

TEST REPORT

Applicant: MARVALSTAR SCIENTIFIC TECHNOLOGY CO.,LTD

Address of Applicant: 11th Floor, 9th Building, CYG New Materials Harbor Area, Gaoxinzhong First Rd, Nanshan District, ShenZhen City, GuangDong Province, China.

Equipment Under Test (EUT)

Product Name: Tablet PC

Model No.: MR775, MM781, MR792, MR793, MR1071, MM872, MM881, MQ892, MM794, MG795

FCC ID: 2ABCQMR775

Applicable standards: FCC CFR Title 47 Part 15 Subpart B:2012

Date of sample receipt: November 04, 2013

Date of Test: November 04-11, 2013

Date of report issue: November 11, 2013

Test Result : PASS *

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

Authorized Signature:

A handwritten signature in black ink, appearing to read "Robinson Lo", is positioned above a circular blue official seal. The seal contains the letters "GTS" in the center, surrounded by a border with text that is partially illegible but includes "GTS" and "TEST REPORT".

Robinson Lo

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 GTS 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. Any mention of GTS International Electrical Approvals or testing done by GTS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by GTS International Electrical Approvals in writing.

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2 Version

Version No.	Date	Description
00	November 11, 2013	Original

Prepared By:



Date:

November 11, 2013

Project Engineer

Check By:



Date:

November 11, 2013

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Conducted Emission	Part15.107	PASS
Radiated Emissions	Part15.109	PASS

PASS: The EUT complies with the essential requirements in the standard.

5 General Information

5.1 Client Information

Applicant:	MARVALSTAR SCIENTIFIC TECHNOLOGY CO.,LTD
Address of Applicant:	11th Floor, 9th Building, CYG New Materials Harbor Area, Gaoxinzhong First Rd, Nanshan District, ShenZhen City, GuangDong Province, China.
Manufacturer :	MARVALSTAR SCIENTIFIC TECHNOLOGY CO.,LTD
Address of Manufacturer :	11th Floor, 9th Building, CYG New Materials Harbor Area, Gaoxinzhong First Rd, Nanshan District, ShenZhen City, GuangDong Province, China.
Factory:	shenzhen suonaide technology Co.LTD
Address of Factory :	4/F,No.2 Building,Shenhuaye baoan Industry, Western Development Area ,Xixiang Town,Baoan District ,shenzhen city

5.2 General Description of EUT

Product Name:	Tablet PC
Model No.:	MR775, MM781, MR792, MR793, MR1071, MM872, MM881, MQ892, MM794, MG795
Test Model No.:	MR775
Remark:	<i>All above models are identical in the same PCB layout, interior structure and electrical circuits. The only difference is model name for commercial purpose.</i>
Power supply:	Adapter: Model No.:JY-05200 Input: AC 100-240V 50/60Hz 0.3A Max. Output: DC 5V, 2.0A Or 3.7V Lithium-ion battery

5.3 Test mode

Test mode:	
Playing mode	Keep the EUT in Playing mode
Video Record mode	Keep the EUT in Video Recording mode
PC mode	Keep the EUT in data exchanging mode.
HDMI mode	Keep the EUT in video playing with HDMI output mode.

5.4 Test Facility

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

- **CNAS —Registration No.: CNAS L5775**

CNAS has accredited Global United Technology Services Co., Ltd. To ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 600491, June 28, 2013.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. Has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

Tel: 0755-27798480

Fax: 0755-27798960

5.6 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
HP	Printer	CB495A	05257893	DoC
Lenovo	PC Host	M6900	EA05257893	DoC
DELL	MONITOR	E178FPC	N/A	DoC
DELL	KEYBOARD	SK-8115	N/A	DoC
DELL	MOUSE	MOC5UO	N/A	DoC

5.7 Deviation from Standards

Biconical, log.per. antenna and horn antenna were used instead of dipole antenna.

Semi-anechoic Chamber was used as alternation of open air test sites, and all test suites were performed with radiated method in it.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.

