SGS-CSTC Standards Technical Services Ltd.

No.198 Kezhu Road, Science Town Economic& Technology Development District Guangzhou, China 510663

Telephone: +86 (0) 20 8215 5555
Fax: +86 (0) 20 8207 5059
Email: sgs_internet_operations@sgs.com

TEST REPORT

Application No.:	SZEMO081105449RF
Applicant/ Manufacturer:	Sunitec Enterprise Co., Ltd.
Address of Applicant:	No.2, Qilin Road 2, RunTang Ind, Dan-Keng Village Fu Min Community, Guan-Lan Town, BaoAn District, Shenzhen Guangdong China
FCC ID:	RA8-BC007
Fundamental Carrier Frequency :	2.402GHz to 2.480GHz
Equipment Under Test (EUT):	
Name:	Bluetooth Speakerphone
Model No.:	BC900; BC900A; BC900B; 0265CBHSOL♣
♣	Please refer to section 2 of this report which indicates which item was actually tested and which were electrically identical.
Standards:	FCC PART 15 Subpart C: 2008 ANSI C63.4 2003
Date of Receipt:	05 November 2008
Date of Test:	05 to 28 November 2008
Date of Issue:	01 December 2008

Test Result :	**PASS ***

* In the configuration tested, the EUT detailed in this report complied with the standards specified above. Please refer to section 2 of this report for further detail.

Authorized Signature:

Robinson Lo
Manager

2 Test Summary

Test	Test Requirement	Standard Paragraph	Result
Antenna Requirement	FCC PART 15 :2008	Section 15.247 (c)	PASS
Conducted Emission	FCC PART 15 :2008	Section 15.207	PASS
Occupied Bandwidth	FCC PART 15 :2008	Section 15.247 (a1)	PASS
Carrier Frequencies Separated	FCC PART 15 :2008	Section 15.247(a)(1)	PASS
Hopping Channel Number	FCC PART 15 :2008	Section 15.247(a)(1)(iii)	PASS
Dwell Time	FCC PART 15 :2008	Section 15.247(a)(1)(iii)	PASS
Pseudorandom Frequency Hopping Sequence	FCC PART 15 :2008	Section 15.247(a)(1)	PASS
Maximum Peak Output Power	FCC PART 15 :2008	Section 15.247(b)(1)	PASS
RF Exposure Compliance Requirement	FCC PART 15 :2008	15.247(b)(4)& TCB Exclusion List (7 July 2002)	PASS
Radiated Emission	FCC PART 15 :2008	Section 15.209，15.247(d)&15.205	PASS

Remark:

1. The EUT was tested installing fully charged batteries.

2. Item No.: BC900; BC900A; BC900B; 0265CBHSOL

   Only the item BC900 was tested. There is not changed in PCBA. The difference of above models is just the appearance, and the difference between BC900 and 0265CBHSOL is the model No..

3 Contents

4 General Information

4.1 General Description of the E.U.T

Product Name:	Bluetooth Speakerphone
Model:	BC900; BC900A; BC900B; 0265CBHSOL
Number of Channels	79 Channels
Channel Separation	1 MHz
Type of Modulation	FHSS (Frequency Hopping Spread Spectrum); Adaptive Frequency Hopping (AFH) is used.
Dwell time	Per channel is less than 0.4s.
Antenna Type	Integral
Power Supply:	3.7V Recharge Lithium-ion Battery

4.2 Description of Support Units

Description	Manufacturer	Model No.
PC	IBM	2662
Coder	HengTong ELECTRON	HT4000
Printer	Canon	BJC-1000SP

4.3 Standards Applicable for Testing

The customer requested FCC tests for the EUT.

The standard used was FCC PART 15 Subpart C: 2008. ANSI C63.4:2003.and DA 00-705.

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory. No.198 Kezhu Road, Science Town Economic& Technology Development District Guangzhou. China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

4.5 Other Information Requested by the Customer

None.

4.6 Test Facility

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

- **NVLAP – Lab Code: 200611-0**

  SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

- **FCC – Registration No.: 282399**

  SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399. May 31. 2002. With the above and NVLAP's accreditation. SGS-CSTC is an authorized test laboratory for the DoC process.

5 Equipments Used during Test

RE in Chamber						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (dd-mm-yy)**	**Cal.Due date (dd-mm-yy)**
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	16-06-2007	15-06-2009
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	12-12-2007	11-12-2008
3	EMI Test software	AUDIX	E3	SEL0050	N/A	N/A
4	Coaxial cable	SGS	N/A	SEL0028	18-06-2008	17-06-2009
5	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0014	12-08-2008	11-08-2009
6	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	18-06-2008	17-06-2009
7	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0005	12-08-2008	11-08-2009
8	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	12-08-2008	11-08-2009
9	Pre-amplifier (1-18GHz)	Rohde & Schwarz	AFS42-00101 800-25-S-42	SEL0081	18-06-2008	17-06-2009
10	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002650-30-8P-44	SEL0080	18-06-2008	17-06-2009
11	Band filter	Amindeon	82346	SEL0094	18-06-2008	17-06-2009
12	Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	15-06-2008	14-06-2009

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (dd-mm-yy)**	**Cal.Due date (dd-mm-yy)**
1	Shielding Room	ZhongYu Electron	GB-88	SEL0042	N/A	N/A
2	LISN	ETS-LINDGREN	3816/2	SEL0021	18-06-2008	17-06-2009
3	ISN	Rohde & Schwarz	ENY 22 1109	EMC0114	18-06-2008	17-06-2009
4	ISN	Rohde & Schwarz	ENY 41 1110	EMC0115	18-06-2008	17-06-2009
5	EMI Test Receiver	Rohde & Schwarz	ESCI	SEL0022	18-06-2008	17-06-2009
6	Coaxial Cable	SGS	N/A	SEL0024	18-06-2008	17-06-2009

6 Test Results

6.1 E.U.T. test conditions

Operating Environment:

Temperature: 24.0 °C

Humidity: 50 % RH

Atmospheric Pressure: 1010 mbar

Test frequencies: 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:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 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

Test frequency is the lowest channel: 0 channel(2402MHz), middle channel: 38 channel(2441MHz) and highest channel: 78 channel(2480MHz)

6.2 Antenna Requirement

6.2.1 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 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.

6.2.2 EUT Antenna

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.

Test result: The unit does meet the FCC requirements.

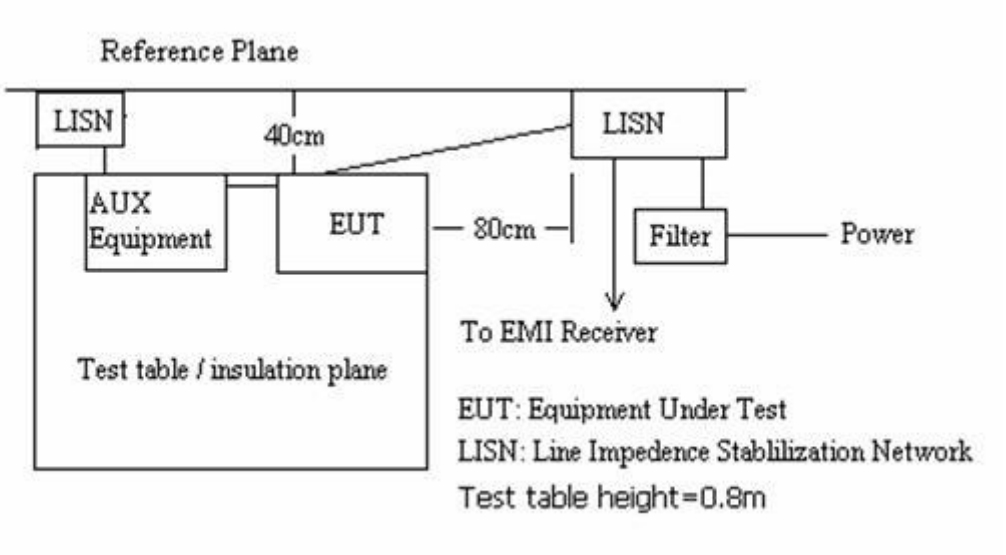
6.3 Conducted Emissions at Mains Terminals 150 kHz to 30MHz

Test Requirement:	FCC Part 15.207
Test Method:	ANSI C63.4:2003
Frequency Range:	150KHz to 30MHz
Detector:	RBW=9KHz VBW=30KHz
	Quasi-Peak if maximised peak within 6dB of Quasi-Peak limit
EUT Operation:	Pre-test the EUT in charging mode

