

# TEST REPORT

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

**Factory:** Dongguan 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: 12-channel receiver

Model No.: FGr12B

Trade Mark: FLYSKY

**FCC ID:** N4ZFGR12B

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

**Date of sample receipt:** June 19, 2020

**Date of Test:** June 22, 2020-July 27, 2020

**Date of report issued:** July 28, 2020

**Test Result :** PASS \*

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

Authorized Signature:

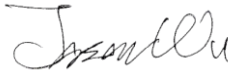



Robinson Lo  
Laboratory Manager

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	July 28, 2020	Original

**Prepared By:**  **Date:** July 28, 2020  
\_\_\_\_\_  
**Project Engineer**

**Check By:**  **Date:** July 28, 2020  
\_\_\_\_\_  
**Reviewer**

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## 4 Test Summary

Test Item	Section	Result
Antenna Requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	N/A
Conducted Peak Output Power	15.247 (b)(1)	Pass
20dB Occupied Bandwidth	15.247 (a)(1)	Pass
Carrier Frequencies Separation	15.247 (a)(1)	Pass
Hopping Channel Number	15.247 (a)(1)	Pass
Dwell Time	15.247 (a)(1)	Pass
Pseudorandom Frequency Hopping Sequence	15.247(b)(4)	Pass
Radiated Emission	15.205/15.209	Pass
Band Edge	15.247(d)	Pass

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

*Remark : Test according to ANSI C63.10:2013.*

### 4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(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:	12-channel receiver
Model No.:	FGr12B
Serial No.:	N/A
Test sample(s) ID:	GTS202006000229-1
Sample(s) Status	Engineer sample
Operation Frequency:	2402.15MHz~2479.85MHz
Channel numbers:	171
Modulation technology:	GMSK
Antenna Type:	Integral Antenna
Antenna gain:	2dBi
Power supply:	DC 3.5-9V

Operation Frequency each of channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402.15	45	2421.95	89	2441.75	133	2462.75
2	2402.60	46	2422.40	90	2442.20	134	2463.20
3	2403.05	47	2422.85	91	2442.65	135	2463.65
4	2403.50	48	2423.30	92	2443.10	136	2464.10
5	2403.95	49	2423.75	93	2444.75	137	2464.55
6	2404.40	50	2424.20	94	2445.20	138	2465.00
7	2404.85	51	2424.65	95	2445.65	139	2465.45
8	2405.30	52	2425.10	96	2446.10	140	2465.90
9	2405.75	53	2425.55	97	2446.55	141	2466.35
10	2406.20	54	2426.00	98	2447.00	142	2466.80
11	2406.65	55	2426.45	99	2447.45	143	2467.25
12	2407.10	56	2426.90	100	2447.90	144	2467.70
13	2407.55	57	2427.35	101	2448.35	145	2468.15
14	2408.00	58	2427.80	102	2448.80	146	2468.60
15	2408.45	59	2428.25	103	2449.25	147	2469.05
16	2408.90	60	2428.70	104	2449.70	148	2469.50
17	2409.35	61	2429.15	105	2450.15	149	2469.95
18	2409.80	62	2429.60	106	2450.60	150	2470.40
19	2410.25	63	2430.05	107	2451.05	151	2470.85
20	2410.70	64	2430.50	108	2451.50	152	2471.30
21	2411.15	65	2430.95	109	2451.95	153	2471.75
22	2411.60	66	2431.40	110	2452.40	154	2472.20
23	2412.05	67	2431.85	111	2452.85	155	2472.65
24	2412.50	68	2432.30	112	2453.30	156	2473.10
25	2412.95	69	2432.75	113	2453.75	157	2473.55
26	2413.40	70	2433.20	114	2454.20	158	2474.00
27	2413.85	71	2433.65	115	2454.65	159	2474.45
28	2414.30	72	2434.10	116	2455.10	160	2474.90
29	2414.75	73	2434.55	117	2455.55	161	2475.35
30	2415.20	74	2435.00	118	2456.00	162	2475.80
31	2415.65	75	2435.45	119	2456.45	163	2476.25
32	2416.10	76	2435.90	120	2456.90	164	2476.70
33	2416.55	77	2436.35	121	2457.35	165	2477.15
34	2417.00	78	2436.80	122	2457.80	166	2477.60
35	2417.45	79	2437.25	123	2458.25	167	2478.05
36	2417.90	80	2437.70	124	2458.70	168	2478.50
37	2418.35	81	2438.15	125	2459.15	169	2478.95
38	2418.80	82	2438.60	126	2459.60	170	2479.40

39	2419.25	83	2439.05	127	2460.05	171	2479.85
40	2419.70	84	2439.50	128	2460.50		
41	2420.15	85	2439.95	129	2460.95		
42	2420.60	86	2440.40	130	2461.40		
43	2421.05	87	2440.85	131	2461.85		
44	2421.50	88	2441.30	132	2462.30		

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	2402.15MHz
The middle channel	2440.40MHz
The Highest channel	2479.85MHz

## 5.2 Test mode

Transmitting mode	Keep the EUT in transmitting mode.
Remark: During the test, the test voltage was tuned from DC 3.5V to DC 9V, and found that the worst case was the DC 9V. So the report just shows that condition's data.	

## 5.3 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.</li> <li>● <b>IC —Registration No.: 9079A</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</li> <li>● <b>NVLAP (LAB CODE:600179-0)</b> Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0</li> </ul>
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## 5.4 Test Location

All other tests were performed at:
<p>Global United Technology Services Co., Ltd. Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960</p>

## 5.5 Description of Support Units

Manufacturer	Description	Model	Serial Number
ShenZhen FLYSKY Technology Co.,Ltd	Remote control	F6S	N/A
MEILI	DC POWER SUPPLY	MCH-305A	011121168

## 5.6 Deviation from Standards

None.
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## 5.7 Abnormalities from Standard Conditions

None.
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## 5.8 Additional Instructions

Software (Used for test) from client
Built-in by manufacturer, power set default.



## 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. 02 2020	July. 01 2025
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. 25 2020	June. 24 2021
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 25 2020	June. 24 2021
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 25 2020	June. 24 2021
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 25 2020	June. 24 2021
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 25 2020	June. 24 2021
9	Coaxial Cable	GTS	N/A	GTS211	June. 25 2020	June. 24 2021
10	Coaxial cable	GTS	N/A	GTS210	June. 25 2020	June. 24 2021
11	Coaxial Cable	GTS	N/A	GTS212	June. 25 2020	June. 24 2021
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 25 2020	June. 24 2021
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 25 2020	June. 24 2021
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 25 2020	June. 24 2021
15	Band filter	Amindeon	82346	GTS219	June. 25 2020	June. 24 2021
16	Power Meter	Anritsu	ML2495A	GTS540	June. 25 2020	June. 24 2021
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 25 2020	June. 24 2021
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 25 2020	June. 24 2021
19	Splitter	Agilent	11636B	GTS237	June. 25 2020	June. 24 2021
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 25 2020	June. 24 2021
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 19 2019	Oct. 18 2020
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 19 2019	Oct. 18 2020
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 19 2019	Oct. 18 2020
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 25 2020	June. 24 2021

<b>RF Conducted Test:</b>						
<b>Item</b>	<b>Test Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Cal.Date (mm-dd-yy)</b>	<b>Cal.Due date (mm-dd-yy)</b>
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 25 2020	June. 24 2021
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 25 2020	June. 24 2021
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 25 2020	June. 24 2021
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 25 2020	June. 24 2021
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 25 2020	June. 24 2021
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 25 2020	June. 24 2021
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 25 2020	June. 24 2021

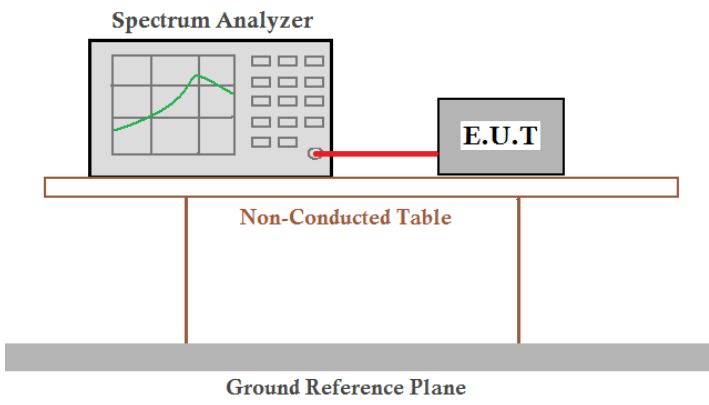
<b>General used equipment:</b>						
<b>Item</b>	<b>Test Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Inventory No.</b>	<b>Cal.Date (mm-dd-yy)</b>	<b>Cal.Due date (mm-dd-yy)</b>
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 25 2020	June. 24 2021
2	Barometer	ChangChun	DYM3	GTS255	June. 25 2020	June. 24 2021

## 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>	
<b>EUT Antenna:</b>	
<p><i>The antenna is integral antenna, the best case gain of the antenna is 2dBi, reference to the appendix II for details.</i></p>	

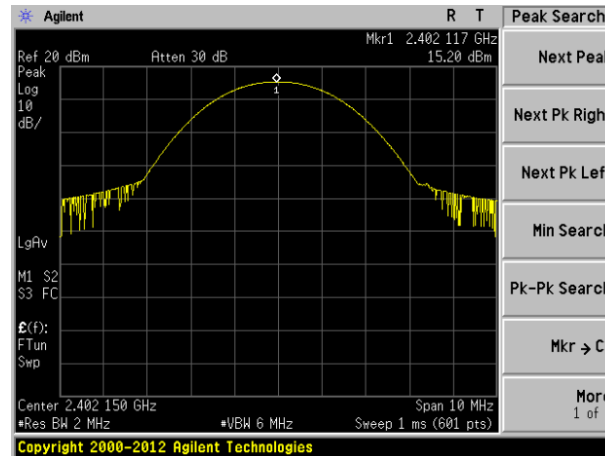
## 7.2 Conducted Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(1)
Test Method:	ANSI C63.10:2013
Limit:	20.97dBm
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

