

FC

Test Report

Product Name	Bluetooth Headset
Model No.	H385
FCC ID.	OHH-H385H

Applicant	Cal-Comp Electronics (Thailand) Co. Ltd.
Address	191/54,57, 18th FL., Rachadapisek Rd., Klongtoey, Bangkok, Thailand

Date of Receipt	May 22, 2007
Issued Date	Aug. 30, 2007
Report No.	079026R-RFUSP06V01

The Test Results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.

This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Issued Date: Aug. 30, 2007

Report No.: 079026R-RFUSP06V01



Product Name	Bluetooth Headset
Applicant	Cal-Comp Electronics (Thailand) Co. Ltd.
Address	191/54,57, 18th FL., Rachadapisek Rd., Klongtoey, Bangkok, Thailand
Manufacturer	Cal-Comp Electronics (Thailand) Co. Ltd.
Model No.	H385
FCC ID.	OHH-H385H
Rated Voltage	AC 120V/60Hz
Working Voltage	DC 3.8V
Trade Name	MOTOROLA
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2006 ANSI C63.4: 2003
Test Result	Complied



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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Bluetooth Headset
Trade Name	MOTOROLA
FCC ID.	OHH-H385H
Model No.	H385
Frequency Range	2402 – 2480MHz
Channel Number	79
Type of Modulation	FHSS (GFSK)
Antenna type	Printed
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”
Power Adapter (1)	MFR: Motorola, M/N: FMP5202A Input: 100-240V, 50-60Hz 0.15A Output: 5V-850mA Cable Out: Non-Shielded, 1.75m
Power Adapter (2)	MFR: Motorola, M/N: FMP5185B Input: 100-240V, 50-60Hz 0.15A Output: 5V-550mA Cable Out: Non-Shielded, 1.75m
Power Adapter (3)	MFR: Motorola, M/N: FMP5100 Input: 100-240V, 50-60Hz 0.2A Output: 5V-550mA Cable Out: Non-Shielded, 1.75m

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	Cal-Comp	N/A	2.37dBi for 2.4 GHz

Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	2402 MHz	Channel 20:	2422 MHz	Channel 40:	2442 MHz	Channel 60:	2462 MHz
Channel 01:	2403 MHz	Channel 21:	2423 MHz	Channel 41:	2443 MHz	Channel 61:	2463 MHz
Channel 02:	2404 MHz	Channel 22:	2424 MHz	Channel 42:	2444 MHz	Channel 62:	2464 MHz
Channel 03:	2405 MHz	Channel 23:	2425 MHz	Channel 43:	2445 MHz	Channel 63:	2465 MHz
Channel 04:	2406 MHz	Channel 24:	2426 MHz	Channel 44:	2446 MHz	Channel 64:	2466 MHz
Channel 05:	2407 MHz	Channel 25:	2427 MHz	Channel 45:	2447 MHz	Channel 65:	2467 MHz
Channel 06:	2408 MHz	Channel 26:	2428 MHz	Channel 46:	2448 MHz	Channel 66:	2468 MHz
Channel 07:	2409 MHz	Channel 27:	2429 MHz	Channel 47:	2449 MHz	Channel 67:	2469 MHz
Channel 08:	2410 MHz	Channel 28:	2430 MHz	Channel 48:	2450 MHz	Channel 68:	2470 MHz
Channel 09:	2411 MHz	Channel 29:	2431 MHz	Channel 49:	2451 MHz	Channel 69:	2471 MHz
Channel 10:	2412 MHz	Channel 30:	2432 MHz	Channel 50:	2452 MHz	Channel 70:	2472 MHz
Channel 11:	2413 MHz	Channel 31:	2433 MHz	Channel 51:	2453 MHz	Channel 71:	2473 MHz
Channel 12:	2414 MHz	Channel 32:	2434 MHz	Channel 52:	2454 MHz	Channel 72:	2474 MHz
Channel 13:	2415 MHz	Channel 33:	2435 MHz	Channel 53:	2455 MHz	Channel 73:	2475 MHz
Channel 14:	2416 MHz	Channel 34:	2436 MHz	Channel 54:	2456 MHz	Channel 74:	2476 MHz
Channel 15:	2417 MHz	Channel 35:	2437 MHz	Channel 55:	2457 MHz	Channel 75:	2477 MHz
Channel 16:	2418 MHz	Channel 36:	2438 MHz	Channel 56:	2458 MHz	Channel 76:	2478 MHz
Channel 17:	2419 MHz	Channel 37:	2439 MHz	Channel 57:	2459 MHz	Channel 77:	2479 MHz
Channel 18:	2420 MHz	Channel 38:	2440 MHz	Channel 58:	2460 MHz	Channel 78:	2480 MHz
Channel 19:	2421 MHz	Channel 39:	2441 MHz	Channel 59:	2461 MHz		

