

TEST REPORT

Applicant: Shenzhen Topstar Technology Co., Ltd.

Address of Applicant: Room 2417, Sangda Building, Huaafa Road 46, Futian District, Shenzhen, China

Equipment Under Test (EUT)

Product Name: OPS Computer

Model No.: TOP-H631, TOP-H651, TOP-H632, TOP-H652

FCC ID: 2ACM2TOPH651

Applicable standards: FCC CFR Title 47 Part 15 Subpart B:2013

Date of sample receipt: June 12, 2014

Date of Test: June 13-18, 2014

Date of report issue: June 23, 2014

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	June 23, 2014	Original

Prepared By:

Edward Pan

Date:

June 23, 2014

Project Engineer

Check By:

Hans Hu

Date:

June 23, 2014

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:	Shenzhen Topstar Technology Co., Ltd.
Address of Applicant:	Room 2417, Sangda Building, Huaafa Road 46, Futian District, Shenzhen, China
Manufacturer:	Shenzhen Topstar Technology Co., Ltd.
Address of Manufacturer:	Room 2417, Sangda Building, Huaafa Road 46, Futian District, Shenzhen, China
Factory:	Shenzhen Dingyu Technology Co., Ltd
Address of Factory:	3-4/F, Seven Building, Area B, Hekeng Industry Zone, Langkou Road, Longhua Dalang Community, Baoan District, Shenzhen, China

5.2 General Description of EUT

Product Name:	OPS Computer
Model No.:	TOP-H631, TOP-H651, TOP-H632, TOP-H652
Power supply:	Model No.: EXA0904YH Input: AC 100-240V, 50-60Hz, 1.5A Output: DC 19V, 4.74A

5.3 Test mode

Test mode:	
Burning test mode (VGA output)	Keep the EUT in burning test mode with VGA output.
Burning test mode (HDMI output)	Keep the EUT in burning test mode with HDMI output.
Test voltage:	
AC 120V/60Hz	

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)**

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 Approval
HP	Printer	CB495A	05257893	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. 28 2014	Mar. 27 2015
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	Feb. 23 2014	Feb. 22 2015
5	Double -ridged waveguide horn	SCHWARZBECK	9120D	GTS208	June 28 2013	June 27 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

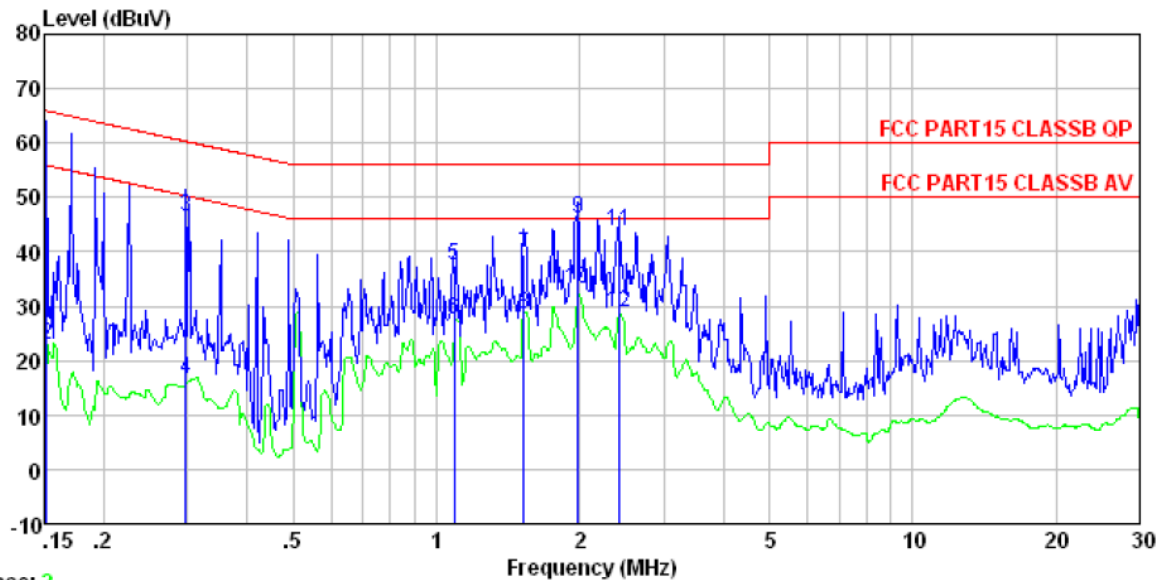
7 Test Results and Measurement Data

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><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 Test table/Insulation plane <i>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</i>														
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: 2003 on conducted measurement.														
Test Instruments:	Refer to section 6 for details														
Test mode:	Refer to section 5.3 for details, and found the Burning test mode (HDMI output) which is the worst mode, so only the data of worst mode was show on the test report.														
Test results:	Pass														