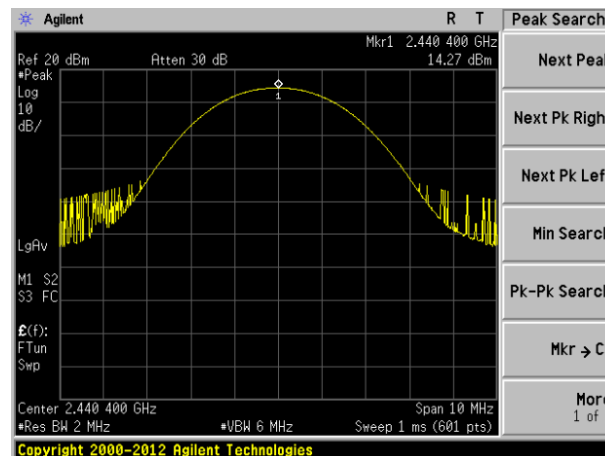
### Measurement Data

Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	15.20	20.97	Pass
Middle	14.27		
Highest	14.64		

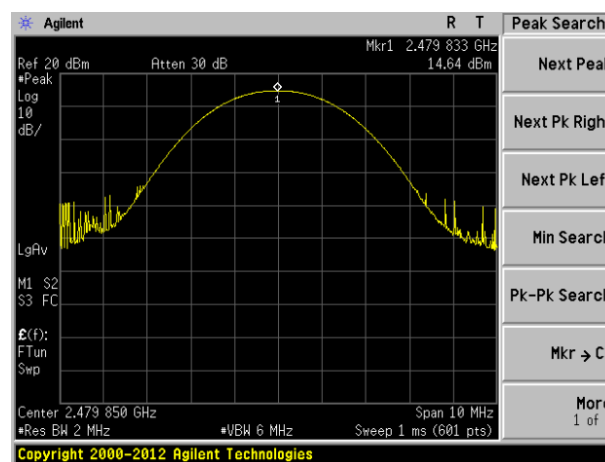
Test plot as follows:



Lowest channel

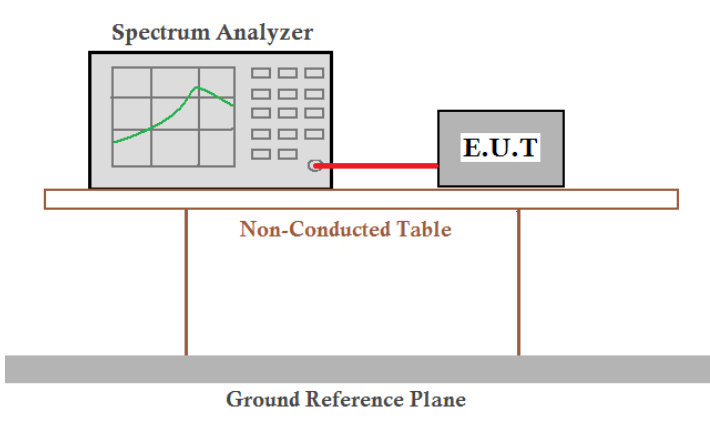


Middle channel



Highest channel

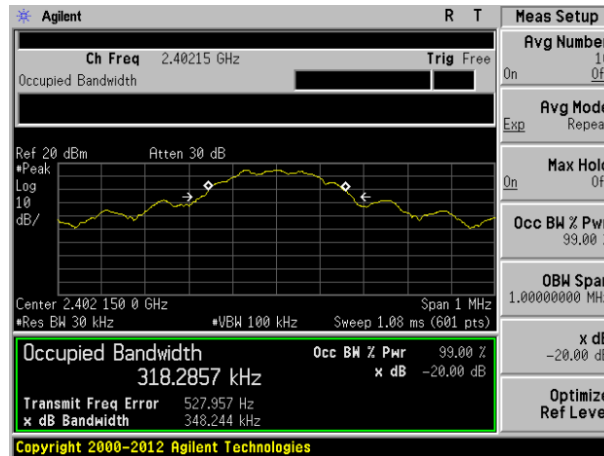
### 7.3 20dB Emission Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Limit:	N/A
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 positioned above 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

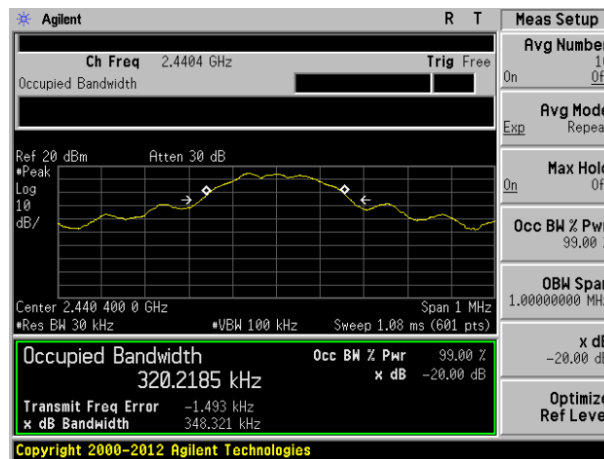
### Measurement Data

Test channel	20dB Emission Bandwidth (MHz)	Result
Lowest	0.348	Pass
Middle	0.348	
Highest	0.347	

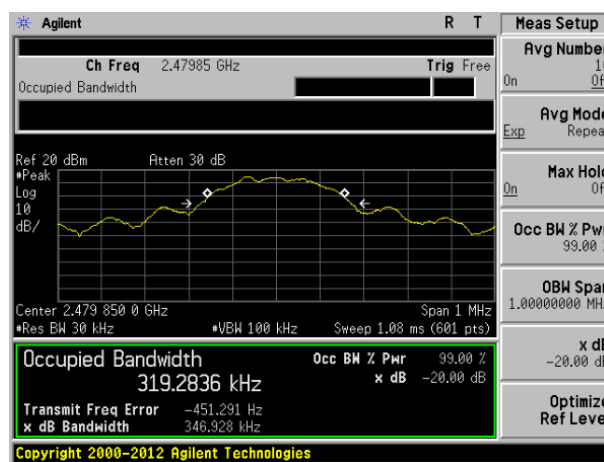
Test plot as follows:



Lowest channel

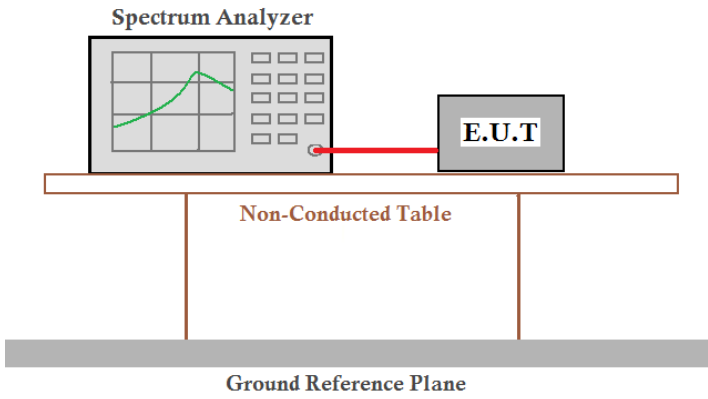


Middle channel



Highest channel

## 7.4 Carrier Frequencies Separation

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100KHz, VBW=300KHz, detector=Peak
Limit:	0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)
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

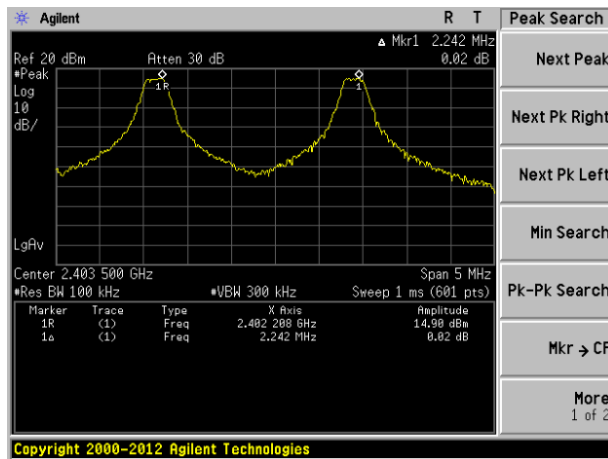
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	2242	232	Pass
Middle	773	232	Pass
Highest	2783	232	Pass

Note: According to section 7.3

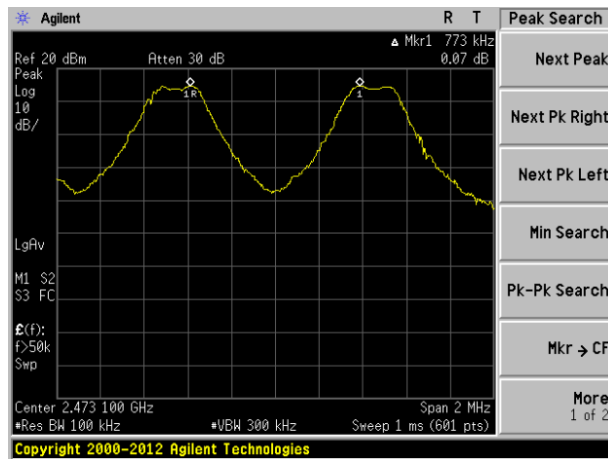
Mode	20dB bandwidth (kHz) (worse case)	Limit (kHz) (Carrier Frequencies Separation)
GMSK	348	232



