FCC Report

Applicant:	Amimon Ltd.
Address of Applicant:	2 Maskit St. Herzlia Israel
Equipment Under Test (EUT)	
Product Name:	Digital propotional radio control system
Model No.:	AMI-X6B
FCC ID:	VQSFALCORERX
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247:2016
Date of sample receipt:	December 14, 2016
Date of Test:	December 15-26, 2016
Date of report issued:	December 27, 2016
Test Result :	PASS *

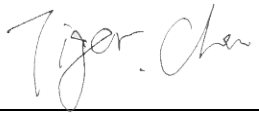
* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

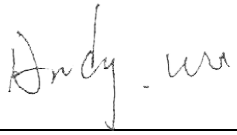
Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*December 27, 2016*	*Original*

Prepared By:  ***Date:*** *December 27, 2016*

Project Engineer

Check By:  ***Date:*** *December 27, 2016*

Reviewer

3 Contents

Page

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.

N/A: Not applicable..

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

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(1)
Conducted Peak Output Power	2.4GHz ~ 2.4835GHz	±1.5dB	(1)
20dB Emission Bandwidth	2.4GHz ~ 2.4835GHz	±5 %	(1)
Carrier Frequencies Separation	2.4GHz ~ 2.4835GHz	±5 %	(1)
Dwell Time	2.4GHz ~ 2.4835GHz	±5 %	(1)
Band Edge	2.31GHz ~ 2.5GHz	± 3.5dB	(1)
Hopping Channel Number	2.4GHz ~ 2.4835GHz	N/A	(1)
Pseudorandom Frequency Hopping Sequence	2.4GHz ~ 2.4835GHz	N/A	(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 Client Information

Applicant:	Amimon Ltd.
Address of Applicant:	2 Maskit St. Herzlia Israel
Manufacturer/Factory:	Dongguan Flysky RC Model technology Co.,Ltd
Address of Manufacturer/ Factory:	West building 3, Huangjiangyuan Ind Park, Qiaoli North Gate, Changping Town, Dongguan ,China

5.2 General Description of EUT

Product Name:	Digital propotional radio control system
Model No.:	AMI-X6B
Operation Frequency:	2408.0MHz~2475.0MHz
Channel numbers:	135
Modulation technology:	GFSK
Antenna Type:	ANT 1: Integral Antenna ANT 2: Integral Antenna
Antenna gain:	ANT 1: 0dBi ANT 2: 0dBi
Power supply:	DC 4.0V~6.5V

Remark: The system works in the frequency range of 2408.0MHz to 2475MHz. This band has been divided to 135 independent channels. Each radio system uses 16 different channels, the minimum channel separation is ≥1MHz. By using various switch-on times, hopping scheme and channel frequencies, the system can guarantee a jamming free radio transmission. The channel list is below.

Operation Frequency each of channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2408.00	36	2425.50	71	2443.00	106	2460.50
2	2408.50	37	2426.00	72	2443.50	107	2461.00
3	2409.00	38	2426.50	73	2444.00	108	2461.50
4	2409.50	39	2427.00	74	2444.50	109	2462.00
5	2410.00	40	2427.50	75	2445.00	110	2462.50
6	2410.50	41	2428.00	76	2445.50	111	2463.00
7	2411.00	42	2428.50	77	2446.00	112	2463.50
8	2411.50	43	2429.00	78	2446.50	113	2464.00
9	2412.00	44	2429.50	79	2447.00	114	2464.50
10	2412.50	45	2430.00	80	2447.50	115	2465.00
11	2413.00	46	2430.50	81	2448.00	116	2465.50
12	2413.50	47	2431.00	82	2448.50	117	2466.00
13	2414.00	48	2431.50	83	2449.00	118	2466.50
14	2414.50	49	2432.00	84	2449.50	119	2467.00
15	2415.00	50	2432.50	85	2450.00	120	2467.50
16	2415.50	51	2433.00	86	2450.50	121	2468.00
17	2416.00	52	2433.50	87	2451.00	122	2468.50
18	2416.50	53	2434.00	88	2451.50	123	2469.00
19	2417.00	54	2434.50	89	2452.00	124	2469.50
20	2417.50	55	2435.00	90	2452.50	125	2470.00
21	2418.00	56	2435.50	91	2453.00	126	2470.50
22	2418.50	57	2436.00	92	2453.50	127	2471.00
23	2419.00	58	2436.50	93	2454.00	128	2471.50
24	2419.50	59	2437.00	94	2454.50	129	2472.00
25	2420.00	60	2437.50	95	2455.00	130	2472.50
26	2420.50	61	2438.00	96	2455.50	131	2473.00
27	2421.00	62	2438.50	97	2456.00	132	2473.50
28	2421.50	63	2439.00	98	2456.50	133	2474.00
29	2422.00	64	2439.50	99	2457.00	134	2474.50
30	2422.50	65	2440.00	100	2457.50	135	2475.00
31	2423.00	66	2440.50	101	2458.00		
32	2423.50	67	2441.00	102	2458.50		
33	2424.00	68	2441.50	103	2459.00		
34	2424.50	69	2442.00	104	2459.50		
35	2425.00	70	2442.50	105	2460.00		

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	2408.0MHz
The middle channel	2440.0MHz
The Highest channel	2475.0MHz

5.3 Test mode

Transmitting mode	Keep the EUT in transmitting mode.

5.4 Test Facility

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

● **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 22, 2016.

● **Industry Canada (IC) —Registration No.: 9079A-2**

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.

5.5 Test Location

All other tests were performed at:

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

5.6 Other Information Requested by the Customer

None.

5.7 Description of Support Units

None.

5.8 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	9.0(L)*6.0(W)* 6.0(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	Spectrum Analyzer	Agilent	E4440A	GTS533	June 29 2016	June 28 2017
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June 29 2016	June 28 2017
5	Loop Antenna	ZHINAN	ZN30900A	GTS534	June 29 2016	June 28 2017
6	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June 29 2016	June 28 2017
7	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 29 2016	June 28 2017
8	Horn Antenna	ETS-LINDGREN	3160	GTS217	June 29 2016	June 28 2017
9	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
10	Coaxial Cable	GTS	N/A	GTS213	June 29 2016	June 28 2017
11	Coaxial Cable	GTS	N/A	GTS211	June 29 2016	June 28 2017
12	Coaxial cable	GTS	N/A	GTS210	June 29 2016	June 28 2017
13	Coaxial Cable	GTS	N/A	GTS212	June 29 2016	June 28 2017
14	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June 29 2016	June 28 2017
15	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June 29 2016	June 28 2017
16	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 29 2016	June 28 2017
17	Band filter	Amindeon	82346	GTS219	June 29 2016	June 28 2017

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	ChangChun	DYM3	GTS257	June 29 2016	June 28 2017

6 Test results and Measurement Data

6.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)

15.203 requirement:

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.

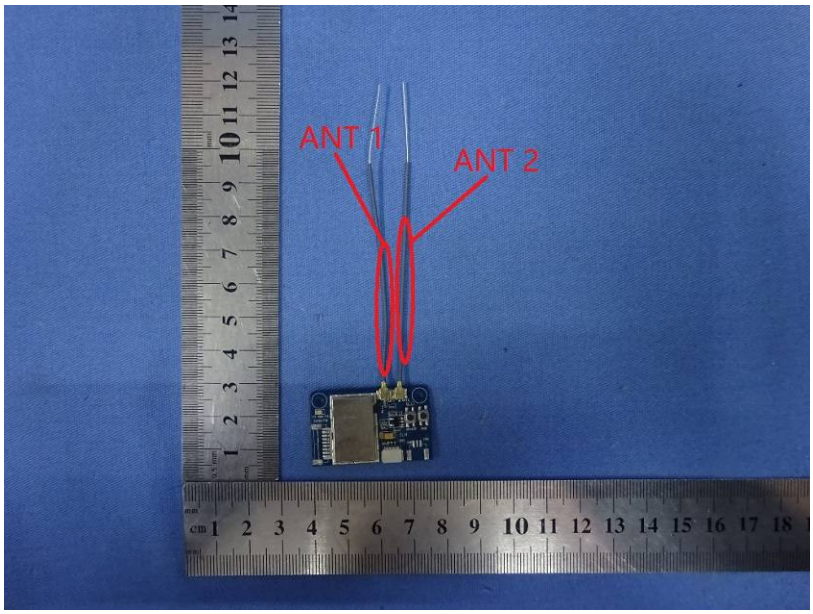
15.247(c) (1)(i) requirement:

(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.

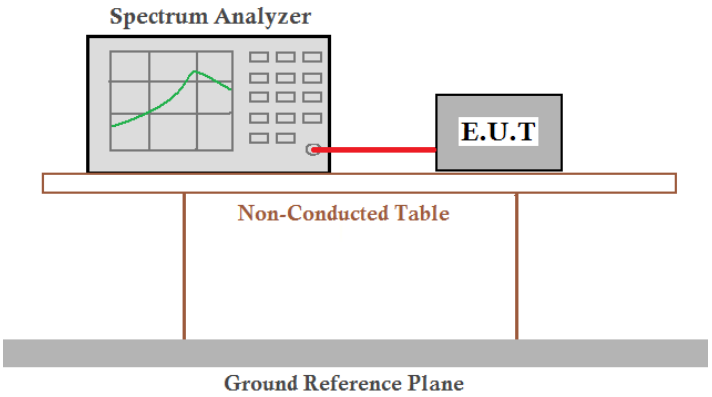
EUT Antenna:

The antenna is integral Antenna, the best case gain of the antenna is 0dBi

Two antenna can't transmit at the same time. While the ANT1 transmitting, the ANT2 act as a receiver antenna and vice versa.



6.2 Conducted Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(1)
Test Method:	DA 00-705, ANSI C63.10:2013
Limit:	20.97dBm
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

Antenna 1:

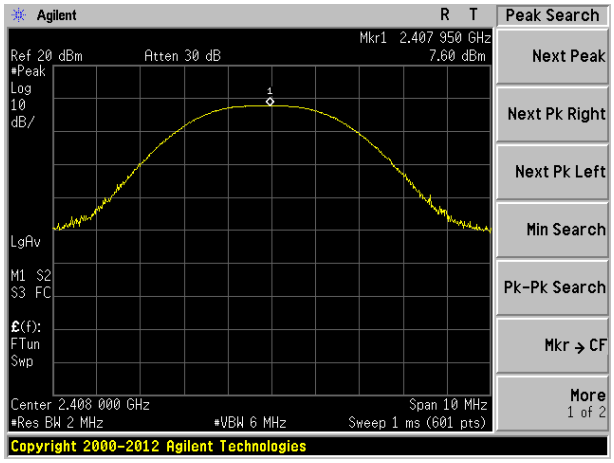
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	7.60	20.97	Pass
Middle	8.86		
Highest	10.31		

Antenna 2:

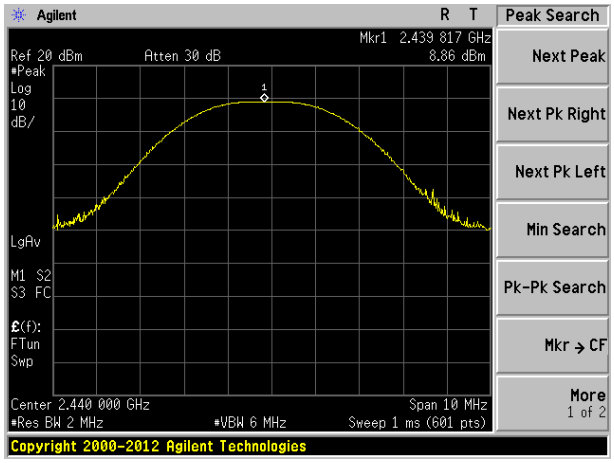
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	7.62	20.97	Pass
Middle	8.36		
Highest	8.70		

