TEST REPORT

Applicant:	Harman International Industries, Incorporated
Address of Applicant:	8500 Balboa Blvd, Northridge, CA 91329, United States
Manufacturer:	Harman International Industries, Incorporated
Address of Manufacturer:	8500 Balboa Blvd, Northridge, CA 91329, United States
Product name:	Powered soundbar speaker
Model:	CINEMA SB400
Rating(s):	100-240V~, 50/60Hz, 100W
Trademark:	JBL
Standards:	FCC Part 15.247 :2010 RSS-210 issue 8
FCC ID:	APISB400SGG
IC ID:	6132A-SB400CGG
Data of Receipt:	2012-10-15
Date of Test:	2012-10-15~2012-10-25
Date of Issue:	2012-10-29
Test Result	**Pass***

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

Authorized for issue by:

Test by:	Jumy qiu	***Reviewed by:***	Pauler Li
Oct.29.2012	Jumy Qiu	Oct.29.2012	Pauler Li
	Project Engineer		Project Engineer
Date	*Name/Position* *Signature*	*Date*	*Name/Position* *Signature*

Possible test case verdicts:	
test case does not apply to the test object ..:	N/A
test object does meet the requirement .....:	P (Pass)
test object does not meet the requirement ..:	F (Fail)

Testing Laboratory information:

Testing Laboratory Name ..... :	I-Test Laboratory
Address.....:	1-2 floor, South Block, Building A2 , No 3 Keyan Lu, Science City, Guangzhou, Guangdong Province, P.R. China
Testing location :	Same as above
Tel :	0086-20-32209330
Fax :	0086-20-62824387
E-mail :	itl@i-testlab.com

General remarks:

The test results presented in this report relate only to the object tested.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

This report would be invalid test report without all the signatures of testing technician and approver.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

General product information:

The EUT include two parts, One is centre part with Bluetooth and 2.4G FSK wireless module, the other part is subwoofer part with 2.4G FSK wireless module. The report is for Subwoofer part of the system.

The EUT have two kinds of power board, One is power supply board of soundbar (JQH, type:NER-SPM00-217) and power supply board of subwoofer (JQH, type:NER-SPM00-216); The alternative power supply board of soundbar (Hanwei, type： Hanny13w70)) and power supply board of subwoofer (Hanwei, type： Hanny23w150). Two kinds of power board have been tested. The worse-case is with power supply board of soundbar (Hanwei, type:Hanny13w70)) and power supply board of subwoofer (Hanwei, type: Hanny23w150)

1 Test Summary

Test	Test Requirement	Test method	Result
Antenna Requirement	FCC PART 15 C section 15.247 (c) and Section 15.203	FCC PART 15 C section 15.247 (c) and Section 15.203	PASS
Occupied Bandwidth (99% and -20dB)	FCC PART 15 C section 15.247 (a)(1); RSS 210 A8.1 (1)	ANSI C63.10: Clause 6.9 & DA 00-705	PASS
Carrier Frequencies Separated	FCC PART 15 C section 15.247(a)(1); RSS 210 A8.1 (1)	DA 00-705	PASS
Hopping Channel Number	FCC PART 15 C section 15.247(a)(1)(iii) RSS 210 A8.1 (4)	DA 00-705	PASS
Dwell Time	FCC PART 15 C section 15.247(a)(1)(iii); RSS 210 A8.1 (4)	DA 00-705	PASS
Maximum Peak Output Power	FCC PART 15 C section 15.247(b)(1); RSS 210 A8.4 (2)	ANSI C63.10: Clause 6.10 & DA 00-705	PASS
Conducted Spurious Emission (30 MHz to 25 GHz)	FCC PART 15 C section 15.247(d); RSS 210 A8.5	ANSI C63.10: Clause 6.7 & DA 00-705	PASS
Radiated Spurious Emission (9 kHz to 25 GHz)	FCC PART 15 C section 15.247(d); RSS 210 A8.5	ANSI C63.10: Clause 6.4, 6.5 and 6.6 & DA 00-705	PASS
Band Edges Measurement	FCC PART 15 C section 15.247 (d) &15.205	ANSI C63.10: Clause 6.9 & DA 00-705	PASS
Conducted Emissions at Mains Terminals	FCC PART 15 C section 15.207; RSS GEN Table 2	ANSI C63.10: Clause 6.2 & DA 00-705	PASS

Remark:

N/A: not applicable. Refer to the relative section for the details.
EUT: In this whole report EUT means Equipment Under Test.
Tx: In this whole report Tx (or tx) means Transmitter.
Rx: In this whole report Rx (or rx) means Receiver.
RF: In this whole report RF means Radio Frequency.
ANSI C63.10: the detail version is ANSI C63.10:2009 in the whole report.
DA 00-705: “Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems”

2 Contents

3 General Information

3.1 Client Information

Applicant:	Harman International Industries, Incorporated
Address of Applicant:	8500 Balboa Blvd, Northridge, CA 91329, United States

3.2 General Description of E.U.T.

Name:	Powered soundbar speaker
Model No.:	CINEMA SB400
Trade Mark:	JBL
Operating Frequency:	2403.5MHz to 2477.3MHz for 2.4G FSK wireless module.
Channels:	49 channels with 1.53MHz step for 2.4G FSK wireless module
Type of Modulation	FSK for 2.4G FSK wireless module
Dwell time	Per channel is less than 0.4s.
Antenna Type	Cable antenna
Antenna gain:	2dBi
Speciality:	Bluetooth 2.1with EDR
Function:	Audio speaker system with Bluetooth function.

3.3 Details of E.U.T.

EUT Power Supply:	AC Power, Class II
Rated power:	100-240V~, 50/60Hz 100W
Test mode:	The program used to control the EUT for staying in continuous transmitting and receiving mode is programmed. Channel lowest (2403.5MHz), middle (2440.4MHz) and highest (2477.3MHz) are chosen for 2.4G FSK wireless module full testing.
Power cord:	1.5m*2 power cord

3.4 Description of Support Units

The EUT has been tested as an independent unit for fixed frequency by testing lab.

3.5 Test Location

All tests were performed at:

Guangzhou ITL Co., Ltd.

1-2 floor, South Block, Building A2 , No 3 Keyan Lu, Science City, Guangzhou, Guangdong Province, P.R. China

0086-20-32209330

itl@i-testlab.com

No tests were sub-contracted.

3.6 Deviation from Standards

Biconical and log periodic antennas were used instead of dipole antennas.

3.7 Abnormalities from Standard Conditions

None.

3.8 Other Information Requested by the Customer

None.

3.9 Test Facility

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

- **CNAS(Lab code:L4957)**
- **FCC (Registration No.:935596)**
- **IC (Registration NO.:8368A)**

3.10 Measurement Uncertainty

Parameter	Uncertainty
Radio frequency	$\pm 1.06 \times 10^{-7}$
total RF power, conducted	1.37 dB
RF power density , conducted	2.89 dB
All emissions, radiated	±3.35 dB
Temperature	±0.23 °C
Humidity	±0.3 %
DC and low frequency voltages	±0.3 %

4 Instruments Used during Test

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Due Date
1	Spectrum Analyzer	Agilent	N9010A	MY51250936	2013.02.29
2	Pre Amplifier	HP	8447F	3113A05905	2013.09.06
3	Pre Amplifier	Mini-circuits	MLA-0120-A02-34	2648A04738	2013.06.07
4	Biconilog Antenna	ETS•Lindgren	3142D	00108096	2013.01.28
5	Horn Antenna	A-INFOMW	JXTXLB-10180-N	J2031090612133	2012.12.17
6	EMI Test Receiver	R&S	ESCI	100124	2013.06.07
7	LISN	R&S	ENV216	100120	2013.06.07
8	50Ω Coaxial Cable	Mini-circuits	CBL	ITL-115	2013.09.06
9	Semi-Anechoic chamber	ETS•Lindgren	FACT3 2.0	ITL-100	2013.04.10
10	Loop Antenna	ZHINAN	ZN30900A	002489	2013.01.22

5 Test Results

5.1 E.U.T. test conditions

Test Voltage: Input: AC 120V, 60 Hz

Temperature: 20.0 -25.0 °C

Humidity: 38-50 % RH

Atmospheric Pressure: 1000 -1010 mbar

Test frequencies and frequency range:

According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

According to the 15.33 (a) For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Number of fundamental frequencies to be tested in EUT transmit band

Frequency range in which	Number of	Location in frequency range
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

Frequency range of radiated emission measurements

Lowest frequency generated	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz,
At or above 10 GHz to below	5th harmonic of highest fundamental frequency or to 100 GHz,
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz,

EUT channels and frequencies list for 2.4G wireless module:

channel	Frequency	channel	Frequency	channel	Frequency	channel	Frequency
1	2403.5	14	2423.5	27	2443.5	40	2463.5
2	2405.1	15	2425.1	28	2445.0	41	2465.0
3	2406.6	16	2426.6	29	2446.6	42	2466.6
4	2408.1	17	2428.1	30	2448.1	43	2468.1
5	2409.7	18	2429.7	31	2449.6	44	2469.6
6	2411.2	19	2431.2	32	2451.2	45	2471.2
7	2412.8	20	2432.7	33	2452.7	46	2.4727
8	2414.3	21	2434.3	34	2454.3	47	2474.2
9	2415.8	22	2435.8	35	2455.8	48	2475.8
10	2417.4	23	2437.4	36	2457.3	49	2477.3
11	2418.9	24	2438.9	37	2458.9		
12	2420.4	25	2440.4	38	2460.4		
13	2422.0	26	2442.0	39	2461.9		

Channel lowest (2403.5MHz), middle (2440.4MHz) and highest (2477.3MHz) are chosen for 2.4G FSK wireless module full testing.

5.2 Antenna equirement

Standard requirement

15.203 requirement:

For intentional device. According to 15.203. an intentional radiator shall be designed to Ensure that no antenna other than that furnished by the responsible party shall be used with the device.

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

(i) Systems operating in the 2400-2483.5 MHz bands that are used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi 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 6 dBi.

EUT Antenna

The antenna is an internal Cable antenna and no consideration of replacement. The best case gain of the antenna is 2dBi.

Test result: The unit does meet the FCC requirements.

5.3 Occupied Bandwidth

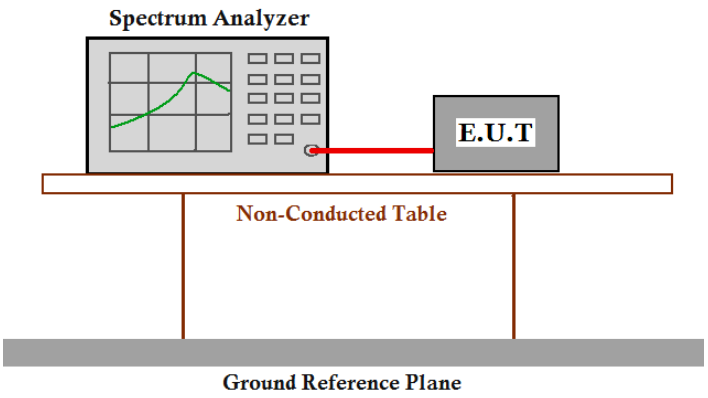
Test Requirement: FCC Part 15 C section 15.247 and RSS-210

(a)(1) 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.

Test Method: ANSI C63.10: Clause 6.9 & DA 00-705

Test Status: Test the EUT in continuous transmitting mode at the lowest, middle and highest channel with different data package

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: Span = approximately 2 to 3 times the 20dB bandwidth, centring on a hopping channel;
3. Set the spectrum analyzer: RBW >= 1% of the 20dB bandwidth VBW >= RBW. Sweep = auto; Detector Function = Peak. Trace = Max Hold.
4. Mark the peak frequency and -20dB points bandwidth.

Test result (-20dB bandwidth), For 2.4G FSK wireless module

FSK mode:

Test Channel	Bandwidth(MHz)	2/3 bandwidth(MHz)
Lowest	2.19	1.46
Middle	2.20	1.47
Highest	2.22	1.48

Test result (99% bandwidth)

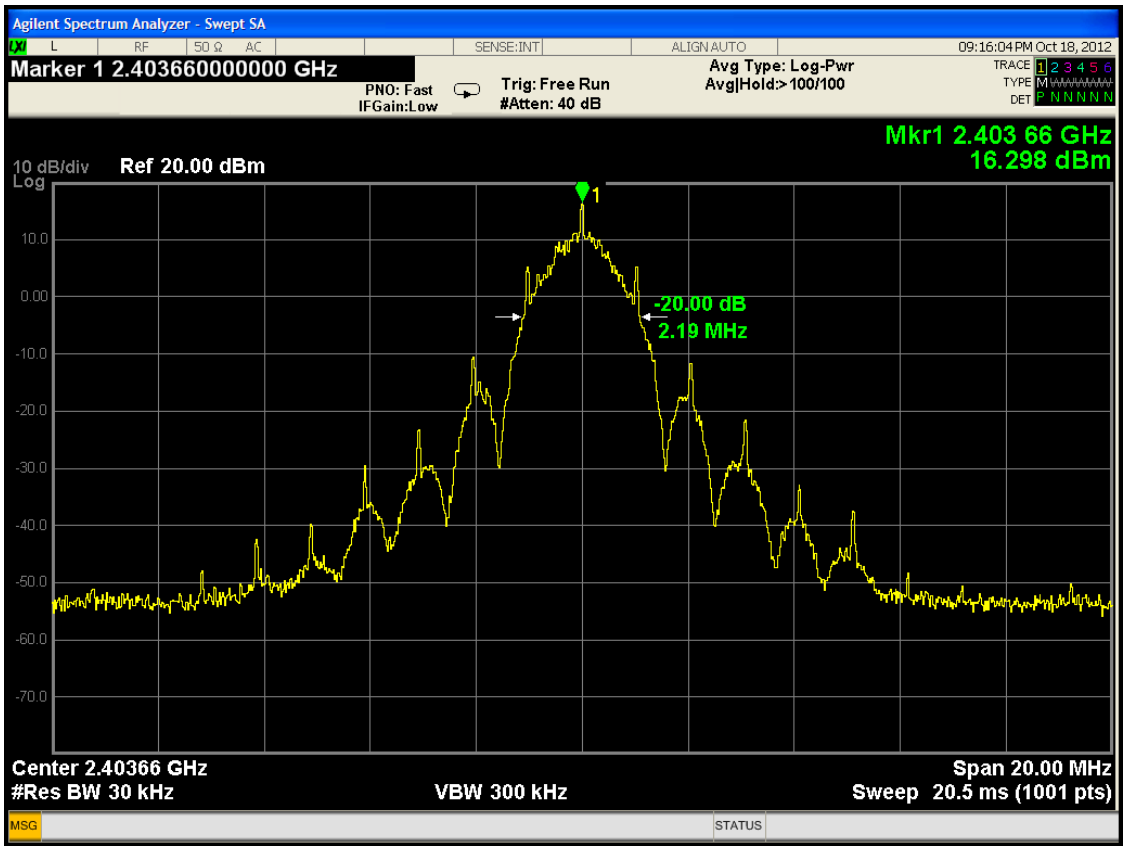
FSK mode:

Test Channel	Bandwidth(MHz)
Lowest	2.16
Middle	2.14
Highest	2.14

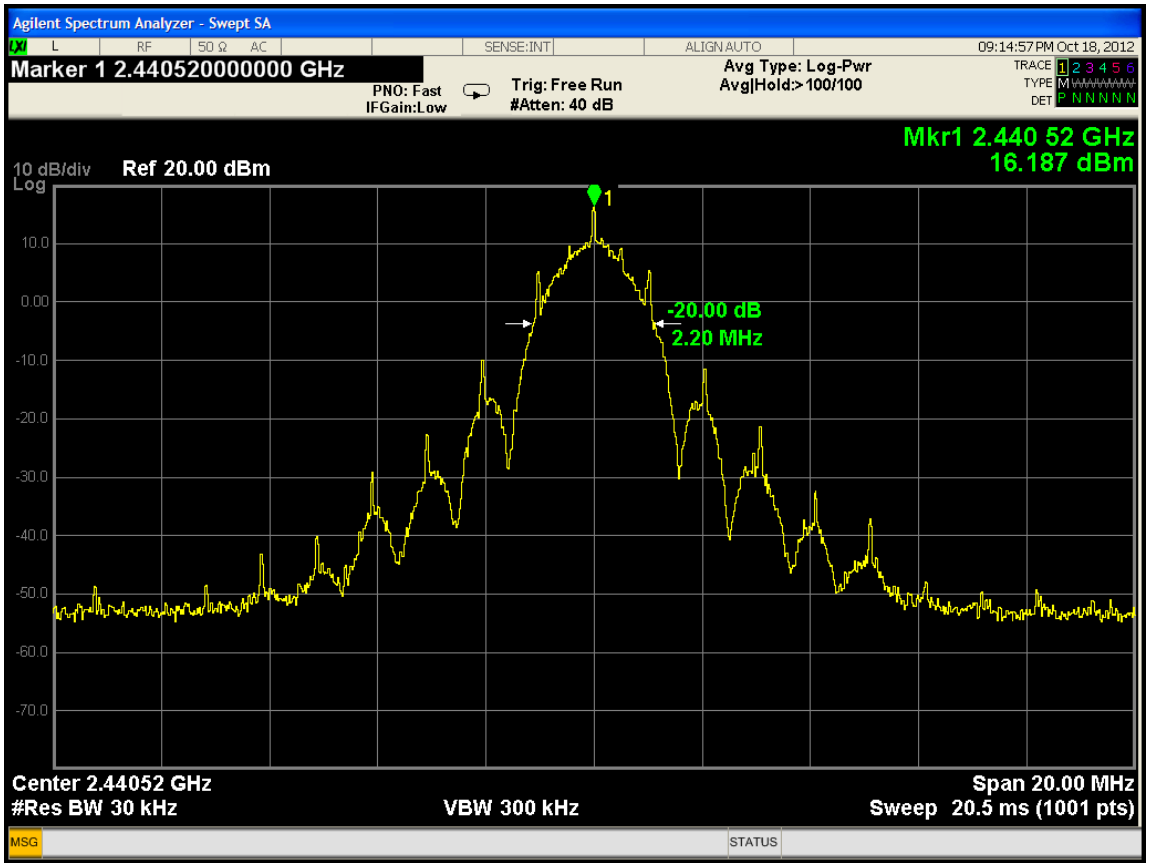
For 2.4G FSK wireless module

Result plot as follows:

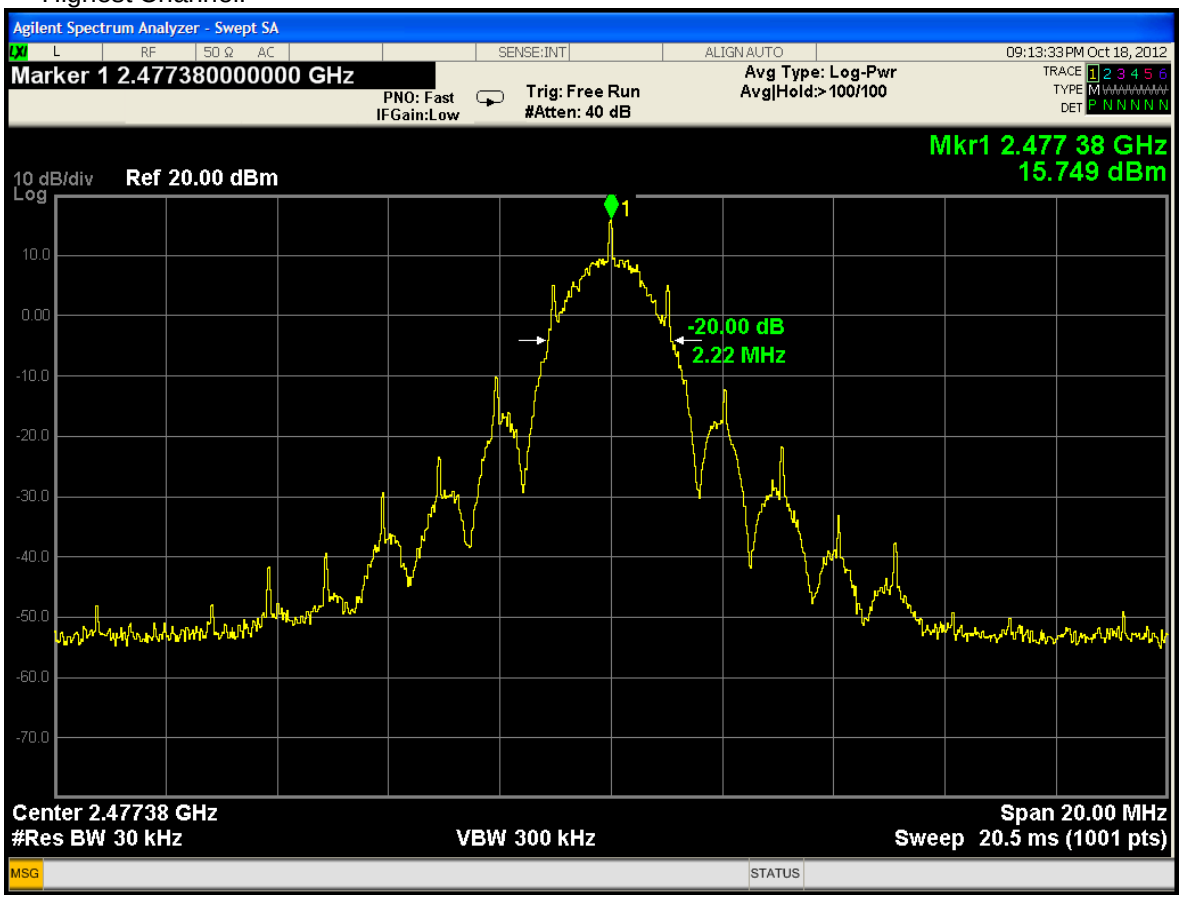
Lowest Channel:



