

TEST REPORT

Applicant	Sonim Technologies, Inc.
Address	1825 S. Grant St., Suite 200., San Mateo, CA, 94402

Manufacturer or Supplier	Tian Li Auto Parts & Accessories Co., Ltd
Address	No.13,Jing Tian Road, XinSheng Village, Long Gang District, Long Gang Town, ShenZhen, GuangDong, China
Product	Bluetooth PTT Car Kit
Brand Name	Sonim
Model Name	AVK01G
FCC ID	WYPVK01011AA
Additional Model & Model Difference	N/A
Date of tests	Apr. 06, 2015 ~ May 06, 2015

The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

☒ **FCC Part 15, Subpart B, Class B**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Jeffery Lee Project Engineer / EMC Department	Approved by Sam Tung Manager / EMC Department
	 Date: May 07, 2015

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Test Report No.: FV150211N026

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FV150211N026	Original release	May 07, 2015

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart B			
Standard Section	Test Item	Result	Remark
FCC Part 15, Subpart B, Class B	Radiated Emission Test (30MHz ~ 1GHz)	PASS	Meets Class B Limit Minimum passing margin is -3.86dB at 64.92MHz
	Radiated Emission Test (Above 1GHz)	PASS	Meets Class B Limit Minimum passing margin is -9.80dB at 3876.584MHz

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Radiated emissions	30MHz ~ 1GHz	+/-4.10dB
	Above 1GHz	+/-4.58dB

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Bluetooth PTT Car Kit
MODEL NAME	AVK01G
TYPE NUMBER	VK01011AA , VK01013AA
POWER SUPPLY	Powered by Host Unit
OPERATING FREQUENCY	Below 15MHz
CABLE SUPPLIED	DC Line: Unshielded, Detachable, 1.0m.

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

2.2 DESCRIPTION OF TEST MODES

The EUT was tested under the following modes. And the final worst mode was marked in boldface and recorded in this report.

For All Tests:

Test Mode
CD Mode
USB Playing
FM (AM)
BT Mode

2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an dependent 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.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Mobile Phone	SAMSUNG	GT-S7572	R21D85CCB7N	N/A
2	USB	SONY	USM8GQ/SC	4-415-184-01	N/A

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	Aux In Line: Unshielded, Detachable 1.0m or 1.5m
2	N/A

3 EMISSION TEST

3.1 RADIATED EMISSION MEASUREMENT

3.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.109)

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Radiated Emissions Limits at 10 meters (dBµV/m)				
Frequencies (MHz)	FCC 15B/ ICES-003, Class A	FCC 15B / ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	39	29.5	40	30
88-216	43.5	33.1		
216-230	46.4	35.6		
230-960			47	37
960-1000	49.5	43.5		
1000-3000	Avg: 49.5	Avg: 43.5	Not defined	Not defined
Above 3000	Peak: 69.5	Peak: 63.5	Not defined	Not defined

Radiated Emissions Limits at 3 meters (dBμV/m)				
Frequencies (MHz)	FCC 15B / ICES-003, Class A	FCC 15B / ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	49.5	40	50.5	40.5
88-216	54	43.5		
216-230	56.9	46		
230-960				
960-1000	60	54	57.5	47.5
1000-3000	Avg: 60 Peak: 80	Avg: 54 Peak: 74	Avg: 56 Peak: 76	Avg: 50 Peak: 70
Above 3000			Avg: 60 Peak: 80	Avg: 54 Peak: 74

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

Note: (1) The lower limit shall apply at the transition frequencies.

(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

3.1.2 TEST INSTRUMENTS

FREQUENCY RANGE BELOW 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	100962	Mar. 05,15	Mar. 04,16
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-554	Dec. 08, 14	Dec. 07, 15
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-555	Nov. 24, 14	Nov. 23, 15
Signal Amplifier	Agilent	8447D	2944A10488	Jun. 25,14	Jun. 24,15
Signal Amplifier	Agilent	8447D	2944A11174	Jun. 25,14	Jun. 24,15
10m Semi-anechoic Chamber	CHANGLING	21.4m*12.1m*8.8m	NSEMC006	May 15, 14	May 14, 16
Test Software	ADT	ADT_Radiated_V8.7.x	N/A	N/A	N/A

FREQUENCY RANGE ABOVE 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101003	Apr. 07, 15	Apr. 06, 16
Pre-Amplifier (100MHz-26.5GHz)	EMCI	EMC 012645	980077	Jun. 16,14	Jun. 15,15
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 20,14	Nov. 19,15
Test Software	ADT	ADT_Radiated_V8.7.x	N/A	N/A	N/A

- NOTES:** 1. The test was performed in 10 Chamber (a 3m Semi-anechoic chamber).
 2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 3. The FCC Site Registration No. is 502831.

