

### FCC Report (Bluetooth)

**Applicant:** FLYSKY RC MODEL TECHNOLOGY CO., LTD

**Address of Applicant:** West building3, Huangjianyuan Ind, Park QIAOLI North Gate  
Changping Town, Dongguan, China

**Manufacturer:** ShenZhen FLYSKY Technology Co.,Ltd

**Address of Manufacturer:** 16F, Huafeng Building, No. 6006 Shennan Road, Futian  
District, Shenzhen, Guangdong, China

**Factory:** FLYSKY RC MODEL TECHNOLOGY CO., LTD

**Address of Factory:** West building3, Huangjianyuan Ind, Park QIAOLI North Gate  
Changping Town, Dongguan, China

**Equipment Under Test (EUT)**

Product Name: Bluetooth Module

Model No.: BT-4.0

Trade Mark: FLYSKY

**FCC ID:** N4Z-NB4

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

**Date of sample receipt:** November 19, 2018

**Date of Test:** November 20-26, 2018

**Date of report issued:** November 26, 2018

**Test Result :** PASS \*

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

Authorized Signature:



**Robinson Lo**

**Laboratory Manager**

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

Version No.	Date	Description
00	November 26, 2018	Original

Prepared By:



Date:

November 26, 2018

Project Engineer

Check By:



Date:

November 26, 2018

Reviewer

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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 Output Power	15.247 (b)(3)	Pass
Channel 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

**Remarks:**

1. Pass: The EUT complies with the essential requirements in the standard.
2. Test according to ANSI C63.10:2013

### Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.54dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 5.34dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 5.34dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.44dB	(1)

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

## 5 General Information

### 5.1 General Description of EUT

Product Name:	Bluetooth Module
Model No.:	BT-4.0
Test sample(s) ID:	GTS201811000096-1
Sample(s) Status	Engineer sample
Serial No.:	18FWBLM12000001
Hardware version:	V2.0
Software version:	V2.0
Operation Frequency:	2402MHz~2480MHz
Channel Numbers:	40
Channel Separation:	2MHz
Modulation Type:	GFSK
Antenna Type:	Chip Antenna
Antenna Gain:	2.0dBi(Declare by applicant)
Power Supply:	DC 1.9~3.6V, 20~25mA

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	11	2422MHz	21	2442MHz	31	2462MHz
2	2404MHz	12	2424MHz	22	2444MHz	32	2464MHz
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
9	2418MHz	19	2438MHz	29	2458MHz	39	2478MHz
10	2420MHz	20	2440MHz	30	2460MHz	40	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	2402MHz
The middle channel	2440MHz
The Highest channel	2480MHz

## 5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
<p><i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i></p>	

## 5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
Lenovo	Notebook PC	E40	N/A

## 5.4 Test Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> <li>● <b>FCC —Registration No.: 381383</b> 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 381383, January 08, 2018.</li> <li>● <b>Industry Canada (IC) —Registration No.: 9079A-2</b> 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, August 15, 2016.</li> </ul>
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## 5.5 Test Location

All tests were performed at:
<p>Global United Technology Services Co., Ltd. Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960</p>

## 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	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 27 2018	June. 26 2019
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 27 2018	June. 26 2019
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 27 2018	June. 26 2019
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 27 2018	June. 26 2019
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 27 2018	June. 26 2019
9	Coaxial Cable	GTS	N/A	GTS211	June. 27 2018	June. 26 2019
10	Coaxial cable	GTS	N/A	GTS210	June. 27 2018	June. 26 2019
11	Coaxial Cable	GTS	N/A	GTS212	June. 27 2018	June. 26 2019
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 27 2018	June. 26 2019
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 27 2018	June. 26 2019
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 27 2018	June. 26 2019
15	Band filter	Amindeon	82346	GTS219	June. 27 2018	June. 26 2019
16	Power Meter	Anritsu	ML2495A	GTS540	June. 27 2018	June. 26 2019
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 27 2018	June. 26 2019
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 27 2018	June. 26 2019
19	Splitter	Agilent	11636B	GTS237	June. 27 2018	June. 26 2019
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 27 2018	June. 26 2019



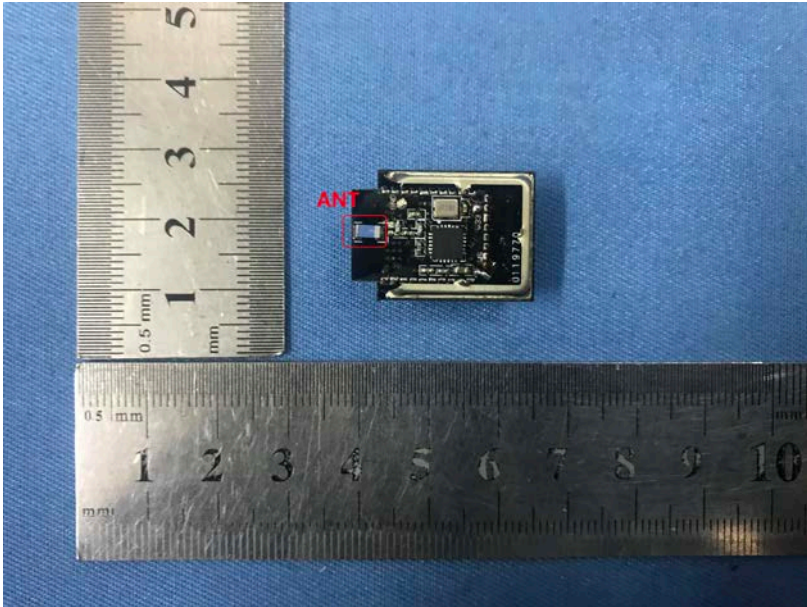
RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 27 2018	June. 26 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 27 2018	June. 26 2019
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 27 2018	June. 26 2019
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 27 2018	June. 26 2019
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 27 2018	June. 26 2019
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 27 2018	June. 26 2019
8	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
9	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 27 2018	June. 26 2019

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 27 2018	June. 26 2019
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 27 2018	June. 26 2019
5	Coaxial Cable	GTS	N/A	GTS227	June. 27 2018	June. 26 2019
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 27 2018	June. 26 2019
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 27 2018	June. 26 2019

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 27 2018	June. 26 2019
2	Barometer	ChangChun	DYM3	GTS255	June. 27 2018	June. 26 2019

## 7 Test results and Measurement Data

### 7.1 Antenna requirement

<b>Standard requirement:</b>	FCC Part15 C Section 15.203 /247(c)
<p><b>15.203 requirement:</b></p> <p>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.</p> <p><b>15.247(c) (1)(i) requirement:</b></p> <p>(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.</p>	
<p><b>E.U.T Antenna:</b></p> <p><i>The antenna is chip antenna, the best case gain of the antenna is 2.0dBi</i></p>	
	

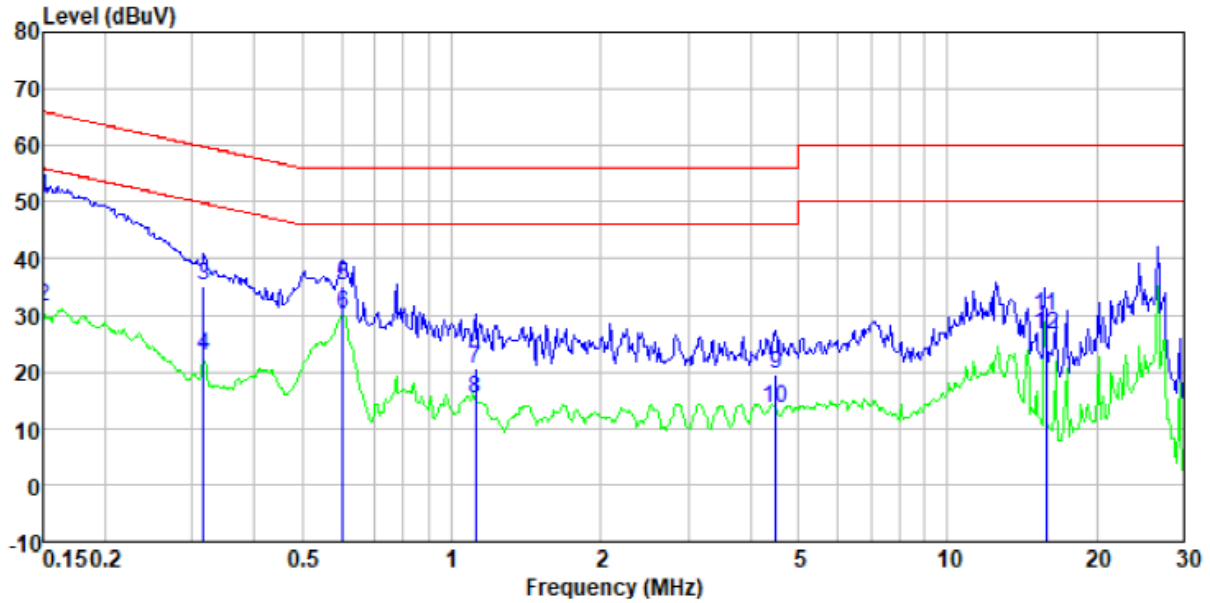
## 7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	150KHz to 30MHz				
Class / Severity:	Class B				
Receiver setup:	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		
* Decreases with the logarithm of the frequency.					
Test setup:	<p><i>Remark:</i>  E.U.T: Equipment Under Test  LISN: Line Impedance Stabilization Network  Test table height=0.8m</p>				
Test procedure:	<ol style="list-style-type: none"> <li>1. The EUT 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.</li> <li>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).</li> <li>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 C63.10: 2013 on conducted measurement.</li> </ol>				
Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.2 for details				
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.: 1012mbar
Test voltage:	AC 120V, 60Hz				
Test results:	Pass				

Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

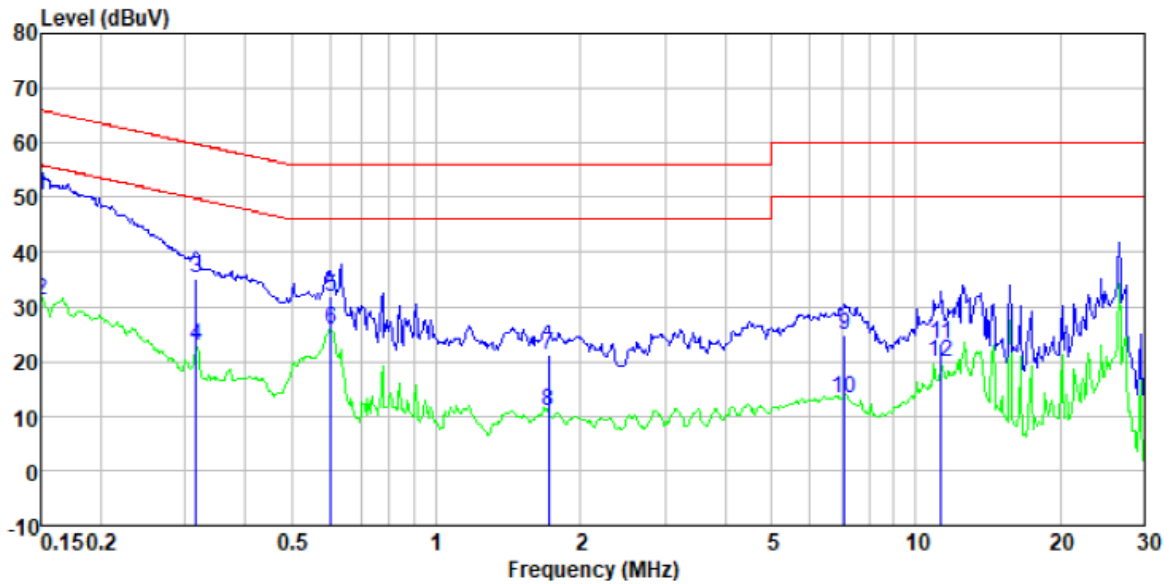
**Measurement data**

Line:



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.15	50.47	0.40	0.07	50.94	66.00	-15.06	QP
0.15	31.14	0.40	0.07	31.61	56.00	-24.39	Average
0.32	34.78	0.39	0.10	35.27	59.80	-24.53	QP
0.32	22.30	0.39	0.10	22.79	49.80	-27.01	Average
0.60	34.78	0.28	0.12	35.18	56.00	-20.82	QP
0.60	29.76	0.28	0.12	30.16	46.00	-15.84	Average
1.12	20.28	0.20	0.15	20.63	56.00	-35.37	QP
1.12	14.94	0.20	0.15	15.29	46.00	-30.71	Average
4.50	19.05	0.20	0.17	19.42	56.00	-36.58	QP
4.50	13.23	0.20	0.17	13.60	46.00	-32.40	Average
15.80	29.58	0.22	0.21	30.01	60.00	-29.99	QP
15.80	26.12	0.22	0.21	26.55	50.00	-23.45	Average

**Neutral:**

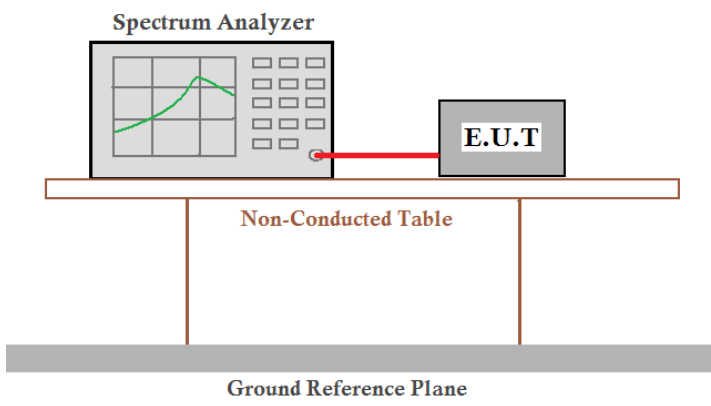


Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.15	50.11	0.40	0.07	50.58	66.00	-15.42	QP
0.15	30.84	0.40	0.07	31.31	56.00	-24.69	Average
0.32	34.60	0.39	0.10	35.09	59.80	-24.71	QP
0.32	22.54	0.39	0.10	23.03	49.80	-26.77	Average
0.60	31.58	0.28	0.12	31.98	56.00	-24.02	QP
0.60	25.58	0.28	0.12	25.98	46.00	-20.02	Average
1.72	20.74	0.20	0.17	21.11	56.00	-34.89	QP
1.72	10.64	0.20	0.17	11.01	46.00	-34.99	Average
7.10	24.61	0.20	0.19	25.00	60.00	-35.00	QP
7.10	12.96	0.20	0.19	13.35	50.00	-36.65	Average
11.32	22.67	0.20	0.20	23.07	60.00	-36.93	QP
11.32	19.56	0.20	0.20	19.96	50.00	-30.04	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
4. *If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.*

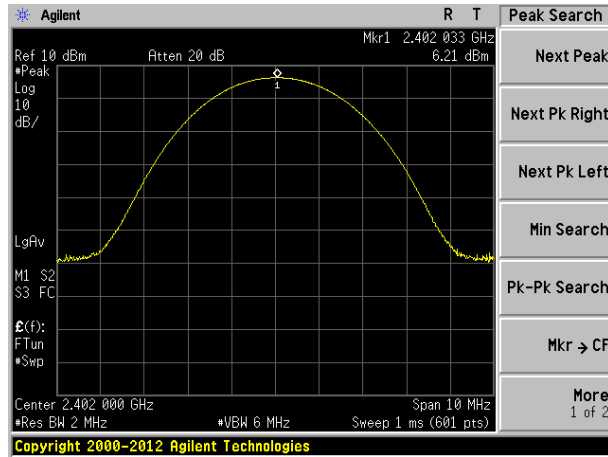
## 7.3 Conducted Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05
Limit:	30dBm
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

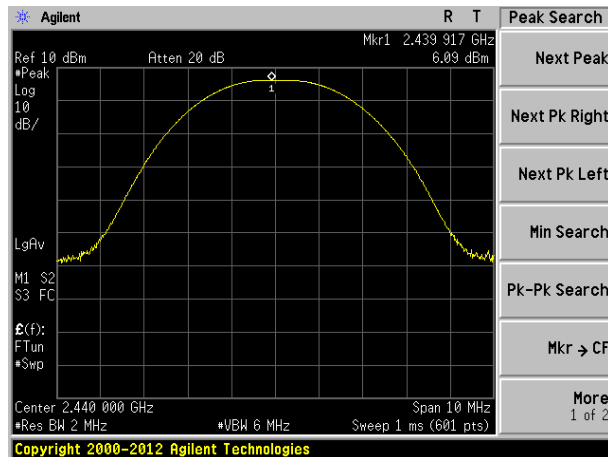
### Measurement Data

Test channel	Peak Output Power (dBm)	Limit(dBm)	Result
Lowest	6.21	30.00	Pass
Middle	6.09		
Highest	5.99		

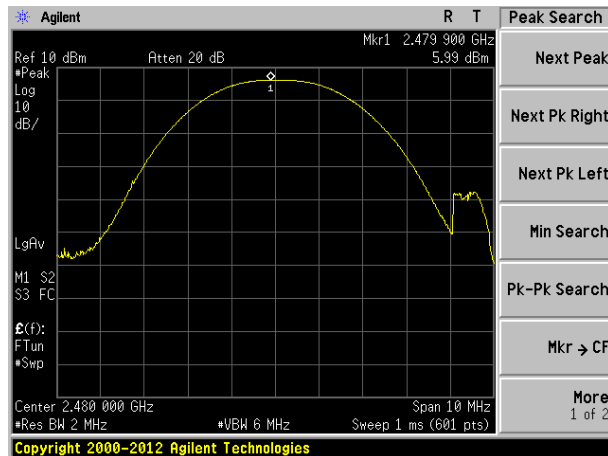
Test plot as follows:



Lowest channel

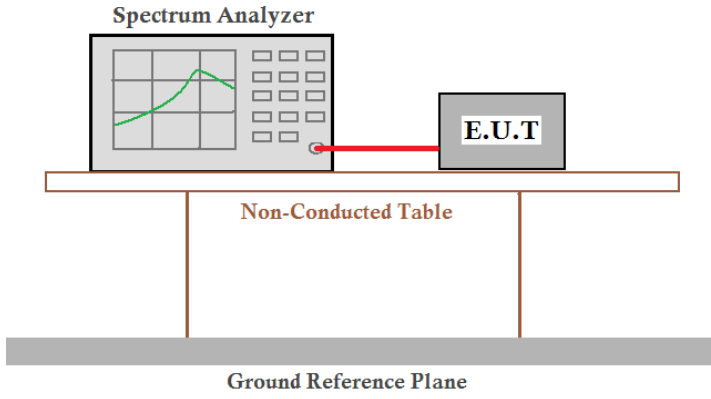


Middle channel



Highest channel

## 7.4 Channel Bandwidth

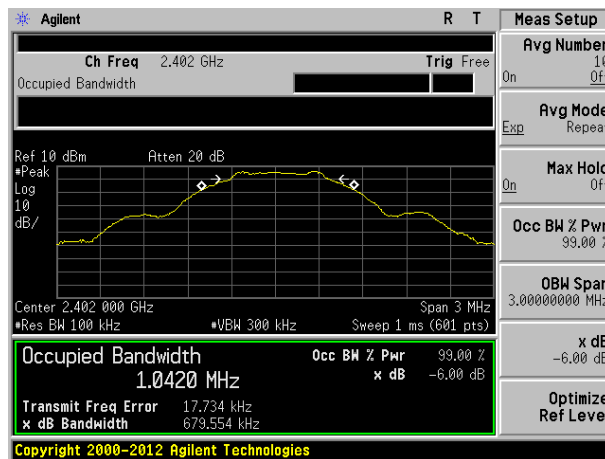
Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05
Limit:	>500KHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by two vertical legs. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

