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FCC PART 15 SUBPART C TEST REPORT

Report Reference No......: **CTL1505181276-WF**

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Tracy Qi

Date of issue.....: June 02, 2015

Test Firm.....: **Shenzhen CTL Testing Technology Co., Ltd.**

Address.....: Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China.

Applicant's name.....: **Shenzhen Leader-union Technology Co., Ltd**

Address.....: 3F No.90, Alley 5, Hekan Village, Bantian, Longgang District, Shenzhen, China

Test specification:

Standard: **FCC Part 15.249:** Operation within the bands 920-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz and 24.0 - 24.25 GHz.

TRF Originator.....: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF.....: Dated 2011-01

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Test item description: **Wireless Mouse**

Trade Mark: Indena, Polaroid

Models/Type reference.....: G-109, G-102, G-108, G-180, G-113, G-202, G-301, G-106, G-162

Modulation: GFSK

Work Frequency.....: 2408 MHz~2474 MHz

Antenna Type.....: internal

FCC ID: OIHG-109-1

Result.....: **Positive**

TEST REPORT

Test Report No. :	CTL1505181276-WF	June 02, 2015
		Date of issue

Equipment under Test : Wireless Mouse

Model /Type : G-109

Listed Models G-102, G-108, G-180, G-113, G-202, G-301, G-106, G-162

Difference Description Only the color and model's name is different

Applicant : **Shenzhen Leader-union Technology Co., Ltd**

Address : 3F No.90, Alley 5, Hekan Village, Bantian, Longgang District, Shenzhen, China

Manufacturer **Shenzhen Leader-union Technology Co., Ltd**

Address 3F No.90, Alley 5, Hekan Village, Bantian, Longgang District, Shenzhen, China

Test Result according to the standards on page 4:	Positive
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The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 15.249](#): Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.

[ANSI C63.4-2009](#)



2. SUMMARY

2.1. General Remarks

Date of receipt of test sample : May 18, 2015

Testing commenced on : May 18, 2015

Testing concluded on : June 02, 2015

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage : 120V / 60 Hz 115V / 60Hz
 12 V DC 24 V DC
 Other (specified in blank below)

DC 3.0V from battery(AAA*2)

2.3. Short description of the Equipment under Test (EUT)

The EUT is a Wireless Mouse work at 2408~2474 MHz.

Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2408	27	2460
02	2410	28	2462
03	2412	29	2464
04	2414	30	2466
05	2416	31	2468
06	2418	32	2470
07	2420	33	2472
08	2422	34	2474
09	2424		
10	2426		
11	2428		
12	2430		
13	2432		
14	2434		
15	2436		
16	2438		
17	2440		
18	2442		
19	2444		
20	2446		
21	2448		
22	2450		
23	2452		
24	2454		
25	2456		
26	2458		

Modulation: GFSK

For more details, refer to the user's manual of the EUT.

Serial number: Prototype

2.4. EUT operation mode

Test Mode(TM)	Description	Remark
TM1	Bottom Channel Transmitting	/
TM2	Middle Channel Transmitting	/
TM3	Top Channel Transmitting	/

The field strength of radiation emission was measured in the following position: EUT stand-up position (Y axis), lie-down position (X, Z axis).

The following data show only with the worst case setup.

The worst case of Y axis was reported.

Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report.

Remark: New battery is used during all test

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

○ - supplied by the manufacturer

● - supplied by the lab

2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: OIHG-109-1 filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.

2.7. Modifications

No modifications were implemented to meet testing criteria.



3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

3.2. Test Facility

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

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology 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 our files. Registration 970318, December 19, 2013.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

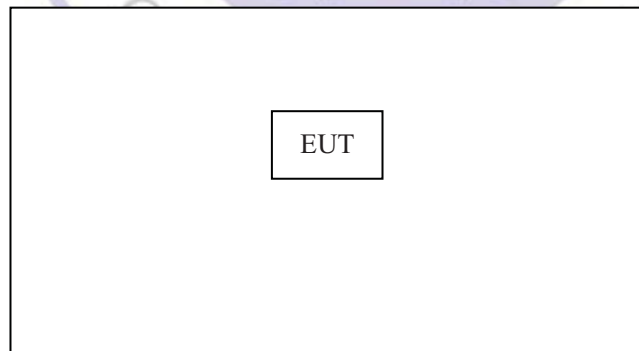
Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 950-1050mbar

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	1~26.5GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



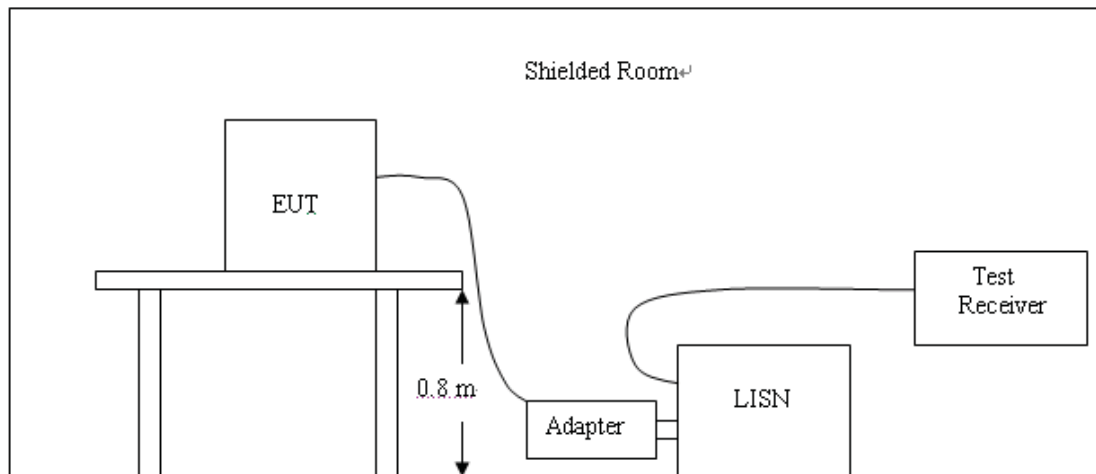
3.6. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2014/07/12	2015/07/11
EMI Test Receiver	R&S	ESCI	103710	2014/07/10	2015/07/09
Spectrum Analyzer	Agilent	E4407B	MY45108355	2014/07/06	2015/07/05
Controller	EM Electronics	Controller EM 1000	N/A	2014/07/06	2015/07/05
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2014/07/12	2015/07/11
Horn Antenna	SCHWARZBECK	BBHA9170	1562	2014/07/12	2015/07/11
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2014/07/12	2015/07/11
LISN	R&S	ENV216	101316	2014/07/10	2015/07/09
LISN	SCHWARZBECK	NSLK8127	8127687	2014/07/10	2015/07/09
Microwave Preamplifier	HP	8349B	3155A00882	2014/07/10	2015/07/09
Amplifier	HP	8447D	3113A07663	2014/07/10	2015/07/09
Transient Limiter	Com-Power	LIT-153	532226	2014/07/10	2015/07/09
Radio Communication Tester	R&S	CMU200	3655A03522	2014/07/06	2015/07/05
Temperature/Humidity Meter	zhicheng	ZC1-2	22522	2014/07/10	2015/07/09
SIGNAL GENERATOR	HP	8647A	3200A00852	2014/07/10	2015/07/09
Wideband Peak Power Meter	Anritsu	ML2495A	220.23.35	2014/07/06	2015/07/05
Climate Chamber	ESPEC	EL-10KA	A20120523	2014/07/06	2015/07/05
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	/	2014/07/06	2015/07/05
High-Pass Filter	K&L	41H10-1375/U12750-O/O	/	2014/07/06	2015/07/05

4. TEST CONDITIONS AND RESULTS

4.1. Conducted Emissions Test

TEST CONFIGURATION



TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4.
- 2 Support equipment, if needed, was placed as per ANSI C63.4.
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 4 If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

The RBW/VBW for 150KHz to 30MHz: 9KHz

CONDUCTED POWER LINE EMISSION LIMIT

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following :

Frequency (MHz)	Maximum RF Line Voltage (dB μ V)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

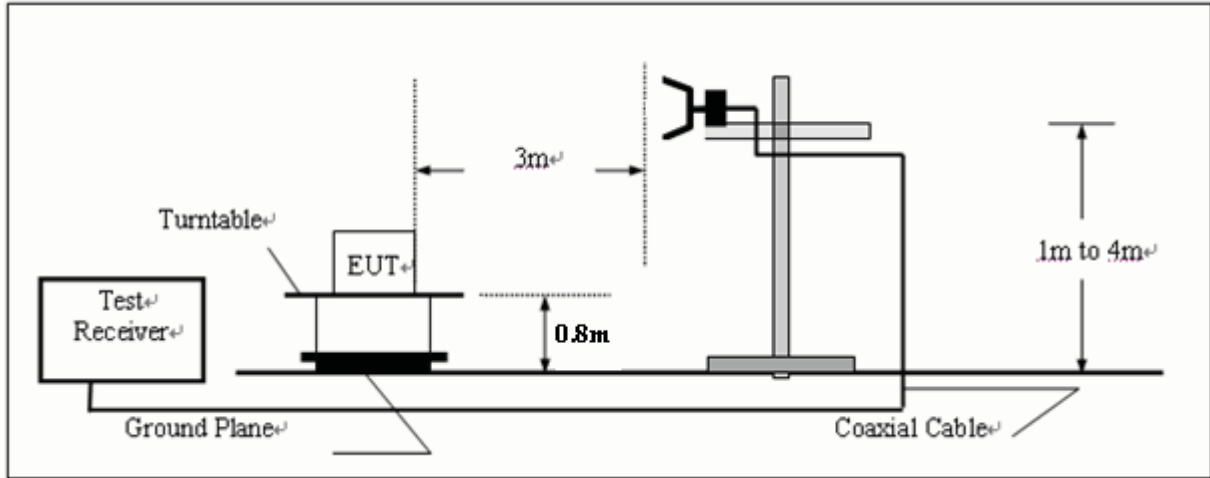
TEST RESULTS

Not applicable to this device.



4.2. Fundamental Emissions

TEST CONFIGURATION



Fundamental Emissions Limit

2400-2483.5 MHz Band: 94 dBuV/m (average)

Set RBW to 1 MHz and VBM to 3MHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength. Peak detector is used for both test.

Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.

TEST RESULTS

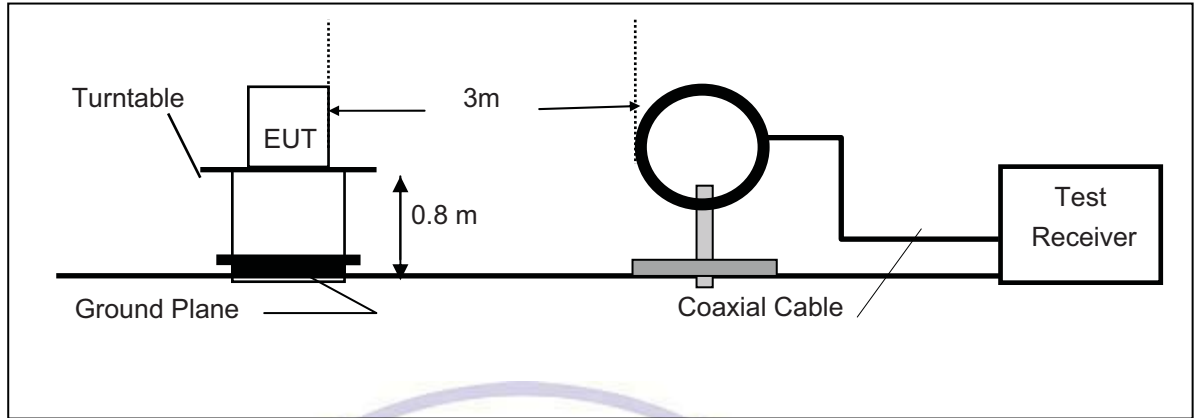
Field Strength of Fundamental Emissions Result					
Modulation	Frequency	Max.Fundamental	Margin	Limit	Type
Mode	(MHz)	(dBuV/m)@3m	(dB)	(dBuV/m)@3m	
GFSK	2408	90.47	23.53	114	peak
GFSK	2408	70.98	23.02	94	average
GFSK	2440	91.15	22.85	114	peak
GFSK	2440	69.75	24.25	94	average
GFSK	2474	90.02	23.98	114	peak
GFSK	2474	70.54	23.46	94	average

Note: Measurement worst emissions of receive antenna polarization: Horizontal.