6 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 Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	GTS250	Mar. 29 2013	Mar. 28 2014
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	ESU EMI Test Receiver	R&S	ESU26	GTS203	Jul. 06 2013	Jul. 05 2014
4	BiConiLog Antenna	SCHWARZBECK	VULB9163	GTS214	Mar. 09 2013	Mar. 08 2014
5	Double -ridged waveguide horn	SCHWARZBECK	9120D	GTS208	Mar. 09 2013	Mar. 08 2014
6	RF Amplifier	HP	8347A	GTS204	Jul. 06 2013	Jul. 05 2014
7	Preamplifier	HP	8349B	GTS206	Jul. 06 2013	Jul. 05 2014
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial cable	GTS	N/A	GTS210	Jul. 06 2013	Jul. 05 2014
10	Coaxial Cable	GTS	N/A	GTS211	Jul. 06 2013	Jul. 05 2014
11	Thermo meter	N/A	N/A	GTS256	Jul. 06 2013	Jul. 05 2014

Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	Sep. 07 2013	Sep. 06 2014
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	Jul. 02 2013	Jul. 01 2014
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	Jul. 02 2013	Jul. 01 2014
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jul. 02 2013	Jul. 01 2014
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	Jul. 02 2013	Jul. 01 2014
6	Coaxial Cable	GTS	N/A	GTS227	Jul. 02 2013	Jul. 01 2014
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	ChangChun	DYM3	GTS257	July 09 2013	July 08 2014

