A2 Buliding, Shangxue Industry Park, Longgang District, Shenzhen City, Guangdong Province, China
Prepared By :	Shenzhen BCTC Technology Co., Ltd.
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Test Date:	Apr. 10 – Apr. 20, 2017
Date of Report :	Apr. 20, 2017
Report No.:	BCTC-LH170401345E



## TEST RESULT CERTIFICATION

**Applicant's name** ..... : Shenzhen Aomway Science and Technology Co., Ltd.  
**Address** ..... : 501, A2 Buliding, Shangxue Industry Park, Longgang District, Shenzhen City, Guangdong Province, China  
**Manufacturer's Name** ..... : Shenzhen Aomway Science and Technology Co., Ltd.  
**Address** ..... : 501, A2 Buliding, Shangxue Industry Park, Longgang District, Shenzhen City, Guangdong Province, China

### Product description

**Product name** ..... : Commander Goggles V1  
**Trademark** ..... : N/A  
**Model and/or type reference** ..... : Commander Goggles V1  
Commander Goggles V2, Commander Goggles V3,  
Commander Goggles V4  
**Standards** ..... : FCC Part15B  
ANSI C63.4-2014

This device described above has been tested by BCTC, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Prepared by(Engineer): Snow Zeng

Snow Zeng

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Jade Yang

Approved(Manager): Carson Zhang

Carson Zhang

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## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15			
Standard Section	Test Item	Judgment	Remark
Part 15.107	Conducted Emission	PASS	
Part 15.109	Radiated Spurious Emission	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

### 1.1 TEST FACILITY

Shenzhen BCTC Technology Co., Ltd.

Add. : No.101, Yousong Road, Longhua New District, Shenzhen, China  
FCC Registered No.: 187086

### 1.2 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 % .

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$



## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	Commander Goggles V1
Trade Name	N/A
Model Name	Commander Goggles V1 Commander Goggles V2, Commander Goggles V3, Commander Goggles V4
Model Difference	The product's different for model name and outlook color.
Product Description	The EUT is a Commander Goggles V1 Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.
Power	DC 10V from adapter
Adapter	--
hardware version	--
Software version	--
Serial number	--
Connecting I/O Port(s)	Please refer to the User's Manual
Max Operation Frequency	5GHz

**Note:**

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



## 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Mini HDMI Playing
Mode 2	TF card Playing
Mode 3	
Mode 4	
<b>For Conducted &amp; Radiated Emission</b>	
Final Test Mode	Description
Mode 1	Mini HDMI Playing

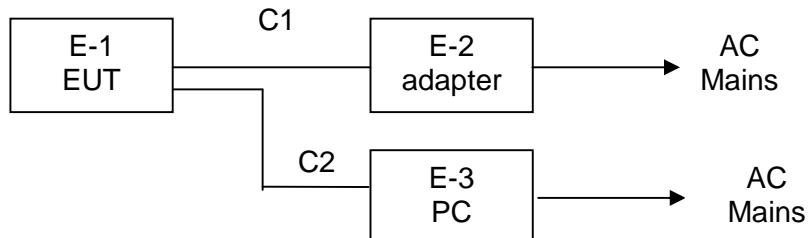
Note:

(1) The measurements are performed at the highest, middle, lowest available channels.



## 2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted and Radiated Emission Test



## 2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Commander Goggles V1	N/A	Commander Goggles V1	N/A	EUT
E-2	Adapter	WINTEC	GM-120100	N/A	
E-3	PC	BCTC	BC036	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C1	No	No	0.8m	DC Line
C2	No	No	1.2m	Mini HDMI line

Note:

- (1) For detachable type I/O cable should be specified the length in cm in『Length』column.