Middle Channel:

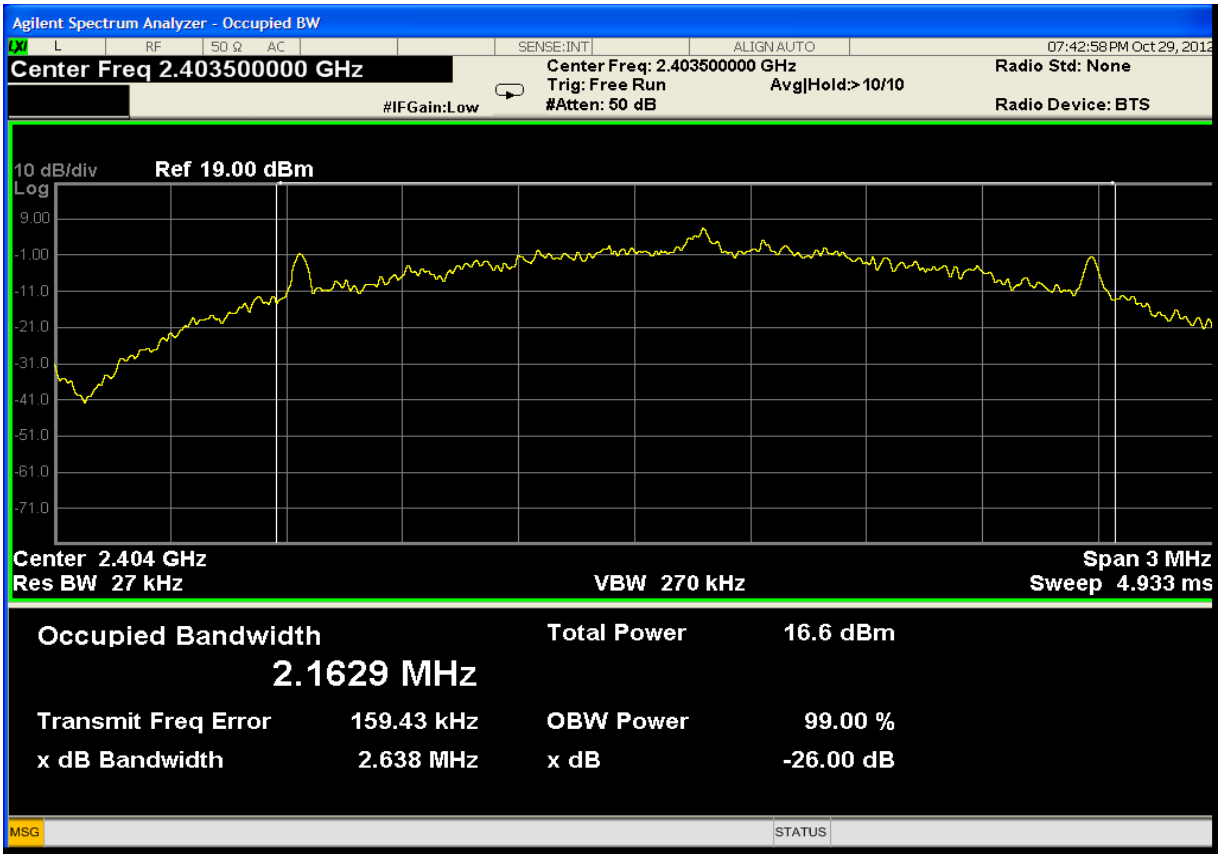


Highest Channel:

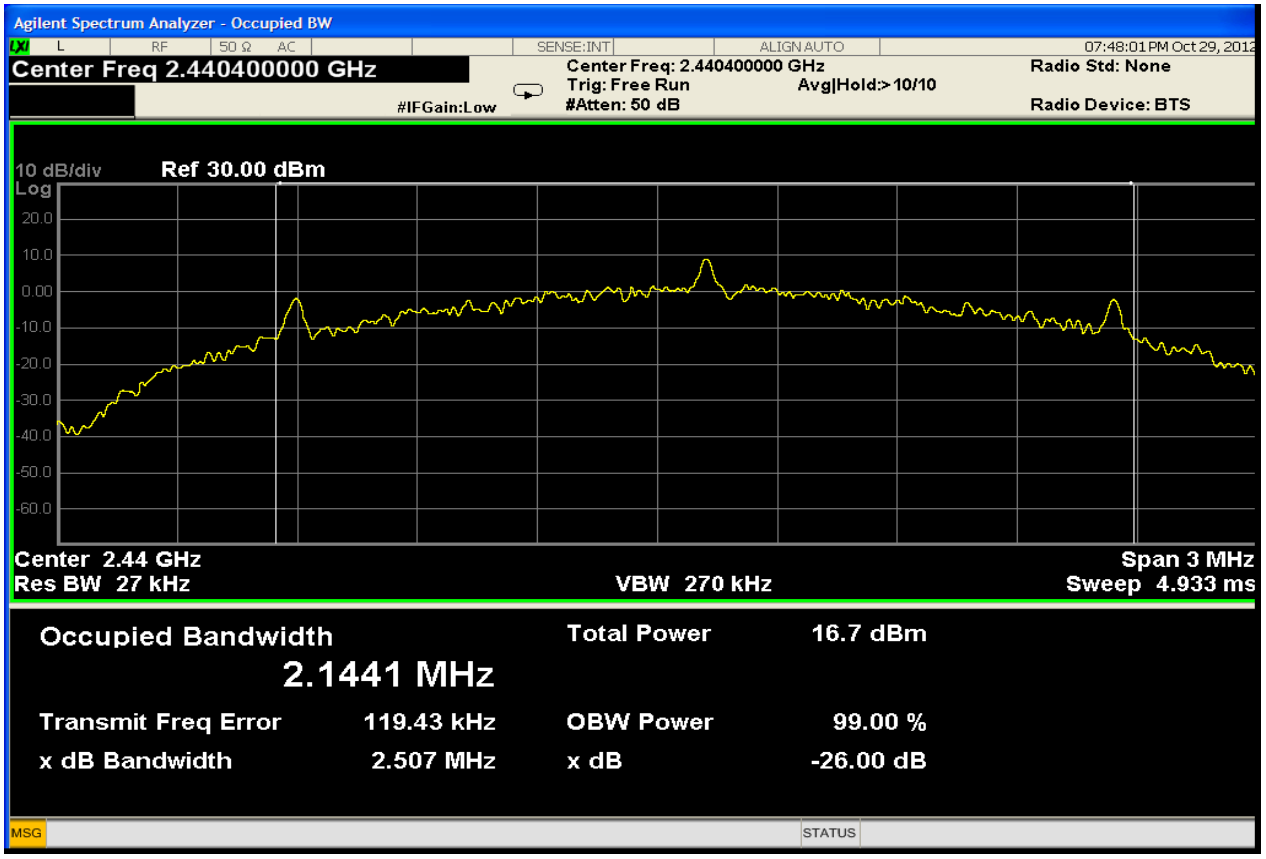


(99% bandwidth)

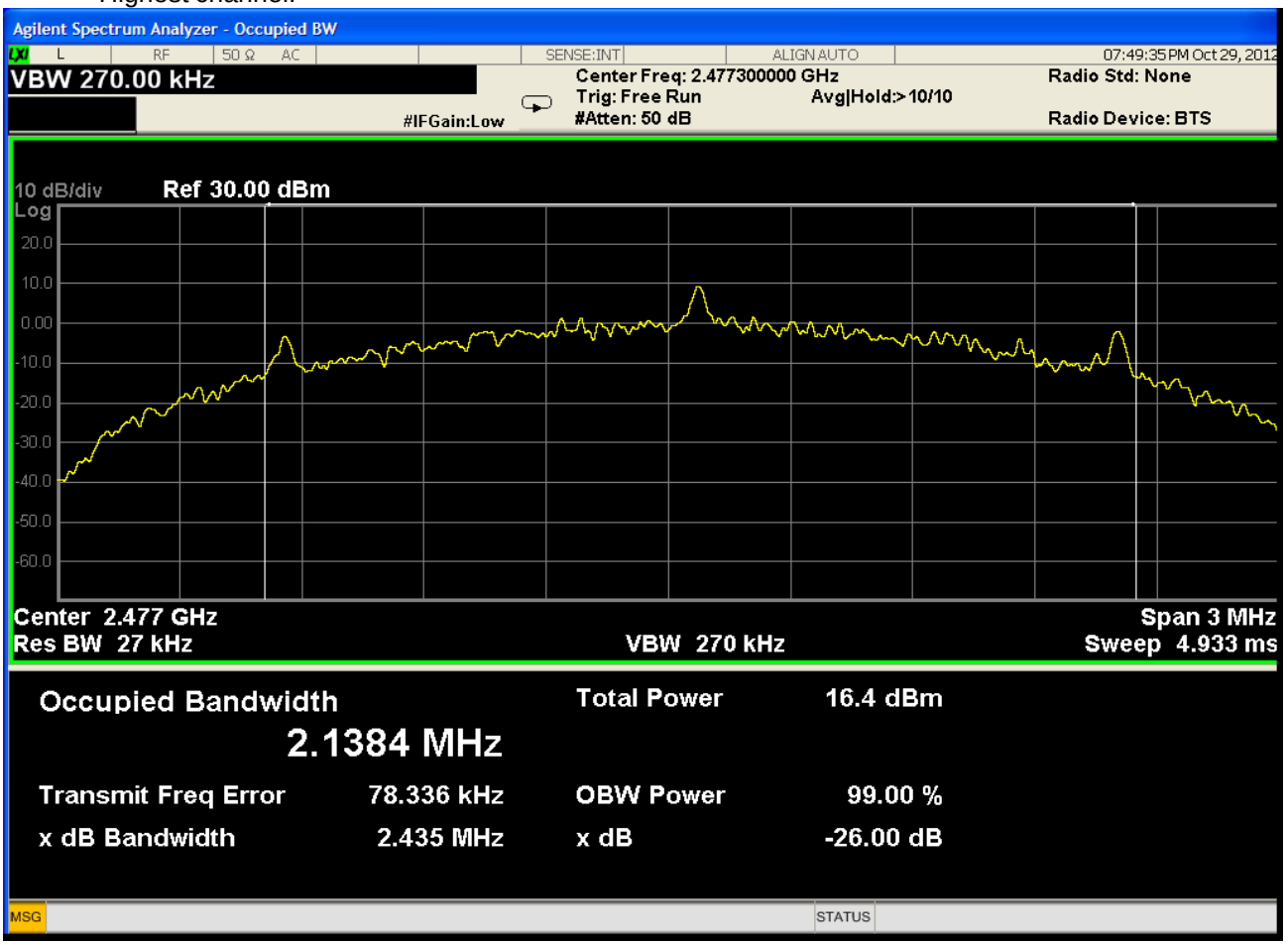
Lowest channel:



Middle channel:



Highest channel:



5.4 Carrier Frequencies Separated

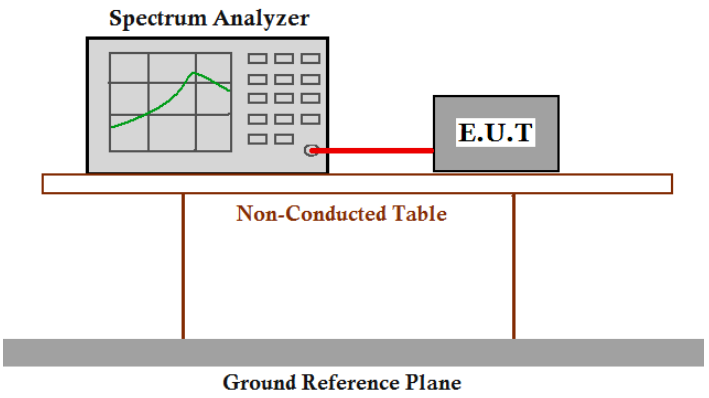
Test Requirement: FCC Part 15 C section 15.247 and RSS-210

(a),(1) 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.

Test Method: DA 00-705

Test Status: Test the EUT in continuous transmitting mode at the lowest, middle and highest channel with different data package

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low attenuation RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW >= 1% of the span, VBW >= RBW,. Sweep = auto; Detector Function = Peak. Trace = Max, hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section. Submit this plot.

Test result:

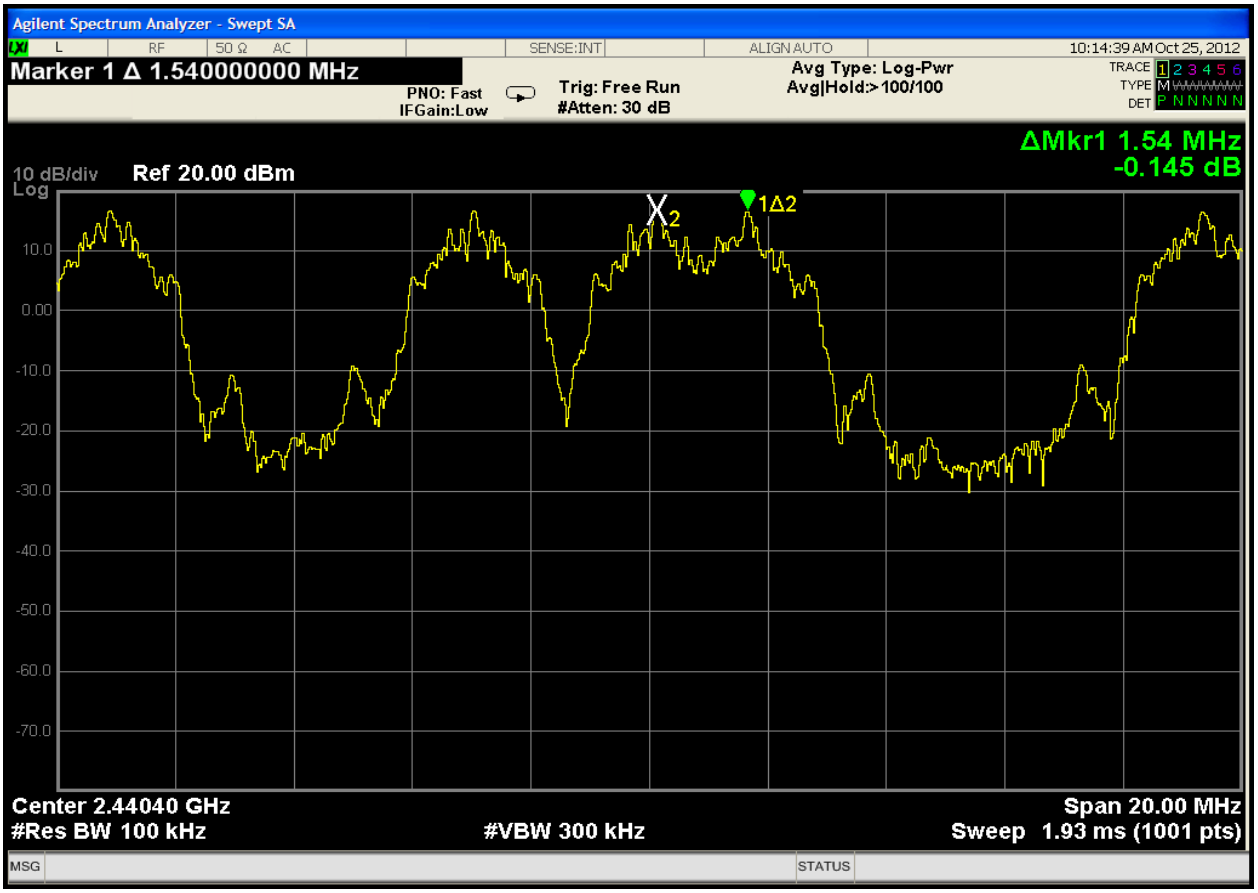
For 2.4G FSK wireless module

Test Channel	Carrier Frequencies Separated	Pass/Fail
Lower Channels (channel 1 and channel 2)	1.54MHz	Pass
Middle Channels (channel 24 and channel 25)	1.54MHz	Pass
Upper Channels (channel 48 and channel 49)	1.54MHz	Pass
Remark: The limit is maximum two-thirds of the 20 dB bandwidth: 1.48 MHz		

For 2.4G FSK wireless module
Carrier Frequencies Separated plot:

1. Lowest Channels:

2. Middle Channels:



3. Highest Channels

5.5 Hopping Channel Number

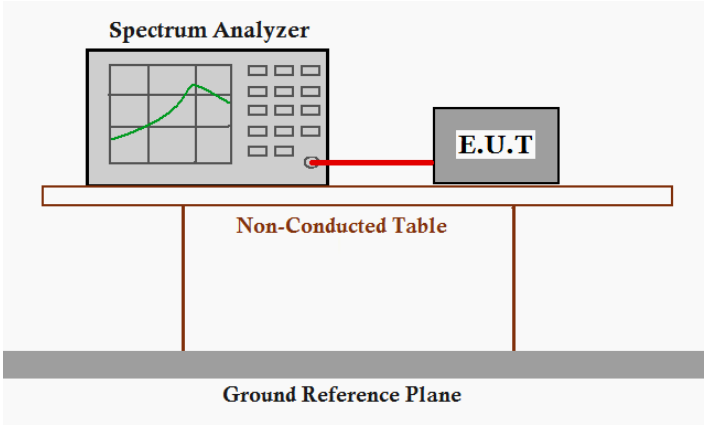
Test Requirement: FCC Part15 C section 15.247 and RSS-210

(a)(1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

Test Method: DA 00-705

Test Status: Test the EUT in continuous transmitting mode at the lowest, middle and highest channel with different data package

Test Configuration:

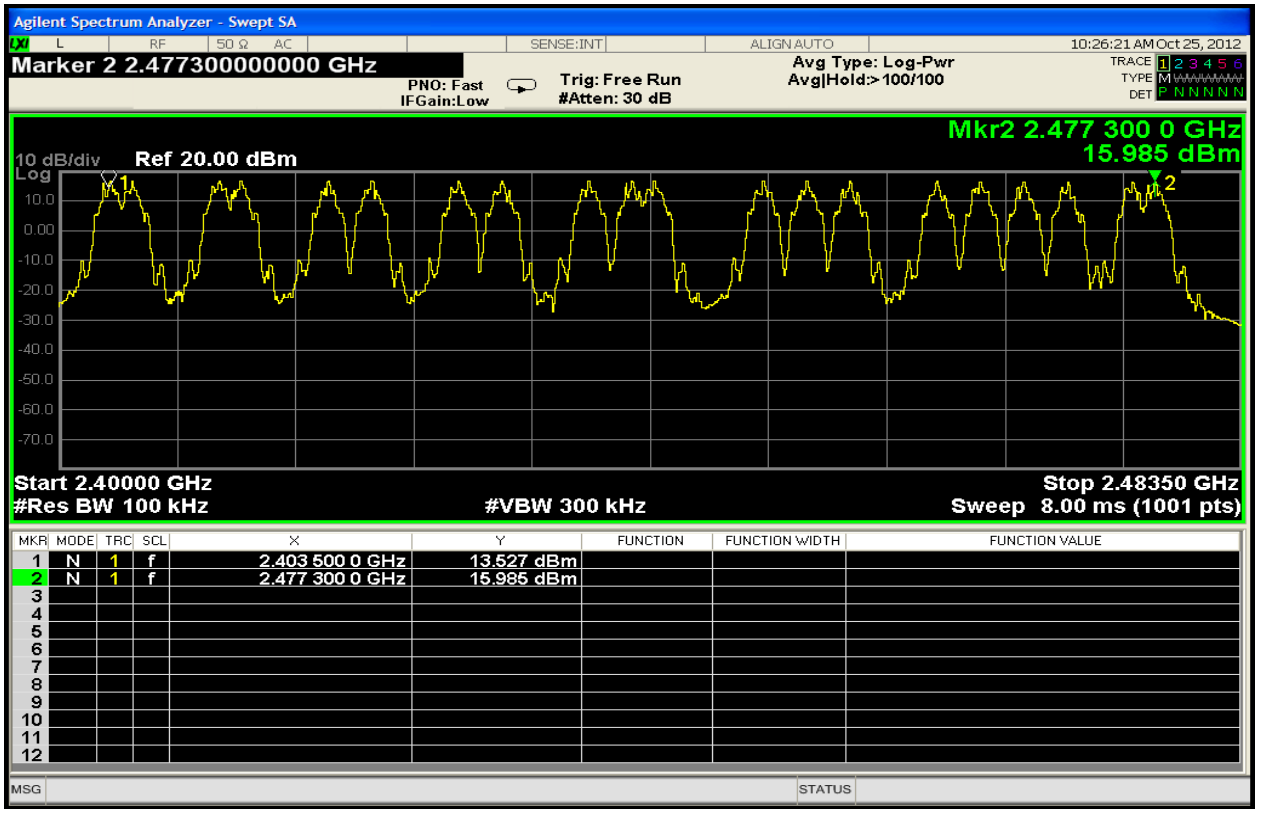


Test Procedure:

1. Remove the antenna from the EUT and then connect a low attenuation RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100 kHz. VBW = 300 kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.
4. Set the spectrum analyzer: start frequency = 2400 MHz. stop frequency = 2483.5 MHz. Submit the test result graph.

For 2.4G FSK wireless module

Test result: Total channels are 20 channels.



Test result: The unit does meet the FCC and RSS-210 requirements.