### Measurement Data

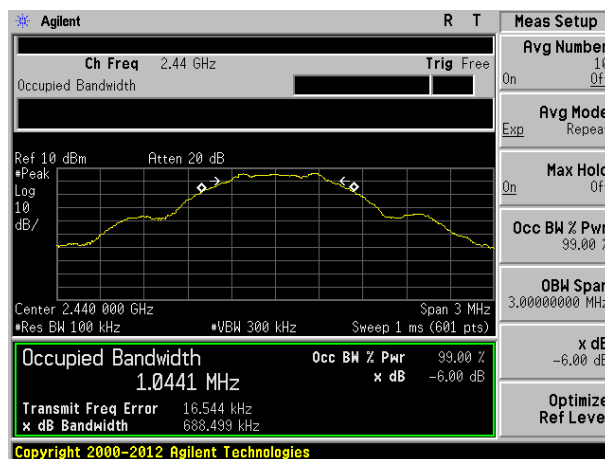
Test channel	Channel Bandwidth (MHz)	Limit(KHz)	Result
Lowest	0.680	>500	Pass
Middle	0.688		
Highest	0.682		



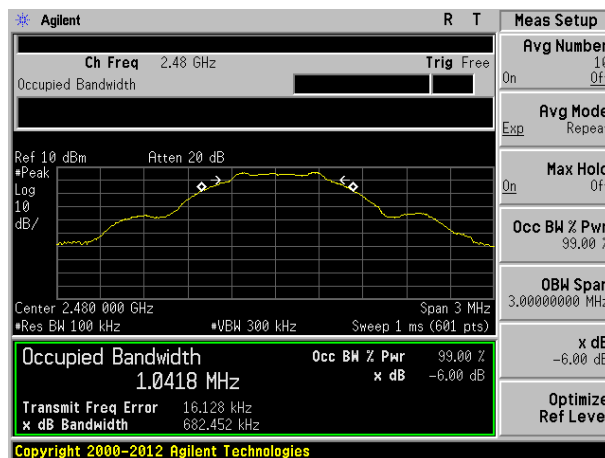
Test plot as follows:



Lowest channel

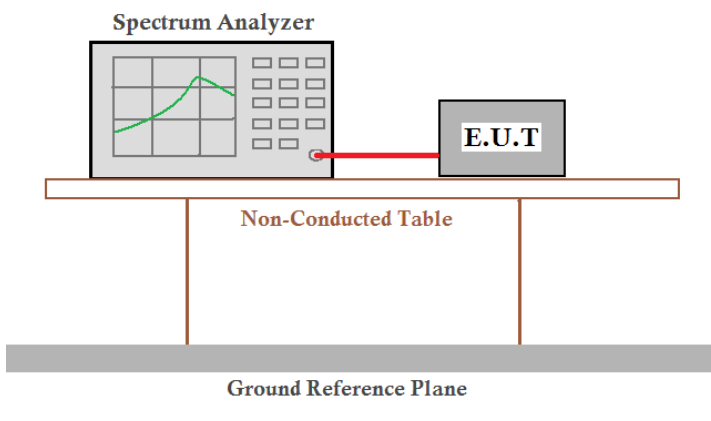


Middle channel



Highest channel

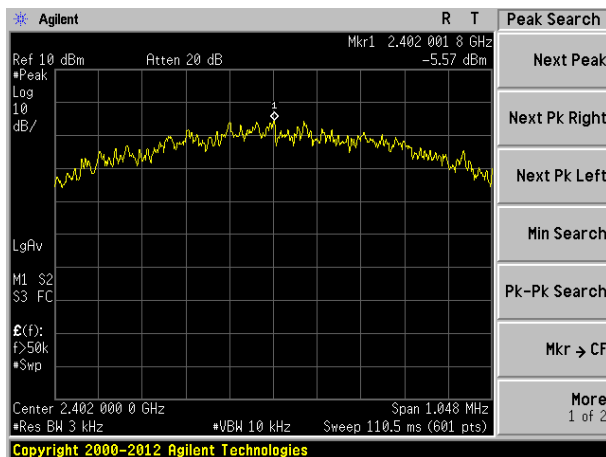
## 7.5 Power Spectral Density

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05
Limit:	8dBm/3kHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

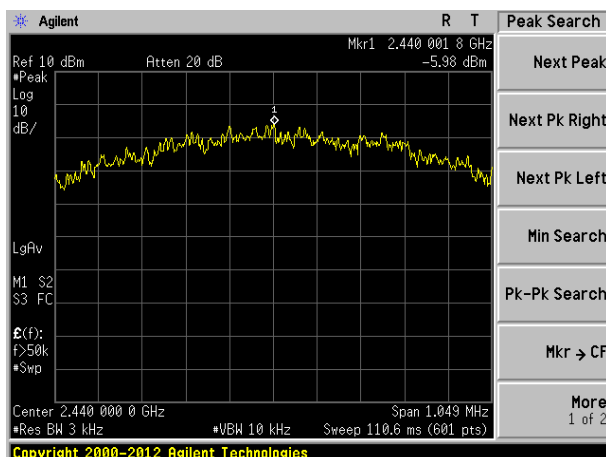
### Measurement Data

Test channel	Power Spectral Density (dBm/3kHz)	Limit(dBm/3kHz)	Result
Lowest	-5.57	8.00	Pass
Middle	-5.98		
Highest	-6.26		

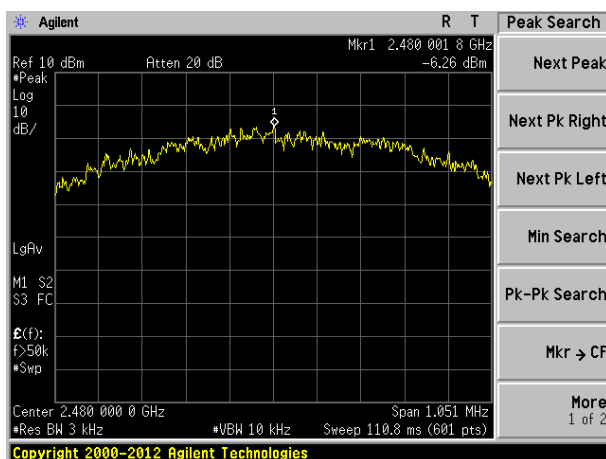
Test plot as follows:



Lowest channel



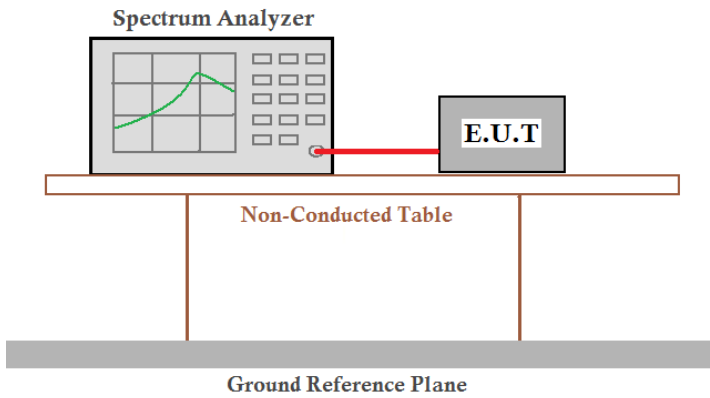
Middle channel



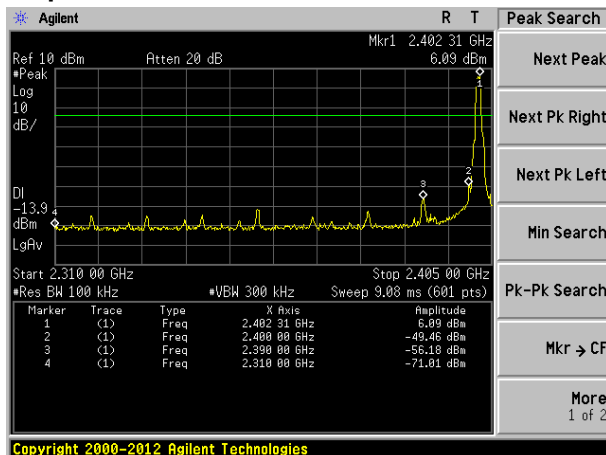
Highest channel

## 7.6 Band edges

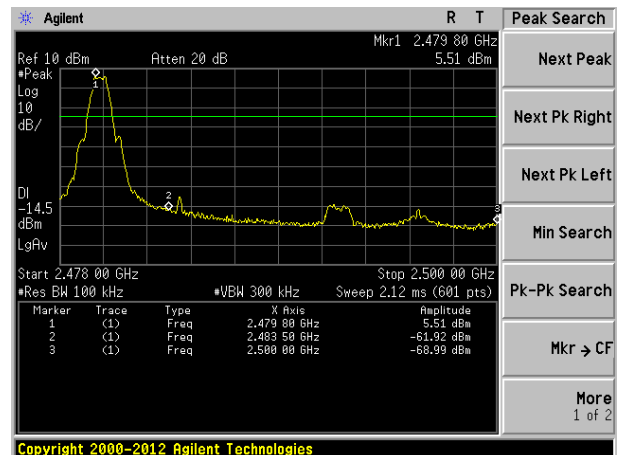
### 7.6.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05
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. A Spectrum Analyzer is connected to an Equipment Under Test (E.U.T.) via a red cable. Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