## 2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

### Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer	Agilent	E4407B	MY45109572	2016.08.27	2017.08.26
2	Test Receiver	R&S	ESPI	101396	2016.08.27	2017.08.26
3	Bilog Antenna	SCHWARZBECK	VULB9160	VULB9160-3369	2016.08.27	2017.08.26
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2016.08.27	2017.08.26
5	Spectrum Analyzer	Agilent	N9020A	MY5051041	2016.08.27	2017.08.26
6	Horn Antenna	SCHWARZBECK	9120D	9120D-1275	2016.08.29	2017.08.28
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2016.08.29	2017.08.28
8	Amplifier	SCHWARZBECK	BBV9718	9718-270	2016.08.29	2017.08.28
9	Amplifier	SCHWARZBECK	BBV9743	9743-119	2016.08.29	2017.08.28
10	Loop Antenna	ARA	PLCommander Goggles V1 MI-BTH0730/B	1029	2016.07.06	2017.07.05
11	Power Meter	R&S	NRVS	100696	2016.08.27	2017.08.26
12	Power Sensor	R&S	URV5-Z4	0395.1619.05	2016.08.27	2017.08.26
13	RF cables	R&S	N/A	N/A	2016.08.27	2017.08.26
14	966 chamber	ChengYu	966 Room	966	2016.08.27	2017.08.26

### Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Test Receiver	R&S	ESCI	1166.5950K03-101165-ha	2016.08.27	2017.08.26
2	LISN	R&S	NSLK8126	8126466	2016.08.27	2017.08.26
3	LISN	R&S	NSLK8126	8126487	2016.08.27	2017.08.26
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2016.08.27	2017.08.26
5	RF cables	R&S	R204	R20X	2016.08.27	2017.08.26



### 3. EMC EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class B (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

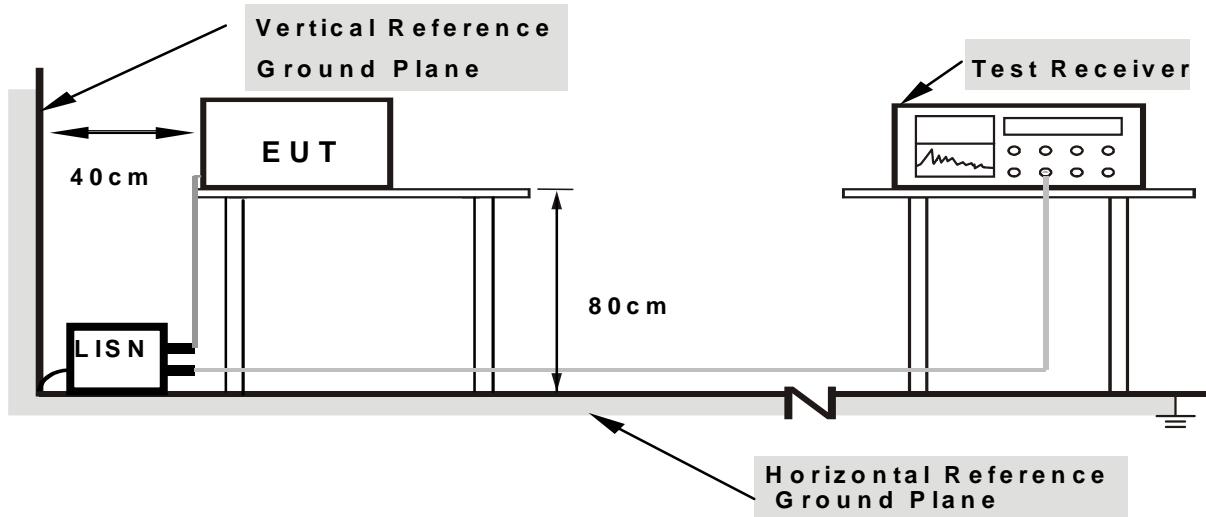
#### 3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 3.1.3 DEVIATION FROM TEST STANDARD