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

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. The transmitter is presented with a continuous data stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its 79 channels and over the minimum number of hopping channels (75 channels).

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Note:

1. This device is a Bluetooth Headset with a built-in 2.4GHz Bluetooth transceiver.
2. The different is appearance.
3. These tests were conducted on a sample for the purpose of demonstrating compliance of bluetooth transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
4. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
5. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

1.2. Operational Description

The EUT is an Bluetooth Headset with a built-in 2.4GHz Bluetooth transceiver. The number of the channels is 79 in 2402-2480MHz. The device adapts the frequency hopping spread spectrum modulation. The antenna is connector-type and provides diversity function to improve the receiving function.

This device provides wireless technology that revolutionizes personal connectivity. It is the solution for the seamless integration of Bluetooth technology into personal computer enabling short-range wireless connections between desktop/laptop computers, Bluetooth-enabled peripherals, and portable handheld devices.

Test Mode	Mode 1: Transmitter Mode 2: FMP5202A Adapter (1) Mode 3: FMP5185B Adapter (2) Mode 4: 5100 Adapter (3)
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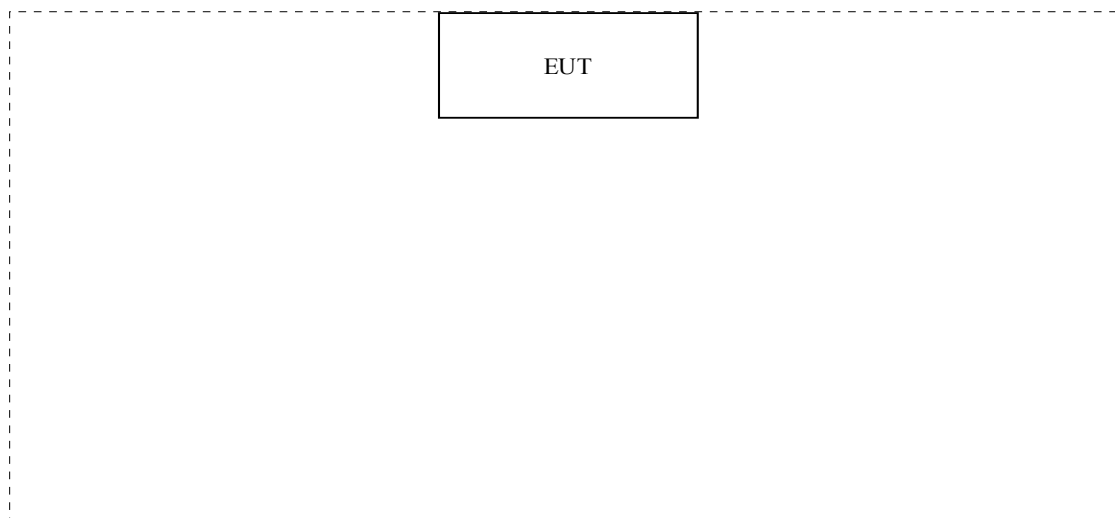
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
(1)	N/A	N/A	N/A	N/A	N/A

Signal Cable Type	Signal cable Description
A. N/A	N/A

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- 1 Setup the EUT and simulators as shown on 1.4.
- 2 Turn on the power of all equipment.
- 3 Messages will be transmitted and received through EUT.
- 4 Test is based on the mandatory continuous transmitter.
- 5 Repeat the above procedure (3) to (4).