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	ETS-Lindgren	3117	00085519	Feb. 03,15	Feb. 02,17

- NOTES:** 1. The test was performed in 10 Chamber (a 3m Semi-anechoic chamber).
 2. The calibration interval of the above test instruments is 24 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 3. The FCC Site Registration No. is 502831.

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170242	Feb. 13,14	Feb. 12,17

- NOTES:** 1. The test was performed in 10 Chamber (a 3m Semi-anechoic chamber).
 2. The calibration interval of the above test instruments is 36 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 3. The FCC Site Registration No. is 502831.

3.1.1.3 TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4:2013 (section 12).

<Frequency Range below 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from 1 meter to 4 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 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
3. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$ (if the raw value not contains the amplifier)
4. $\text{Correction Factor (dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Amplifier Gain(dB)}$ (if the raw value contains the amplifier)
5. $\text{Margin value} = \text{Emission level} - \text{Limit value}$

<Frequency Range above 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter chamber room. 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 height of antenna can be varied from one meter-to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. The bore sight should be used during the test above 1GHz.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test receiver/spectrum was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

NOTE:

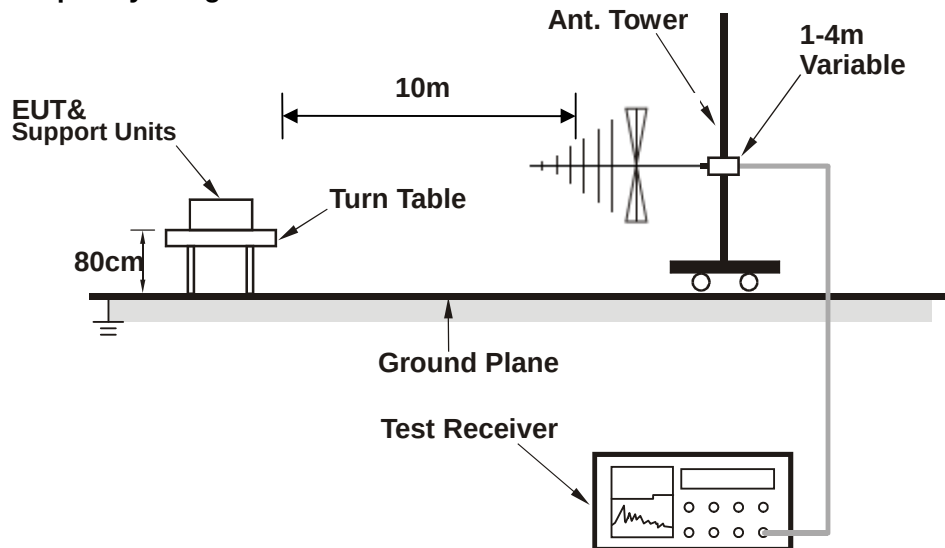
1. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 10Hz for Average detection at frequency above 1GHz.
2. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.
3. $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
4. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$ (if the raw value not contains the amplifier)
5. $\text{Correction Factor (dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Amplifier Gain(dB)}$ (if the raw value contains the amplifier).
6. $\text{Margin value} = \text{Emission level} - \text{Limit value}$