5.6 Dwell Time

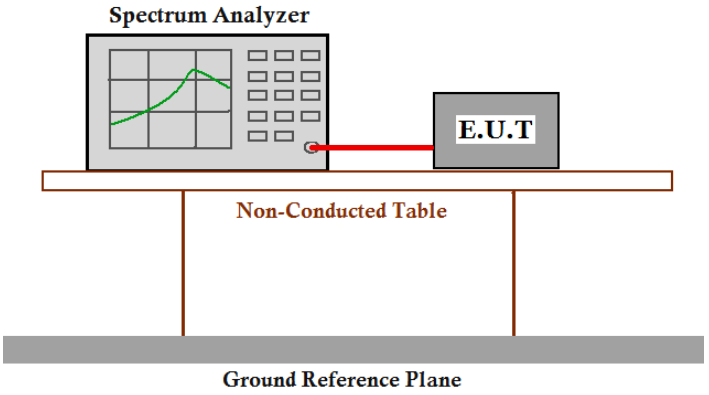
Test Requirement: FCC Part 15 C section 15.247 and RSS-210

(a)(1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Method: DA 00-705

Test Status: Test the EUT in continuous transmitting mode at the lowest, middle and highest channel with different data package

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low attenuation RF cable from the antenna port to the spectrum.

2. Set spectrum analyzer span = 0. centered on a hopping channel;
3. Set RBW = 1 MHz and VBW = 1 MHz. Sweep = as necessary to capture the entire dwell time per hopping channel. Detector Function = Peak. Trace = View;
4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g.. data rate. modulation format. etc.). Repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s). An oscilloscope may be used instead of a spectrum analyzer.

Test Result:

For 2.4G FSK wireless module:

Frequency:2403.5MHz

Mode	Number of transmission in a 8s (20Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
1	20*8=160	0.156	24.96	400

Frequency:2440.4MHz

Mode	Number of transmission in a 8s (20Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
1	20*8=160	0.150	24	400

Frequency:2477.3MHz

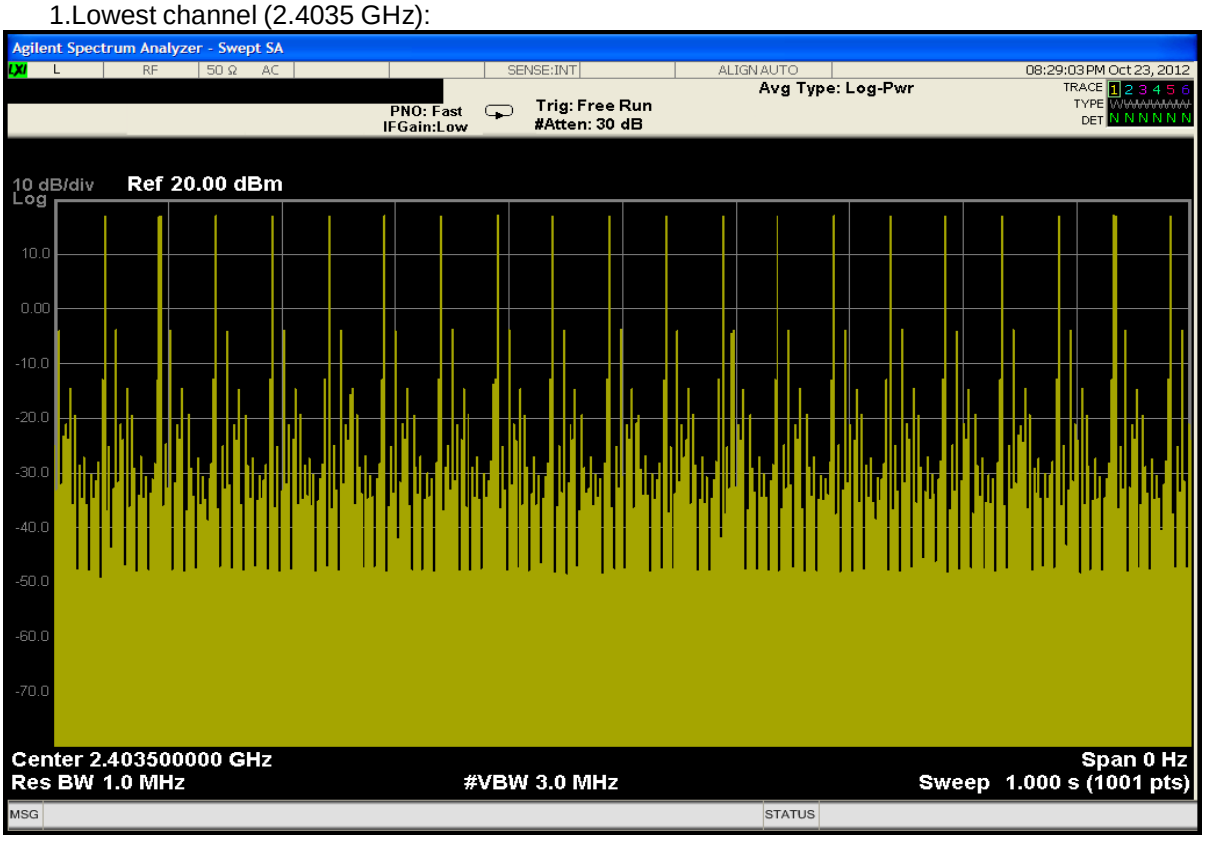
Mode	Number of transmission in a 8s (20Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
1	20*8=160	0.150	24	400

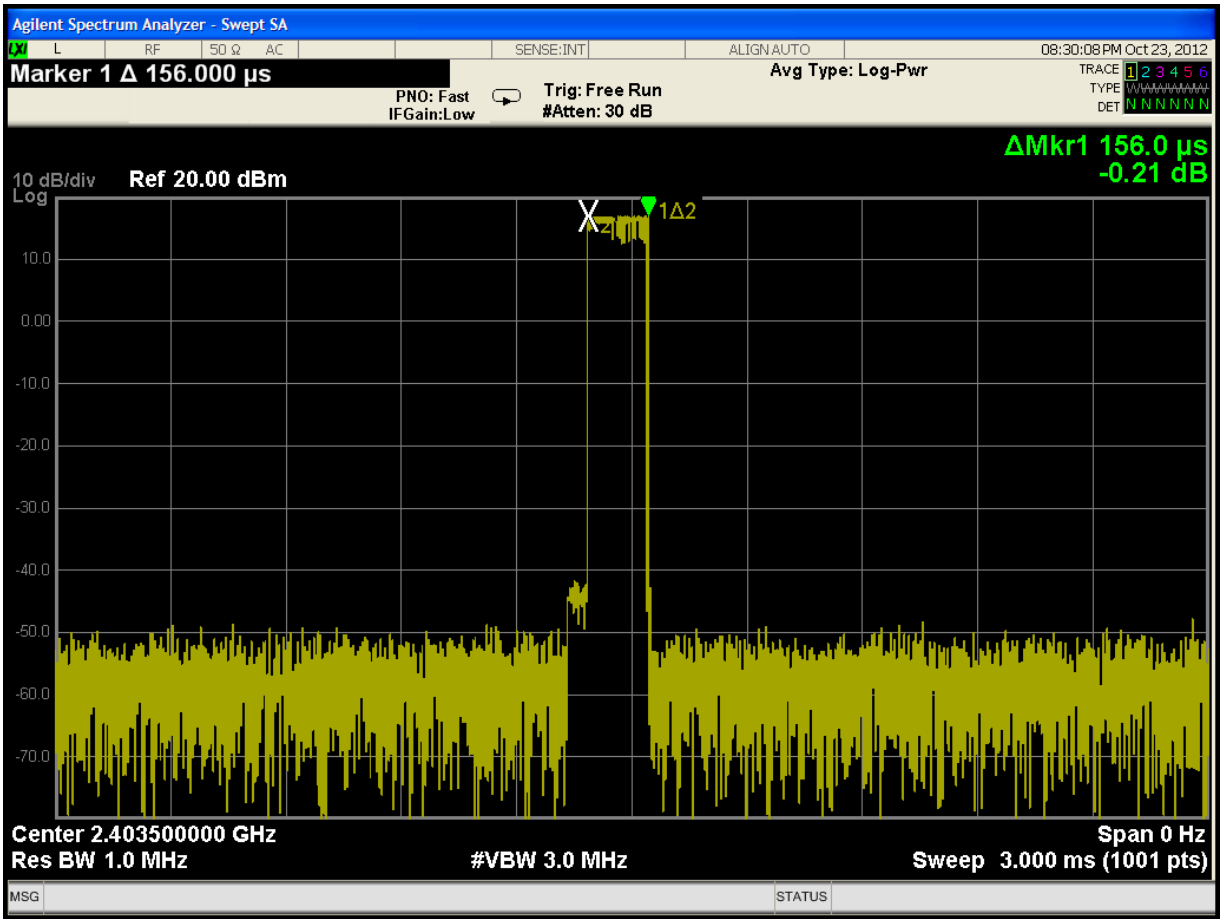
TEST RESULTS: The unit does meet the requirements.

The unit does meet the FCC and RSS-210 requirements.

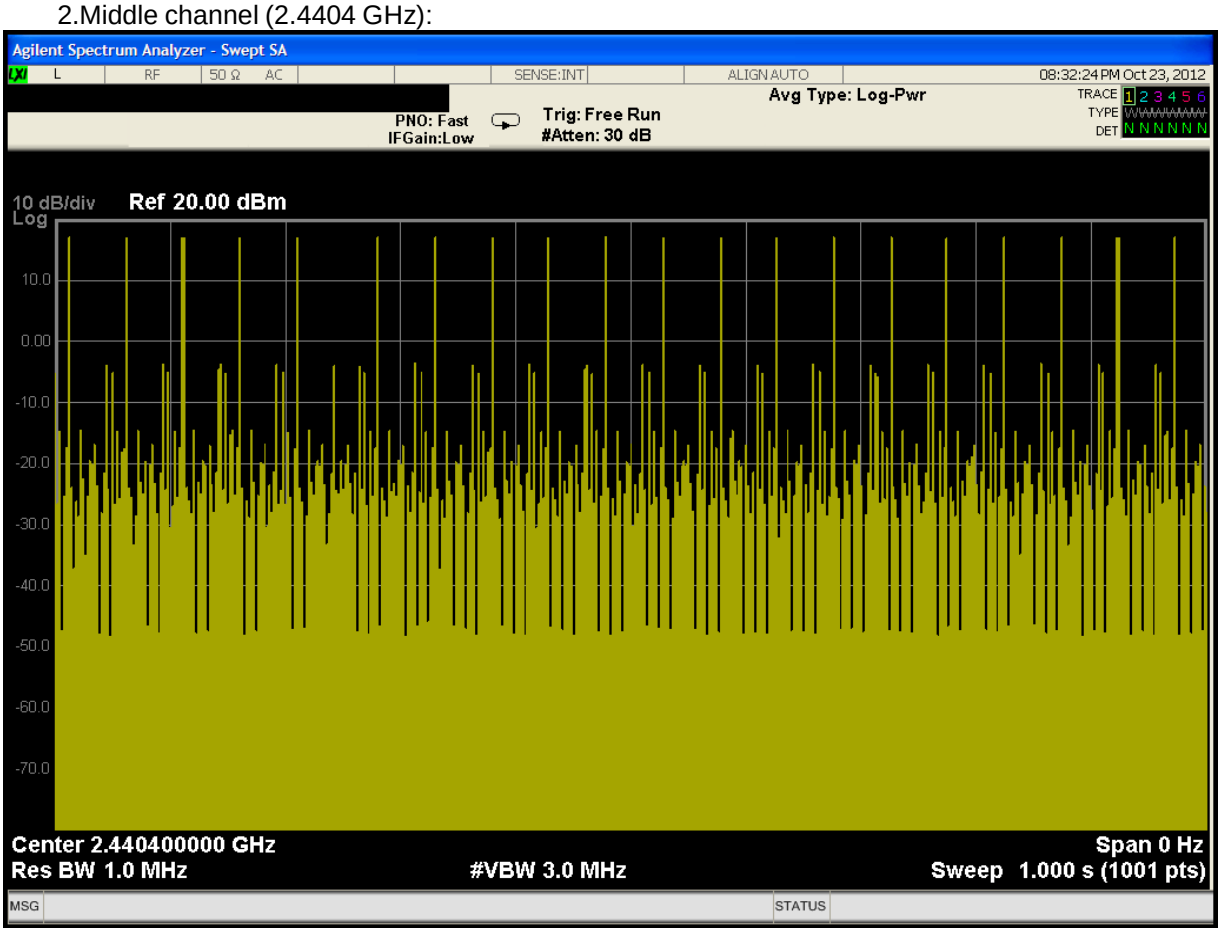
For 2.4G FSK wireless module

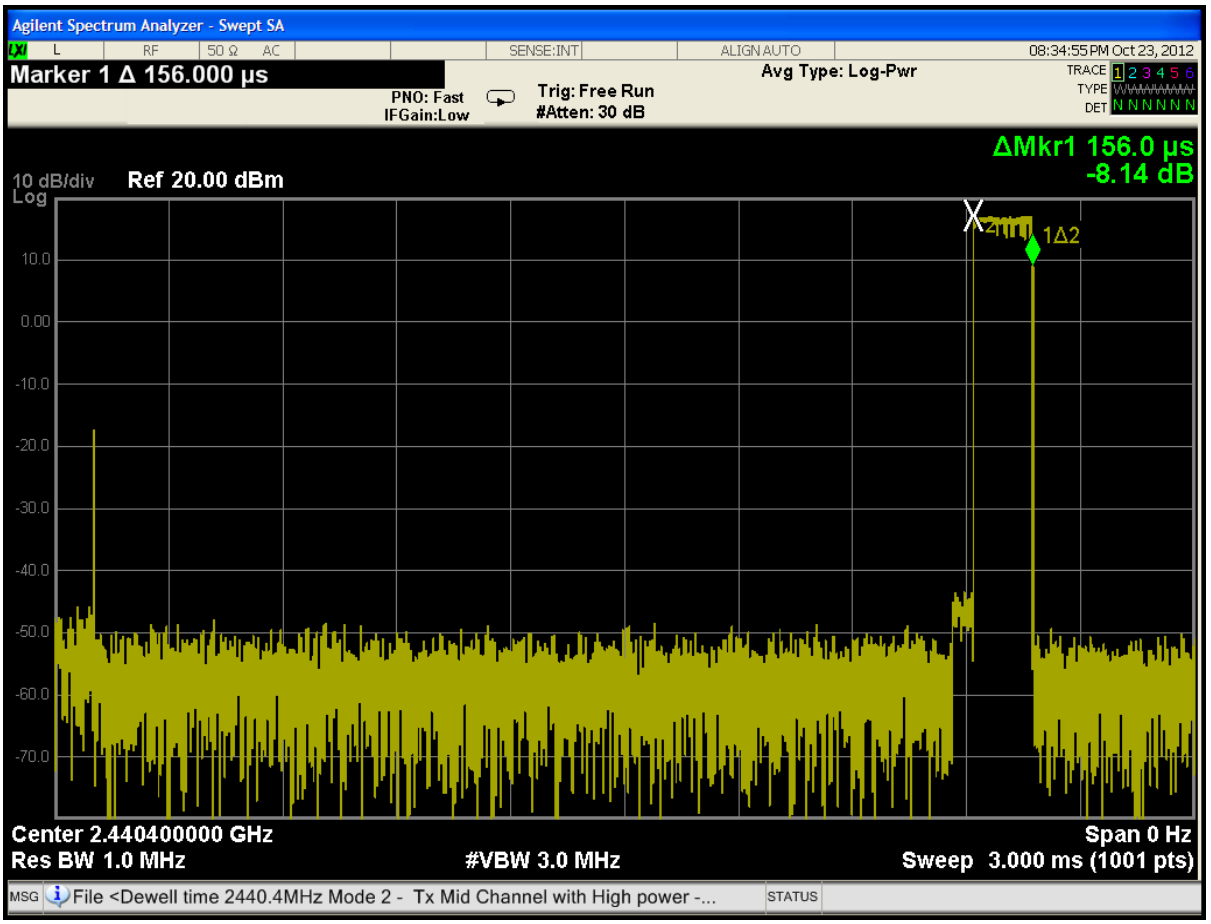
1.Lowest channel (2.4035 GHz):



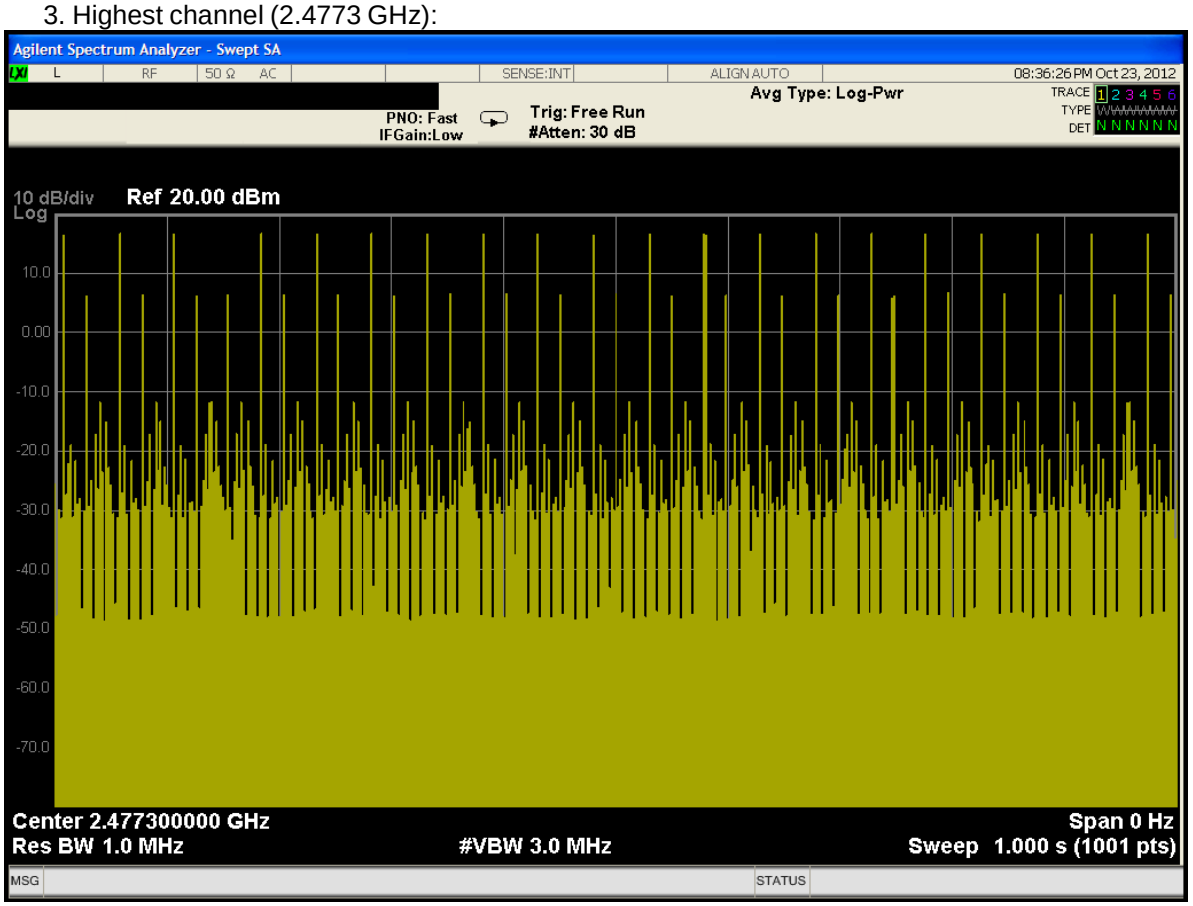


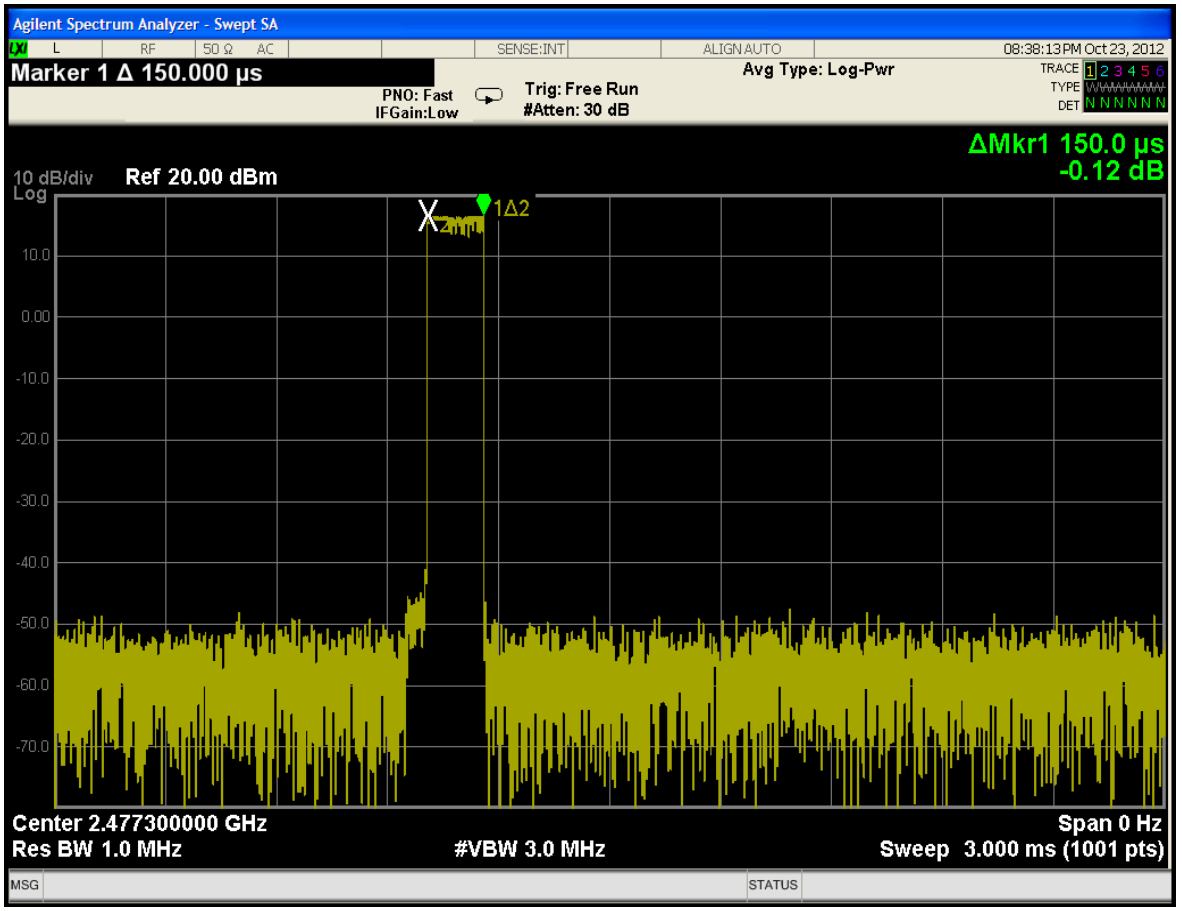
2.Middle channel (2.4404 GHz):





3. Highest channel (2.4773 GHz):





5.7 Maximum Peak Output Power

Test Requirement: FCC Part 15 C section 15.247 and RSS-210

(b)(1)For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band:

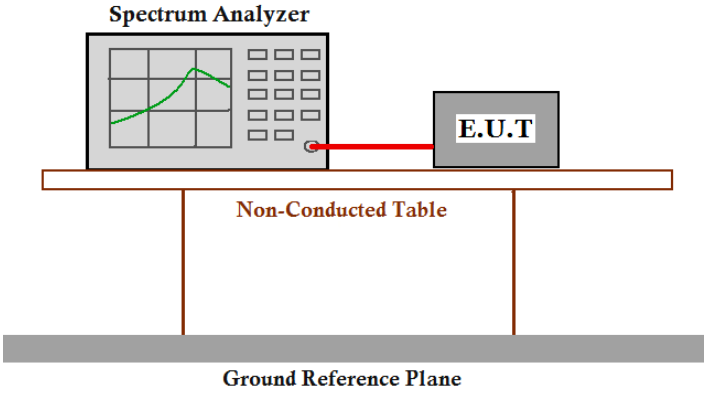
0.125 watts.