### Test plot as follows:



Lowest channel



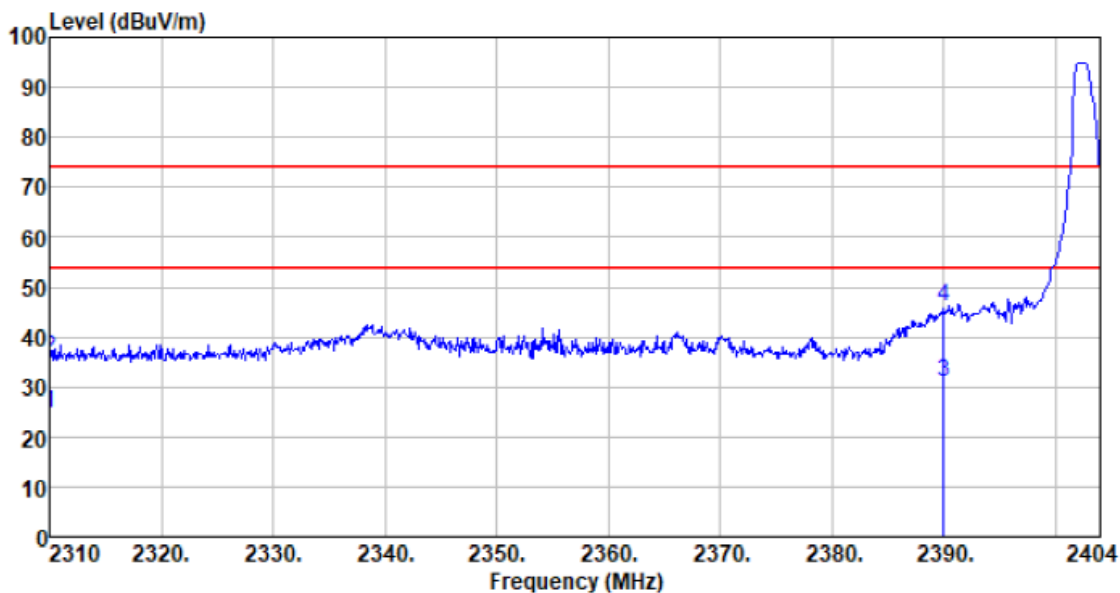
Highest channel

## 7.6.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	Above 1GHz	Peak RMS	1MHz 1MHz	3MHz 3MHz	Peak Average
Limit:	Frequency		Limit (dBuV/m @3m)		Value
	Above 1GHz		54.00		Average
			74.00		Peak
Test setup:					
Test Procedure:	<ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>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.</li> <li>7. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.</li> </ol>				
Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.2 for details				
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.: 1012mbar
Test results:	Pass				

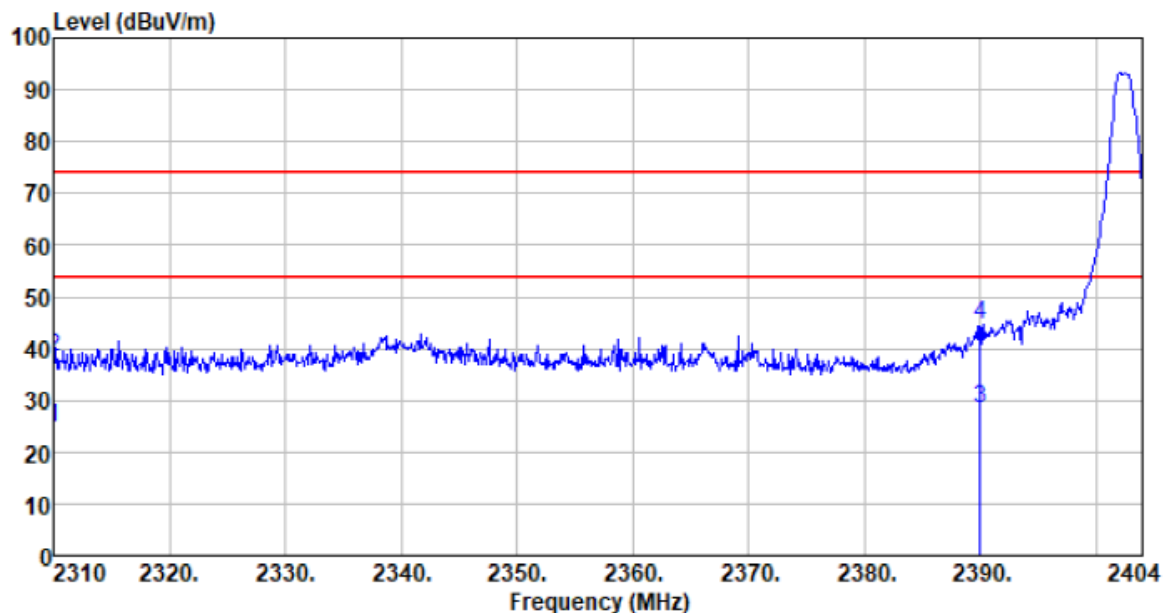
**Measurement data:**

<b>Polarization:</b>	<b>Horizontal</b>	<b>Test Frequency :</b>	<b>2402MHz</b>
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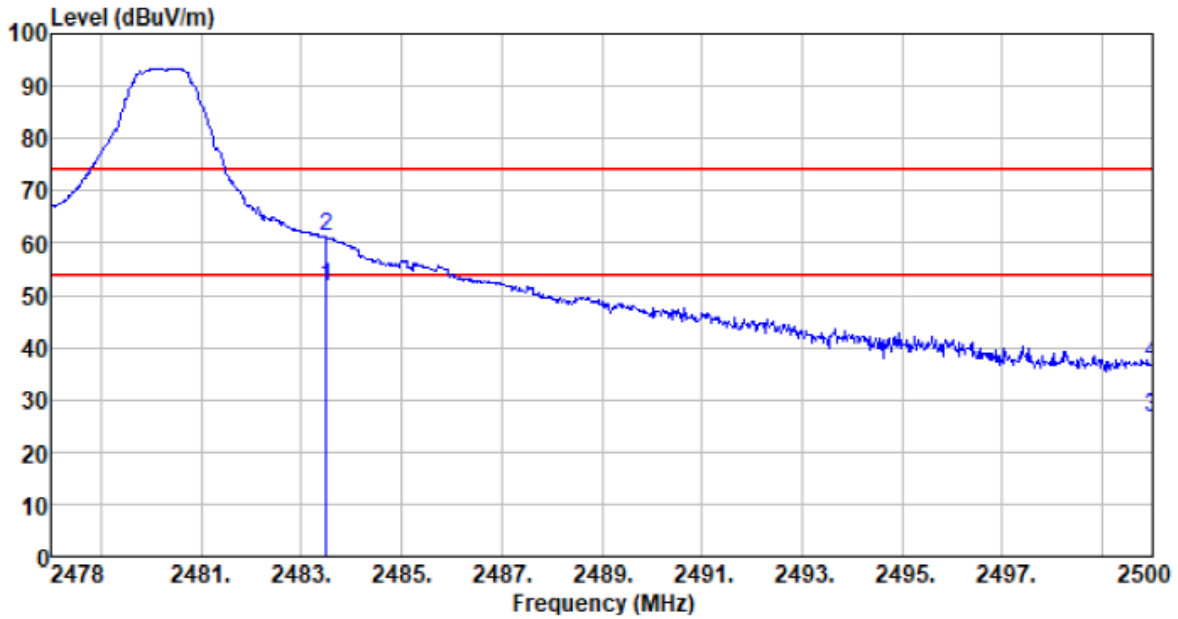
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2310.000	33.61	27.14	6.19	42.04	24.90	54.00	-29.10	Average
2310.000	44.43	27.14	6.19	42.04	35.72	74.00	-38.28	Peak
2390.000	39.42	27.37	6.31	42.11	30.99	54.00	-23.01	Average
2390.000	54.65	27.37	6.31	42.11	46.22	74.00	-27.78	Peak

<b>Polarization:</b>	<b>Vertical</b>	<b>Test Frequency :</b>	<b>2402MHz</b>
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2310.000	33.52	27.14	6.19	42.04	24.81	54.00	-29.19	Average
2310.000	47.08	27.14	6.19	42.04	38.37	74.00	-35.63	Peak
2389.994	36.96	27.37	6.31	42.11	28.53	54.00	-25.47	Average
2389.994	52.99	27.37	6.31	42.11	44.56	74.00	-29.44	Peak

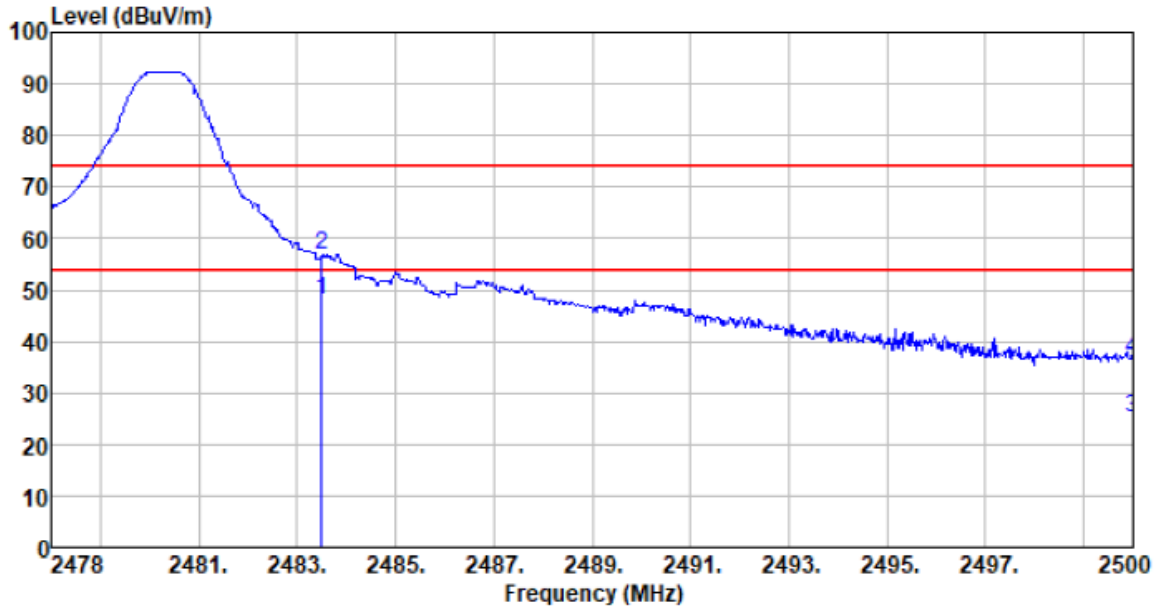
<b>Polarization:</b>	<b>Horizontal</b>	<b>Test Frequency :</b>	<b>2480MHz</b>
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2483.500	59.55	27.66	6.45	42.01	51.65	54.00	-2.35	Average
2483.500	69.07	27.66	6.45	42.01	61.17	74.00	-12.83	Peak
2500.000	34.27	27.70	6.47	42.00	26.44	54.00	-27.56	Average
2500.000	44.83	27.70	6.47	42.00	37.00	74.00	-37.00	Peak