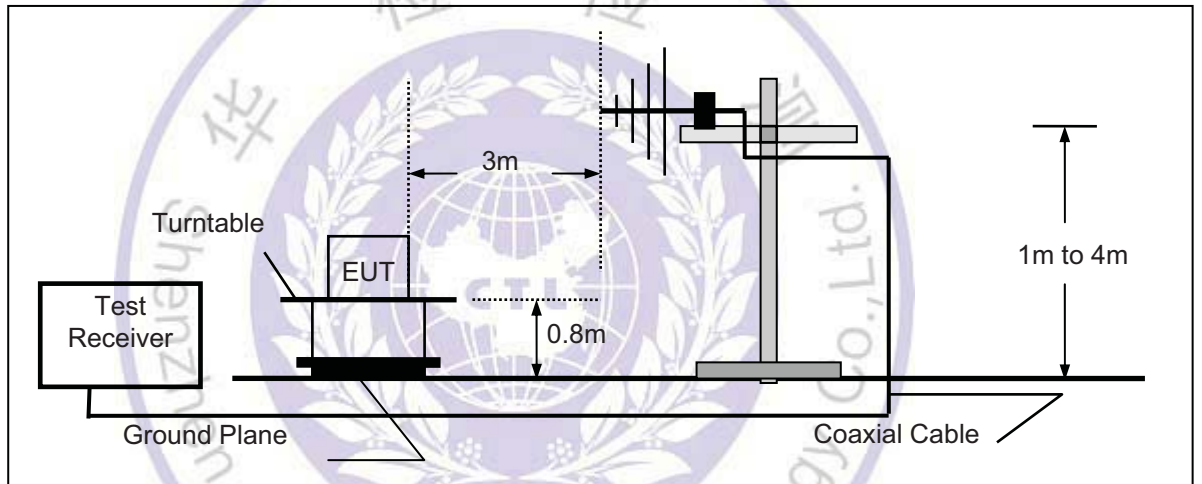
4.3. Transmitter Radiated Unwanted Emissions

TEST CONFIGURATION

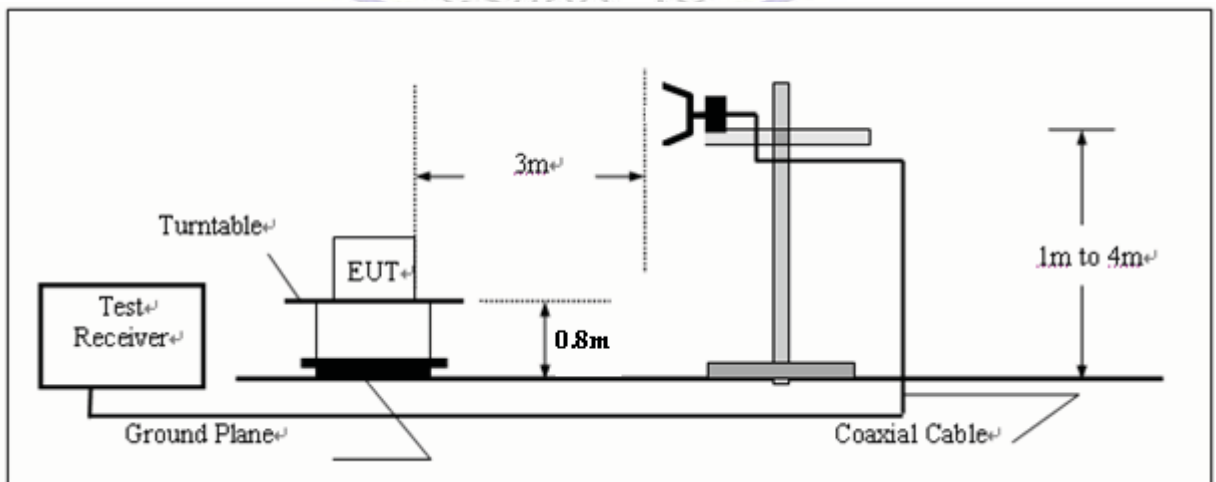
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

RADIATION LIMIT

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. Based on the Frequency Generator in the device include 12MHz. The test frequency range from 9KHz to 25GHz per FCC PART 15.33(a).

Note:

Three axes are chosen for pretest, the Y axis is the worst mode for final test.

For battery operated equipment, the equipment tests shall be performed using a new battery.

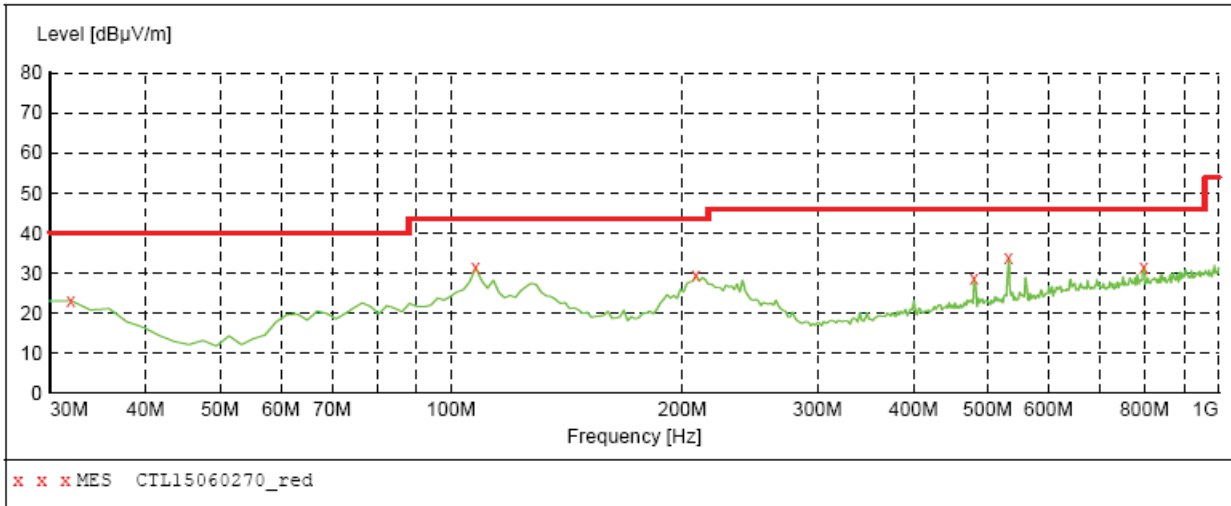
TEST RESULTS

All the test modes (TM1, TM2, TM3) completed for test. The worst case of Radiated Emission is TM1; the test data of this mode was reported.

Below 1GHz Test Results:

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	MaxPeak	300.0 ms	120 kHz	JB1
30.0 MHz	1.0 GHz				



MEASUREMENT RESULT: "CTL15060270_red"

6/2/2015 5:40PM

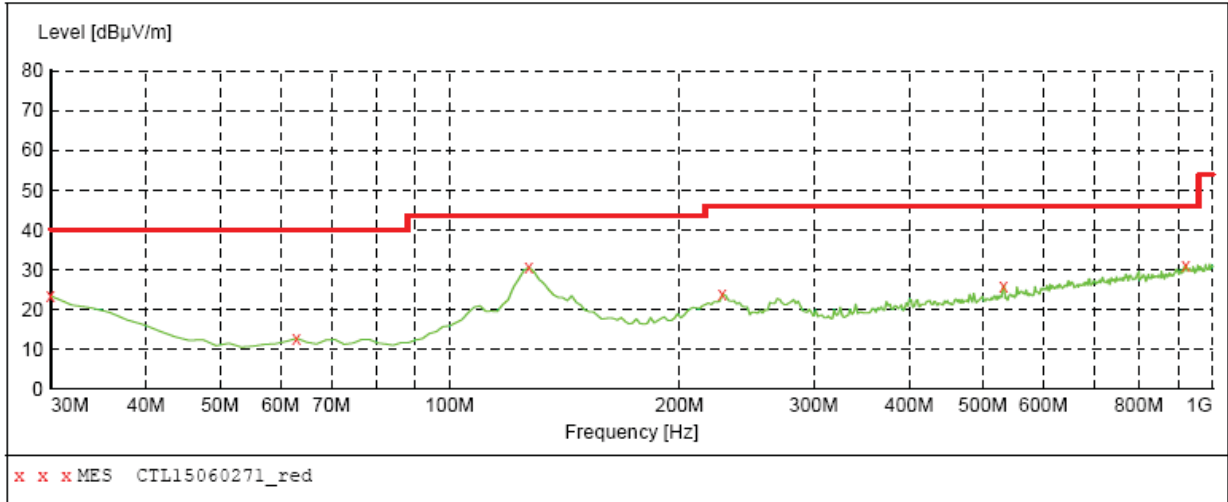
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.940000	23.00	19.6	40.0	17.0	---	0.0	0.00	VERTICAL
107.600000	31.30	13.3	43.5	12.2	---	0.0	0.00	VERTICAL
208.480000	29.40	14.3	43.5	14.1	---	0.0	0.00	VERTICAL
480.080000	28.50	20.1	46.0	17.5	---	0.0	0.00	VERTICAL
532.460000	33.70	20.6	46.0	12.3	---	0.0	0.00	VERTICAL
798.240000	31.30	24.8	46.0	14.7	---	0.0	0.00	VERTICAL

Remark:

- (1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.
- (2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency				
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



MEASUREMENT RESULT: "CTL15060271_red"

6/2/2015 5:42PM

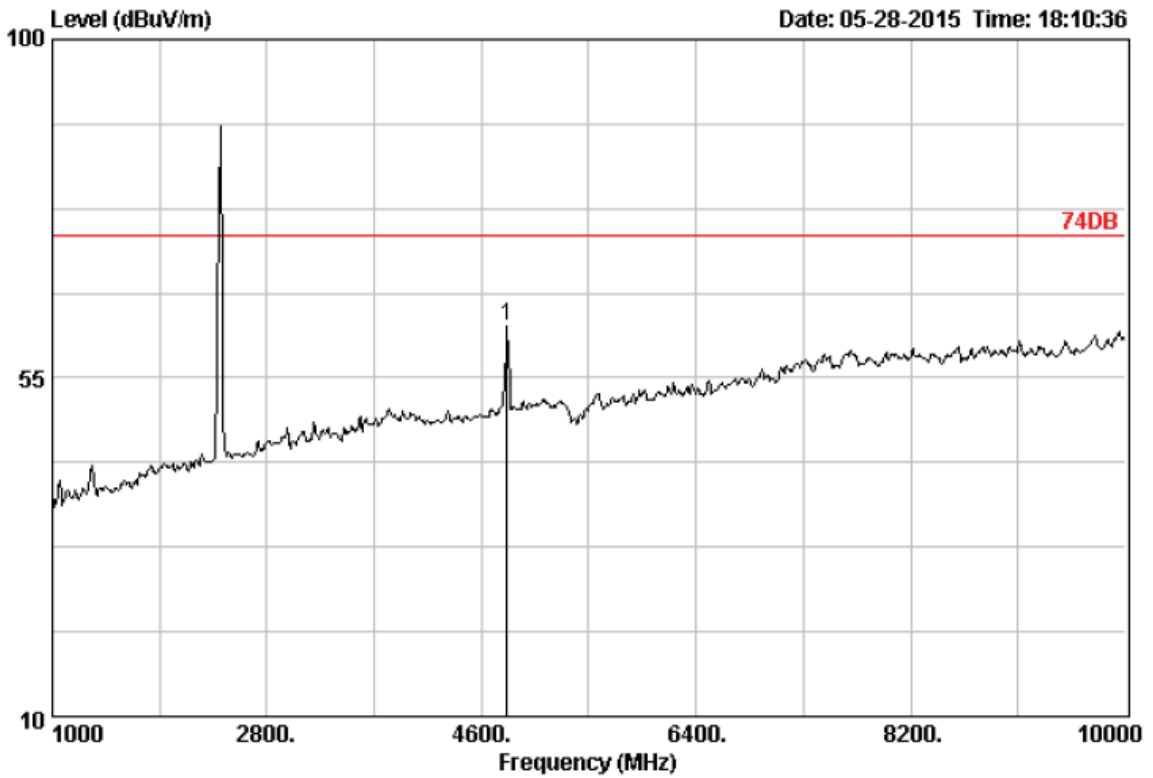
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	23.30	21.1	40.0	16.7	---	0.0	0.00	HORIZONTAL
62.980000	12.70	8.4	40.0	27.3	---	0.0	0.00	HORIZONTAL
127.000000	30.50	15.0	43.5	13.0	---	0.0	0.00	HORIZONTAL
227.880000	23.80	14.1	46.0	22.2	---	0.0	0.00	HORIZONTAL
532.460000	26.00	20.6	46.0	20.0	---	0.0	0.00	HORIZONTAL
922.400000	31.20	26.3	46.0	14.8	---	0.0	0.00	HORIZONTAL

Remark:

- (1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.
- (2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

Above 1 GHz Test Results:

