

FCC REPORT

Applicant: WigWag Inc

Address of Applicant: Suite 200, 4009 Banister Lane, Austin, TX 78704, USA

Equipment Under Test (EUT)

Product Name: WigWag Filament Smart Bulb

Model No.: WWFLM921A, WWFLM921B, WWFLM921C, WWFLM921D, WWFLM921E, WWFLM921F

FCC ID: 2AC5J-WIGWAG

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: 02 Sep., 2014

Date of Test: 02 Sep., to 16 Sep., 2014

Date of report issued: 16 Sep., 2014

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.

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2 Version

Version No.	Date	Description
00	16 Sep., 2014	Original

Prepared by:

Yoyo Luo

Date:

16 Sep., 2014

Report Clerk

Reviewed by:

Wimer Zhang

Date:

16 Sep., 2014

Project Engineer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(3)	Pass
6dB Emission Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205/15.209	Pass

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

5 General Information

5.1 Client Information

Applicant:	WigWag Inc
Address of Applicant:	Suite 200, 4009 Banister Lane, Austin, TX 78704 , USA
Manufacturer/Factory:	Shenzhen LEDE Tech. Co., Ltd
Address of Manufacturer/Factory:	3/F, 10th building, Changxing Industrial Zone, Gongming Town, Bao'an District, Shenzhen City, Guangdong Province, China

5.2 General Description of E.U.T.

Product Name:	WigWag Filament Smart Bulb
Model No.:	WWFLM921A, WWFLM921B, WWFLM921C, WWFLM921D, WWFLM921E, WWFLM921F
Operation Frequency:	2405-2480 MHz
Channel numbers:	16
Channel separation:	5 MHz
Modulation technology:	GFSK
Data speed :	1Mbps
Antenna Type:	Internal Antenna
Antenna gain:	0 dBi
Power supply:	AC120/60Hz
Remark:	Item NO.: WWFLM921A, WWFLM921B, WWFLM921C, WWFLM921D, WWFLM921E, WWFLM921F were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name.

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2405MHz	4	2425MHz	8	2445MHz	12	2465MHz
1	2410MHz	5	2430MHz	9	2450MHz	13	2470MHz
2	2415MHz	6	2435MHz	10	2455MHz	14	2475MHz
3	2420MHz	7	2440MHz	11	2460MHz	15	2480MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2405MHz
The middle channel	2445MHz
The Highest channel	2480MHz

5.3 Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Operation mode	Keep the EUT in continuous transmitting with modulation
<p>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. Duty cycle setting during the transmission is 100% with maximum power setting for all modulations.</p>	

5.4 Description of Support Units

N/A

5.5 Laboratory Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> ● FCC - Registration No.: 817957 Shenzhen Zhongjian Nanfang Testing Co., Ltd. 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 out files. Registration 817957, February 27, 2012. ● 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.
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5.6 Laboratory Location

<p>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</p>
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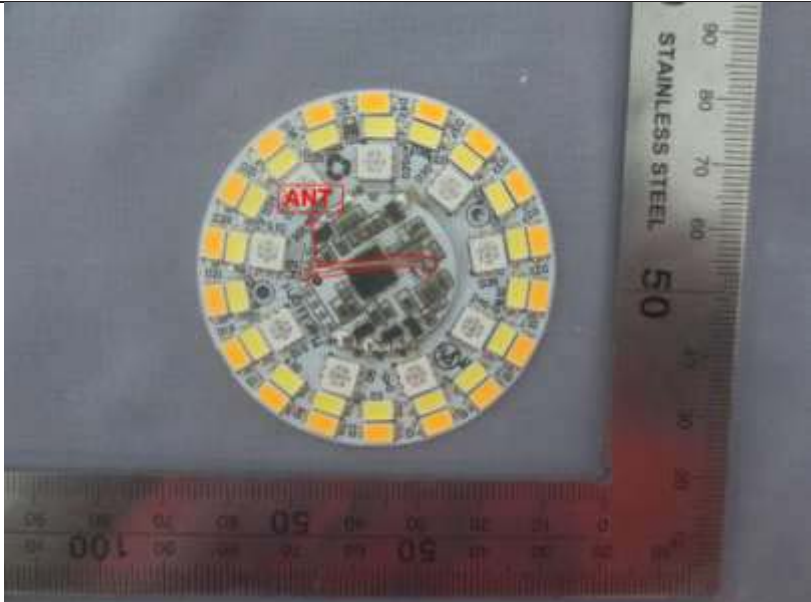
5.7 Test Instruments list

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	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	Aug 23 2014	Aug 22 2017
2	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	CCIS0005	Apr 19 2014	Apr 19 2015
3	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	CCIS0006	Apr 19 2014	Apr 19 2015
4	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
5	Coaxial Cable	CCIS	N/A	CCIS0016	Apr. 01 2014	Mar. 31 2015
6	Coaxial Cable	CCIS	N/A	CCIS0017	Apr. 01 2014	Mar. 31 2015
7	Coaxial cable	CCIS	N/A	CCIS0018	Apr. 01 2014	Mar. 31 2015
8	Coaxial Cable	CCIS	N/A	CCIS0019	Apr. 01 2014	Mar. 31 2015
9	Coaxial Cable	CCIS	N/A	CCIS0087	Apr. 01 2014	Mar. 31 2015
10	Amplifier(10kHz-1.3GHz)	HP	8447D	CCIS0003	Apr. 01 2014	Mar. 31 2015
11	Amplifier(1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	June 09 2014	June 08 2015
12	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	Apr. 01 2014	Mar. 31 2015
13	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 30 2014	Mar. 29 2015
14	Printer	HP	HP LaserJet P1007	N/A	N/A	N/A
15	Positioning Controller	UC	UC3000	CCIS0015	N/A	N/A
16	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP	CCIS0023	Apr 19 2014	Apr 19 2015
17	EMI Test Receiver	Rohde & Schwarz	ESPI	CCIS0022	Apr 01 2014	Mar. 31 2015
18	Loop antenna	Laplace instrument	RF300	EMC0701	Apr 01 2014	Mar. 31 2015
19	Universal radio communication tester	Rhode & Schwarz	CMU200	CCIS0069	May. 29 2014	May. 28 2015
20	Signal Analyzer	Rohde & Schwarz	FSIQ3	CCIS0088	Apr 19 2014	Apr 19 2015

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	Oct 10 2011	Oct 09 2014
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	Apr 10 2014	Apr 09 2015
3	LISN	CHASE	MN2050D	CCIS0074	Apr 10 2014	Apr 10 2015
4	Coaxial Cable	CCIS	N/A	CCIS0086	Apr. 01 2014	Mar. 31 2015
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

6 Test results and Measurement Data

6.1 Antenna requirement:

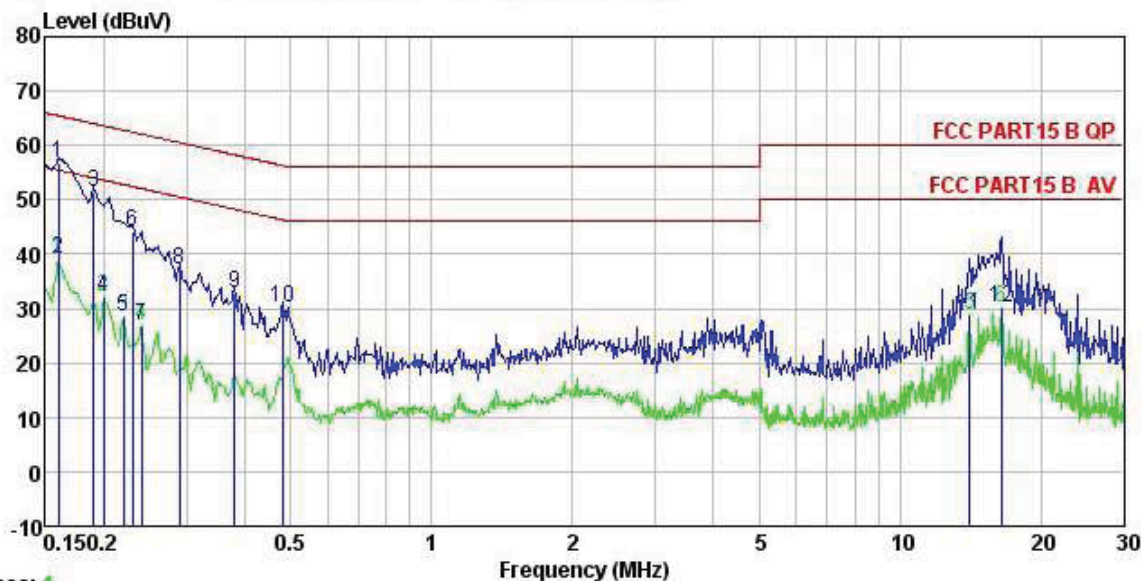
Standard requirement:	FCC Part15 C Section 15.203 /247(c)
<p>15.203 requirement: <i>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</i></p> <p>15.247(c) (1)(i) requirement: <i>(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.</i></p>	
E.U.T Antenna:	
<p><i>The antenna is an internal antenna which cannot replace by end-user, the best case gain of the antenna is 0 dBi.</i></p>	
	

