

FCC REPORT

Applicant: SHENZHEN TUGAO INTELLIGENT CO., LTD

Address of Applicant: 8th Floor, Bldg A, Jingang Science&Technology Park, Fuyong,
Bao'an District, Shenzhen, Guangdong, China.

Equipment Under Test (EUT)

Product Name: Smart phone

Model No.: Symbol X

Trade mark: HOTWAV

FCC ID: 2AOKUSYMBOLX

Applicable standards: FCC CFR Title 47 Part 15 Subpart B

Date of sample receipt: 17 May, 2018

Date of Test: 18 May, to 20 Jun., 2018

Date of report issued: 20 Jun., 2018

Test Result: PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

2 Version

Version No.	Date	Description
00	20 Jun., 2018	Original

Tested by:

Zora Lee

Date:

20 Jun., 2018

Test Engineer

Reviewed by:

Wimer Zhang

Date:

20 Jun., 2018

Project Engineer

3 Contents

	Page
1 COVER PAGE.....	1
2 VERSION	2
3 CONTENTS	3
4 TEST SUMMARY.....	4
5 GENERAL INFORMATION.....	5
5.1 CLIENT INFORMATION	5
5.2 GENERAL DESCRIPTION OF E.U.T.	5
5.3 TEST MODE.....	5
5.4 MEASUREMENT UNCERTAINTY.....	5
5.5 DESCRIPTION OF SUPPORT UNITS	6
5.6 RELATED SUBMITTAL(s) / GRANT (s).....	6
5.7 LABORATORY FACILITY	6
5.8 LABORATORY LOCATION	6
5.9 TEST INSTRUMENTS LIST.....	7
6 TEST RESULTS AND MEASUREMENT DATA.....	8
6.1 CONDUCTED EMISSION.....	8
6.2 RADIATED EMISSION	11
7 TEST SETUP PHOTO	17
8 EUT CONSTRUCTIONAL DETAILS	18

4 Test Summary

Test Item	Section in CFR 47	Result
Conducted Emission	Part 15.107	Pass
Radiated Emission	Part 15.109	Pass
<i>Remark:</i> <i>Pass: The EUT complies with the essential requirements in the standard.</i> <i>N/A: The EUT not applicable of the test item.</i>		

5 General Information

5.1 Client Information

Applicant:	SHENZHEN TUGAO INTELLIGENT CO., LTD
Address of Applicant:	8th Floor, Bldg A, Jingang Science&Technology Park, Fuyong, Bao'an District, Shenzhen, Guangdong, China.
Manufacturer/Factory:	SHENZHEN TUGAO INTELLIGENT CO., LTD
Address:	8th Floor, Bldg A, Jingang Science&Technology Park, Fuyong, Bao'an District, Shenzhen, Guangdong, China.

5.2 General Description of E.U.T.

Product Name:	Smart phone
Model No.:	Symbol X
Power supply:	Rechargeable Li-ion Battery DC3.8V-2500mAh
AC adapter :	Input: AC100-240V, 50/60Hz, 0.15A Output: DC 5.0V, 1.0A

5.3 Test Mode

Operating mode	Detail description
PC mode	Keep the EUT in Downloading mode(Worst case)
Charging+Recording mode	Keep the EUT in Charging+Recording mode
Charging+Playing mode	Keep the EUT in Charging+Playing mode

The sample was placed 0.8m above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

5.4 Measurement Uncertainty

Parameters	Expanded Uncertainty
Conducted Emission (9kHz ~ 30MHz)	±2.22 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±2.76 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.28 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.72 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±2.88 dB (k=2)

5.5 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
DELL	PC	OPTIPLEX745	N/A	DoC
DELL	MONITOR	E178FPC	N/A	DoC
DELL	KEYBOARD	SK-8115	N/A	DoC
DELL	MOUSE	MOC5UO	N/A	DoC
LENOVO	Laptop	SL510	2847A65	DoC

5.6 Related Submittal(s) / Grant (s)

This is an original grant, no related submittals and grants.