Refer to the result “Hopping channel number” of this document. The 1 watt (30.0 dBm) limit applies.

Test Method: ANSI C63.10: Clause 6.10 & DA 00-705

Test Status: Test the EUT in continuous transmitting mode at the lowest, middle and highest channel with different data package

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low attenuation RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 2 MHz. VBW = 2 MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

Test Result: (For 2.4G FSK wireless module)

FSK mode:

Test Channel	Fundamental Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Result
Lowest	2402	18.114	20.96	Pass
Middle	2441	18.077	20.96	Pass
Highest	2480	17.795	20.96	Pass

Remark: cable lose=1.0dB

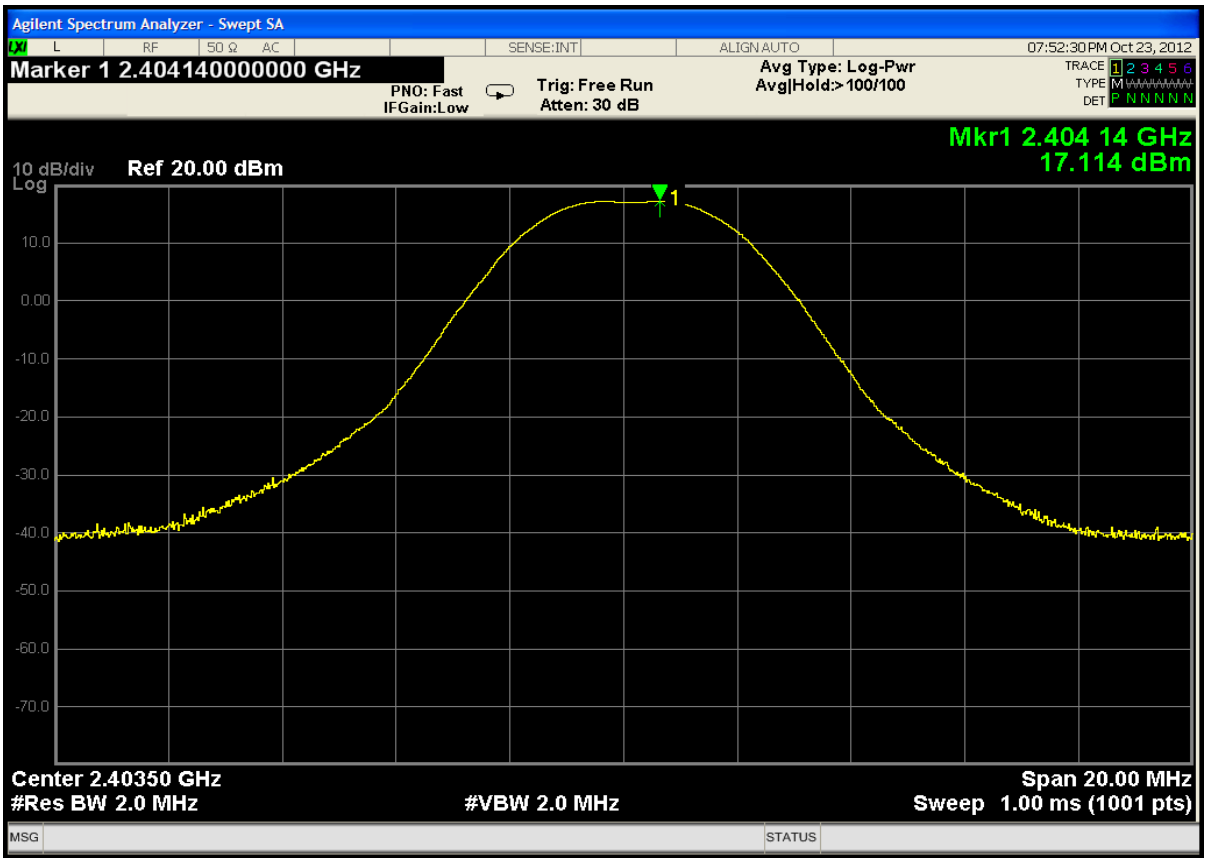
Test result: The unit does meet the FCC and RSS-210 requirements.

Test result plot as follows:

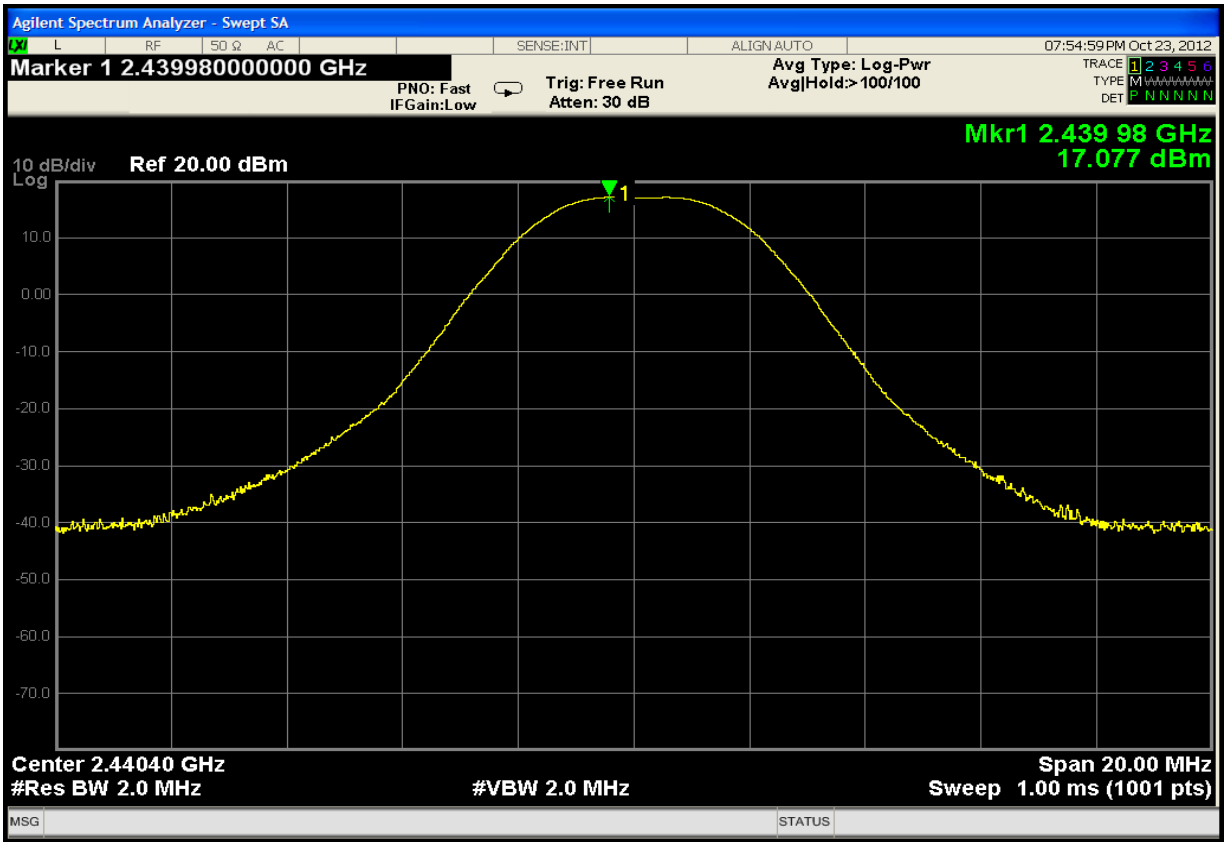
For 2.4G FSK wireless module

FSK mode:

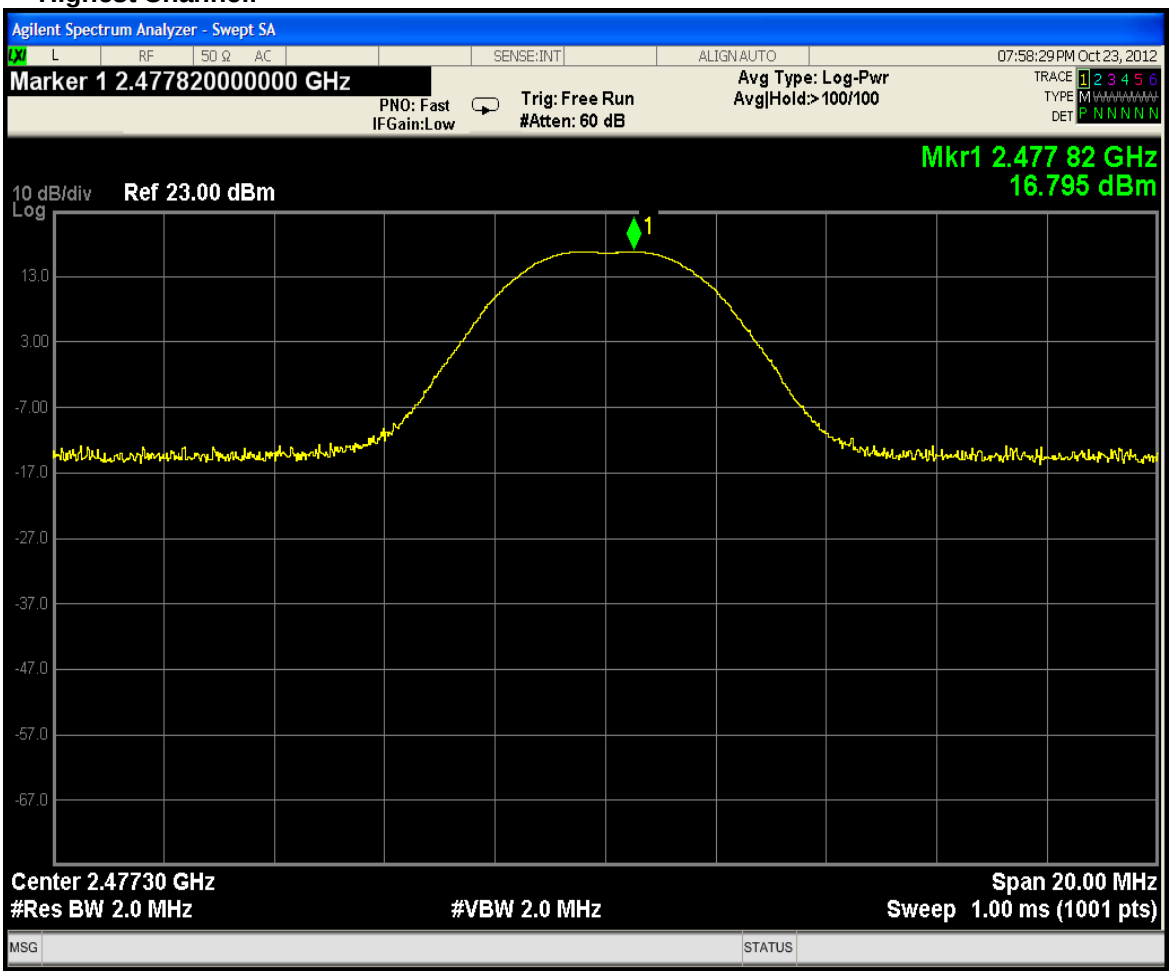
Lowest Channel:



Middle Channel:



Highest Channel:



5.8 Conducted Spurious Emissions

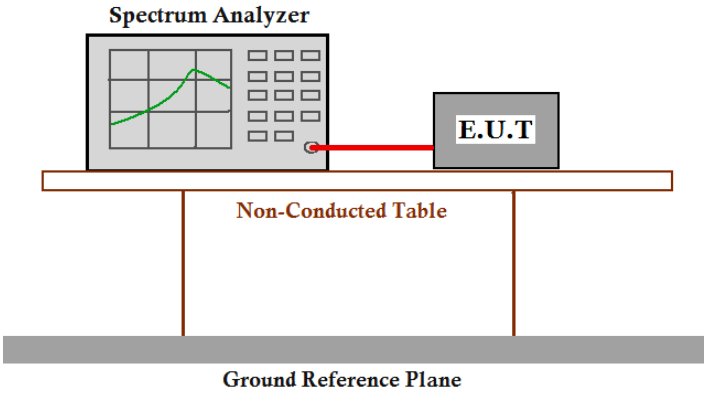
Test Requirement: FCC Part15 C section 15.247 and RSS-210

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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. Provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Method: ANSI C63.10: Clause 6.7 & DA 00-705

Test Status: Test the EUT in continuous transmitting mode at the lowest, middle and highest channel with different data package

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low attenuation RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 100 kHz. VBW >= RBW. Sweep = auto; Detector Function = Peak (Max. hold).

For 2.4G FSK wireless module

Test result plot as follows:

Lowest Channel:

Middle Channel

Highest channel

5.9 Radiated Spurious Emissions

Test Requirement: FCC Part15 C section 15.247 and RSS-210

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, and provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Method: ANSI C63.10: Clause 6.4, 6.5 and 6.6 & DA 00-705

Test Status: Test the EUT in continuous transmitting mode at the lowest, middle and highest channel with different data package

Detector: For PK value:

RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz, 9kHz for <30MHz
VBW ≥ RBW
Sweep = auto

Detector function = peak

Trace = max hold

For AV value:

RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz, 9kHz for <30MHz

VBW =10 Hz

Sweep = auto

Detector function = peak

Trace = max hold

15.209 Limit: 40.0 dBµV/m between 30MHz & 88MHz

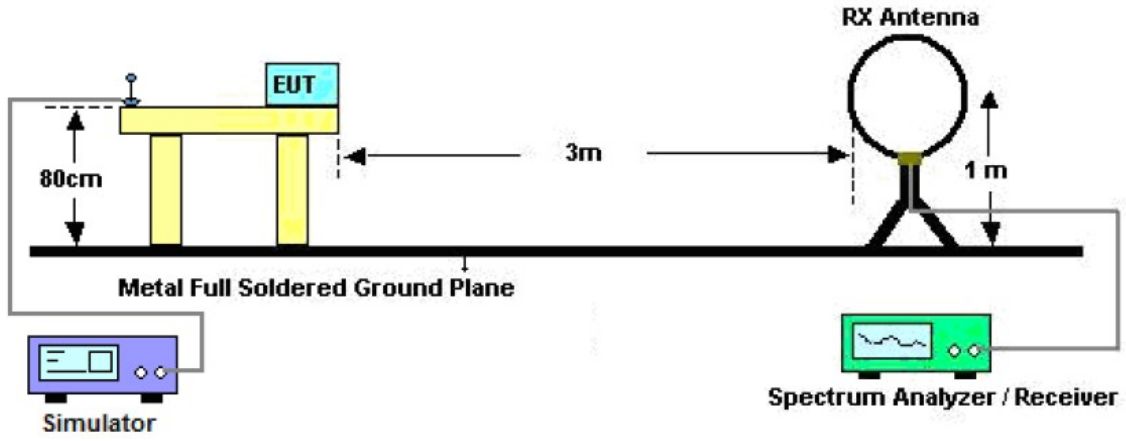
43.5 dBµV/m between 88MHz & 216MHz

46.0 dBµV/m between 216MHz & 960MHz

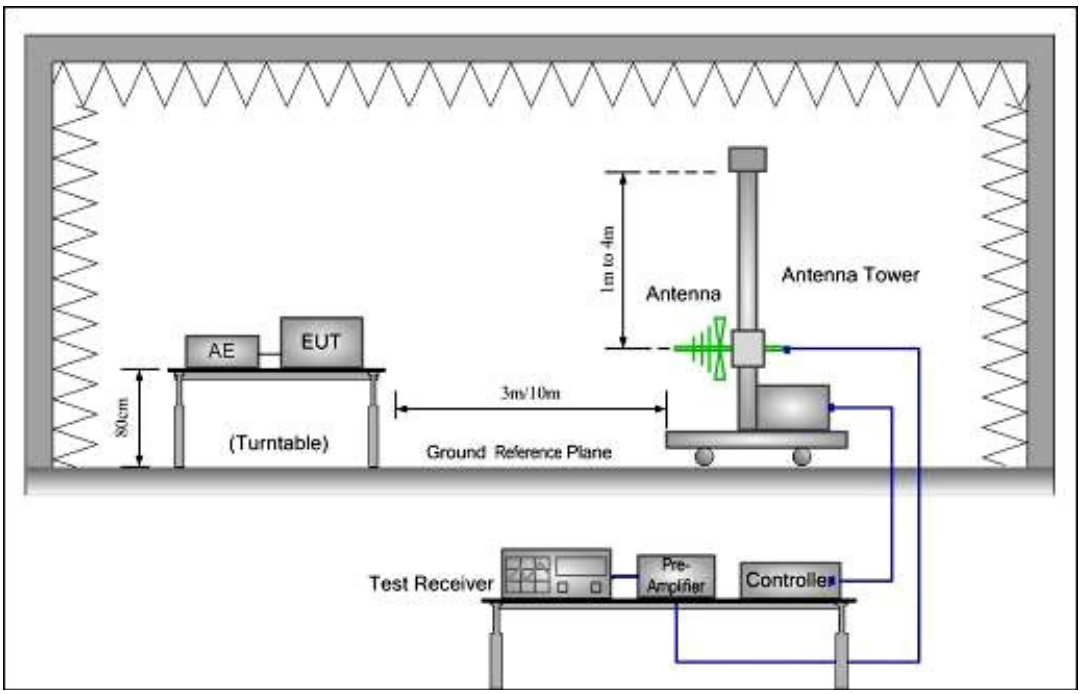
54.0 dBµV/m above 960MHz

Test Configuration:

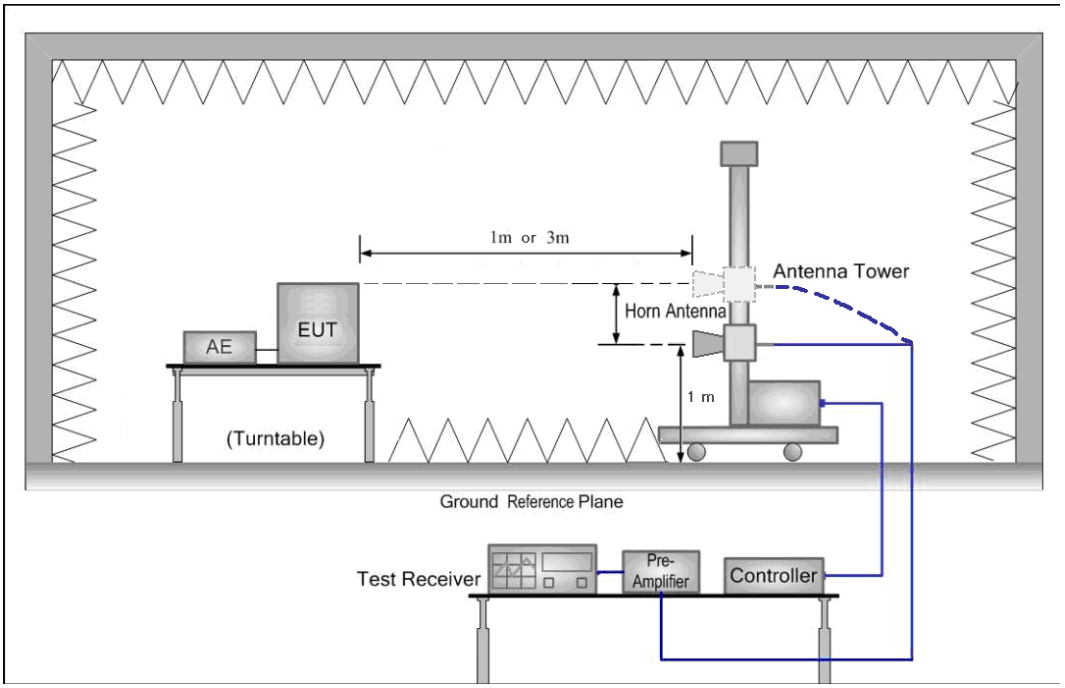
1) 9kHz to 30MHz emissions:



2) 30 MHz to 1 GHz emissions:



3) 1 GHz to 40 GHz emissions:



Test Procedure: The procedure used was ANSI Standard C63.4:2003. The receiver was scanned from 30MHz to 25GHz.When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from 20log(dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit.