3.1.4 DEVIATION FROM TEST STANDARD

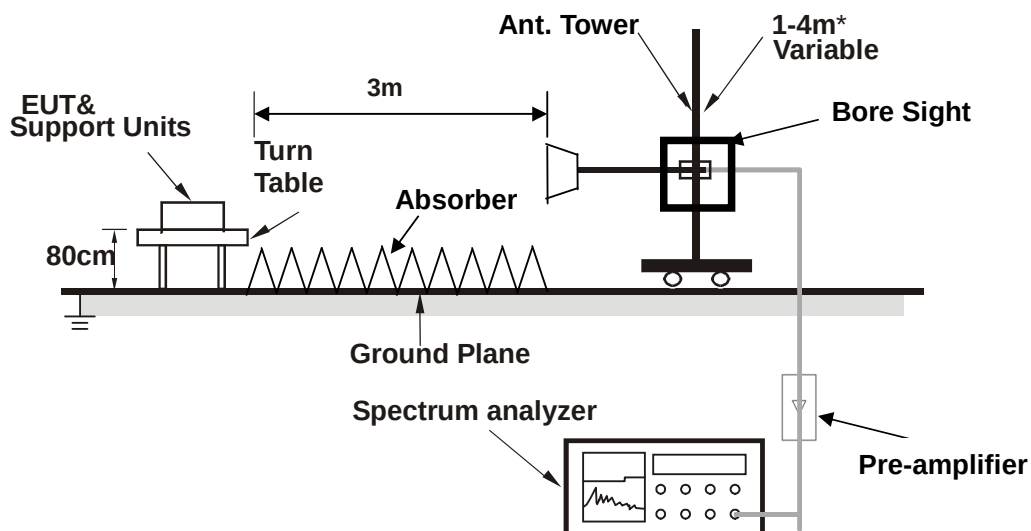
No deviation.

3.1.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



* : depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

3.1.6 EUT OPERATING CONDITIONS

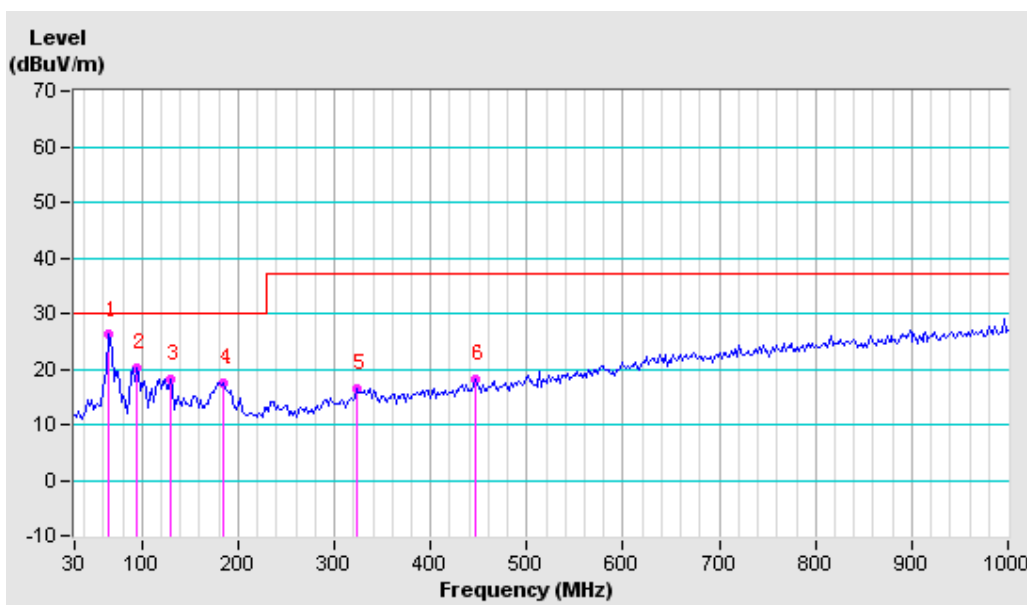
- Turn on the power supply of the EUT.
- EUT was operated according to the type description in manufacturer's specifications or the User's Manual.

3.1.7 TEST RESULTS

TEST MODE	BT Mode	FREQUENCY RANGE	30-1000MHz
TEST VOLTAGE	AC 120V/60Hz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 55% RH	TESTED BY: William Wang	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	64.92	-15.66	41.80	26.14	30.00	-3.86	400	150
2	94.02	-18.72	38.94	20.22	30.00	-9.78	400	314
3	128.94	-15.50	33.67	18.17	30.00	-11.83	400	137
4	185.20	-15.34	32.90	17.56	30.00	-12.44	400	105
5	322.94	-11.82	28.32	16.50	37.00	-20.50	400	176
6	447.10	-9.65	27.79	18.14	37.00	-18.86	400	192