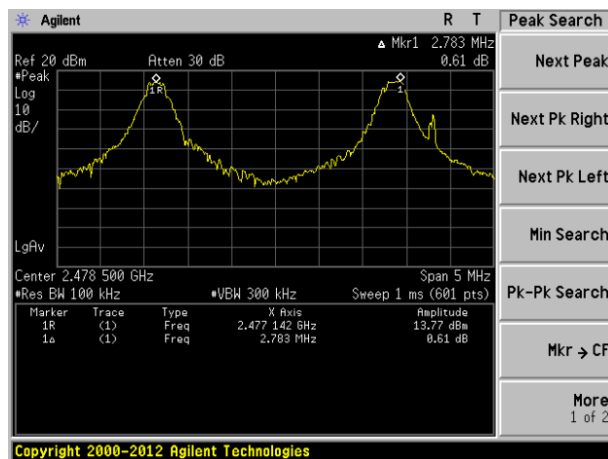
Test plot as follows:



Lowest channel

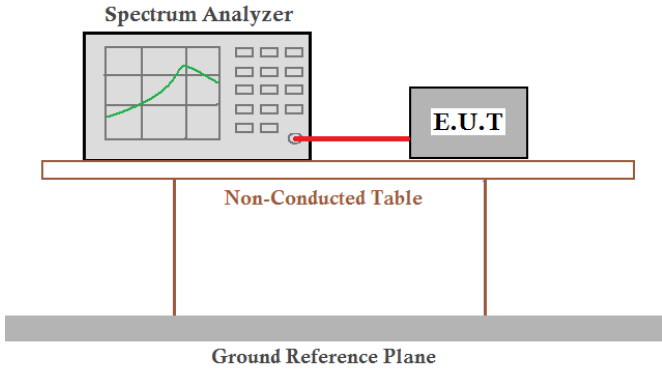


Middle channel



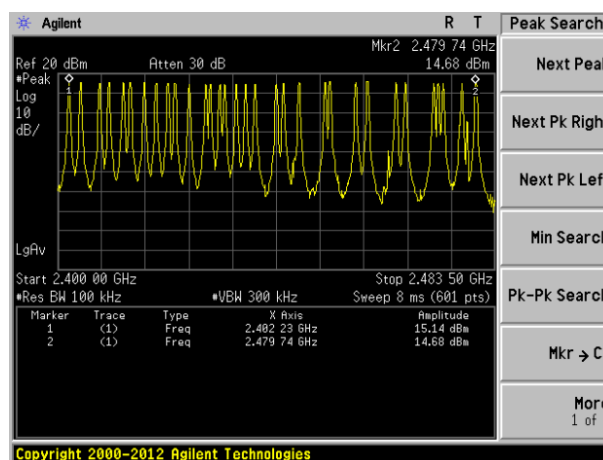
Highest channel

## 7.5 Hopping Channel Number

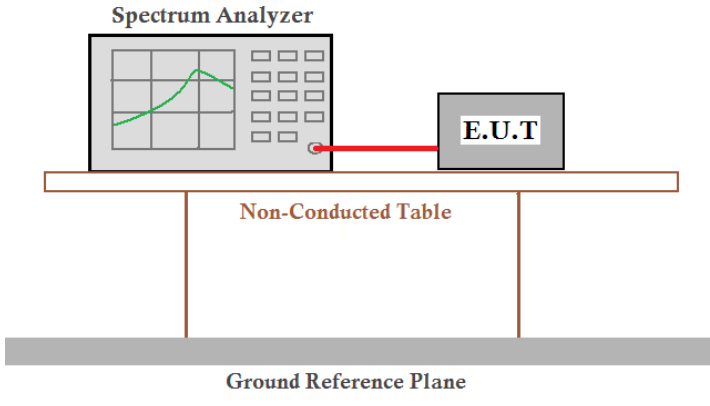
Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100kHz, VBW=300kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak
Limit:	15 channels
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an Equipment Under Test (E.U.T.). 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

### Measurement Data:

Hopping channel numbers	Limit	Result
32	15	Pass



## 7.6 Dwell Time

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=1MHz, VBW=1MHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second
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

Frequency(MHz)	Ton (ms)	Dwell time(ms)	Limit(ms)	Result
2402.15	1.933	74.2272	400	Pass
2440.40	1.933	148.4544	400	Pass
2479.85	1.933	74.2272	400	Pass

The formula as below:

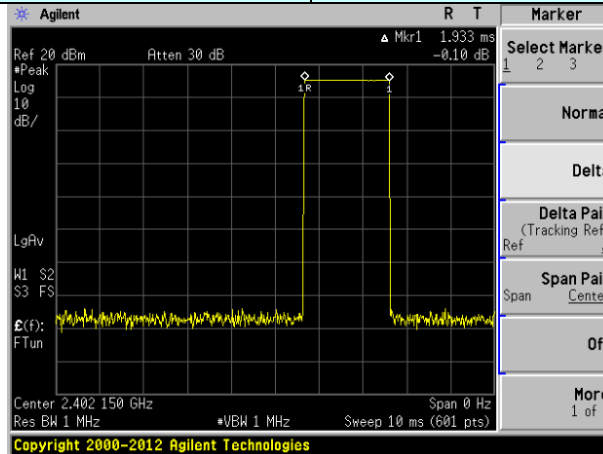
2402.15MHz: Dwell time = Ton \* Ton times in 1s \* 0.4s \* channel numbers=1.933ms\*3\*0.4\*32=74.2272ms

2440.40MHz: Dwell time = Ton \* Ton times in 1s \* 0.4s \* channel numbers=1.933ms\*6\*0.4\*32=148.4544ms

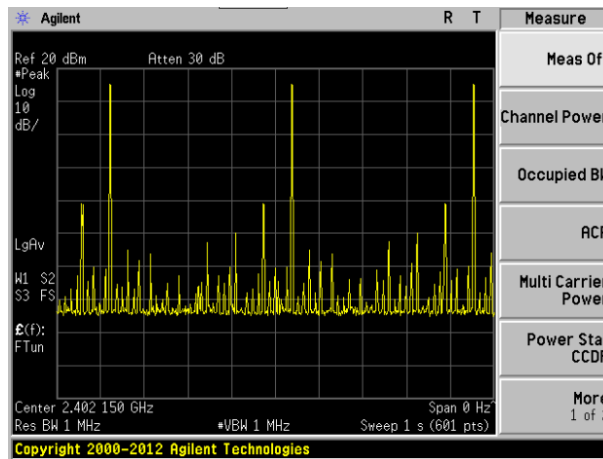
2479.85MHz: Dwell time = Ton \* Ton times in 1s \* 0.4s \* channel numbers=1.933ms\*3\*0.4\*32=74.2272ms

Test plot as follows:

Frequency:	2402.15MHz
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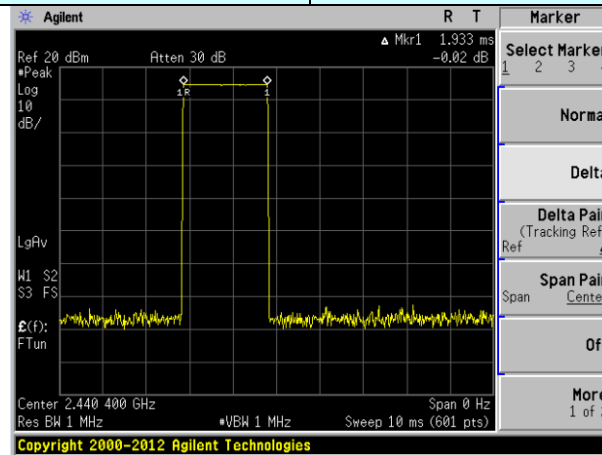