6.2 Conducted Emission

Test Requirement:	FCC Part15 C Section 15.207			
Test Method:	ANSI C63.4: 2003			
Test Frequency Range:	150 kHz to 30 MHz			
Class / Severity:	Class B			
Receiver setup:	RBW=9kHz, VBW=30kHz			
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
* Decreases with the logarithm of the frequency.				
Test procedure	<div>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which provides a 50ohm/50uH coupling impedance for the measuring equipment.</div> <div>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).</div> <div>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.</div>			
Test setup:	<div><div><div>Reference Plane</div><div><div><div>LISN</div><div>AUX Equipment</div><div>E.U.T</div></div><div>40cm</div><div>80cm</div><div>Test table/Insulation plane</div></div><div><div>LISN</div><div>Filter</div><div>AC power</div><div>EMI Receiver</div></div></div><div><div>Remark</div><div>E.U.T: Equipment Under Test</div><div>LISN: Line Impedance Stabilization Network</div><div>Test table height=0.8m</div></div></div>			
Test Instruments:	Refer to section 5.7 for details			
Test mode:	Refer to section 5.3 for details			
Test results:	Passed			

Measurement Data

Neutral:

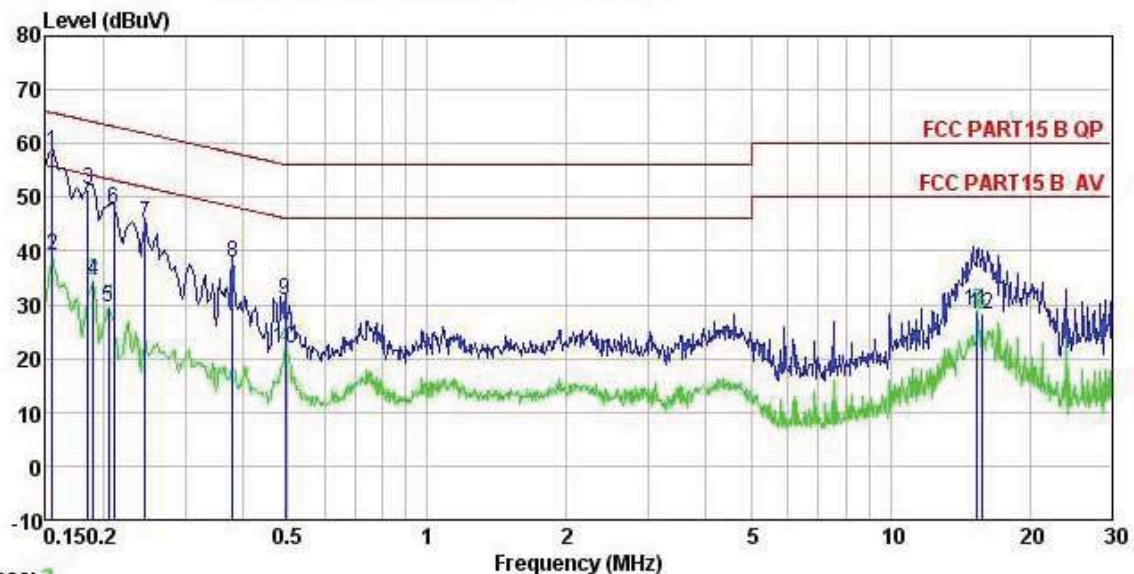


Trace: 1

Site : CCIS Shielding Room
 Condition : FCC PART15 B QP LISN NEUTRAL
 EUT : WigWag Filament Smart Bulb
 Model : WVVFLM921A
 Test Mode : BT TX mode
 Power Rating : AC 120V/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: NIKE
 Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.160	45.57	0.25	10.78	56.60	65.47	-8.87	QP
2	0.160	28.01	0.25	10.78	39.04	55.47	-16.43	Average
3	0.190	40.32	0.25	10.76	51.33	64.02	-12.69	QP
4	0.200	21.10	0.25	10.76	32.11	53.62	-21.51	Average
5	0.220	17.36	0.25	10.76	28.37	52.83	-24.46	Average
6	0.230	33.15	0.25	10.75	44.15	62.44	-18.29	QP
7	0.240	15.90	0.25	10.75	26.90	52.08	-25.18	Average
8	0.289	26.08	0.26	10.74	37.08	60.54	-23.46	QP
9	0.379	21.88	0.25	10.72	32.85	58.30	-25.45	QP
10	0.481	19.16	0.28	10.75	30.19	56.32	-26.13	QP
11	14.063	17.67	0.25	10.91	28.83	50.00	-21.17	Average
12	16.486	18.88	0.25	10.91	30.04	50.00	-19.96	Average

Line:



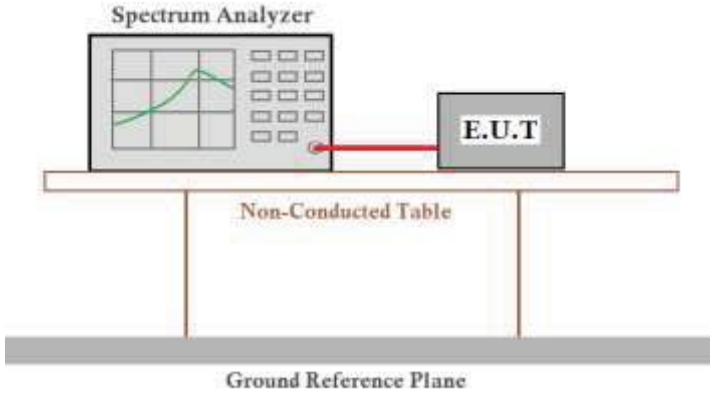
Trace: 3
 Site : CCIS Shielding Room
 Condition : FCC PART15 B QP LISN LINE
 EUT : WigWag Filament Smart Bulb
 Model : WWWFLM921A
 Test Mode : BT TX mode
 Power Rating : AC 120V/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: NIKE
 Remark :

	Read	LISN	Cable	Limit	Over	
Freq	Level	Factor	Loss	Line	Limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB
1	0.155	47.28	0.27	10.78	58.33	65.74 -7.41 QP
2	0.155	28.12	0.27	10.78	39.17	55.74 -16.57 Average
3	0.185	40.38	0.28	10.77	51.43	64.24 -12.81 QP
4	0.190	23.53	0.28	10.76	34.57	54.02 -19.45 Average
5	0.205	18.64	0.28	10.76	29.68	53.40 -23.72 Average
6	0.211	36.80	0.28	10.76	47.84	63.18 -15.34 QP
7	0.246	34.06	0.27	10.75	45.08	61.91 -16.83 QP
8	0.379	26.82	0.28	10.72	37.82	58.30 -20.48 QP
9	0.494	19.88	0.29	10.76	30.93	56.10 -25.17 QP
10	0.494	10.74	0.29	10.76	21.79	46.10 -24.31 Average
11	15.388	17.58	0.32	10.90	28.80	50.00 -21.20 Average
12	15.718	16.93	0.32	10.91	28.16	50.00 -21.84 Average