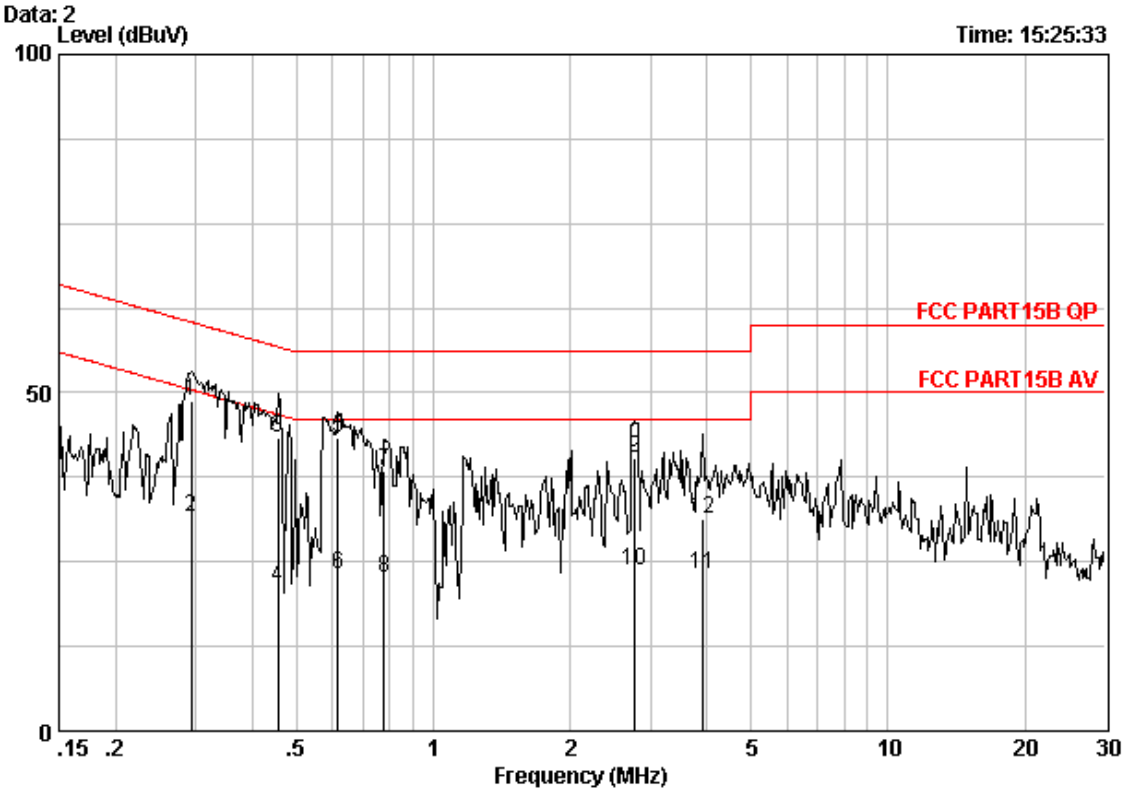
An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Plan View of Test Setup



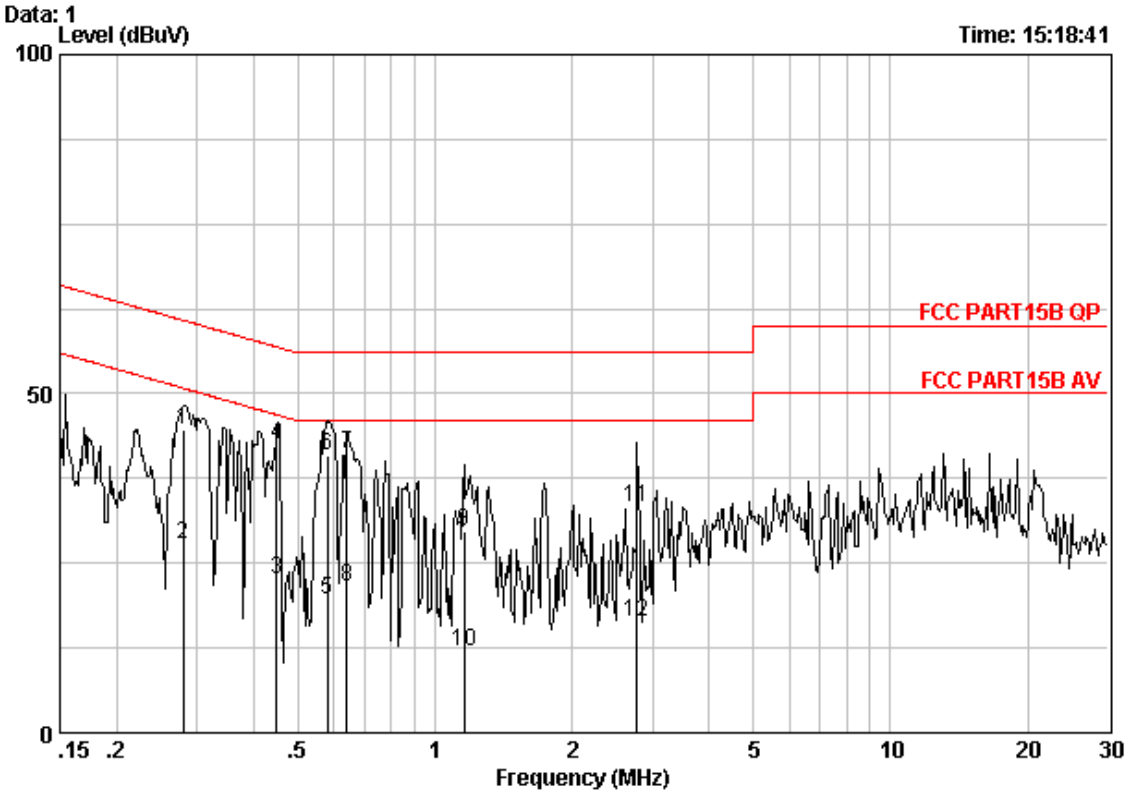
Live line:



Site : Shielding Room
Condition : FCC PART15B QP CE LINE
EUT : Bluetooth Speakerphone
Job No. : 5449RF
MODE : charging

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1 @	0.29300	0.05	-0.04	48.70	48.71	60.44	-11.73	QP
2	0.29300	0.05	-0.04	31.60	31.61	50.44	-18.83	Average
3	0.45600	0.06	-0.04	43.30	43.32	56.77	-13.45	QP
4	0.45600	0.06	-0.04	21.20	21.22	46.77	-25.55	Average
5	0.61700	0.06	-0.05	43.40	43.41	56.00	-12.59	QP
6	0.61700	0.06	-0.05	23.20	23.21	46.00	-22.79	Average
7	0.77900	0.07	-0.05	38.30	38.32	56.00	-17.68	QP
8	0.77900	0.07	-0.05	22.60	22.62	46.00	-23.38	Average
9	2.780	0.14	-0.07	40.30	40.36	56.00	-15.64	QP
10	2.780	0.14	-0.07	23.70	23.76	46.00	-22.24	Average
11	3.900	0.16	-0.09	23.10	23.17	46.00	-22.83	Average
12	3.900	0.16	-0.09	31.30	31.37	56.00	-24.63	QP

Neutral line:



Site : Shielding Room
Condition : FCC PART15B QP CE NEUTRAL
EUT : Bluetooth Speakerphone
Job No. : 5449RF
MODE : charging

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.28000	0.05	-0.04	44.70	44.71	60.82	-16.11	QP
2	0.28000	0.05	-0.04	27.80	27.81	50.82	-23.01	Average
3	0.44900	0.06	-0.04	22.50	22.52	46.89	-24.38	Average
4	0.44900	0.06	-0.04	42.40	42.42	56.89	-14.48	QP
5	0.57900	0.06	-0.04	19.70	19.72	46.00	-26.28	Average
6	0.57900	0.06	-0.04	40.90	40.92	56.00	-15.08	QP
7	0.64000	0.06	-0.04	41.20	41.22	56.00	-14.78	QP
8	0.64000	0.06	-0.04	21.50	21.52	46.00	-24.48	Average
9	1.160	0.09	-0.05	29.70	29.74	56.00	-26.26	QP
10	1.160	0.09	-0.05	12.00	12.04	46.00	-33.96	Average
11	2.780	0.14	-0.07	33.10	33.16	56.00	-22.84	QP
12	2.780	0.14	-0.07	16.20	16.26	46.00	-29.74	Average

Remark: Level = Real Level + Cable loss + LISN factor

TEST RESULTS: The unit does meet the FCC requirements.

