FCC Report

Product Description: Smart Phone Projector

Trade Mark: Akyumen

Model No.: Hawk01, Hawk02, Hawk03, Hawk04, Hawk05, Hawk06, Hawk07, Hawk08, Hawk09, Hawk10, Hawk11, Hawk12, Hawk13, Hawk14, Hawk15, Hawk16, Hawk17, Hawk18, Hawk19,

FCC ID: 2ADLD-HAWK01

Applicant: Akyumen Technologies Corp.

Address: 7401 Wiles Road, Suite 123 Coral Spring, FL 33067 USA

Applicable standards:	FCC CFR Title 47 Part 15 Subpart B: 2013
Test Date:	24 November ~ 08 December, 2014
Issued Date:	08 December, 2014
Test Result:	Complied

James Wu

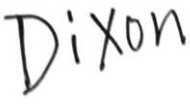
James Wu
Laboratory Manager

2 Version

Version No.	*Date*	*Description*
00	*08 December, 2014*	*Original*

Prepared By:  ***Date:*** *08 December, 2014*

Young Li
Project Engineer

Check By:  ***Date:*** *08 December, 2014*

Dixon Hao
Reviewer

3 Contents

4 Test Summary

Test Item	Test Method	Result
Conducted Emission	15.107	Complied
Radiated Emission	15.109	Complied

Complied: The EUT has complied with the essential requirements in the standard.

5 General Information

5.1 Client Information

Applicant:	Akyumen Technologies Corp.
Address:	7401 Wiles Road, Suite 123 Coral Spring, FL 33067 USA
Manufacturer:	Akyumen Technologies Corp.
Address:	7401 Wiles Road, Suite 123 Coral Spring, FL 33067 USA

5.2 General Description of EUT

Product Name:	Smart Phone Projector
Brand Mark:	Akyumen
Model No.:	Hawk01, Hawk02, Hawk03, Hawk04, Hawk05, Hawk06, Hawk07, Hawk08, Hawk09, Hawk10, Hawk11, Hawk12, Hawk13, Hawk14, Hawk15, Hawk16, Hawk17, Hawk18, Hawk19,
Test model No.:	Hawk01
Software version:	V1.0
Hardware version:	V1.0
AC Adapter:	Model: JHD-AP012C-050150AB Input: AC 100~240V 50/60Hz 0.35A Output: DC 5.0V 1.5A
Power supply:	lithium-ion charge battery 3.7V

5.3 Test Mode

PC mode	Keep the EUT in exchange data with PC.

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
HP	Printer	CB495A	05257893	DoC
Lenovo	PC Host	M6900	EA05257893	DoC
DELL	PC	OPTIPLEX745	GTS312	DoC
DELL	MONITOR	E178FPC	N/A	DoC
DELL	KEYBOARD	SK-8115	N/A	DoC
DELL	MOUSE	MOC5UO	N/A	DoC

5.5 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 fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, July 20, 2010.

- **Industry Canada (IC) —Registration No.: 9079A-1**

  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-1.

5.6 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

6 Test Instruments list

Instrument	Manufacturer	Model No.	Inventory No.	Next Cal. Date
3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 27 2015
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A
EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jun. 30 2015
BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 22 2015
Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 26 2015
Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 27 2015
EMI Test Software	AUDIX	E3	N/A	N/A
Coaxial Cable	GTS	N/A	GTS213	Mar. 28 2015
Coaxial Cable	GTS	N/A	GTS211	Mar. 28 2015
Coaxial cable	GTS	N/A	GTS210	Mar. 28 2015
Coaxial Cable	GTS	N/A	GTS212	Mar. 28 2015
Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jun. 30 2015
Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jun. 30 2015
Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 26 2015
Band filter	Amindeon	82346	GTS219	Mar. 28 2015
Universal radio communication tester	Rohde & Schwarz	CMU200	GTS235	May 09 2015
Signal Generator	Rohde & Schwarz	SML03	GTS236	May 09 2015
Temp. Humidity/ Barometer	Oregon Scientific	BA-888	GTS248	May 09 2015
D.C. Power Supply	Instek	PS-3030	GTS232	NA
Splitter	Agilent	11636B	GTS237	May 09 2015