No deviation

### 3.1.4 TEST SETUP



**Note:** 1. Support units were connected to second LISN.  
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

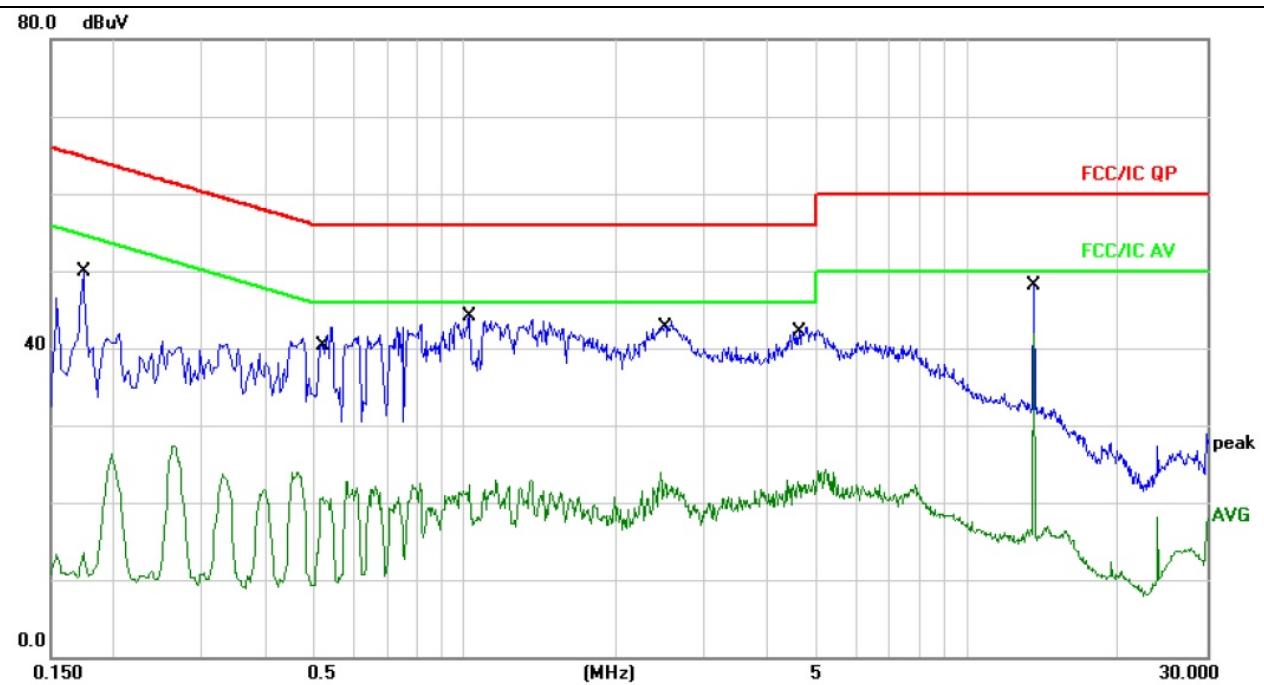
### 3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