6.4 Occupied Bandwidth

Test Requirement:	FCC 15.247(a)
Test Method:	ANSI C63.4 2003& DA 00-705
Test Status:	Test in fixing operating frequency at lowest, Middle, highest channel.
Test Procedure:	

The Transmitter output of EUT was connected to the spectrum analyzer. The 20 dB bandwidth of the fundamental frequency was measured. The setting of spectrum analyzer is as follows;

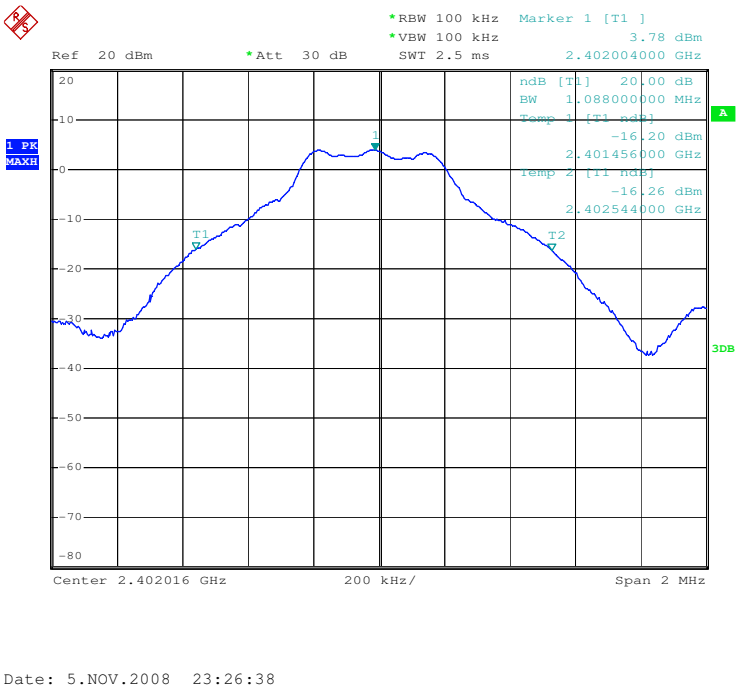
Equipment Mode	Spectrum Analyzer
Detector Function	Peak Mode
RBW	100KHz
VBW	100KHz

Test result:
20dB Bandwidth:

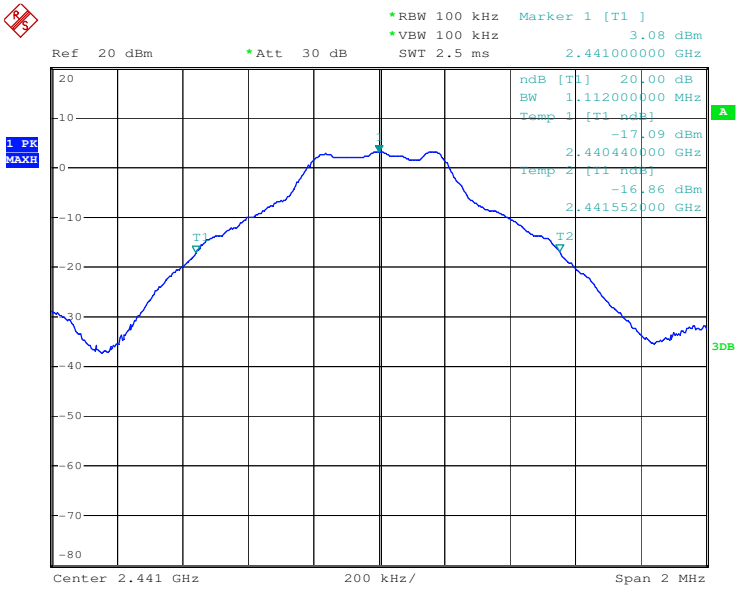
Lowest Frequency 2.402GHz	**Middle Frequency** 2.441GHz	**Highest Frequency** 2.480GHz
1088 KHz	1112 KHz	1088 KHz

Result plot as follows:

1. Lowest Channel(2.402GHz):



2. Middle Channel (2.441GHz):



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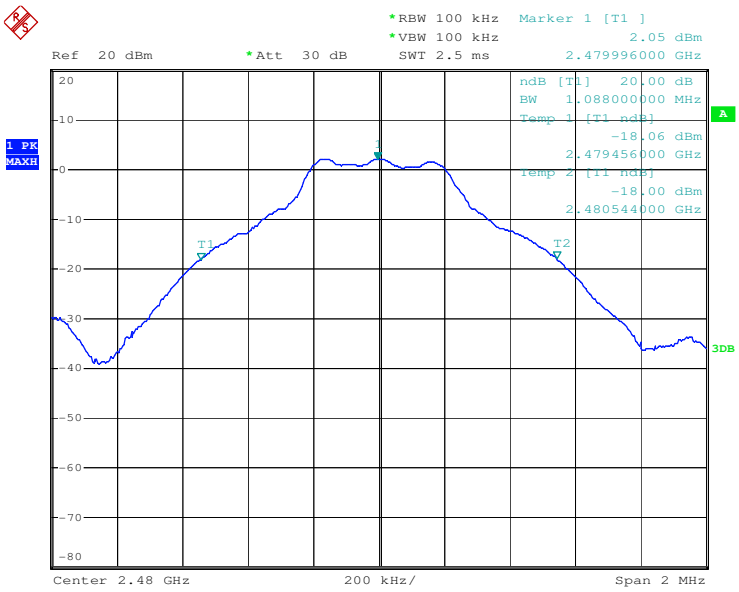
3. Highest Channel (2.480GHz):



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Test result: The unit does meet the FCC requirements.

6.5 Carrier Frequencies Separated

Test Requirement: FCC 15.247(a)

Test Method: ANSI C63.4 2003& DA 00-705

Test requirements: Regulation 15.247(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 Status: Test in hopping transmitting operating mode.

Test Procedure:

1 Connect EUT antenna terminal to the spectrum analyzer with a low loss cable.

Equipment mode: Spectrum analyzer

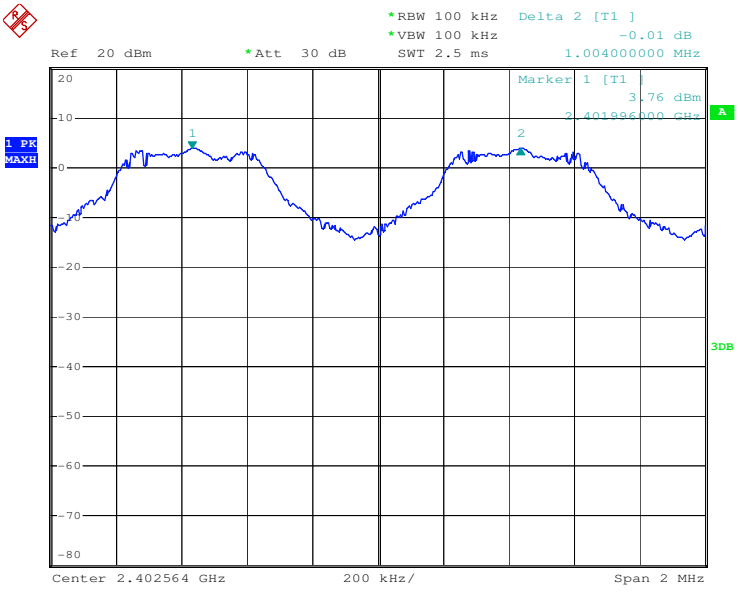
Equipment Mode	Spectrum Analyzer
Detector Function	Peak Mode
RBW	100KHz
VBW	100KHz

2. By using the Max-Hold function record the separation of two adjacent channels.
3. Measure the frequency difference of these two adjacent channels by spectrum analyzer Marker function.
4. Repeat above procedures until all frequencies measured were complete.

Test result:

Lowest Frequency 2.402GHz	**Middle Frequency** 2.441GHz	**Highest Frequency** 2.480GHz
1.004MHz	1.004MHz	0.992MHz

1. Lowest Channel (2.402GHz):



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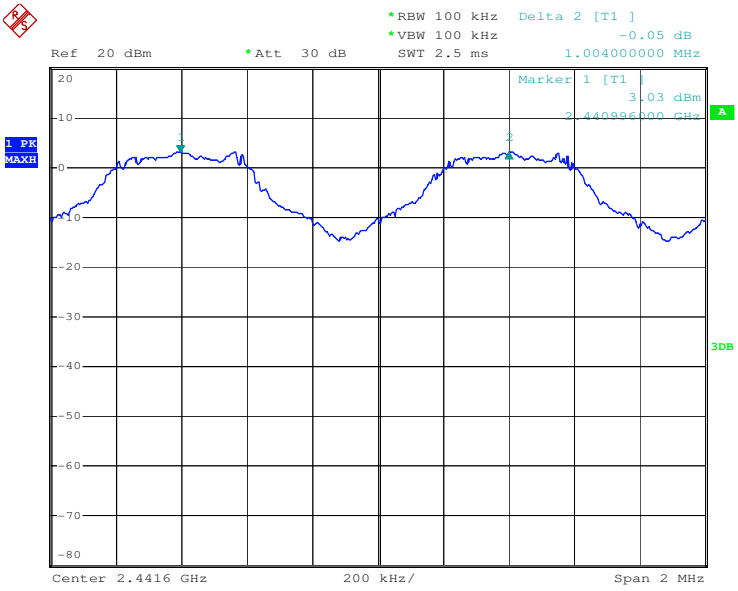
2. Middle Channel (2.441GHz):



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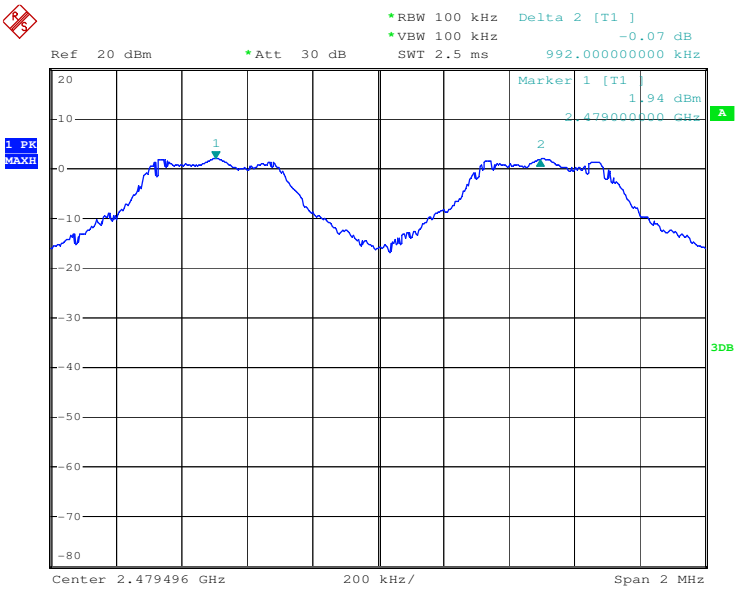
3. Highest Channel (2.480GHz):



Date: 7.NOV.2008 09:16:36

Test result: The unit does meet the FCC requirements.