Conducted Emission				
Instrument	Manufacturer	Model No.	Inventory No.	Next Cal. Date
Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	Sep. 06 2015
EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	Jun. 30 2015
10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	Jun. 30 2015
Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jun. 30 2015
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	Jun. 30 2015
Coaxial Cable	GTS	N/A	GTS227	Jun. 30 2015
EMI Test Software	AUDIX	E3	N/A	N/A
Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	Sep. 06 2015
EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	Jun. 30 2015

7 Measurement Data and Test Results

7.1 Conducted Emissions

☞ Standard requirement

FCC Part15 C Section 15.107

☞ Test method

ANSI C63.4:2003

☞ Receiver set

RBW=9KHz, VBW=30KHz, Sweep time=auto

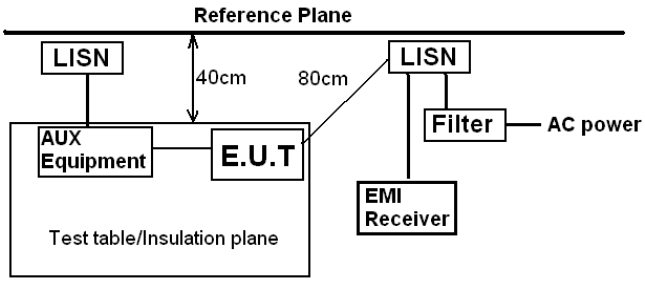
☞ Limit

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 mode

Refer to section 5.3 for details

☞ Test setup



Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

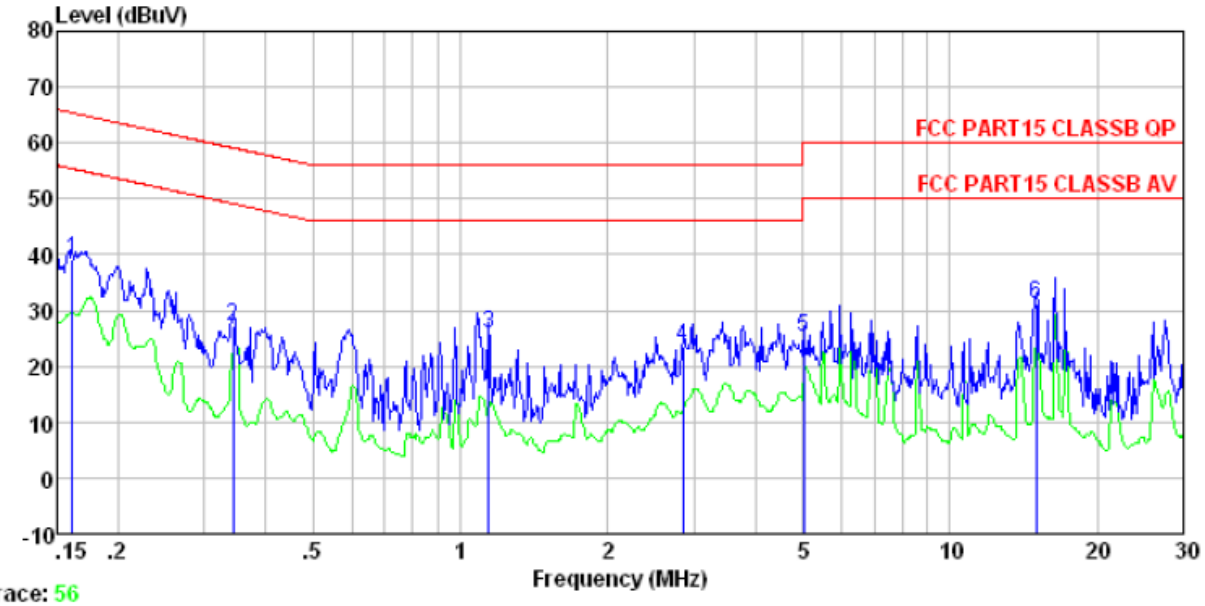
☞ Test mode

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 Result

Complied

Test mode:	PC mode	Temperature:	24~26℃
Phase Polarity:	Line	Relative Humidity:	50~53%