<b>Polarization:</b>	<b>Vertical</b>	<b>Test Frequency :</b>	<b>2480MHz</b>
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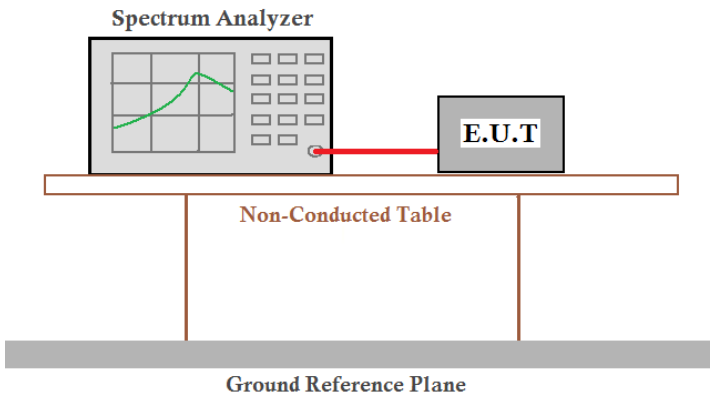
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2483.500	55.98	27.66	6.45	42.01	48.08	54.00	-5.92	Average
2483.500	64.73	27.66	6.45	42.01	56.83	74.00	-17.17	Peak
2500.000	33.04	27.70	6.47	42.00	25.21	54.00	-28.79	Average
2500.000	44.40	27.70	6.47	42.00	36.57	74.00	-37.43	Peak

**Remarks:**

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
3. *The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.*

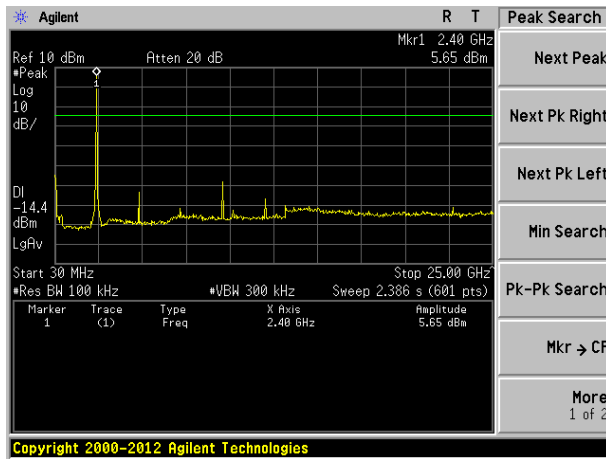
## 7.7 Spurious Emission

### 7.7.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05
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. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

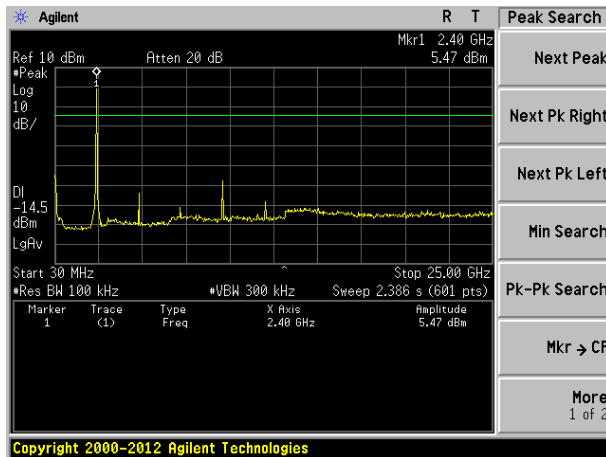
**Test plot as follows:**

Lowest channel



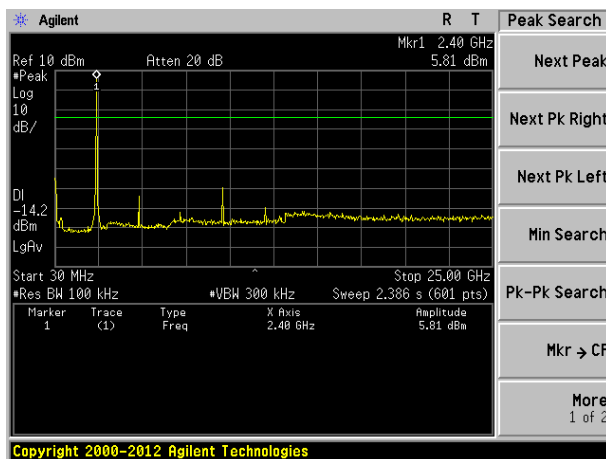
30MHz~25GHz

Middle channel



30MHz~25GHz

Highest channel

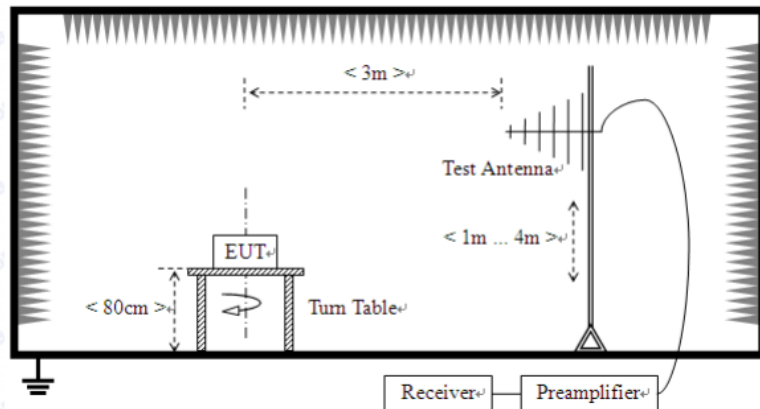


30MHz~25GHz

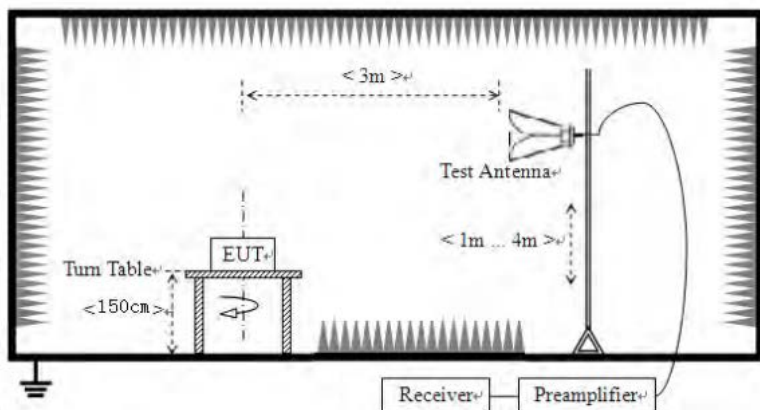
## 7.7.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209																									
Test Method:	ANSI C63.10:2013																									
Test Frequency Range:	9kHz to 25GHz																									
Test site:	Measurement Distance: 3m																									
Receiver setup:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Detector</th> <th>RBW</th> <th>VBW</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>30MHz-1GHz</td> <td>Quasi-peak</td> <td>120KHz</td> <td>300KHz</td> <td>Quasi-peak</td> </tr> <tr> <td rowspan="2">Above 1GHz</td> <td>Peak</td> <td>1MHz</td> <td>3MHz</td> <td>Peak</td> </tr> <tr> <td>Peak</td> <td>1MHz</td> <td>10Hz</td> <td>Average</td> </tr> </tbody> </table>				Frequency	Detector	RBW	VBW	Value	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak	Above 1GHz	Peak	1MHz	3MHz	Peak	Peak	1MHz	10Hz	Average			
Frequency	Detector	RBW	VBW	Value																						
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak																						
Above 1GHz	Peak	1MHz	3MHz	Peak																						
	Peak	1MHz	10Hz	Average																						
Limit:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Limit (uV/m)</th> <th>Value</th> <th>Measurement Distance</th> </tr> </thead> <tbody> <tr> <td>30MHz-88MHz</td> <td>100</td> <td>QP</td> <td rowspan="5">3m</td> </tr> <tr> <td>88MHz-216MHz</td> <td>150</td> <td>QP</td> </tr> <tr> <td>216MHz-960MHz</td> <td>200</td> <td>QP</td> </tr> <tr> <td>960MHz-1GHz</td> <td>500</td> <td>QP</td> </tr> <tr> <td rowspan="2">Above 1GHz</td> <td>500</td> <td>Average</td> </tr> <tr> <td>5000</td> <td>Peak</td> </tr> </tbody> </table>				Frequency	Limit (uV/m)	Value	Measurement Distance	30MHz-88MHz	100	QP	3m	88MHz-216MHz	150	QP	216MHz-960MHz	200	QP	960MHz-1GHz	500	QP	Above 1GHz	500	Average	5000	Peak
Frequency	Limit (uV/m)	Value	Measurement Distance																							
30MHz-88MHz	100	QP	3m																							
88MHz-216MHz	150	QP																								
216MHz-960MHz	200	QP																								
960MHz-1GHz	500	QP																								
Above 1GHz	500	Average																								
	5000	Peak																								
Test setup:	<p>For radiated emissions from 9kHz to 30MHz</p>																									