6.6 Hopping Channel Number

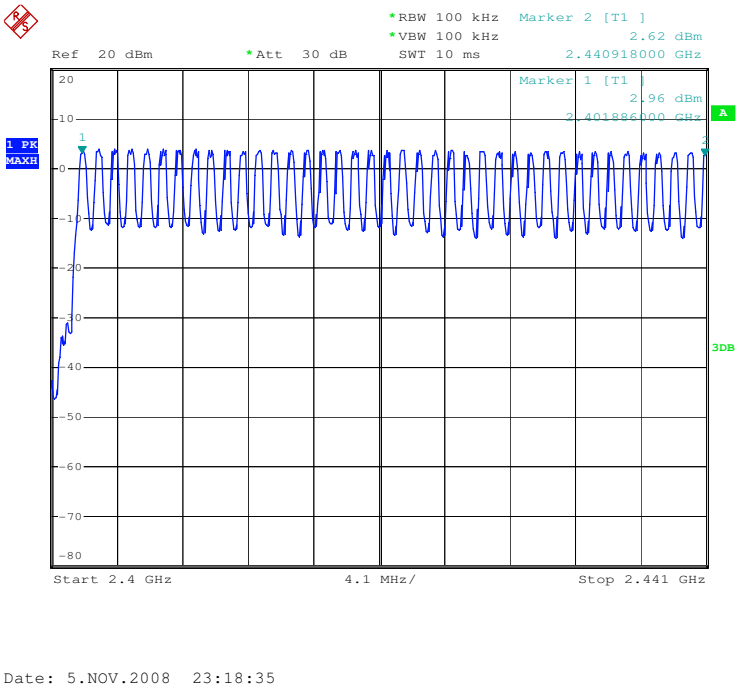
Test Requirement:	FCC 15.247(a)
Test Method:	ANSI C63.4:2003, 15.247 & DA 00-705
Requirements:	Regulation 15.247 (a) (1) (iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.
Test Status:	Test in hopping transmitting operating mode.

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: RBW = 100 kHz. VBW = 100 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 = 2400MHz. stop frequency = 2483.5MHz. Submit the test result graph.

Test result: Total channels are 79 channels.

1. Hopping channel numbers (1/2)



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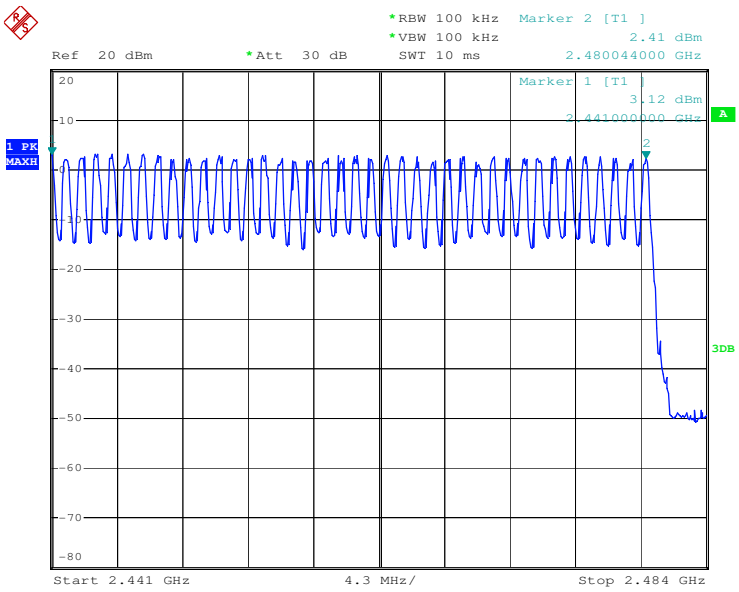
2. Hopping channel numbers (2/2)



Date: 5.NOV.2008 23:20:53

Test result: The unit does meet the FCC requirements.

6.7 Dwell Time

Test Requirement:	FCC 15.247(a)
Test Method:	ANSI C63.4 2003& DA 00-705
Test requirements:	Regulation 15.247(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 Status:	Test in hopping transmitting operating mode.

Test Procedure:

1. Connect EUT antenna terminal to the spectrum analyzer with a low loss cable.
   Equipment mode: spectrum analyzer, detector function: Peak
   RBW=1MHz, VBW=1MHz, Span=zero.
2. Adjust the center frequency of spectrum analyzer on any frequency be measured.
3. Measure the Dwell Time by spectrum analyzer Marker function.
4. Repeat above procedures until all frequencies measured were complete.

Test Result:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

1. Lowest channel: (2.402GHz)

   DH1 time slot=0.53(ms)*(1600/ (2*79))*31.6=169.6 ms

   DH3 time slot=1.78(ms)*(1600/ (4*79))*31.6=284.8 ms

   DH5 time slot=3.00(ms)*(1600/ (6*79))*31.6=320ms

2. Middle channel: (2.441GHz)

   DH1 time slot=0.54(ms)*(1600/ (2*79))*31.6=172.8 ms

   DH3 time slot=1.79(ms)*(1600/ (4*79))*31.6=286.4 ms

   DH5 time slot=3.04(ms)*(1600/ (6*79))*31.6=324.27ms

3. Highest channel: (2.480GHz)

   DH1 time slot=0.52(ms)*(1600/ (2*79))*31.6=166.4ms

   DH3 time slot=1.78(ms)*(1600/ (4*79))*31.6=284.8ms

   DH5 time slot=3.02(ms)*(1600/ (6*79))*31.6=322.13ms

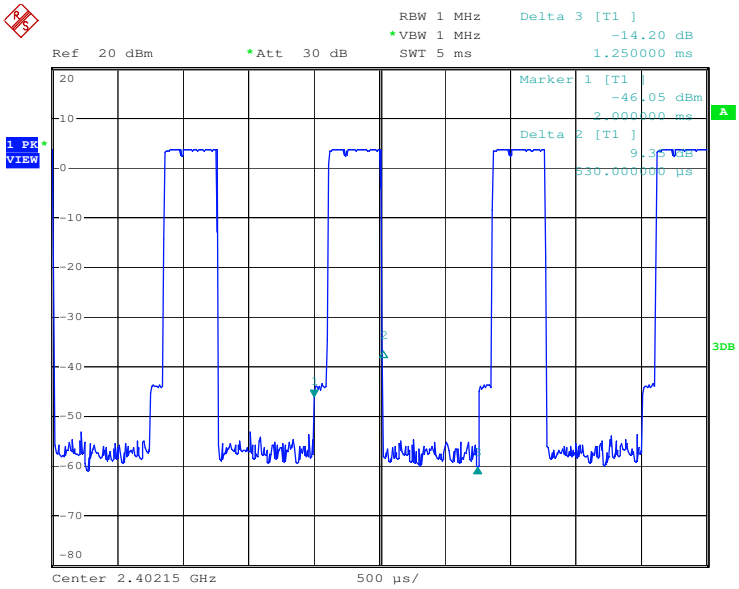
The results are not greater than 0.4 seconds.

The unit does meet the FCC requirements.