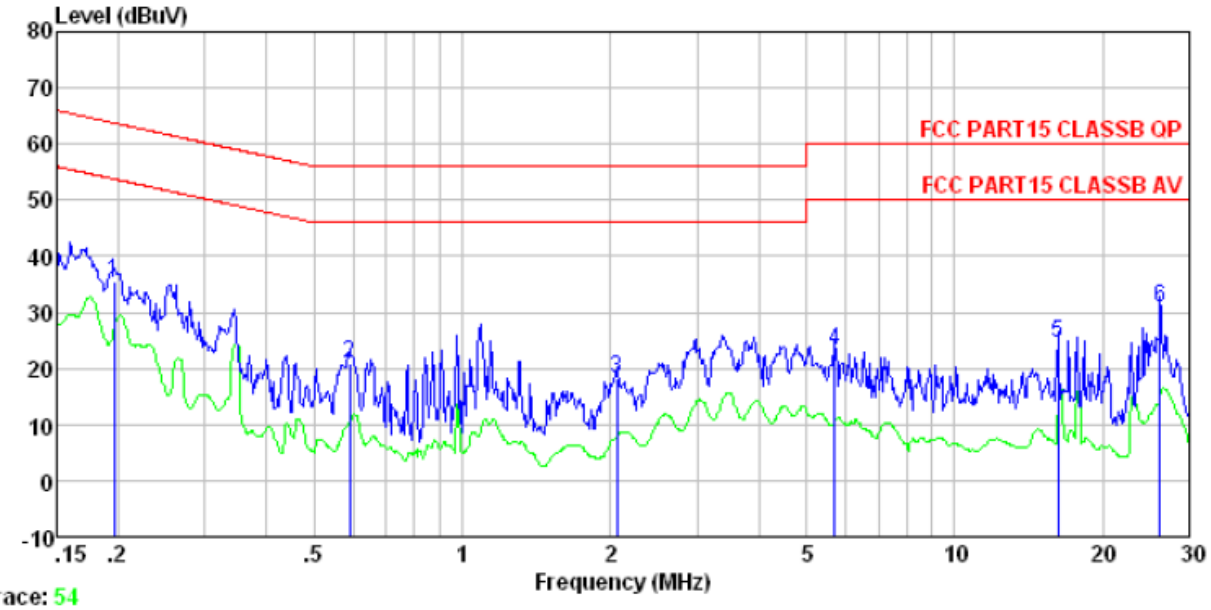
Trace: 56

Condition: FCC PART15 CLASSB QP LISN-2013 LINE

Test mode: PC mode

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.162	38.72	0.15	0.12	38.99	65.38	-26.39	QP
2	0.343	26.91	0.11	0.10	27.12	59.13	-32.01	QP
3	1.141	25.56	0.13	0.13	25.82	56.00	-30.18	QP
4	2.854	23.30	0.15	0.15	23.60	56.00	-32.40	QP
5	5.031	24.70	0.21	0.15	25.06	60.00	-34.94	QP
6	14.986	30.79	0.27	0.22	31.28	60.00	-28.72	QP

Test mode:	PC mode	Temperature:	24~26℃
Phase Polarity:	Nertral	Relative Humidity:	50~53%