Submit this data.

5.9.1 Harmonic and other spurious emissions

For Model: Subwoofer (Power supply: JQH, type: NER-SPM00-216)

Test at low Channel in transmitting status

9kHz~30MHz Test result

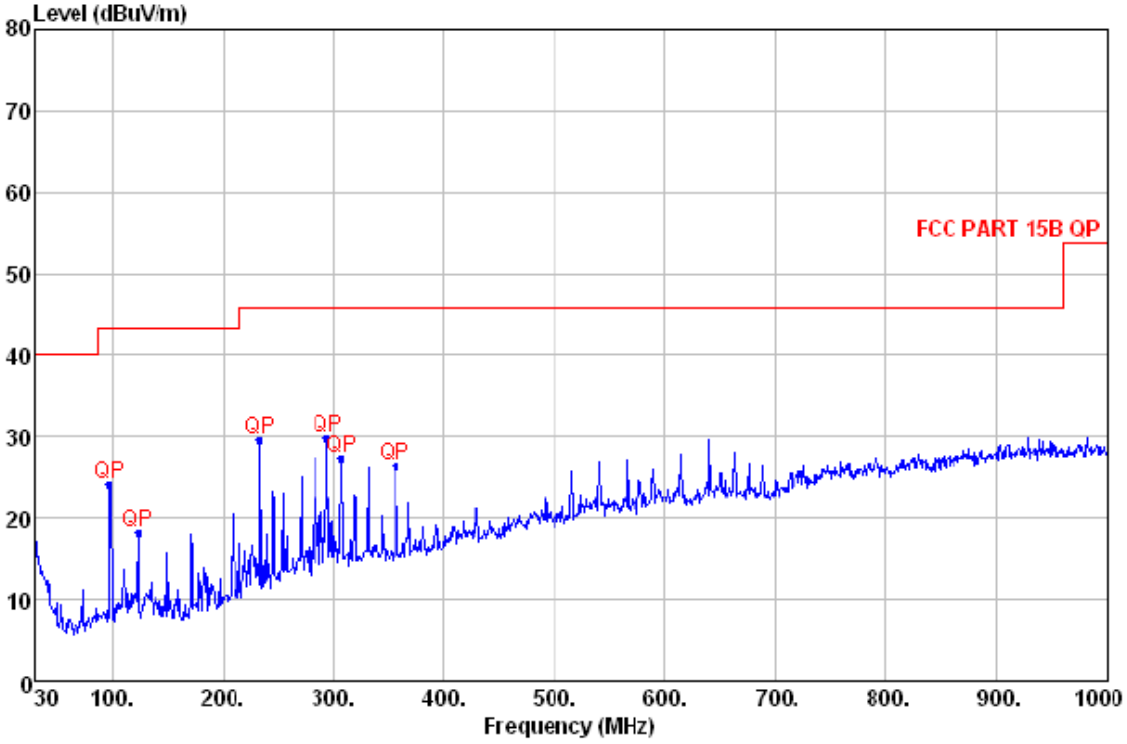
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	97.900	24.32	QP	8.58	1.16	43.50	-19.18	100	189
2	123.120	18.19	QP	7.70	1.32	43.50	-25.31	100	24
3	233.700	29.71	QP	10.98	1.86	46.00	-16.29	100	258
4	294.810	29.84	QP	13.68	2.10	46.00	-16.16	200	155
5	307.420	27.46	QP	13.65	2.15	46.00	-18.54	200	208
6	355.920	26.52	QP	14.20	2.30	46.00	-19.48	200	146

Level=Read Level + Antenna Factor + Cable Loss

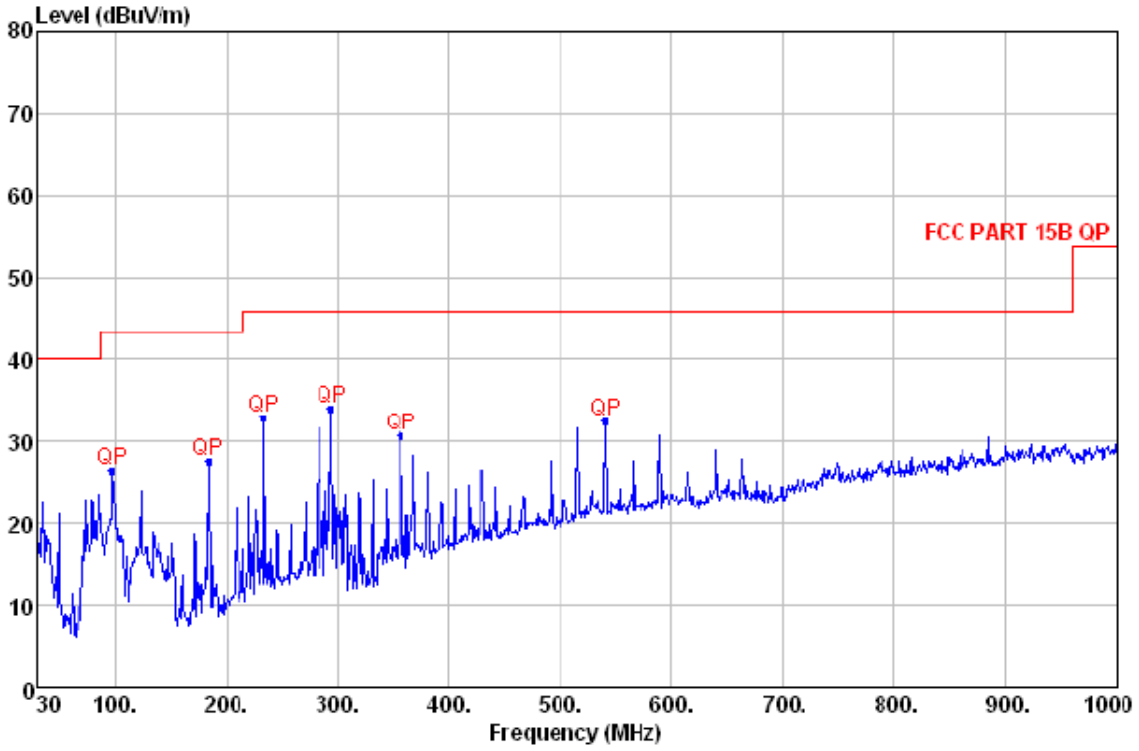
Test at low Channel in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBµV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	97.900	26.56	QP	8.58	1.16	43.50	-16.94	100	305
2	184.230	27.66	QP	8.30	1.63	43.50	-15.84	100	94
3	233.700	32.93	QP	10.98	1.86	46.00	-13.07	100	294
4	294.810	34.19	QP	13.68	2.10	46.00	-11.81	200	102
5	356.890	30.67	QP	14.25	2.30	46.00	-15.33	200	141
6	541.190	32.63	QP	19.36	2.89	46.00	-13.37	200	166

Level=Read Level + Antenna Factor + Cable Loss

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4807.000	34.32	9.59	27.62	38.60	54.89	74.00	V
7210.500	34.88	12.15	27.33	36.06	55.76	74.00	V
9614.000	37.72	14.41	27.14	36.12	61.11	74.00	V
4807.000	34.32	9.59	27.62	38.65	54.94	74.00	H
7210.500	34.88	12.15	27.33	36.09	55.79	74.00	H
9614.000	37.72	14.41	27.14	36.16	61.15	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4807.000	34.32	9.59	27.62	33.31	49.6	54.00	V
7210.500	34.88	12.15	27.33	20.81	40.51	54.00	V
9614.000	37.72	14.41	27.14	23.63	48.62	54.00	V
4807.000	34.32	9.59	27.62	31.05	47.34	54.00	H
7210.500	34.88	12.15	27.33	21.61	41.31	54.00	H
9614.000	37.72	14.41	27.14	23.23	48.22	54.00	H

Test at Middle Channel in transmitting status

9kHz~30MHz Test result

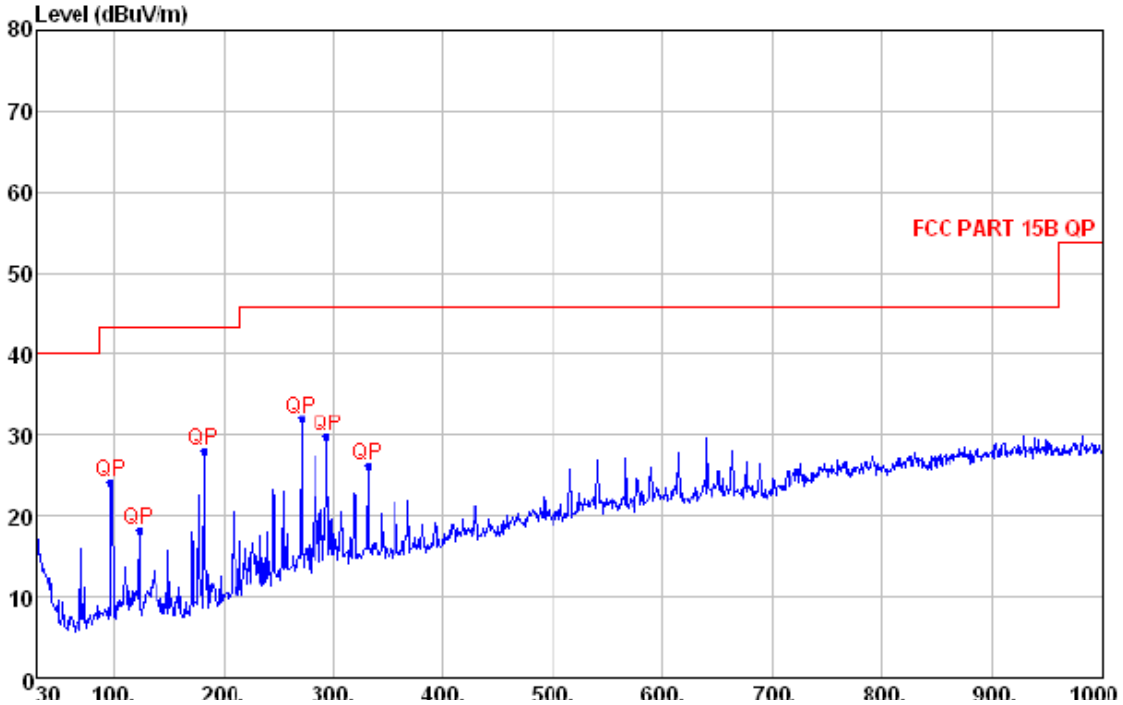
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	97.900	24.32	QP	8.58	1.16	43.50	-19.18	100	156
2	123.120	18.19	QP	7.70	1.32	43.50	-25.31	100	84
3	182.290	28.14	QP	8.30	1.62	43.50	-15.36	100	249
4	270.560	32.18	QP	12.95	2.01	46.00	-13.82	200	301
5	294.810	29.84	QP	13.68	2.10	46.00	-16.16	200	147
6	331.670	26.23	QP	13.95	2.23	46.00	-19.77	200	164

Level=Read Level + Antenna Factor + Cable Loss

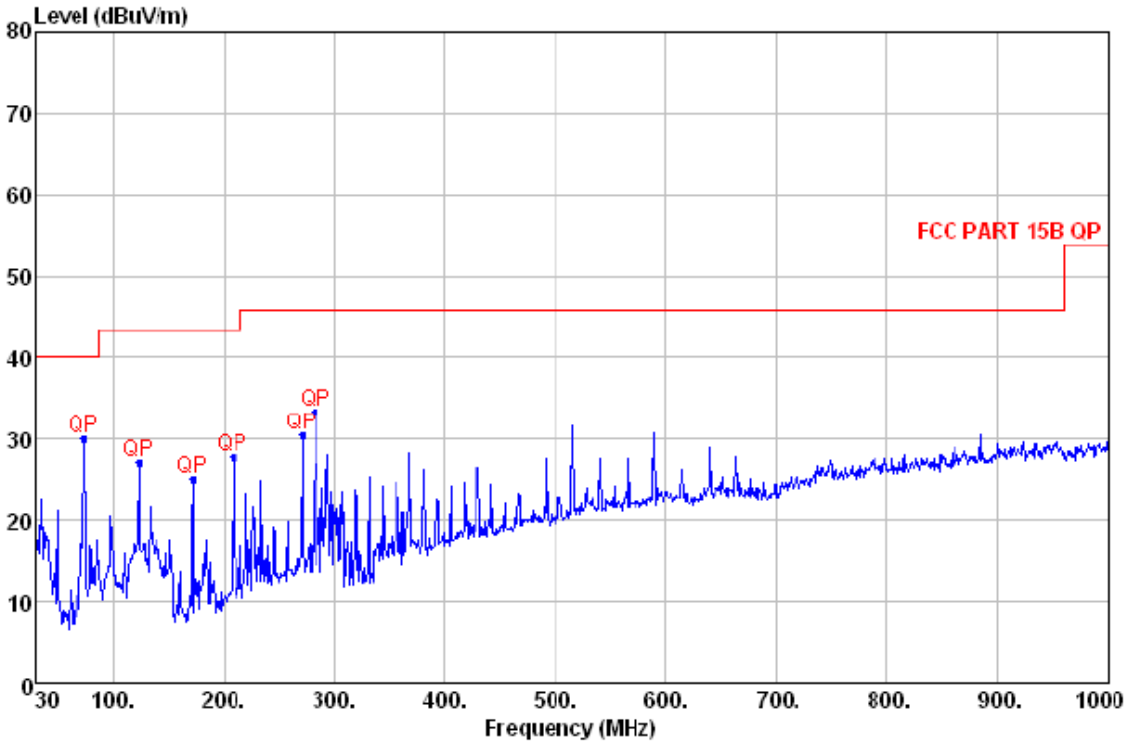
Test at Middle Channel in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	73.650	30.05	QP	7.29	1.00	40.00	-9.95	100	306
2	123.120	27.12	QP	7.70	1.32	43.50	-16.38	100	186
3	172.590	25.24	QP	8.30	1.57	43.50	-18.26	100	67
4	208.480	27.76	QP	9.17	1.74	43.50	-15.74	200	264
5	270.560	30.52	QP	12.95	2.01	46.00	-15.48	200	147
6	283.170	33.32	QP	13.38	2.06	46.00	-12.68	200	112

Level=Read Level + Antenna Factor + Cable Loss

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4880.800	34.33	9.59	27.60	39.50	55.82	74.00	V
7321.200	34.92	12.17	27.31	37.06	56.84	74.00	V
9761.600	37.91	14.49	27.13	36.19	61.46	74.00	V
4880.800	34.33	9.59	27.60	39.62	55.94	74.00	H
7321.200	34.92	12.17	27.31	36.08	55.86	74.00	H
9761.600	37.91	14.49	27.13	36.19	61.46	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4880.800	34.33	9.59	27.60	33.81	50.13	54.00	V
7321.200	34.92	12.17	27.31	21.61	41.39	54.00	V
9761.600	37.91	14.49	27.13	22.69	47.96	54.00	V
4880.800	34.33	9.59	27.60	32.75	49.07	54.00	H
7321.200	34.92	12.17	27.31	21.19	40.97	54.00	H
9761.600	37.91	14.49	27.13	22.38	47.65	54.00	H

Test at high Channel in transmitting status

9kHz~30MHz Test result

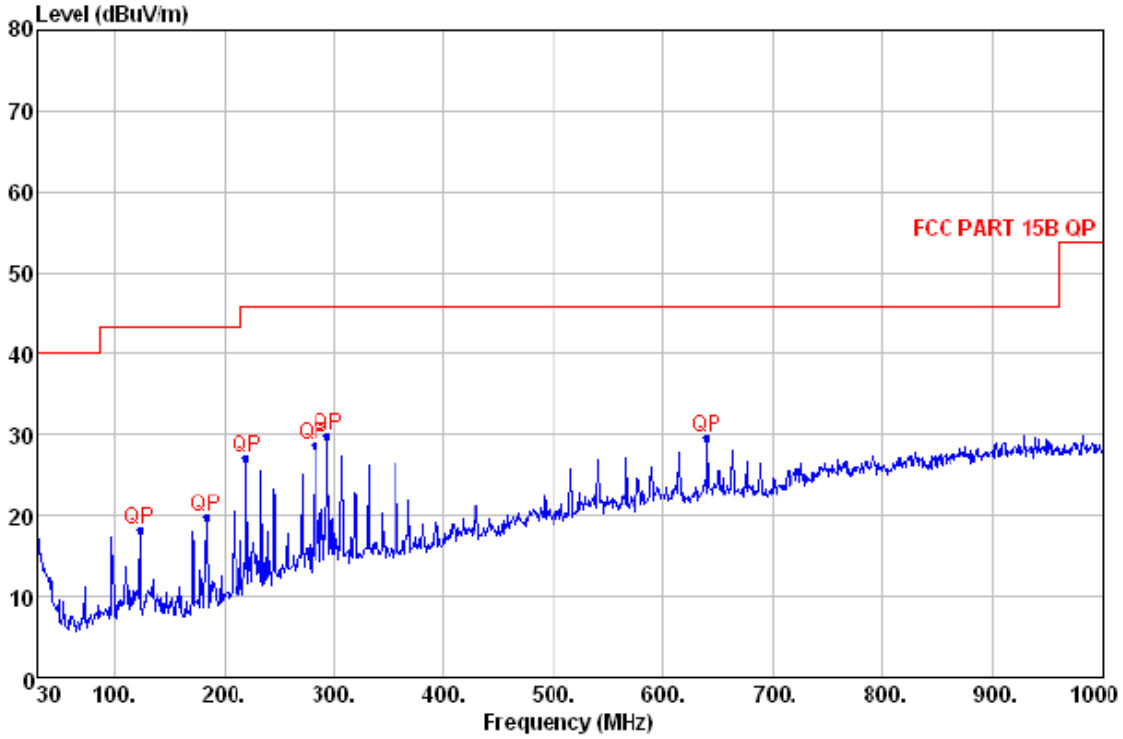
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	123.120	18.19	QP	7.70	1.32	43.50	-25.31	100	57
2	184.230	19.91	QP	8.30	1.63	43.50	-23.59	100	222
3	221.090	27.08	QP	10.23	1.80	46.00	-18.92	100	158
4	282.200	28.84	QP	13.27	2.05	46.00	-17.16	200	91
5	294.810	29.84	QP	13.68	2.10	46.00	-16.16	200	185
6	639.160	29.72	QP	20.47	3.17	46.00	-16.28	200	124

Level=Read Level + Antenna Factor + Cable Loss

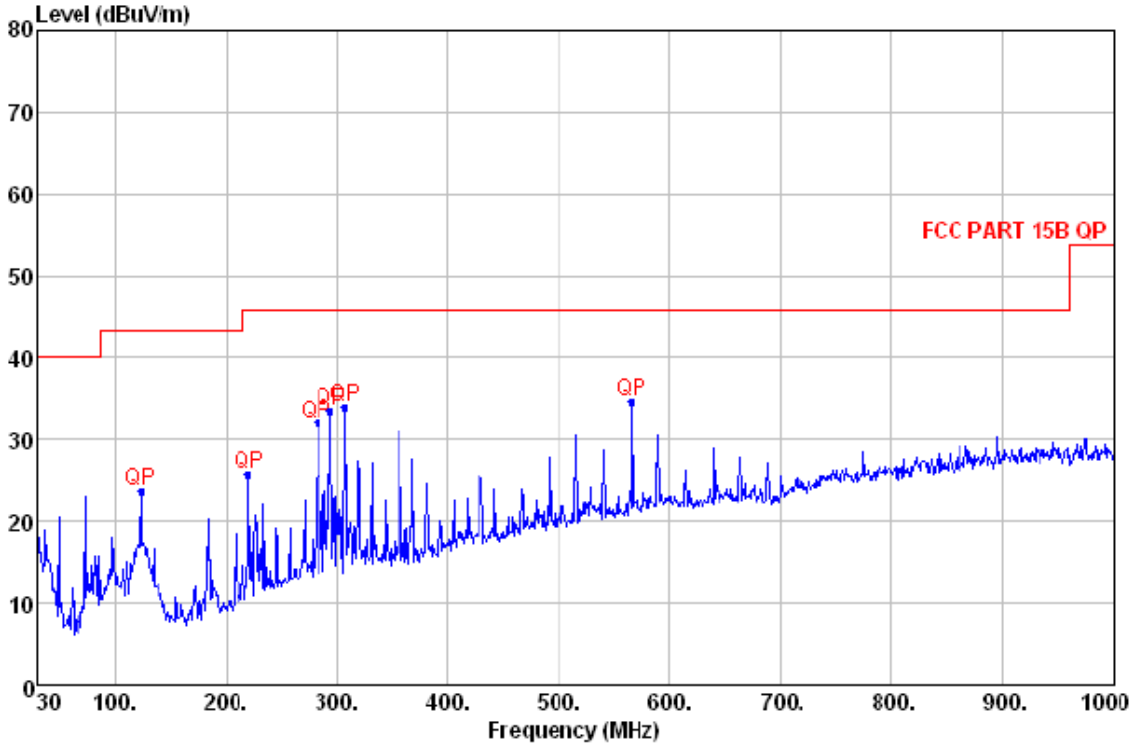
Test at High Channel in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	123.120	23.88	QP	7.70	1.32	43.50	-19.62	100	304
2	221.090	25.88	QP	10.23	1.80	46.00	-20.12	100	88
3	282.200	32.02	QP	13.27	2.05	46.00	-13.98	100	257
4	294.810	33.64	QP	13.68	2.10	46.00	-12.36	200	206
5	307.420	33.99	QP	13.65	2.15	46.00	-12.01	200	196
6	565.440	34.85	QP	19.46	2.96	46.00	-11.15	200	147

