

FCC Report

Applicant: Shenzhen Micro Star Electronic Technology Co., Ltd.

Address of Applicant: 4F, Block C, NO. 56, FengTang Road, Fuyong, Bao'an district, Shenzhen, P.R.C.

Equipment Under Test (EUT)

Product Name: SPORT DV

Model No.: SDV-105, SDV-106, SDV-107, SDV-108, SDV-109

Applicable standards: FCC CFR Title 47 Part 15 Subpart B:2014

Date of sample receipt: January 25, 2016

Date of Test: January 26-27, 2016

Date of report issue: January 28, 2016

Test Result : PASS *

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

Authorized Signature:



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.

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2 Version

Version No.	Date	Description
00	January 28, 2016	Original

Prepared By:

Edward. Pan

Date:

January 28, 2016

Project Engineer

Check By:

Hank. Yan

Date:

January 28, 2016

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.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	$\pm 4.34\text{dB}$	(1)
Radiated Emission	30MHz ~ 1000MHz	$\pm 4.24\text{dB}$	(1)
Radiated Emission	1GHz ~ 26.5GHz	$\pm 4.68\text{dB}$	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	$\pm 3.45\text{dB}$	(1)

Note (1): The measurement uncertainty is for coverage factor of $k=2$ and a level of confidence of 95%.

Remark: Test according to ANSI C63.4:2014

5 General Information

5.1 Client Information

Applicant:	Shenzhen Micro Star Electronic Technology Co., Ltd.
Address of Applicant:	4F, Block C, NO. 56, FengTang Road, Fuyong, Bao'an district, Shenzhen, P.R.C.
Manufacturer/ Factory:	Shenzhen Micro Star Electronic Technology Co., Ltd.
Address of Manufacture/ Factor:	4F, Block C, NO. 56, FengTang Road, Fuyong, Bao'an district, Shenzhen, P.R.C.

5.2 General Description of EUT

Product Name:	SPORT DV
Model No.:	SDV-105, SDV-106, SDV-107, SDV-108, SDV-109
Power Supply:	Charger: Input: AC 100-240V, 50/60Hz Output: DC 5.0V±50%, 1000±50mA Or DC 3.7V 900mAh Li-ion Battery

5.3 Test mode

Test mode:	
PC mode	Keep the EUT in exchange data status with PC by USB line mode
REC mode	Keep the EUT in video record mode
HDMI mode	Keep the EUT in video playing and HDMI output mode
Playing mode	Keep the EUT in video playing mode

5.4 Test Facility

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

- **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.

No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China

Tel: 0755-27798480

Fax: 0755-27798960

5.6 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC Approval
Apple	PC	A1278	C1MN99ERDTY3	FCC DOC
DELL	KEYBOARD	SK-8115	N/A	FCC DOC
DELL	MOUSE	N/A	N/A	FCC 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	July. 03 2015	July. 02 2020
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	July. 03 2015	July. 02 2016
4	BiConiLog Antenna	SCHWARZBECK	VULB9163	GTS214	July. 06 2015	July. 05 2016
5	Double -ridged waveguide horn	SCHWARZBECK	9120D	GTS208	July. 06 2015	July. 05 2016
6	RF Amplifier	HP	8347A	GTS204	July. 03 2015	July. 02 2016
7	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	July. 03 2015	July. 02 2016
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial cable	GTS	N/A	GTS210	July. 05 2015	July. 04 2016
10	Coaxial Cable	GTS	N/A	GTS211	July. 05 2015	July. 04 2016
11	Thermo meter	N/A	N/A	GTS256	July. 06 2015	July. 05 2016

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	7.3(L)x3.1(W)x2.9(H)	GTS252	May. 16 2014	May. 15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April. 29 2015	April. 29 2016
3	Pulse Limiter	R&S	ESH3-Z2	GTS224	July. 03 2015	July. 02 2016
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	July. 03 2015	July. 02 2016
5	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	July. 03 2015	July. 02 2016
6	Coaxial Cable	GTS	N/A	GTS227	July. 05 2015	July. 04 2016
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Thermo meter	KTJ	TA328	GTS233	July. 07 2015	July. 06 2016