Test plot as follows:

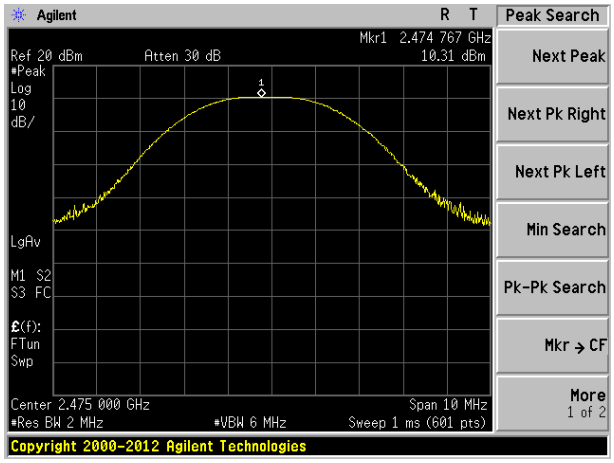
		Antenna:	Antenna 1



Lowest channel

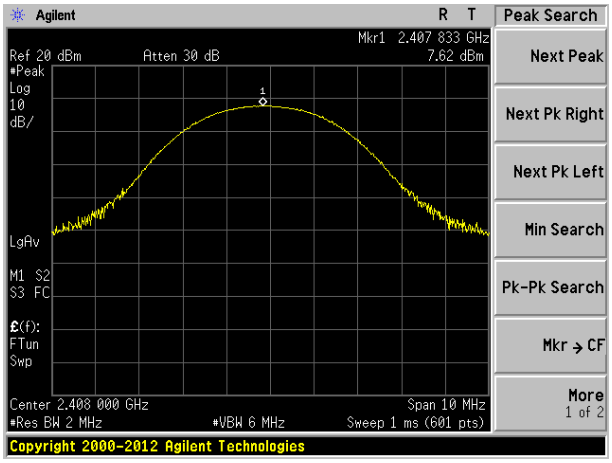


Middle channel

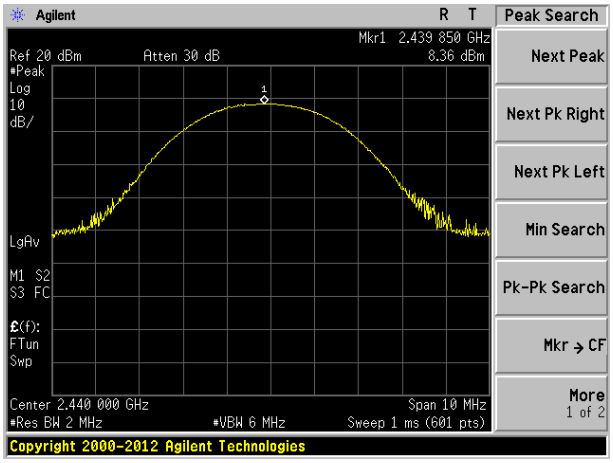


Highest channel

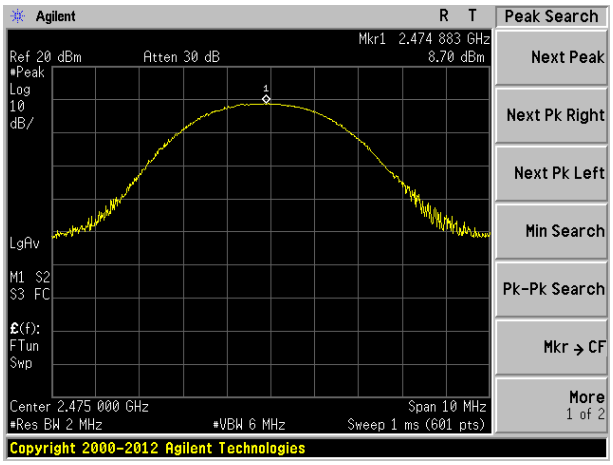
		Antenna:	Antenna 2



Lowest channel

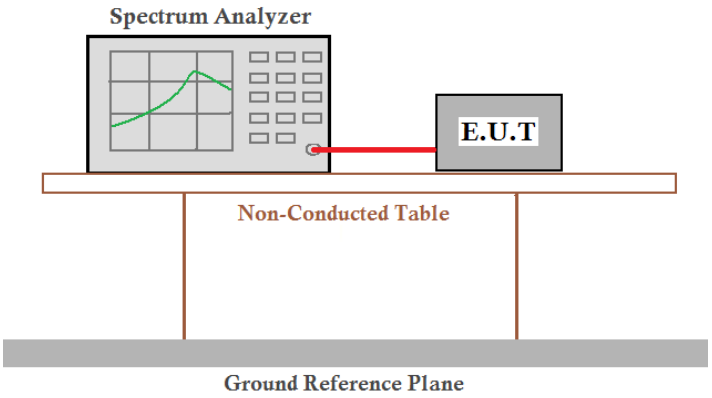


Middle channel



Highest channel

6.3 20dB Emission Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	DA 00-705, ANSI C63.10:2013
Limit:	N/A
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

Antenna 1:

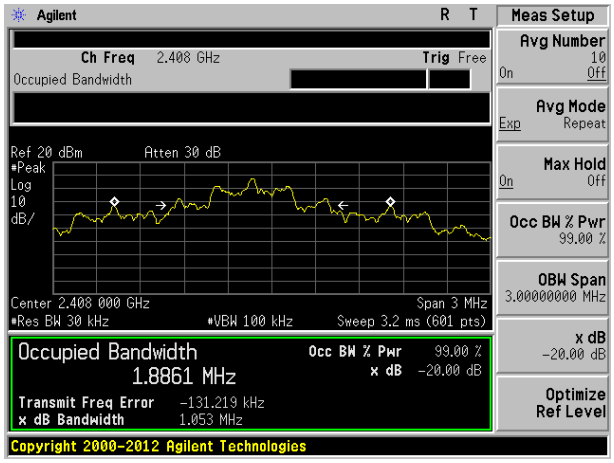
Test channel	20dB Emission Bandwidth (MHz)	Result
Lowest	1.053	Pass
Middle	1.049	
Highest	1.049	

Antenna 2:

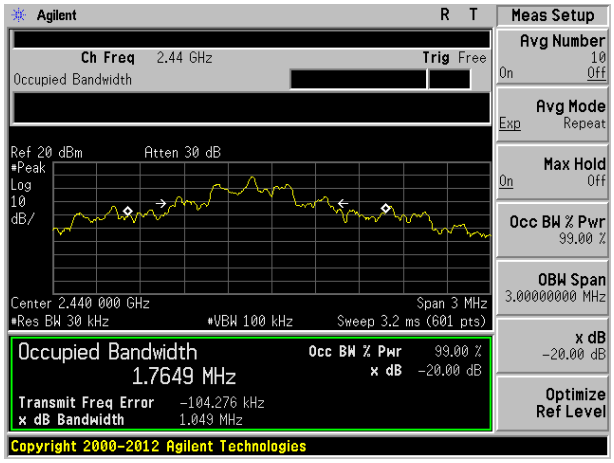
Test channel	20dB Emission Bandwidth (MHz)	Result
Lowest	1.046	Pass
Middle	1.050	
Highest	1.047	

Test plot as follows:

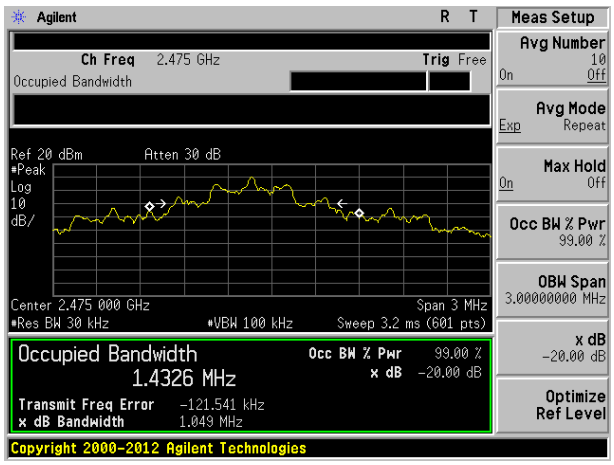
		Antenna:	Antenna 1



Lowest channel

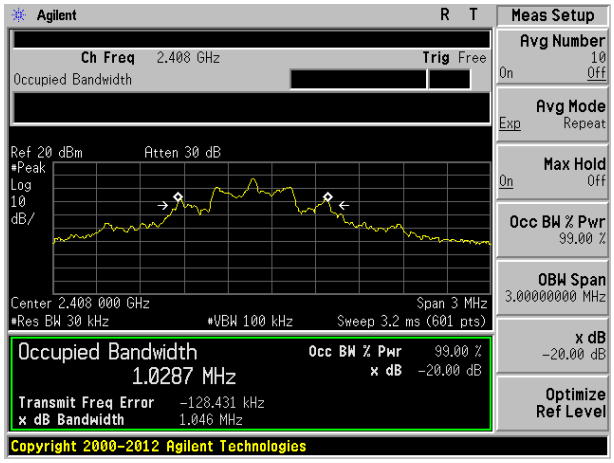


Middle channel

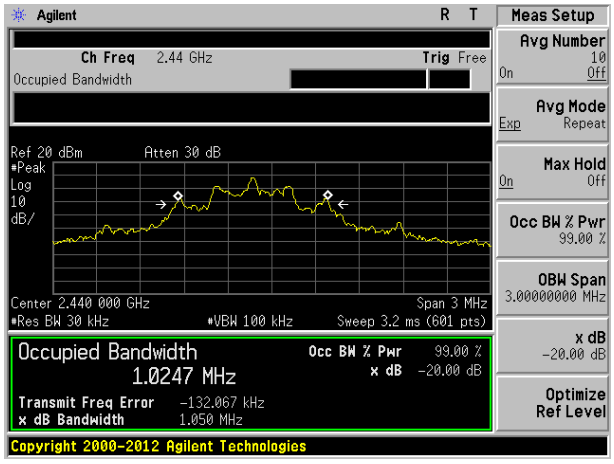


Highest channel

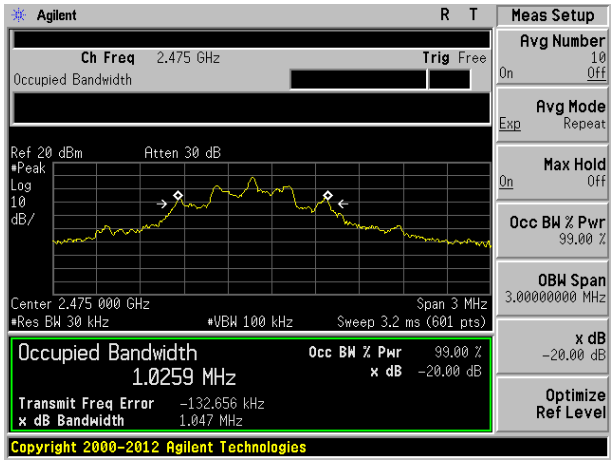
		Antenna:	Antenna 2



Lowest channel

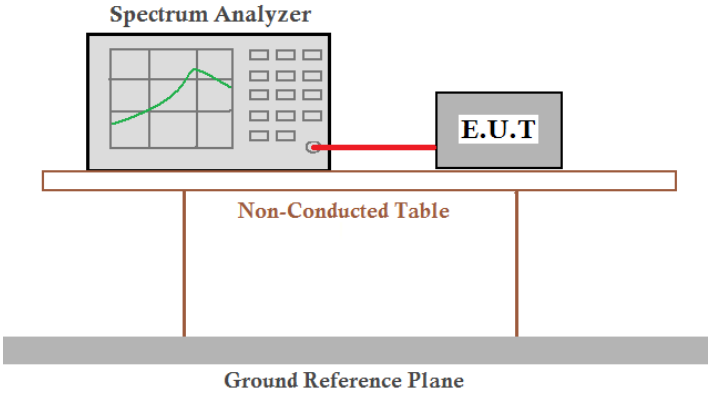


Middle channel



Highest channel

6.4 Carrier Frequencies Separation

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	DA 00-705, 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:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