Measurement Data

Line:

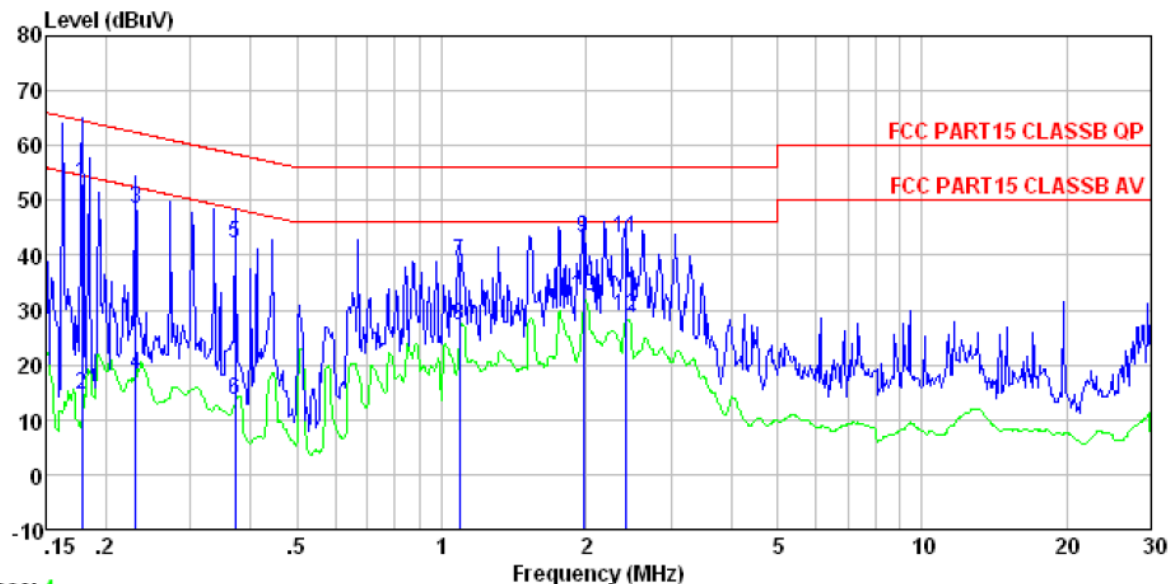


Trace: 2

Condition : FCC PART15 CLASSB QP LISN-2013 LINE
 Job No. : 0975RF
 Test mode : Burning test mode(HDMI output)
 Test Engineer: Qing

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.152	55.92	0.15	0.12	56.19	65.91	-9.72	QP
2	0.152	22.65	0.15	0.12	22.92	55.91	-32.99	Average
3	0.297	46.10	0.11	0.10	46.31	60.32	-14.01	QP
4	0.297	16.50	0.11	0.10	16.71	50.32	-33.61	Average
5	1.088	37.25	0.13	0.13	37.51	56.00	-18.49	QP
6	1.088	27.22	0.13	0.13	27.48	46.00	-18.52	Average
7	1.527	39.16	0.12	0.14	39.42	56.00	-16.58	QP
8	1.527	28.16	0.12	0.14	28.42	46.00	-17.58	Average
9	1.980	45.91	0.12	0.14	46.17	56.00	-9.83	QP
10	1.980	32.77	0.12	0.14	33.03	46.00	-12.97	Average
11	2.422	43.50	0.13	0.15	43.78	56.00	-12.22	QP
12	2.422	28.49	0.13	0.15	28.77	46.00	-17.23	Average

Neutral:



Trace: 4

Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL
 Job No. : 0975RF
 Test mode : Burning test mode(HDMI output)
 Test Engineer: Qing