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 07 2015	July 06 2016

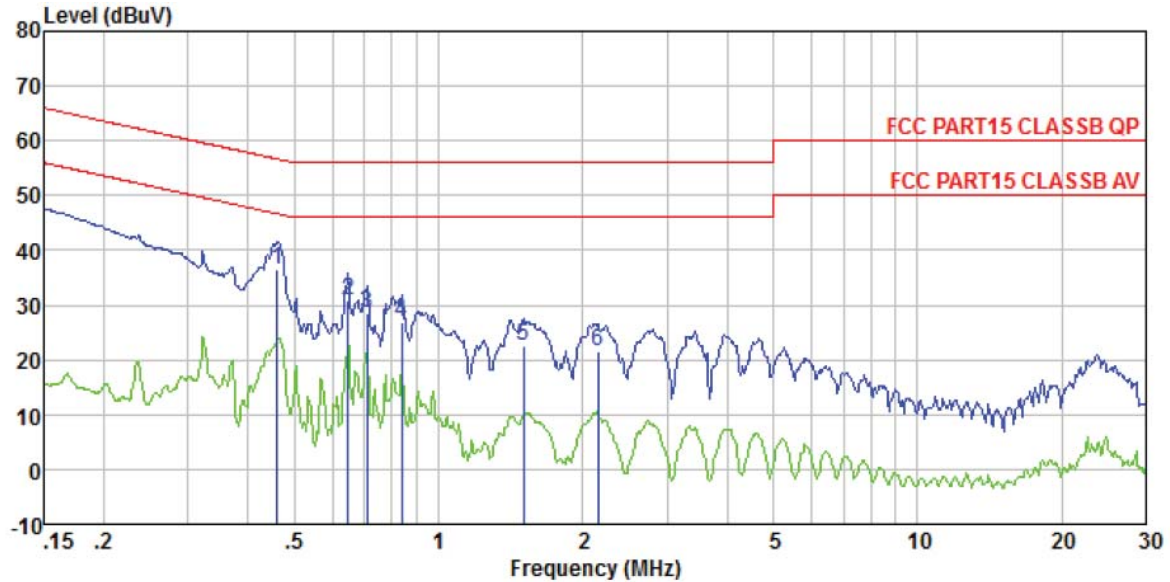
7 Test Results and Measurement Data

7.1 Conducted Emissions

Test Requirement:	FCC Part15 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, Sweep time=auto																
Limit:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><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></table> * Decreases with the logarithm of the frequency.			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
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															
Test setup:	Reference Plane Remark: 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.). 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: 2014 on conducted measurement.																
Test Instruments:	Refer to section 6 for details																
Test mode:	Refer to section 5.3 for details																
Test results:	Pass																

Measurement Data

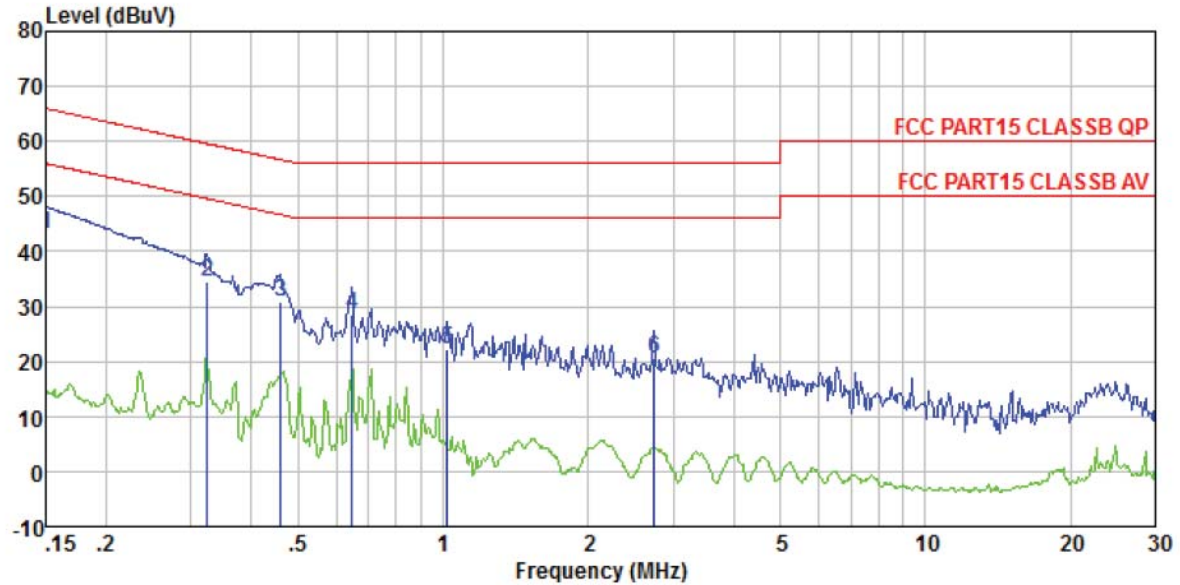
Line:



Condition : FCC PART15 CLASSB QP LISN-2013 LINE
 Job No. : 0189
 Test mode : PC mode
 Test Engineer: Arslan

	Freq	Read Level	LISN Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.461	36.29	36.52	0.12	0.11	56.67	-20.15	QP
2	0.647	30.60	30.86	0.13	0.13	56.00	-25.14	QP
3	0.708	28.22	28.49	0.14	0.13	56.00	-27.51	QP
4	0.839	26.64	26.91	0.14	0.13	56.00	-29.09	QP
5	1.503	22.26	22.52	0.12	0.14	56.00	-33.48	QP
6	2.155	21.30	21.57	0.12	0.15	56.00	-34.43	QP

Neutral:



Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL
 Job No. : 0189
 Test mode : PC mode
 Test Engineer: Arslan

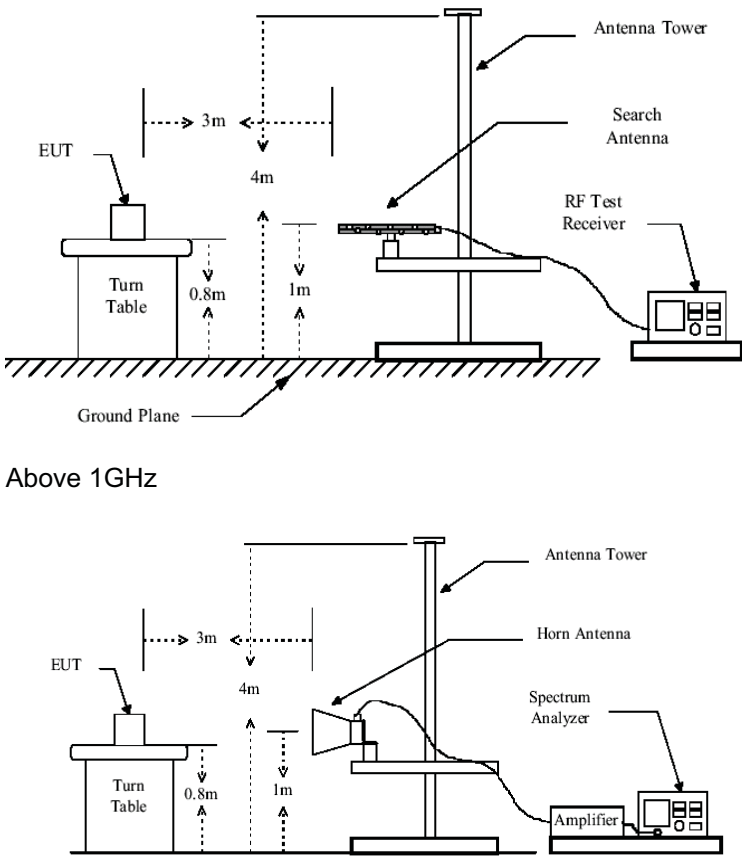
	Freq	Read Level	LISN Level	Cable Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.150	42.84	43.03	0.07	0.12	66.00	-22.97	QP
2	0.325	34.19	34.35	0.06	0.10	59.57	-25.22	QP
3	0.461	30.58	30.75	0.06	0.11	56.67	-25.92	QP
4	0.647	28.29	28.49	0.07	0.13	56.00	-27.51	QP
5	1.021	22.16	22.36	0.07	0.13	56.00	-33.64	QP
6	2.736	20.15	20.40	0.10	0.15	56.00	-35.60	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 C63.4:2014																								
Test Frequency Range:	30MHz to 6GHz																								
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																								
Receiver setup:	<table><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr><tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr><tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr></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																					
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value																					
Above 1GHz	Peak	1MHz	3MHz	Peak Value																					
	Peak	1MHz	10Hz	Average Value																					
Limit:	<table><tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr><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 rowspan="2">Above 1GHz</td><td>54.00</td><td>Average Value</td></tr><tr><td>74.00</td><td>Peak Value</td></tr></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																							
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																							
Test Procedure:	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: ± 4.5dB
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Note:

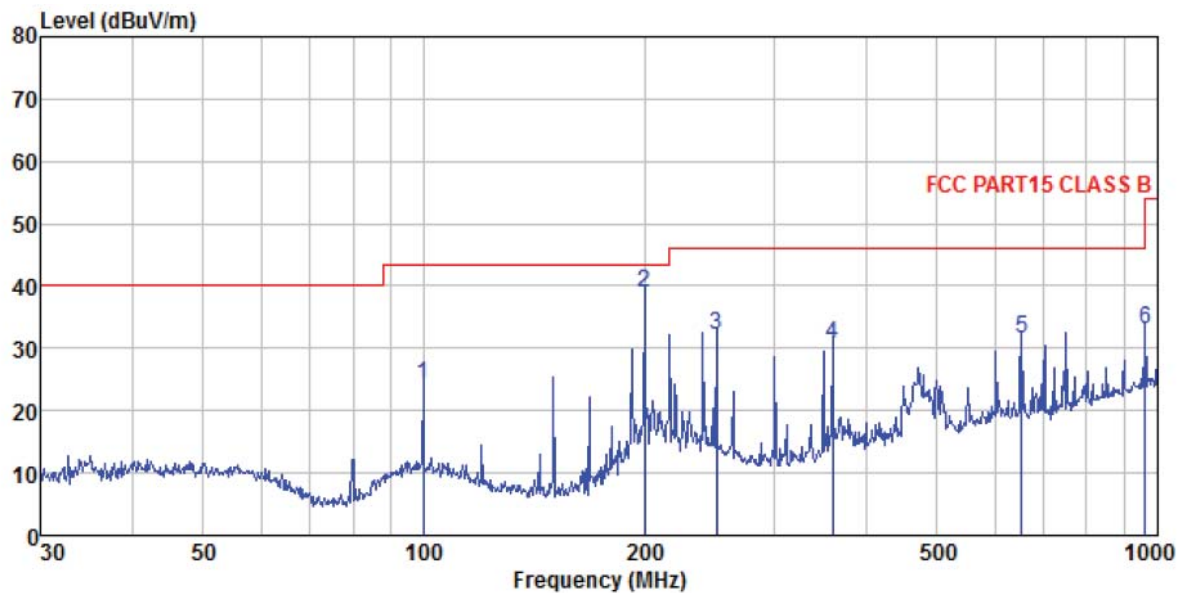
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$

Measurement Data

Below 1GHz

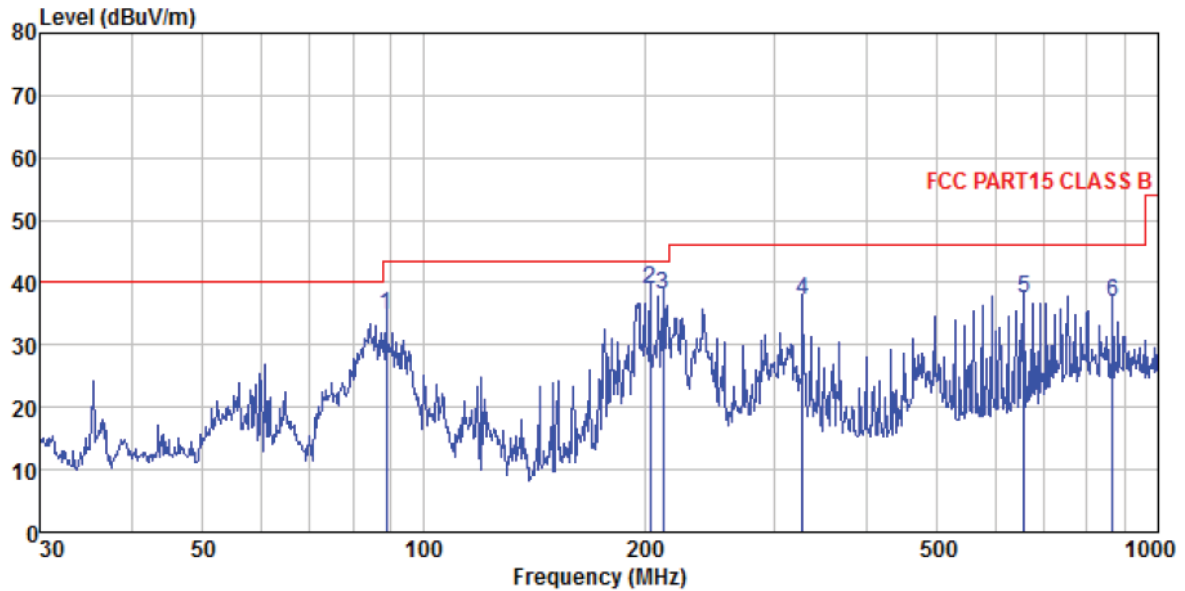
Horizontal:



Condition : FCC PART15 CLASS B VULB9163-2013M HORIZONTAL
 Job No. : 0189
 Test Mode : PC mode
 Test Engineer: Chen

	Freq	ReadAntenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	99.878	37.47	15.16	1.19	29.70	24.12	43.50	-19.38 QP
2	199.986	53.64	12.57	1.84	29.20	38.85	43.50	-4.65 QP
3	250.301	45.50	14.07	2.12	29.65	32.04	46.00	-13.96 QP
4	360.448	41.35	16.43	2.67	29.69	30.76	46.00	-15.24 QP
5	651.942	36.23	20.65	3.92	29.25	31.55	46.00	-14.45 QP
6	962.162	33.60	23.49	5.09	29.10	33.08	54.00	-20.92 QP

Vertical:

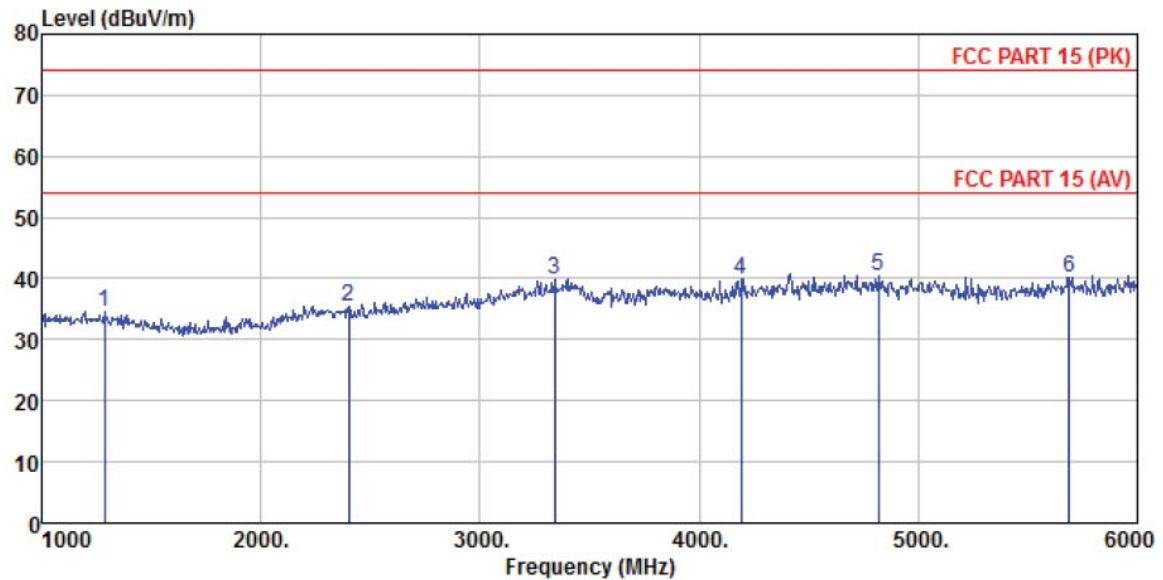


Condition : FCC PART15 CLASS B VULB9163-2013M VERTICAL
 Job No. : 0189
 Test Mode : PC mode
 Test Engineer: Chen

	Freq	ReadAntenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	88.964	49.83	13.61	1.10	29.75	34.79	43.50	-8.71 QP
2	203.523	53.62	12.67	1.86	29.23	38.92	43.50	-4.58 QP
3	211.527	52.67	12.93	1.91	29.31	38.20	43.50	-5.30 QP
4	327.887	48.72	15.66	2.51	29.84	37.05	46.00	-8.95 QP
5	656.530	42.09	20.66	3.94	29.24	37.45	46.00	-8.55 QP
6	866.088	38.60	22.78	4.73	29.13	36.98	46.00	-9.02 QP