Ton

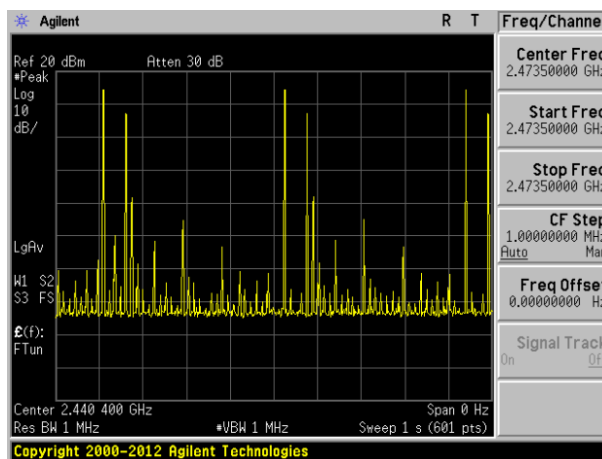


Ton times in 1s

Frequency: 2440.40MHz

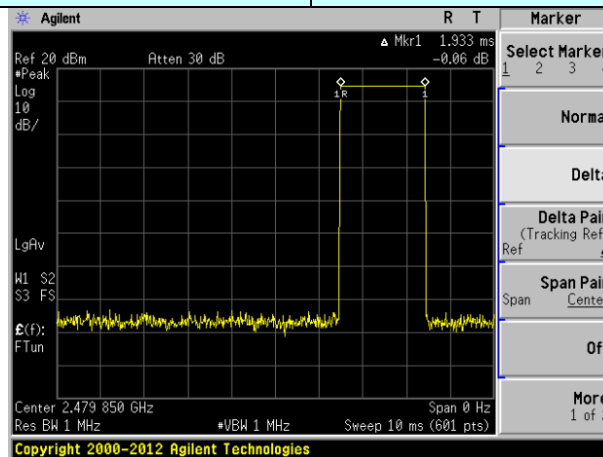


Ton

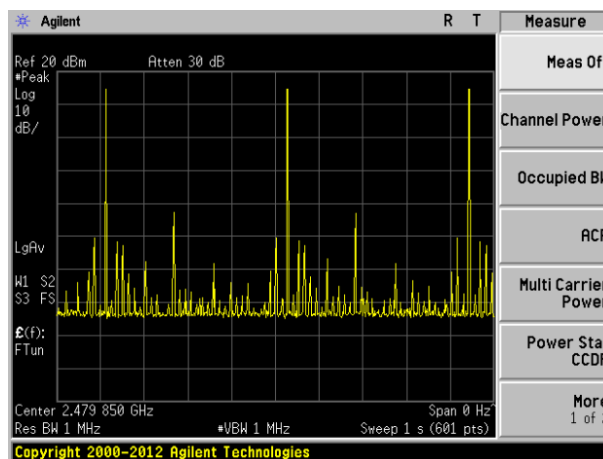


Ton times in 1s

Frequency: 2479.85MHz



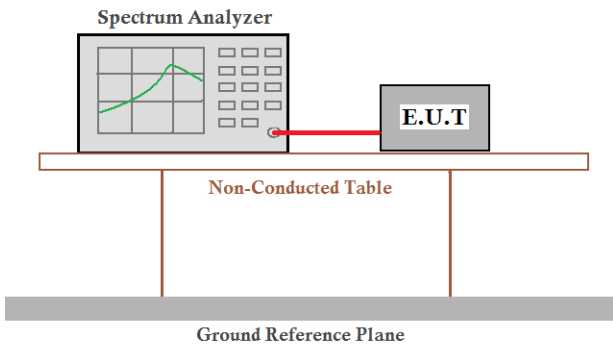
Ton



Ton times in 1s

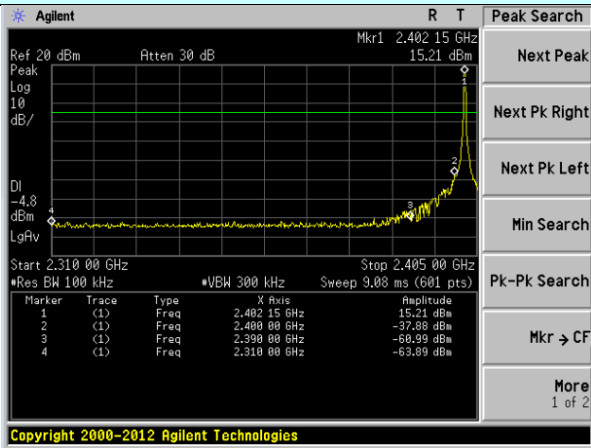
## 7.7 Band Edge

### 7.7.1 Conducted Emission Method

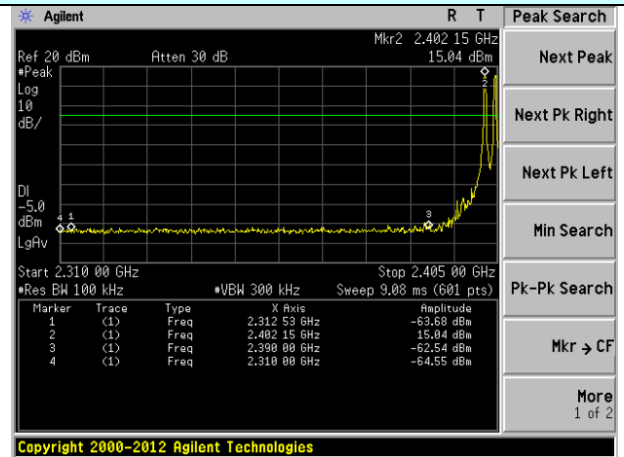
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100kHz, VBW=300kHz, Detector=Peak
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by 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:

Test channel: Lowest channel

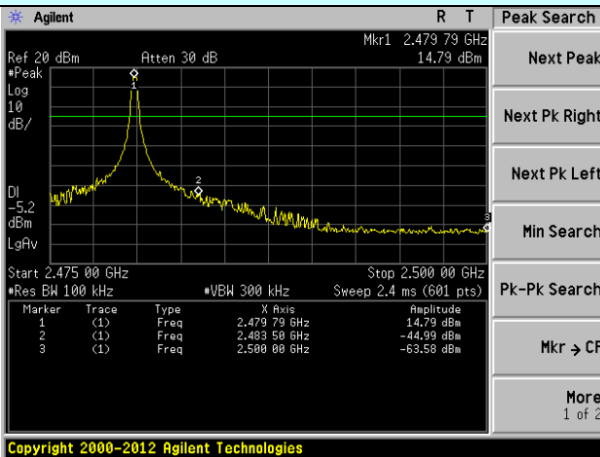


No-hopping mode

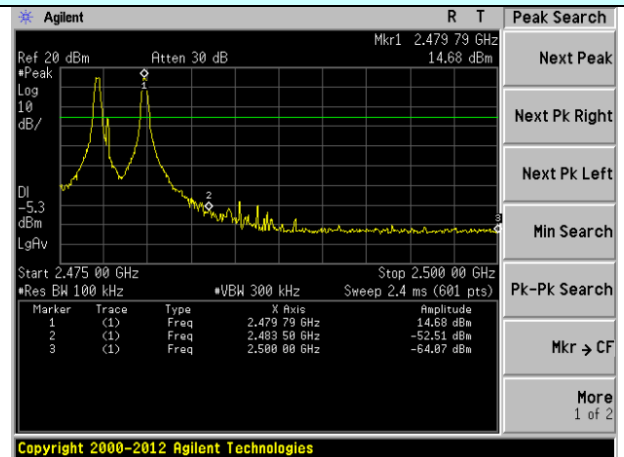


Hopping mode

Test channel: Highest channel



No-hopping mode



Hopping mode



## 7.7.2 Radiated Emission Method

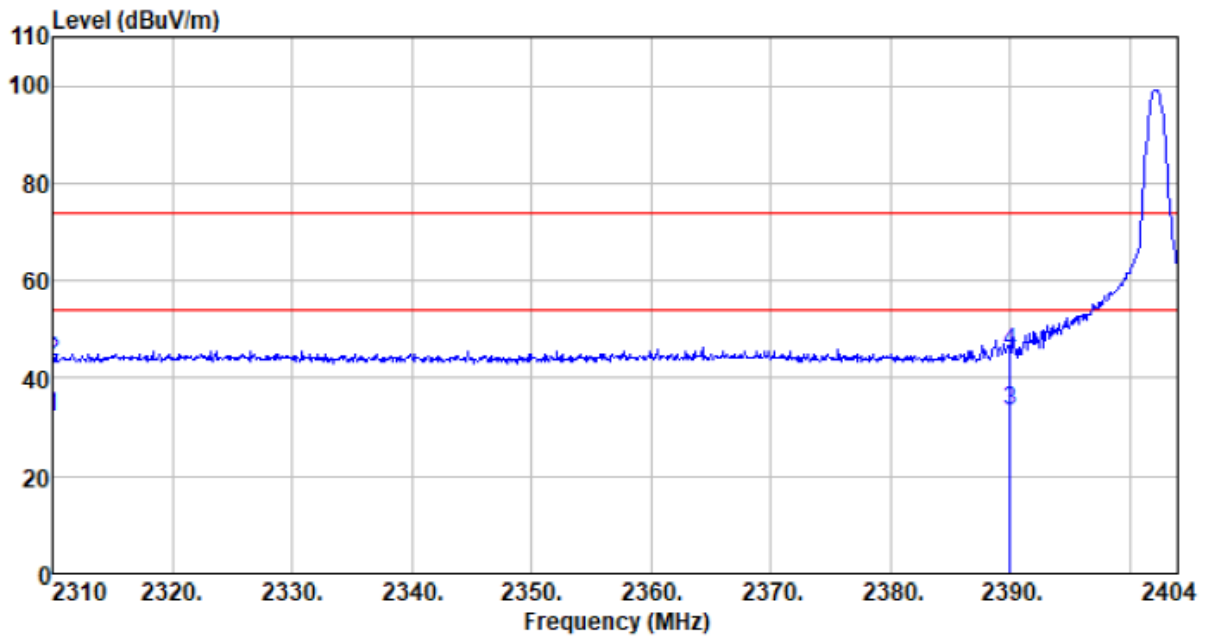
Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	Above 1GHz		54.00		Average Value
			74.00		Peak Value
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> </ol>				
Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.2 for details				
Temp. / Hum.	Temp.:	25 °C	Humid.:	52%	Press.: 1 012mbar
Test results:	Pass				

## Measurement Data

Remark:

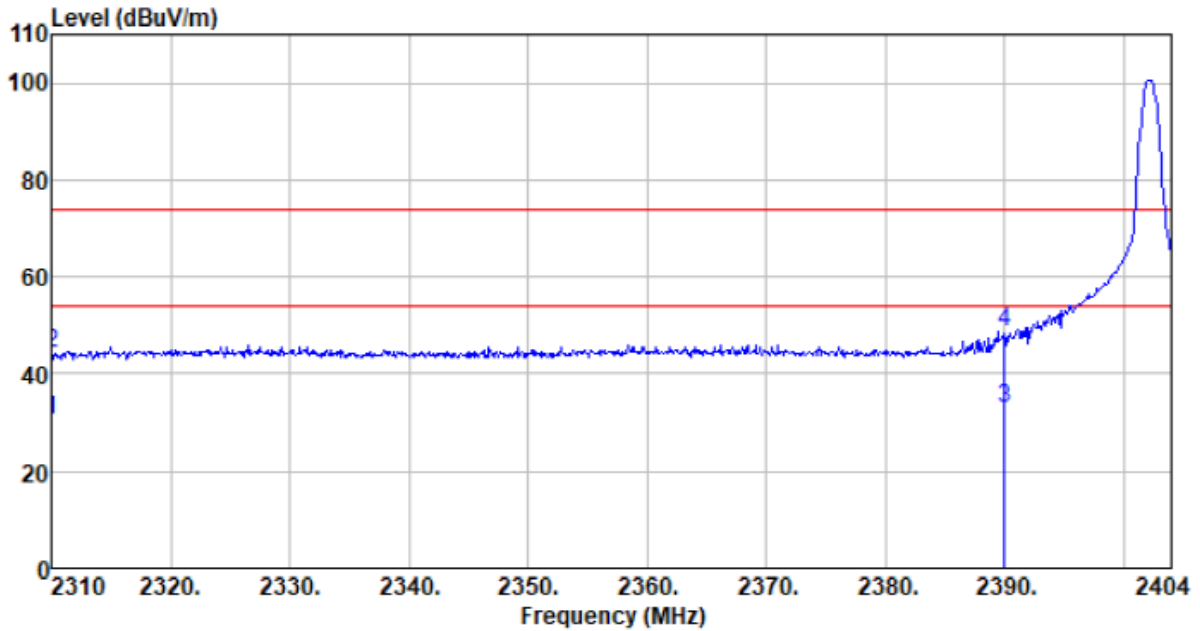
1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

Test channel:	Lowest	Polarization:	Vertical
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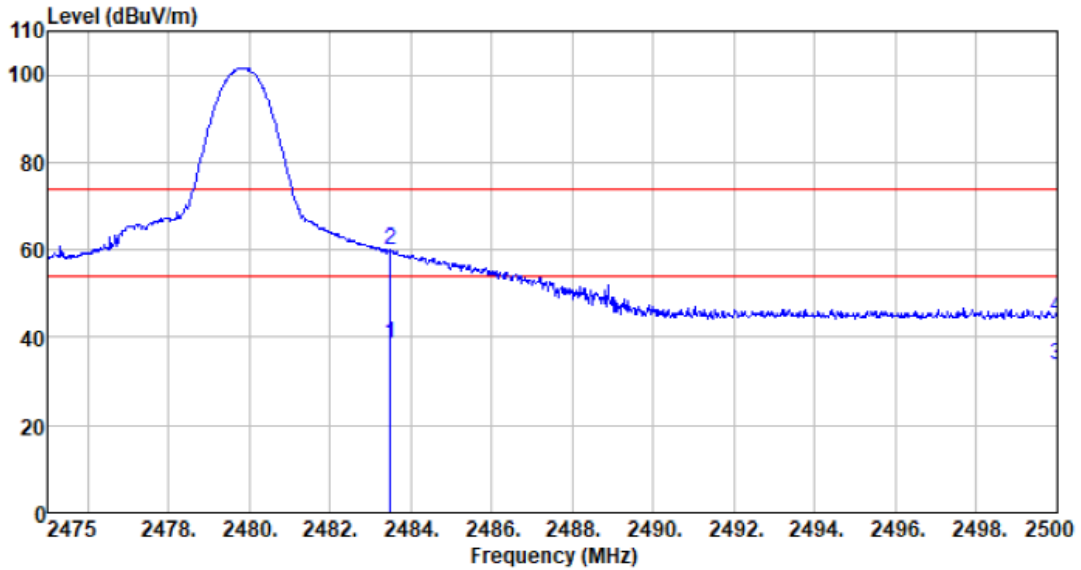
Freq MHz	Reading level dBUV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBUV/m	Limit level dBUV/m	Over limit dB	Remark
2310.000	32.53	27.14	2.81	30.43	32.05	54.00	-21.95	Average
2310.000	43.75	27.14	2.81	30.43	43.27	74.00	-30.73	Peak
2390.000	33.29	27.37	2.91	30.24	33.33	54.00	-20.67	Average
2390.000	45.33	27.37	2.91	30.24	45.37	74.00	-28.63	Peak

Test channel:	Lowest	Polarization:	Horizontal
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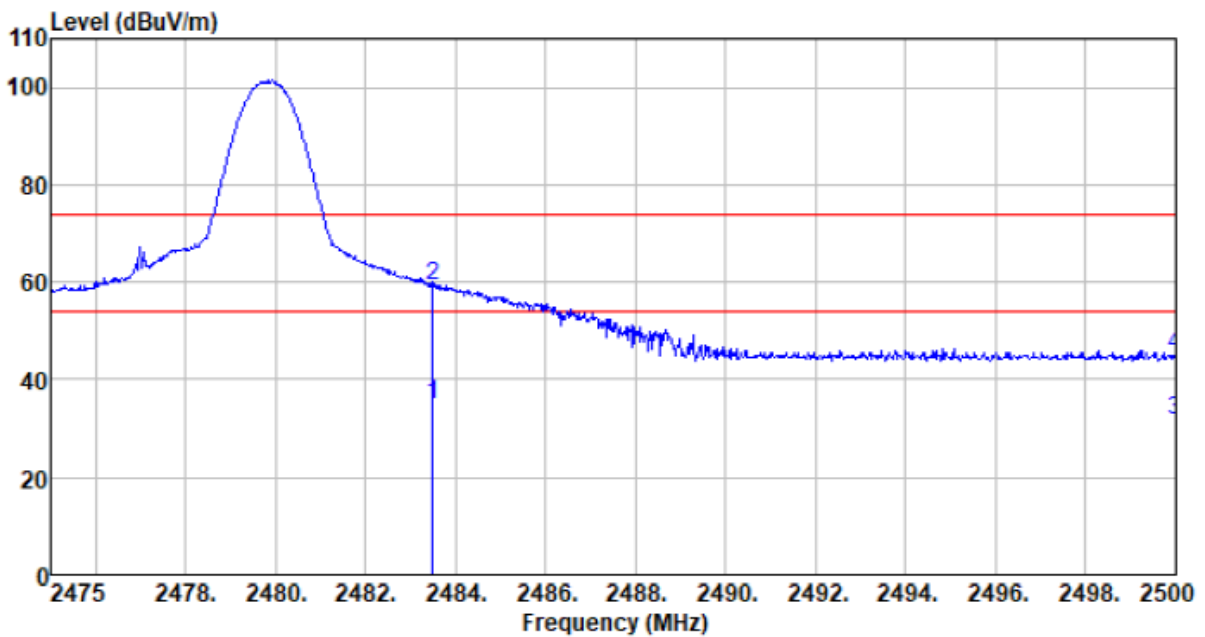
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	30.88	27.14	2.81	30.43	30.40	54.00	-23.60	Average
2310.000	44.88	27.14	2.81	30.43	44.40	74.00	-29.60	Peak
2390.000	32.87	27.37	2.91	30.24	32.91	54.00	-21.09	Average
2390.000	48.68	27.37	2.91	30.24	48.72	74.00	-25.28	Peak

Test channel:	Highest	Polarization:	Vertical
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2483.500	38.06	27.66	2.99	30.12	38.59	54.00	-15.41	Average
2483.500	59.59	27.66	2.99	30.12	60.12	74.00	-13.88	Peak
2500.000	33.17	27.70	3.01	30.13	33.75	54.00	-20.25	Average
2500.000	44.26	27.70	3.01	30.13	44.84	74.00	-29.16	Peak

Test channel:	Highest	Polarization:	Horizontal
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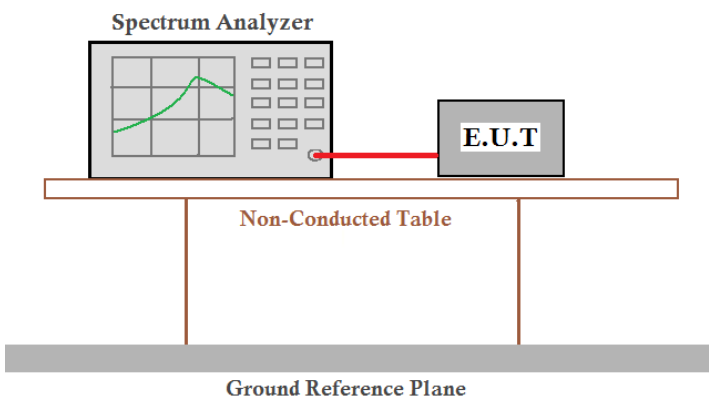
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2483.500	34.42	27.66	2.99	30.12	34.95	54.00	-19.05	Average
2483.500	58.83	27.66	2.99	30.12	59.36	74.00	-14.64	Peak
2500.000	30.94	27.70	3.01	30.13	31.52	54.00	-22.48	Average
2500.000	44.46	27.70	3.01	30.13	45.04	74.00	-28.96	Peak

**Remark:**

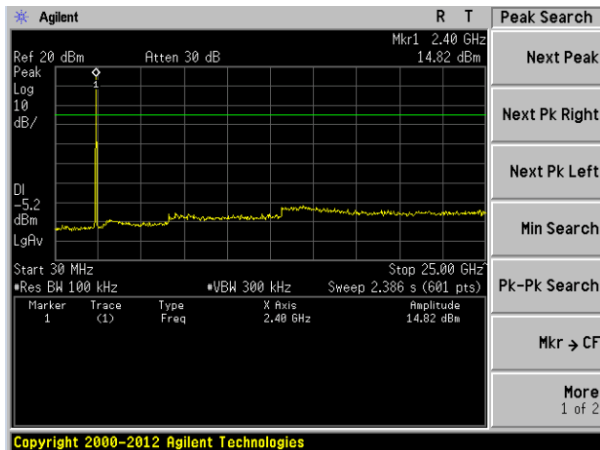
1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