Please refer the graph as below:

1. Lowest channel (2.402 GHz):

DH1



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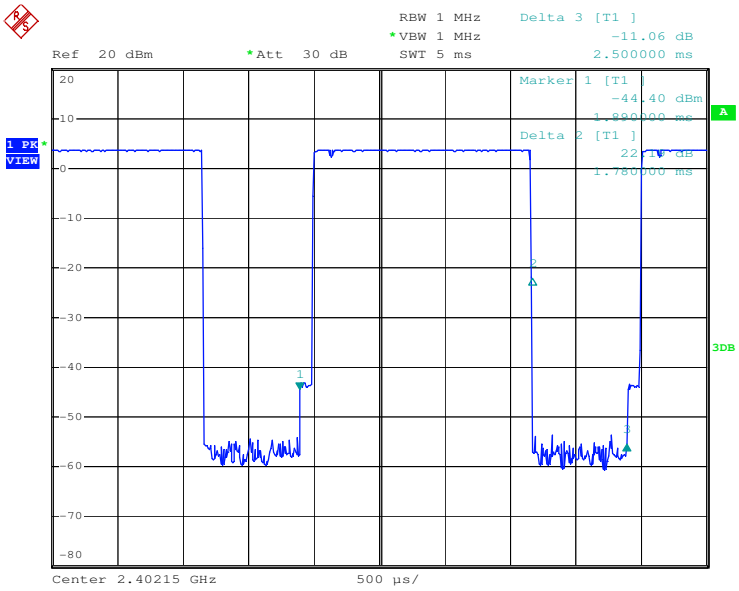
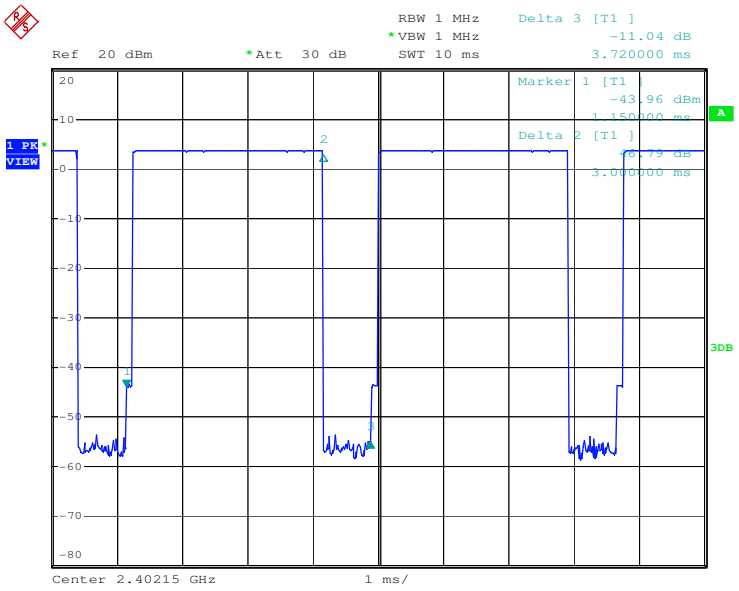
DH3



Date: 5.NOV.2008 23:39:36

DH5



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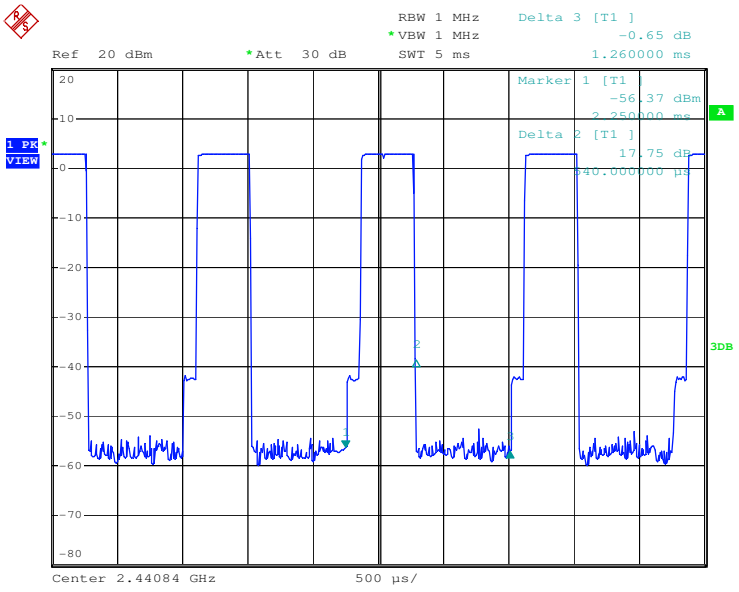
2. Middle channel (2.441 GHz):

DH1



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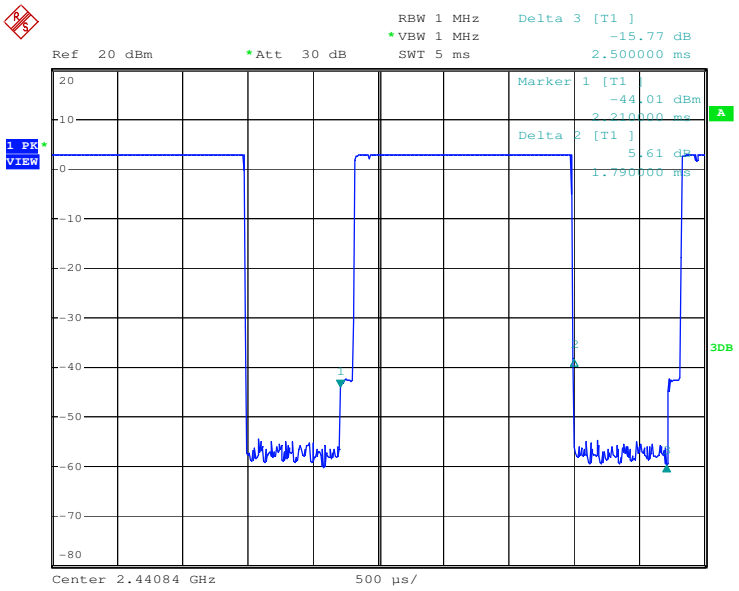
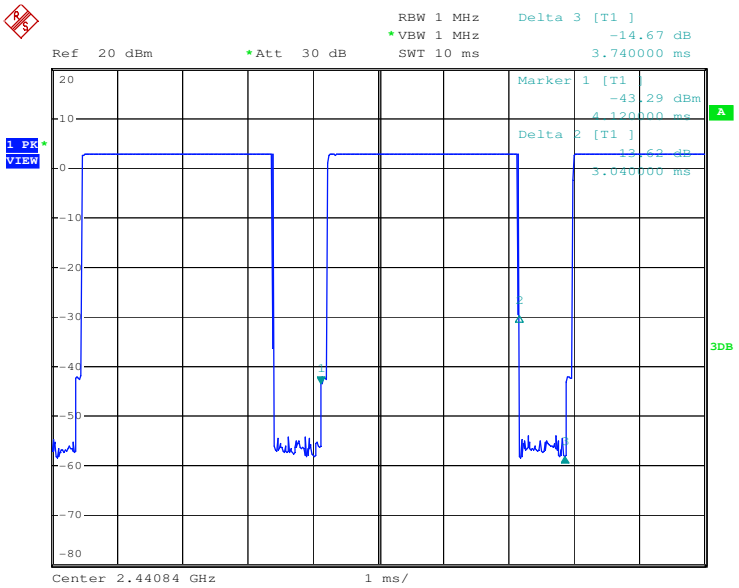
DH3



Date: 6.NOV.2008 00:04:56

DH5



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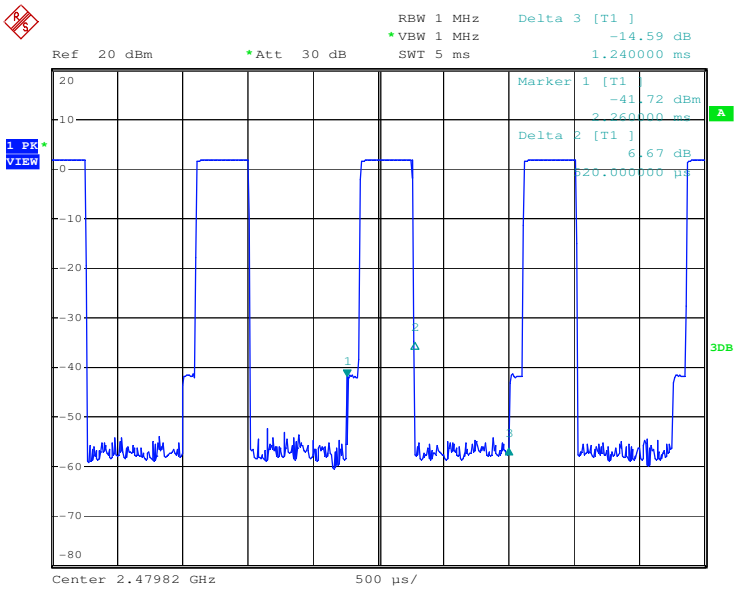
3. Highest channel (2.480GHz):