5.7 Laboratory Facility

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

- **FCC - Registration No.: 727551**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

5.8 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info@ccis-cb.com, Website: <http://www.ccis-cb.com>

5.9 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	3m SAC	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	07-22-2017	07-21-2020
2	BiConiLog Antenna	SCHWARZBECK	VULB9163	CCIS0005	03-16-2018	03-15-2019
3	Horn Antenna	SCHWARZBECK	BBHA9120D	CCIS0006	03-16-2018	03-15-2019
4	Pre-amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	03-07-2018	03-06-2019
5	Pre-amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	03-07-2018	03-06-2019
6	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP30	CCIS0023	03-07-2018	03-06-2019
7	EMI Test Receiver	Rohde & Schwarz	ESRP7	CCIS0167	03-07-2018	03-06-2019
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	N/A	N/A	CCIS0018	03-07-2018	03-06-2019
10	Coaxial Cable	N/A	N/A	CCIS0020	03-07-2018	03-06-2019

Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	07-22-2017	07-21-2020
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	03-07-2018	03-06-2019
3	LISN	CHASE	MN2050D	CCIS0074	03-19-2018	03-18-2019
4	LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	07-21-2017	07-20-2018
5	Coaxial Cable	CCIS	N/A	CCIS0086	03-07-2018	03-06-2019
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

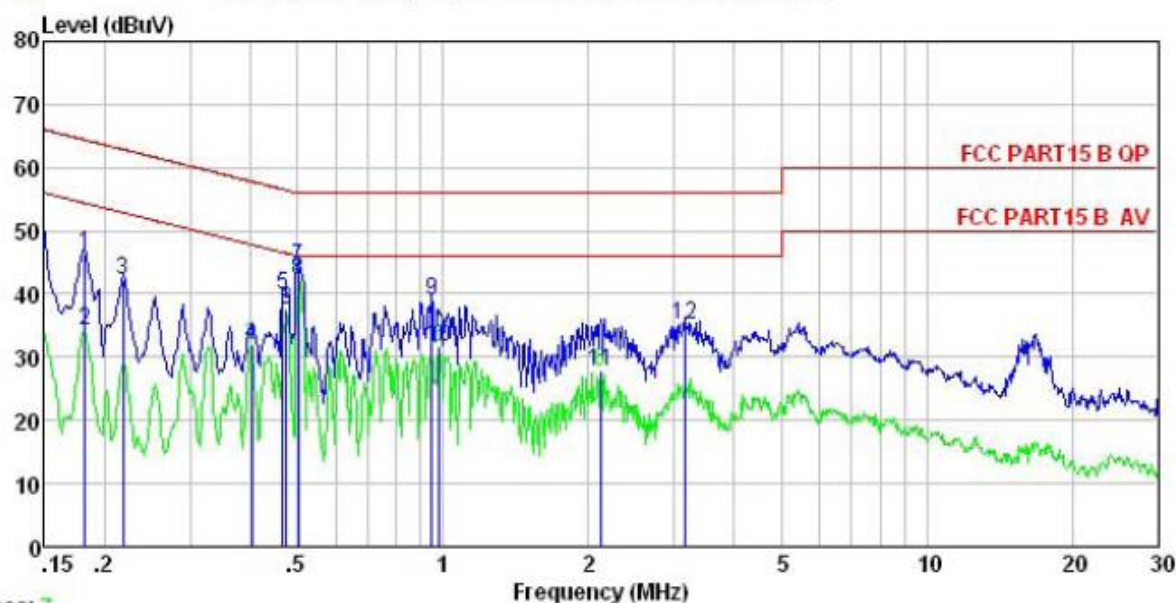
6 Test results and Measurement Data

6.1 Conducted Emission

Test Requirement:	FCC Part 15 B Section 15.107					
Test Method:	ANSI C63.4:2014					
Test Frequency Range:	150kHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9kHz, VBW=30kHz					
Limit:	Frequency range (MHz)	Limit (dBμV)				
		Quasi-peak		Average		
	0.15-0.5	66 to 56*		56 to 46*		
	0.5-5	56		46		
	0.5-30	60		50		
* Decreases with the logarithm of the frequency.						
Test setup:	Reference Plane <i>Remark</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m					
Test procedure	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.					
Test environment:	Temp.:	23 °C	Humid.:	56%	Press.:	101kPa
Test Instruments:	Refer to section 5.9 for details					
Test mode:	Refer to section 5.3 for details					
Test results:	Pass					

Measurement data:

Test Phase: Line



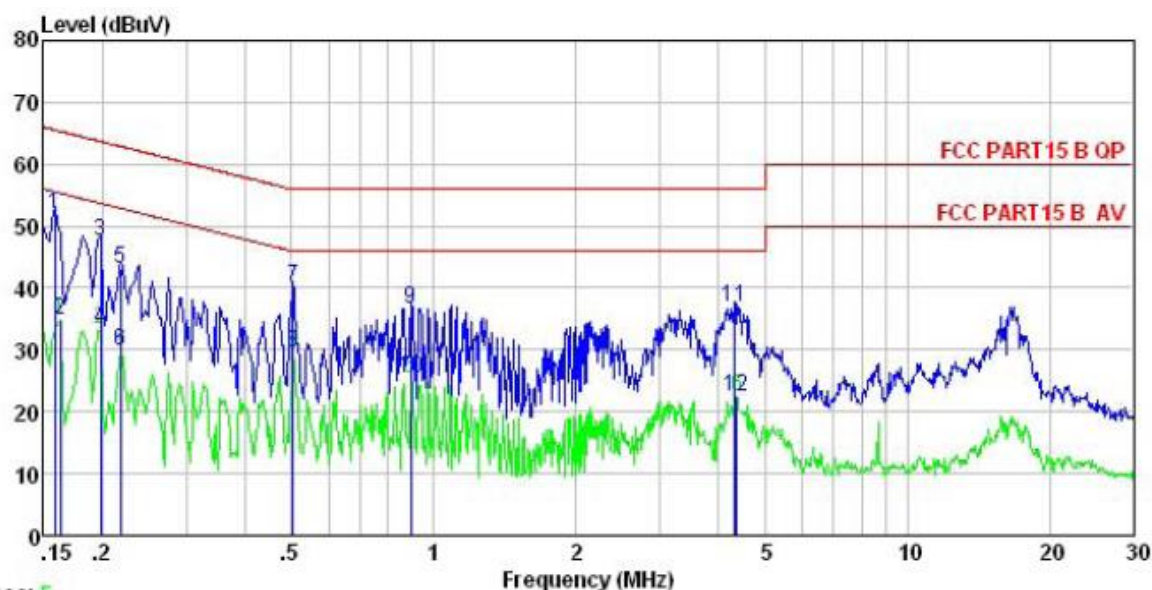
Site : CCIS Shielding Room
 Condition : FCC PART15 B QP LISN LINE
 EUT : Smart phone
 Model : Symbol X
 Test Mode : PC mode
 Power Rating : AC 120V/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: Zoar
 Remark :

	Freq	Read	LISN	Cable	Level	Limit	Over	
	MHz	Level	Factor	Loss	dBuV	Line	Limit	Remark
		dBuV	dB	dB	dBuV	dBuV	dB	
1	0.182	35.25	0.28	10.77	46.30	64.42	-18.12	QP
2	0.182	23.17	0.28	10.77	34.22	54.42	-20.20	Average
3	0.219	31.09	0.28	10.76	42.13	62.88	-20.75	QP
4	0.402	20.75	0.28	10.72	31.75	47.81	-16.06	Average
5	0.466	28.87	0.29	10.75	39.91	56.58	-16.67	QP
6	0.474	26.44	0.29	10.75	37.48	46.45	-8.97	Average
7	0.502	33.36	0.29	10.76	44.41	56.00	-11.59	QP
8	0.502	31.12	0.29	10.76	42.17	46.00	-3.83	Average
9	0.948	27.89	0.25	10.85	38.99	56.00	-17.01	QP
10	0.984	20.48	0.25	10.87	31.60	46.00	-14.40	Average
11	2.121	16.62	0.26	10.95	27.83	46.00	-18.17	Average
12	3.156	24.08	0.27	10.91	35.26	56.00	-20.74	QP

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss.