Level=Read Level + Antenna Factor + Cable Loss

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4954.600	34.36	9.60	27.61	39.38	55.73	74.00	V
7431.900	34.98	12.19	27.30	37.38	57.25	74.00	V
9909.200	37.96	14.52	27.11	36.28	61.65	74.00	V
4954.600	34.36	9.60	27.61	39.69	56.04	74.00	H
7431.900	34.98	12.19	27.30	37.08	56.95	74.00	H
9909.200	37.96	14.52	27.11	36.16	61.53	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4954.600	34.36	9.60	27.61	34.63	50.98	54.00	V
7431.900	34.98	12.19	27.30	22.67	42.54	54.00	V
9909.200	37.96	14.52	27.11	22.59	47.96	54.00	V
4954.600	34.36	9.60	27.61	32.78	49.13	54.00	H
7431.900	34.98	12.19	27.30	21.68	41.55	54.00	H
9909.200	37.96	14.52	27.11	22.38	47.75	54.00	H

Test at Receiving status

9kHz~30MHz Test result

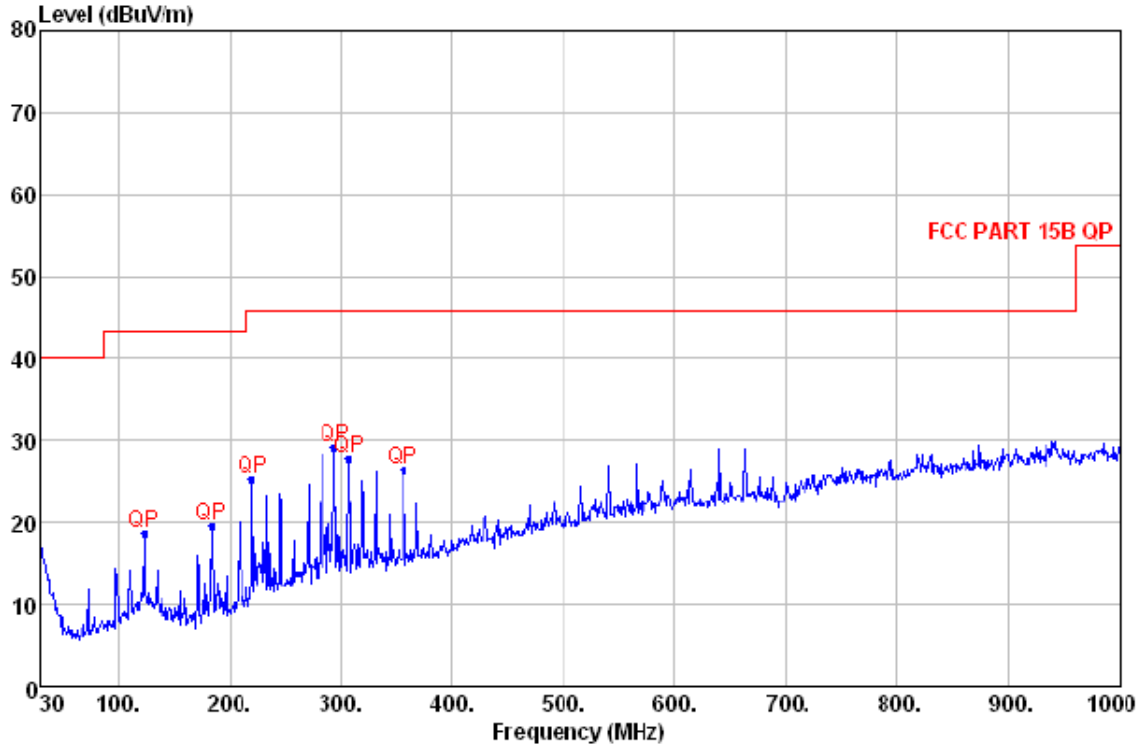
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	123.120	18.65	QP	7.70	1.32	43.50	-24.85	100	311
2	184.230	19.72	QP	8.30	1.63	43.50	-23.78	100	189
3	221.090	25.42	QP	10.23	1.80	46.00	-20.58	100	59
4	294.810	29.16	QP	13.68	2.10	46.00	-16.84	200	206
5	307.420	27.86	QP	13.65	2.15	46.00	-18.14	200	125
6	355.920	26.43	QP	14.20	2.30	46.00	-19.57	200	166

Level=Read Level + Antenna Factor + Cable Loss

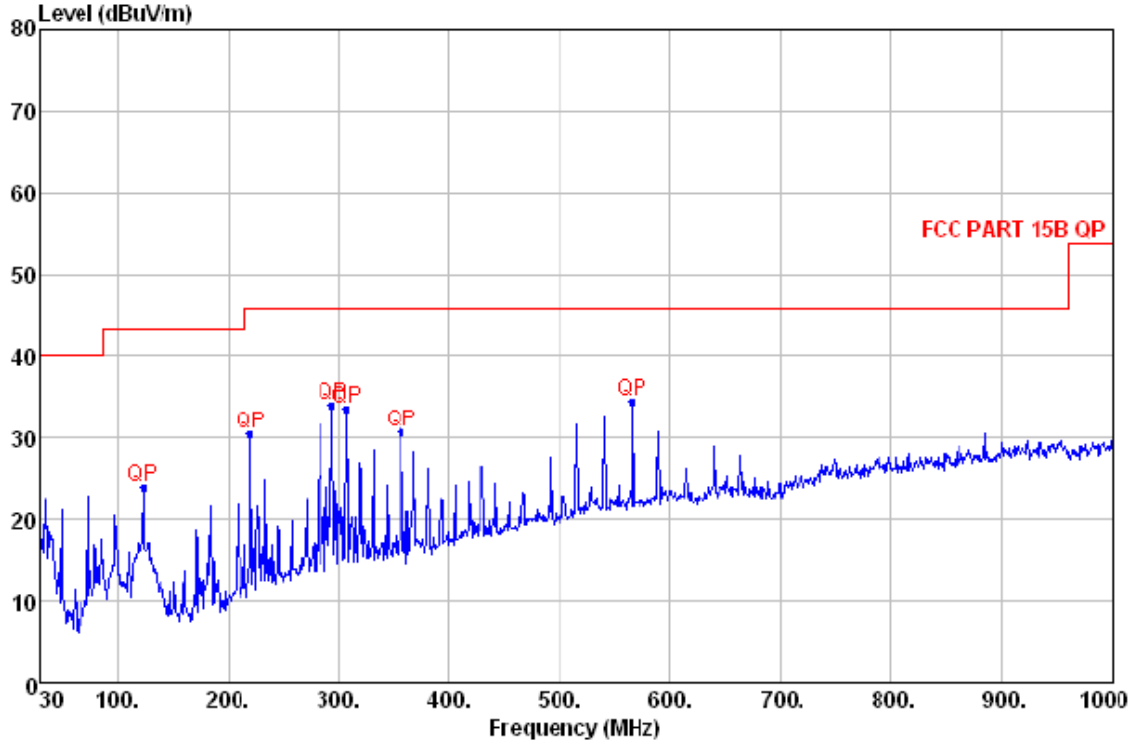
Test at Receiving status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	123.120	24.12	QP	7.70	1.32	43.50	-19.38	100	124
2	221.090	30.42	QP	10.23	1.80	46.00	-15.58	100	188
3	294.810	34.19	QP	13.68	2.10	46.00	-11.81	100	205
4	307.420	33.56	QP	13.65	2.15	46.00	-12.44	200	258
5	356.890	30.67	QP	14.25	2.30	46.00	-15.33	200	98
6	565.440	34.56	QP	19.46	2.96	46.00	-11.44	200	288

Level=Read Level + Antenna Factor + Cable Loss

Test at Receiving status

Above 1 GHz Spurious Emissions Measurement

No emissions above 1GHz were found.

For Model: Subwoofer (Power supply: Hanwei, type: Hanny23w150)

Test at low Channel in transmitting status

9kHz~30MHz Test result

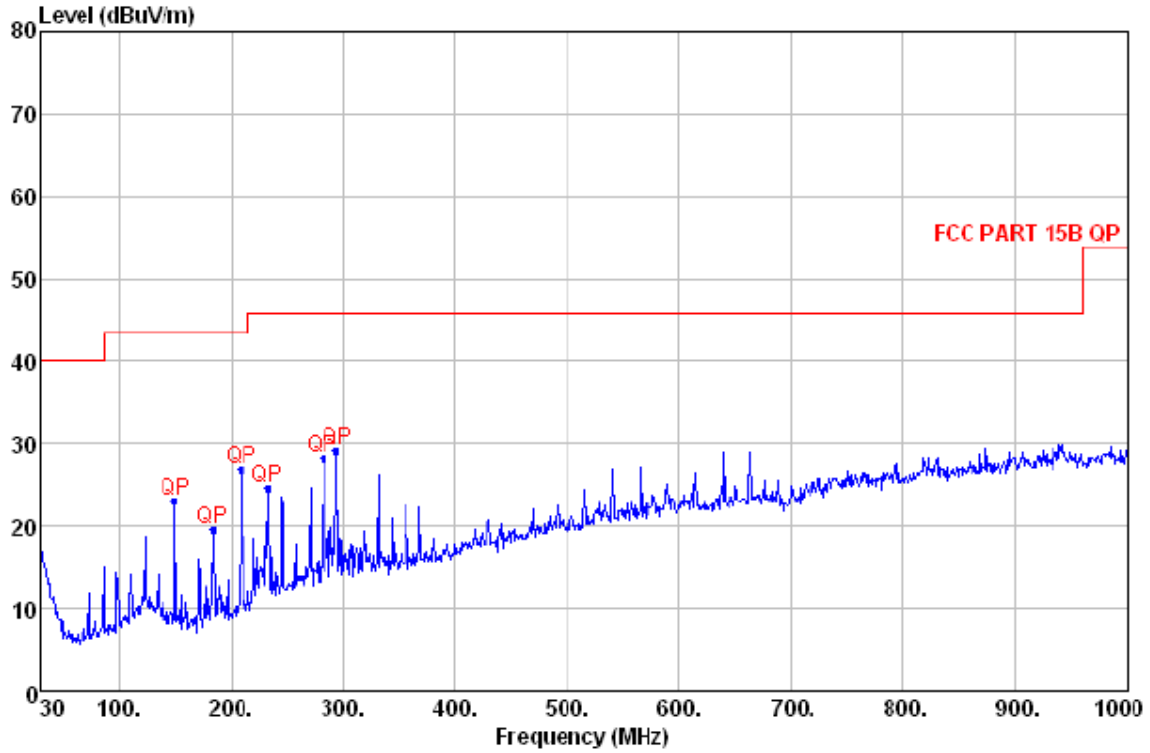
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	150.280	23.08	QP	7.13	1.46	43.50	-20.42	100	294
2	184.230	19.72	QP	8.30	1.63	43.50	-23.78	100	199
3	209.450	27.04	QP	9.19	1.75	43.50	-16.46	100	120
4	232.730	24.77	QP	11.04	1.85	46.00	-21.23	200	62
5	282.200	28.34	QP	13.27	2.05	46.00	-17.66	200	165
6	294.810	29.16	QP	13.68	2.10	46.00	-16.84	200	224

Level=Read Level + Antenna Factor + Cable Loss

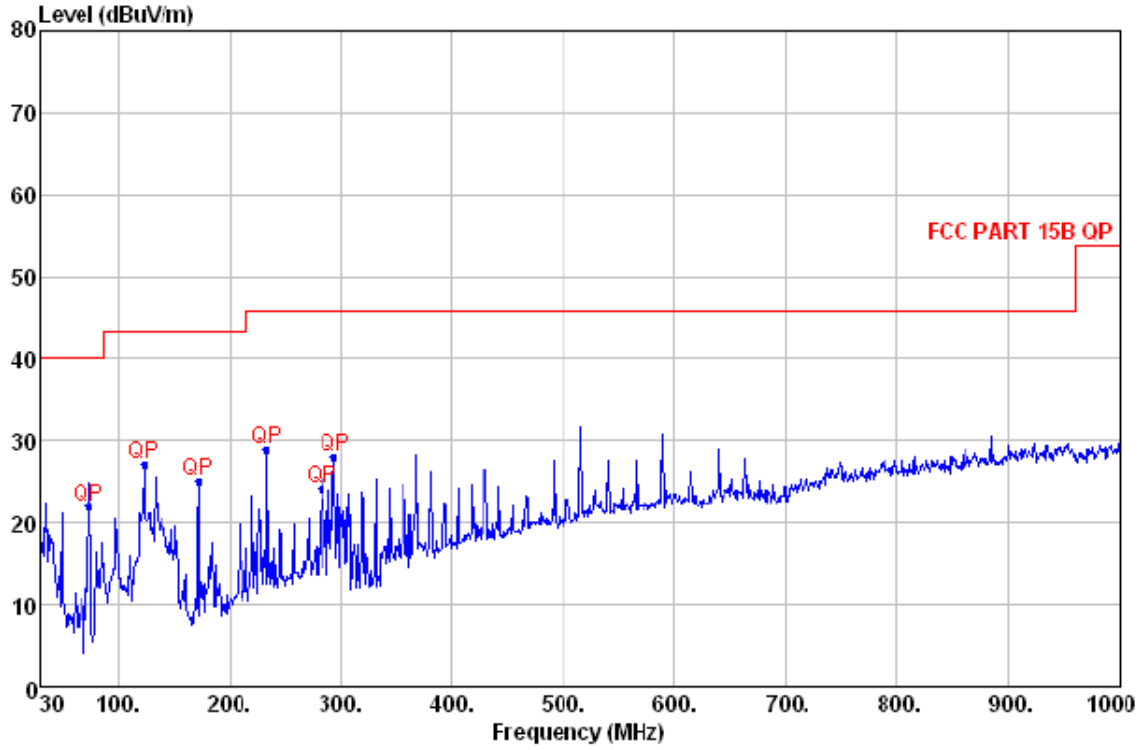
Test at low Channel in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	73.650	22.05	QP	7.29	1.00	40.00	-17.95	100	306
2	123.120	27.12	QP	7.70	1.32	43.50	-16.38	100	247
3	172.590	25.24	QP	8.30	1.57	43.50	-18.26	100	124
4	233.700	28.93	QP	10.98	1.86	46.00	-17.07	200	224
5	283.170	24.32	QP	13.38	2.06	46.00	-21.68	200	175
6	294.810	28.19	QP	13.68	2.10	46.00	-17.81	200	147

Level=Read Level + Antenna Factor + Cable Loss

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4807.000	34.32	9.59	27.62	38.53	54.82	74.00	V
7210.500	34.88	12.15	27.33	36.61	56.31	74.00	V
9614.000	37.72	14.41	27.14	36.53	61.52	74.00	V
4807.000	34.32	9.59	27.62	38.69	54.98	74.00	H
7210.500	34.88	12.15	27.33	36.29	55.99	74.00	H
9614.000	37.72	14.41	27.14	36.61	61.6	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4807.000	34.32	9.59	27.62	33.51	49.8	54.00	V
7210.500	34.88	12.15	27.33	21.83	41.53	54.00	V
9614.000	37.72	14.41	27.14	22.86	47.85	54.00	V
4807.000	34.32	9.59	27.62	31.35	47.64	54.00	H
7210.500	34.88	12.15	27.33	22.53	42.23	54.00	H
9614.000	37.72	14.41	27.14	23.62	48.61	54.00	H

Test at Middle Channel in transmitting status

9kHz~30MHz Test result

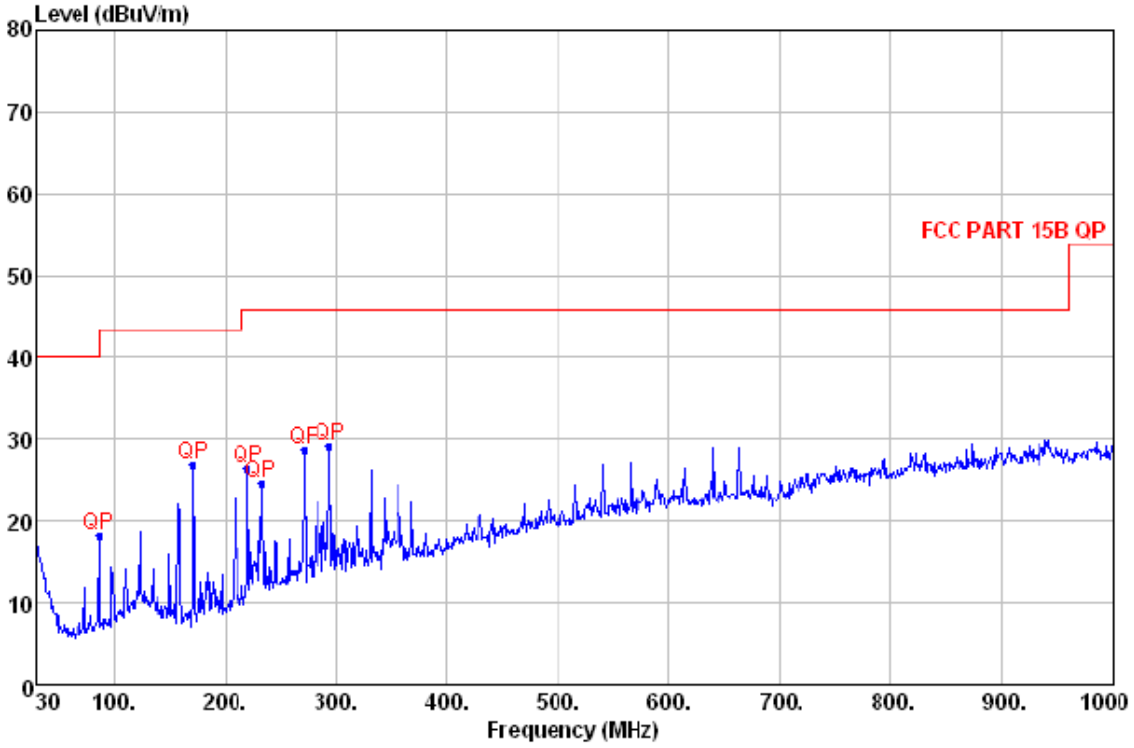
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	87.230	18.26	QP	7.93	1.09	40.00	-21.74	100	306
2	171.620	26.98	QP	8.33	1.57	43.50	-16.52	100	25
3	221.090	26.42	QP	10.23	1.80	46.00	-19.58	100	268
4	232.730	24.77	QP	11.04	1.85	46.00	-21.23	200	87
5	271.530	28.77	QP	12.88	2.01	46.00	-17.23	200	169
6	294.810	29.16	QP	13.68	2.10	46.00	-16.84	200	246

Level=Read Level + Antenna Factor + Cable Loss

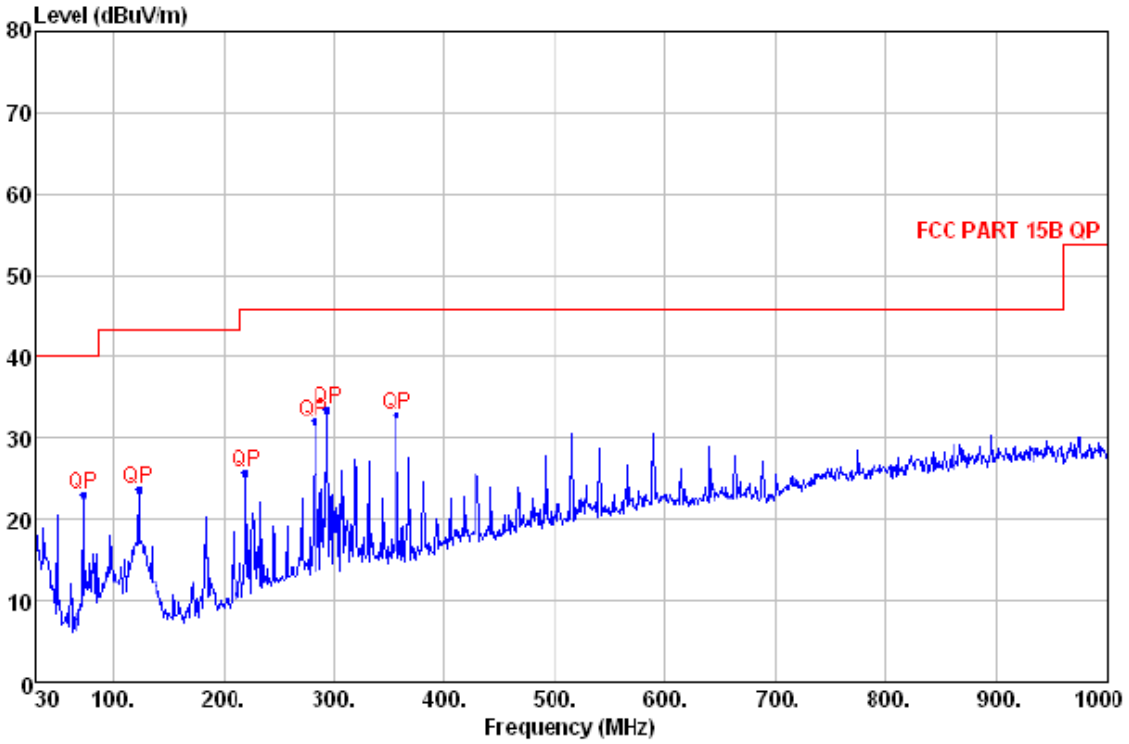
Test at Middle Channel in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	73.650	23.21	QP	7.29	1.00	40.00	-16.79	100	289
2	123.120	23.88	QP	7.70	1.32	43.50	-19.62	100	169
3	221.090	25.88	QP	10.23	1.80	46.00	-20.12	100	81
4	282.200	32.02	QP	13.27	2.05	46.00	-13.98	200	248
5	294.810	33.64	QP	13.68	2.10	46.00	-12.36	200	74
6	356.890	32.93	QP	14.25	2.30	46.00	-13.07	200	128