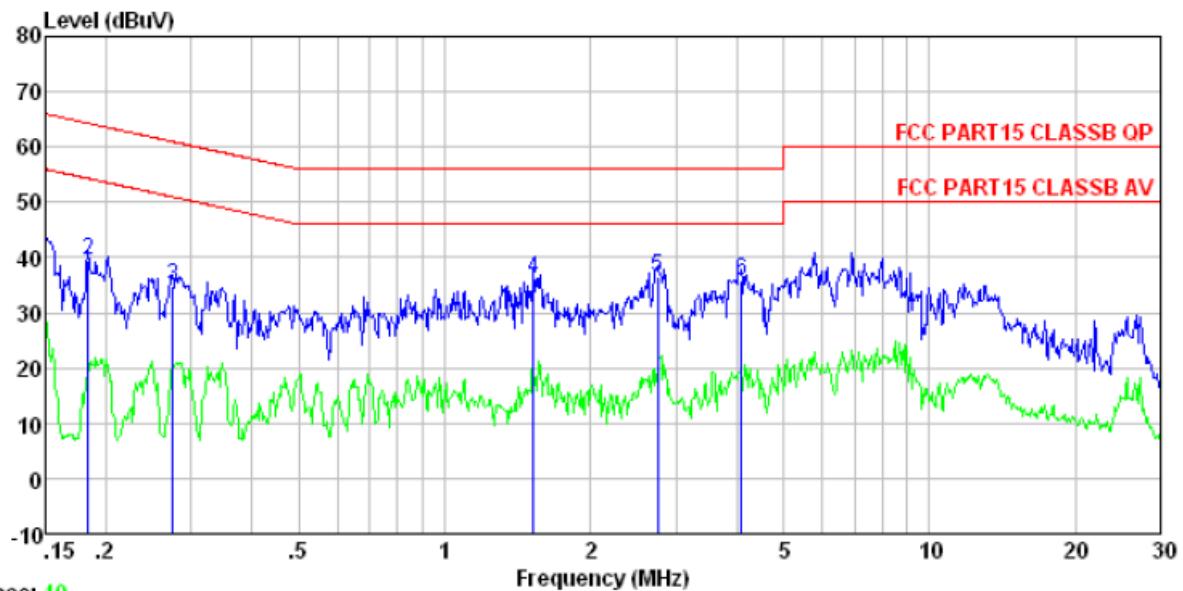
7 Test Results and Measurement Data

7.1 Conducted Emissions

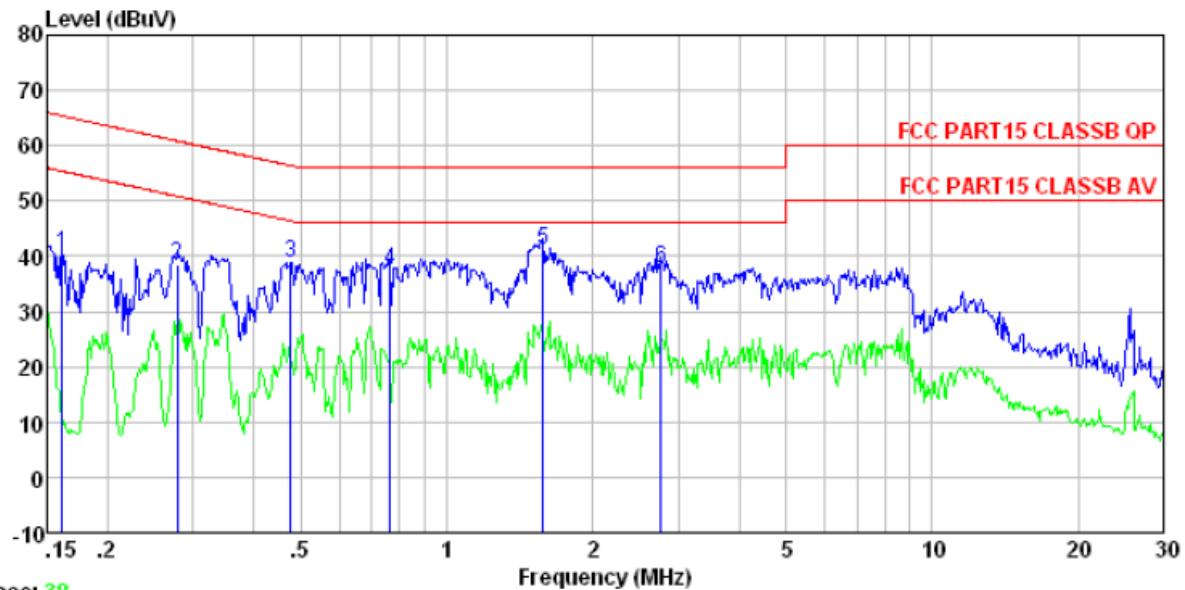
Test Requirement:	FCC Part15 B Section 15.107																
Test Method:	ANSI C63.4:2003																
Test Frequency Range:	150KHz to 30MHz																
Class / Severity:	Class B																
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto																
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>			Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
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	Quasi-peak	Average															
0.15-0.5	66 to 56*	56 to 46*															
0.5-5	56	46															
5-30	60	50															
	<p>* Decreases with the logarithm of the frequency.</p>																
Test setup:	<p>Reference Plane</p> <p><i>Remark</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>																
Test procedure:	<ol style="list-style-type: none"> 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides 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 refer 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: 2003 on conducted measurement. 																
Test Instruments:	Refer to section 6 for details																
Test mode:	Pre-scan all modes in section 5.3, and found the PC mode which is the worst mode, so only the data of worst mode was show on the test report.																
Test results:	Pass																

Measurement Data

Line:



Freq	Read	LISN	Cable	Limit	Over	Remark
	Level	Factor	Loss	Level	Line	
MHz	dBuV	dB	dB	dBuV	dBuV	dB
1	0.150	41.81	-0.26	0.10	41.65	66.00 -24.35 QP
2	0.183	39.51	-0.23	0.10	39.38	64.33 -24.95 QP
3	0.274	34.91	-0.22	0.10	34.79	60.98 -26.19 QP
4	1.527	36.35	-0.23	0.10	36.22	56.00 -19.78 QP
5	2.750	36.63	-0.25	0.10	36.48	56.00 -19.52 QP
6	4.092	36.10	-0.29	0.10	35.91	56.00 -20.09 QP

Neutral:


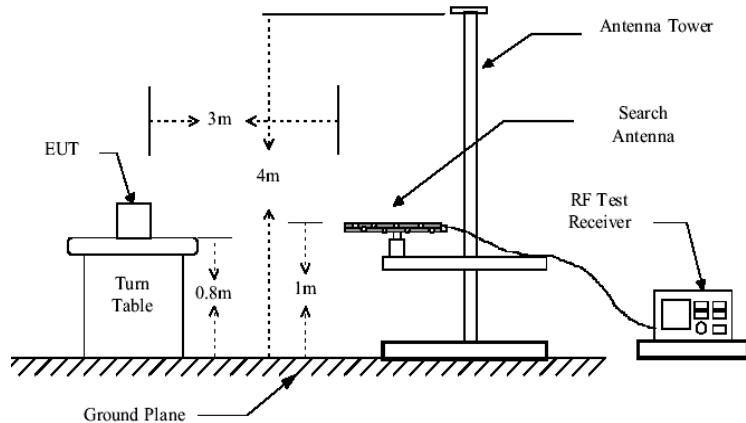
Freq	Read	LISN	Cable	Limit	Over	Remark		
	MHz	Level	Factor	Loss	Level	Line	Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.162	40.46	-0.13	0.10	40.43	65.38	-24.95	QP
2	0.279	38.47	-0.09	0.10	38.48	60.85	-22.37	QP
3	0.476	38.86	-0.08	0.10	38.88	56.41	-17.53	QP
4	0.763	37.45	-0.08	0.10	37.47	56.00	-18.53	QP
5	1.577	41.20	-0.10	0.10	41.20	56.00	-14.80	QP
6	2.765	37.70	-0.12	0.10	37.68	56.00	-18.32	QP