### 3.1.6 TEST RESULTS



Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode :	Mode 1



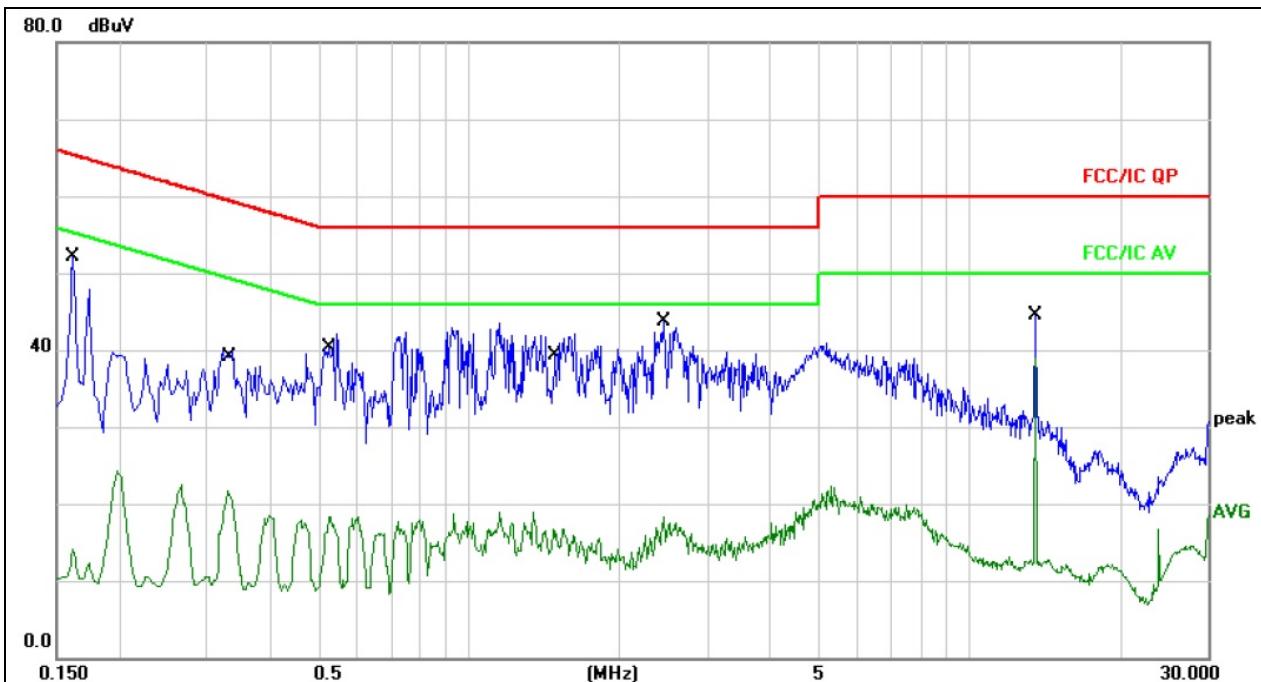
## Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
1		0.1740	39.86	10.06	49.92	64.76	-14.84	QP	
2		0.1740	5.92	10.06	15.98	54.76	-38.78	AVG	
3		0.5220	32.63	10.12	42.75	56.00	-13.25	QP	
4		0.5220	10.51	10.12	20.63	46.00	-25.37	AVG	
5		1.0260	33.96	10.17	44.13	56.00	-11.87	QP	
6		1.0260	12.10	10.17	22.27	46.00	-23.73	AVG	
7		2.5100	33.40	10.19	43.59	56.00	-12.41	QP	
8		2.5100	12.29	10.19	22.48	46.00	-23.52	AVG	
9		4.6100	32.46	10.15	42.61	56.00	-13.39	QP	
10		4.6100	12.60	10.15	22.75	46.00	-23.25	AVG	
11		13.5620	38.05	10.14	48.19	60.00	-11.81	QP	
12	*	13.5620	31.83	10.14	41.97	50.00	-8.03	AVG	



Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test Mode :	Mode 1

**Remark:**

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Comment
			Level	Factor	ment			
MHz		dBuV	dB	dBuV	dBuV	dB	Detector	
1	0.1620	41.97	10.05	52.02	65.36	-13.34	QP	
2	0.1620	4.12	10.05	14.17	55.36	-41.19	AVG	
3	0.3300	29.77	10.10	39.87	59.45	-19.58	QP	
4	0.3300	11.61	10.10	21.71	49.45	-27.74	AVG	
5	0.5260	31.97	10.12	42.09	56.00	-13.91	QP	
6	0.5260	8.25	10.12	18.37	46.00	-27.63	AVG	
7	1.4780	31.92	10.17	42.09	56.00	-13.91	QP	
8	1.4780	6.63	10.17	16.80	46.00	-29.20	AVG	
9	2.4500	33.48	10.18	43.66	56.00	-12.34	QP	
10	2.4500	8.16	10.18	18.34	46.00	-27.66	AVG	
11	13.5620	34.41	10.14	44.55	60.00	-15.45	QP	
12 *	13.5620	28.79	10.14	38.93	50.00	-11.07	AVG	



### 3.2 RADIATED EMISSION MEASUREMENT

#### 3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

1. The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/ meter at 30 meters
2. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