Test Phase: Neutral



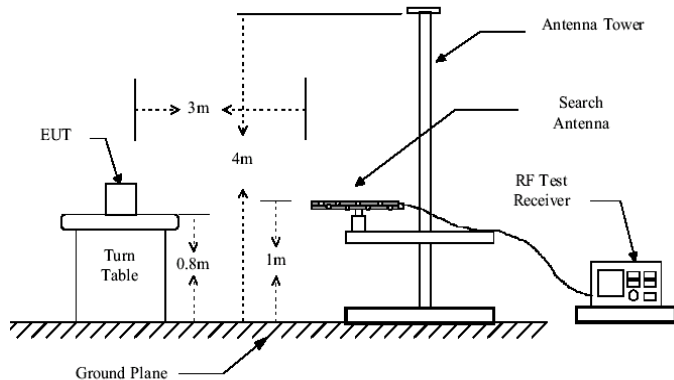
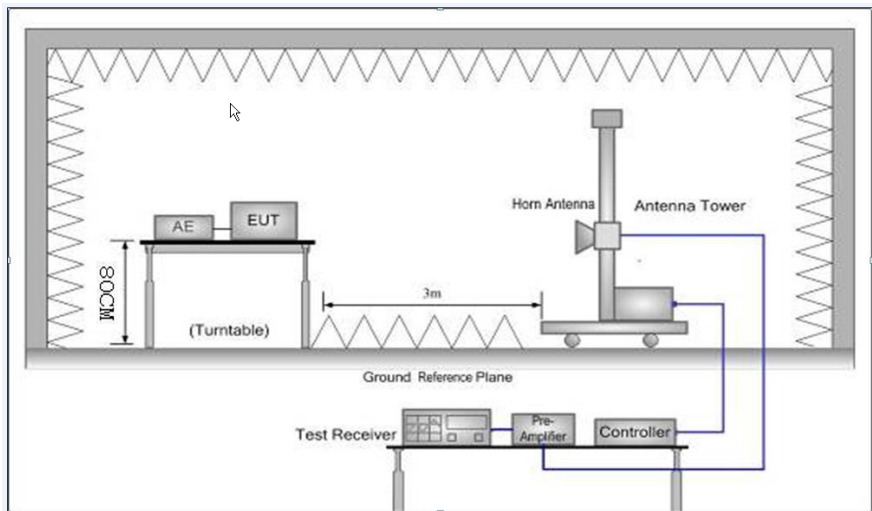
Site : CCIS Shielding Room
 Condition : FCC PART15 B QP LISN NEUTRAL
 EUT : Smart phone
 Model : Symbol X
 Test Mode : PC mode
 Power Rating : AC 120V/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: Zoar
 Remark :

	Read	LISN	Cable	Limit	Over	
Freq	Level	Factor	Loss	Line	Limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB
1	0.158	41.02	0.25	10.78	52.05	65.56 -13.51 QP
2	0.162	23.68	0.25	10.77	34.70	55.34 -20.64 Average
3	0.198	36.51	0.25	10.76	47.52	63.71 -16.19 QP
4	0.198	22.28	0.25	10.76	33.29	53.71 -20.42 Average
5	0.219	32.14	0.25	10.76	43.15	62.88 -19.73 QP
6	0.219	18.68	0.25	10.76	29.69	52.88 -23.19 Average
7	0.505	29.04	0.29	10.76	40.09	56.00 -15.91 QP
8	0.505	18.47	0.29	10.76	29.52	46.00 -16.48 Average
9	0.894	25.63	0.21	10.84	36.68	56.00 -19.32 QP
10	0.894	14.45	0.21	10.84	25.50	46.00 -20.50 Average
11	4.315	25.60	0.29	10.88	36.77	56.00 -19.23 QP
12	4.361	11.36	0.29	10.88	22.53	46.00 -23.47 Average

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss.