Notes:

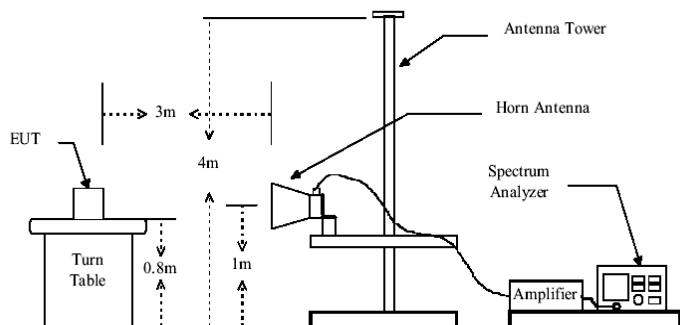
1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

7.2 Radiated Emission

Test Requirement:	FCC Part15 B Section 15.109																									
Test Method:	ANSI C63.4:2003																									
Test Frequency Range:	30MHz to 9GHz																									
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																									
Receiver setup:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Detector</th> <th>RBW</th> <th>VBW</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>30MHz-1GHz</td> <td>Quasi-peak</td> <td>120kHz</td> <td>300kHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td>Above 1GHz</td> <td>Peak</td> <td>1MHz</td> <td>3MHz</td> <td>Peak Value</td> </tr> <tr> <td></td> <td>Peak</td> <td>1MHz</td> <td>10Hz</td> <td>Average Value</td> </tr> </tbody> </table>					Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value		Peak	1MHz	10Hz	Average Value	
Frequency	Detector	RBW	VBW	Remark																						
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Limit:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Limit (dBuV/m @3m)</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>30MHz-88MHz</td> <td>40.00</td> <td>Quasi-peak Value</td> </tr> <tr> <td>88MHz-216MHz</td> <td>43.50</td> <td>Quasi-peak Value</td> </tr> <tr> <td>216MHz-960MHz</td> <td>46.00</td> <td>Quasi-peak Value</td> </tr> <tr> <td>960MHz-1GHz</td> <td>54.00</td> <td>Quasi-peak Value</td> </tr> <tr> <td>Above 1GHz</td> <td>54.00</td> <td>Average Value</td> </tr> <tr> <td></td> <td>74.00</td> <td>Peak Value</td> </tr> </tbody> </table>					Frequency	Limit (dBuV/m @3m)	Remark	30MHz-88MHz	40.00	Quasi-peak Value	88MHz-216MHz	43.50	Quasi-peak Value	216MHz-960MHz	46.00	Quasi-peak Value	960MHz-1GHz	54.00	Quasi-peak Value	Above 1GHz	54.00	Average Value		74.00	Peak Value
Frequency	Limit (dBuV/m @3m)	Remark																								
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960MHz-1GHz	54.00	Quasi-peak Value																								
Above 1GHz	54.00	Average Value																								
	74.00	Peak Value																								
Test Procedure:	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. 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 rota 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 setup:	Below 1GHz																									



Above 1GHz



Test environment:	Temp.: 25 °C	Humid.: 52%	Press.: 1 012mbar
Measurement Record:	Uncertainty: $\pm 4.5\text{dB}$		
Test Instruments:	Refer to section 6 for details		
Test mode:	Pre-scan all modes in section 5.3, and found the PC mode which is the worst mode, so only the data of worst mode was show on the test report.		
Test results:	Pass		

Note:

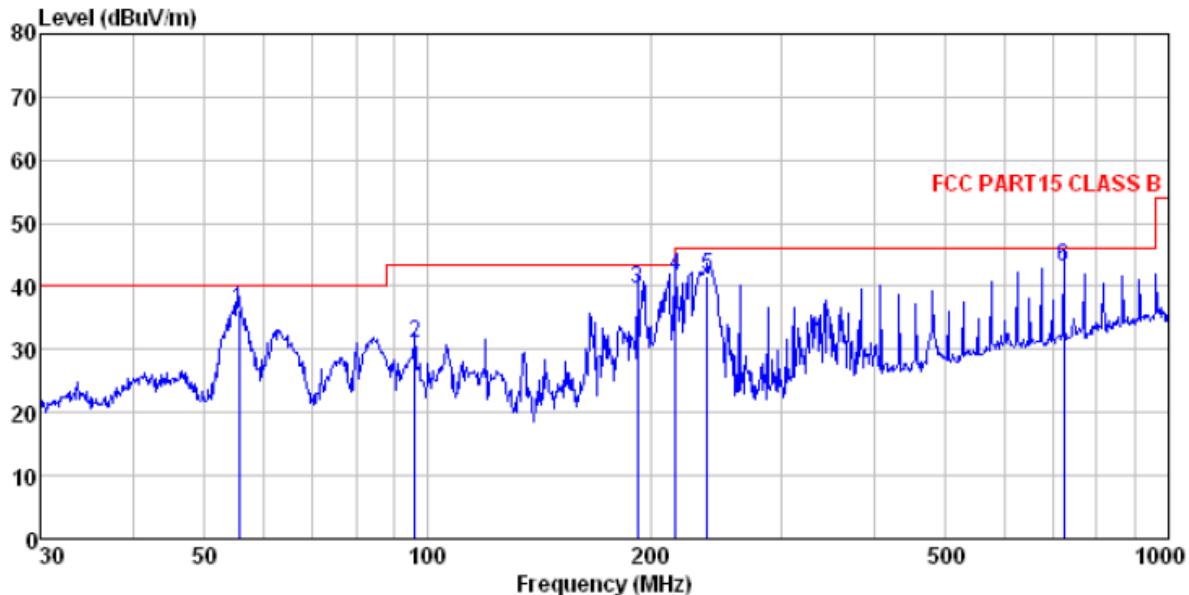
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

Measurement Data

Below 1GHz

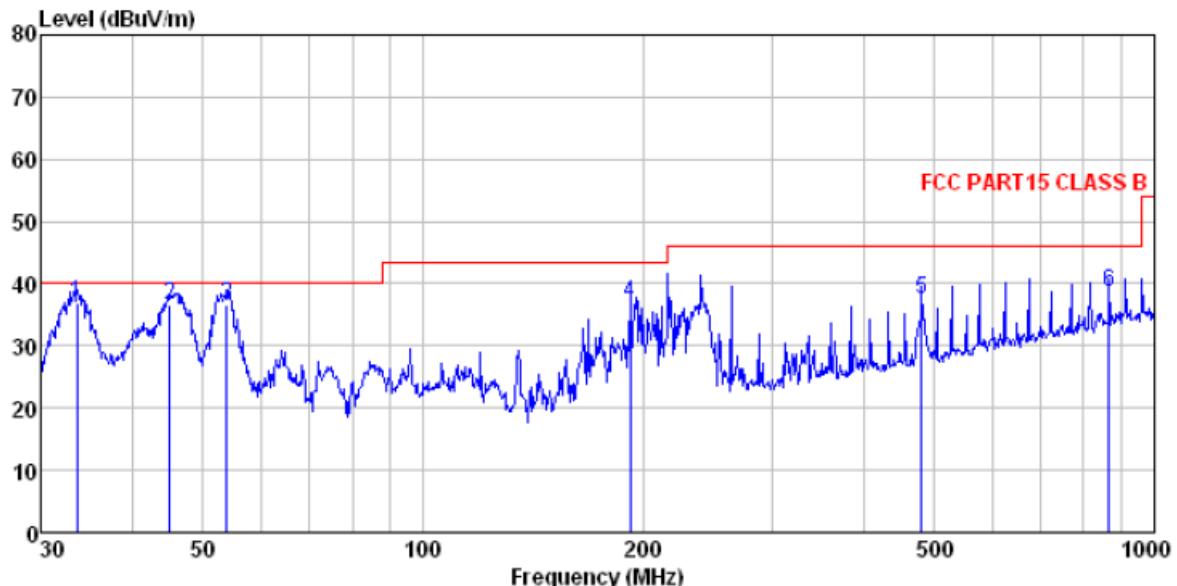
Horizontal:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163-2013M HORIZONTAL
 Job No. : 1776RF
 Test Mode : PC mode
 Test Engineer: Yang