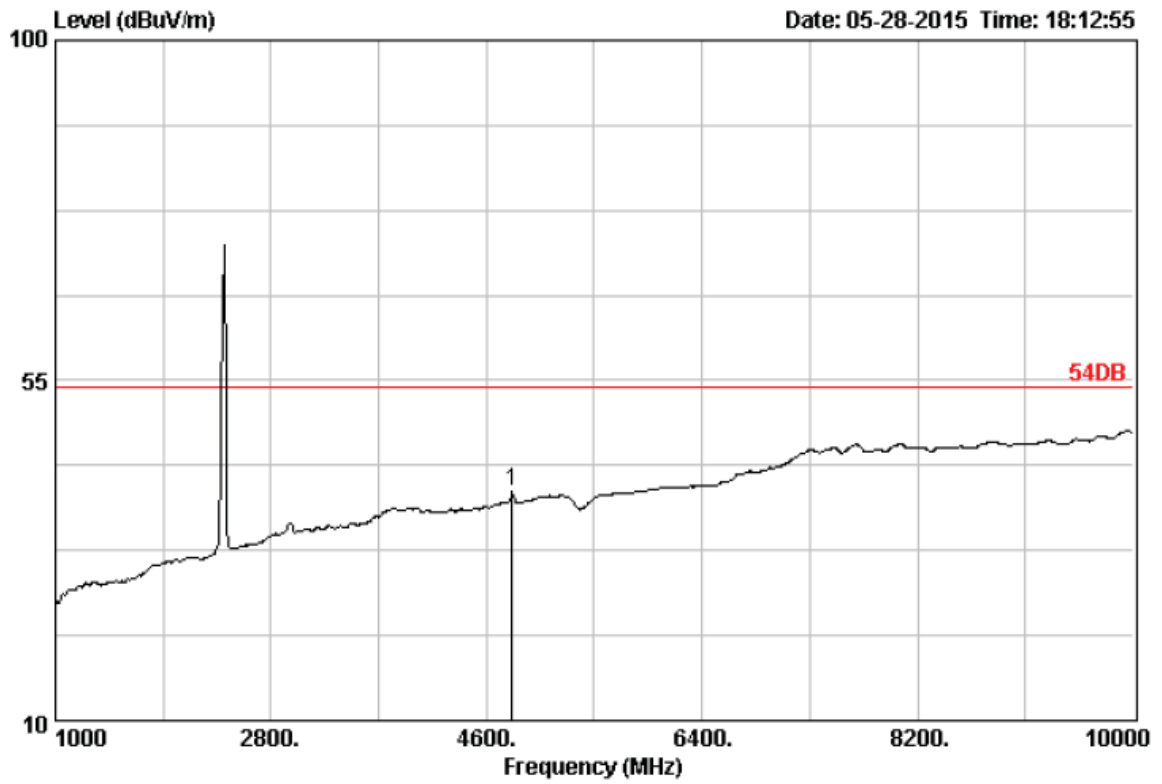
Bottom Channel (2408MHz):



```

Site no.       : 3m Chamber           Data no. : 1251
Dis. / Ant.   : 3m DRH-118          Ant. pol. : HORIZONTAL
Limit         : 74DB
Env. / Ins.   : 23*C/54%
Engineer      :
EUT           :
Power         :
M/N           :
Test Mode     :
    
```

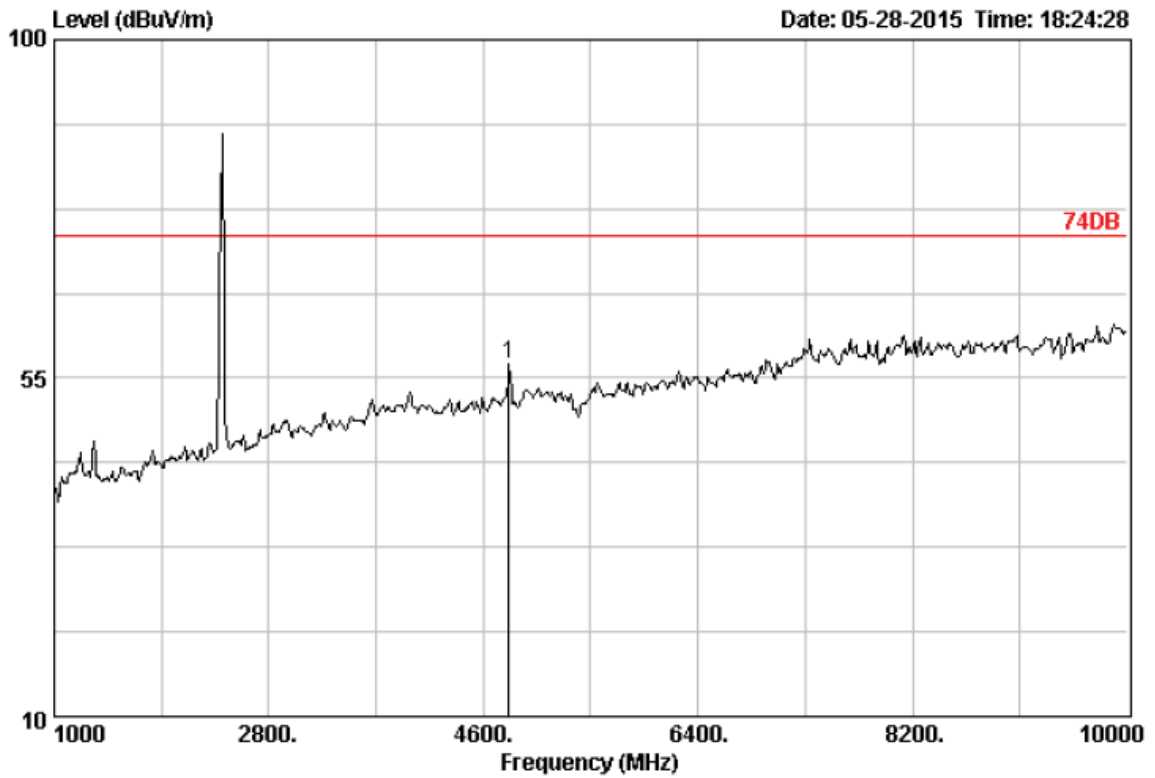
Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission		Margin (dB)	Remark
				Level (dBuV/m)	Limits (dBuV/m)		
1 4816.00	33.48	6.91	55.74	61.80	74.00	12.20	Peak



Site no. : 3m Chamber
 Dis. / Ant. : 3m DRH-118
 Limit : 54DB
 Env. / Ins. : 23°C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

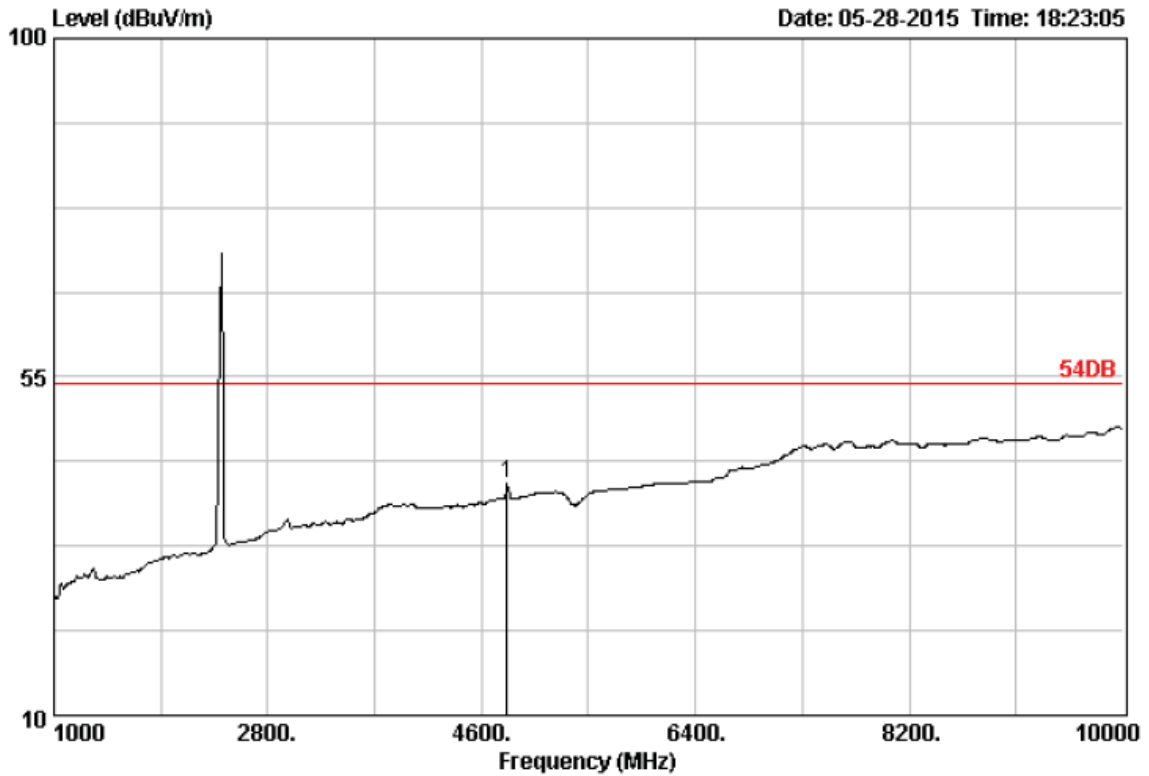
Data no. : 1252
 Ant. pol. : HORIZONTAL

Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission			Margin (dB)	Remark
				Level (dBuV/m)	Limits (dBuV/m)			
1	4816.00	33.48	6.91	34.28	40.34	54.00	13.66	Average



Site no. : 3m Chamber Data no. : 1255
 Dis. / Ant. : 3m DRH-118 Ant. pol. : VERTICAL
 Limit : 74DB
 Env. / Ins. : 23*C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

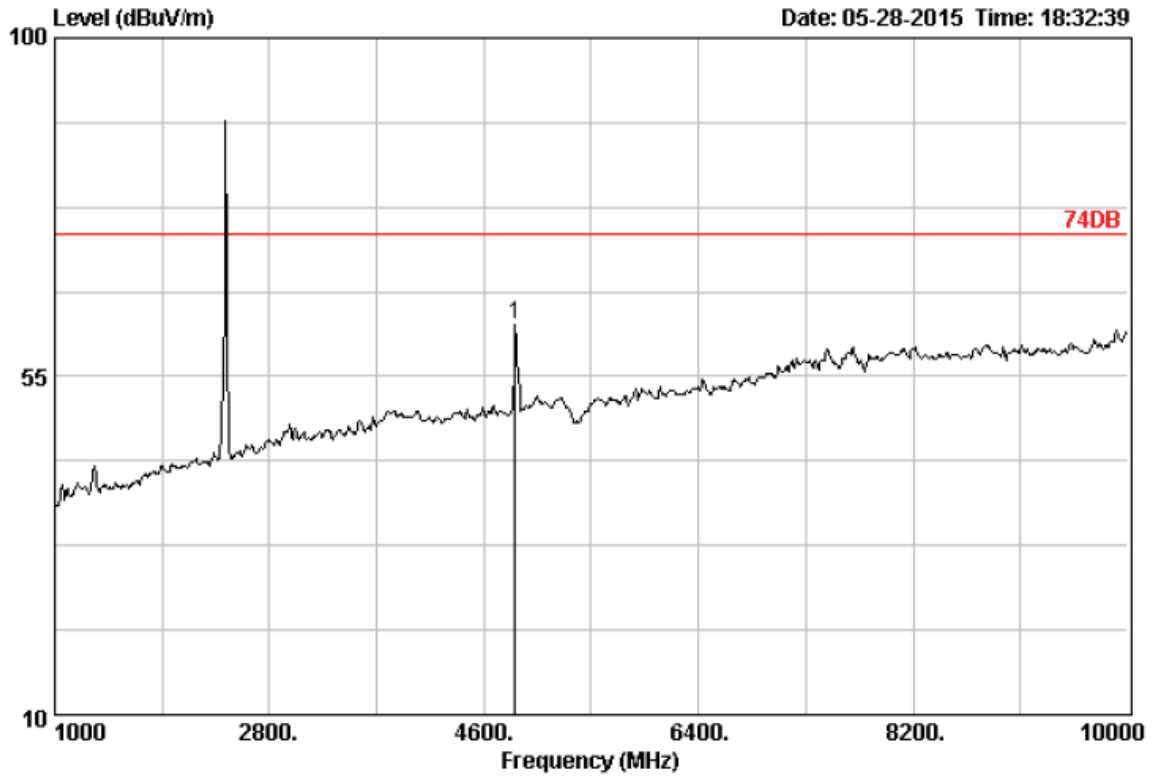
Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Reading (dBUV)	Emission		Margin (dB)	Remark
				Level (dBUV/m)	Limits (dBUV/m)		
1 4816.00	33.48	6.91	50.85	56.91	74.00	17.09	Peak



Site no. : 3m Chamber Data no. : 1254
 Dis. / Ant. : 3m DRH-118 Ant. pol. : VERTICAL
 Limit : 54DB
 Env. / Ins. : 23*C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