6.2 Radiated Emission

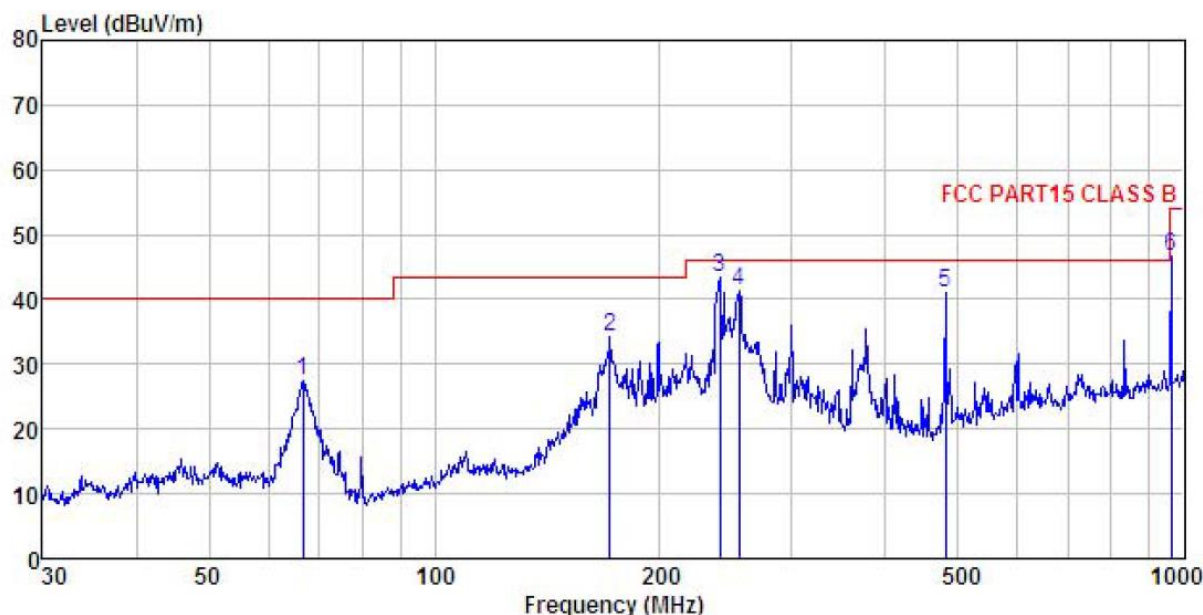
Test Requirement:	FCC Part 15 B Section 15.109				
Test Method:	ANSI C63.4:2014				
Test Frequency Range:	30MHz to 6000MHz				
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.0		Quasi-peak Value
	88MHz-216MHz		43.5		Quasi-peak Value
	216MHz-960MHz		46.0		Quasi-peak Value
	960MHz-1GHz		54.0		Quasi-peak Value
	Above 1GHz		54.0		Average Value
		74.0		Peak Value	
Test setup:	Below 1GHz				
					
Test setup:	Above 1GHz				
					

Test Procedure:	1. 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. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. 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. 4. 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. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. 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.					
Test environment:	Temp.:	25 °C	Humid.:	55%	Press.:	1 01kPa
Test Instruments:	Refer to section 5.9 for details					
Test mode:	Refer to section 5.3 for details					
Test results:	Passed					
Remark:	All of the observed value above 6GHz were the noise floor , which were no recorded					

Measurement Data:

Below 1GHz

Test Polarization: Horizontal



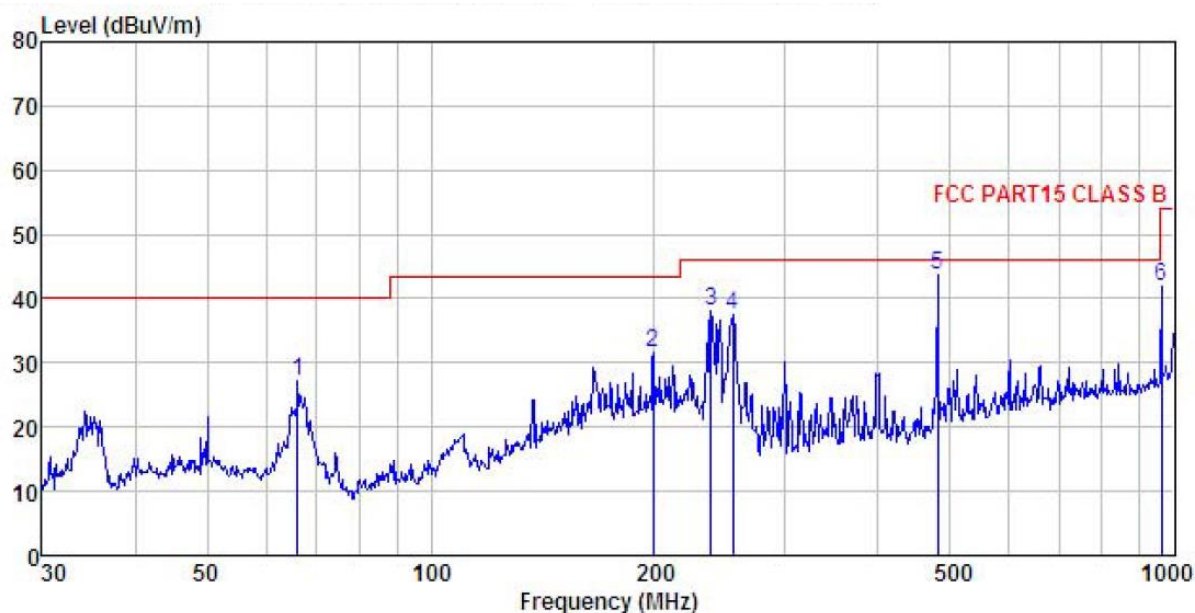
Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M2G) HORIZONTAL
 EUT : Smart phone
 Model : Symbol X
 Test mode : PC mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Zora
 REMARK :