#### 3.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

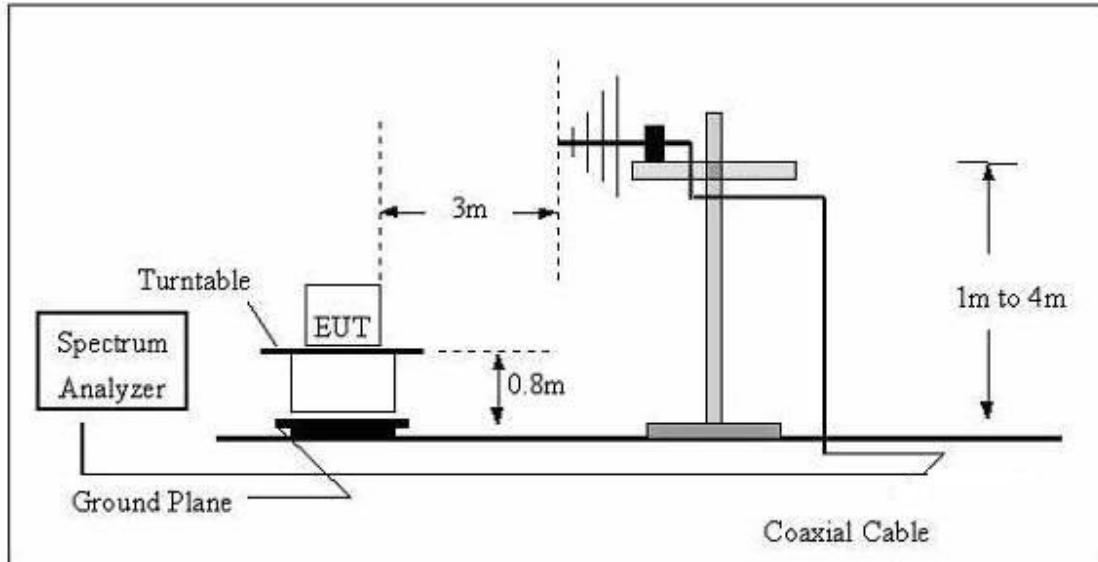
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