For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



Test Procedure:

1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) 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 Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

**Measurement data:**

*Remark:*

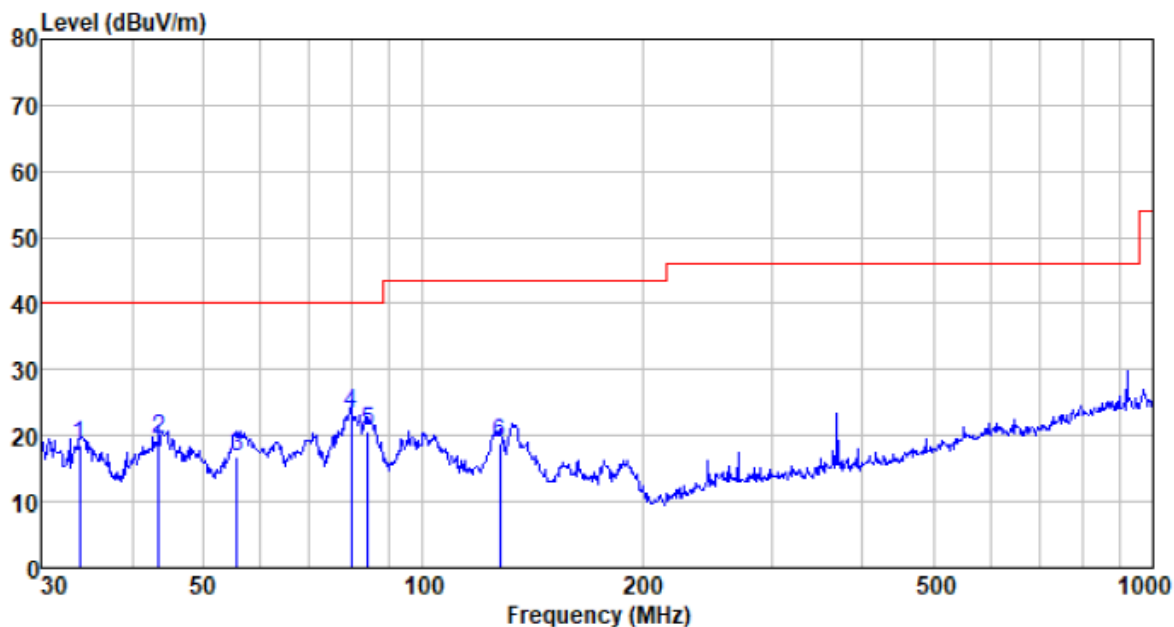
*Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*

**■ 9kHz~30MHz**

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

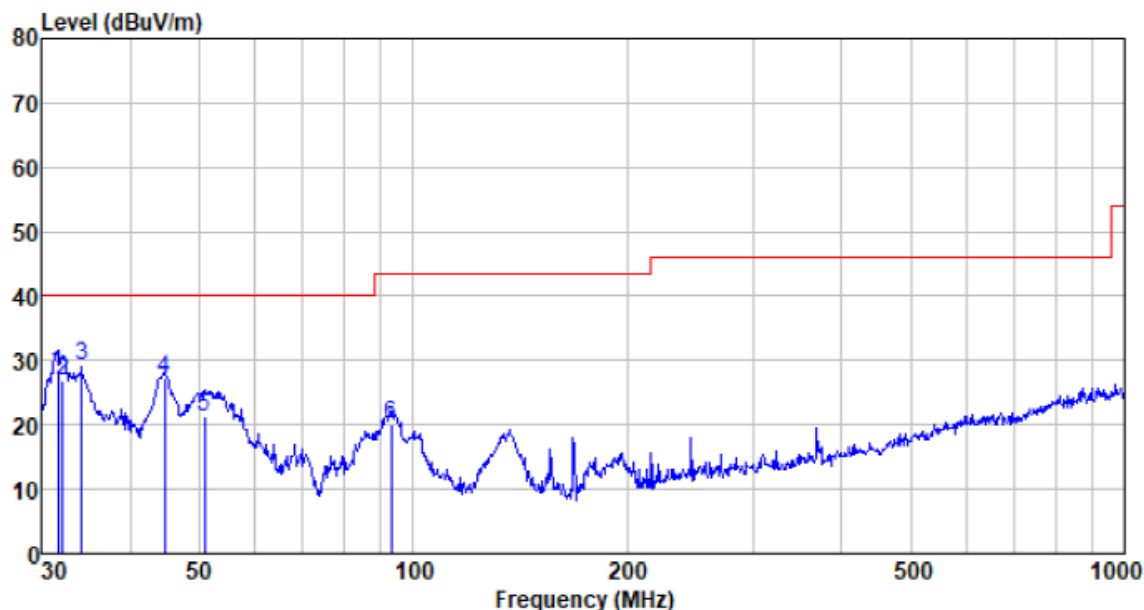
■ Below 1GHz

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
33.917	42.09	11.28	0.60	35.28	18.69	40.00	-21.31	QP
43.506	42.38	12.24	0.70	35.86	19.46	40.00	-20.54	QP
55.609	40.42	11.73	0.82	36.26	16.71	40.00	-23.29	QP
79.800	51.35	7.40	1.03	36.54	23.24	40.00	-16.76	QP
84.110	47.35	8.80	1.06	36.59	20.62	40.00	-19.38	QP
127.665	45.90	8.51	1.42	36.93	18.90	43.50	-24.60	QP

**Vertical:**

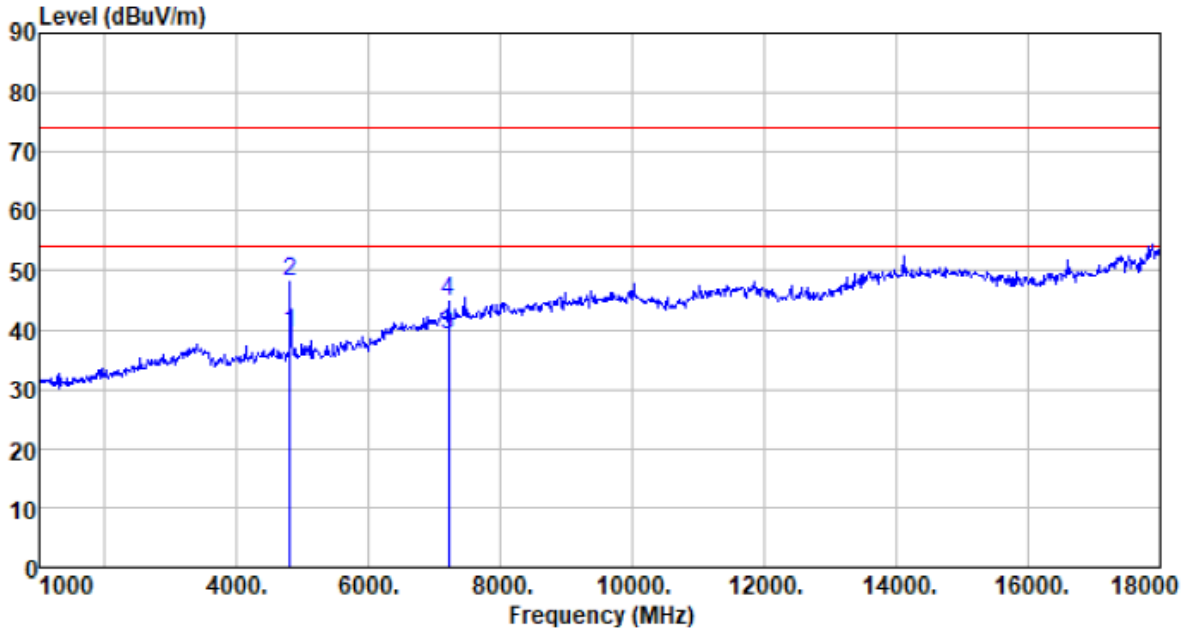


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
31.620	51.23	11.23	0.57	35.12	27.91	40.00	-12.09	QP
32.179	50.05	11.25	0.58	35.16	26.72	40.00	-13.28	QP
34.156	52.79	11.28	0.60	35.30	29.37	40.00	-10.63	QP
44.743	50.15	12.25	0.72	35.92	27.20	40.00	-12.80	QP
50.942	44.53	12.20	0.78	36.19	21.32	40.00	-18.68	QP
93.113	44.42	11.18	1.14	36.66	20.08	43.50	-23.42	QP