## 7.8 Spurious Emission

### 7.8.1 Conducted Emission Method

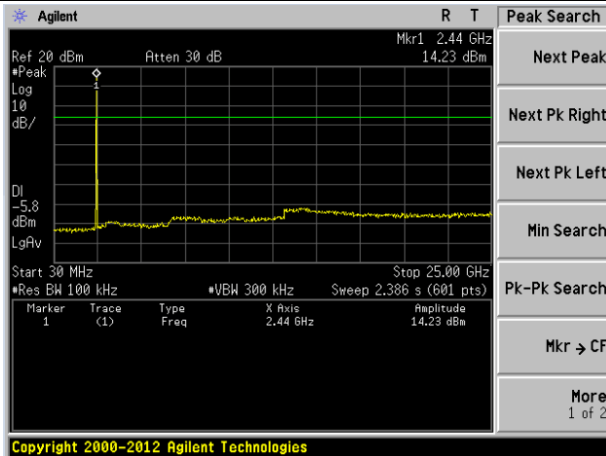
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below 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 two 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

Lowest channel



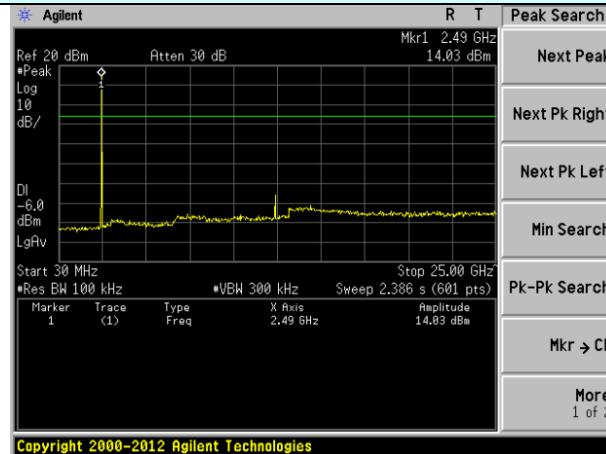
30MHz~25GHz

Middle channel



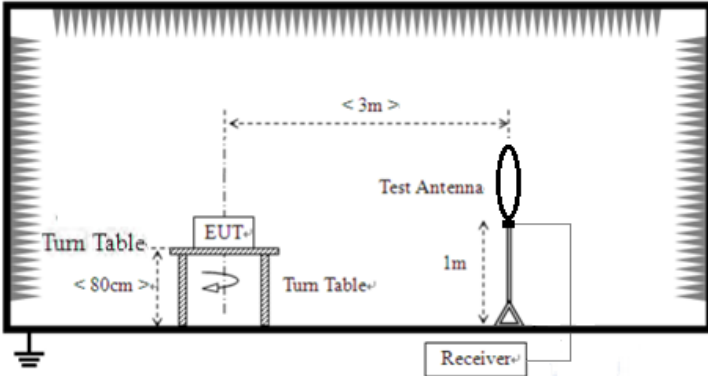
30MHz~25GHz

Highest channel



30MHz~25GHz

## 7.8.2 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:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
Peak		1MHz	10Hz	Average	
Limit: (Spurious Emissions)	Frequency	Limit (uV/m)	Value	Measurement Distance	
	0.009MHz-0.490MHz	2400/F(KHz)	QP	300m	
	0.490MHz-1.705MHz	24000/F(KHz)	QP	30m	
	1.705MHz-30MHz	30	QP	30m	
	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:	Below 30MHz				
					
Below 1GHz					



	<p>Above 1GHz</p>						
<p>Test Procedure:</p>	<ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table (0.8 meters for below 1GHz and 1.5meters for above 1GHz) 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> </ol>						
<p>Test Instruments:</p>	<p>Refer to section 5.8 for details</p>						
<p>Test mode:</p>	<p>Refer to section 5.2 for details</p>						
<p>Temp. / Hum.</p>	<table border="1"> <tr> <td>Temp.:</td> <td>25 °C</td> <td>Humid.:</td> <td>52%</td> <td>Press.:</td> <td>1 012mbar</td> </tr> </table>	Temp.:	25 °C	Humid.:	52%	Press.:	1 012mbar
Temp.:	25 °C	Humid.:	52%	Press.:	1 012mbar		

Test results:	Pass
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*Remark:*

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

**Measurement data:**

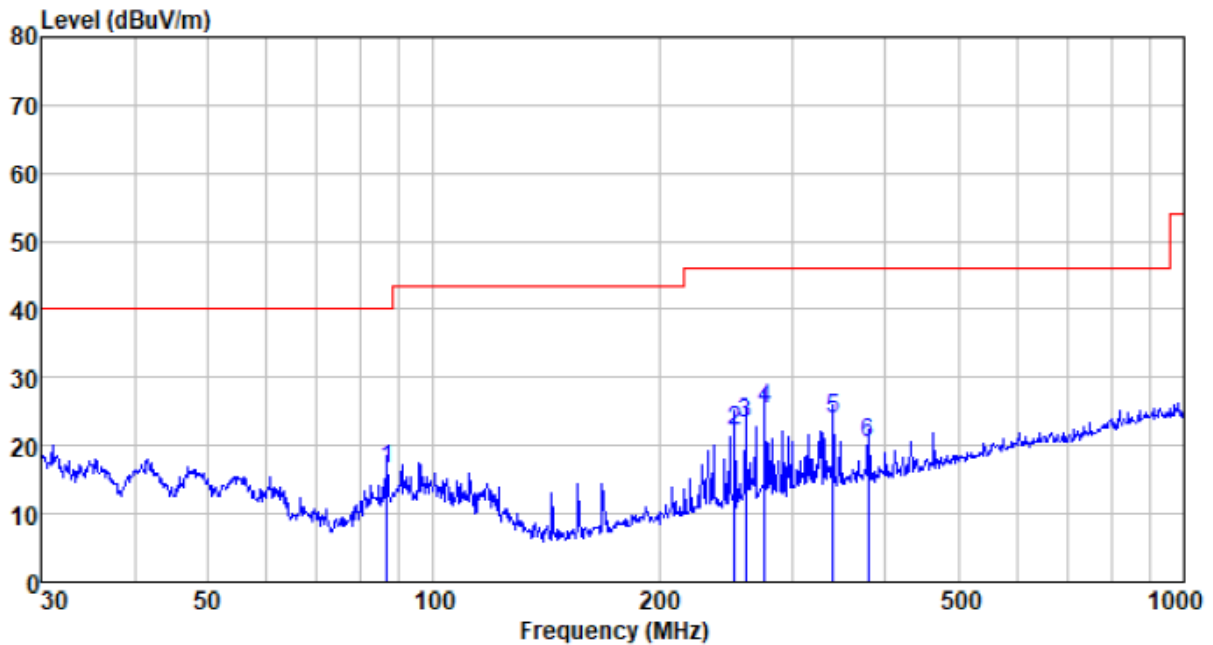
■ **Below 30MHz**

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.

■ 30MHz ~ 1GHz

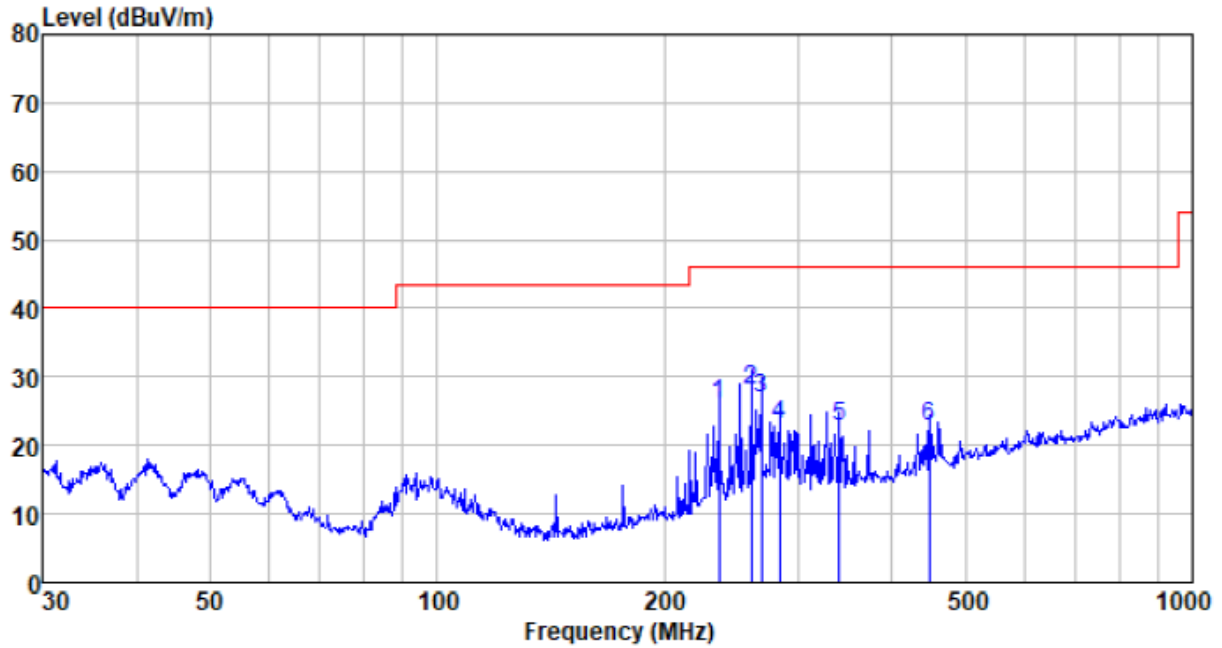
Pre-scan all test modes, found worst case at 2479.85MHz, and so only show the test result of 2479.85MHz