Antenna 1:

Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	2417	*702*	Pass
Middle	2508	*702*	Pass
Highest	2508	*702*	Pass

Note: According to section 6.3

Mode	*20dB bandwidth (kHz) (worse case)*	*Limit (kHz) (Carrier Frequencies Separation)*
GFSK	*1053*	*702*

Antenna 2:

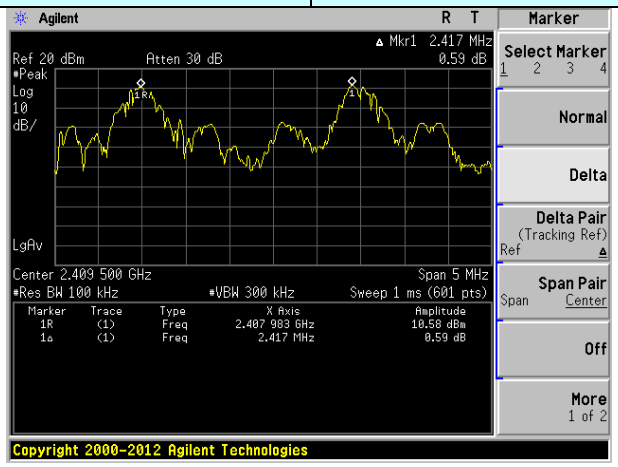
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	2517	*700*	Pass
Middle	2508	*700*	Pass
Highest	2683	*700*	Pass

Note: According to section 6.3

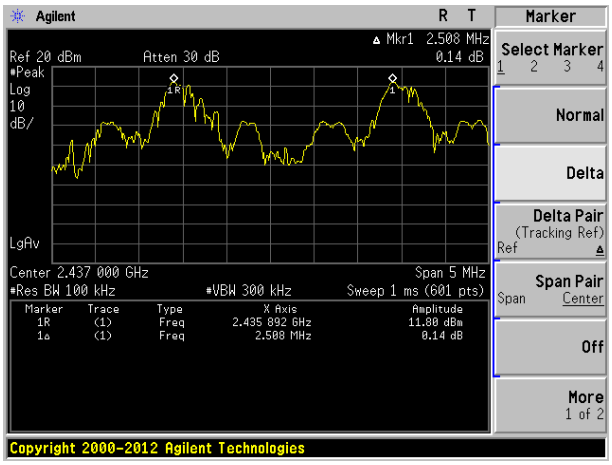
Mode	*20dB bandwidth (kHz) (worse case)*	*Limit (kHz) (Carrier Frequencies Separation)*
GFSK	*1050*	*700*

Test plot as follows:

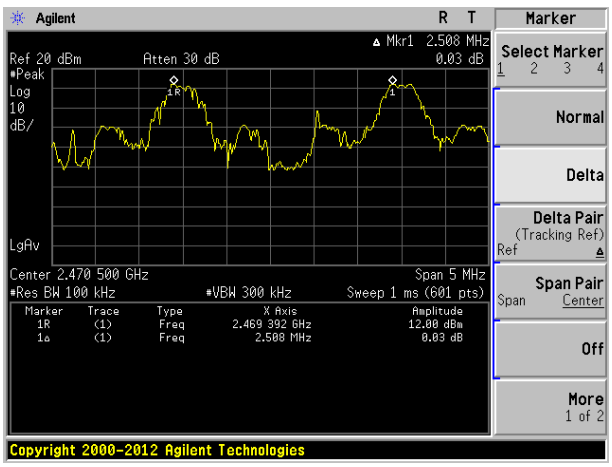
		Antenna:	Antenna 1



Lowest channel

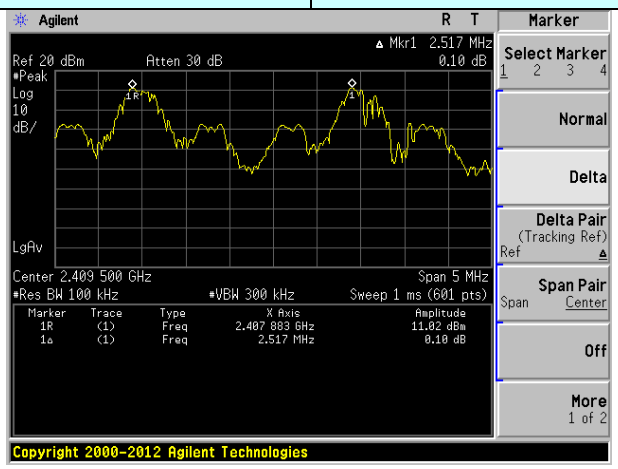


Middle channel

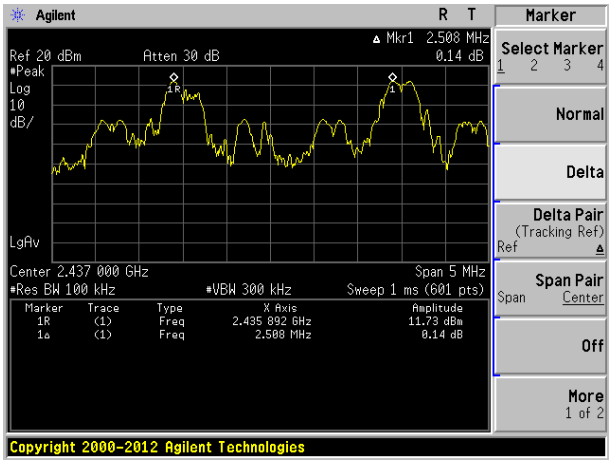


Highest channel

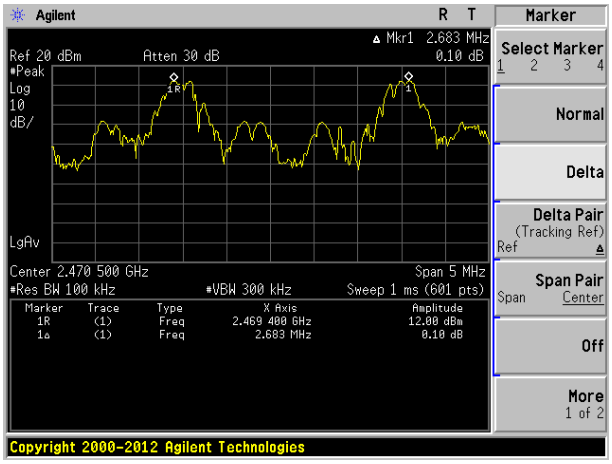
		Antenna:	Antenna 2



Lowest channel

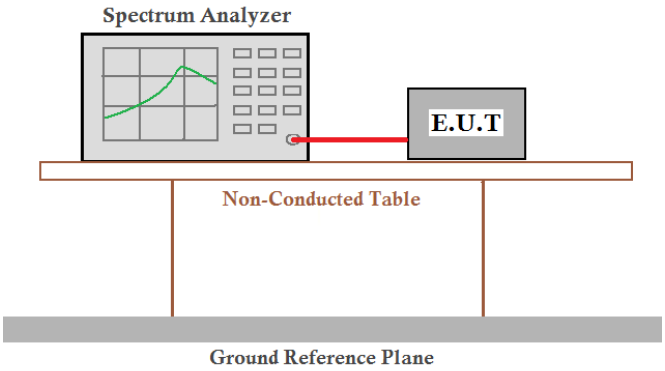


Middle channel



Highest channel

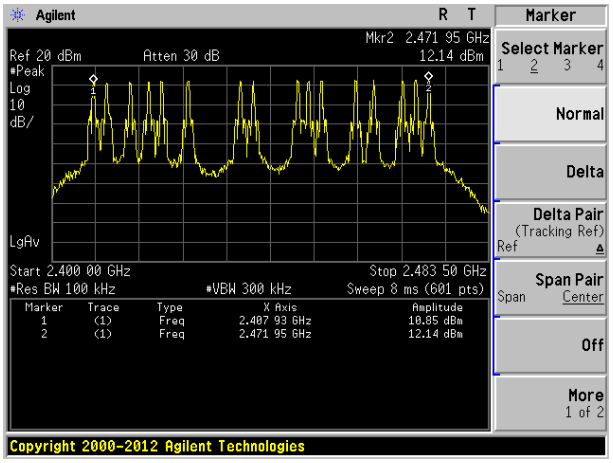
6.5 Hopping Channel Number

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii)
Test Method:	DA 00-705, ANSI C63.10:2013
Receiver setup:	RBW=100kHz, VBW=300kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak
Limit:	15 channels
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data:

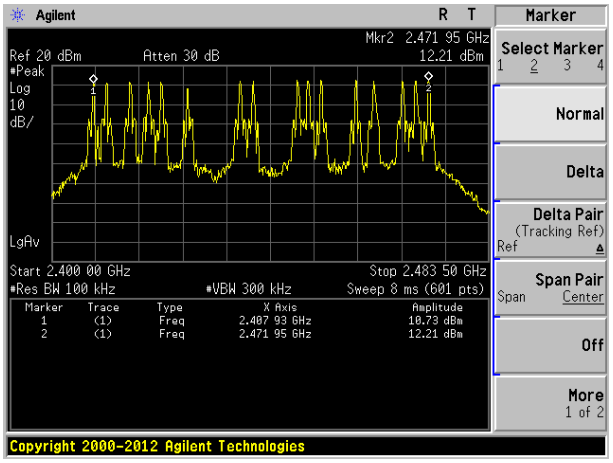
Antenna 1:

Hopping channel numbers	Limit	Result
16	15	Pass

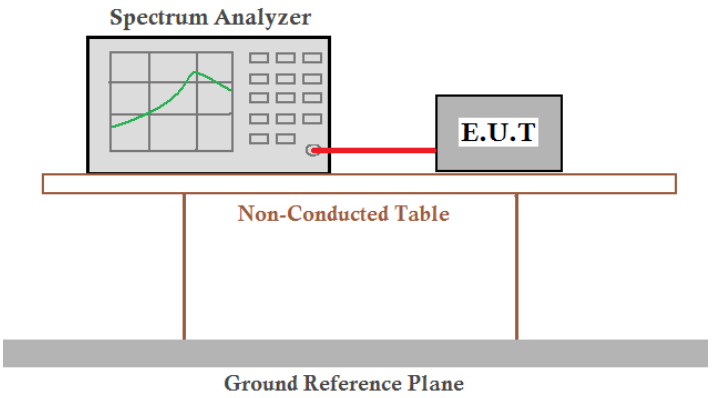


Antenna 2:

Hopping channel numbers	Limit	Result
16	15	Pass



6.6 Dwell Time

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii)
Test Method:	DA 00-705, ANSI C63.10:2013
Receiver setup:	RBW=1MHz, VBW=1MHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

Antenna 1:

Frequency	Ton (ms)	Dwell time(ms)	Limit(ms)	Result
2.408GHz	1.333	4.27	400	Pass
2.440GHz	1.333	5.12	400	Pass
2.475GHz	1.250	4.80	400	Pass