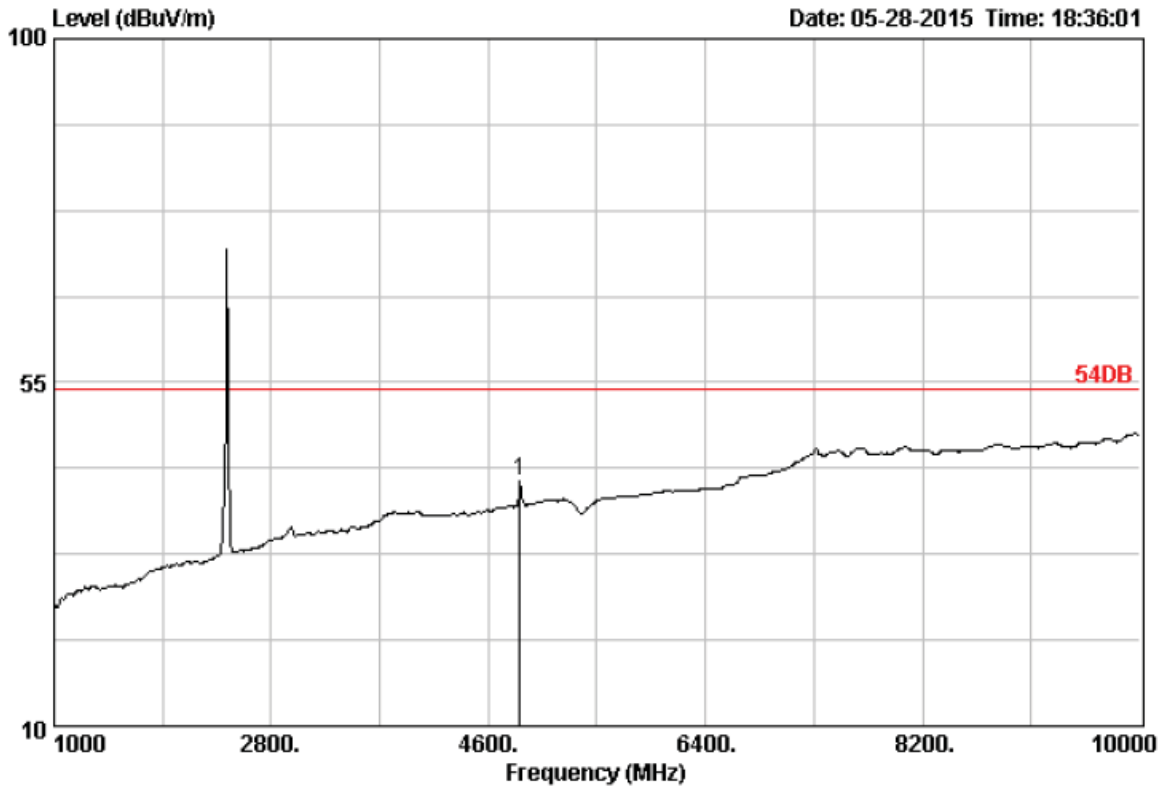
Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Emission		Limits (dBuV/m)	Margin (dB)	Remark
			Reading (dBuV)	Level (dBuV/m)			
1 4816.00	33.48	6.91	34.78	40.84	54.00	13.16	Average

Middle Channel (2440 MHz):



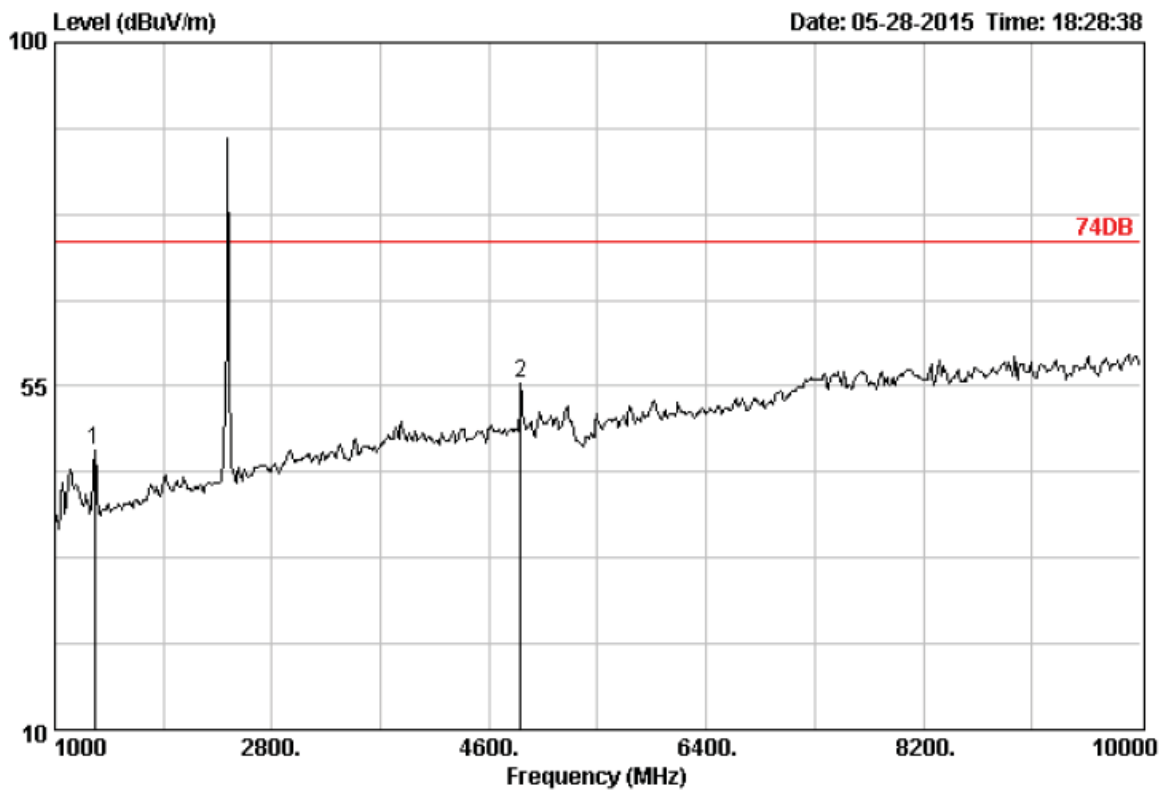
Site no. : 3m Chamber Data no. : 1258
 Dis. / Ant. : 3m DRH-118 Ant. pol. : HORIZONTAL
 Limit : 74DB
 Env. / Ins. : 23°C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

	Ant.	Cable	Emission		Limits	Margin	Remark
Freq. (MHz)	Factor (dB)	Loss (dB)	Reading (dBUV)	Level (dBUV/m)	(dBUV/m)	(dB)	
1 4861.00	33.57	6.94	55.81	62.01	74.00	11.99	Peak



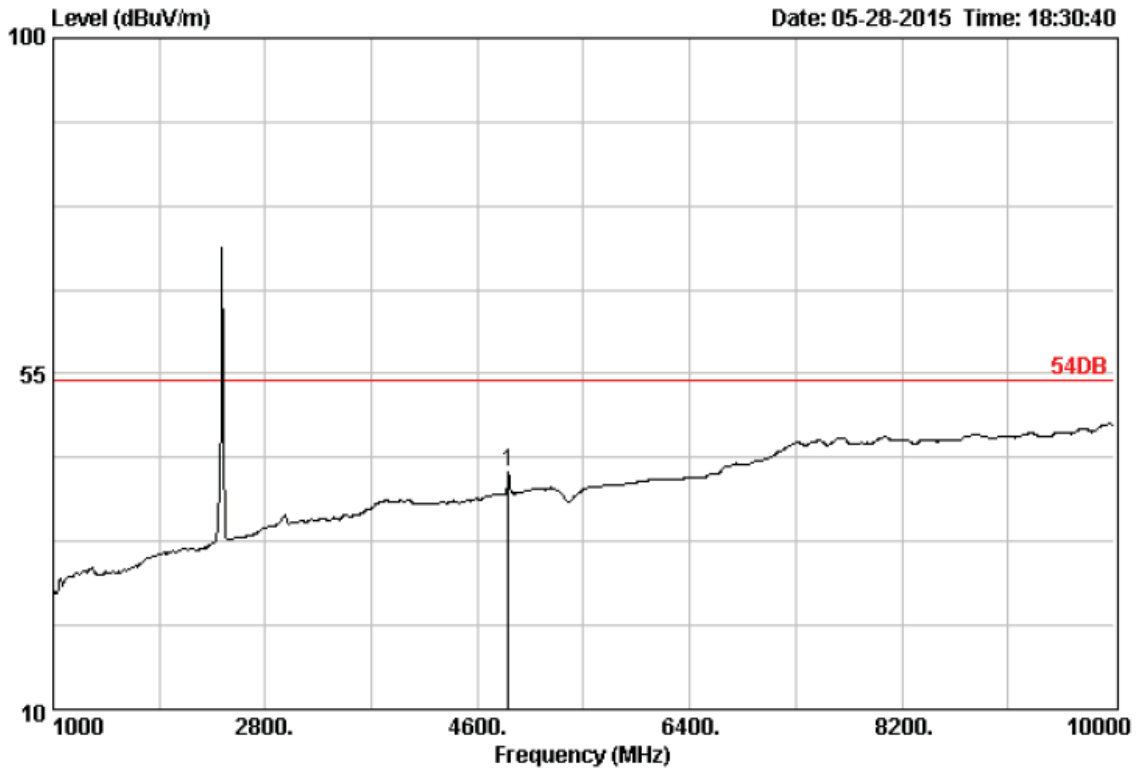
Site no. : 3m Chamber Data no. : 1259
 Dis. / Ant. : 3m DRH-118 Ant. pol. : HORIZONTAL
 Limit : 54DB
 Env. / Ins. : 23*C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4861.00	33.57	6.94	35.82	42.02	54.00	11.98	Average



Site no. : 3m Chamber Data no. : 1256
 Dis. / Ant. : 3m DRH-118 Ant. pol. : VERTICAL
 Limit : 74DB
 Env. / Ins. : 23°C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Emission		Limits (dBuV/m)	Margin (dB)	Remark
				Reading (dBuV)	Level (dBuV/m)			
1	1333.00	25.64	3.59	53.28	46.62	74.00	27.38	Peak
2	4861.00	33.57	6.94	49.11	55.31	74.00	18.69	Peak

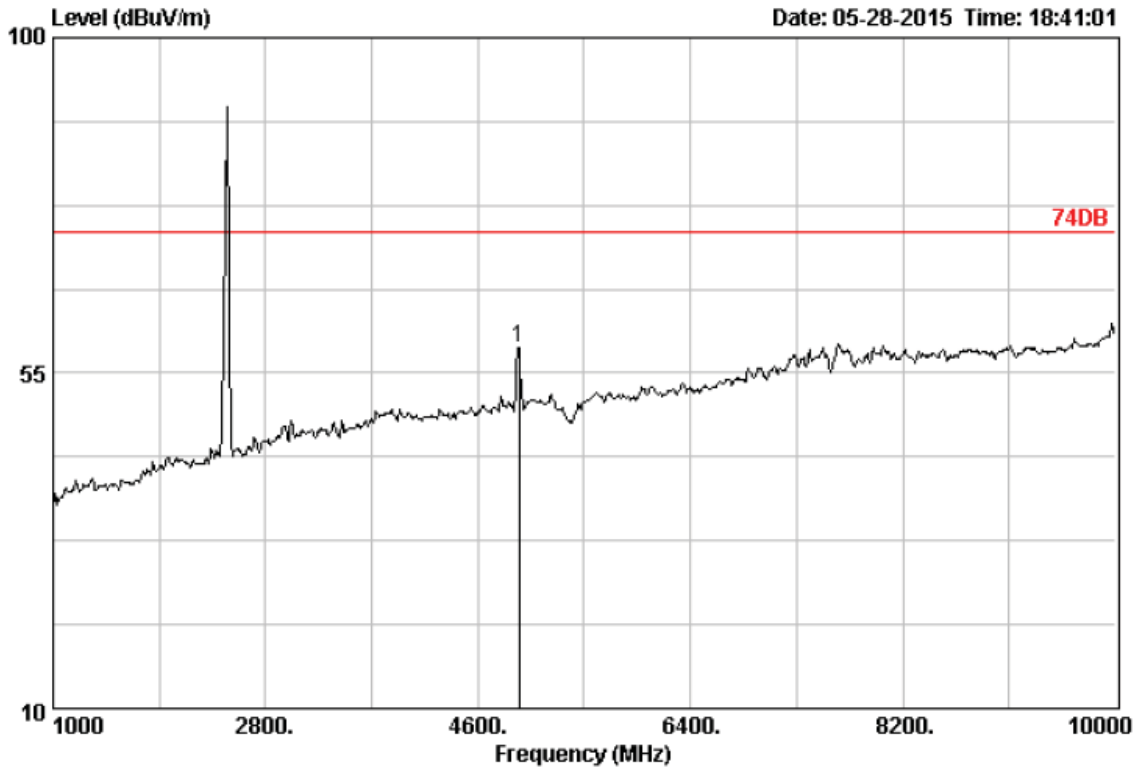


Site no. : 3m Chamber
 Dis. / Ant. : 3m DRH-118
 Limit : 54DB
 Env. / Ins. : 23*C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