Vertical



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
86.807	42.43	9.68	1.08	36.61	16.58	40.00	-23.42	QP
252.063	45.14	12.22	2.14	37.38	22.12	46.00	-23.88	QP
260.144	46.05	12.47	2.18	37.39	23.31	46.00	-22.69	QP
276.124	47.55	12.95	2.25	37.40	25.35	46.00	-20.65	QP
340.782	44.52	14.37	2.57	37.46	24.00	46.00	-22.00	QP
379.914	40.16	15.00	2.76	37.50	20.42	46.00	-25.58	QP

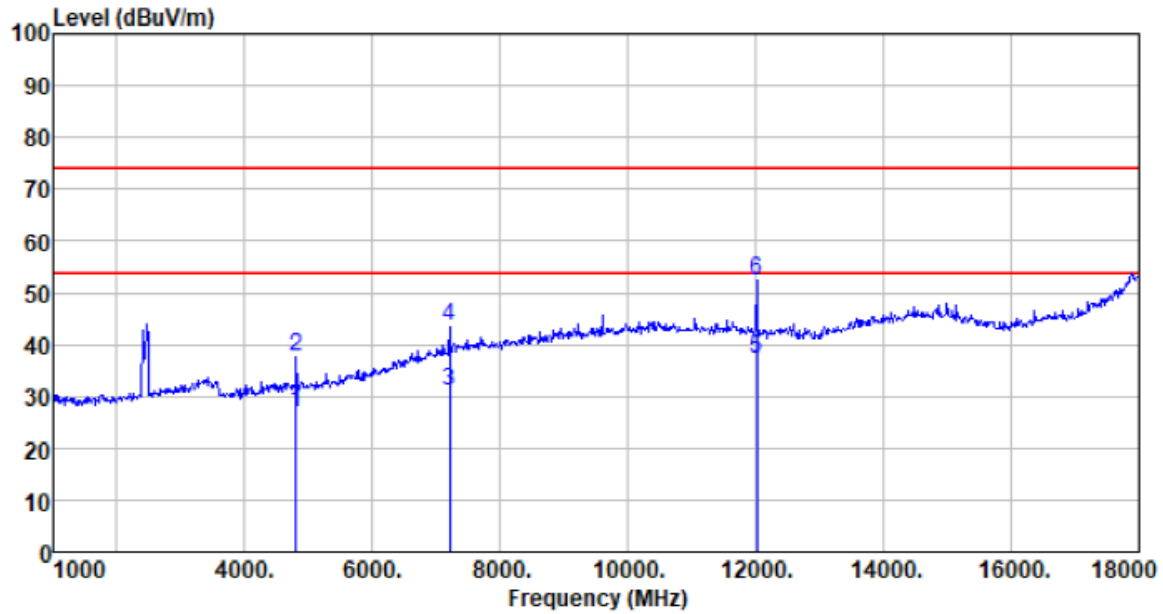
Horizontal



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
235.816	49.49	11.71	2.05	37.37	25.88	46.00	-20.12	QP
260.144	50.87	12.47	2.18	37.39	28.13	46.00	-17.87	QP
268.485	49.34	12.73	2.21	37.40	26.88	46.00	-19.12	QP
283.979	44.99	13.16	2.29	37.41	23.03	46.00	-22.97	QP
340.782	43.25	14.37	2.57	37.46	22.73	46.00	-23.27	QP
447.982	40.75	16.32	3.08	37.51	22.64	46.00	-23.36	QP

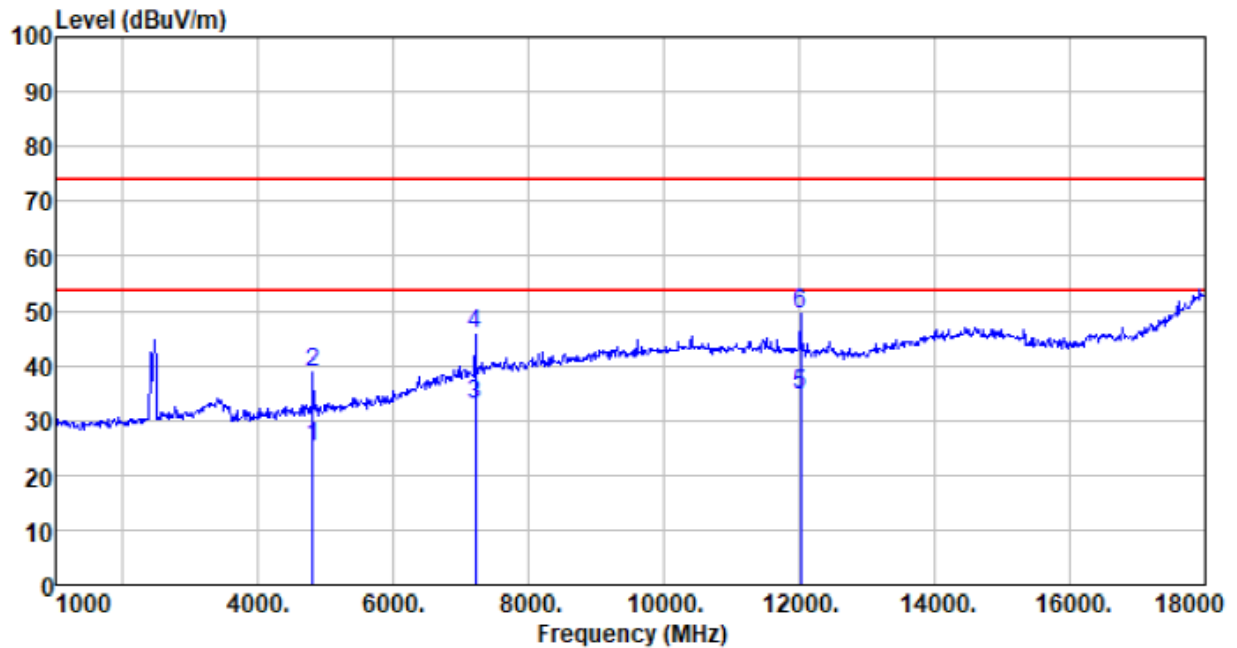
■ Above 1GHz

Test channel:	Lowest	Polarization:	Vertical
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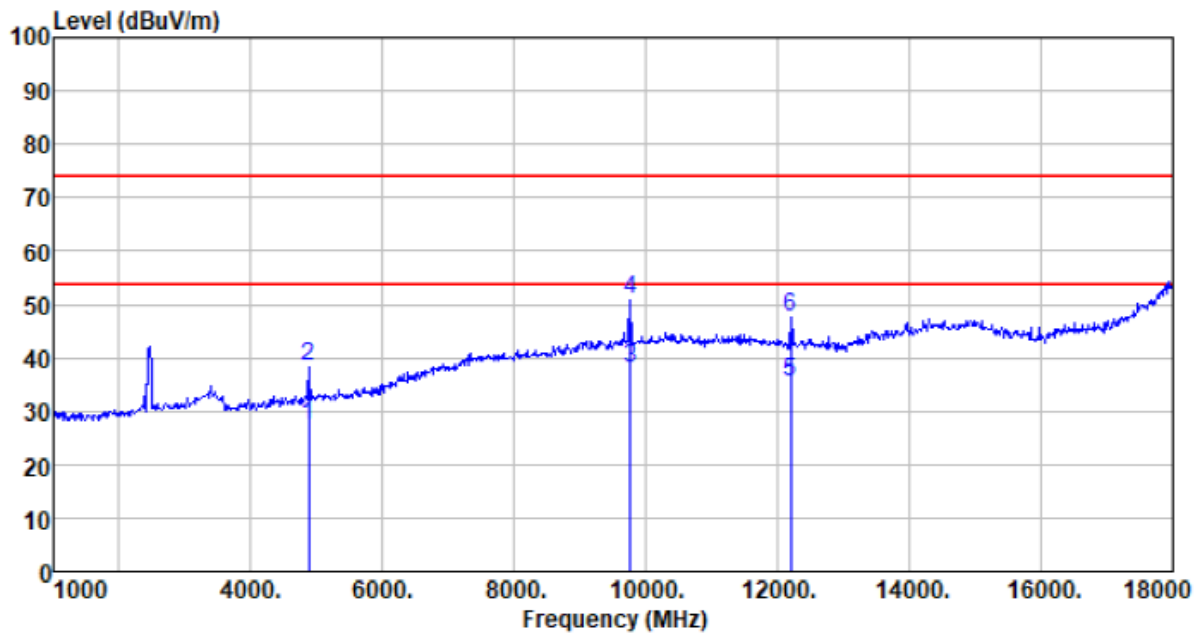
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4804.300	28.87	31.20	4.61	37.73	26.95	54.00	-27.05	Average
4804.300	39.39	31.20	4.61	37.73	37.47	74.00	-36.53	Peak
7206.450	24.15	36.16	6.48	35.63	31.16	54.00	-22.84	Average
7206.450	36.61	36.16	6.48	35.63	43.62	74.00	-30.38	Peak
12010.750	26.19	38.50	8.94	36.20	37.43	54.00	-16.57	Average
12010.750	41.02	38.50	8.94	36.20	52.26	74.00	-21.74	Peak