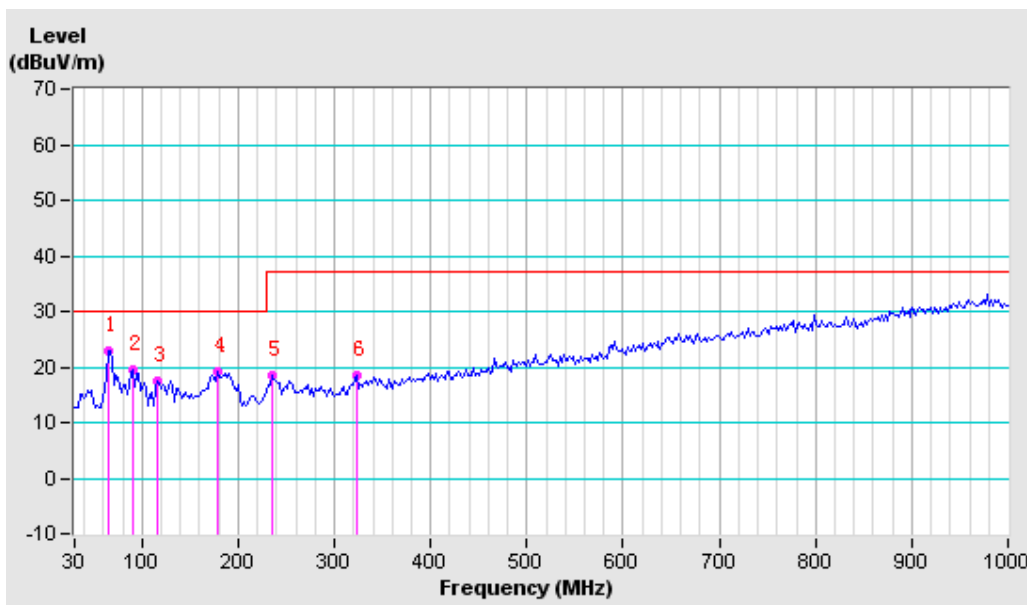
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4. Only emissions significantly above equipment noise floor are reported.



TEST MODE	BT Mode	FREQUENCY RANGE	30-1000MHz
TEST VOLTAGE	AC 120V/60Hz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	23 deg. C, 55% RH	TESTED BY: William Wang	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	64.92	-14.59	37.58	22.99	30.00	-7.01	100	306
2	90.14	-17.25	36.67	19.42	30.00	-10.58	100	235
3	115.36	-15.15	32.69	17.54	30.00	-12.46	100	340
4	179.38	-13.44	32.60	19.16	30.00	-10.84	100	312
5	235.64	-12.69	31.09	18.40	37.00	-18.60	100	49
6	322.94	-9.57	28.04	18.47	37.00	-18.53	100	68

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4. Only emissions significantly above equipment noise floor are reported.