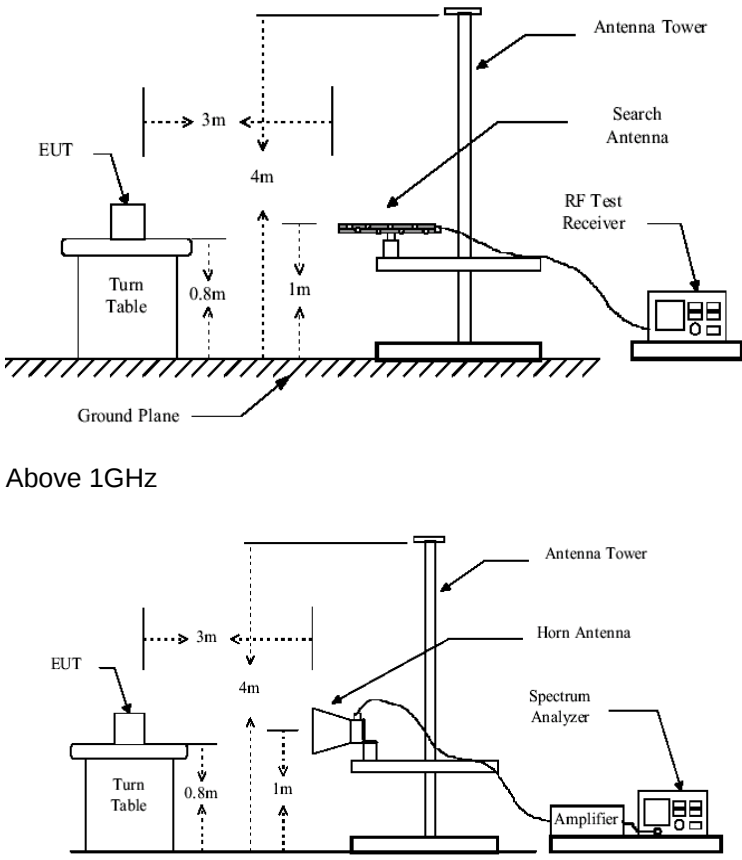
	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.179	52.84	0.07	0.13	53.04	64.55	-11.51	QP
2	0.179	14.49	0.07	0.13	14.69	54.55	-39.86	Average
3	0.230	48.12	0.06	0.12	48.30	62.44	-14.14	QP
4	0.230	18.20	0.06	0.12	18.38	52.44	-34.06	Average
5	0.371	42.12	0.06	0.10	42.28	58.47	-16.19	QP
6	0.371	13.50	0.06	0.10	13.66	48.47	-34.81	Average
7	1.088	38.65	0.08	0.13	38.86	56.00	-17.14	QP
8	1.088	27.15	0.08	0.13	27.36	46.00	-18.64	Average
9	1.970	42.99	0.09	0.14	43.22	56.00	-12.78	QP
10	1.970	32.20	0.09	0.14	32.43	46.00	-13.57	Average
11	2.422	42.83	0.10	0.15	43.08	56.00	-12.92	QP
12	2.422	28.48	0.10	0.15	28.73	46.00	-17.27	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

7.2 Radiated Emission

Test Requirement:	FCC Part15 B Section 15.109																																					
Test Method:	ANSI C63.4:2003																																					
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 colspan="2">Frequency</td><td colspan="2">Limit (dBuV/m @3m)</td><td>Remark</td></tr><tr><td colspan="2">30MHz-88MHz</td><td colspan="2">40.00</td><td>Quasi-peak Value</td></tr><tr><td colspan="2">88MHz-216MHz</td><td colspan="2">43.50</td><td>Quasi-peak Value</td></tr><tr><td colspan="2">216MHz-960MHz</td><td colspan="2">46.00</td><td>Quasi-peak Value</td></tr><tr><td colspan="2">960MHz-1GHz</td><td colspan="2">54.00</td><td>Quasi-peak Value</td></tr><tr><td colspan="2" rowspan="2">Above 1GHz</td><td colspan="2">54.00</td><td>Average Value</td></tr><tr><td colspan="2">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, and found the Burning test mode (HDMI output) which is the worst mode, so only the data of worst mode was show on the test report.
Test results:	Pass

Note:

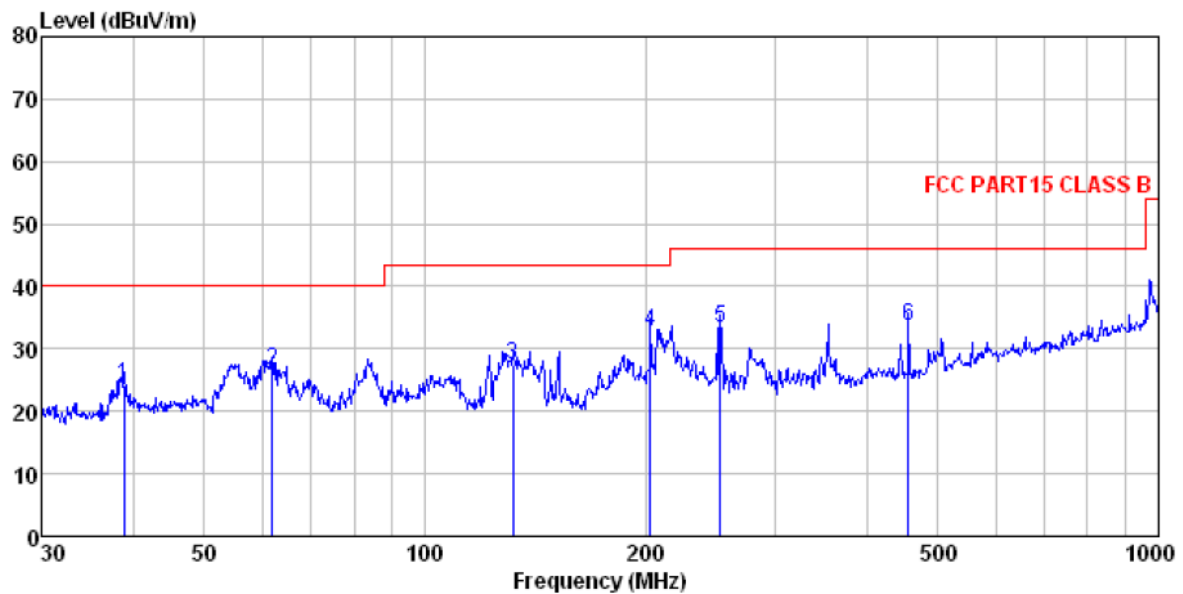
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

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

Measurement Data

Below 1GHz

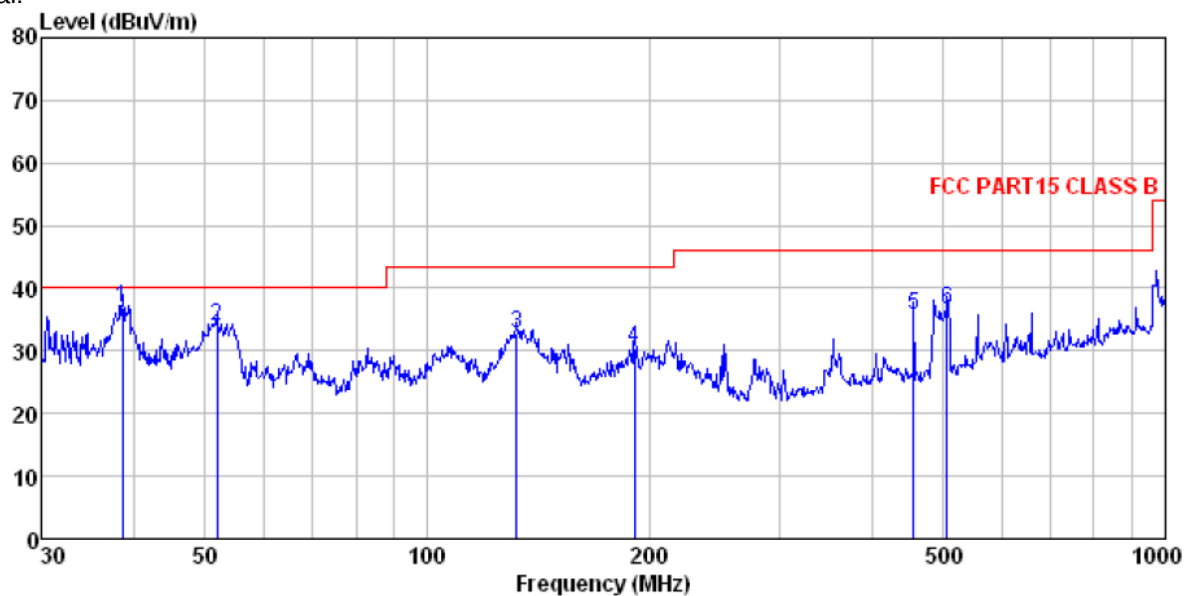
Horizontal:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163-2013M HORIZONTAL
 Job No. : 975RF
 Test Mode : Burning test mode(HDMI output)
 Test Engineer: Bing