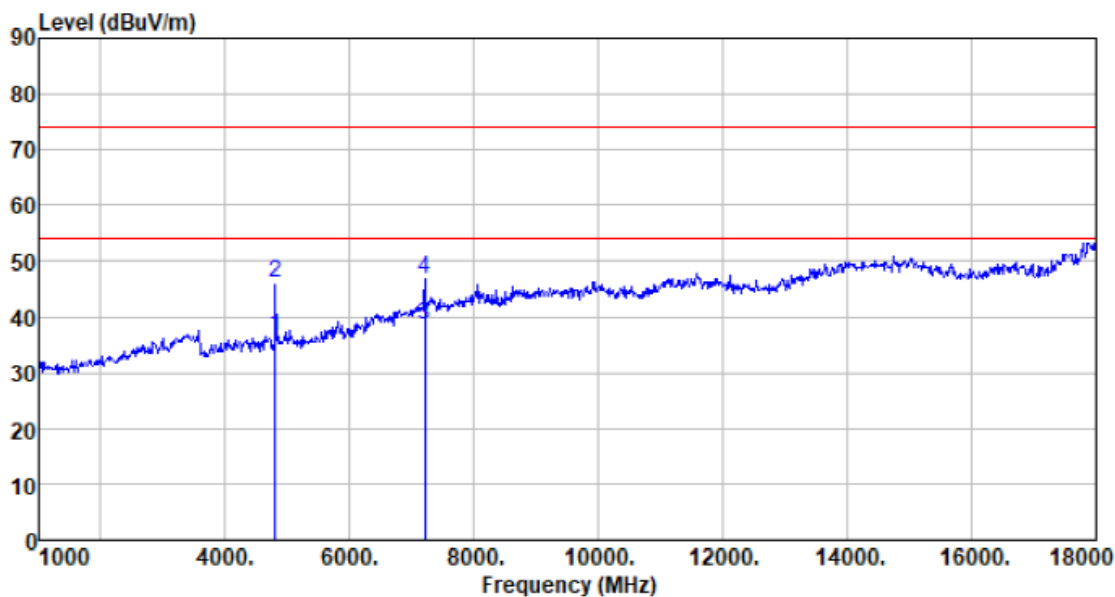
■ Above 1GHz

<b>Polarization:</b>	<b>Horizontal</b>	<b>Test Frequency :</b>	<b>2402MHz</b>
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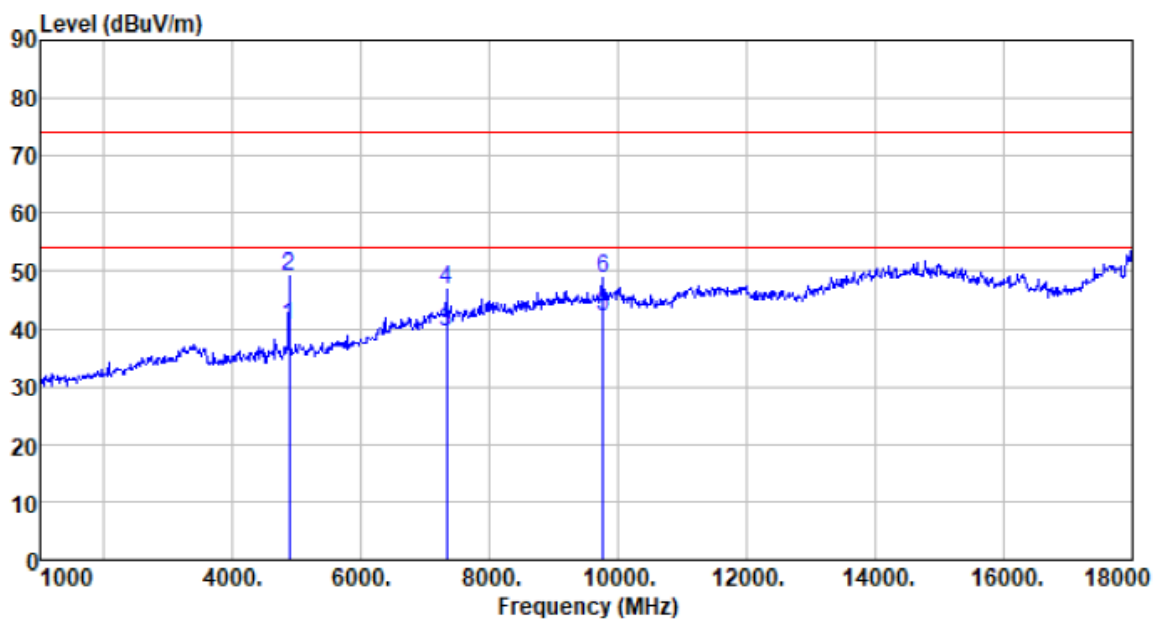
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
4804.000	36.46	31.35	9.36	37.58	39.59	54.00	-14.41	Average
4804.000	44.90	31.35	9.36	37.58	48.03	74.00	-25.97	Peak
7206.000	27.64	35.89	11.21	35.44	39.30	54.00	-14.70	Average
7206.000	33.08	35.89	11.21	35.44	44.74	74.00	-29.26	Peak

<b>Polarization:</b>	<b>Vertical</b>	<b>Test Frequency :</b>	<b>2402MHz</b>
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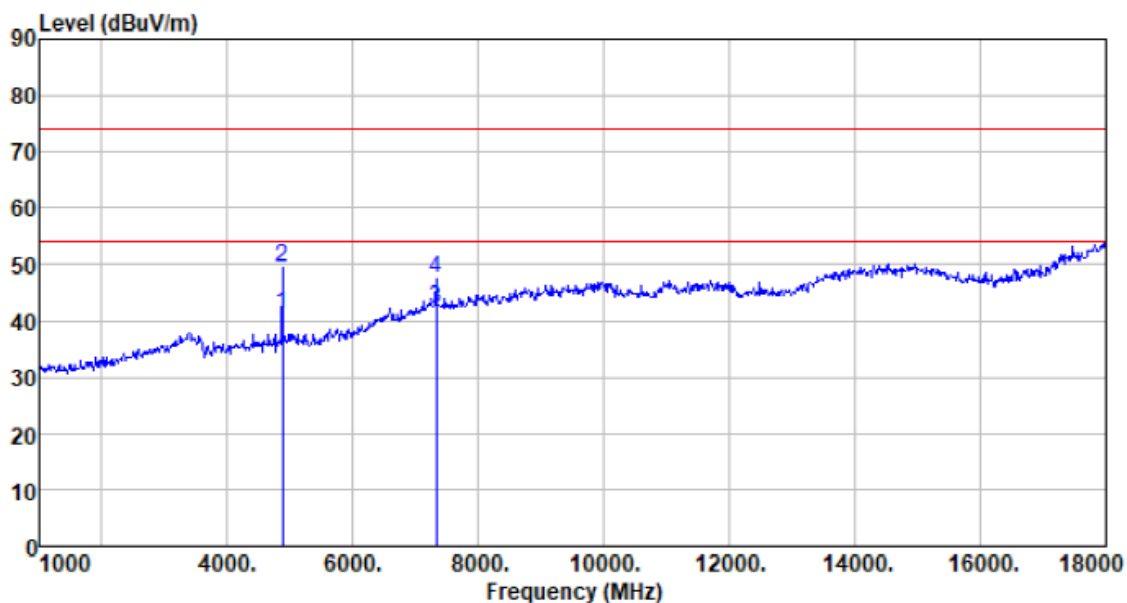
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
4804.000	33.55	31.35	9.36	37.58	36.68	54.00	-17.32	Average
4804.000	43.05	31.35	9.36	37.58	46.18	74.00	-27.82	Peak
7206.000	26.90	35.89	11.21	35.44	38.56	54.00	-15.44	Average
7206.000	35.09	35.89	11.21	35.44	46.75	74.00	-27.25	Peak

<b>Polarization:</b>	<b>Horizontal</b>	<b>Test Frequency :</b>	<b>2440MHz</b>
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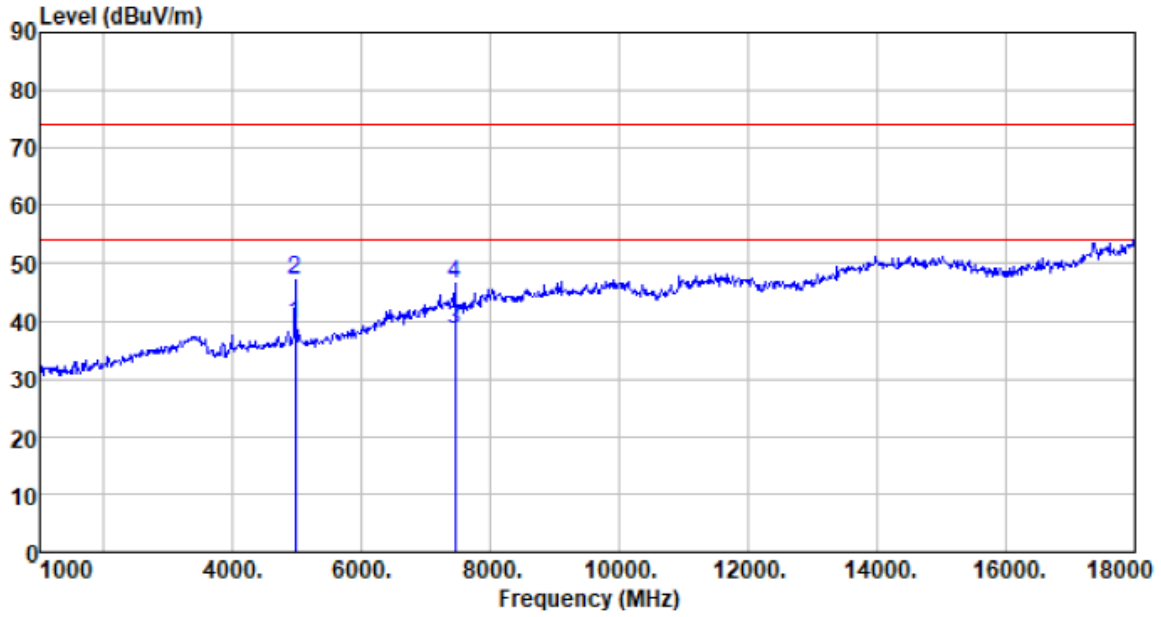
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
4880.000	37.11	31.48	9.42	37.59	40.42	54.00	-13.58	Average
4880.000	45.82	31.48	9.42	37.59	49.13	74.00	-24.87	Peak
7320.000	27.62	36.17	11.30	35.47	39.62	54.00	-14.38	Average
7320.000	34.95	36.17	11.30	35.47	46.95	74.00	-27.05	Peak
9760.000	26.18	38.07	13.01	35.09	42.17	54.00	-11.83	Average
9760.000	32.81	38.07	13.01	35.09	48.80	74.00	-25.20	Peak