DH1



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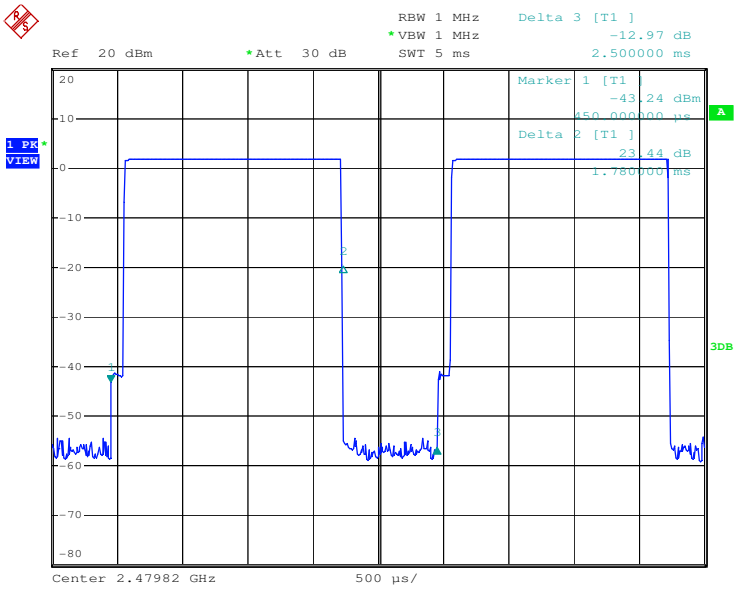
DH3



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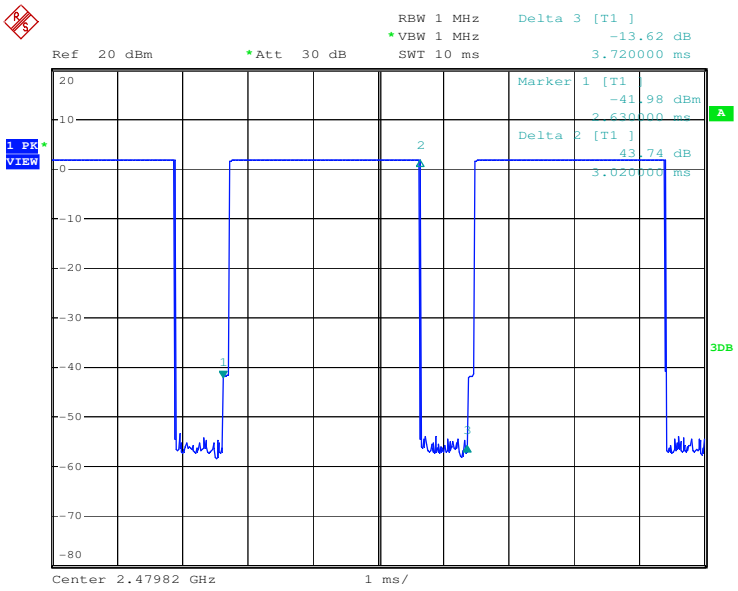
DH5



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6.8 Pseudorandom Frequency Hopping Sequence

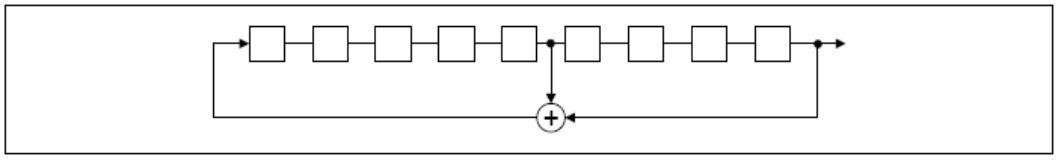
6.8.1 Standard requirement

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.

6.8.2 EUT Pseudorandom Frequency Hopping Sequence

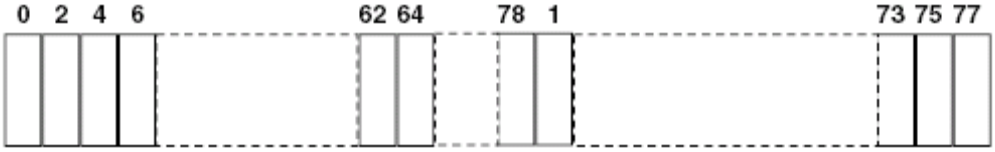
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. and the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized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

An example of Pseudorandom Frequency Hopping Sequence as follow:



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.

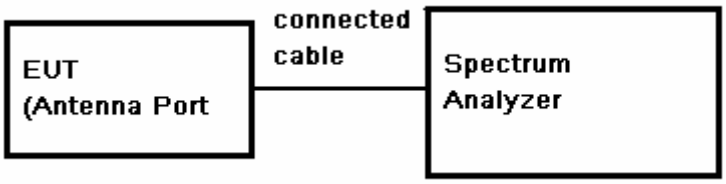
6.9 Maximum Peak Output Power

Test Requirement: FCC Part 15.247 & DA 00-705

Test Method: ANSI C63.4 & DA 00-705

Test Limit: Regulation 15.247 (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 (30.0dBm) limit applies.

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: RBW = 1 MHz. VBW = 1 MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, middle and highest channel individually. Record the max value.

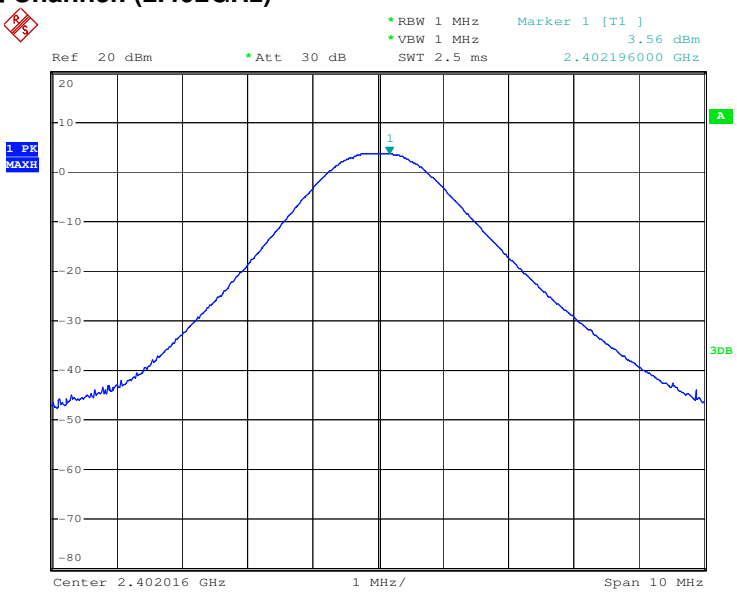
Test Result:

Test channel	Reading Power (dBm)	Cable Loss (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
2.402GHz	3.56	1.20	4.76	30.00	25.24
2.441GHz	2.89	1.20	4.09	30.00	25.91
2.480GHz	1.94	1.20	3.14	30.00	26.86

Test result: The unit does meet the FCC requirements.

Test result plot as follows:

1. Lowest Channel: (2.402GHz)



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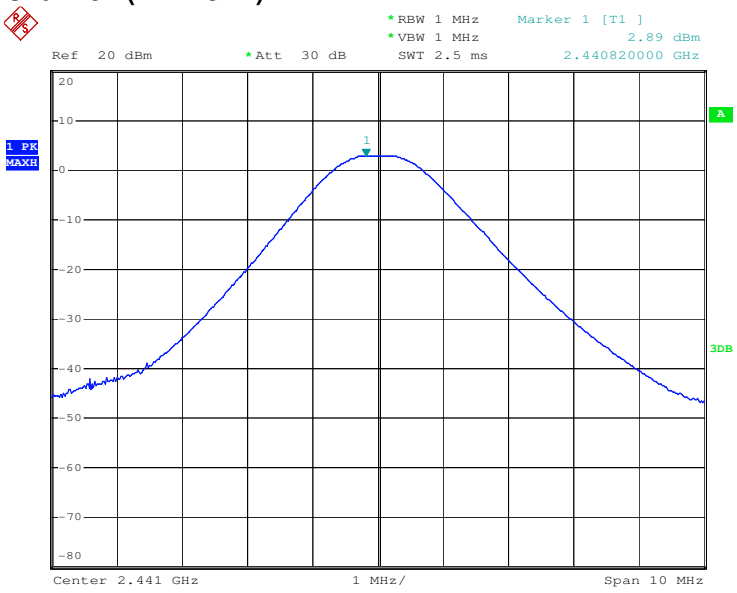
2. Middle Channel: (2.441GHz)



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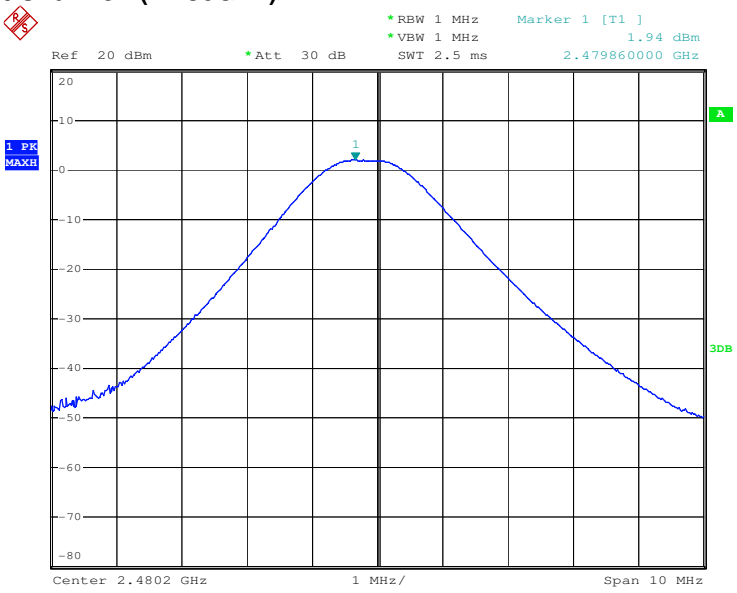
3. Highest Channel: (2.480GHz)