	Freq	ReadAntenna	Cable Preamp		Limit	Over	
	Level	Factor	Loss Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB
1	38.888	40.40	15.30	0.65	32.06	24.29	40.00 -15.71 QP
2	61.995	43.84	13.90	0.88	31.93	26.69	40.00 -13.31 QP
3	131.758	47.16	10.82	1.45	31.91	27.52	43.50 -15.98 QP
4	202.810	50.48	12.64	1.86	32.14	32.84	43.50 -10.66 QP
5	252.948	49.40	14.06	2.14	32.16	33.44	46.00 -12.56 QP
6	455.906	44.67	17.58	3.11	31.70	33.66	46.00 -12.34 QP

Vertical:

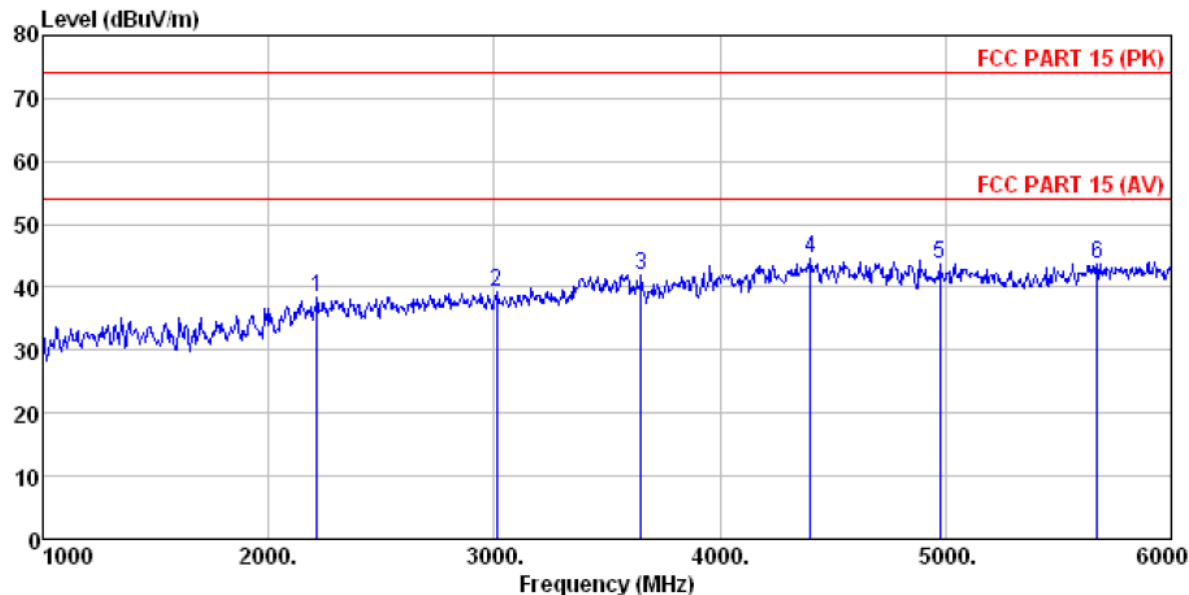


Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163-2013M VERTICAL
 Job No. : 975RF
 Test Mode : Burning test mode(HDMI output)
 Test Engineer: Bing

	Freq	Read 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	38.616	52.99	15.25	0.65	32.06	36.83	40.00	-3.17	QP
2	51.843	50.00	15.16	0.79	31.96	33.99	40.00	-6.01	QP
3	132.221	52.37	10.77	1.45	31.91	32.68	43.50	-10.82	QP
4	191.074	48.10	12.56	1.80	32.11	30.35	43.50	-13.15	QP
5	455.906	46.77	17.58	3.11	31.70	35.76	46.00	-10.24	QP
6	506.479	46.07	18.74	3.33	31.53	36.61	46.00	-9.39	QP