Above 1GHz

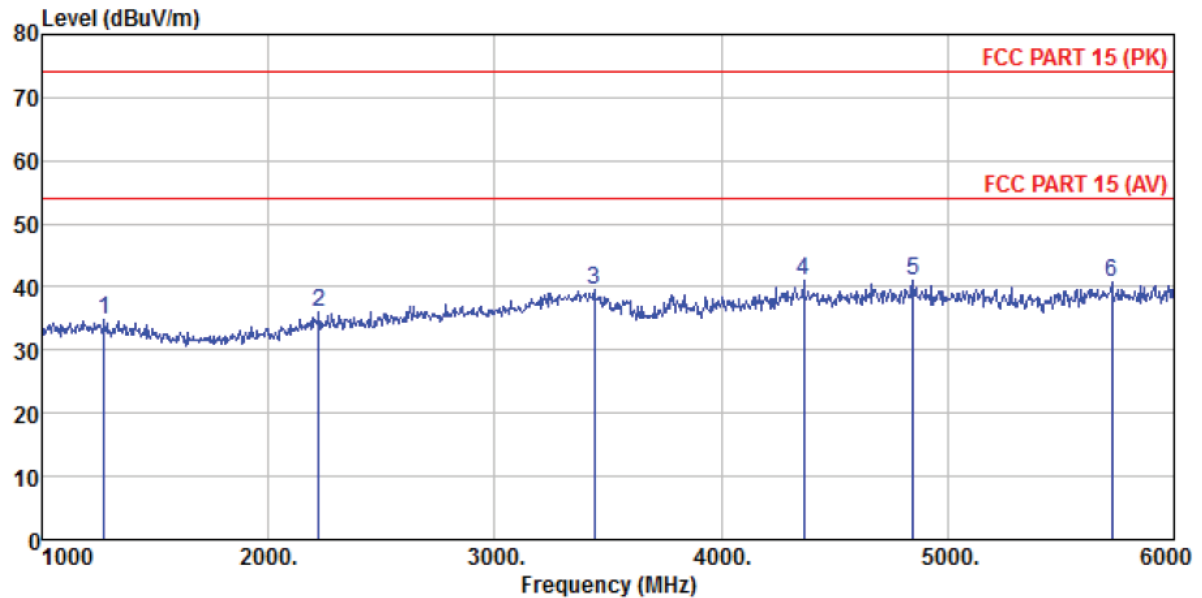
Horizontal:



Condition : FCC PART 15 (PK) BBHA9120D ANT(>1GHZ) HORIZONTAL
 Job No. : 0189
 Test Mode : PC mode
 Test Engineer: He

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1285.000	37.72	25.60	4.53	33.24	34.61	74.00	-39.39	Peak
2	2400.000	36.59	27.58	5.39	34.01	35.55	74.00	-38.45	Peak
3	3340.000	37.69	28.43	6.64	32.93	39.83	74.00	-34.17	Peak
4	4190.000	33.67	30.18	8.05	31.96	39.94	74.00	-34.06	Peak
5	4820.000	32.13	31.79	8.61	32.10	40.43	74.00	-33.57	Peak
6	5690.000	30.32	32.47	9.79	32.31	40.27	74.00	-33.73	Peak

Vertical:



Condition : FCC PART 15 (PK) BBHA9120D ANT(>1GHZ) VERTICAL
 Job No. : 0189
 Test Mode : PC mode
 Test Engineer: He

	Freq	ReadAntenna Level	Cable Factor	Preamp Loss	Level	Limit	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dB	
1	1275.000	37.95	25.58	4.52	33.21	34.84	74.00	-39.16 Peak
2	2225.000	37.16	27.99	5.21	34.21	36.15	74.00	-37.85 Peak
3	3440.000	36.66	28.76	6.84	32.81	39.45	74.00	-34.55 Peak
4	4365.000	33.84	30.97	8.22	31.87	41.16	74.00	-32.84 Peak
5	4845.000	32.81	31.82	8.63	32.11	41.15	74.00	-32.85 Peak
6	5725.000	30.77	32.53	9.83	32.29	40.84	74.00	-33.16 Peak

8 Test Setup Photo

Radiated Emission



Conducted Emission



9 EUT Constructional Details

Reference to the test report No. : GTS16000189E01

-----End-----