Trace: 54

Condition: FCC PART15 CLASSB QP LISN-2013 NEUTRAL

Test mode: PC mode

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.197	35.46	0.07	0.13	35.66	63.76	-28.10	QP
2	0.592	20.69	0.07	0.12	20.88	56.00	-35.12	QP
3	2.066	17.92	0.09	0.15	18.16	56.00	-37.84	QP
4	5.713	22.93	0.16	0.15	23.24	60.00	-36.76	QP
5	16.226	24.06	0.36	0.22	24.64	60.00	-35.36	QP
6	26.139	29.50	0.98	0.23	30.71	60.00	-29.29	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

7.2 Radiated Emission

☞ **Test method**

FCC Part15 C Section 15.109

☞ **Test method**

ANSI C63.4:2003

☞ **Receiver set**

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	Peak	1MHz	3MHz	Average Value

☞ **Limit**

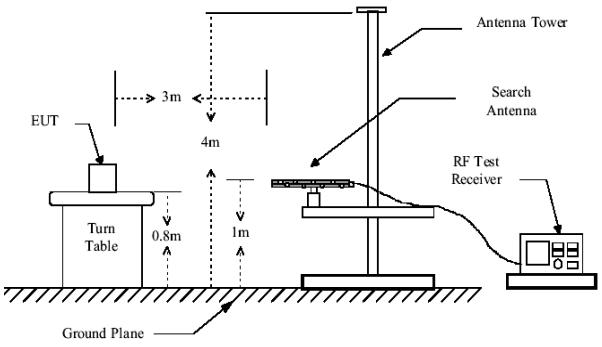
Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.00	Quasi-peak Value
88MHz-216MHz	43.50	Quasi-peak Value
216MHz-960MHz	46.00	Quasi-peak Value
960MHz-1GHz	54.00	Quasi-peak Value
Above 1GHz	54.00	Average Value
	74.00	Peak Value

☞ **Test mode**

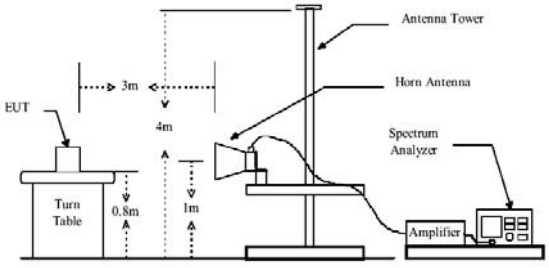
Refer to section 5.3 for details

☞ **Test setup**

Below 1GHz



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 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.

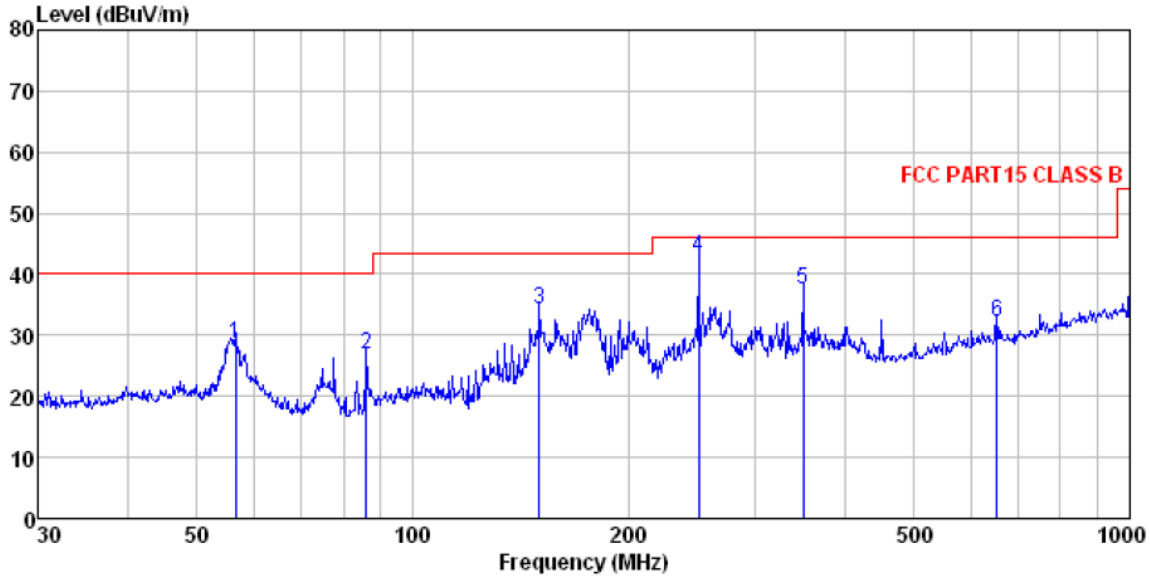
If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