Data no. : 1257
 Ant. pol. : VERTICAL

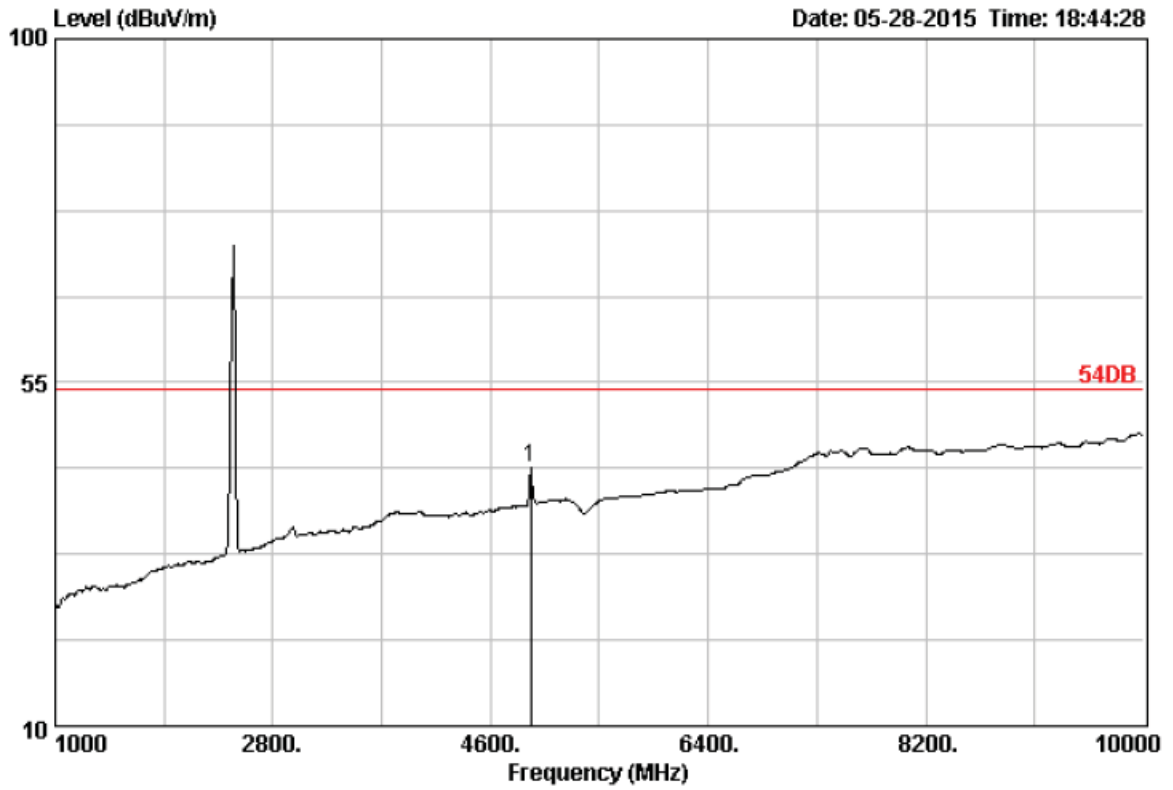
Freq. (MHz)	Ant. Cable		Emission				Remark
	Factor (dB)	Loss (dB)	Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	
1 4861.00	33.57	6.94	35.73	41.93	54.00	12.07	Average

Top Channel (2474MHz):



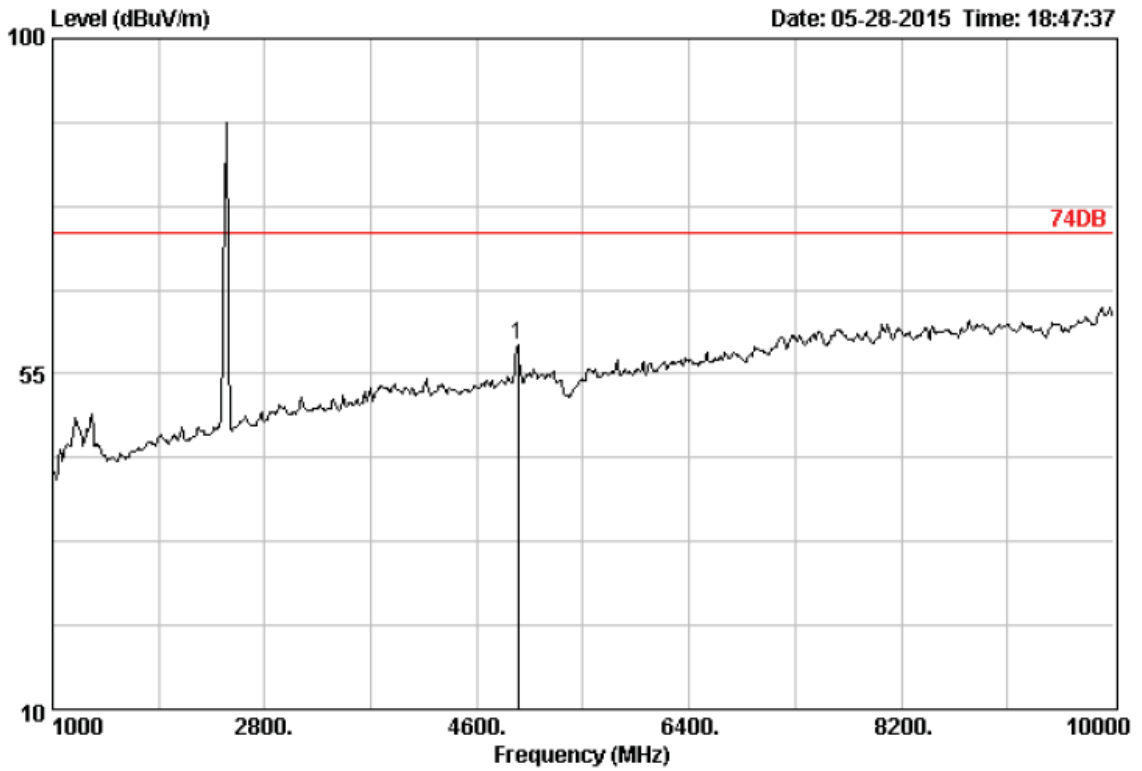
Site no. : 3m Chamber Data no. : 1260
 Dis. / Ant. : 3m DRH-118 Ant. pol. : HORIZONTAL
 Limit : 74DB
 Env. / Ins. : 23*C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Emission				Remark
			Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	
1 4951.00	33.80	7.00	51.74	58.28	74.00	15.72	Peak



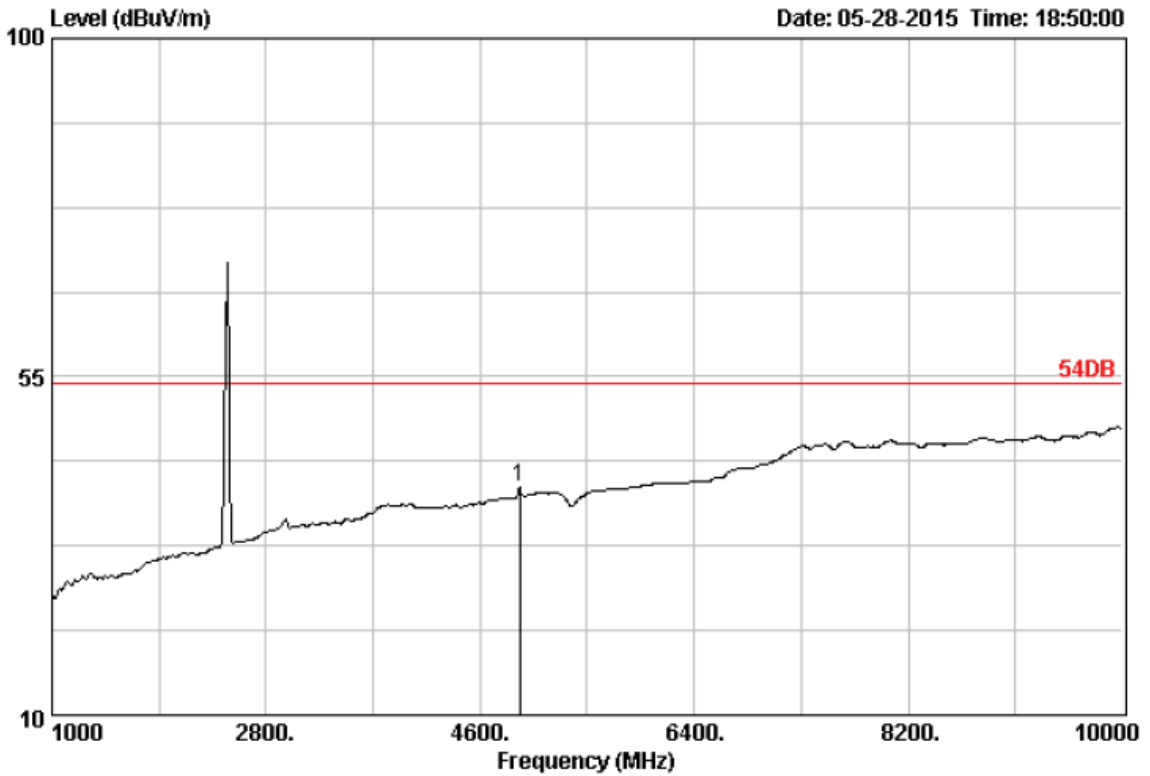
Site no. : 3m Chamber
 Dis. / Ant. : 3m DRH-118
 Limit : 54DB
 Env. / Ins. : 23°C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :
 Data no. : 1261
 Ant. pol. : HORIZONTAL

Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Emission				Margin (dB)	Remark
			Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)			
1 4933.00	33.75	6.99	37.39	43.86	54.00	10.14	Average	



Site no. : 3m Chamber Data no. : 1262
 Dis. / Ant. : 3m DRH-118 Ant. pol. : VERTICAL
 Limit : 74DB
 Env. / Ins. : 23*C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Emission				Remark
			Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	
1 4951.00	33.80	7.00	52.41	58.95	74.00	15.05	Peak



Site no. : 3m Chamber Data no. : 1263
 Dis. / Ant. : 3m DRH-118 Ant. pol. : VERTICAL
 Limit : 54DB
 Env. / Ins. : 23°C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

	Ant.	Cable	Emission		Limits	Margin	Remark
Freq. (MHz)	Factor (dB)	Loss (dB)	Reading (dBuV)	Level (dBuV/m)	(dBuV/m)	(dB)	
1	33.75	6.99	33.87	40.34	54.00	13.66	Average

Note: above 10GHz up to 25GHz was verified, and no any emission was found except system noise floor.

4.4. Band Edge Measurement

TEST CONFIGURATION

Same as Section 4.2

TEST PROCEDURE

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW to 1 MHz and VBM to 3MHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength. Peak detector is used for both test.

LIMIT

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

TEST RESULTS

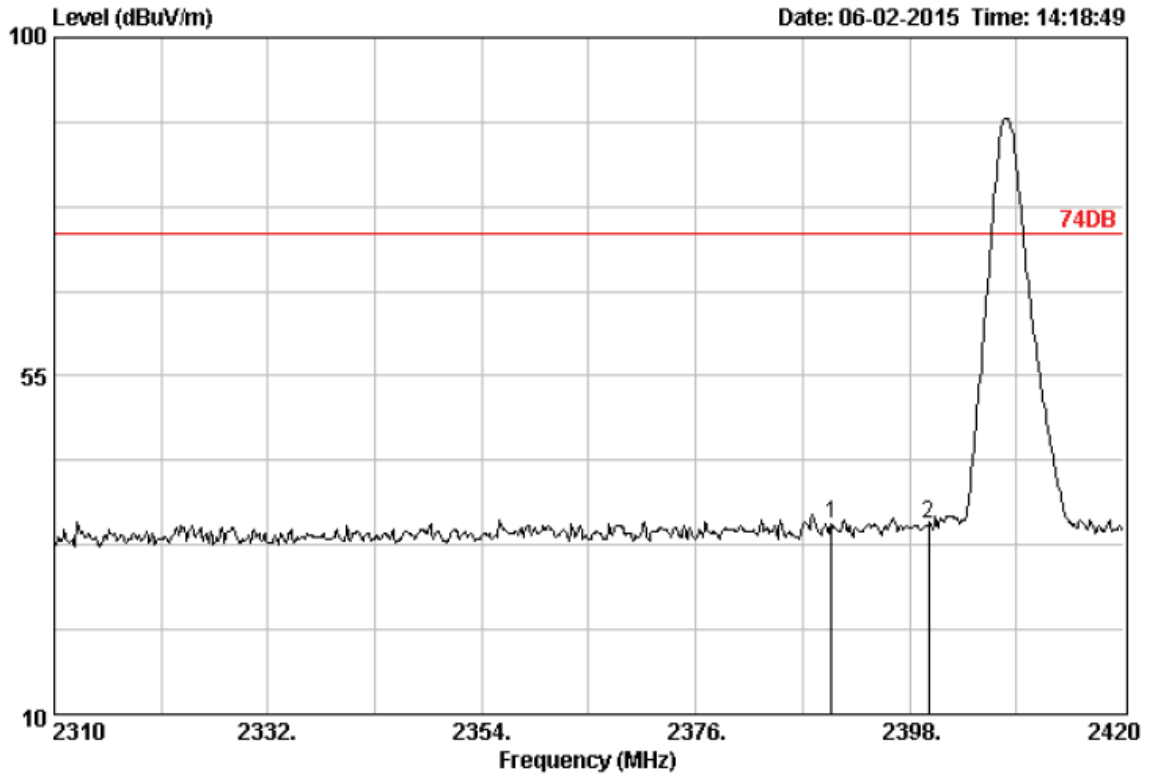
Please see the next page:



Radiated Test:

Operation Mode: TX on Bot Channel

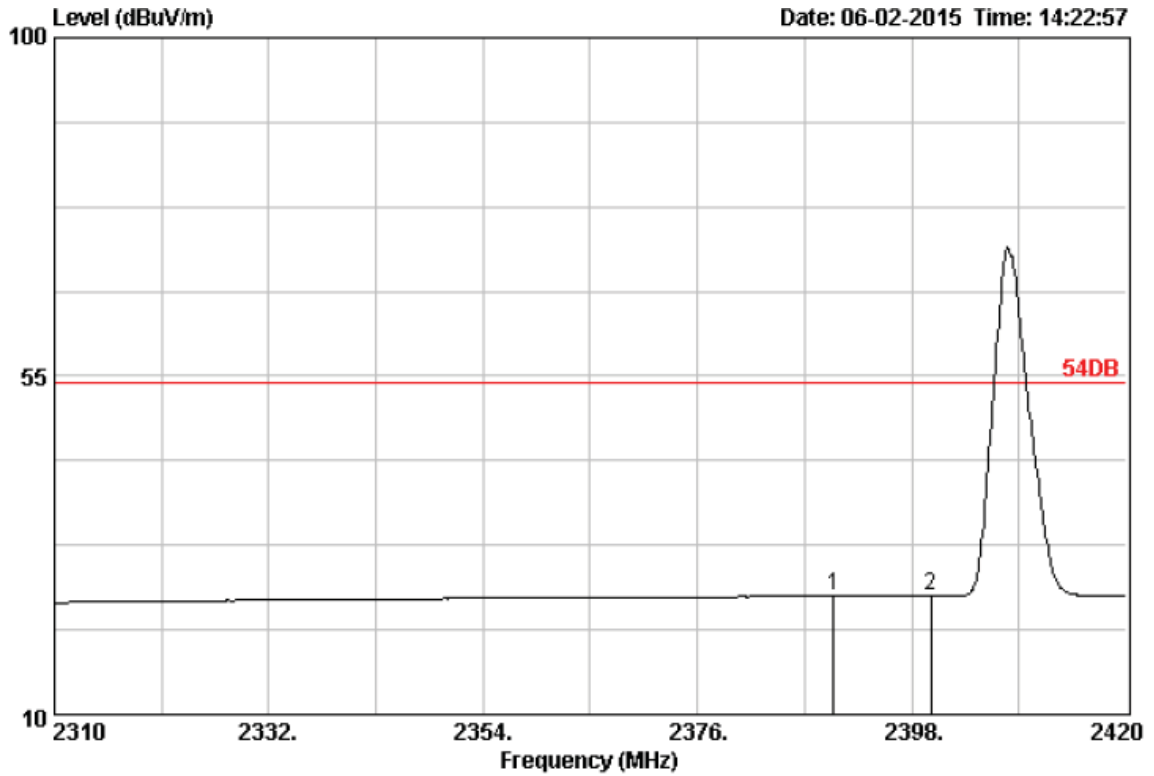
Polarity: Hor.



```

Site no.      : 3m Chamber
Dis. / Ant.  : 3m DRH-118
Limit        : 74DB
Env. / Ins.  : 23°C/54%
Engineer     :
EUT          :
Power        :
M/N          :
Test Mode    :
Data no.     : 1314
Ant. pol.    : HORIZONTAL
    
```

	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.00	28.78	4.61	37.40	35.43	74.00	38.57	Peak
2	2400.00	28.78	4.61	37.25	35.28	74.00	38.72	Peak

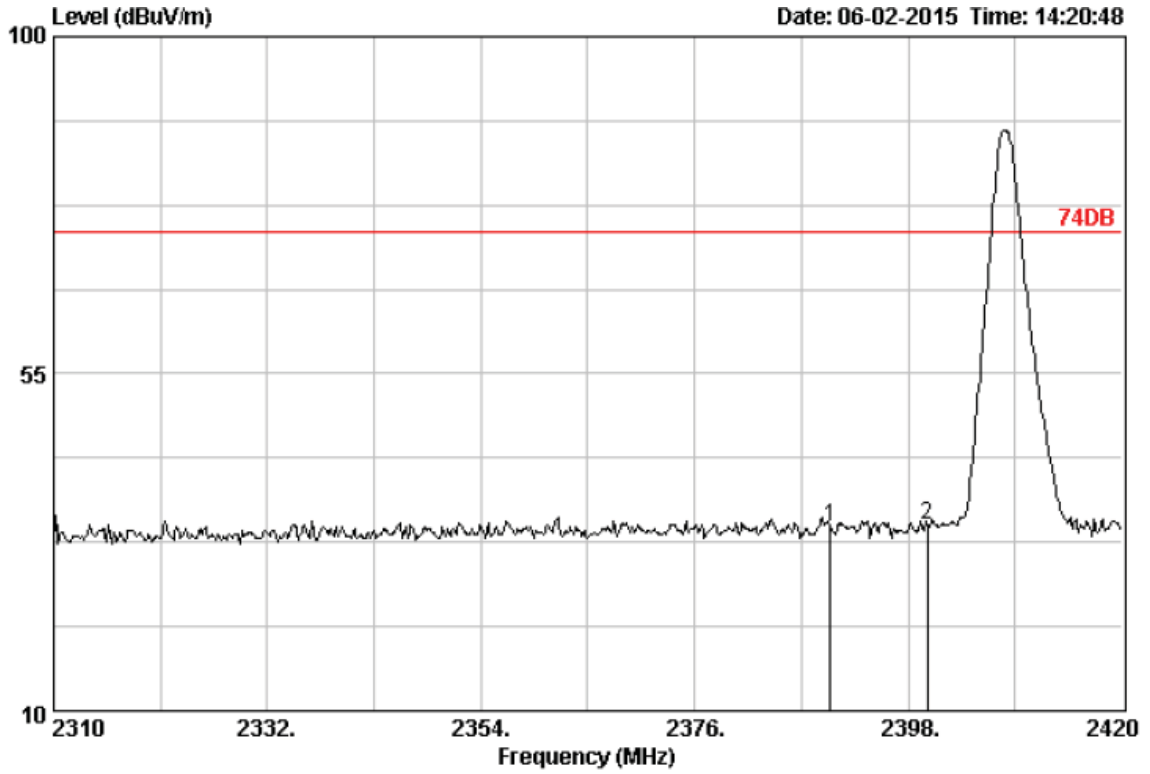


Site no. : 3m Chamber Data no. : 1316
 Dis. / Ant. : 3m DRH-118 Ant. pol. : HORIZONTAL
 Limit : 54DB
 Env. / Ins. : 23°C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.00	28.78	4.61	27.69	25.72	54.00	28.28	Average
2	2400.00	28.78	4.61	27.75	25.78	54.00	28.22	Average

Operation Mode: TX on Bot Channel

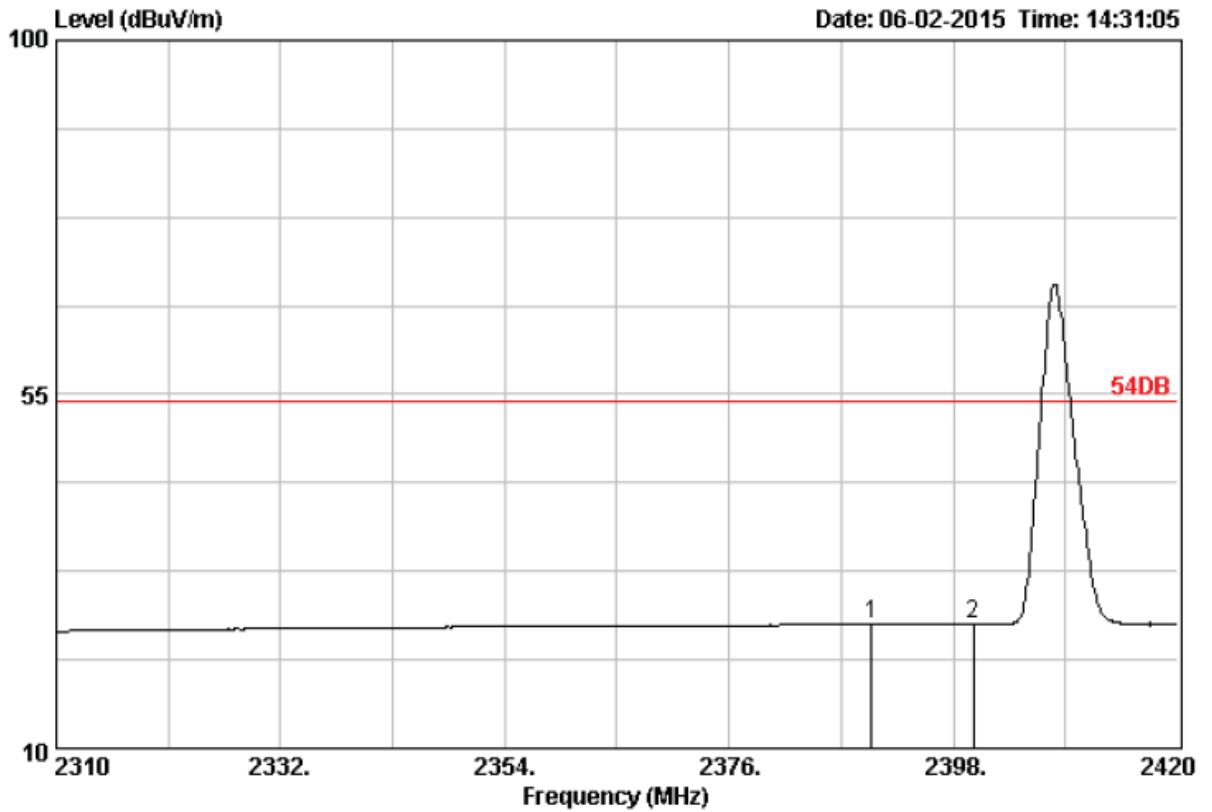
Polarity: Ver.



Site no. : 3m Chamber
 Dis. / Ant. : 3m DRH-118
 Limit : 74DB
 Env. / Ins. : 23*C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

Data no. : 1315
 Ant. pol. : VERTICAL

	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Emission			Margin (dB)	Remark
				Reading (dBUV)	Level (dBUV/m)	Limits (dBUV/m)		
1	2390.00	28.78	4.61	36.64	34.67	74.00	39.33	Peak
2	2400.00	28.78	4.61	36.69	34.72	74.00	39.28	Peak



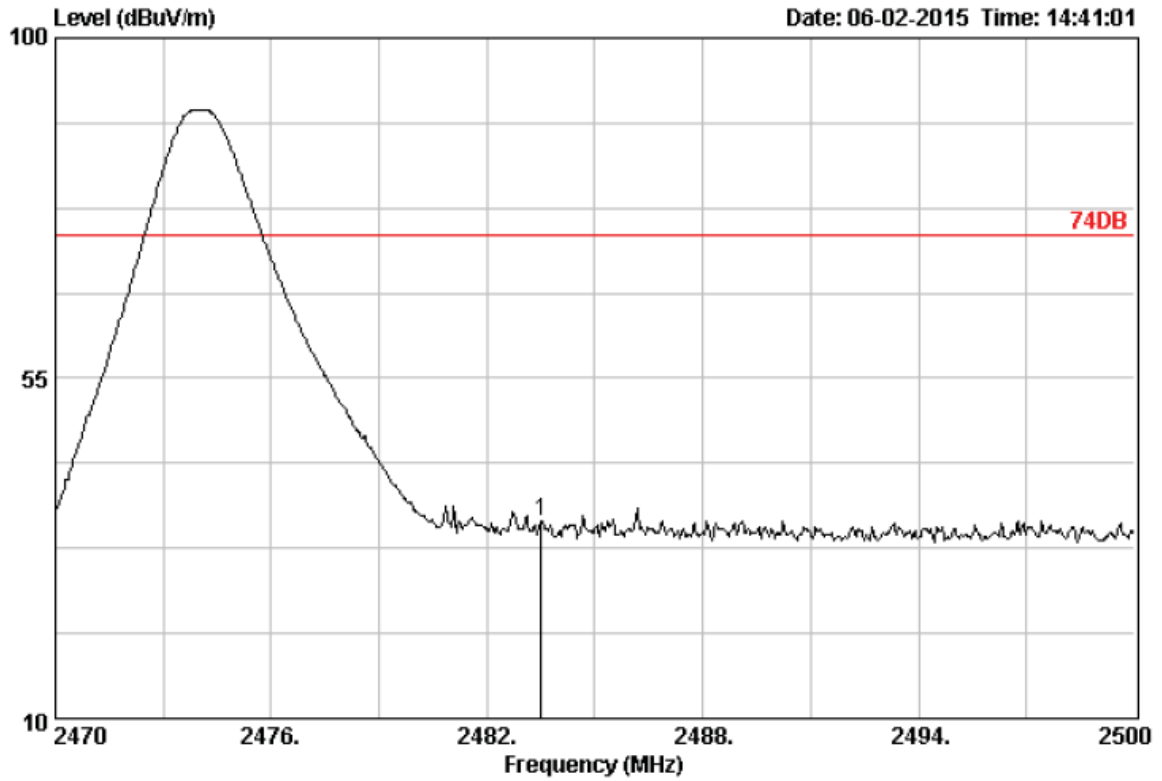
Site no. : 3m Chamber Data no. : 1319
 Dis. / Ant. : 3m DRH-118 Ant. pol. : VERTICAL
 Limit : 54DB
 Env. / Ins. : 23*C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Emission				Remark
				Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	
1	2390.00	28.78	4.61	27.70	25.73	54.00	28.27	Average
2	2400.00	28.78	4.61	27.75	25.78	54.00	28.22	Average