Notes:

1. An initial pre-scan was performed on the live 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

6.3 Conducted Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	Test method refer to KDB558074 v03r01 (DTS Measure Guidance) section 9.2.2.2

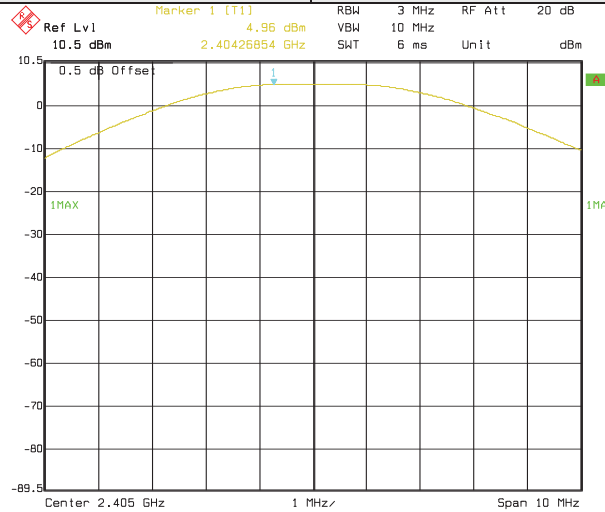
Measurement Data

Test CH	Maximum Peak Conducted Output Power (dBm)	Limit(dBm)	Result
Lowest	4.96	30.00	Pass
Middle	4.96		
Highest	4.84		

Test plot as follows:

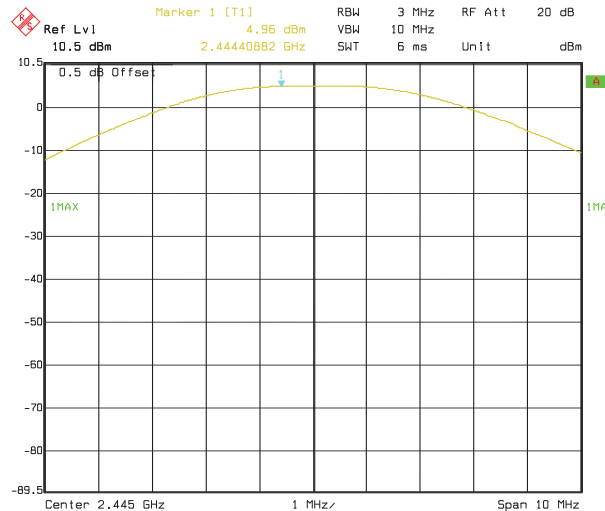
Test mode:

GFSK



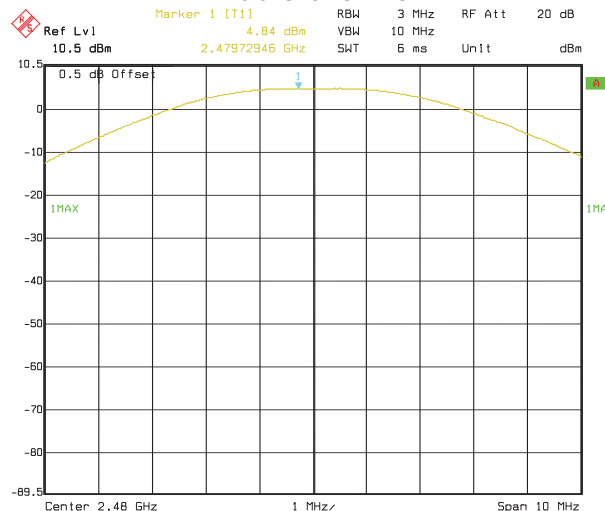
Date: 26.SEP.2014 17:16:37

Lowest channel



Date: 26.SEP.2014 17:17:40

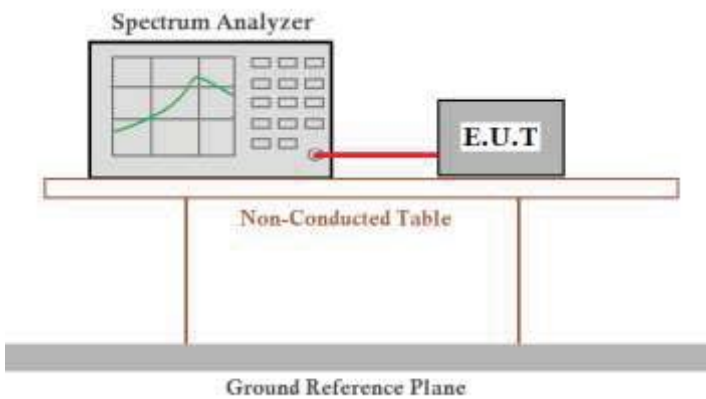
Middle channel



Date: 26.SEP.2014 17:18:48

Highest channel

6.4 Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	>500kHz
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

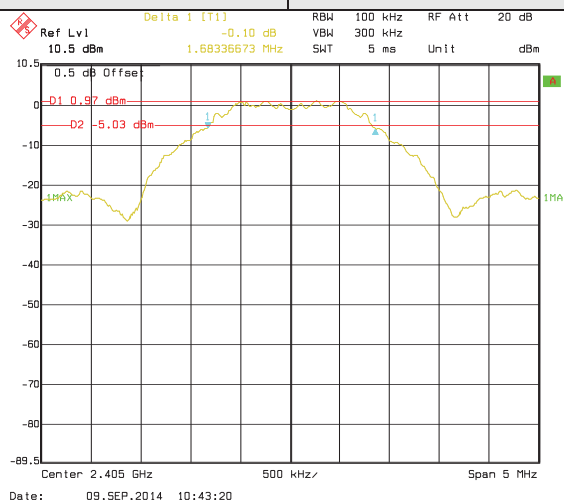
Test CH	6dB Emission Bandwidth (MHz)	Limit(kHz)	Result
Lowest	1.68	>500	Pass
Middle	1.69		
Highest	1.68		

Test CH	99% Occupy Bandwidth (MHz)	Limit(kHz)	Result
Lowest	2.61	N/A	N/A
Middle	2.61		
Highest	2.60		

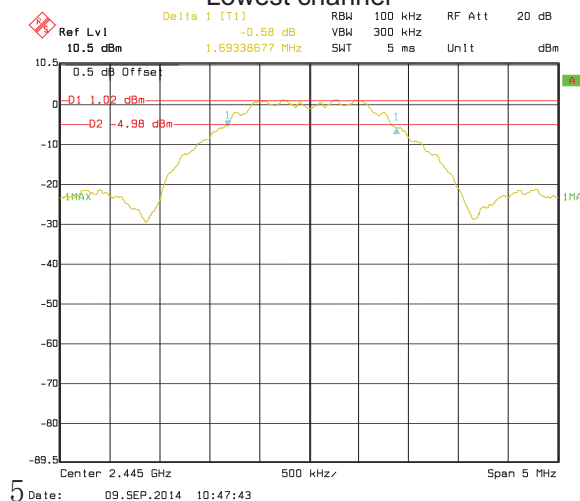
Test plot as follows:

Test mode:6dB EBW

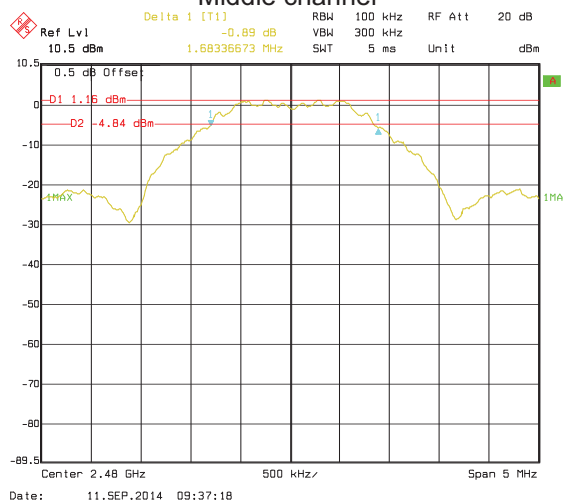
GFSK



Lowest channel



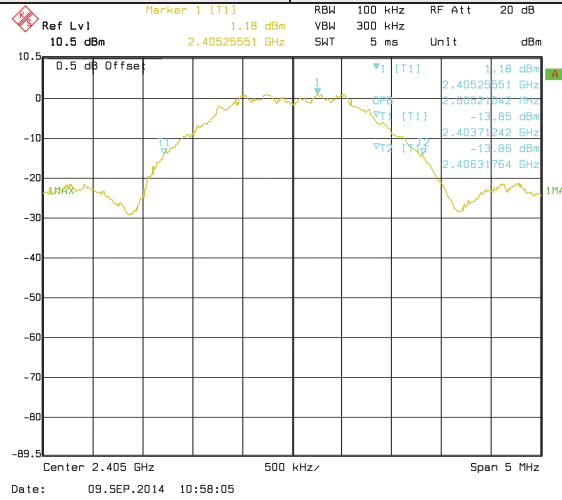
Middle channel



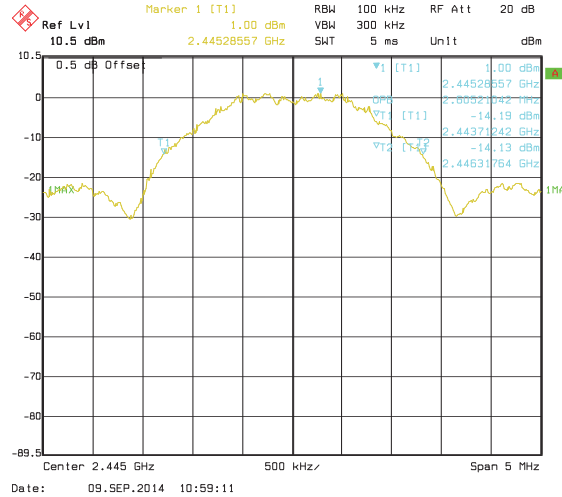
Highest channel

Test mode:99% OBW

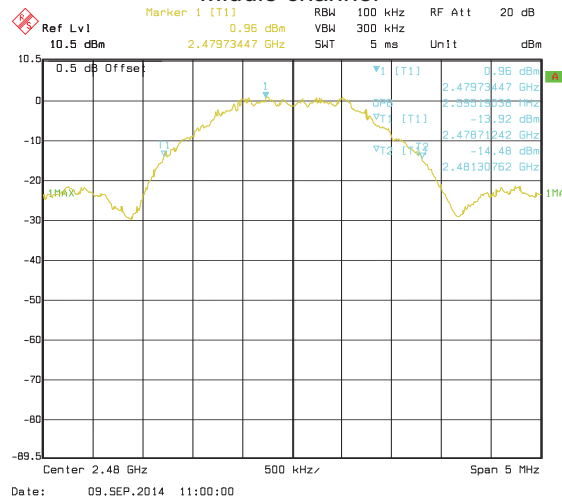
GFSK



Lowest channel

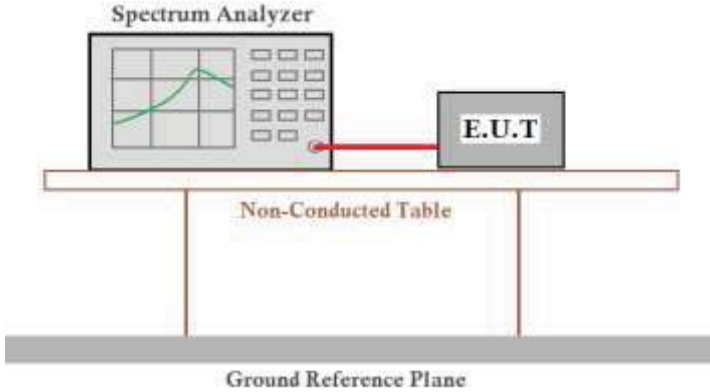


Middle channel



Highest channel

6.5 Power Spectral Density

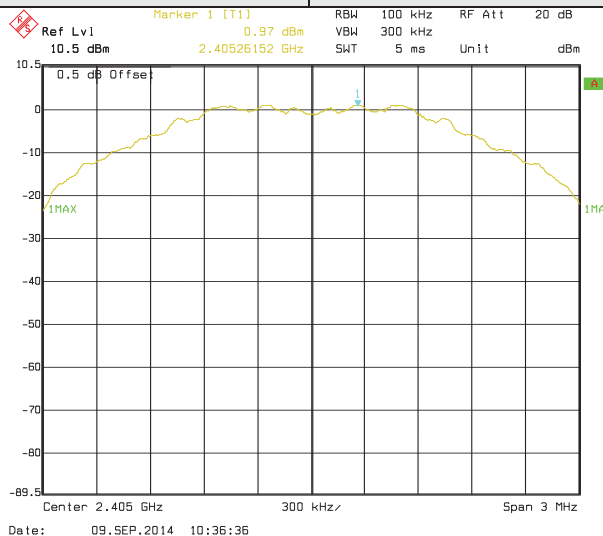
Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	8 dBm
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

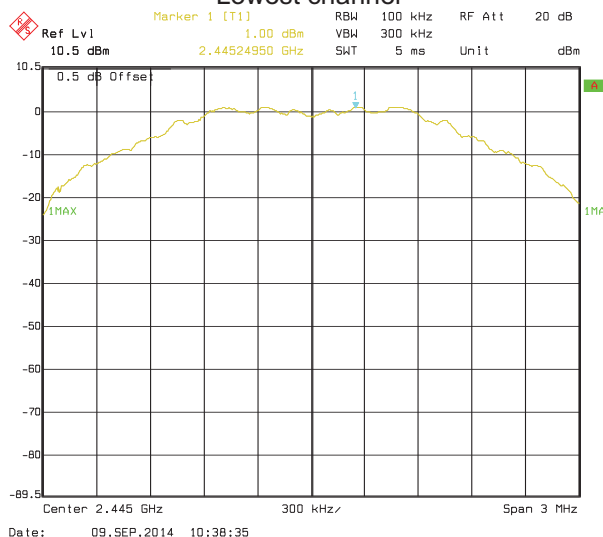
Test CH	Power Spectral Density (dBm)	Limit(dBm)	Result
Lowest	0.97	8.00	Pass
Middle	1.00		
Highest	0.92		

Test plots as follow:

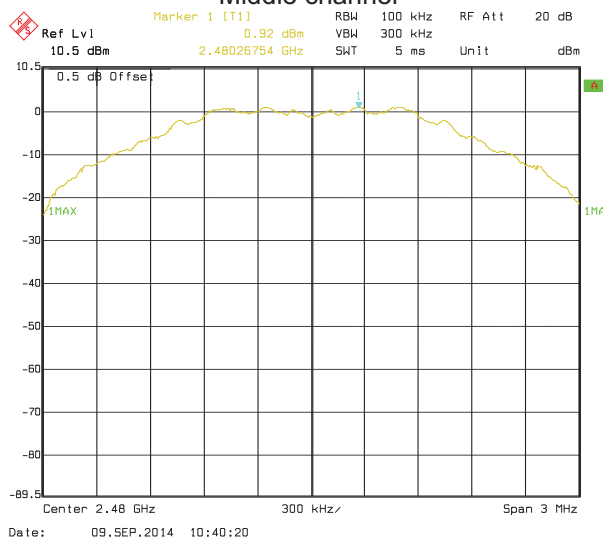
Test mode:



Lowest channel



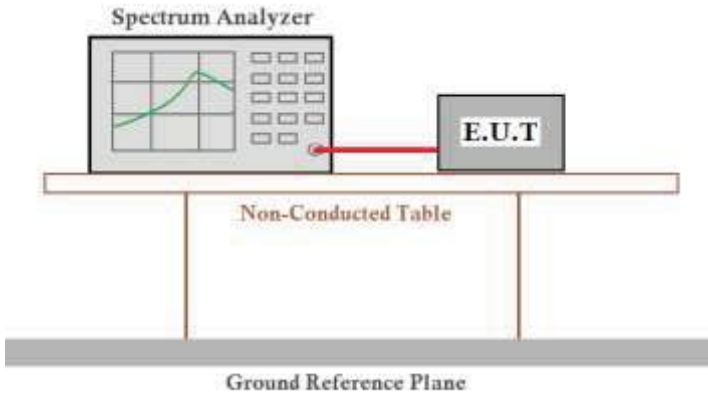
Middle channel



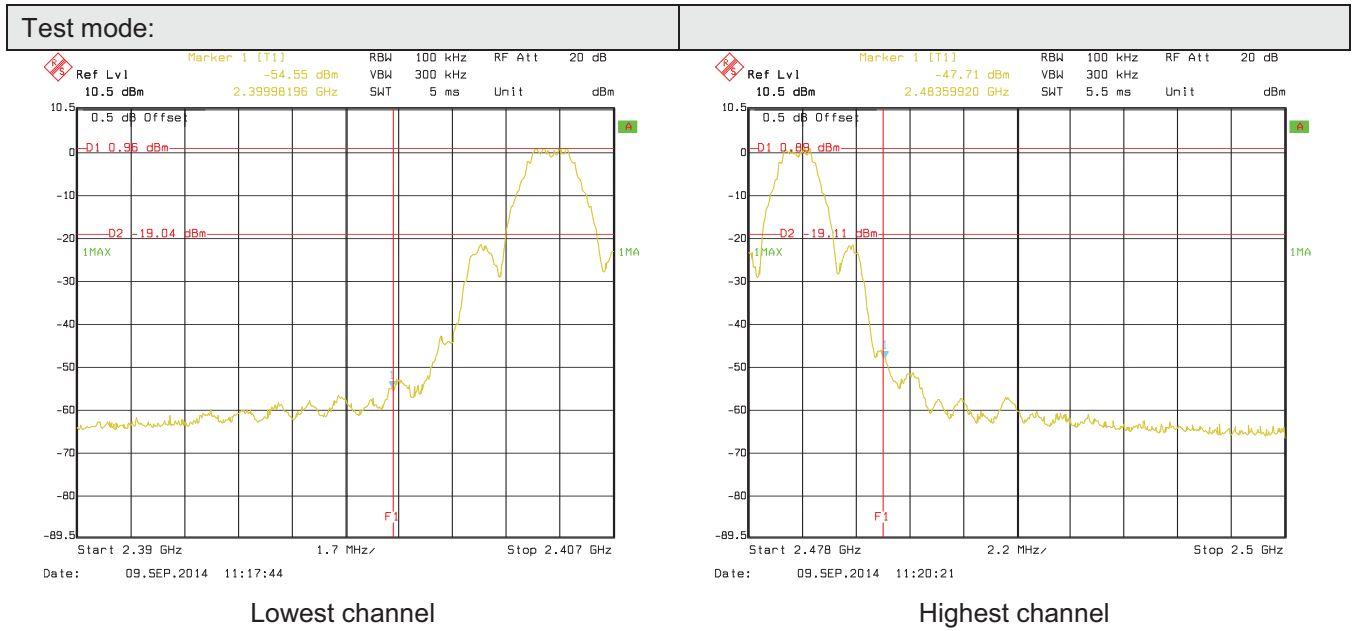
Highest channel

6.6 Band Edge

6.6.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup for conducted emission measurement. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Test plots as follow:

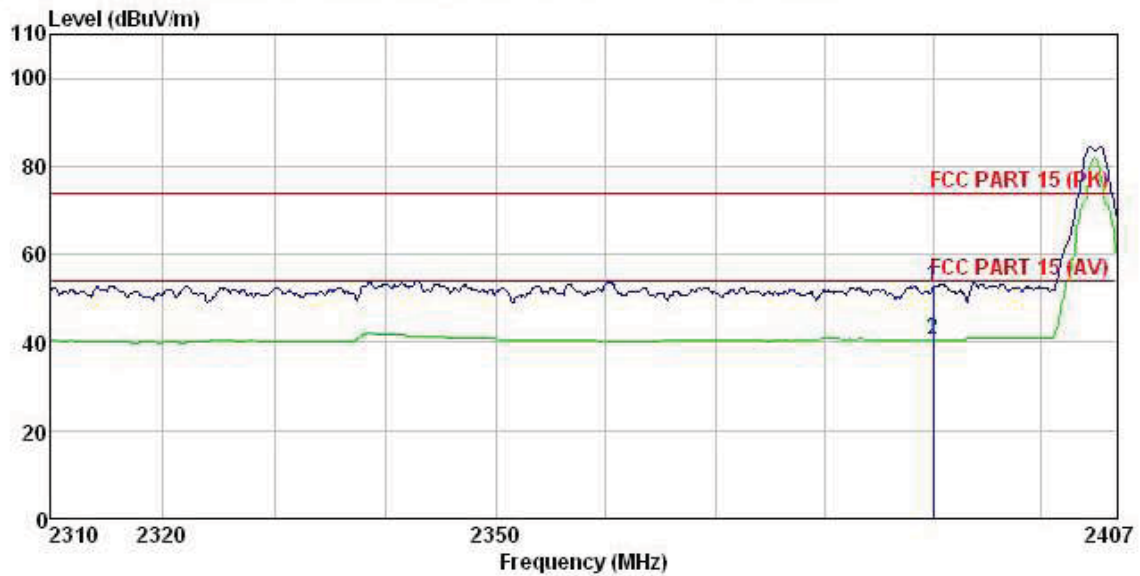


6.6.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205																		
Test Method:	ANSI C63.4: 2003																		
Test Frequency Range:	2.3GHz to 2.5GHz																		
Test site:	Measurement Distance: 3m																		
Receiver setup:	<table><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</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	Above 1GHz	Peak	1MHz	3MHz	Peak Value	Peak	1MHz	10Hz	Average Value
Frequency	Detector	RBW	VBW	Remark															
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 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	Above 1GHz	54.00	Average Value	74.00	Peak Value						
Frequency	Limit (dBuV/m @3m)	Remark																	
Above 1GHz	54.00	Average Value																	
	74.00	Peak Value																	
Test Procedure:	<div><div>1.</div><div>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.</div></div> <div><div>2.</div><div>The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</div></div> <div><div>3.</div><div>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.</div></div> <div><div>4.</div><div>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.</div></div> <div><div>5.</div><div>The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div></div> <div><div>6.</div><div>If the emission level of the EUT in peak mode was 10 dB 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 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</div></div>																		
Test setup:	<div><div><div><div><div>EUT</div><div>Turn Table</div></div><div><div>0.8m</div><div>3m</div></div></div><div><div>4m</div><div>1m</div></div><div><div>Antenna Tower</div><div>Horn Antenna</div></div><div><div>Spectrum Analyzer</div><div>Amplifier</div></div></div></div>																		
Test Instruments:	Refer to section 5.7 for details																		
Test mode:	Refer to section 5.3 for details																		
Test results:	Passed																		

Test channel: Lowest

Horizontal:

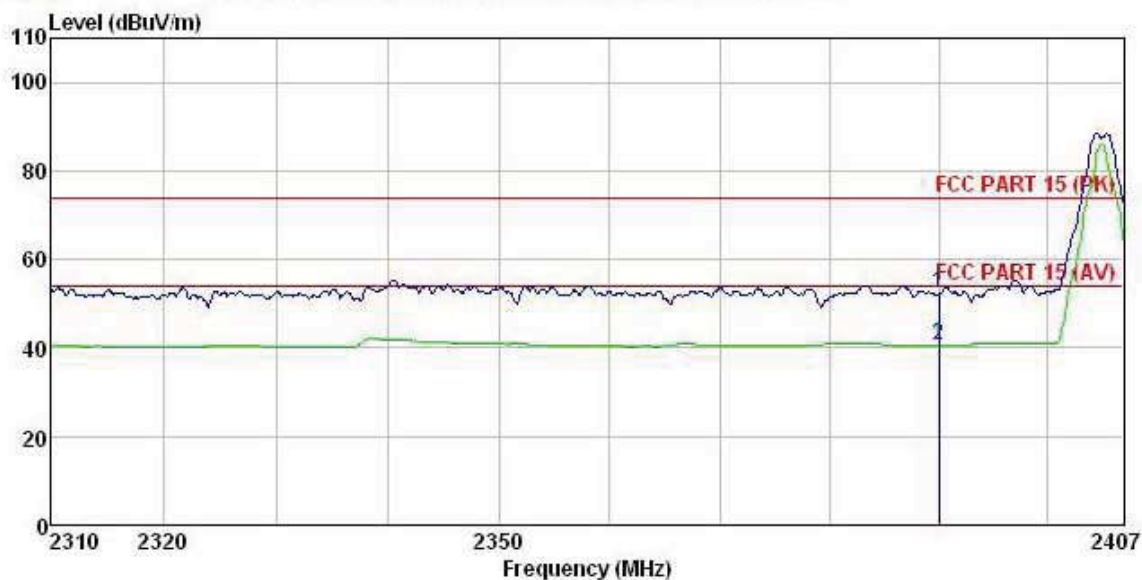


Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
 EUT : LED LAMP
 Model : TintB930
 Test mode : BT-L mode
 Power Rating : AC 120V / 60Hz
 Environment : Temp:25.5°C Humi:55% atmos:101k
 Test Engineer:
 REMARK :

	Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	dB	Line	Limit	Remark
		dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	19.39	27.58	5.67	0.00	52.64	74.00	-21.36	Peak
2	2390.000	7.31	27.58	5.67	0.00	40.56	54.00	-13.44	Average

Test channel: Lowest

Vertical:

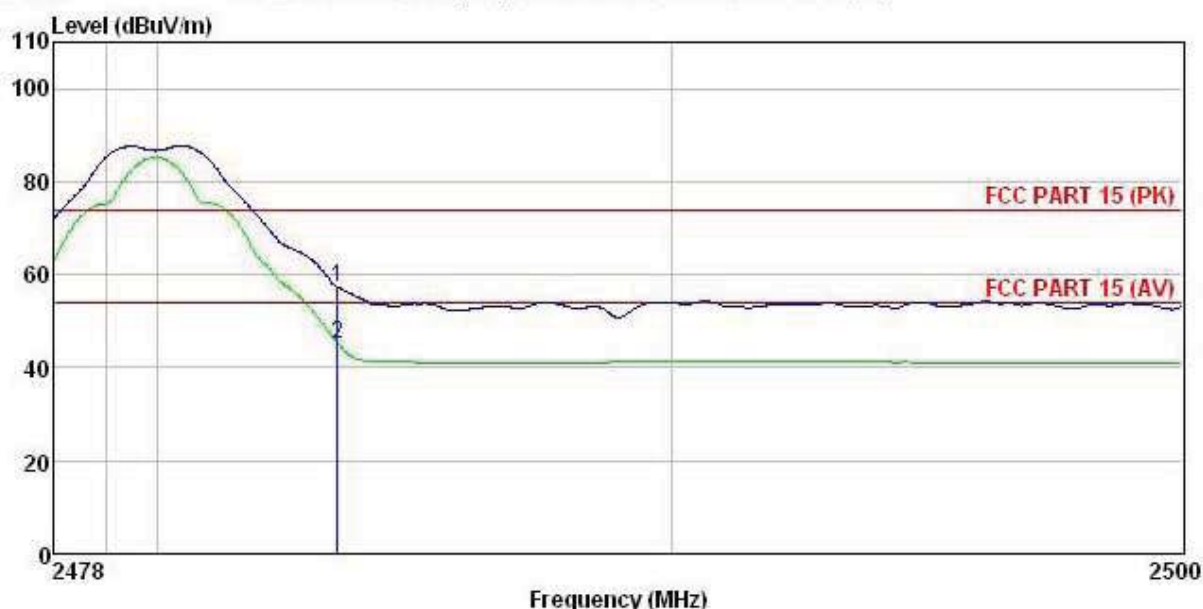


Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
 EUT : LED LAMP
 Model : TintB930
 Test mode : BT-L mode
 Power Rating : AC 120V / 60Hz
 Environment : Temp:25.5°C Humi:55% atmos:101k
 Test Engineer:
 REMARK :

	Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
		dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	19.30	27.58	5.67	0.00	52.55	74.00	-21.45	Peak
2	2390.000	7.38	27.58	5.67	0.00	40.63	54.00	-13.37	Average

Test channel: Highest

Horizontal:

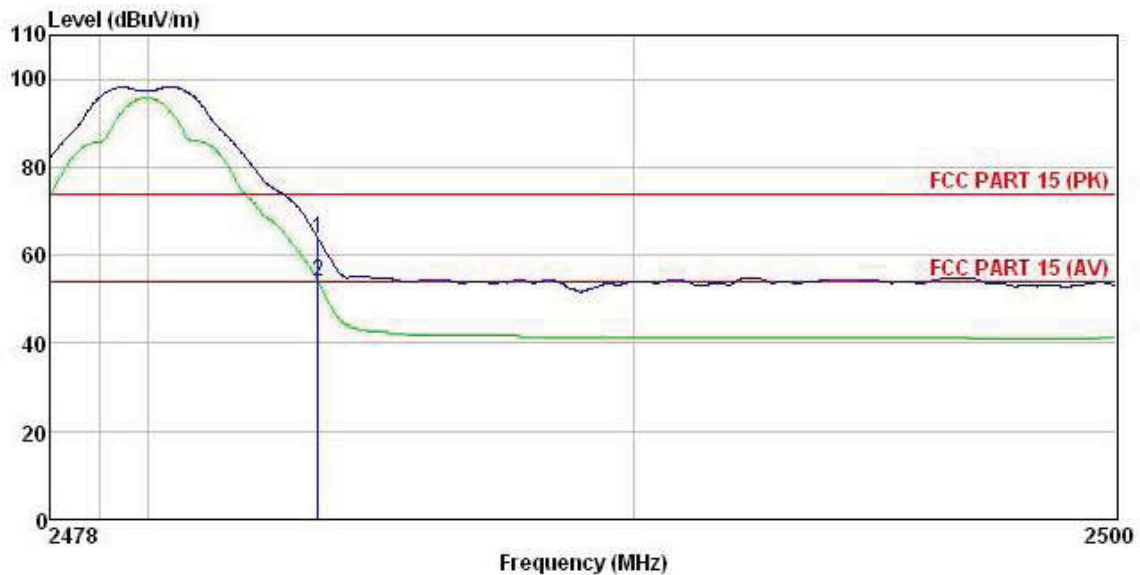


Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
 EUT : LED LAMP
 Model : TintB930
 Test mode : BT-H mode
 Power Rating : AC 120V / 60Hz
 Environment : Temp:25.5°C Humi:55% atmos:101k
 Test Engineer:
 REMARK :

	Freq	ReadAntenna	Cable Preamp	Limit	Over	
	Level	Factor	Loss Factor	Level	Line	Limit Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m dBuV/m dB
1	2483.500	24.07	27.52	5.70	0.00	57.29 74.00 -16.71 Peak
2	2483.500	11.96	27.52	5.70	0.00	45.18 54.00 -8.82 Average

Test channel: Highest

Vertical:

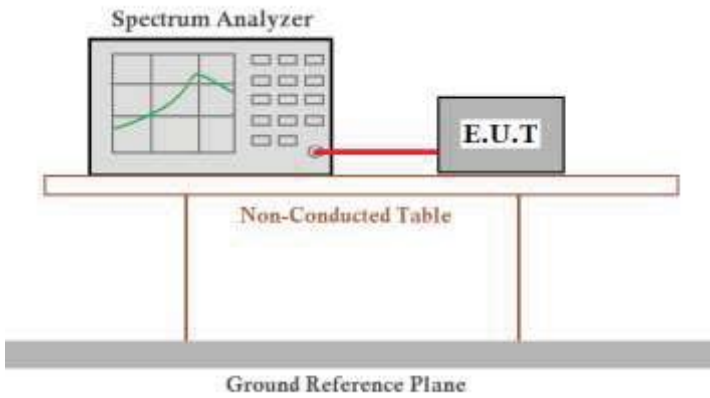


Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
 EUT : LED LAMP
 Model : TintB930
 Test mode : BT-H mode
 Power Rating : AC 120V / 60Hz
 Environment : Temp:25.5°C Humi:55% atmos:101k
 Test Engineer:
 REMARK :

	Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	30.62	27.52	5.70	0.00	63.84	74.00	-10.16	Peak
2	2483.500	20.67	27.52	5.70	0.00	53.89	54.00	-0.11	Average

6.7 Spurious Emission

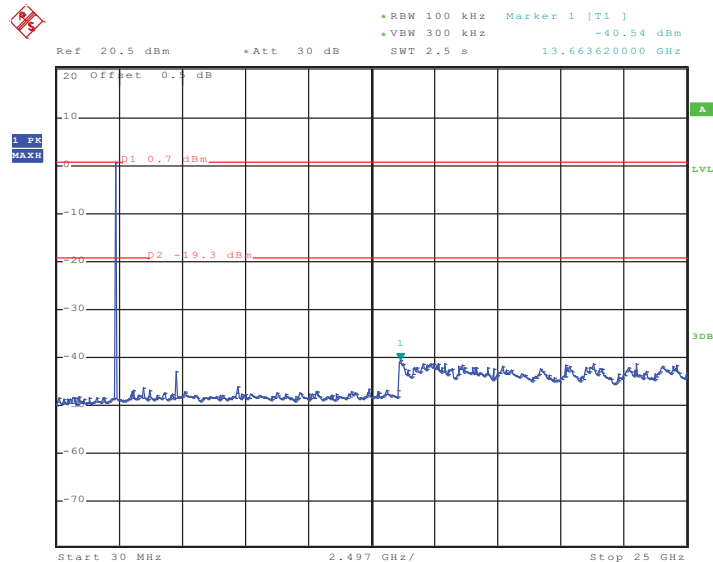
6.7.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup for conducted emissions. A Spectrum Analyzer is connected to an Equipment Under Test (E.U.T.) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Test plot as follows:

Test mode:

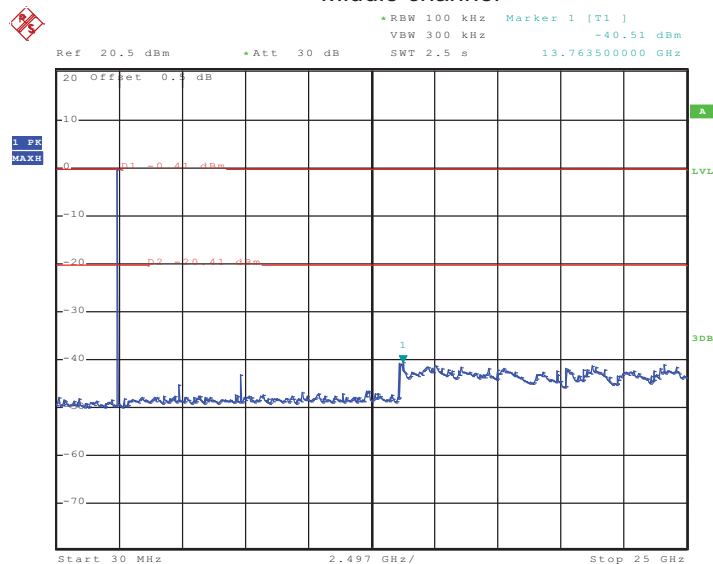
Lowest channel



Date: 15.SEP.2014 09:28:02

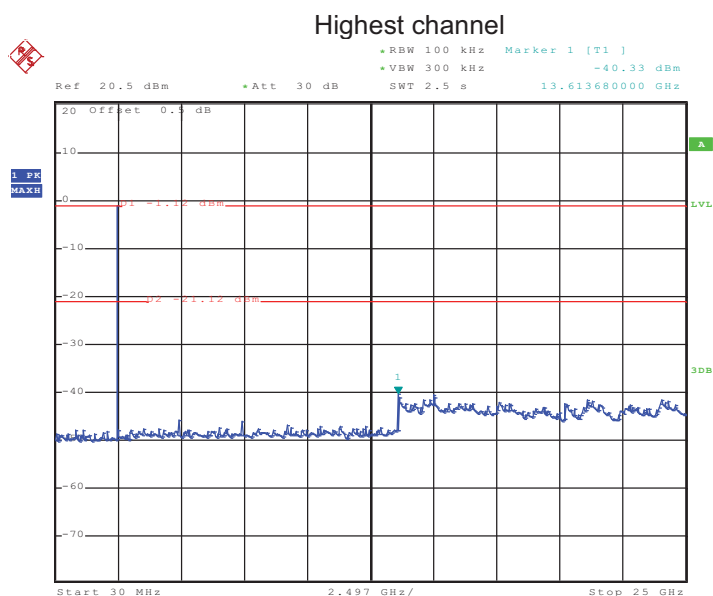
30MHz~25GHz

Middle channel



Date: 12.SEP.2014 08:55:47

30MHz~25GHz

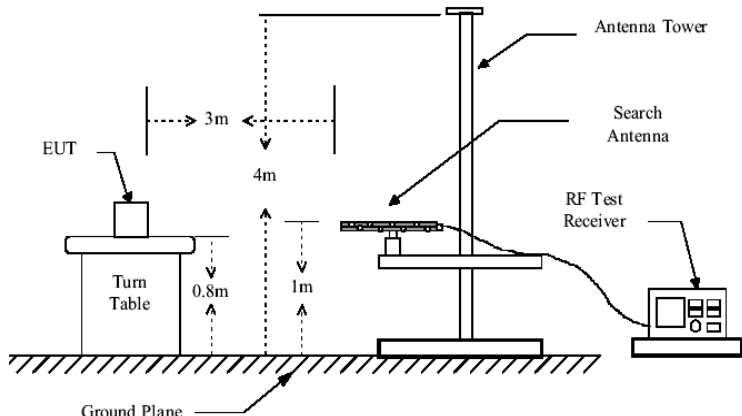
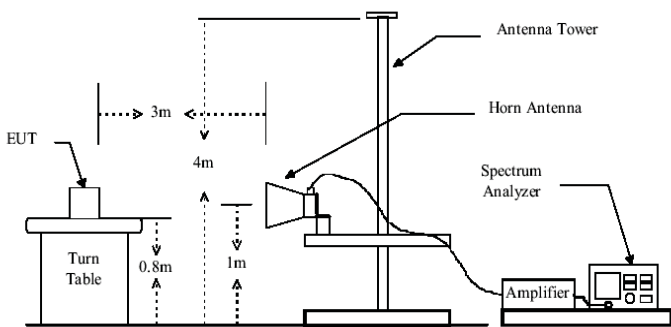