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6.10 RF Exposure Compliance Requirement

6.10.1 Standard requirement

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radia frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

(a) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm^2)	Averaging Times $\|E\|^2$,$\|H\|^2$or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100000			5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm^2)	Averaging Times $\|E\|^2$,$\|H\|^2$or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/500	30
1500-100000			1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

6.10.2 MPE Calculation Method

E (V/m)=(30*P*G)0.5/d Power Density: Pd(W/m2)=E2/377

E=Electric Field (V/m)

P=Peak RF output Power (W)

G=EUT Antenna numeric gain (numeric)

d= Separation distance between radiator and human body (m)

The formula can be changed to

Pd= (30*P*G)/(377*d2)

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

6.10.3 3 Calculated Result and Limit

Normal mode:

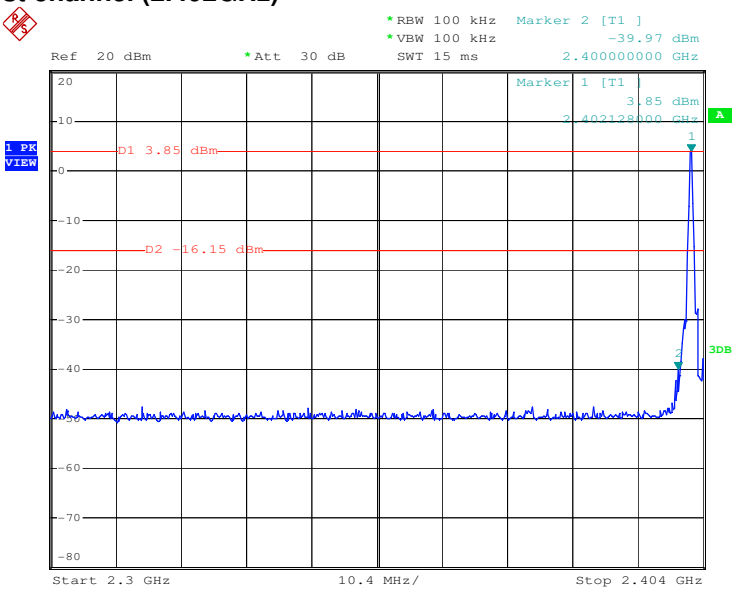
Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
2402	1.0	4.76	2.9922	0.0005953	1	Complies
2441	1.0	4.09	2.5645	0.0005102	1	Complies
2480	1.0	3.14	2.0606	0.0004099	1	Complies

6.11 Band edge

Test Requirement:	FCC 15.247(d)
Test Method:	ANSI C63.4:2003 & DA 00-705
Test Status:	Test lowest channel, highest channel.
Test site:	The transmitter output is connected to spectrum analyzer. The resolution bandwidth is set to 100KHz. The video bandwidth is set to 100KHz.
Limit:	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.

Out-OFF-band spurious emissions-conducted measurement:

1. The lowest channel (2.402GHz)



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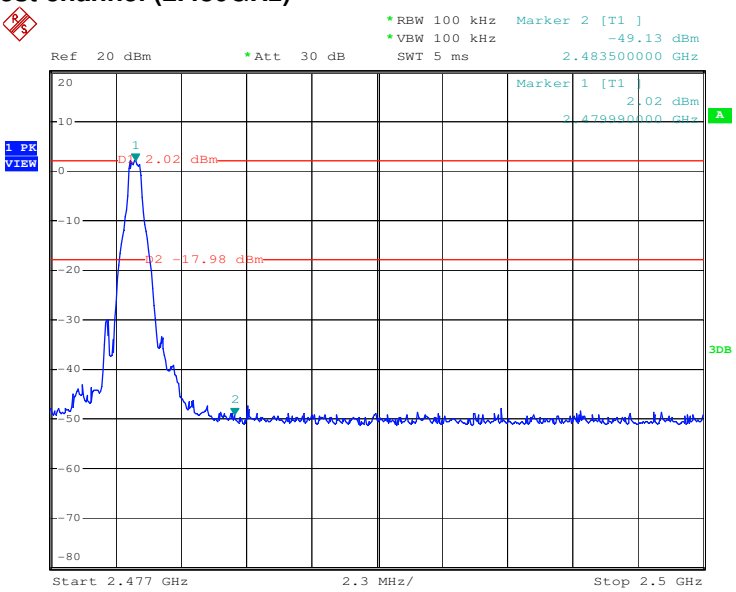
2. The highest channel (2.480GHz)



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6.12 Radiated Emissions

Test Requirement:	15.247(d),15.209 & 15.205
Test Method:	ANSI C63.4:2003 & DA 00-705
Test Status:	Test lowest channel, Middle, highest channel.
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Test Range	30MHz to 25GHz
	30MHz-1000MHz: RBW=100KHz, VBW=300KHz
	Above 1GHz: PK RBW=1MHz, VBW=3MHz
	Average RBW=1MHz, VBW=10Hz
15.209 Limit:	40.0 dBμV/m between 30MHz & 88MHz
	43.5 dBμV/m between 88MHz & 216MHz
	46.0 dBμV/m between 216MHz & 960MHz
	above 960MHz: Average value Limit 54.0 dBμV/m
	Peak value Limit 74.0 dBμV/m.

Test Configuration:

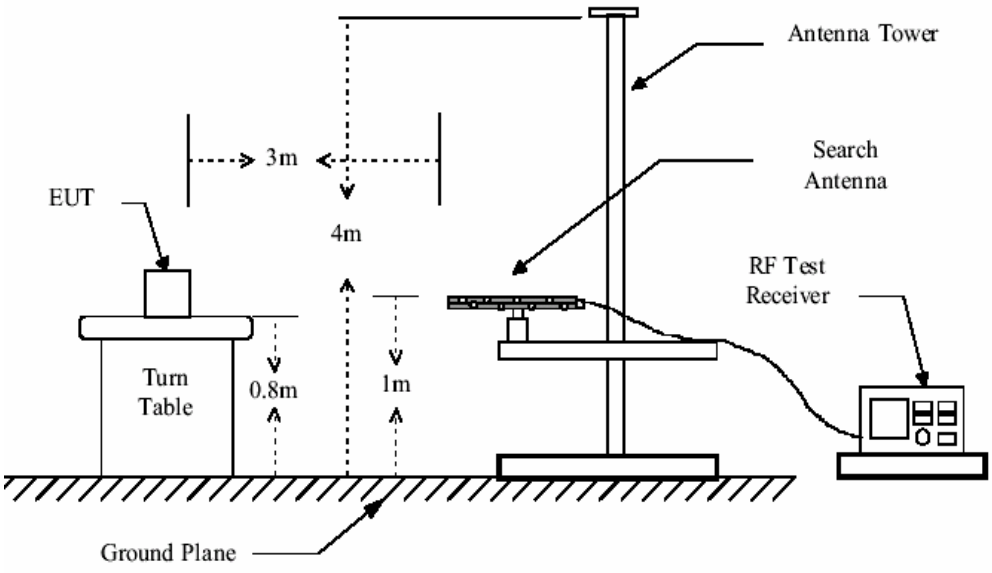

Figure1: 30MHz to 1GHz radiated emissions test configuration

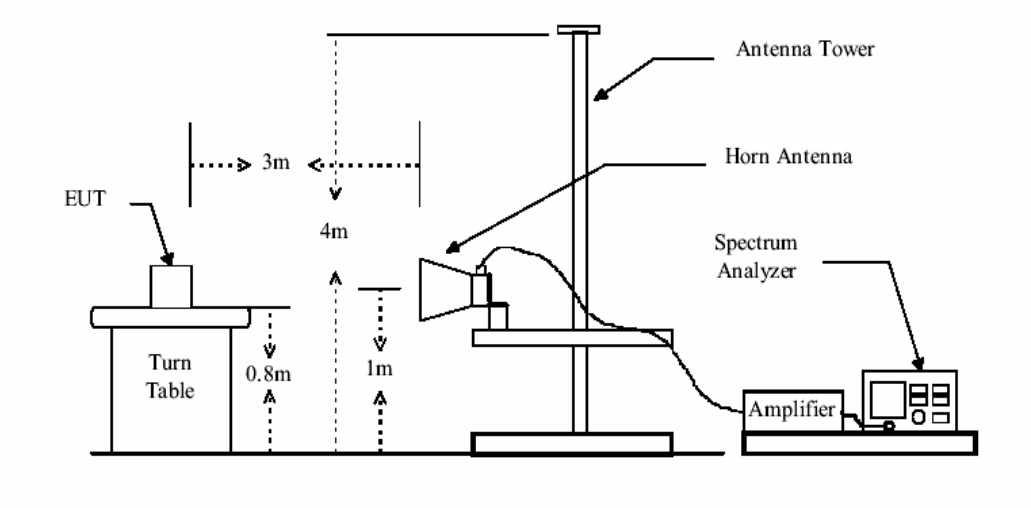

Figure 2: Above 1GHz radiated emissions test configuration

Test Procedure:

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

7 The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

6.12.1 Radiated emission below 1GHz

Test in USB charger mode.

Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
153.190	1.33	9.18	27.43	38.72	21.80	43.50	-21.70
184.230	1.38	9.98	27.24	39.72	23.84	43.50	-19.66
214.300	1.49	10.93	27.08	44.47	29.81	43.50	-13.69
229.820	1.57	11.64	27.00	38.05	24.26	46.00	-21.74
269.590	1.77	12.70	26.83	36.21	23.85	46.00	-22.15
528.580	2.63	18.56	27.68	36.91	30.42	46.00	-15.58

Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
184.230	1.38	9.98	27.24	47.30	31.42	43.50	-12.08
214.300	1.49	10.93	27.08	51.03	36.37	43.50	-7.13
242.430	1.64	12.07	26.95	43.71	30.47	46.00	-15.53
269.590	1.77	12.70	26.83	43.17	30.81	46.00	-15.19
299.660	1.90	13.85	26.72	39.13	28.16	46.00	-17.84
528.580	2.63	18.56	27.68	39.16	32.67	46.00	-13.33

Test in play mode.

Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
60.070	0.80	7.19	28.05	34.31	14.25	40.00	-25.75
99.840	1.20	9.09	27.88	30.94	13.35	43.50	-30.15
229.820	1.57	11.64	27.00	31.38	17.59	46.00	-28.41
402.480	2.21	16.31	27.42	32.37	23.47	46.00	-22.53
497.540	2.59	17.80	27.70	30.13	22.82	46.00	-23.18
792.420	3.18	22.07	26.96	30.24	28.53	46.00	-17.47

Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
90.140	1.10	8.71	27.95	30.51	12.37	43.50	-31.13
113.420	1.24	8.36	27.74	30.66	12.52	43.50	-30.98
156.100	1.33	9.39	27.41	29.90	13.21	43.50	-30.29
243.400	1.64	12.10	26.94	29.54	16.34	46.00	-29.66
398.600	2.20	16.28	27.40	29.22	20.30	46.00	-25.70
722.580	2.98	21.60	27.20	29.81	27.19	46.00	-18.81

6.12.2 Transmitter emission above 1GHz

The lowest channel (2.402GHz)

Peak Measurement

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2400	4.97	32.25	44.75	59.99	52.46	74.00	-21.54	Vertical
4808	6.61	34.04	45.40	48.35	43.60	74.00	-30.40	Vertical
7222	7.63	36.29	44.49	44.71	44.14	74.00	-29.86	Vertical
9619	8.53	36.99	42.20	43.61	46.93	74.00	-27.07	Vertical
12033	10.11	38.82	43.35	43.73	49.31	74.00	-24.69	Vertical
2400	4.97	32.25	44.75	41.19	33.66	74.00	-40.34	Horizontal
4808	6.61	34.04	45.40	48.81	44.06	74.00	-29.94	Horizontal
7222	7.63	36.29	44.49	45.71	45.14	74.00	-28.86	Horizontal
9619	8.53	36.99	42.20	44.34	47.66	74.00	-26.34	Horizontal
12033	10.11	38.82	43.35	42.82	48.40	74.00	-25.60	Horizontal

Average Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	Polarization
2400	4.97	32.25	44.75	27.49	19.96	54.00	-34.04	Vertical
4808	6.61	34.04	45.40	34.43	29.68	54.00	-24.32	Vertical
7222	7.63	36.29	44.49	34.20	33.63	54.00	-20.37	Vertical
9619	8.53	36.99	42.20	29.93	33.25	54.00	-20.75	Vertical
12033	10.11	38.82	43.35	30.60	36.18	54.00	-17.82	Vertical
2400	4.97	32.25	44.75	27.39	19.86	54.00	-34.14	Horizontal
4808	6.61	34.04	45.40	34.43	29.68	54.00	-24.32	Horizontal
7222	7.63	36.29	44.49	34.20	33.63	54.00	-20.37	Horizontal
9619	8.53	36.99	42.20	29.93	33.25	54.00	-20.75	Horizontal
12033	10.11	38.82	43.35	30.59	36.17	54.00	-17.83	Horizontal

The middle channel (2.441GHz)

Peak Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	Polarization
4876	6.64	34.02	45.42	50.18	45.42	74.00	-28.58	Vertical
7324	7.58	36.10	44.39	44.73	44.02	74.00	-29.98	Vertical
9772	8.65	37.12	42.06	43.10	46.81	74.00	-27.19	Vertical
12220	10.17	38.93	43.59	43.15	48.66	74.00	-25.34	Vertical
4876	6.64	34.02	45.42	50.20	45.44	74.00	-28.56	Horizontal
7324	7.58	36.10	44.39	43.92	43.21	74.00	-30.79	Horizontal
9772	8.65	37.12	42.06	43.55	47.26	74.00	-26.74	Horizontal
12220	10.17	38.93	43.59	43.01	48.52	74.00	-25.48	Horizontal

Average Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	Polarization
4876	6.64	34.02	45.42	34.93	30.17	54.00	-23.83	Vertical
7324	7.58	36.10	44.39	31.96	31.25	54.00	-22.75	Vertical
9772	8.65	37.12	42.06	30.67	34.38	54.00	-19.62	Vertical
12220	10.17	38.93	43.59	30.51	36.02	54.00	-17.98	Vertical
4876	6.64	34.02	45.42	34.95	30.19	54.00	-23.81	Horizontal
7324	7.58	36.10	44.39	31.97	31.26	54.00	-22.74	Horizontal
9772	8.65	37.12	42.06	30.70	34.41	54.00	-19.59	Horizontal
12220	10.17	38.93	43.59	30.54	36.05	54.00	-17.95	Horizontal

The highest channel (2.480GHz)

Peak Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	Polarization
2483.5	5.08	32.29	44.77	39.70	32.3	74.00	-41.70	Vertical
4961	6.68	34.01	45.44	47.25	42.50	74.00	-31.50	Vertical
7443	7.52	35.91	44.26	46.94	46.11	74.00	-27.89	Vertical
9925	8.77	37.23	41.92	42.17	46.25	74.00	-27.75	Vertical
12424	10.24	39.06	43.85	45.20	50.65	74.00	-23.35	Vertical
2483.5	5.08	32.29	44.77	40.00	32.60	74.00	-41.40	Horizontal
4961	6.68	34.01	45.44	47.77	43.02	74.00	-30.98	Horizontal
7443	7.52	35.91	44.26	47.17	46.34	74.00	-27.66	Horizontal
9925	8.77	37.23	41.92	42.15	46.23	74.00	-27.77	Horizontal
12424	10.24	39.06	43.85	45.58	51.03	74.00	-22.97	Horizontal

Average Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	Polarization
2483.5	5.08	32.29	44.77	27.10	19.7	54.00	-34.3	Vertical
4961	6.68	34.01	45.44	35.01	30.26	54.00	-23.74	Vertical
7443	7.52	35.91	44.26	32.00	31.17	54.00	-22.83	Vertical
9925	8.77	37.23	41.92	29.98	34.06	54.00	-19.94	Vertical
12424	10.24	39.06	43.85	31.04	36.49	54.00	-17.51	Vertical
2483.5	5.08	32.29	44.77	27.00	19.60	54.00	-34.40	Horizontal
4961	6.68	34.01	45.44	35.01	30.26	54.00	-23.74	Horizontal
7443	7.52	35.91	44.26	32.00	31.17	54.00	-22.83	Horizontal
9925	8.77	37.23	41.92	29.96	34.04	54.00	-19.96	Horizontal
12424	10.24	39.06	43.85	31.04	36.49	54.00	-17.51	Horizontal

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 Factor –Preamplifier Factor.

Remark: No any other emissions level which are attenuated less than 20dB below the limit

According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.

Hence there no other emissions have been reported.

Remark:

1). 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.

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

3) Protest the Bluetooth normal mode

4）For this intentional radiator operates below 25 GHz. The spectrum shall be investigated to the tenth harmonic of the highest fundamental frequency. And above the 4th harmonic of this intentional radiator, the disturbance is very low. So the test result only displays to 4th harmonic.

Section 15.205 Restricted bands of operation.

(a) Except as shown in paragraph (d) of this section. only spurious emissions are permitted in any of the frequency bands listed below:

● MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	
13.36 - 13.41	322 - 335.4		

Test result: The unit does meet the FCC requirements.