Note: The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

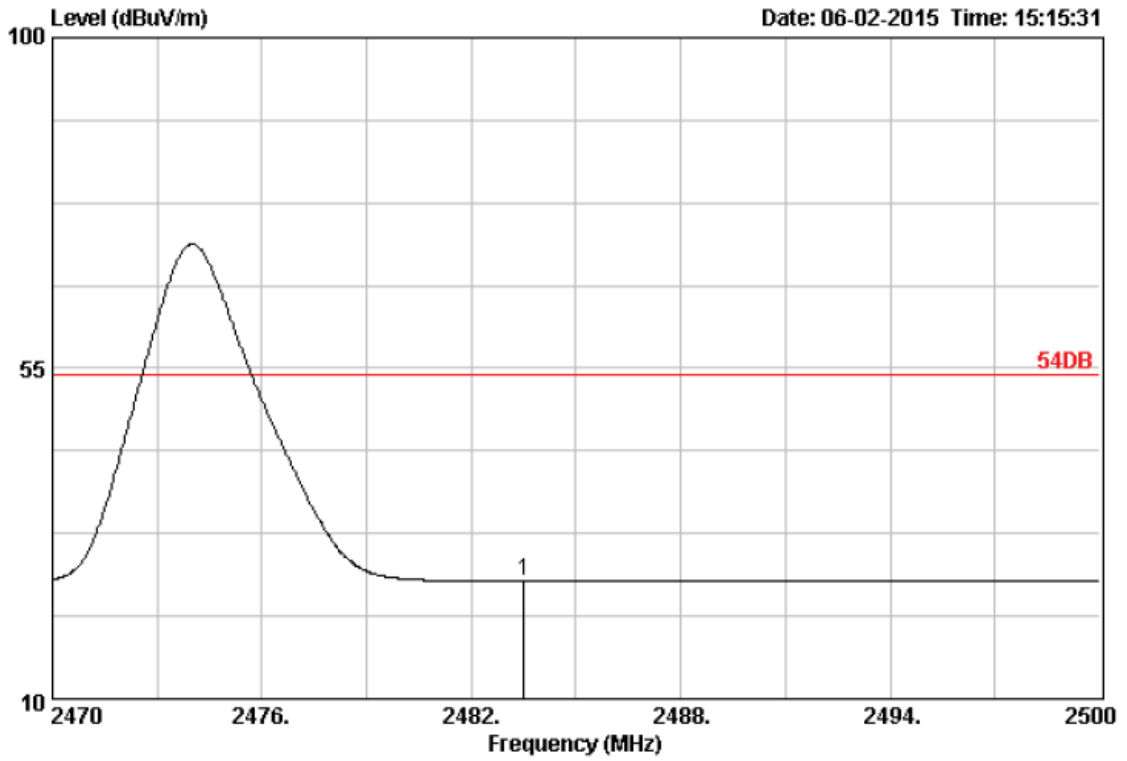
Operation Mode: TX on Top Channel

Polarity: Hor.



Site no. : 3m Chamber Data no. : 1321
 Dis. / Ant. : 3m DRH-118 Ant. pol. : HORIZONTAL
 Limit : 74DB
 Env. / Ins. : 23°C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Emission Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	2483.50	28.93	4.70	37.85	36.10	74.00	37.90	Peak



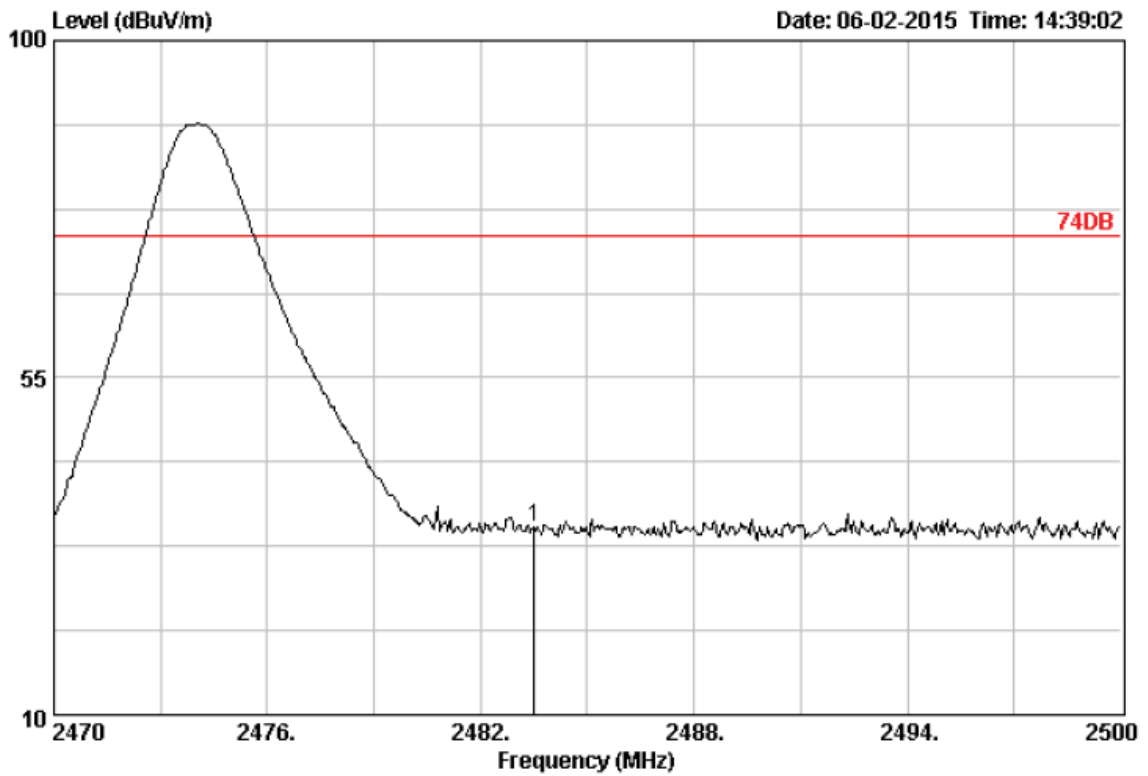
Site no. : 3m Chamber
 Dis. / Ant. : 3m DRH-118
 Limit : 54DB
 Env. / Ins. : 23°C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

Data no. : 1323
 Ant. pol. : HORIZONTAL

Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Emission				Remark
			Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	
1 2483.50	28.93	4.70	27.83	26.08	54.00	27.92	Average

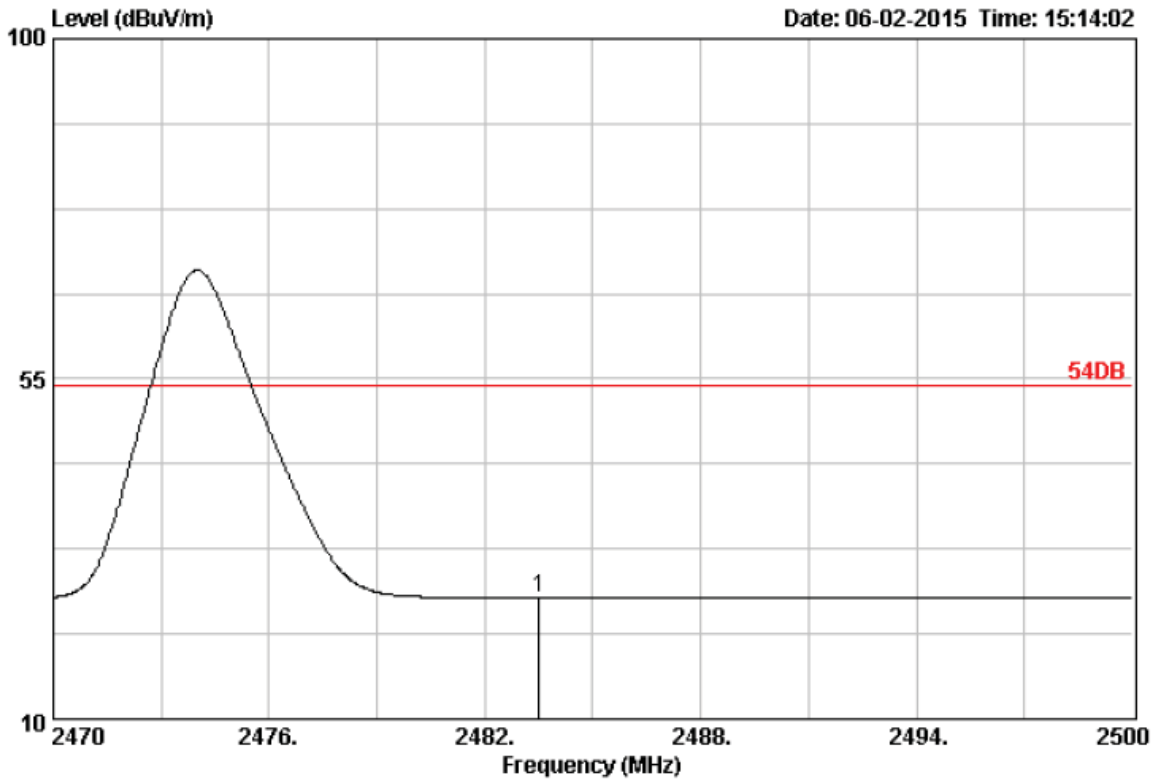
Operation Mode: TX on Top Channel

Polarity: Ver.



Site no. : 3m Chamber Data no. : 1320
 Dis. / Ant. : 3m DRH-118 Ant. pol. : VERTICAL
 Limit : 74DB
 Env. / Ins. : 23°C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2483.50	28.93	4.70	36.72	34.97	74.00	39.03	Peak



Site no. : 3m Chamber Data no. : 1322
 Dis. / Ant. : 3m DRH-118 Ant. pol. : VERTICAL
 Limit : 54DB
 Env. / Ins. : 23*C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Emission		Limits (dBuV/m)	Margin (dB)	Remark
			Reading (dBuV)	Level (dBuV/m)			
1 2483.50	28.93	4.70	27.81	26.06	54.00	27.94	Average

Note: The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

4.5. Occupied Bandwidth Measurement

Measurement Procedure

1. Set EUT as normal operation.
2. $RBW \geq 1\%$ of the 20 dB bandwidth, $VBW \geq RBW$.
3. The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector.

Test SET-UP (Block Diagram of Configuration)

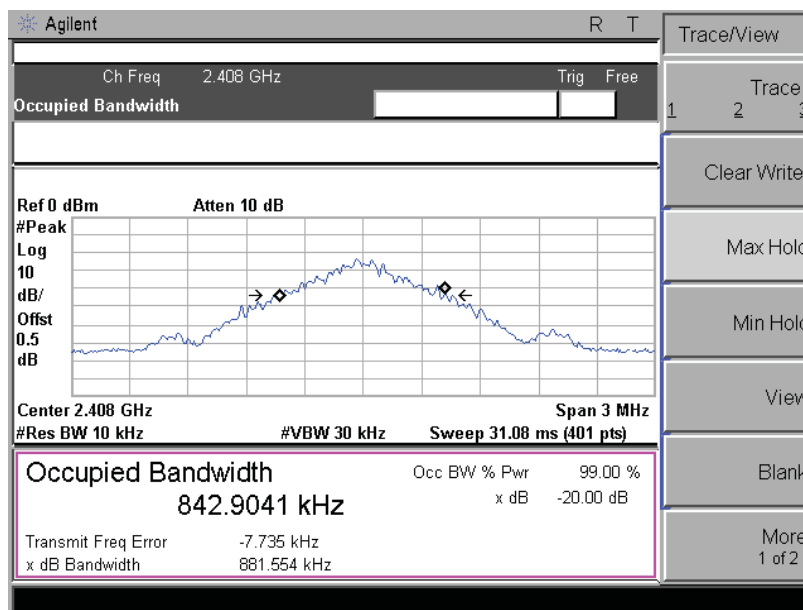
Same as 4.2 Radiated Emission Measurement.

Measurement Equipment Used:

Same as 4.2 Radiated Emission Measurement.