☞ Test Result **Complied**

Measurement data:

Below 1GHz

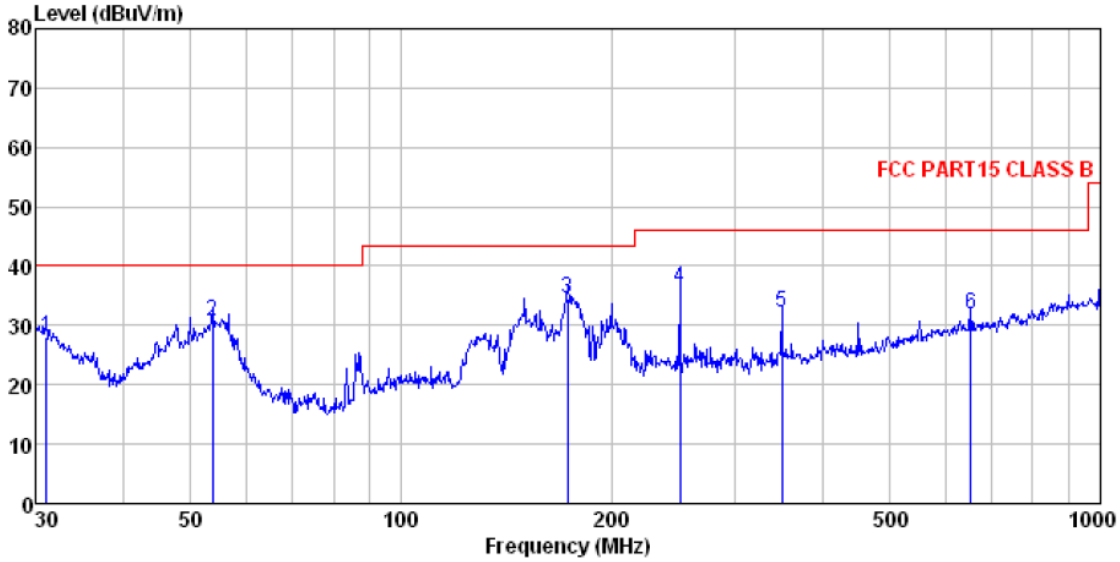
Horizontal:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163-2013M HORIZONTAL

	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	56.593	44.70	14.91	0.83	31.95	28.49	40.00	-11.51	QP
2	86.200	44.83	12.74	1.08	31.73	26.92	40.00	-13.08	QP
3	150.011	54.51	10.26	1.57	31.98	34.36	43.50	-9.14	QP
4	250.301	58.79	14.07	2.12	32.16	42.82	46.00	-3.18	QP
5	350.477	50.76	16.27	2.62	32.02	37.63	46.00	-8.37	QP
6	651.942	38.82	20.65	3.92	31.12	32.27	46.00	-13.73	QP

Vertical:

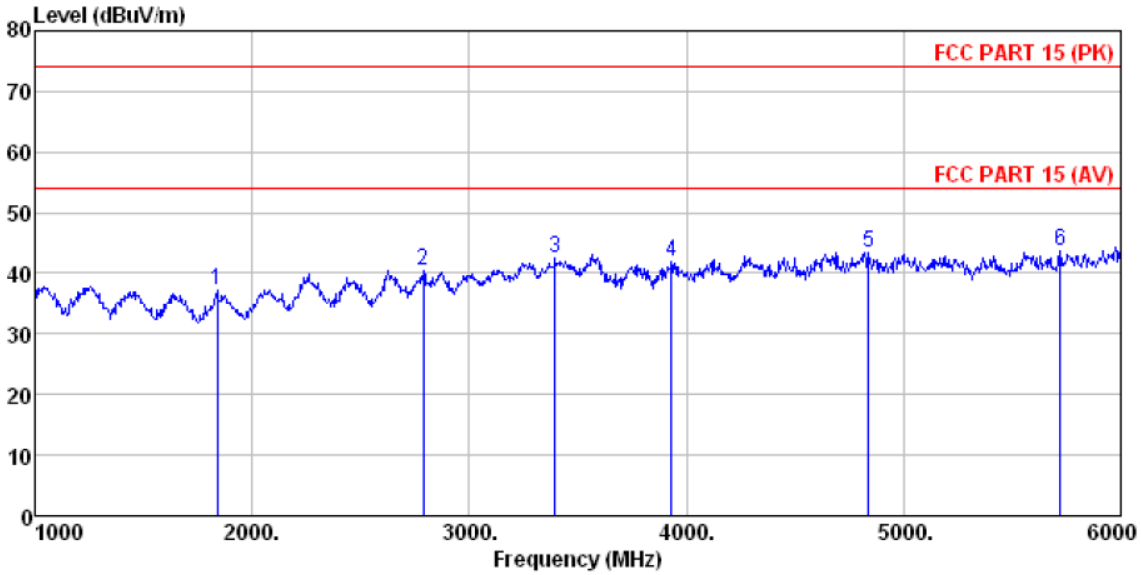


Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163-2013M VERTICAL

	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	31.071	45.15	14.32	0.56	32.06	27.97	40.00	-12.03	QP
2	53.693	46.64	15.07	0.81	31.95	30.57	40.00	-9.43	QP
3	173.205	53.85	11.16	1.70	32.06	34.65	43.50	-8.85	QP
4	250.301	52.22	14.07	2.12	32.16	36.25	46.00	-9.75	QP
5	350.477	45.32	16.27	2.62	32.02	32.19	46.00	-13.81	QP
6	651.942	38.41	20.65	3.92	31.12	31.86	46.00	-14.14	QP

Above 1GHz

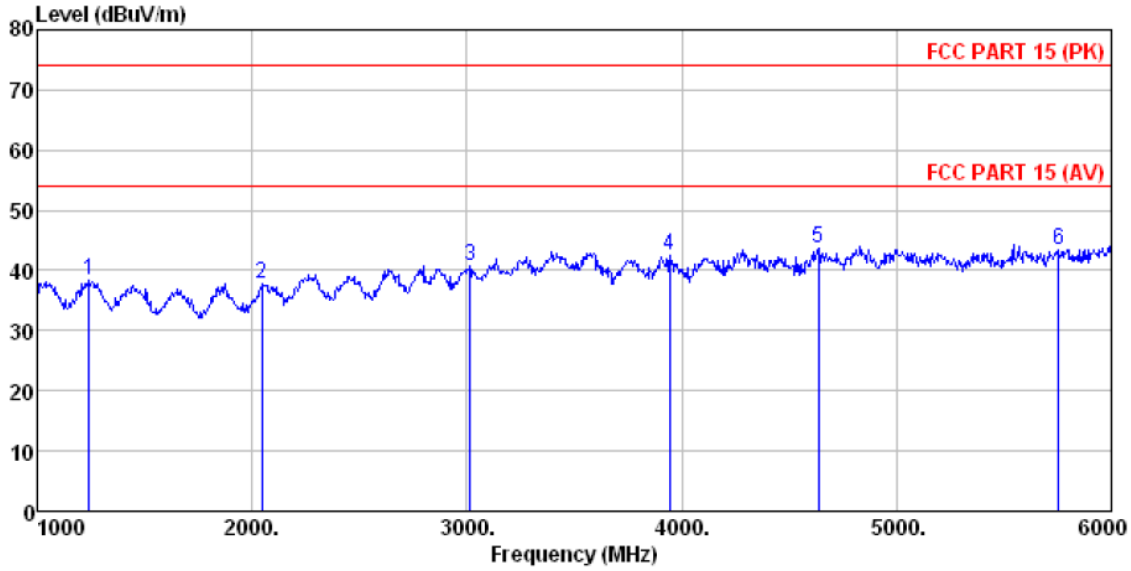
Horizontal:



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL

	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	1840.000	41.10	25.48	4.88	34.17	37.29	74.00	-36.71	Peak
2	2790.000	39.73	28.40	5.75	33.57	40.31	74.00	-33.69	Peak
3	3395.000	39.91	28.60	6.76	32.87	42.40	74.00	-31.60	Peak
4	3930.000	37.02	29.56	7.75	32.27	42.06	74.00	-31.94	Peak
5	4840.000	35.20	31.81	8.63	32.11	43.53	74.00	-30.47	Peak
6	5720.000	33.69	32.53	9.81	32.29	43.74	74.00	-30.26	Peak

Vertical:



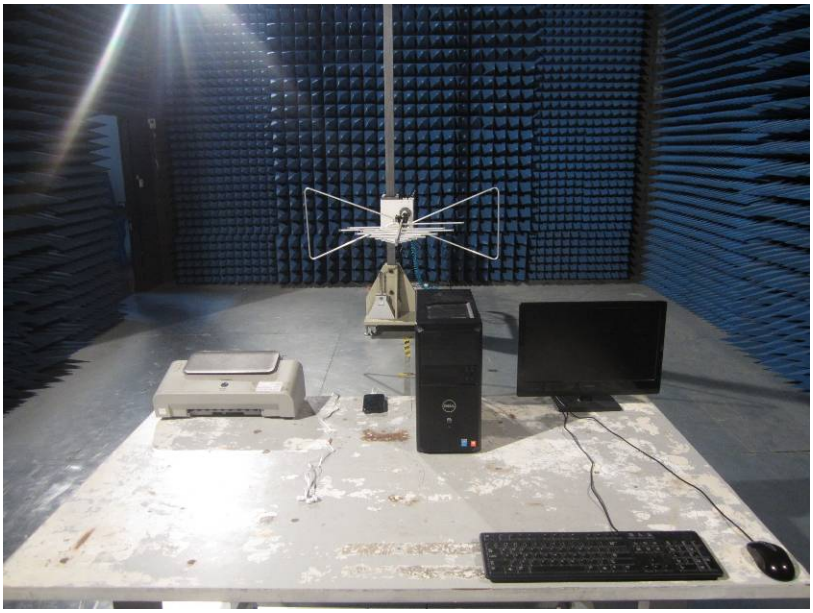
Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL

	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	1240.000	41.68	25.50	4.50	33.16	38.52	74.00	-35.48	Peak
2	2045.000	40.77	26.41	5.01	34.42	37.77	74.00	-36.23	Peak
3	3015.000	39.46	28.50	5.96	33.30	40.62	74.00	-33.38	Peak
4	3945.000	37.49	29.58	7.77	32.25	42.59	74.00	-31.41	Peak
5	4635.000	35.71	31.57	8.46	32.01	43.73	74.00	-30.27	Peak
6	5755.000	33.25	32.59	9.86	32.27	43.43	74.00	-30.57	Peak

8 Test Setup Photo

Conducted emissions:

Radiated emissions:



9 EUT Constructional Details

Reference to the test report No.: TMC141202901

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