The formula as below:

2408MHz: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=1.333ms*5/10*0.4*16=4.27ms

2440MHz: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=1.333ms*6/10*0.4*16=5.12ms

2475MHz: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=1. 250ms*6/10*0.4*16=4.80ms

Antenna 2:

Frequency	Ton (ms)	Dwell time(ms)	Limit(ms)	Result
2.408GHz	1.333	5.12	400	Pass
2.440GHz	1.333	5.12	400	Pass
2.475GHz	1.333	5.12	400	Pass

The formula as below:

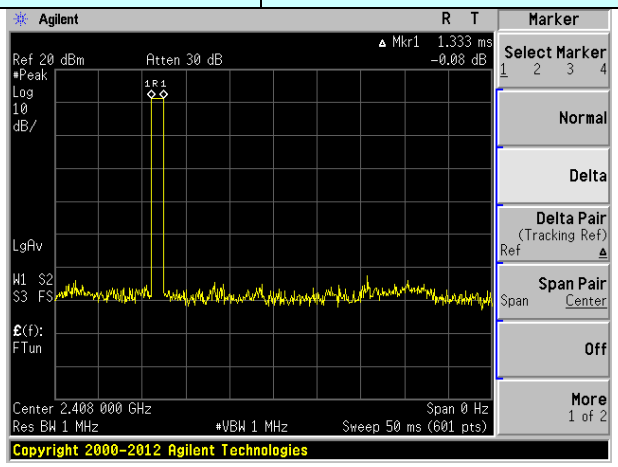
2408MHz: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=1.333ms*6/10*0.4*16=5.12ms

2440MHz: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=1.333ms*6/10*0.4*16=5.12ms

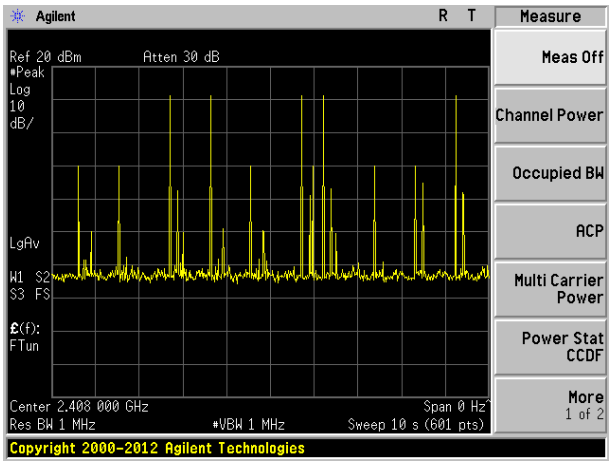
2475MHz: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=1.333ms*6/10*0.4*16=5.12ms

Test plot as follows:

Frequency:	2408MHz	Antenna:	Antenna 1

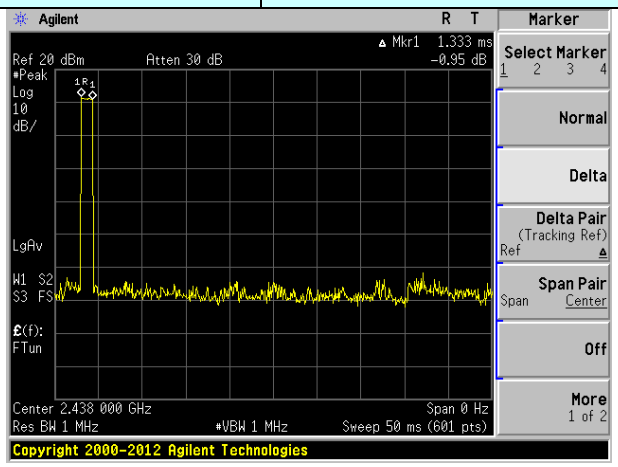


Ton

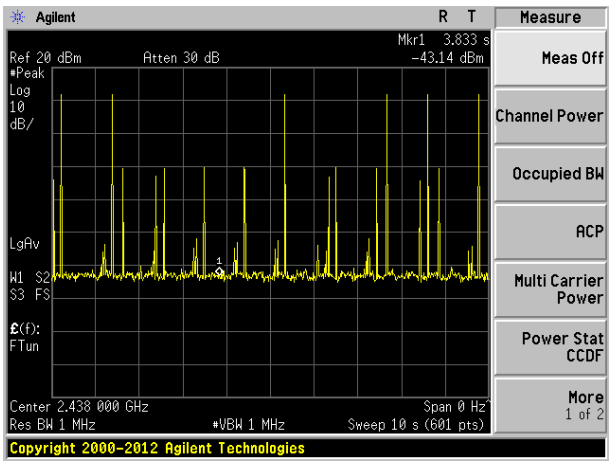


Ton times in 1s

Frequency:	2440MHz	Antenna:	Antenna 1

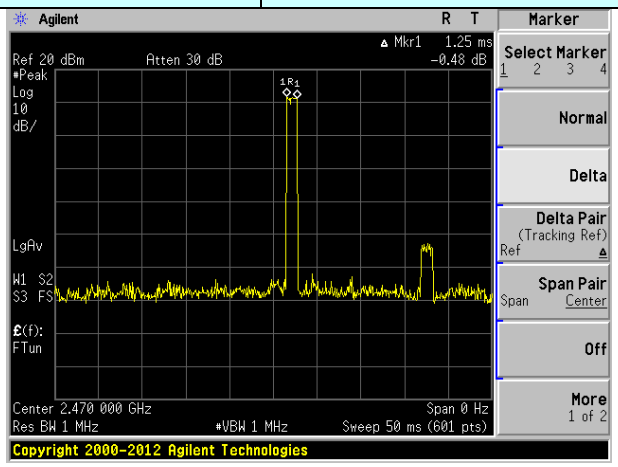


Ton

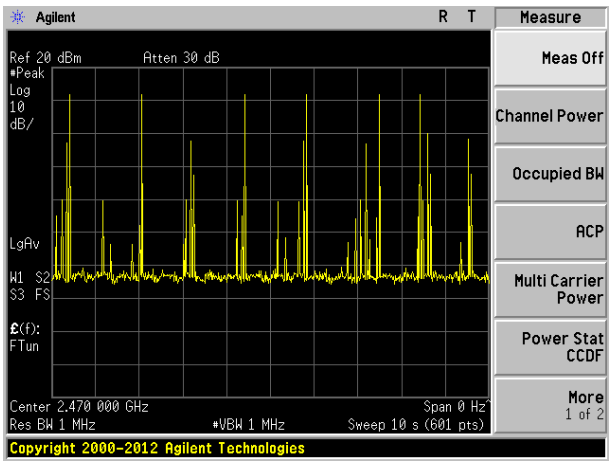


Ton times in 1s

Frequency:	2475MHz	Antenna:	Antenna 1

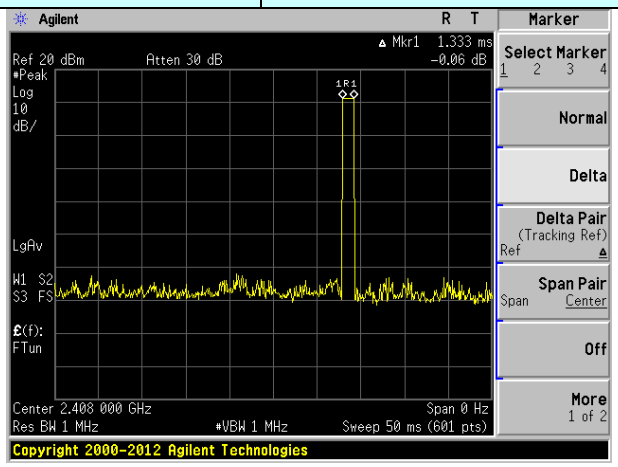


Ton

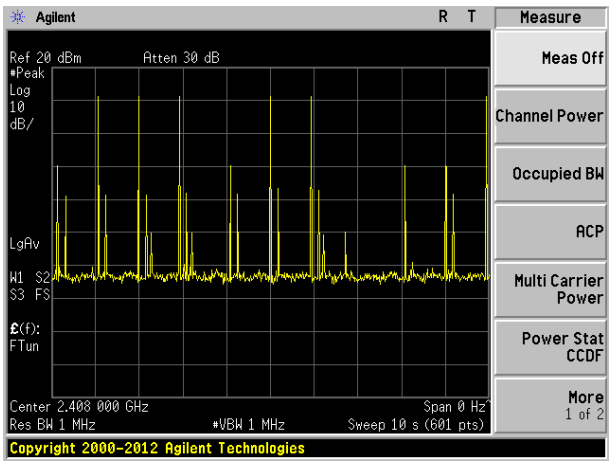


Ton times in 1s

Frequency:	2408MHz	Antenna:	Antenna 2

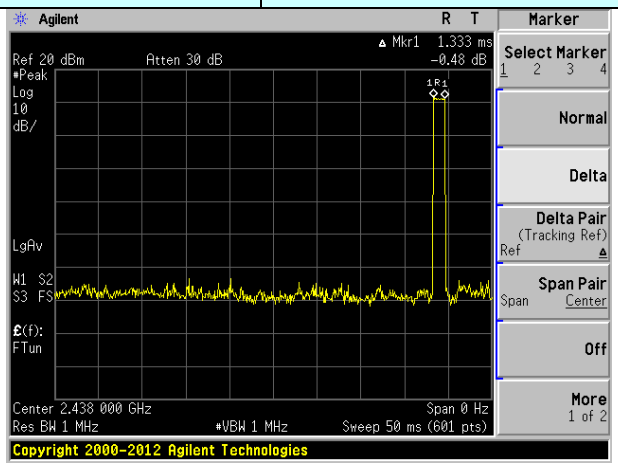


Ton

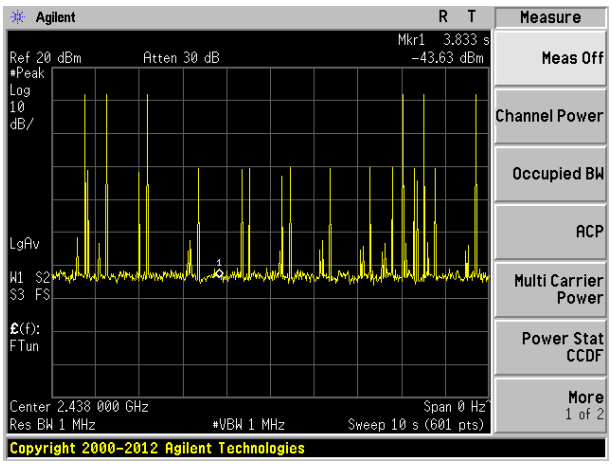


Ton times in 1s

Frequency:	2440MHz	Antenna:	Antenna 2

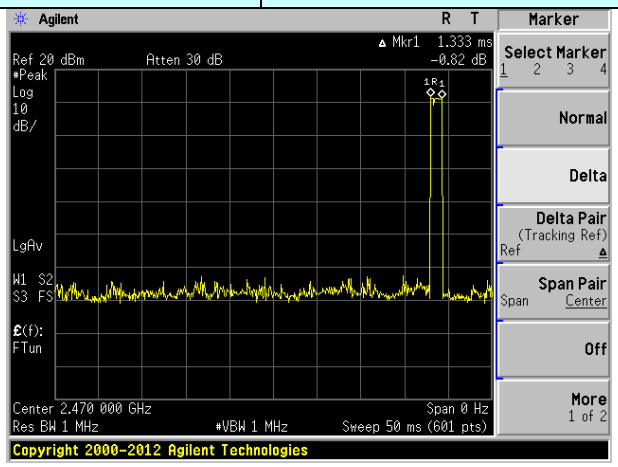


Ton

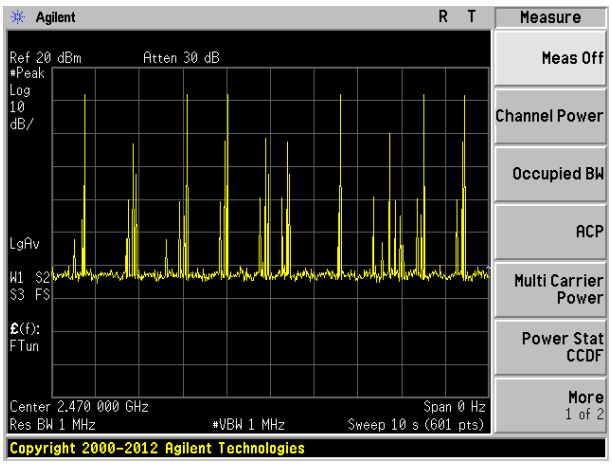


Ton times in 1s

Frequency:	2475MHz	Antenna:	Antenna 2



Ton



Ton times in 1s

6.7 Pseudorandom Frequency Hopping Sequence

Test Requirement:	FCC Part15 C Section 15.247 (a)(1) requirement:

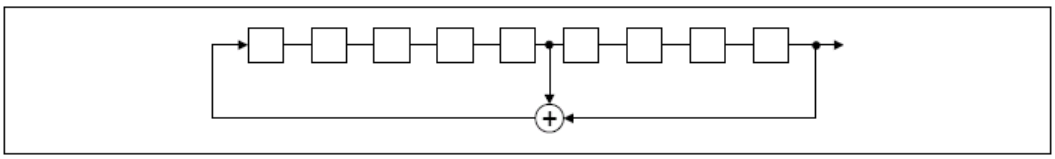
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Alternatively. Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

EUT Pseudorandom Frequency Hopping Sequence

The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

- *Number of shift register stages: 9*
- *Length of pseudo-random sequence: 2^9 -1 = 511 bits*
- *Longest sequence of zeros: 8 (non-inverted signal)*



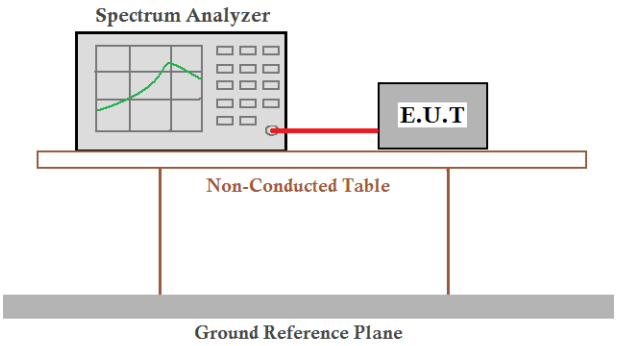
Linear Feedback Shift Register for Generation of the PRBS sequence

Each frequency used equally on the average by each transmitter.

The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

6.8 Band Edge

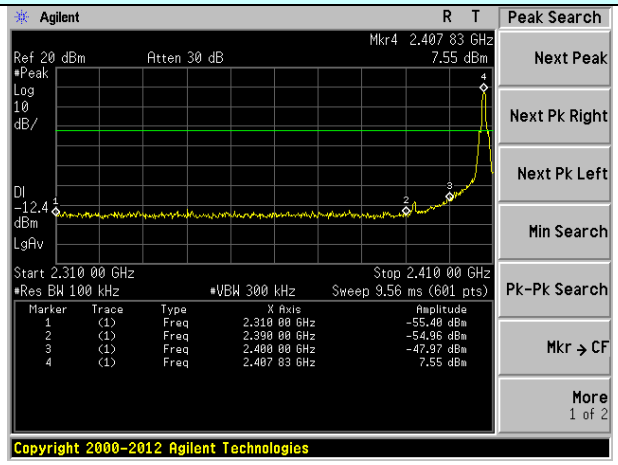
6.8.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	DA 00-705, 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:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

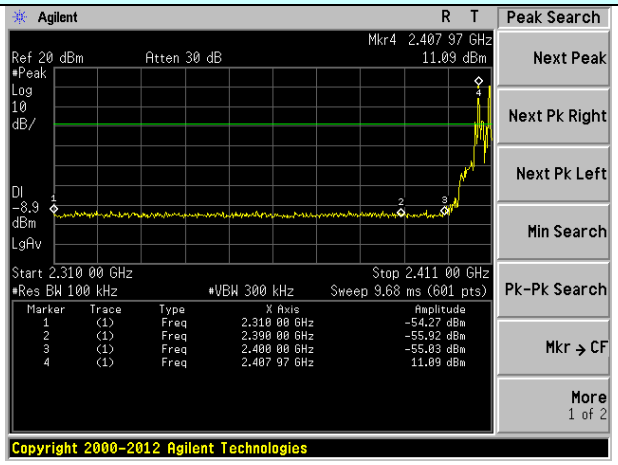
Test plot as follows:

Antenna 1:

Test channel:	Lowest channel

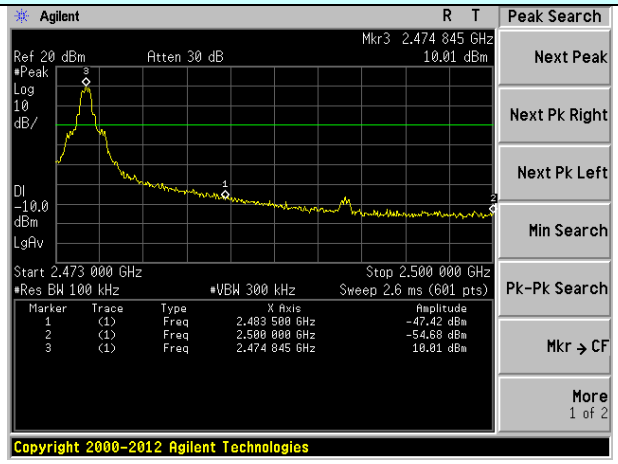


No-hopping mode

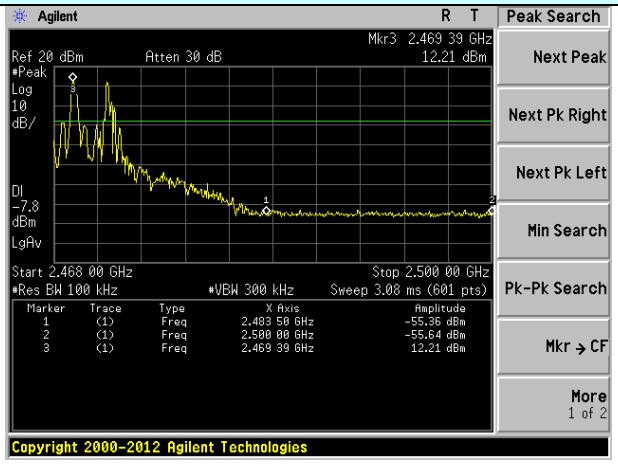


Hopping mode

Test channel:	Highest channel



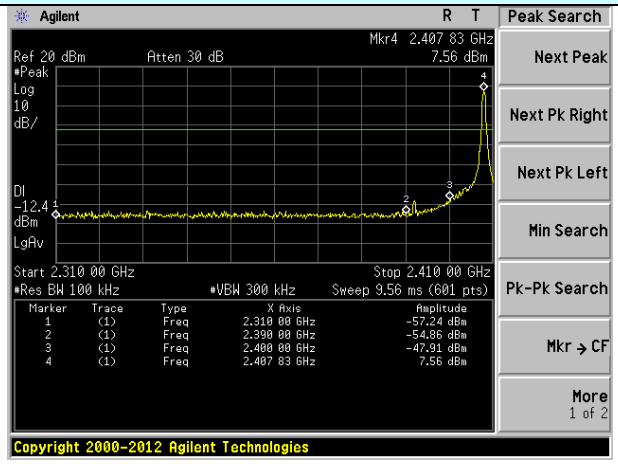
No-hopping mode



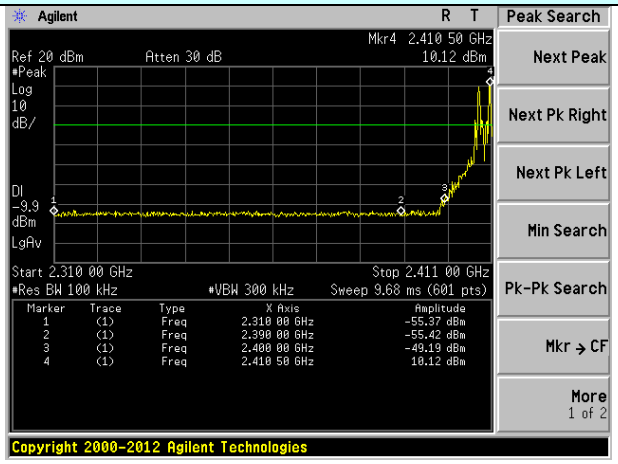
Hopping mode

Antenna 2:

Test channel:	Lowest channel

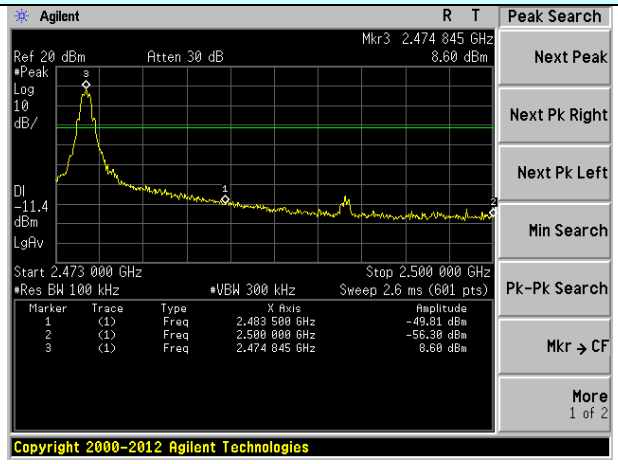


No-hopping mode

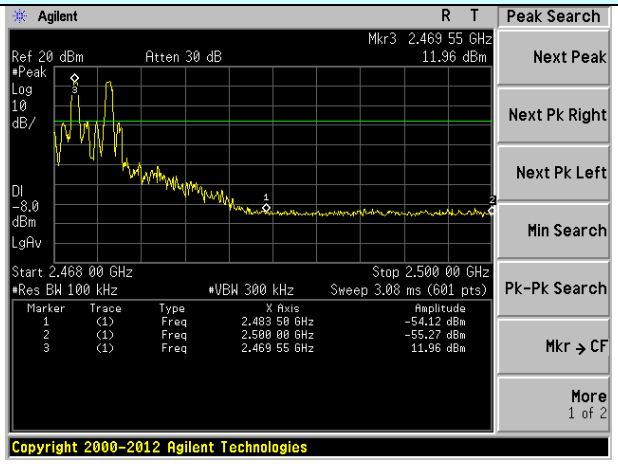


Hopping mode

Test channel:	Highest channel



No-hopping mode



Hopping mode

6.8.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205
Test Method:	ANSI C63.10:2013
Test Frequency Range:	All restriction band have been tested, and 2.3GHz to 2.5GHz band is the worse case
Test site:	Measurement Distance: 3m