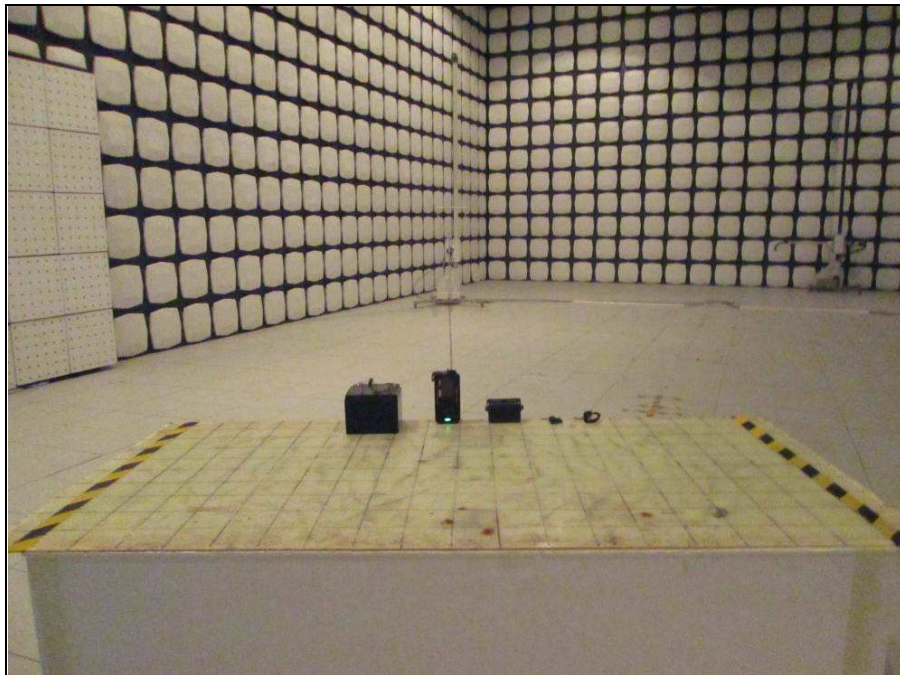
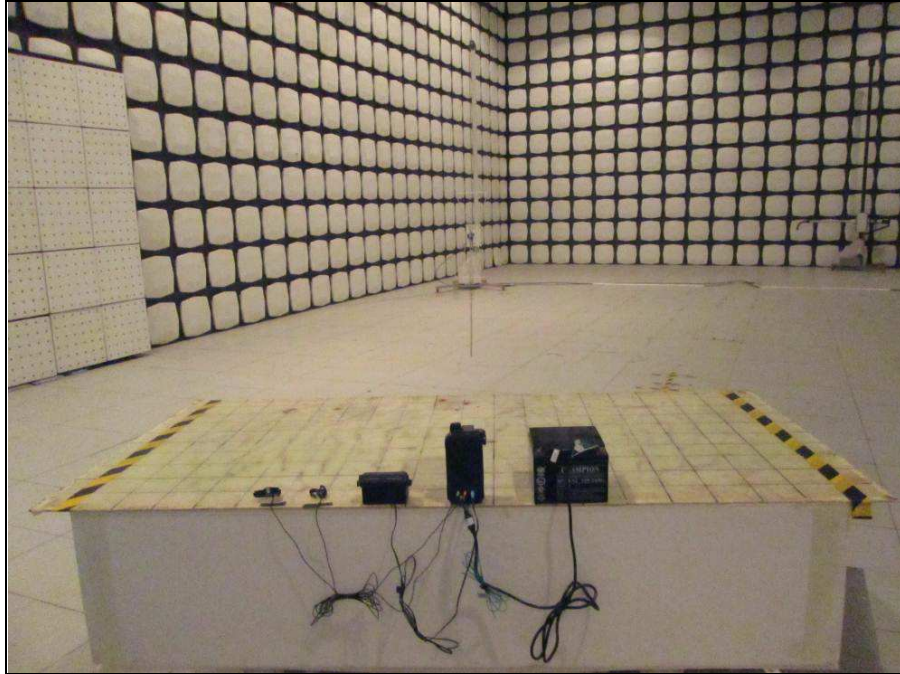
TEST MODE	BT Mode	FREQUENCY RANGE	Above 1GHz
TEST VOLTAGE	AC 120V/60Hz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak, Average 1MHz
ENVIRONMENTAL CONDITIONS	24 deg. C, 62% RH	TESTED BY: William Wang	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	1274.158 PK	-12.73	56.53	43.80	74.00	-30.20	100	71
2	1274.158 AV	-12.73	47.93	35.20	54.00	-18.80	100	71
3	3876.584 PK	-3.64	56.04	52.40	74.00	-21.60	100	85
4	3876.584 AV	-3.64	47.84	44.20	54.00	-9.80	100	85
5	5134.472 PK	-1.47	54.97	53.50	74.00	-20.50	100	19
6	5134.472 AV	-1.47	43.07	41.60	54.00	-12.40	100	19
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT AT 10 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	1674.158 PK	-10.71	59.21	48.50	74.00	-25.50	100	45
2	1674.158 AV	-10.71	45.31	34.60	54.00	-19.40	100	45
3	4215.128 PK	-2.89	56.69	53.80	74.00	-20.20	100	88
4	4215.128 AV	-2.89	44.09	41.20	54.00	-12.80	100	88
5	5387.452 PK	-1.05	53.55	52.50	74.00	-21.50	100	41
6	5387.452 AV	-1.05	43.95	42.90	54.00	-11.10	100	41