### 3.2.3 DEVIATION FROM TEST STANDARD

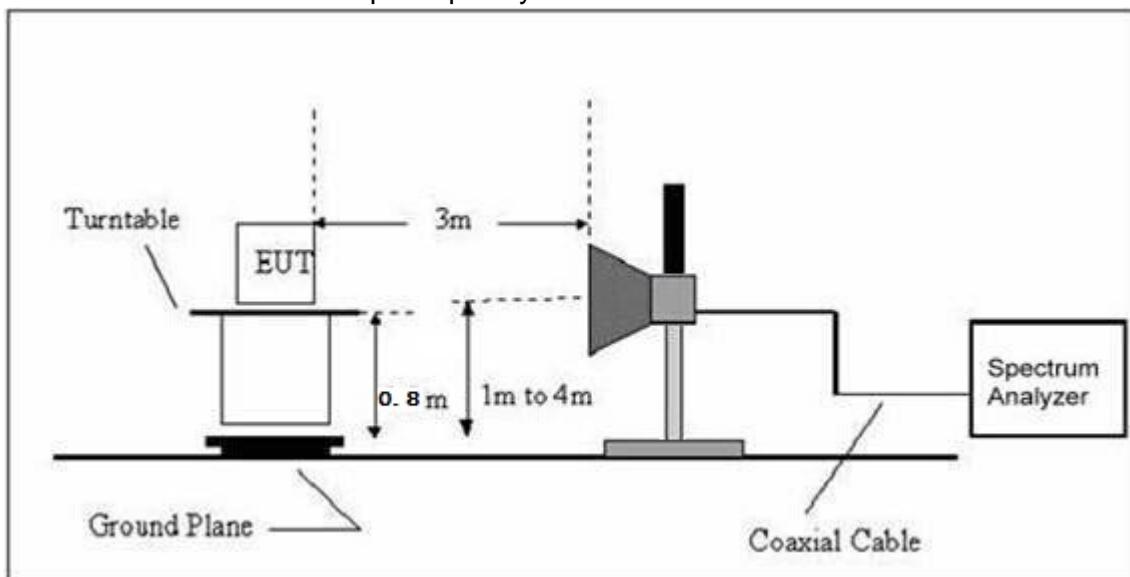
No deviation

### 3.2.4 TEST SETUP

(A) Radiated Emission Test-Up Frequency 30MHz~1GHz



(B) Radiated Emission Test-Up Frequency Above 1GHz



### 3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

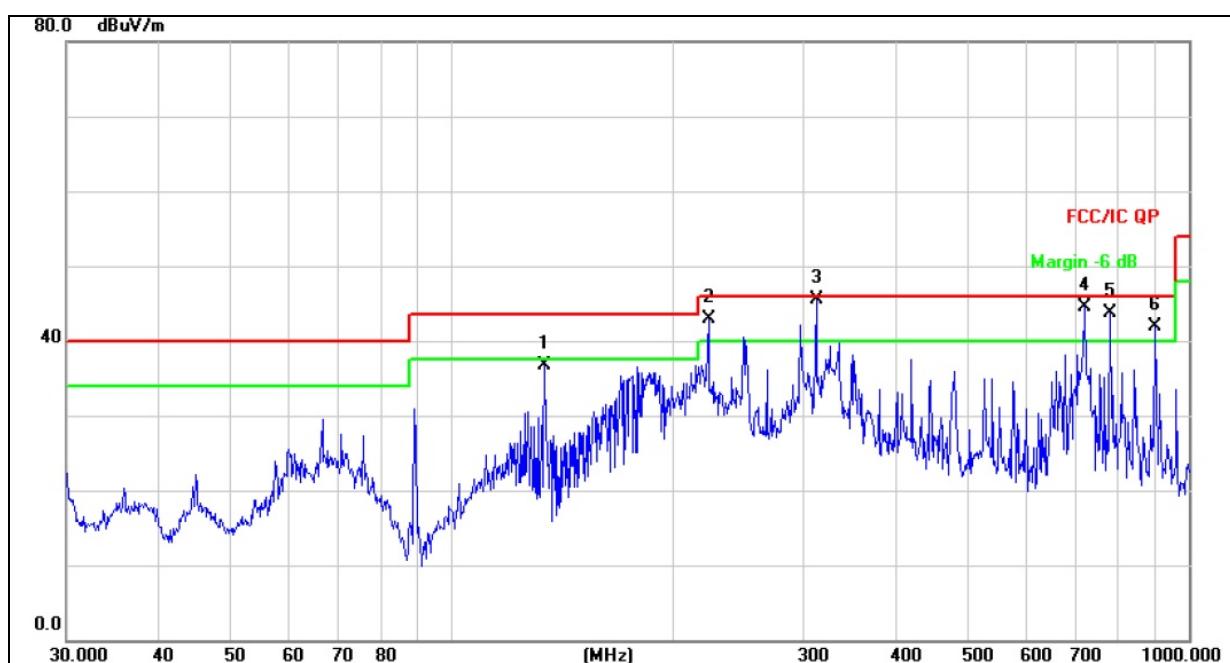
Note:

The emission above 1GHz is background, so no data about it.