<b>Polarization:</b>	<b>Vertical</b>	<b>Test Frequency :</b>	<b>2440MHz</b>
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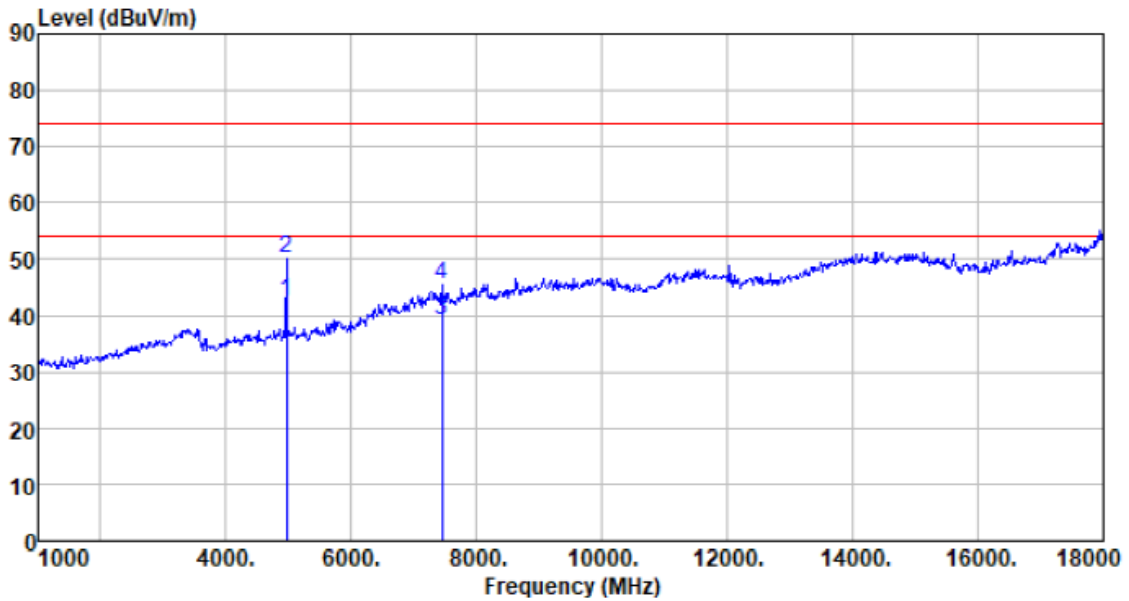
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
4880.000	37.93	31.48	9.42	37.59	41.24	54.00	-12.76	Average
4880.000	46.08	31.48	9.42	37.59	49.39	74.00	-24.61	Peak
7320.000	30.33	36.17	11.30	35.47	42.33	54.00	-11.67	Average
7320.000	35.49	36.17	11.30	35.47	47.49	74.00	-26.51	Peak

<b>Polarization:</b>	<b>Horizontal</b>	<b>Test Frequency :</b>	<b>2480MHz</b>
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
4960.000	35.99	31.63	9.48	37.60	39.50	54.00	-14.50	Average
4960.000	43.52	31.63	9.48	37.60	47.03	74.00	-26.97	Peak
7440.000	26.14	36.46	11.39	35.49	38.50	54.00	-15.50	Average
7440.000	34.28	36.46	11.39	35.49	46.64	74.00	-27.36	Peak

<b>Polarization:</b>	<b>Vertical</b>	<b>Test Frequency :</b>	<b>2480MHz</b>
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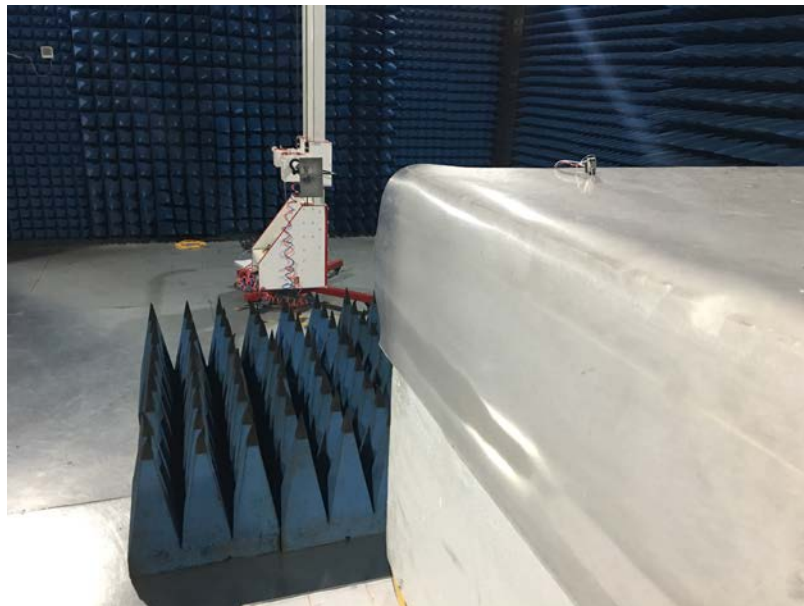
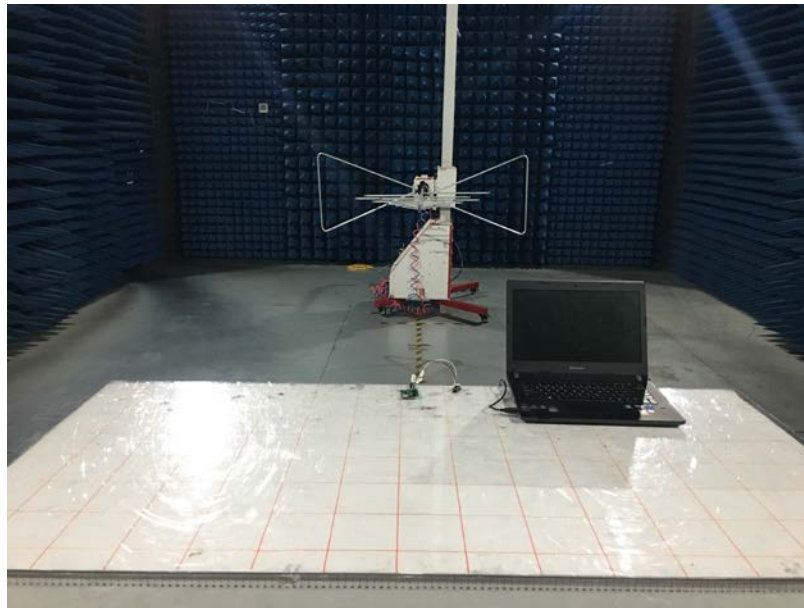
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
4960.000	38.95	31.63	9.48	37.60	42.46	54.00	-11.54	Average
4960.000	46.51	31.63	9.48	37.60	50.02	74.00	-23.98	Peak
7440.000	26.82	36.46	11.39	35.49	39.18	54.00	-14.82	Average
7440.000	33.12	36.46	11.39	35.49	45.48	74.00	-28.52	Peak

*Remarks:*

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *“\*\*”, means this data is the too weak instrument of signal is unable to test.*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

## 8 Test Setup Photo

Radiated Emission

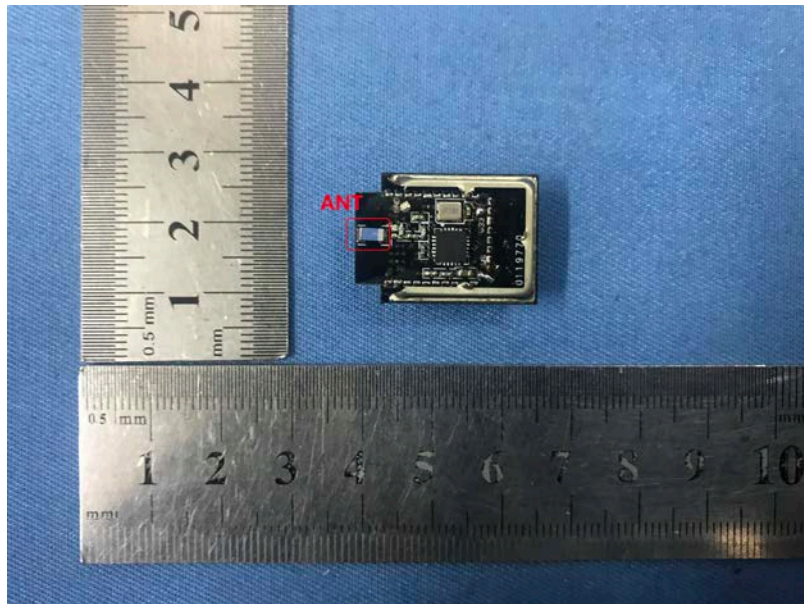


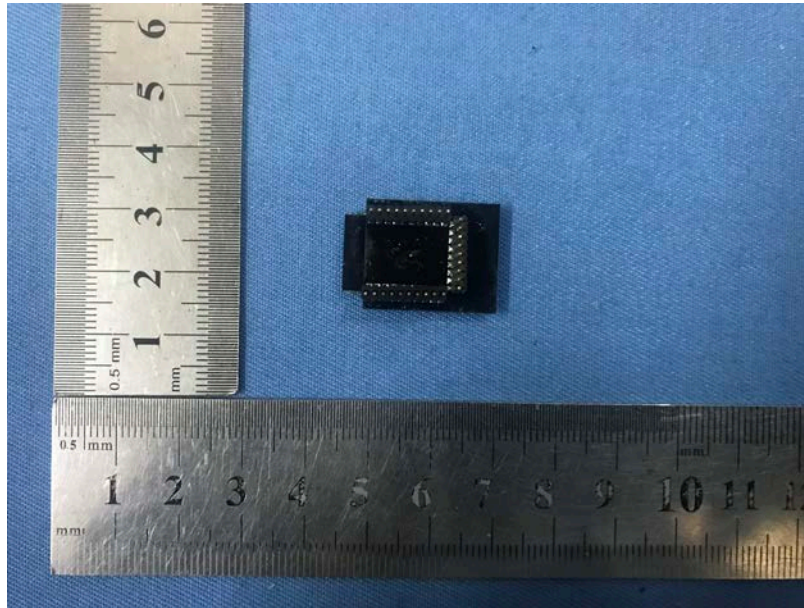
## Conducted Emission





## 9 EUT Constructional Details





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