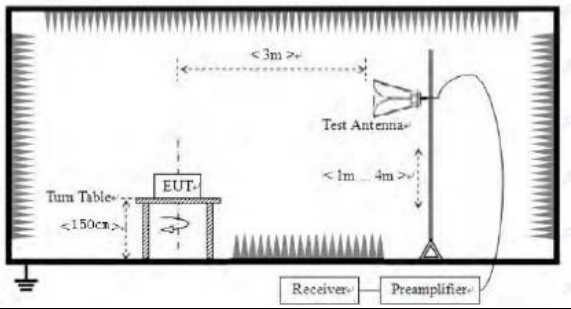
Receiver setup:

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:

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.
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 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

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.*
2. *Two antenna were tested and found the antenna2 is worse. So only the data of antenna1 is reported.*

Antenna 1:

Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	50.31	27.59	5.38	30.18	53.10	74.00	-20.90	Vertical
2400.00	54.20	27.58	5.39	30.18	56.99	74.00	-17.01	Vertical
2390.00	52.26	27.59	5.38	30.18	55.05	74.00	-18.95	Horizontal
2400.00	56.71	27.58	5.39	30.18	59.50	74.00	-14.50	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	40.73	27.59	5.38	30.18	43.52	54.00	-10.48	Vertical
2400.00	41.02	27.58	5.39	30.18	43.81	54.00	-10.19	Vertical
2390.00	40.73	27.59	5.38	30.18	43.52	54.00	-10.48	Horizontal
2400.00	41.02	27.58	5.39	30.18	43.81	54.00	-10.19	Horizontal

Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	56.74	27.53	5.47	29.93	59.81	74.00	-14.19	Vertical
2500.00	42.18	27.55	5.49	29.93	45.29	74.00	-28.71	Vertical
2483.50	55.43	27.53	5.47	29.93	58.50	74.00	-15.50	Horizontal
2500.00	43.35	27.55	5.49	29.93	46.46	74.00	-27.54	Horizontal

Average value:

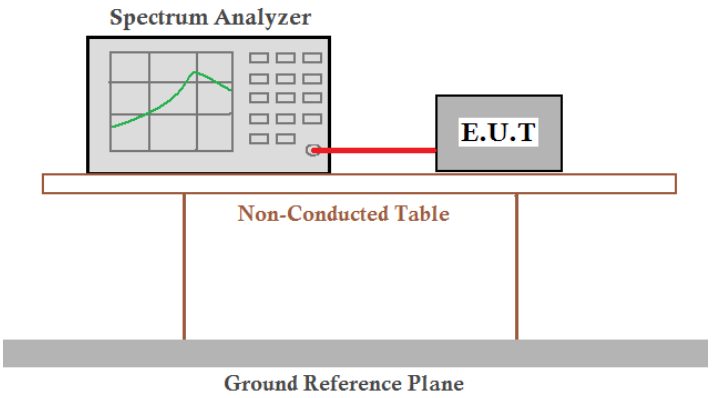
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	38.77	27.53	5.47	29.93	41.84	54.00	-12.16	Vertical
2500.00	34.15	27.55	5.49	29.93	37.26	54.00	-16.74	Vertical
2483.50	38.74	27.53	5.47	29.93	41.81	54.00	-12.19	Horizontal
2500.00	33.21	27.55	5.49	29.93	36.32	54.00	-17.68	Horizontal

Remark:

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

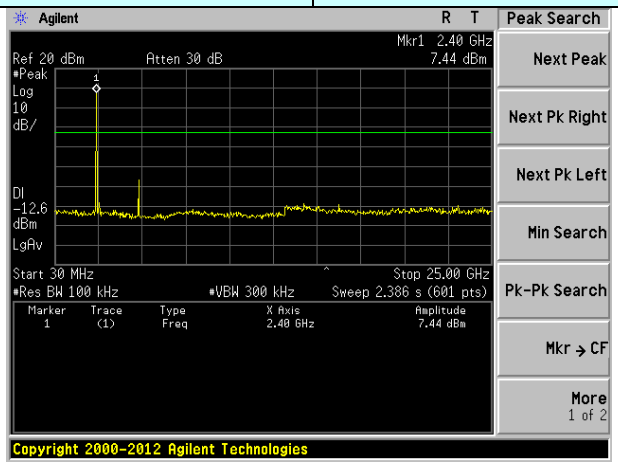
6.9 Spurious Emission

6.9.1 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:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

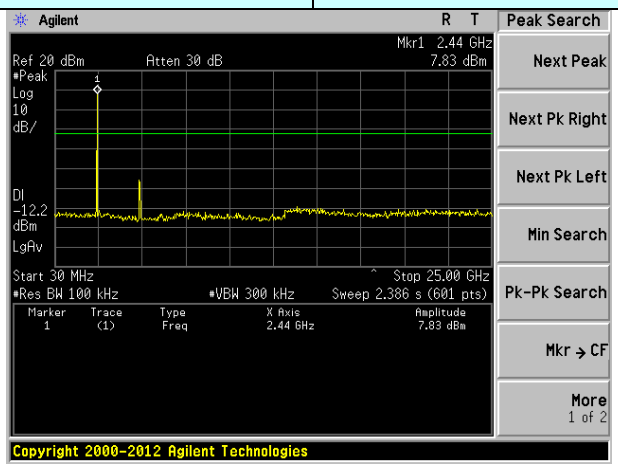
Antenna 1:

Test channel:	Lowest channel



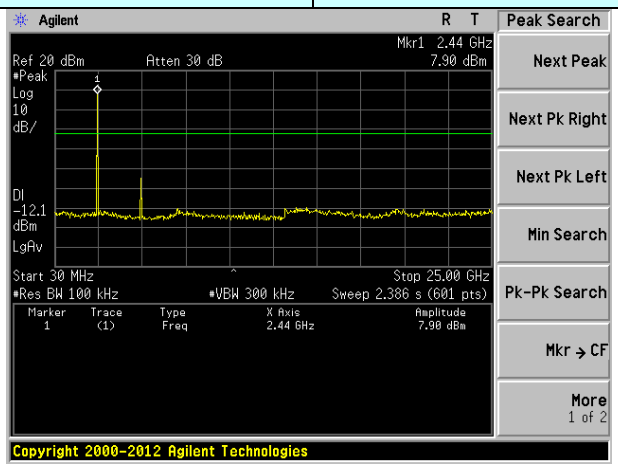
30MHz~25GHz

Test channel:	Middle channel



30MHz~25GHz

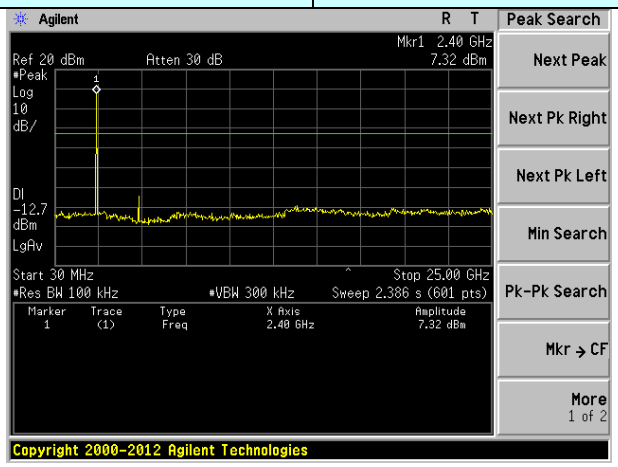
Test channel:	Highest channel



30MHz~25GHz

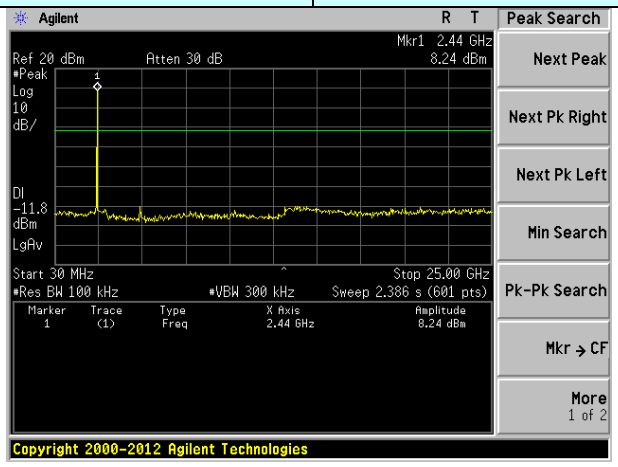
Antenna 2:

Test channel:	Lowest channel



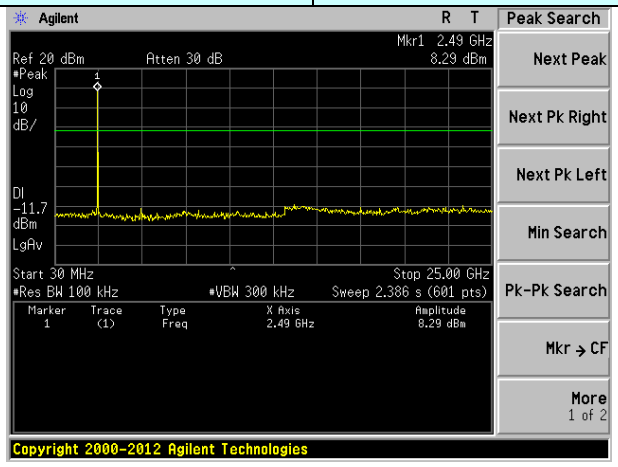
30MHz~25GHz

Test channel:	Middle channel



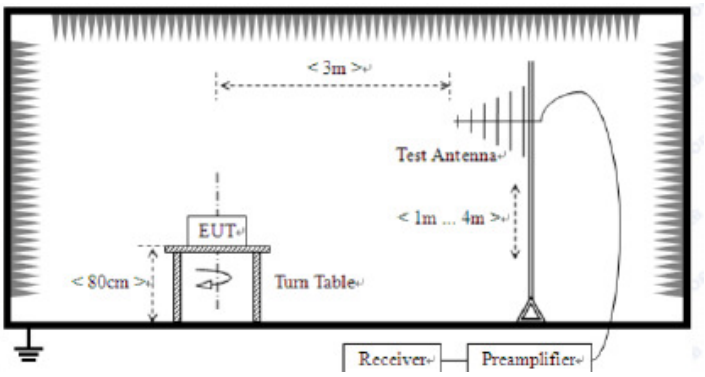
30MHz~25GHz

Test channel:	Highest channel

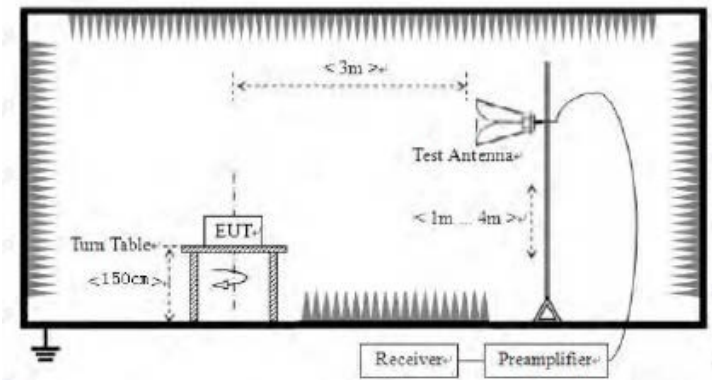


30MHz~25GHz

6.9.2 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 25GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr>
<tr><td>9KHz-150KHz</td><td>Quasi-peak</td><td>200Hz</td><td>600Hz</td><td>Quasi-peak</td></tr>
<tr><td>150KHz-30MHz</td><td>Quasi-peak</td><td>9KHz</td><td>30KHz</td><td>Quasi-peak</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</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>
</table>
</td></tr>
<tr><td>Limit:
(Spurious Emissions)</td><td>
<table>
<tr><th>Frequency</th><th>Limit (uV/m)</th><th>Value</th><th>Measurement Distance</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>QP</td><td>30m</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>QP</td><td rowspan="6">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>
</table>
</td></tr>
<tr><td>Test setup:</td><td>Below 1GHz
 

Above 1GHz</td></tr>
</table>

	
Test Procedure:	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. 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 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

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.