Test channel:	Lowest	Polarization:	Horizontal
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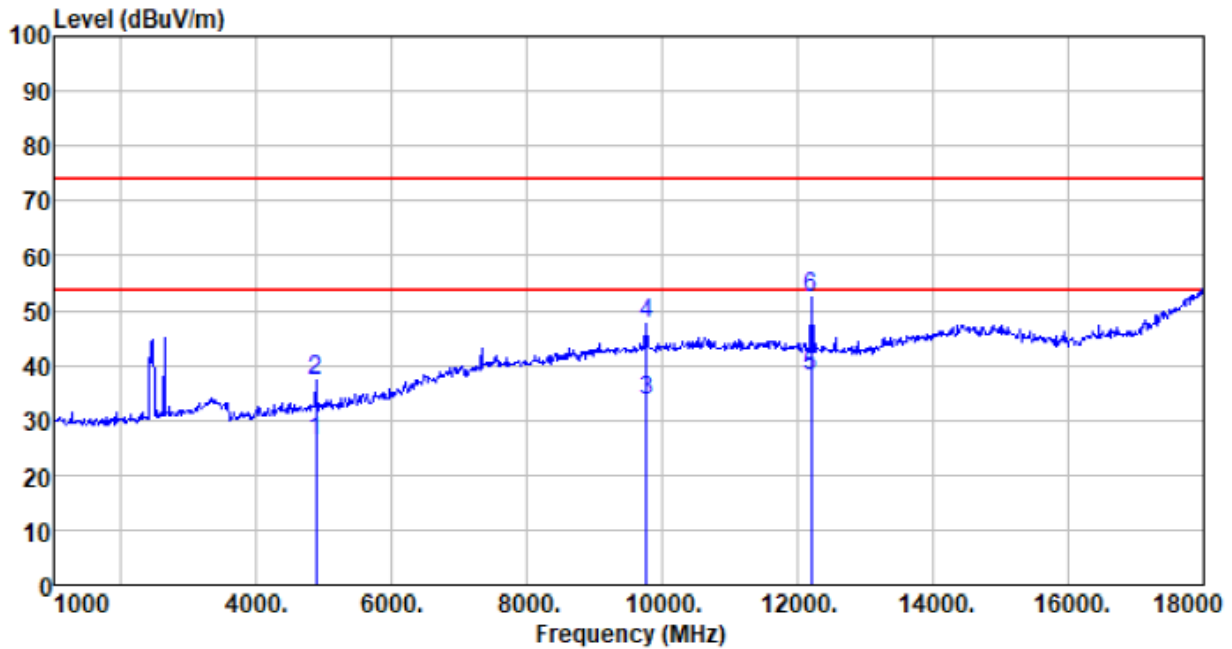
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4804.300	26.91	31.20	4.61	37.73	24.99	54.00	-29.01	Average
4804.300	40.49	31.20	4.61	37.73	38.57	74.00	-35.43	Peak
7206.450	25.84	36.16	6.48	35.63	32.85	54.00	-21.15	Average
7206.450	38.78	36.16	6.48	35.63	45.79	74.00	-28.21	Peak
12010.750	23.42	38.50	8.94	36.20	34.66	54.00	-19.34	Average
12010.750	38.04	38.50	8.94	36.20	49.28	74.00	-24.72	Peak

Test channel:	Middle	Polarization:	Vertical
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4880.800	28.89	31.31	4.69	37.75	27.14	54.00	-26.86	Average
4880.800	40.28	31.31	4.69	37.75	38.53	74.00	-35.47	Peak
9761.600	26.77	38.10	8.03	35.03	37.87	54.00	-16.13	Average
9761.600	39.68	38.10	8.03	35.03	50.78	74.00	-23.22	Peak
12202.000	24.20	38.57	8.96	36.31	35.42	54.00	-18.58	Average
12202.000	36.42	38.57	8.96	36.31	47.64	74.00	-26.36	Peak

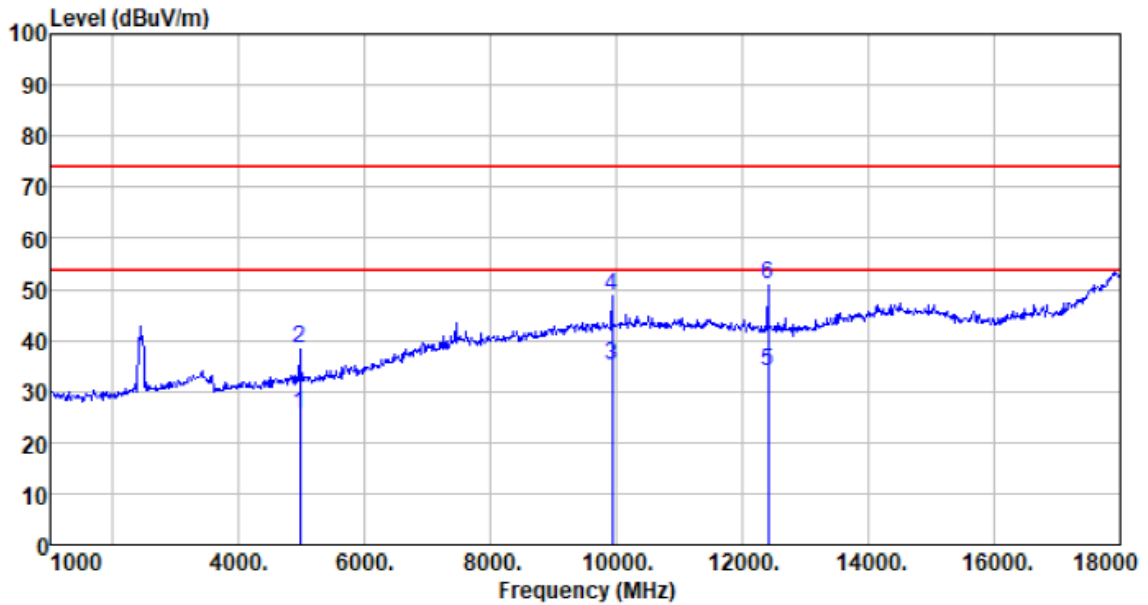
Test channel:	Middle	Polarization:	Horizontal
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4880.800	27.83	31.31	4.69	37.75	26.08	54.00	-27.92	Average
4880.800	38.98	31.31	4.69	37.75	37.23	74.00	-36.77	Peak
9761.600	22.48	38.10	8.03	35.03	33.58	54.00	-20.42	Average
9761.600	36.65	38.10	8.03	35.03	47.75	74.00	-26.25	Peak
12202.000	26.70	38.57	8.96	36.31	37.92	54.00	-16.08	Average
12202.000	41.27	38.57	8.96	36.31	52.49	74.00	-21.51	Peak

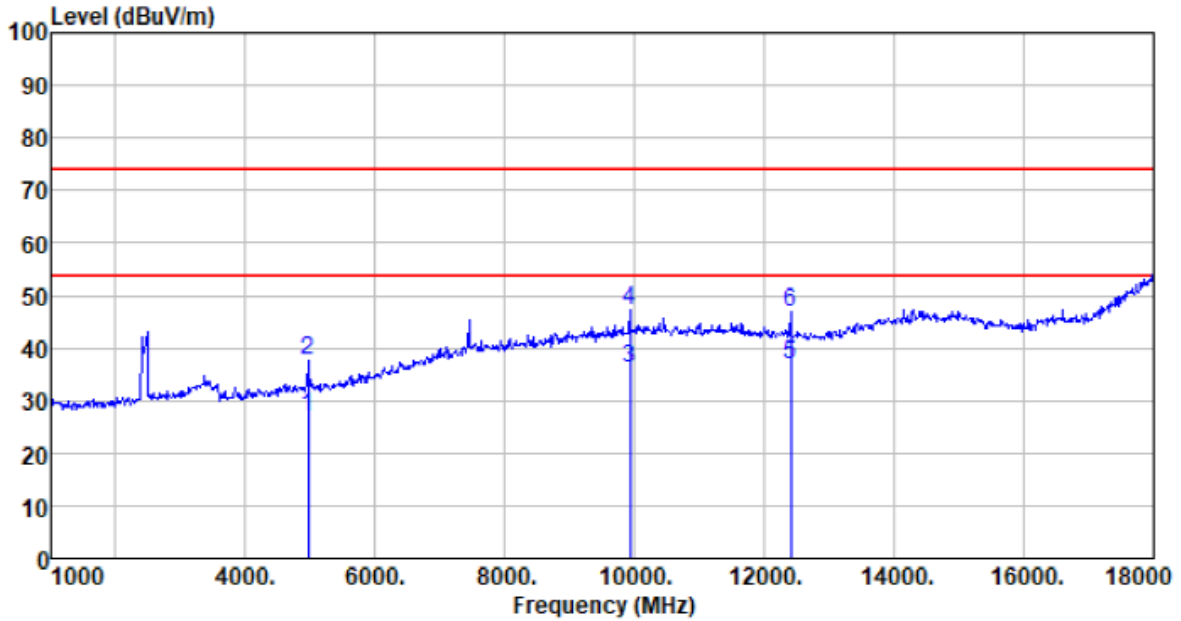


Test channel:	Highest	Polarization:	Vertical
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4959.700	26.97	31.44	4.79	37.78	25.42	54.00	-28.58	Average
4959.700	39.99	31.44	4.79	37.78	38.44	74.00	-35.56	Peak
9919.400	23.83	38.30	8.09	35.14	35.08	54.00	-18.92	Average
9919.400	37.58	38.30	8.09	35.14	48.83	74.00	-25.17	Peak
12399.250	22.75	38.66	8.97	36.44	33.94	54.00	-20.06	Average
12399.250	39.77	38.66	8.97	36.44	50.96	74.00	-23.04	Peak

Test channel:	Highest	Polarization:	Horizontal
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4959.700	28.34	31.44	4.79	37.78	26.79	54.00	-27.21	Average
4959.700	39.33	31.44	4.79	37.78	37.78	74.00	-36.22	Peak
9919.400	24.96	38.30	8.09	35.14	36.21	54.00	-17.79	Average
9919.400	36.10	38.30	8.09	35.14	47.35	74.00	-26.65	Peak
12399.250	25.62	38.66	8.97	36.44	36.81	54.00	-17.19	Average
12399.250	35.76	38.66	8.97	36.44	46.95	74.00	-27.05	Peak

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. No emission found in frequency above 18GHz.

## 8 Test Setup Photo

Reference to the **appendix I** for details.

## 9 EUT Constructional Details

Reference to the **appendix II** for details.

---End---