	Read	Antenna	Cable	Preamp		Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
-----	-----	-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	66.733	45.69	10.12	1.44	29.75	27.50	40.00	-12.50 QP
2	171.393	51.10	9.46	2.66	29.04	34.18	43.50	-9.32 QP
3	239.987	56.11	12.97	2.82	28.59	43.31	46.00	-2.69 QP
4	254.728	53.67	13.33	2.82	28.53	41.29	46.00	-4.71 QP
5	480.528	49.44	16.97	3.46	28.92	40.95	46.00	-5.05 QP
6	962.162	47.42	22.50	4.27	27.65	46.54	54.00	-7.46 QP

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test Polarization: Vertical



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M2G) VERTICAL
 EUT : Smart phone
 Model : Symbol X
 Test mode : PC mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Zora
 REMARK :

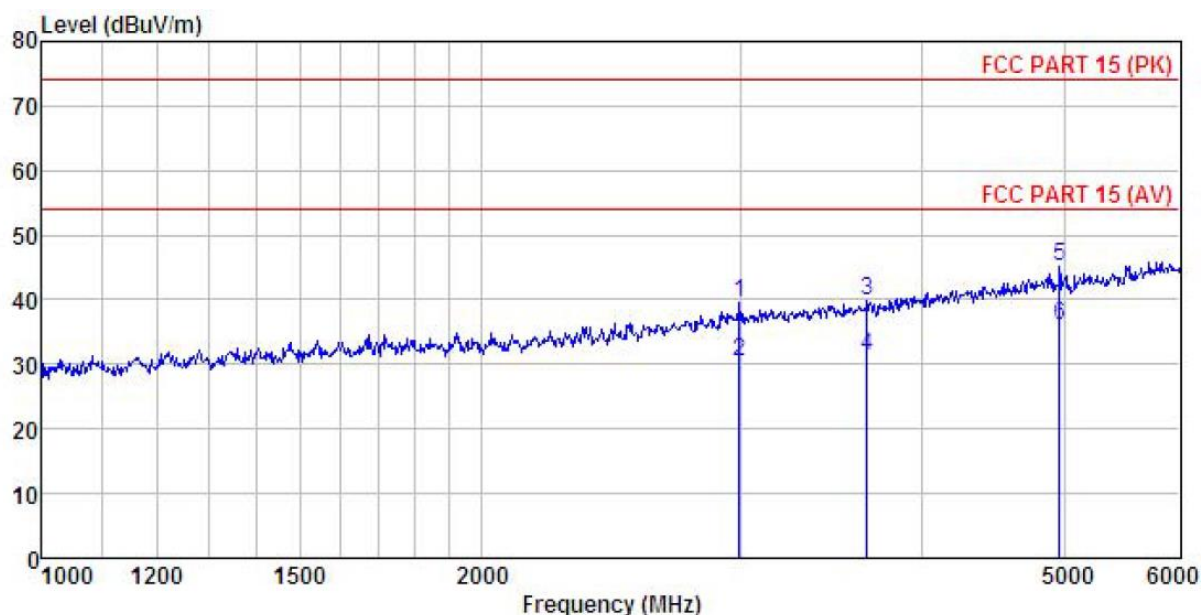
	ReadAntenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m
1	66.266	45.20	10.27	1.41	29.75	27.13
2	199.286	46.06	11.48	2.86	28.83	31.57
3	238.310	51.06	12.91	2.82	28.60	38.19
4	254.728	49.73	13.33	2.82	28.53	37.35
5	480.528	52.31	16.97	3.46	28.92	43.82
6	962.162	42.78	22.50	4.27	27.65	41.90