Date: 15.SEP.2014 09:29:14

30MHz~25GHz

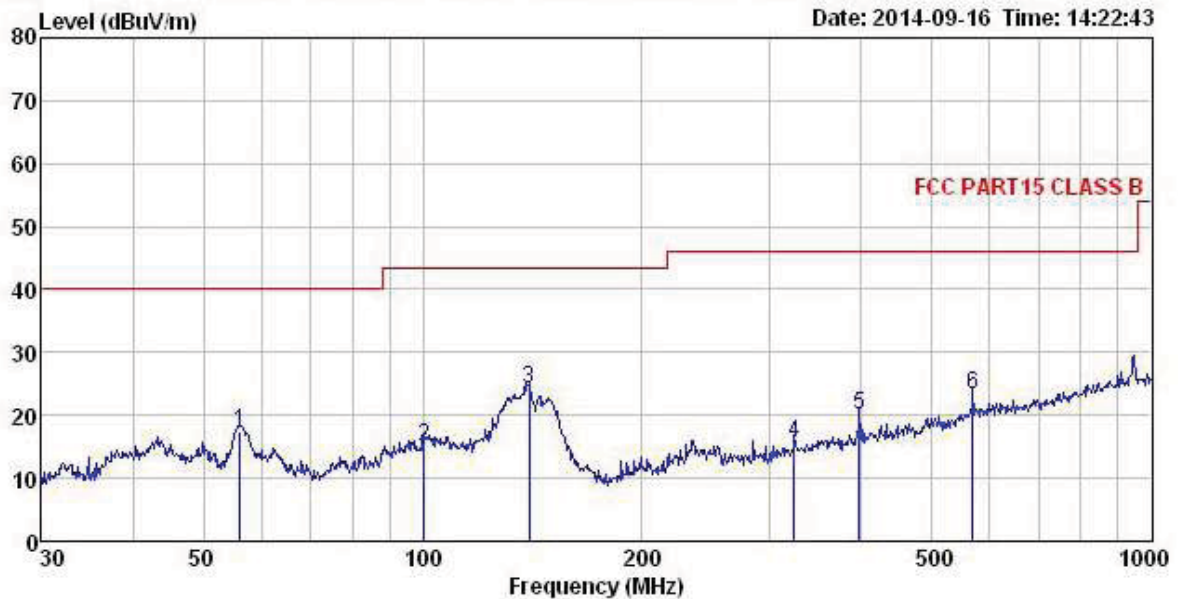
6.7.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.4:2003				
Test Frequency Range:	9KHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	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:	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 Procedure:	<div>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.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div> <div>6. If the emission level of the EUT in peak mode was 10 dB 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 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</div>				

Test setup:	<p>Below 1GHz</p>  <p>Above 1GHz</p> 
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	<ol style="list-style-type: none"> 1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis is the worst case. 2. 9 kHz to 30MHz is too low, so only shows the data of above 30MHz in this report.

Below 1GHz

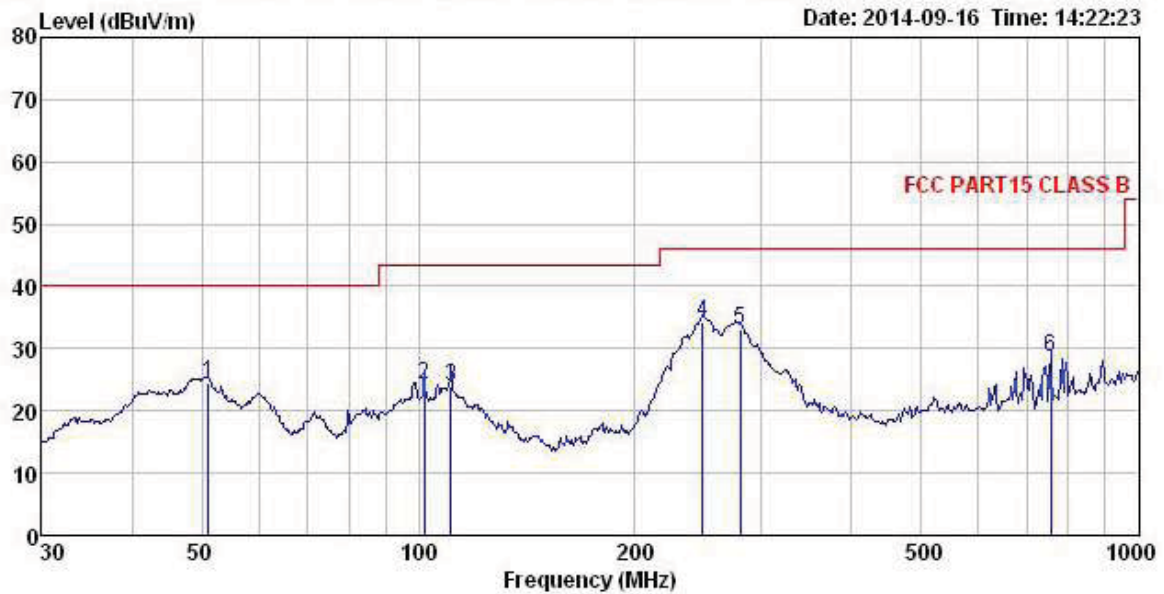
Horizontal:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) HORIZONTAL
 EUT : WigWag Filament Smart Bulb
 Model : WWFLM921A
 Test mode : BT TX mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% atmos:101k
 Test Engineer:
 REMARK :

	Freq	ReadAntenna	Cable	Preamp		Limit	Over	
		Level	Factor	Loss	Factor	Level	Line	Limit
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	56.197	33.65	12.95	0.66	29.79	17.47	40.00	-22.53 QP
2	100.581	30.48	13.11	0.97	29.52	15.04	43.50	-28.46 QP
3	139.851	44.01	8.19	1.26	29.27	24.19	43.50	-19.31 QP
4	323.320	28.89	13.46	1.85	28.50	15.70	46.00	-30.30 QP
5	397.633	31.79	15.01	2.11	28.77	20.14	46.00	-25.86 QP
6	568.613	31.74	17.93	2.57	29.04	23.20	46.00	-22.80 QP

Vertical:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) VERTICAL
 EUT : WigWag Filament Smart Bulb
 Model : WVVFLM921A
 Test mode : BT TX mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55% atmos:101k
 Test Engineer:
 REMARK :

	Freq	ReadAntenna	Cable	Preamp	Limit	Over	
	Level	Factor	Loss	Factor	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dB
1	51.121	40.50	13.21	0.62	29.82	24.51	40.00 -15.49 QP
2	102.001	39.85	12.97	0.98	29.51	24.29	43.50 -19.21 QP
3	110.957	40.38	12.04	1.05	29.45	24.02	43.50 -19.48 QP
4	248.552	49.15	12.07	1.61	28.55	34.28	46.00 -11.72 QP
5	280.024	47.31	12.67	1.71	28.48	33.21	46.00 -12.79 QP
6	755.387	34.43	19.53	3.05	28.45	28.56	46.00 -17.44 QP

Above 1GHz

Test channel:		Lowest			Level:		Peak	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4810.00	48.25	31.54	8.90	40.24	48.45	74.00	-25.55	Vertical
4810.00	48.58	31.54	8.90	40.24	48.78	74.00	-25.22	Horizontal
Test channel:		Lowest			Level:		Average	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4810.00	37.45	31.54	8.90	40.24	37.65	54.00	-16.35	Vertical
4810.00	37.69	31.54	8.90	40.24	37.89	54.00	-16.11	Horizontal

Test channel:		Middle			Level:		Peak	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4890.00	47.13	31.58	9.00	40.12	47.59	74.00	-26.41	Vertical
4890.00	47.37	31.58	9.00	40.12	47.83	74.00	-26.17	Horizontal
Test channel:		Middle			Level:		Average	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4890.00	36.69	31.58	9.00	40.12	37.15	54.00	-16.85	Vertical
4890.00	36.83	31.58	9.00	40.12	37.29	54.00	-16.71	Horizontal

Test channel:		Highest			Level:		Peak	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	47.43	31.69	9.08	40.03	48.17	74.00	-25.83	Vertical
4960.00	47.68	31.69	9.08	40.03	48.42	74.00	-25.58	Horizontal
Test channel:		Highest			Level:		Average	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	36.79	31.69	9.08	40.03	37.53	54.00	-16.47	Vertical
4960.00	37.93	31.69	9.08	40.03	38.67	54.00	-15.33	Horizontal

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.*