Above 1GHz

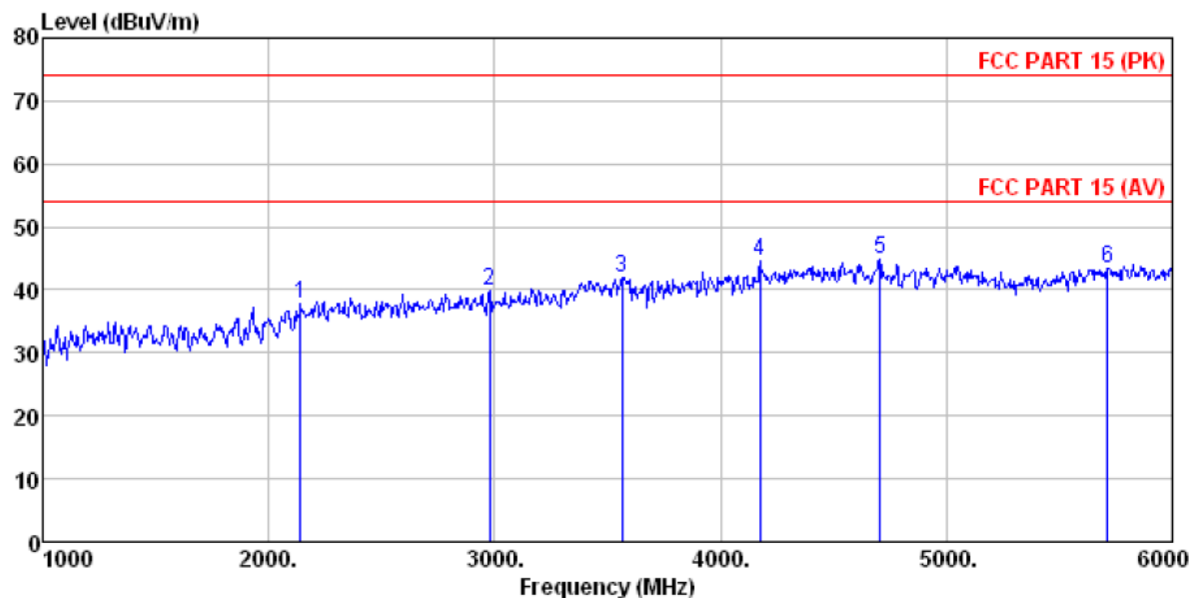
Horizontal:



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
 Job No. : 975RF
 Test Mode : Burning test mode(HDMI output)
 Test Engineer: Bing

	Freq	ReadAntenna	Cable	Preamp	Limit	Over	
		Level	Loss	Factor	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m
1	2215.000	39.57	27.98	5.20	34.23	38.52	74.00
2	3010.000	38.16	28.50	5.94	33.31	39.29	74.00
3	3650.000	38.13	29.19	7.25	32.58	41.99	74.00
4	4400.000	37.18	31.09	8.25	31.89	44.63	74.00
5	4975.000	35.29	31.94	8.74	32.17	43.80	74.00
6	5670.000	33.86	32.44	9.74	32.33	43.71	74.00

Vertical:

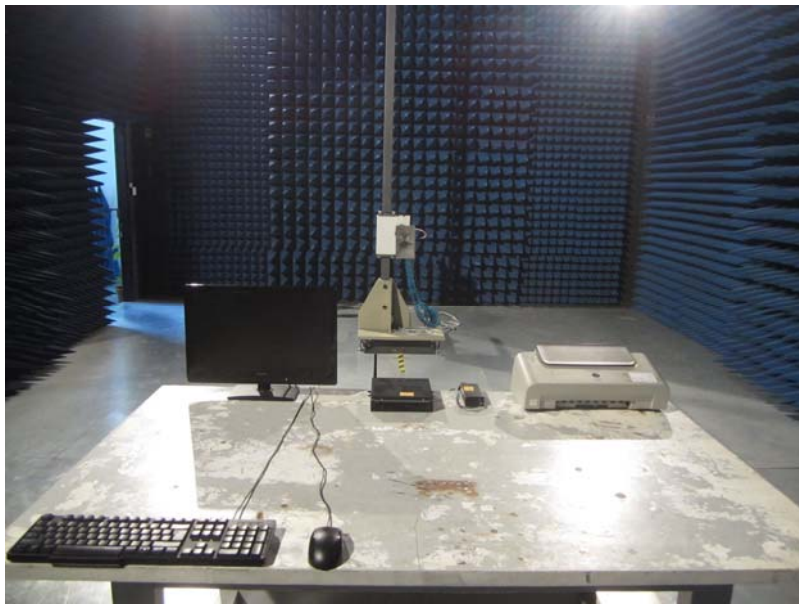
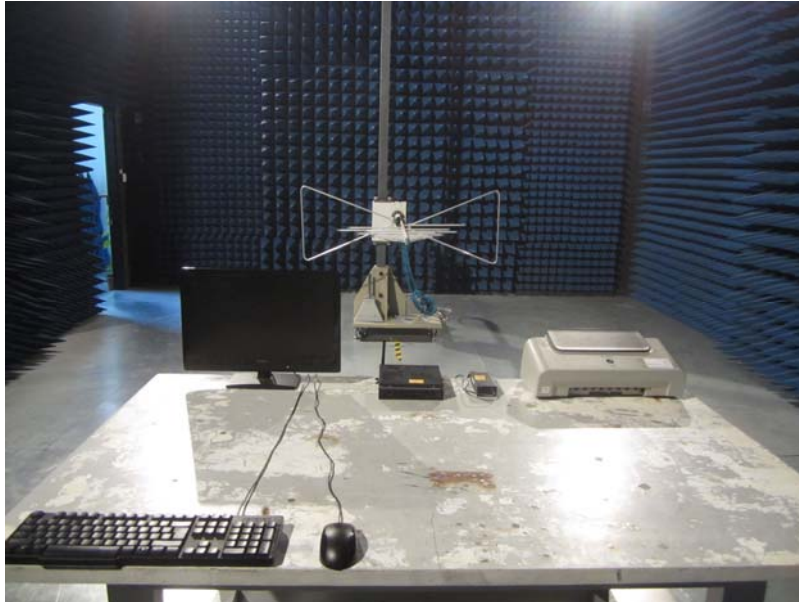


Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
Job No. : 975RF
Test Mode : Burning test mode(HDMI output)
Test Engineer: Bing

	Freq	ReadLevel	AntennaFactor	CableLoss	PreampFactor	Level	Limit	Over	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2140.000	39.41	27.46	5.12	34.30	37.69	74.00	-36.31	Peak
2	2980.000	38.98	28.45	5.91	33.35	39.99	74.00	-34.01	Peak
3	3565.000	38.45	29.10	7.09	32.67	41.97	74.00	-32.03	Peak
4	4175.000	38.44	30.14	8.03	31.98	44.63	74.00	-29.37	Peak
5	4705.000	36.87	31.66	8.52	32.04	45.01	74.00	-28.99	Peak
6	5715.000	33.41	32.50	9.81	32.30	43.42	74.00	-30.58	Peak

8 Test Setup Photo

Radiated Emission



Conducted Emission



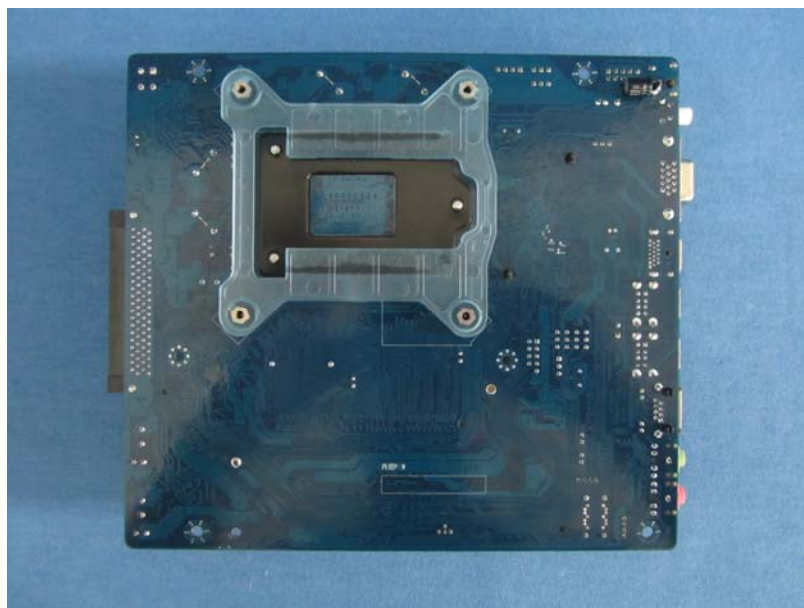
9 EUT Constructional Details





















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