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Above 1GHz

Test Polarization: Horizontal



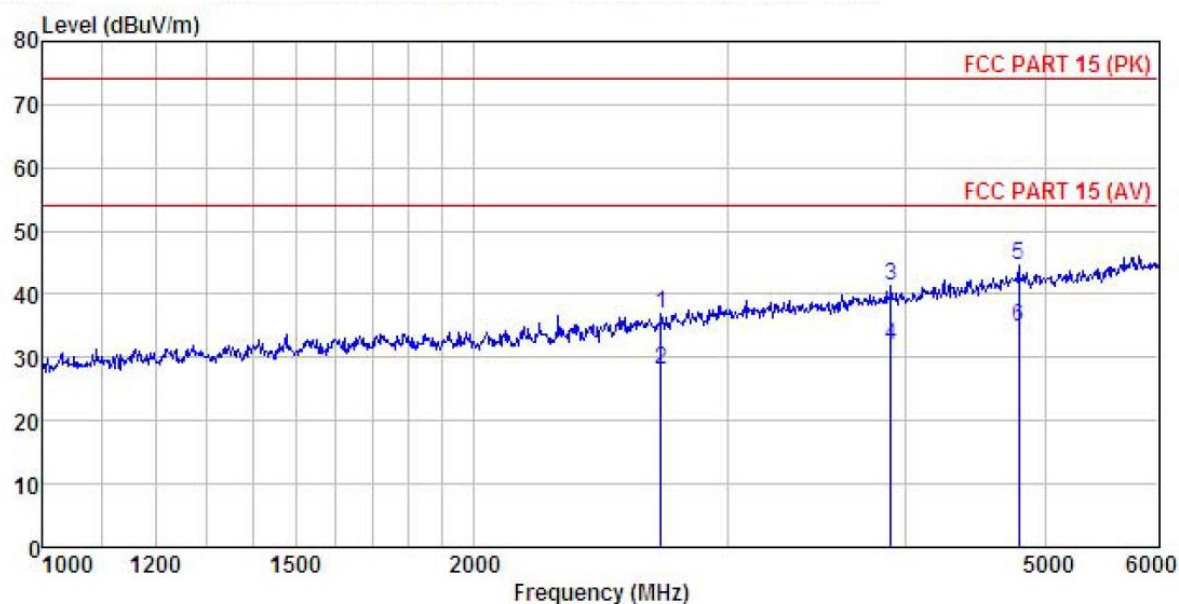
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : Smart phone
 Model : Symbol X
 Test mode : PC mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Zora
 REMARK :

	Freq	Read	Antenna	Cable	Preamp	Limit	Over	
	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2999.209	47.06	28.60	5.35	41.51	39.50	74.00	-34.50 Peak
2	2999.209	37.82	28.60	5.35	41.51	30.26	54.00	-23.74 Average
3	3665.723	46.22	29.35	5.95	41.62	39.90	74.00	-34.10 Peak
4	3665.723	37.59	29.35	5.95	41.62	31.27	54.00	-22.73 Average
5	4962.120	48.43	31.84	6.91	41.87	45.31	74.00	-28.69 Peak
6	4962.120	39.15	31.84	6.91	41.87	36.03	54.00	-17.97 Average

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test Polarization: Vertical



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) VERTICAL
 EUT : Smart phone
 Model : Symbol X
 Test mode : PC mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Zora
 REMARK :

	Read	Antenna	Cable	Preamp		Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2698.334	45.67	28.02	5.04	41.77	36.96	74.00	-37.04 Peak
2	2698.334	36.65	28.02	5.04	41.77	27.94	54.00	-26.06 Average
3	3902.968	47.06	29.96	6.10	41.80	41.32	74.00	-32.68 Peak
4	3902.968	37.48	29.96	6.10	41.80	31.74	54.00	-22.26 Average
5	4796.035	47.87	31.58	6.81	41.83	44.43	74.00	-29.57 Peak
6	4796.035	38.25	31.58	6.81	41.83	34.81	54.00	-19.19 Average

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.