Level=Read Level + Antenna Factor + Cable Loss

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4880.800	34.33	9.59	27.60	39.31	55.63	74.00	V
7321.200	34.92	12.17	27.31	37.63	57.41	74.00	V
9761.600	37.91	14.49	27.13	36.36	61.63	74.00	V
4880.800	34.33	9.59	27.60	39.82	56.14	74.00	H
7321.200	34.92	12.17	27.31	36.11	55.89	74.00	H
9761.600	37.91	14.49	27.13	36.12	61.39	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4880.800	34.33	9.59	27.60	33.61	49.93	54.00	V
7321.200	34.92	12.17	27.31	20.68	40.46	54.00	V
9761.600	37.91	14.49	27.13	24.61	49.88	54.00	V
4880.800	34.33	9.59	27.60	32.85	49.17	54.00	H
7321.200	34.92	12.17	27.31	21.19	40.97	54.00	H
9761.600	37.91	14.49	27.13	25.48	50.75	54.00	H

Test at high Channel in transmitting status

9kHz~30MHz Test result

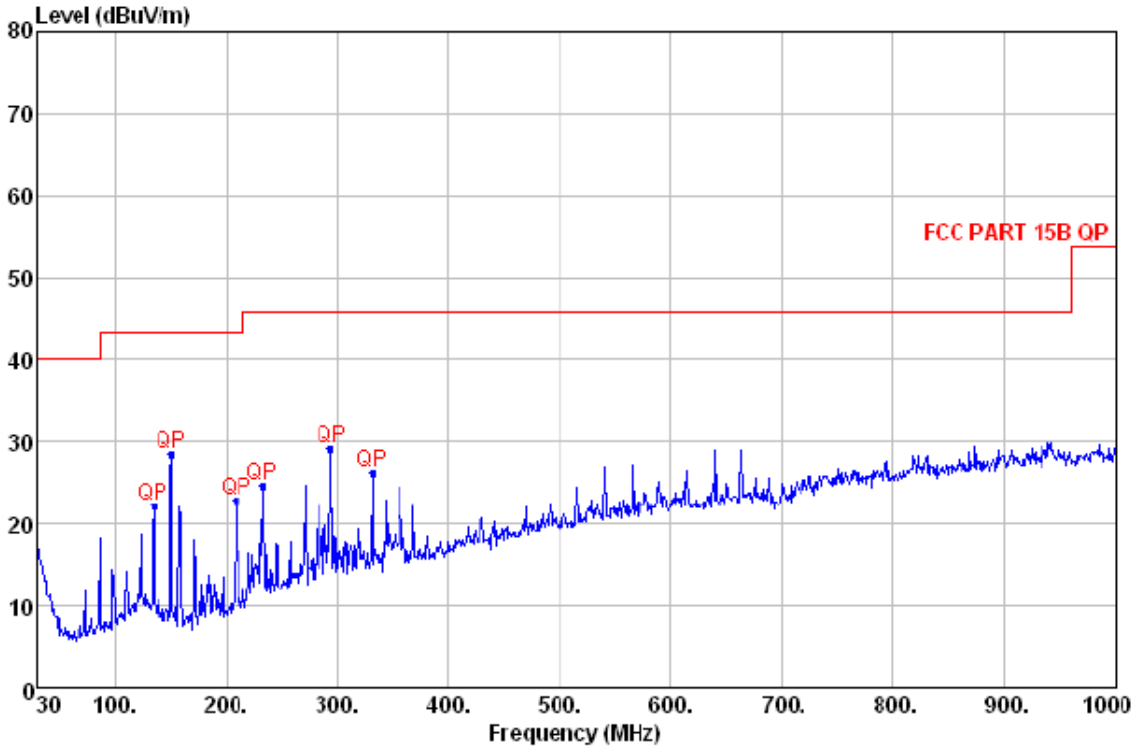
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	134.760	22.24	QP	7.40	1.38	43.50	-21.26	100	15
2	151.250	28.44	QP	7.23	1.47	43.50	-15.06	100	194
3	209.450	23.04	QP	9.19	1.75	43.50	-20.46	100	131
4	232.730	24.77	QP	11.04	1.85	46.00	-21.23	200	99
5	294.810	29.16	QP	13.68	2.10	46.00	-16.84	200	250
6	331.670	26.30	QP	13.95	2.23	46.00	-19.70	200	169

Level=Read Level + Antenna Factor + Cable Loss

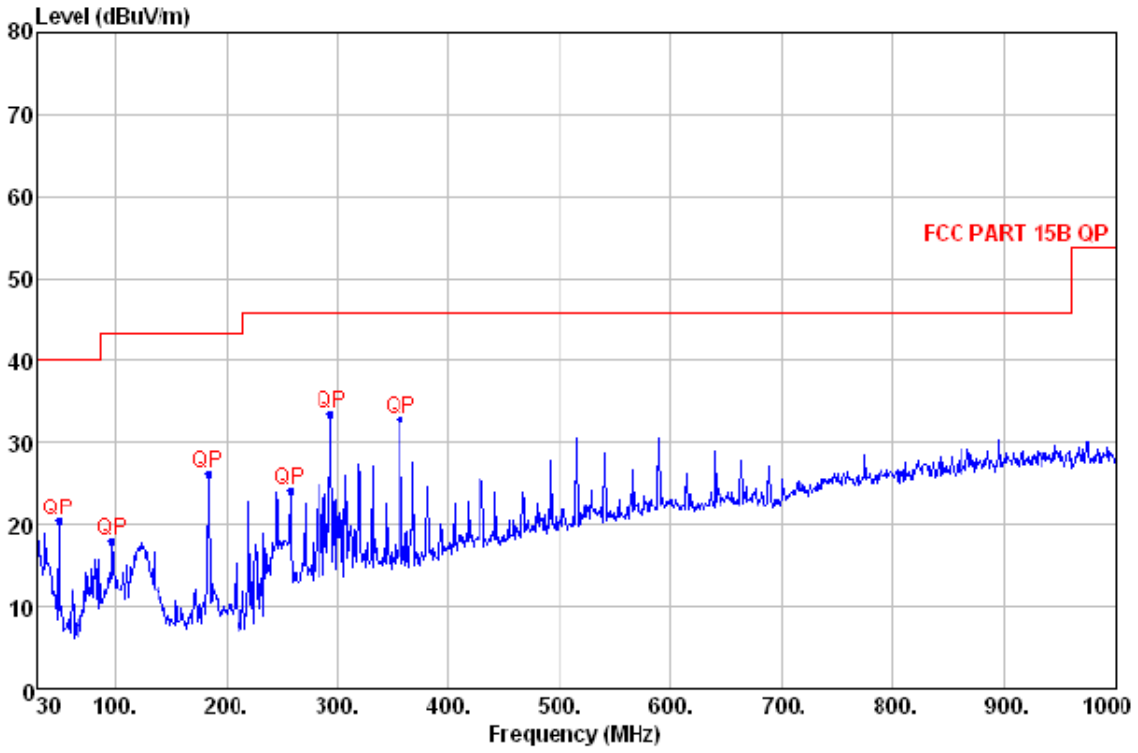
Test at High Channel in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	49.400	20.52	QP	8.57	0.80	40.00	-19.48	100	228
2	97.900	18.07	QP	8.58	1.16	43.50	-25.43	100	149
3	184.230	26.19	QP	8.30	1.63	43.50	-17.31	100	257
4	257.950	24.19	QP	12.30	1.96	46.00	-21.81	200	188
5	294.810	33.64	QP	13.68	2.10	46.00	-12.36	200	105
6	356.890	32.93	QP	14.25	2.30	46.00	-13.07	200	157

Level=Read Level + Antenna Factor + Cable Loss

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4954.600	34.36	9.60	27.61	38.98	55.33	74.00	V
7431.900	34.98	12.19	27.30	36.77	56.64	74.00	V
9909.200	37.96	14.52	27.11	36.72	62.09	74.00	V
4954.600	34.36	9.60	27.61	39.25	55.6	74.00	H
7431.900	34.98	12.19	27.30	37.22	57.09	74.00	H
9909.200	37.96	14.52	27.11	36.65	62.02	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4954.600	34.36	9.60	27.61	35.62	51.97	54.00	V
7431.900	34.98	12.19	27.30	22.89	42.76	54.00	V
9909.200	37.96	14.52	27.11	21.09	46.46	54.00	V
4954.600	34.36	9.60	27.61	33.69	50.04	54.00	H
7431.900	34.98	12.19	27.30	22.28	42.15	54.00	H
9909.200	37.96	14.52	27.11	22.63	48	54.00	H

Test at Receiving status

9kHz~30MHz Test result

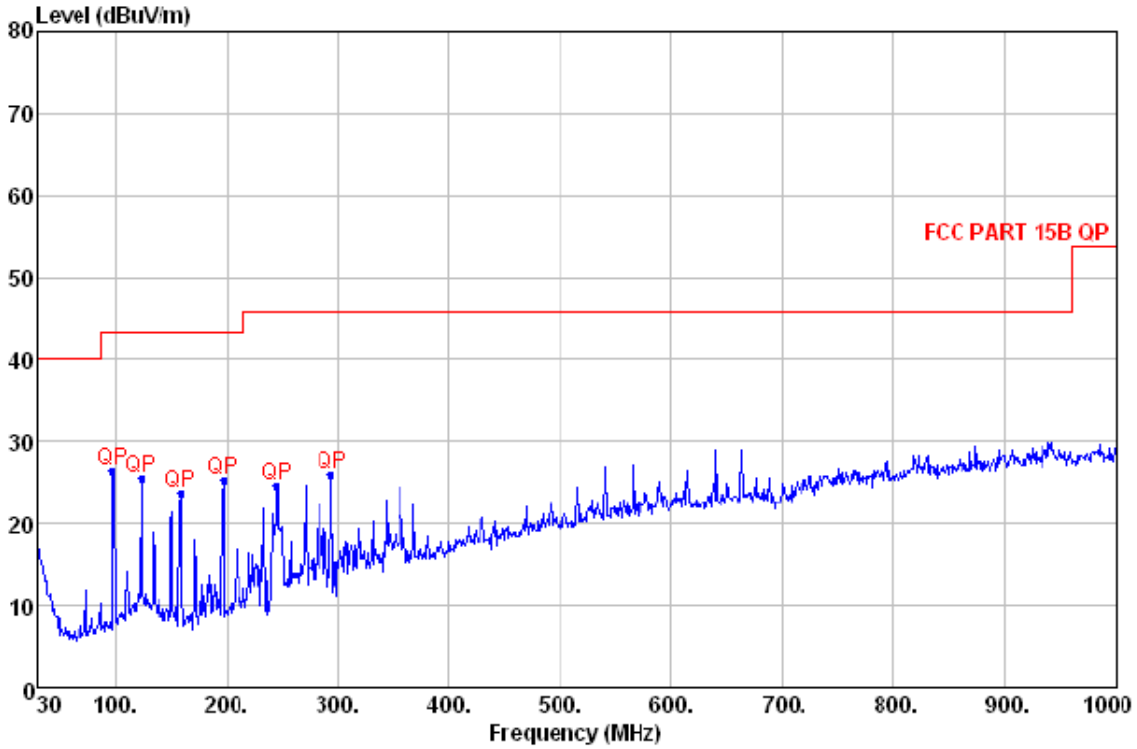
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	97.900	26.55	QP	8.58	1.16	43.50	-16.95	100	268
2	123.120	25.65	QP	7.70	1.32	43.50	-17.85	100	144
3	159.010	23.90	QP	7.76	1.51	43.50	-19.60	100	57
4	196.840	25.49	QP	8.52	1.69	43.50	-18.01	200	187
5	245.340	24.65	QP	11.24	1.91	46.00	-21.35	200	164
6	294.810	26.16	QP	13.68	2.10	46.00	-19.84	200	199

Level=Read Level + Antenna Factor + Cable Loss

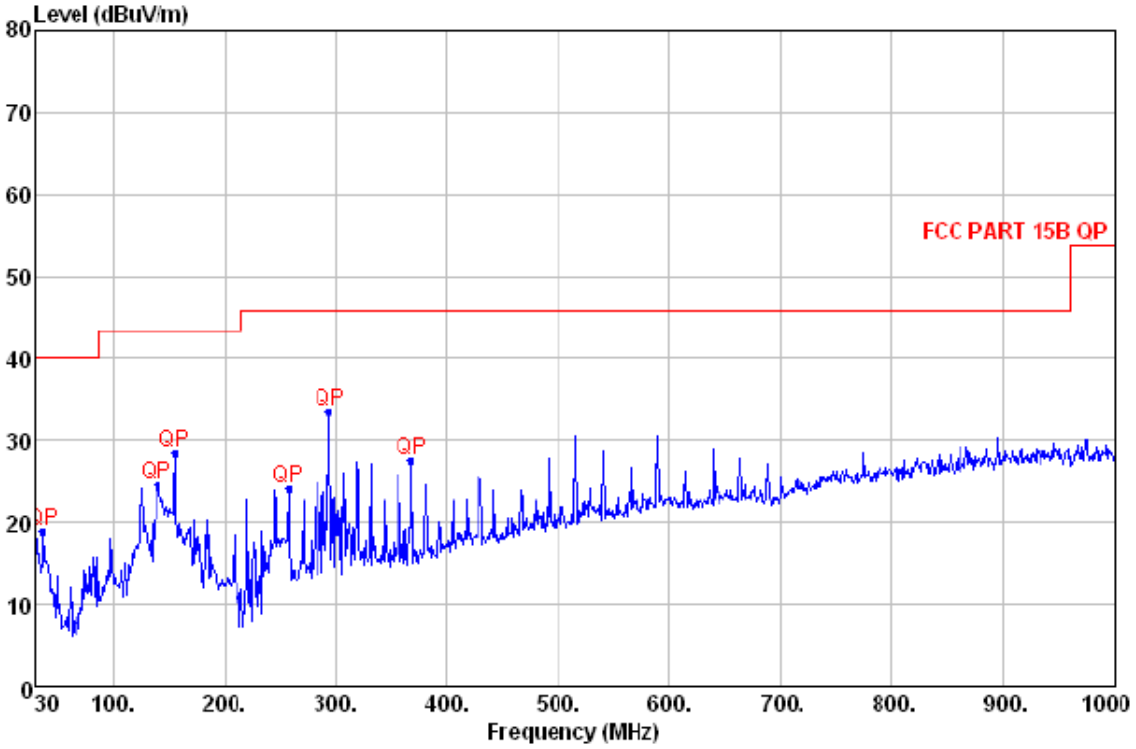
Test at Receiving status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Freq	Level	Remark	Antenna Factor	Cable Loss	Limit Line	Margin	A/pos	T/pos
	MHz	dBuV/m		dB/m	dB	dBuV/m	dB	cm	deg
1	36.790	18.87	QP	13.92	0.69	40.00	-21.13	100	110
2	139.610	24.84	QP	7.40	1.41	43.50	-18.66	100	257
3	156.100	28.62	QP	7.64	1.49	43.50	-14.88	100	198
4	257.950	24.19	QP	12.30	1.96	46.00	-21.81	200	188
5	294.810	33.64	QP	13.68	2.10	46.00	-12.36	200	115
6	368.530	27.60	QP	14.83	2.34	46.00	-18.40	200	198

Level=Read Level + Antenna Factor + Cable Loss

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

No emission is found in the 1-25GHz

Remark:

1). The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Loss –Preamplifier Factor.

2). As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

3). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

Test result: The unit does meet the FCC and RSS-210 requirements.

5.10 Radiated Emissions which fall in the restricted bands

Test Requirement: FCC Part15 C Section 15.247 and RSS-210

(d) In addition, radiated emissions which fall in the restricted bands. as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Test Method: ANSI C63.10: Clause 6.4, 6.5 and 6.6 & DA 00-705

Test Status:

For 2.4G FSK module, Channel lowest (2403.5MHz), middle (2440.4MHz) and highest (2477.3MHz) are chosen for 2.4G FSK wireless module full testing.

Measurement Distance: 3m (Semi-Anechoic Chamber)

Limit: Section 15.209(a)

40.0 dBμV/m between 30MHz & 88MHz;

43.5 dBμV/m between 88MHz & 216MHz;

46.0 dBμV/m between 216MHz & 960MHz;

54.0 dBμV/m above 960MHz.

Detector: For PK value:

RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto

Detector function = peak

Trace = max hold

For AV value:

RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz

VBW =10 Hz

Sweep = auto

Detector function = peak

Trace = max hold

Test Result:

1. Low Channel(2403.5MHz)

Antenna polarization: Vertical

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBμV)	Average Reading Level (dBμV)	Peak Emission Level (dBμV/m)	Average Emission Level (dBμV/m)
2310.000	26.65	6.45	27.78	35.26	21.28	40.58	26.6
2390.000	26.56	6.46	27.79	35.42	21.51	40.65	26.74
2500.000	25.70	6.62	27.80	35.36	21.61	39.88	26.13
2483.500	25.79	6.61	27.80	35.52	21.72	40.12	26.32

Antenna polarization: Horizontal

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBμV)	Average Reading Level (dBμV)	Peak Emission Level (dBμV/m)	Average Emission Level (dBμV/m)
2310.000	26.65	6.45	27.78	35.63	21.28	40.95	26.6
2390.000	26.56	6.46	27.79	35.22	21.53	40.45	26.76
2500.000	25.70	6.62	27.80	35.75	21.61	40.27	26.13
2483.500	25.79	6.61	27.80	35.71	21.38	40.31	25.98

2. Middle Channel(2440.4MHz)

Antenna polarization: Vertical

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBμV)	Average Reading Level (dBμV)	Peak Emission Level (dBμV/m)	Average Emission Level (dBμV/m)
2310.000	26.65	6.45	27.78	35.35	21.18	40.67	26.5
2390.000	26.56	6.46	27.79	35.51	21.62	40.74	26.85
2500.000	25.70	6.62	27.80	35.55	21.28	40.07	25.8
2483.500	25.79	6.61	27.80	35.62	21.83	40.22	26.43

Antenna polarization: Horizontal

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBμV)	Average Reading Level (dBμV)	Peak Emission Level (dBμV/m)	Average Emission Level (dBμV/m)
2310.000	26.65	6.45	27.78	35.32	21.16	40.64	26.48
2390.000	26.56	6.46	27.79	35.28	21.26	40.51	26.49
2500.000	25.70	6.62	27.80	35.77	21.51	40.29	26.03
2483.500	25.79	6.61	27.80	35.36	21.28	39.96	25.88

3. High Channel(2477.3MHz)

Antenna polarization: Vertical

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBμV)	Average Reading Level (dBμV)	Peak Emission Level (dBμV/m)	Average Emission Level (dBμV/m)
2310.000	26.65	6.45	27.78	35.18	21.32	40.5	26.64
2390.000	26.56	6.46	27.79	35.27	21.26	40.5	26.49
2500.000	25.70	6.62	27.80	35.69	21.63	40.21	26.15
2483.500	25.79	6.61	27.80	35.52	21.75	40.12	26.35

Antenna polarization: Horizontal

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBμV)	Average Reading Level (dBμV)	Peak Emission Level (dBμV/m)	Average Emission Level (dBμV/m)
2310.000	26.65	6.45	27.78	35.36	21.38	40.68	26.7
2390.000	26.56	6.46	27.79	35.71	21.22	40.94	26.45
2500.000	25.70	6.62	27.80	35.43	21.28	39.95	25.8
2483.500	25.79	6.61	27.80	35.62	21.33	40.22	25.93

Remark: No any other emission which falls in restricted bands can be detected and be reported.

Test result: The unit does meet the FCC and RSS-210 requirements.

5.11 Band Edges Requirement

Test Requirement: FCC Part15 C section 15.247

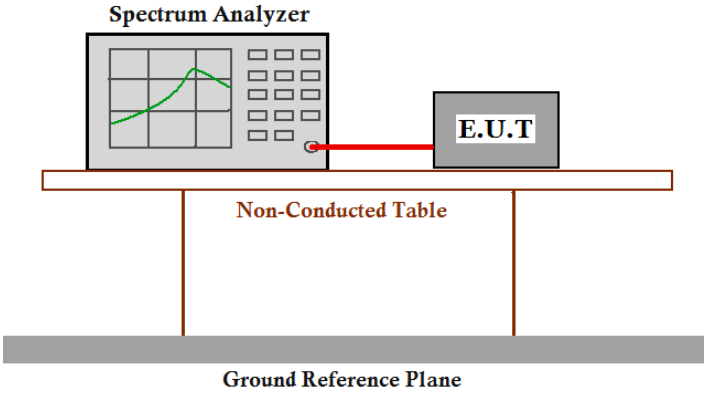
(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Frequency Band: 2400 MHz to 2483.5 MHz

Test Method: ANSI C63.10: Clause 6.9 & DA 00-705

Test Status: Test the EUT in continuous transmitting mode at the lowest, middle and highest channel with different data package

Test Configuration:



Test Procedure: Set RBW of spectrum analyzer to 100 kHz and VBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 kHz bandwidth from band edge.