	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	55.609	52.42	14.97	0.82	31.95	36.26	40.00	-3.74 QP
2	96.099	46.59	14.90	1.16	31.75	30.90	43.50	-12.60 QP
3	191.745	57.39	12.56	1.80	32.12	39.63	43.50	-3.87 QP
4	216.024	58.82	13.07	1.93	32.15	41.67	46.00	-4.33 QP
5	238.310	57.77	13.99	2.06	32.16	41.66	46.00	-4.34 QP
6	721.726	48.95	21.10	4.17	31.22	43.00	46.00	-3.00 QP

Vertical:

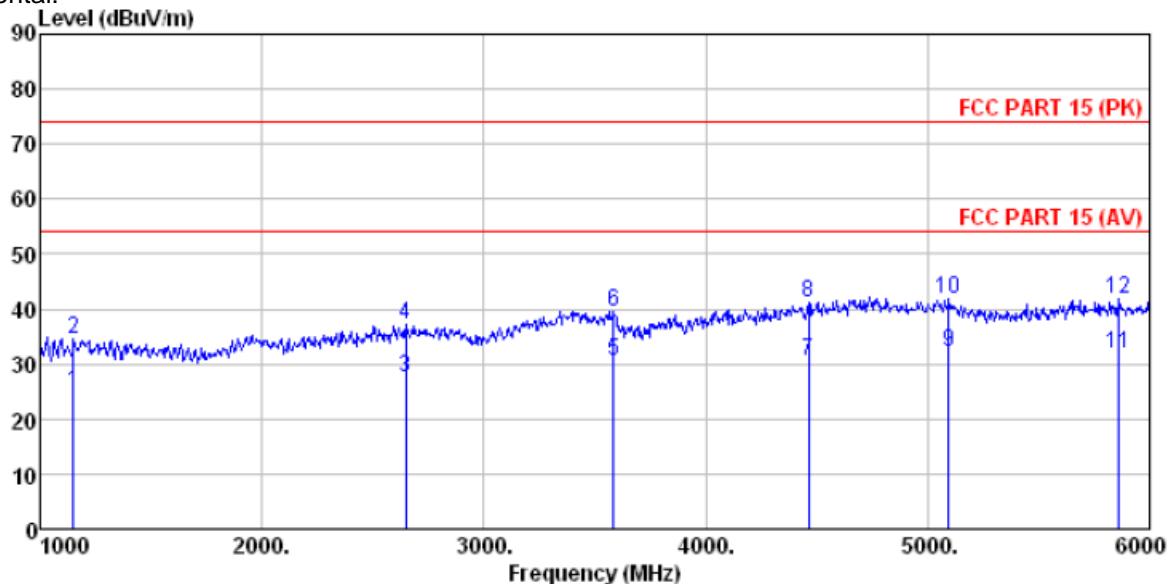


Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163-2013M VERTICAL
 Job No. : 1776RF
 Test Mode : PC mode
 Test Engineer: Yang

	ReadAntenna Freq	Level MHz	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Line dBuV/m	Over Line dB	Over Limit Remark
		dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	33.680	54.07	14.31	0.59	32.06	36.91	40.00	-3.09	QP
2	45.058	52.25	15.55	0.72	32.01	36.51	40.00	-3.49	QP
3	53.882	52.64	15.07	0.81	31.95	36.57	40.00	-3.43	QP
4	191.745	54.57	12.56	1.80	32.12	36.81	43.50	-6.69	QP
5	480.528	47.77	18.07	3.22	31.62	37.44	46.00	-8.56	QP
6	866.088	42.45	22.78	4.73	31.23	38.73	46.00	-7.27	QP