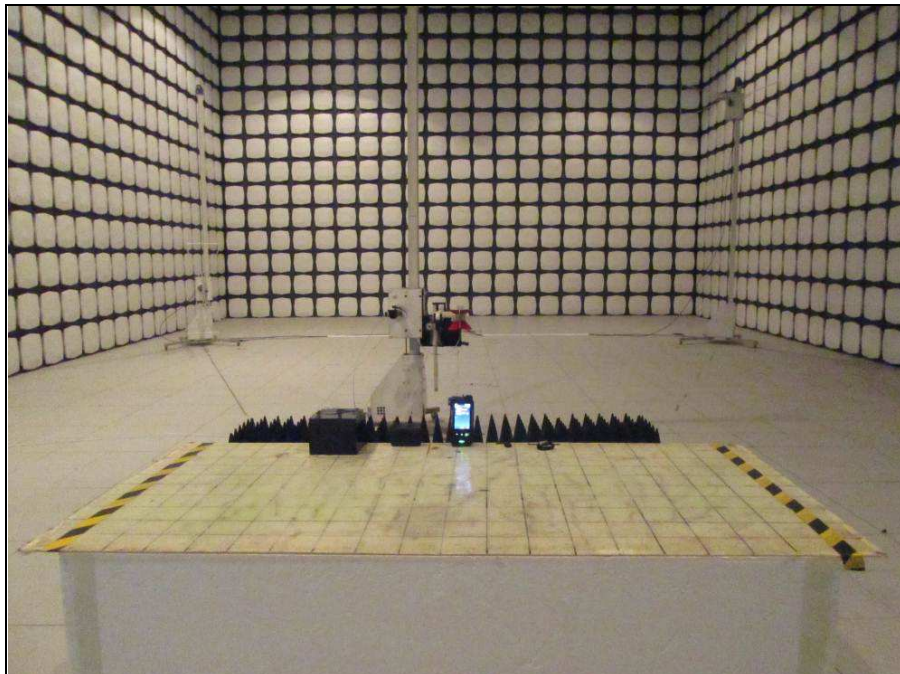
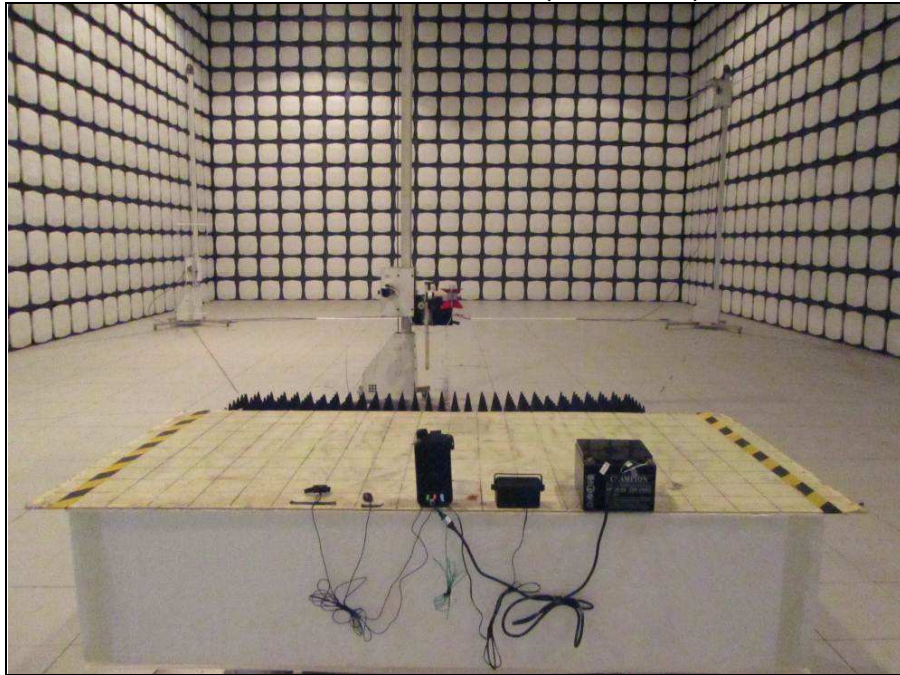
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 1GHz to 6GHz.
 4. Only emissions significantly above equipment noise floor are reported.

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

RADIATED EMISSION TEST (30MHz-1GHz)



RADIATED EMISSION TEST (Above 1GHz)





Test Report No.: FV150211N026

5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

---END---