The band edges was measured and recorded Result:

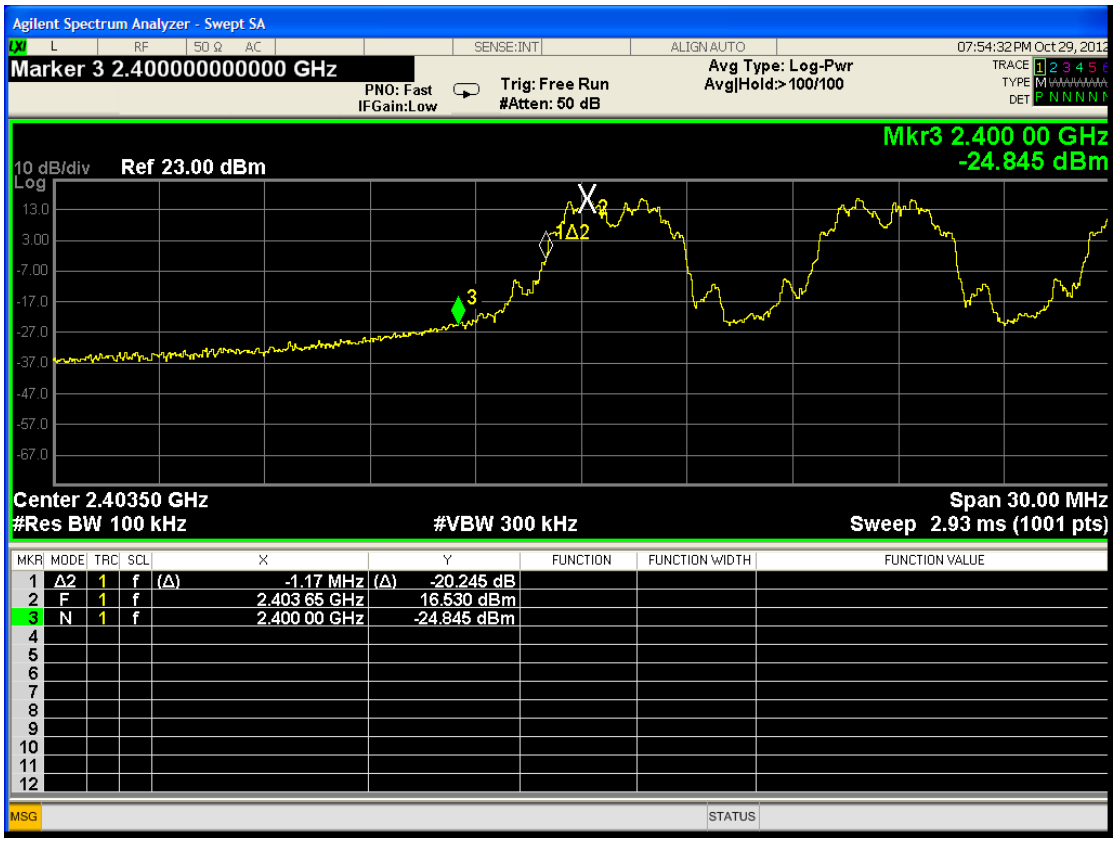
The Lower Edges attenuated more than 20dB.

The Upper Edges attenuated more than 20dB.

The graph as below. Represents the emissions take for this device.

For 2.4G FSK wireless module

Low channel:



High channel:

Test result: The unit does meet the FCC requirements.

5.12 Conducted Emissions at Mains Terminals 150 kHz to 30 MHz

Test Requirement: FCC Part 15 C section 15.207 and RSS-GEN

Test Method: ANSI C63.10: Clause 6.2 & DA 00-705

Frequency Range: 150 kHz to 30 MHz

Detector: Peak for pre-scan (9 kHz Resolution Bandwidth)

Test Limit

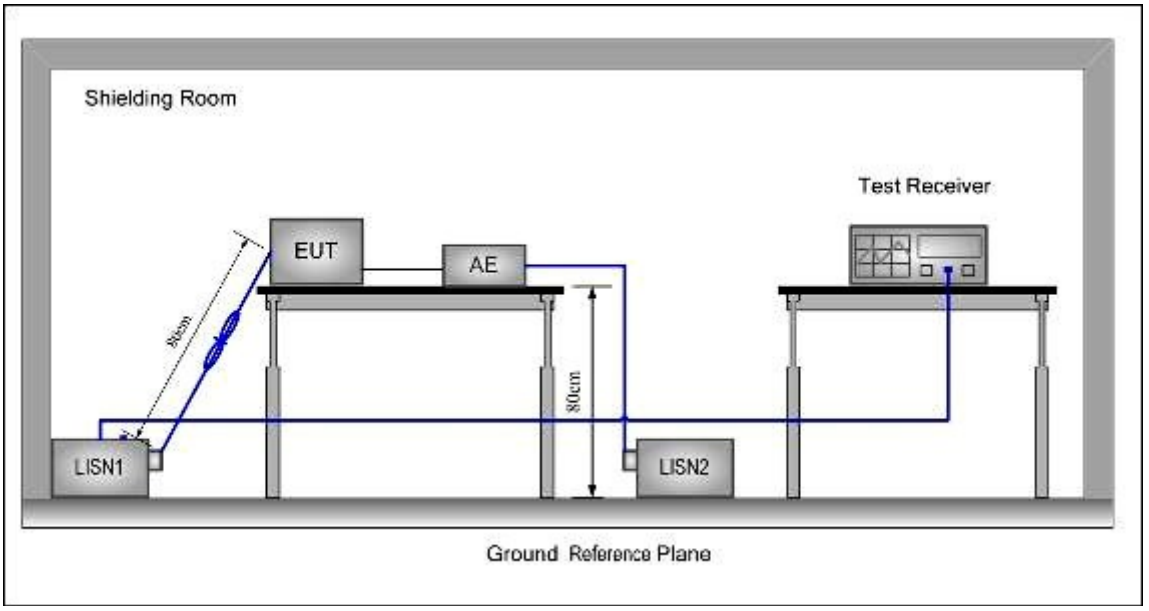
Limits for conducted disturbance at the mains ports of class B

Frequency Range	Class B Limit dB(μV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
NOTE 1 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

EUT Operation:

Test in normal operating mode. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.
Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Test Configuration:



Test procedure:

1. The mains terminal disturbance voltage test was conducted in a shielded room.

2. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.

4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0,4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0,8 m from the LISN 2.

5.12.1 Measurement Data

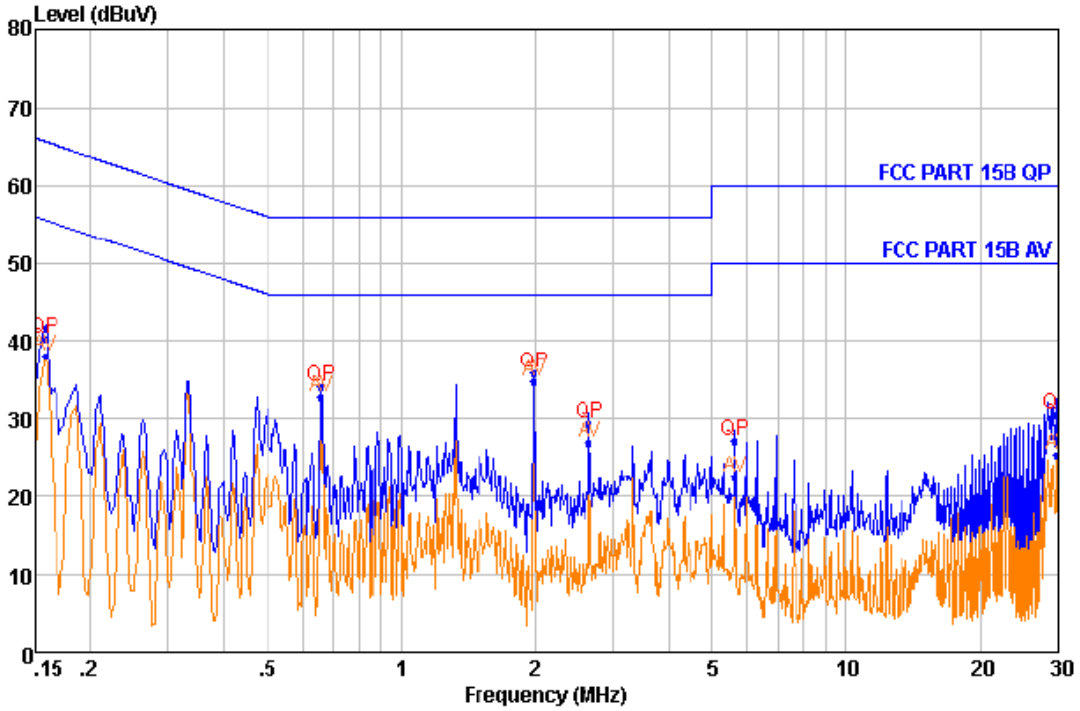
An initial pre-scan was performed on the live and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected. For EUT the communicating was worst case mode.

The following Quasi-Peak and Average measurements were performed on the EUT:

Model: Subwoofer (Power supply: JQH, type: NER-SPM00-216)
Live line

Peak Scan:

Level (dBµV)



Quasi-peak and Average measurement

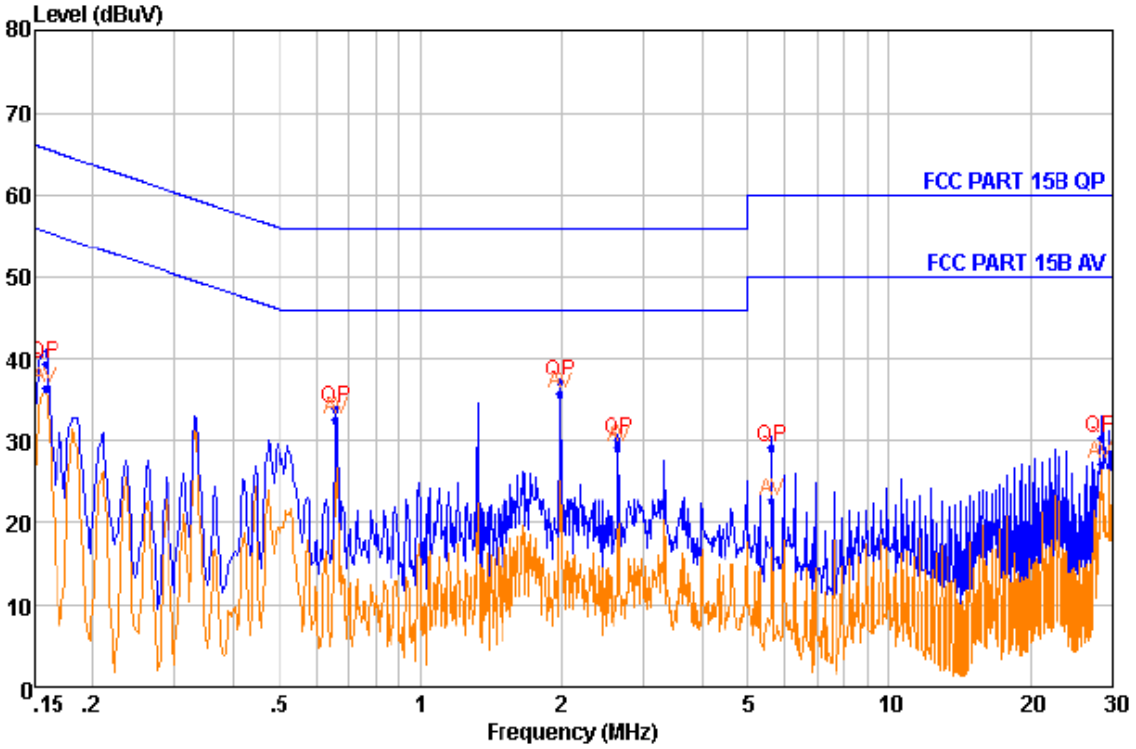
NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Margin dB
1	0.158	40.28	QP	9.70	0.20	65.58	-25.30
2	0.158	38.09	Average	9.70	0.20	55.56	-17.47
3	0.660	34.13	QP	9.70	0.28	56.00	-21.87
4	0.660	32.81	Average	9.70	0.28	46.00	-13.19
5	1.985	35.86	QP	9.65	0.35	56.00	-20.14
6	1.985	34.78	Average	9.65	0.35	46.00	-11.22
7	2.645	29.33	QP	9.63	0.36	56.00	-26.67
8	2.645	27.05	Average	9.63	0.36	46.00	-18.95
9	5.611	27.24	QP	9.63	0.41	60.00	-32.76
10	5.611	22.56	Average	9.63	0.41	50.00	-27.44
11	29.772	30.60	QP	9.65	0.50	60.00	-29.40
12	29.772	25.42	Average	9.65	0.50	50.00	-24.58

Level=Read Level + Lisn Factor + Cable Loss

Neutral Line

Peak Scan:

Level (dBµV)



Quasi-peak and Average measurement

NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Margin dB
1	0.158	39.46	QP	9.70	0.20	65.58	-26.12
2	0.158	36.38	Average	9.70	0.20	55.56	-19.18
3	0.660	33.89	QP	9.63	0.28	56.00	-22.11
4	0.660	32.62	Average	9.63	0.28	46.00	-13.38
5	1.985	37.16	QP	9.62	0.35	56.00	-18.84
6	1.985	35.61	Average	9.62	0.35	46.00	-10.39
7	2.645	30.11	QP	9.62	0.36	56.00	-25.89
8	2.645	29.08	Average	9.62	0.36	46.00	-16.92
9	5.611	29.15	QP	9.62	0.41	60.00	-30.85
10	5.611	22.79	Average	9.62	0.41	50.00	-27.21
11	28.382	30.20	QP	9.62	0.50	60.00	-29.80
12	28.382	27.09	Average	9.62	0.50	50.00	-22.91

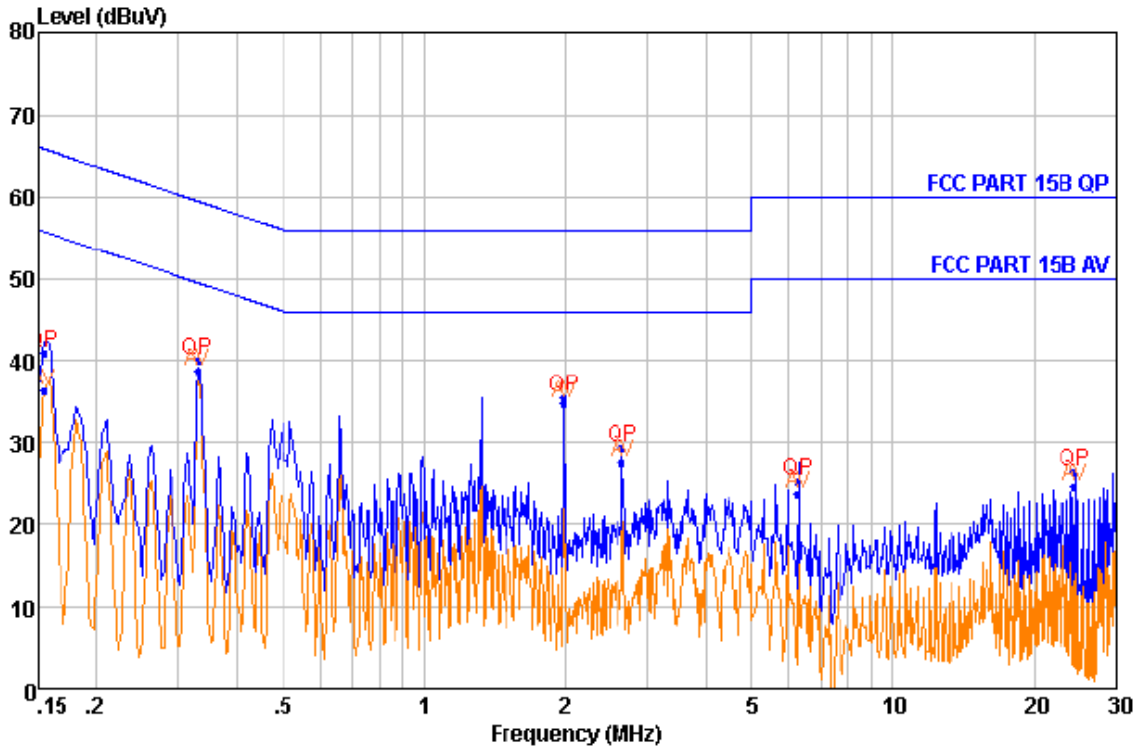
Level=Read Level + Lisn Factor + Cable Loss

Model: Subwoofer (Power supply: Hanwei, type: Hanny23w150)

Live line

Peak Scan:

Level (dBμV)



Quasi-peak and Average measurement

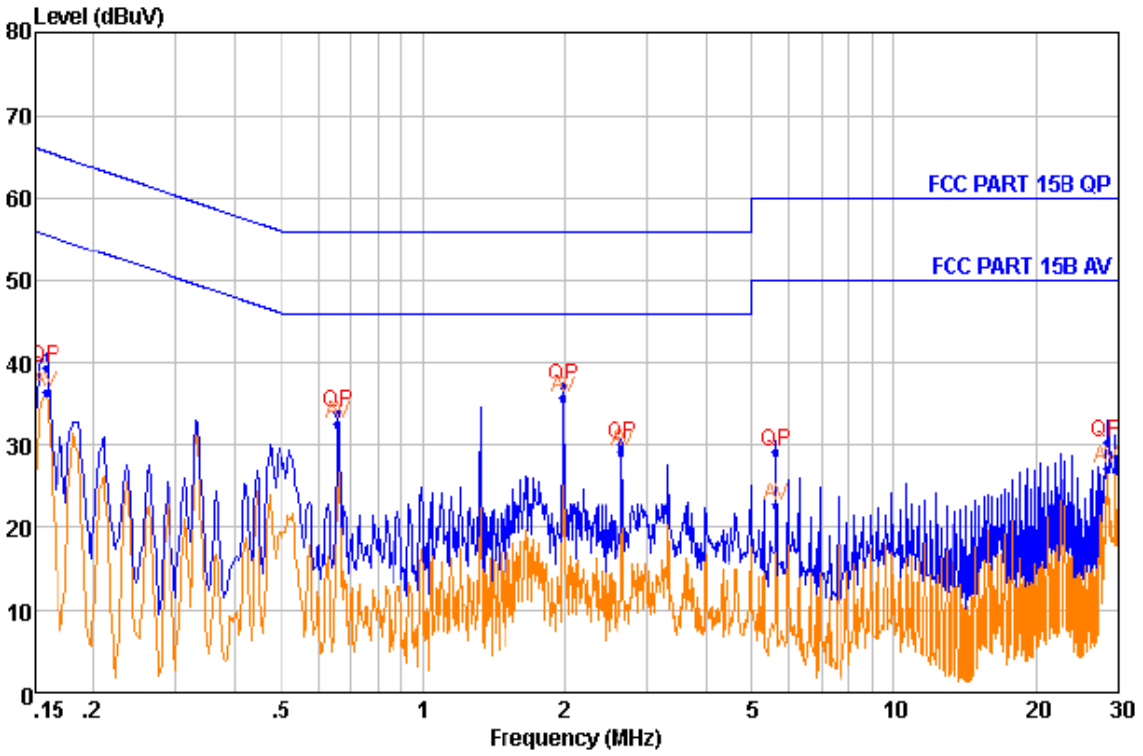
NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Margin dB
1	0.154	40.94	QP	9.70	0.20	65.80	-24.86
2	0.154	36.42	Average	9.70	0.20	55.80	-19.38
3	0.330	40.04	QP	9.66	0.24	59.46	-19.42
4	0.330	38.78	Average	9.66	0.24	49.46	-10.68
5	1.985	35.38	QP	9.65	0.35	56.00	-20.62
6	1.985	34.79	Average	9.65	0.35	46.00	-11.21
7	2.645	29.41	QP	9.63	0.36	56.00	-26.59
8	2.645	27.64	Average	9.63	0.36	46.00	-18.36
9	6.270	25.30	QP	9.67	0.41	60.00	-34.70
10	6.270	23.83	Average	9.67	0.41	50.00	-26.17
11	24.469	26.48	QP	9.67	0.49	60.00	-33.52
12	24.469	24.81	Average	9.67	0.49	50.00	-25.19

Level=Read Level + Lisn Factor + Cable Loss

Neutral Line

Peak Scan:

Level (dBμV)



Quasi-peak and Average measurement

NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Margin dB
1	0.158	39.46	QP	9.70	0.20	65.58	-26.12
2	0.158	36.38	Average	9.70	0.20	55.56	-19.18
3	0.660	33.89	QP	9.63	0.28	56.00	-22.11
4	0.660	32.62	Average	9.63	0.28	46.00	-13.38
5	1.985	37.16	QP	9.62	0.35	56.00	-18.84
6	1.985	35.61	Average	9.62	0.35	46.00	-10.39
7	2.645	30.11	QP	9.62	0.36	56.00	-25.89
8	2.645	29.08	Average	9.62	0.36	46.00	-16.92
9	5.611	29.15	QP	9.62	0.41	60.00	-30.85
10	5.611	22.79	Average	9.62	0.41	50.00	-27.21
11	28.382	30.20	QP	9.62	0.50	60.00	-29.80
12	28.382	27.09	Average	9.62	0.50	50.00	-22.91

Level=Read Level + Lisn Factor + Cable Loss

--End of Report--