Above 1GHz

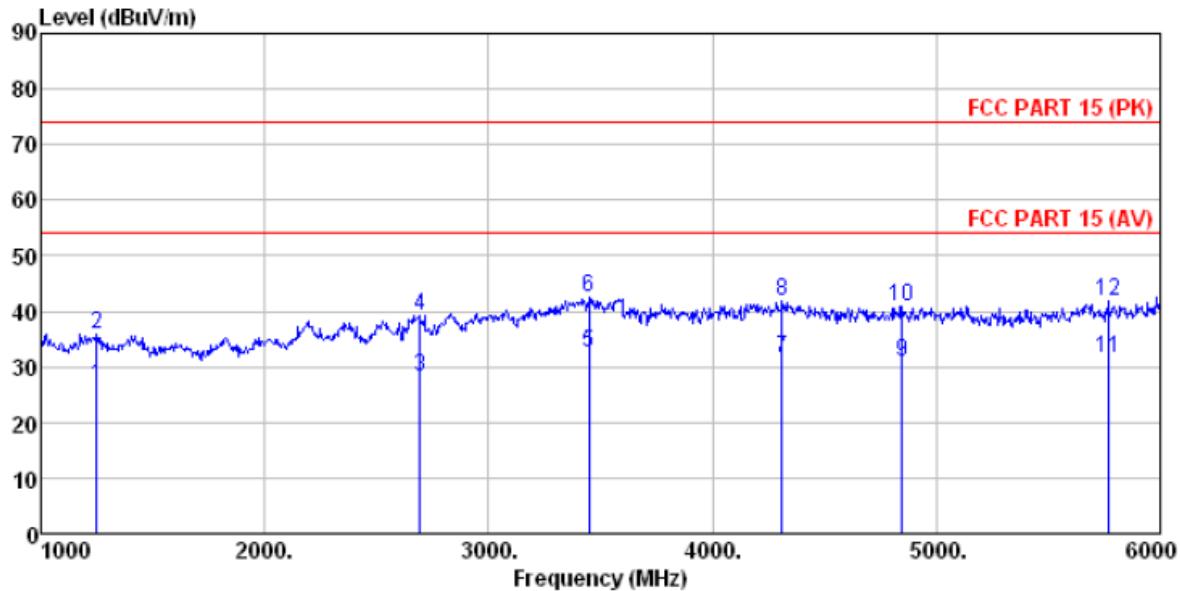
Horizontal:



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT (>1GHZ) HORIZONTAL
 Job No. : 1776RF
 Test Mode : PC mode
 Test Engineer: Sam

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	
1	1150.000	28.46	25.01	4.42	33.01	24.88	54.00 -29.12 Average
2	1150.000	38.02	25.01	4.42	33.01	34.44	74.00 -39.56 Peak
3	2650.000	27.83	27.92	5.63	33.72	27.66	54.00 -26.34 Average
4	2650.000	37.46	27.92	5.63	33.72	37.29	74.00 -36.71 Peak
5	3585.000	26.85	29.12	7.13	32.66	30.44	54.00 -23.56 Average
6	3585.000	36.05	29.12	7.13	32.66	39.64	74.00 -34.36 Peak
7	4465.000	23.01	31.26	8.31	31.92	30.66	54.00 -23.34 Average
8	4465.000	33.54	31.26	8.31	31.92	41.19	74.00 -32.81 Peak
9	5095.000	23.46	32.03	8.90	32.23	32.16	54.00 -21.84 Average
10	5095.000	33.08	32.03	8.90	32.23	41.78	74.00 -32.22 Peak
11	5860.000	21.46	32.72	10.02	32.21	31.99	54.00 -22.01 Average
12	5860.000	31.48	32.72	10.02	32.21	42.01	74.00 -31.99 Peak

Vertical:



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT (>1GHZ) VERTICAL
 Job No. : 1776RF
 Test Mode : PC mode
 Test Engineer: Sam

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	
1	1250.000	29.72	25.52	4.50	33.18	26.56	54.00 -27.44 Average
2	1250.000	39.15	25.52	4.50	33.18	35.99	74.00 -38.01 Peak
3	2695.000	28.01	28.16	5.67	33.66	28.18	54.00 -25.82 Average
4	2695.000	38.97	28.16	5.67	33.66	39.14	74.00 -34.86 Peak
5	3450.000	29.84	28.80	6.86	32.81	32.69	54.00 -21.31 Average
6	3450.000	39.50	28.80	6.86	32.81	42.35	74.00 -31.65 Peak
7	4310.000	24.47	30.77	8.16	31.85	31.55	54.00 -22.45 Average
8	4310.000	34.63	30.77	8.16	31.85	41.71	74.00 -32.29 Peak
9	4845.000	22.59	31.82	8.63	32.11	30.93	54.00 -23.07 Average
10	4845.000	32.66	31.82	8.63	32.11	41.00	74.00 -33.00 Peak
11	5765.000	21.21	32.59	9.88	32.27	31.41	54.00 -22.59 Average
12	5765.000	31.53	32.59	9.88	32.27	41.73	74.00 -32.27 Peak