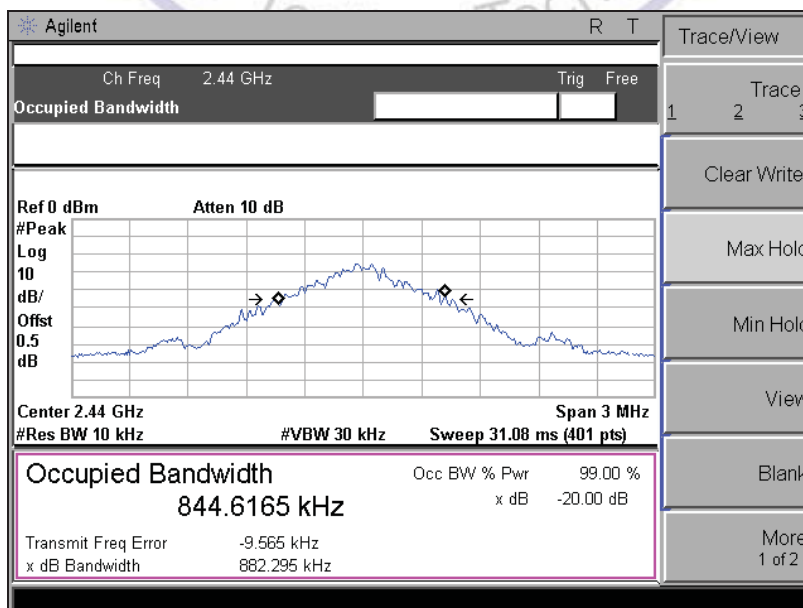
Measurement Results

2408MHz



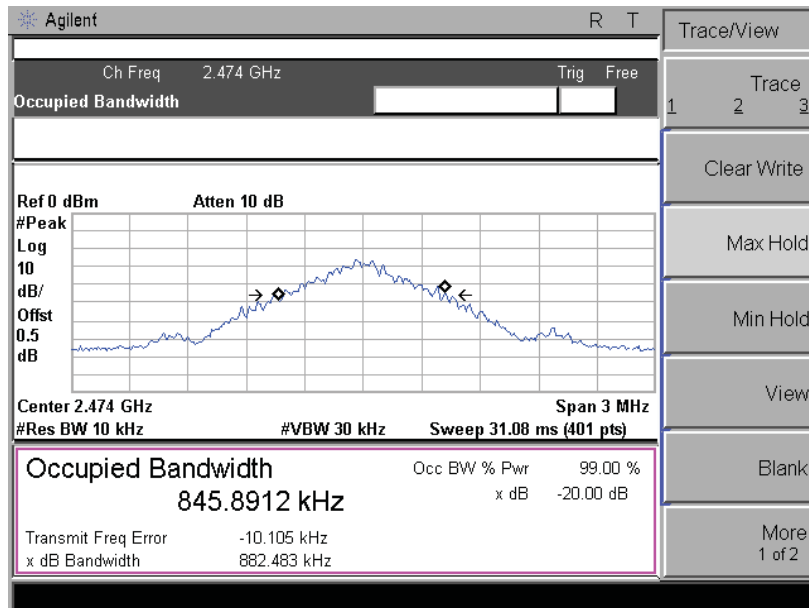
20dB Bandwidth: 881.554 KHz

2440MHz



20dB Bandwidth: 882.295 KHz

2474MHz



20dB Bandwidth: 882.483 KHz



5. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, 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.

And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance.

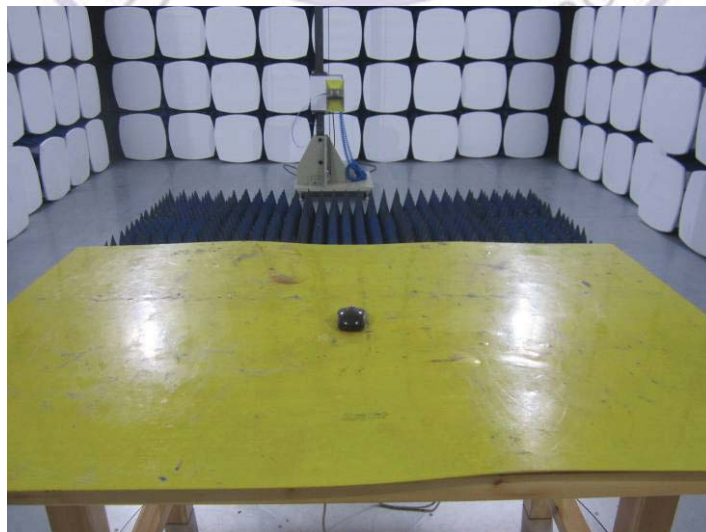
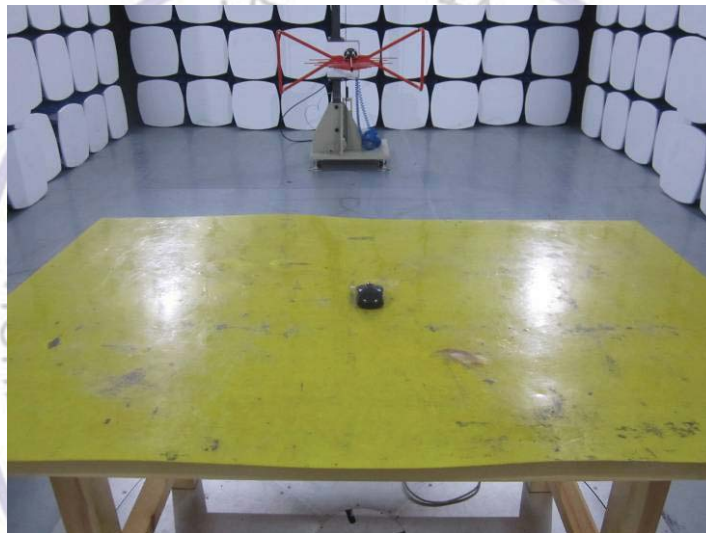
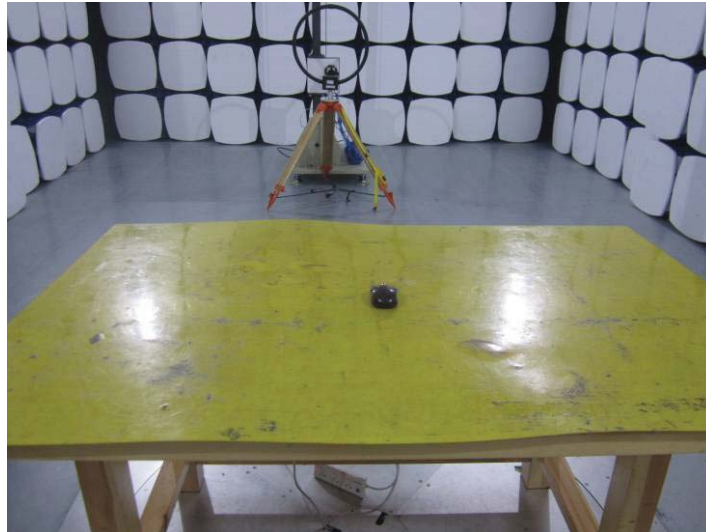
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The antenna used in this product is an internal Antenna, The directional gains of antenna used for transmitting is 0 dBi.

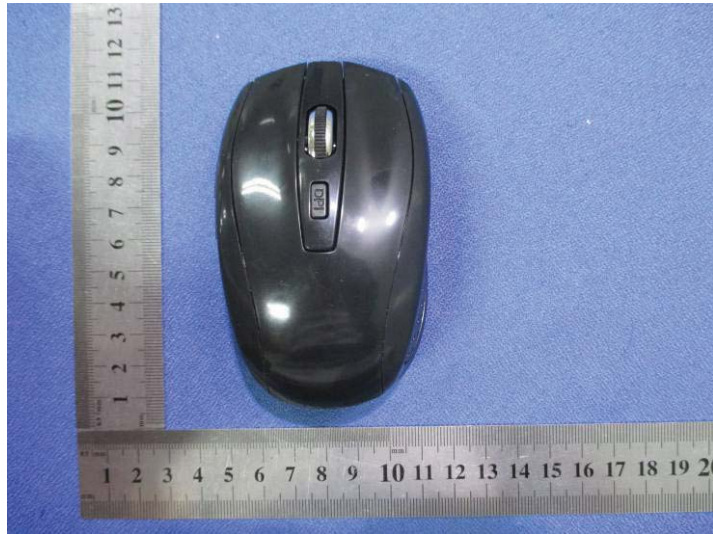


6. Test Setup Photos of the EUT



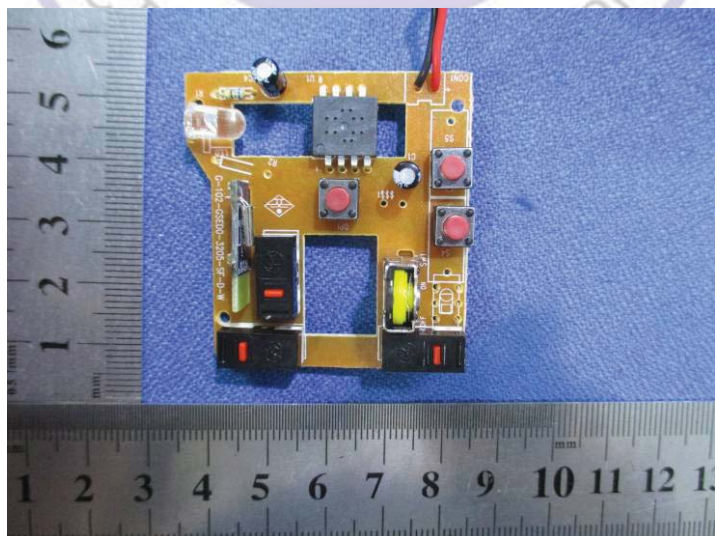
7. External and Internal Photos of the EUT

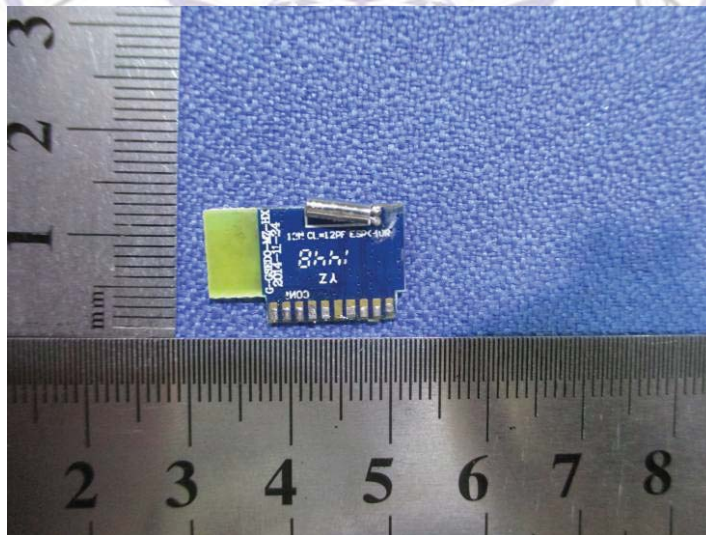
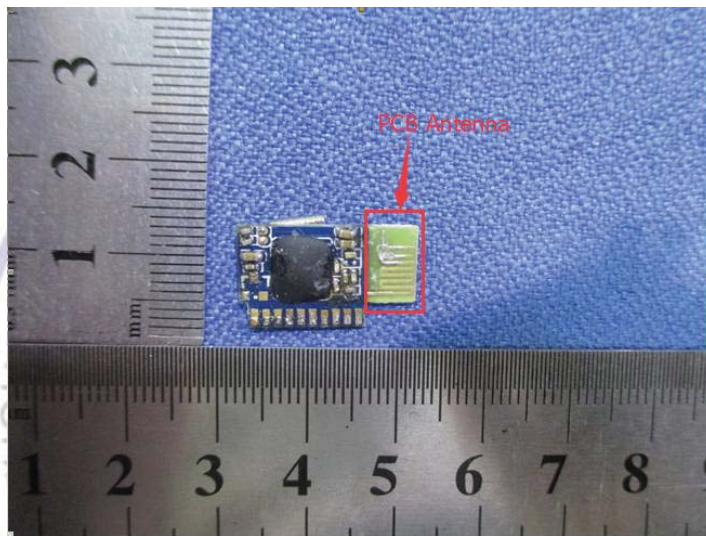
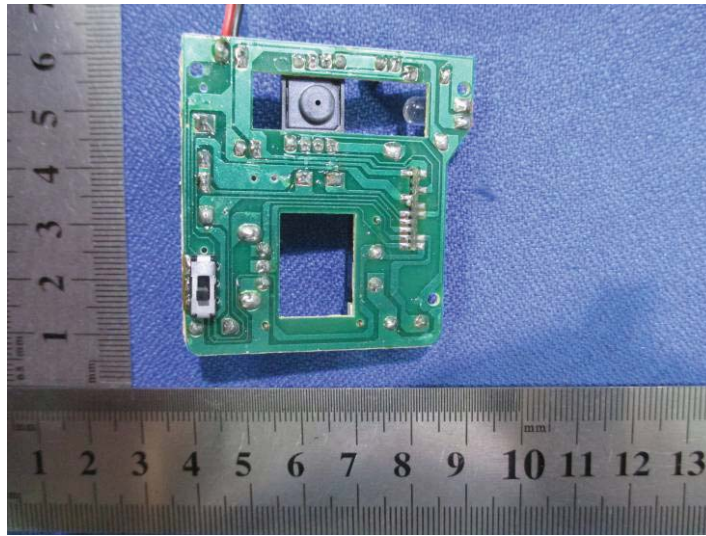
External Photos of EUT





Internal Photos of EUT





.....End of Report.....