### 3.2.6 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

Temperature :	26°C	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 10V from adapter		
Test Mode :	Mode 1		

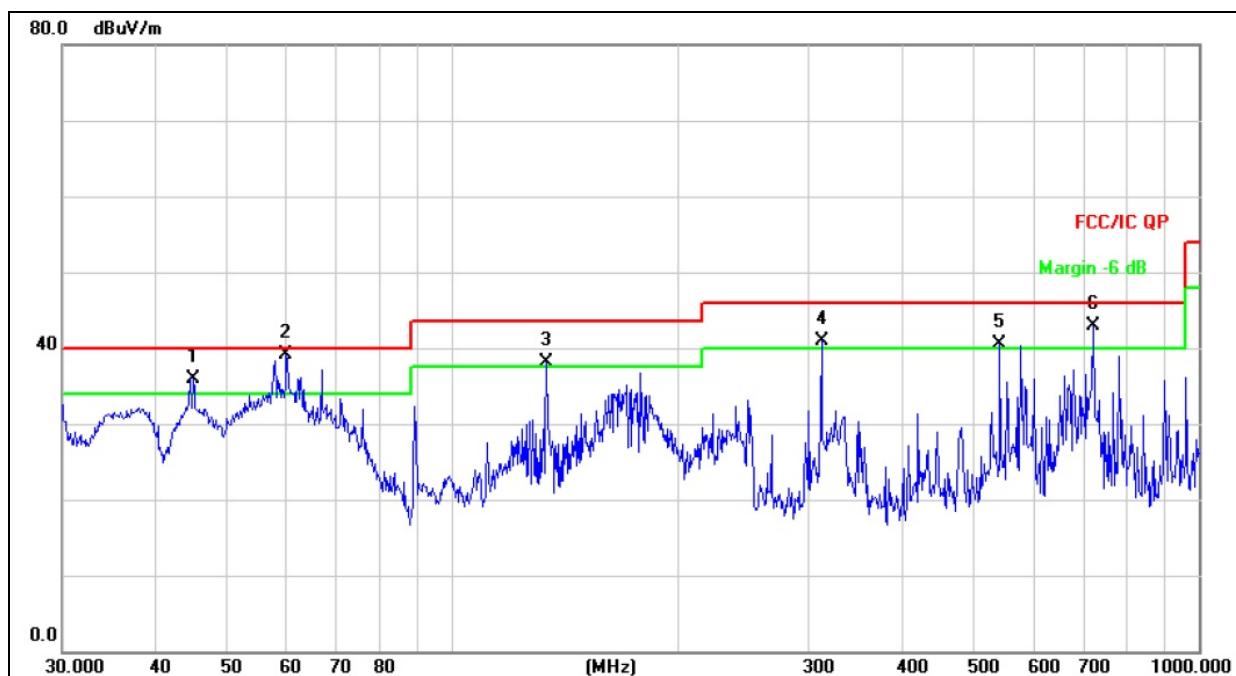
**Remark:**

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over
			Level	Factor	ment		
1		133.6188	50.59	-13.85	36.74	43.50	-6.76 QP
2	!	222.9502	58.41	-15.46	42.95	46.00	-3.05 QP
3	*	312.1794	57.83	-12.27	45.56	46.00	-0.44 QP
4	!	721.7259	48.41	-3.93	44.48	46.00	-1.52 QP
5	!	782.3453	46.54	-2.80	43.74	46.00	-2.26 QP
6	!	900.1474	43.33	-1.45	41.88	46.00	-4.12 QP



Temperature :	26°C	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 10V from adapter		
Test Mode :	Mode 1		



Remark:

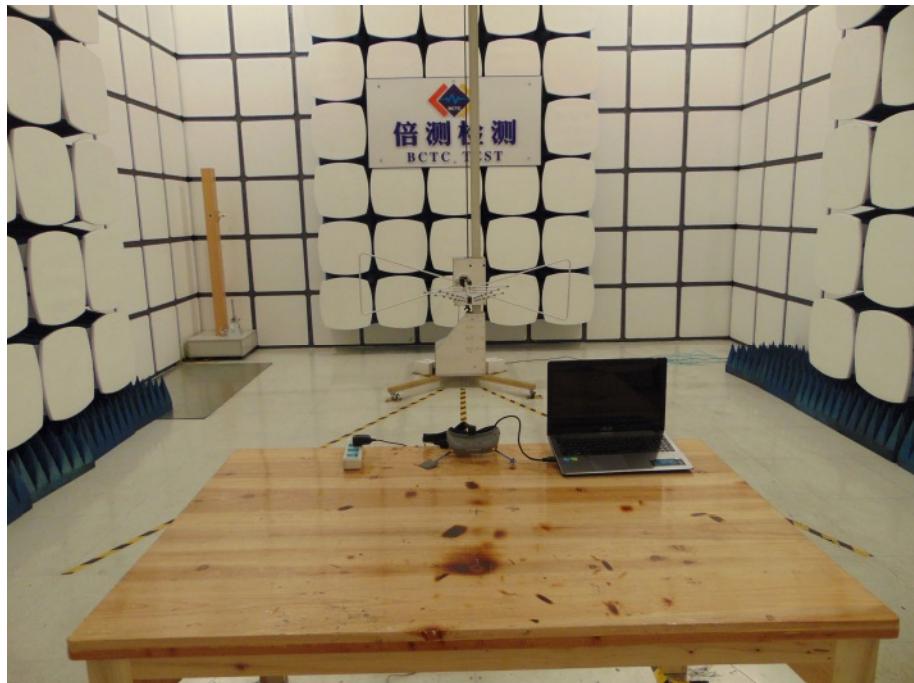
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over
			Level	Factor	ment		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1	!	44.9006	45.46	-9.46	36.00	40.00	-4.00 QP
2	*	59.8588	50.60	-11.50	39.10	40.00	-0.90 QP
3	!	133.6188	51.97	-13.85	38.12	43.50	-5.38 QP
4	!	312.1794	53.22	-12.27	40.95	46.00	-5.05 QP
5	!	541.3725	47.85	-7.35	40.50	46.00	-5.50 QP
6	!	721.7259	46.77	-3.93	42.84	46.00	-3.16 QP



#### 4. TEST SEUUP PHOTO

**Radiated Measurement Photos**





### Conducted Measurement Photos

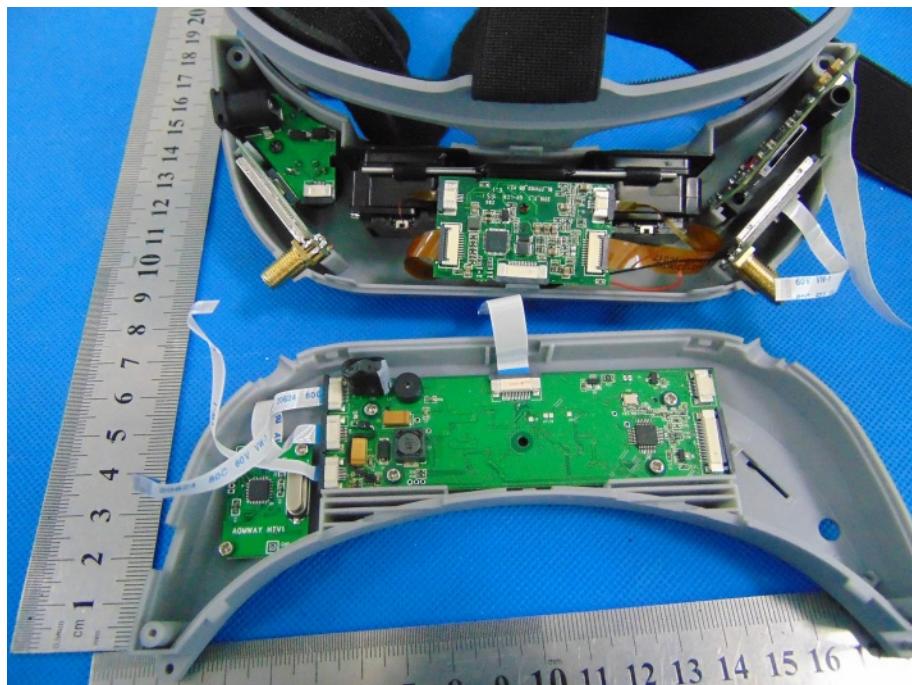




## 5. EUT PHOTO







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