2. The measured filed strength at frequencies below 30MHz are lower than the limit over 30dB. So the data isn't reported.

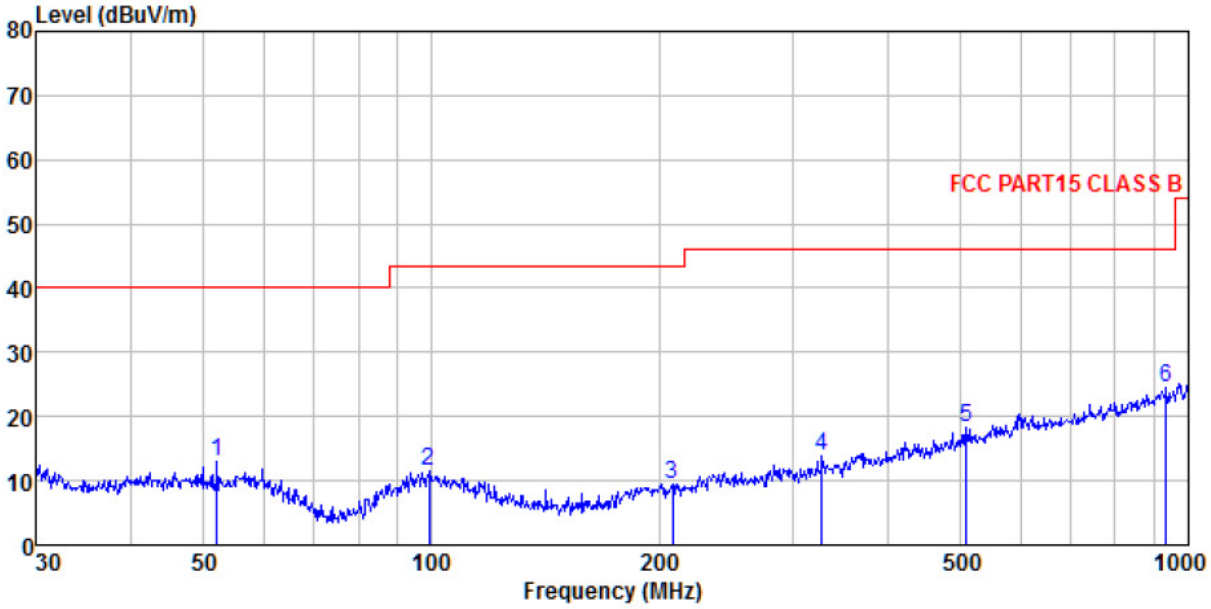
3. Two antenna were tested and found the antenna1 is worse. So only the data of antenna1 is reported.

Measurement data:

Antenna 1:

■ **30MHz ~ 1GHz**

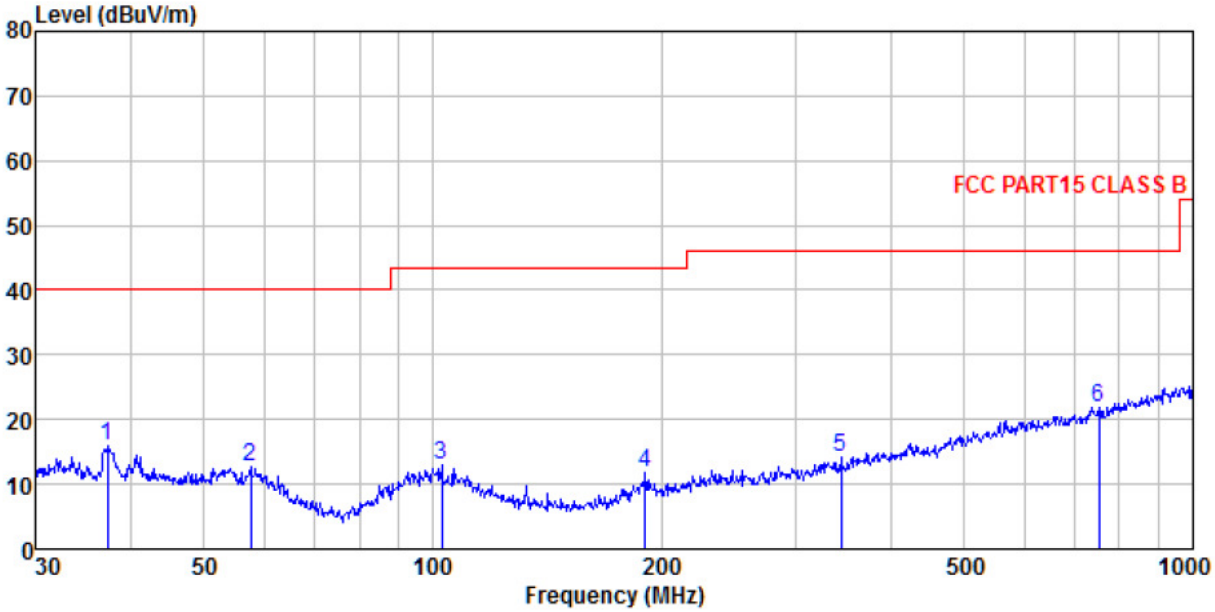
Horizontal:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VERTICAL
Job No. : GTS201612000078
Test Mode : Transmitting mode
Test Engineer: Sky

	Freq	ReadAntenna Level	Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	52.025	27.00	15.16	29.98	0.79	12.97	40.00	-27.03	QP
2	99.180	24.80	15.13	29.70	1.18	11.41	43.50	-32.09	QP
3	207.850	24.16	12.80	29.28	1.89	9.57	43.50	-33.93	QP
4	327.887	25.55	15.66	29.84	2.51	13.88	46.00	-32.12	QP
5	508.258	25.54	18.74	29.30	3.34	18.32	46.00	-27.68	QP
6	935.546	25.35	23.34	29.10	4.99	24.58	46.00	-21.42	QP

Vertical：



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VERTICAL
Job No. : GTS201612000078
Test Mode : Transmitting mode
Test Engineer: Sky

	Freq	ReadLevel	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	37.285	30.33	14.92	30.06	0.63	15.82	40.00	-24.18	QP
2	57.594	26.92	14.85	29.94	0.84	12.67	40.00	-27.33	QP
3	102.719	26.59	14.92	29.68	1.22	13.05	43.50	-30.45	QP
4	190.405	26.79	12.56	29.23	1.79	11.91	43.50	-31.59	QP
5	344.386	25.00	16.20	29.76	2.60	14.04	46.00	-31.96	QP
6	752.743	25.33	21.48	29.20	4.28	21.89	46.00	-24.11	QP

■ **Above 1GHz**

Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4816.00	46.44	31.79	8.61	37.66	49.18	74.00	-24.82	Vertical
7224.00	29.34	36.19	11.66	35.69	41.50	74.00	-32.50	Vertical
9632.00	26.37	38.01	14.16	34.92	43.62	74.00	-30.38	Vertical
12040.00	*					74.00		Vertical
14440.00	*					74.00		Vertical
4816.00	38.92	31.79	8.61	37.66	41.66	74.00	-32.34	Horizontal
7224.00	28.90	36.19	11.66	35.69	41.06	74.00	-32.94	Horizontal
9632.00	27.23	38.01	14.16	34.92	44.48	74.00	-29.52	Horizontal
12040.00	*					74.00		Horizontal
14440.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4816.00	42.18	31.79	8.61	37.66	44.92	54.00	-9.08	Vertical
7224.00	26.51	36.19	11.66	35.69	38.67	54.00	-15.33	Vertical
9632.00	21.62	38.01	14.16	34.92	38.87	54.00	-15.13	Vertical
12040.00	*					54.00		Vertical
14440.00	*					54.00		Vertical
4816.00	36.66	31.79	8.61	37.66	39.40	54.00	-14.60	Horizontal
7224.00	26.07	36.19	11.66	35.69	38.23	54.00	-15.77	Horizontal
9632.00	24.48	38.01	14.16	34.92	41.73	54.00	-12.27	Horizontal
12040.00	*					54.00		Horizontal
14440.00	*					54.00		Horizontal

Remark:

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.*

Test channel:	Middle

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4880.00	49.12	31.85	8.66	37.68	51.95	74.00	-22.05	Vertical
7320.00	30.05	36.37	11.72	35.64	42.50	74.00	-31.50	Vertical
9760.00	26.11	38.35	14.25	34.98	43.73	74.00	-30.27	Vertical
12200.00	*					74.00		Vertical
14640.00	*					74.00		Vertical
4880.00	39.20	31.85	8.66	37.68	42.03	74.00	-31.97	Horizontal
7425.00	28.99	36.37	11.72	35.64	41.44	74.00	-32.56	Horizontal
9900.00	26.75	38.35	14.25	34.98	44.37	74.00	-29.63	Horizontal
12200.00	*					74.00		Horizontal
14640.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4880.00	43.95	31.85	8.66	37.68	46.78	54.00	-7.22	Vertical
7320.00	27.51	36.37	11.72	35.64	39.96	54.00	-14.04	Vertical
9760.00	23.72	38.35	14.25	34.98	41.34	54.00	-12.66	Vertical
12200.00	*					54.00		Vertical
14640.00	*					54.00		Vertical
4880.00	38.03	31.85	8.66	37.68	40.86	54.00	-13.14	Horizontal
7320.00	26.44	36.37	11.72	35.64	38.89	54.00	-15.11	Horizontal
9760.00	23.36	38.35	14.25	34.98	40.98	54.00	-13.02	Horizontal
12200.00	*					54.00		Horizontal
14640.00	*					54.00		Horizontal

Remark:

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.*

Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4950.00	45.76	31.91	8.71	37.69	48.69	74.00	-25.31	Vertical
7425.00	27.88	36.56	11.79	35.59	40.64	74.00	-33.36	Vertical
9900.00	26.57	38.81	14.35	35.06	44.67	74.00	-29.33	Vertical
12375.00	*					74.00		Vertical
14850.00	*					74.00		Vertical
4950.00	38.80	31.91	8.71	37.69	41.73	74.00	-32.27	Horizontal
7425.00	30.45	36.56	11.79	35.59	43.21	74.00	-30.79	Horizontal
9900.00	27.73	38.81	14.35	35.06	45.83	74.00	-28.17	Horizontal
12375.00	*					74.00		Horizontal
14850.00	*					74.00		Horizontal

Average value:

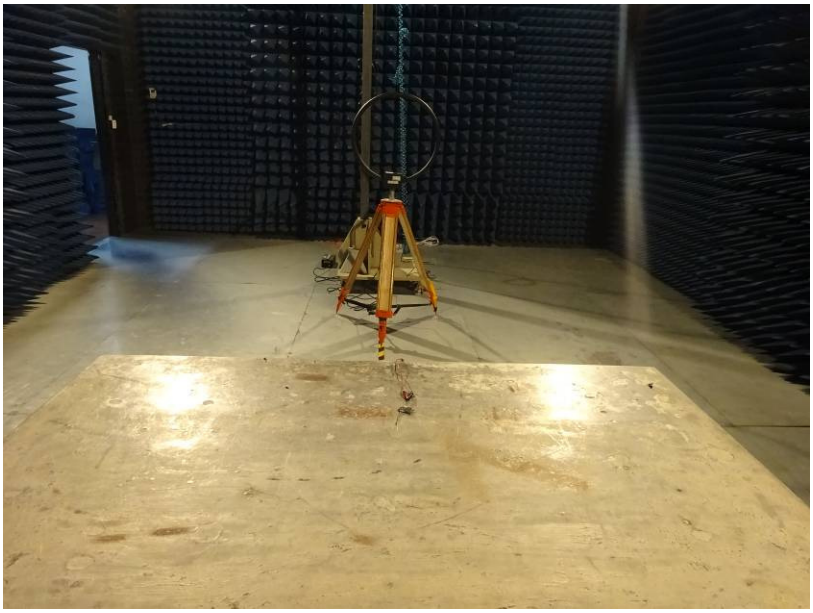
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4950.00	41.70	31.91	8.71	37.69	44.63	54.00	-9.37	Vertical
7425.00	26.64	36.56	11.79	35.59	39.40	54.00	-14.60	Vertical
9900.00	23.68	38.81	14.35	35.06	41.78	54.00	-12.22	Vertical
12375.00	*					54.00		Vertical
14850.00	*					54.00		Vertical
4950.00	34.74	31.91	8.71	37.69	37.67	54.00	-16.33	Horizontal
7425.00	28.20	36.56	11.79	35.59	40.96	54.00	-13.04	Horizontal
9900.00	22.84	38.81	14.35	35.06	40.94	54.00	-13.06	Horizontal
12375.00	*					54.00		Horizontal
14850.00	*					54.00		Horizontal

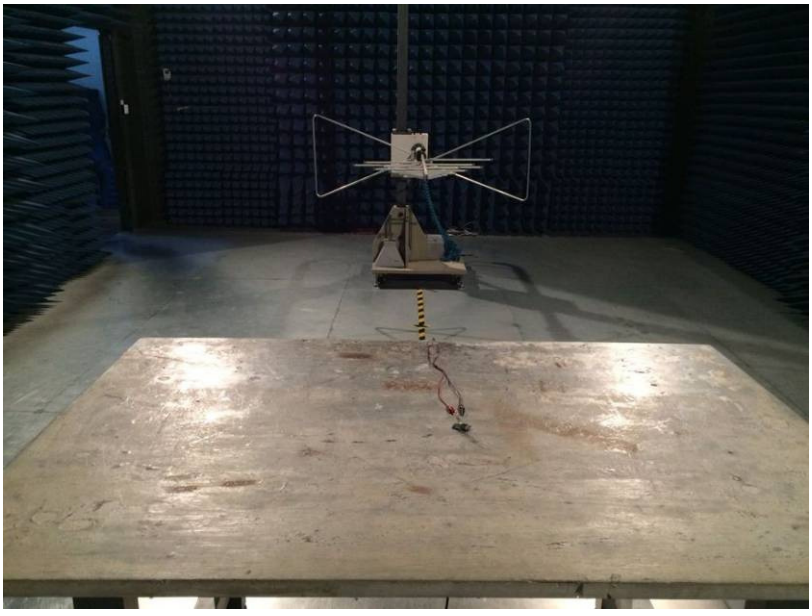
Remark:

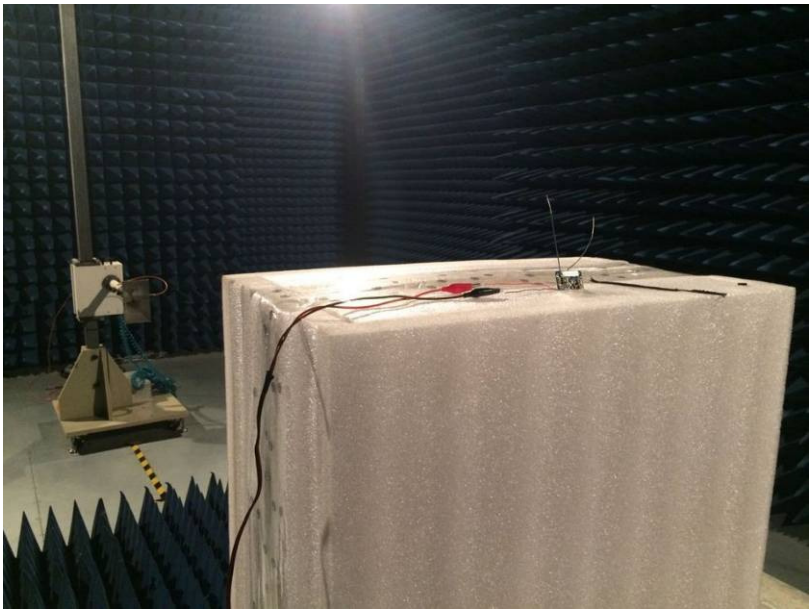
1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *"*", means this data is the too weak instrument of signal is unable to test.*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

7 Test Setup Photo

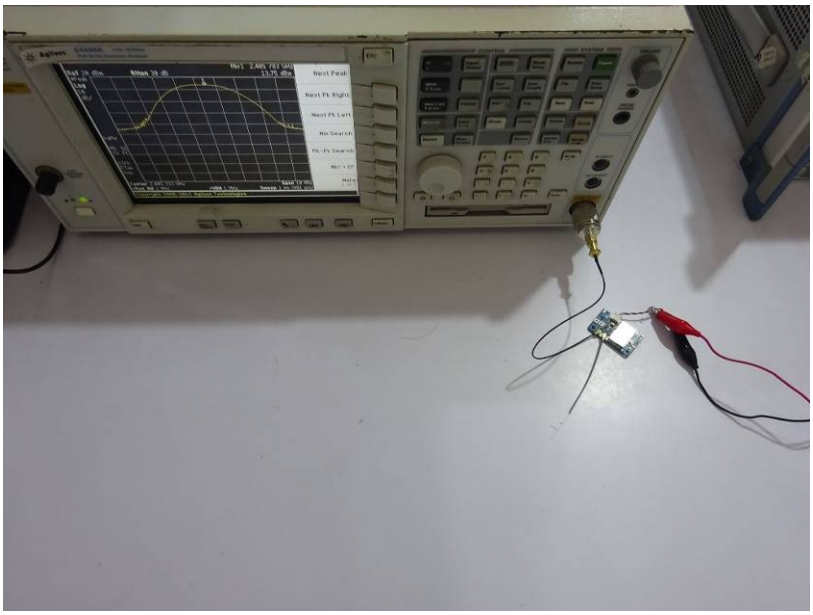
Radiated Emission



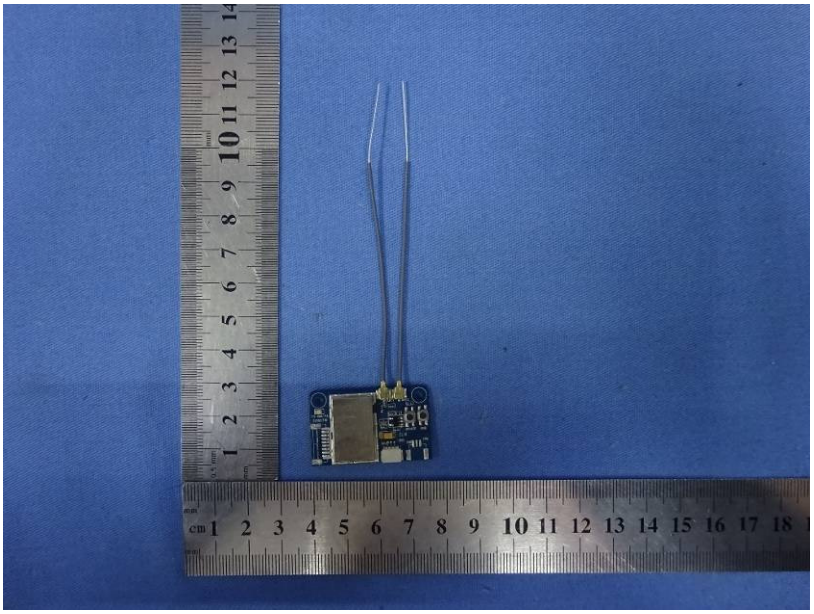


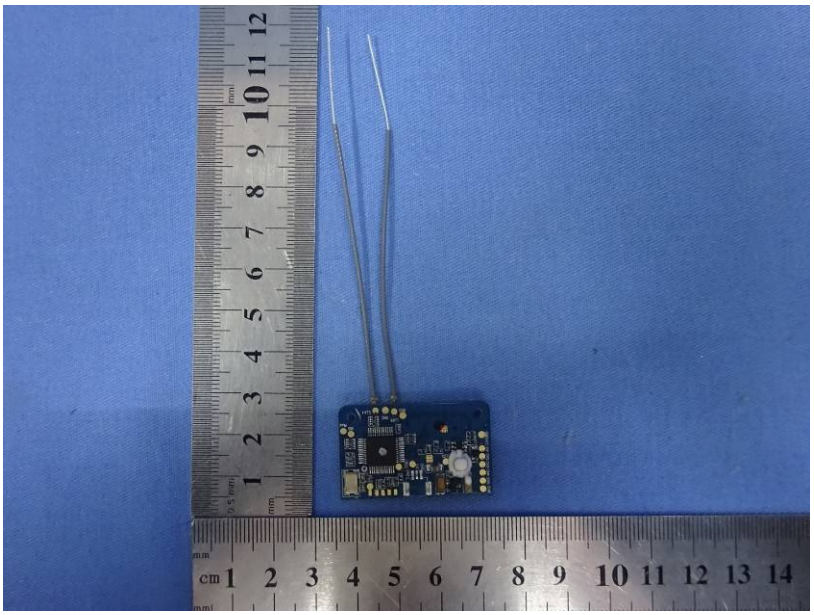


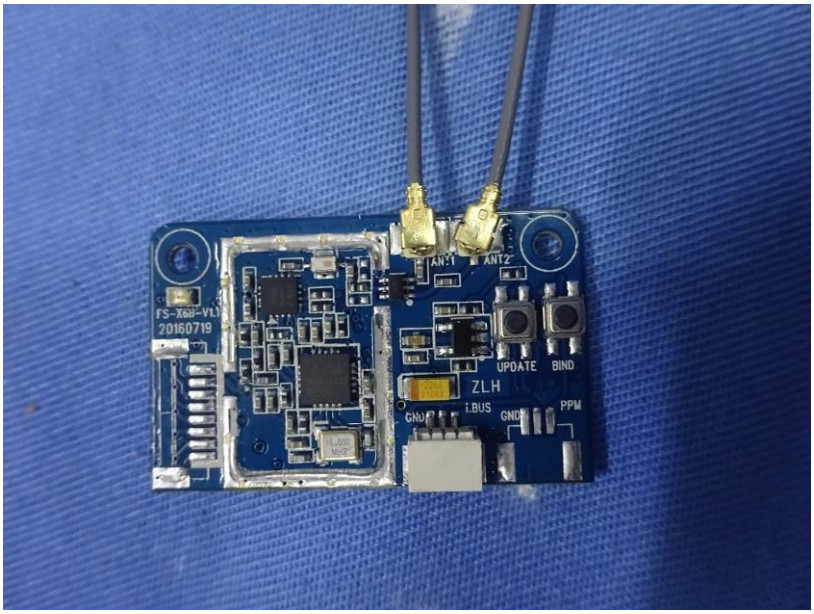
RF tests



8 EUT Constructional Details






FS-X6B-V1.1
20160719
ANT1
ANT2
UPDATE
BIND
ZLH
GND
i.BUS
GND
PPM

---End---