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	30-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2



Accreditation on NVLAP
NVLAP Lab Code: 200533-0



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E-Mail : service@quietek.com



FCC Accreditation Number: TW1014

2. Conducted Emission

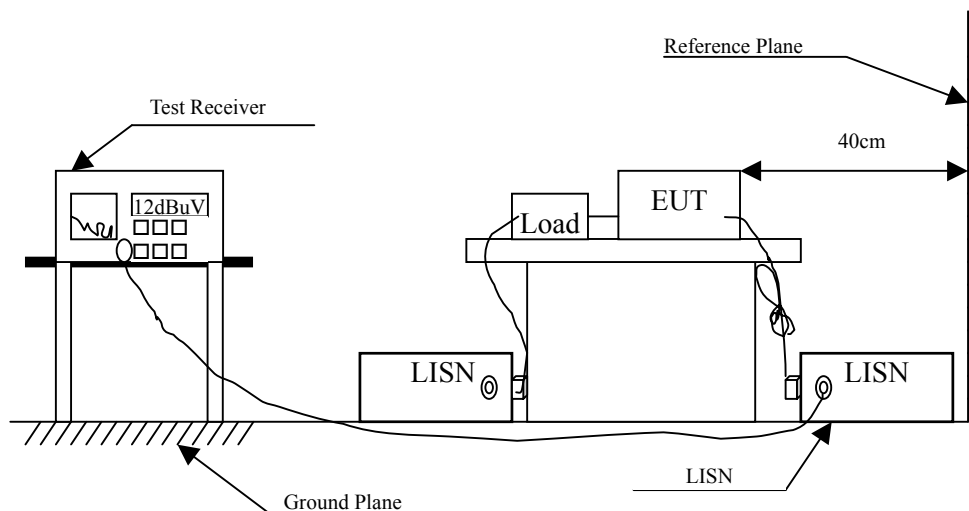
2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2007	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2007	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2007	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2007	
5	No.1 Shielded Room			N/A	

Note: All instruments are calibrated every one year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : Bluetooth Headset
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 2: FMP5202A Adapter (1)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
Line 1					
Quasi-Peak					
0.154	0.364	37.160	37.524	-28.362	65.886
0.181	0.780	35.210	35.990	-29.124	65.114
0.384	0.300	32.020	32.320	-26.994	59.314
1.005	0.317	28.560	28.877	-27.123	56.000
2.834	0.370	26.930	27.300	-28.700	56.000
22.822	1.160	23.750	24.910	-35.090	60.000
Average					
0.154	0.364	25.990	26.354	-29.532	55.886
0.181	0.780	24.660	25.440	-29.674	55.114
0.384	0.300	25.470	25.770	-23.544	49.314
1.005	0.317	21.910	22.227	-23.773	46.000
2.834	0.370	19.100	19.470	-26.530	46.000
22.822	1.160	14.820	15.980	-34.020	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Bluetooth Headset
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 2: FMP5202A Adapter (1)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.162	0.300	35.360	35.660	-29.997	65.657
0.400	0.310	34.320	34.630	-24.227	58.857
0.728	0.314	31.200	31.514	-24.486	56.000
1.295	0.330	29.990	30.320	-25.680	56.000
2.541	0.360	31.270	31.630	-24.370	56.000
22.822	1.010	25.420	26.430	-33.570	60.000
Average					
0.162	0.300	27.040	27.340	-28.317	55.657
0.400	0.310	28.630	28.940	-19.917	48.857
0.728	0.314	25.170	25.484	-20.516	46.000
1.295	0.330	24.200	24.530	-21.470	46.000
2.541	0.360	25.310	25.670	-20.330	46.000
22.822	1.010	17.360	18.370	-31.630	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Bluetooth Headset
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 3: FMP5185B Adapter (2)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
Line 1					
Quasi-Peak					
0.158	0.428	37.750	38.178	-27.593	65.771
0.220	0.505	32.680	33.185	-30.815	64.000
0.705	0.310	26.100	26.410	-29.590	56.000
2.275	0.350	26.730	27.080	-28.920	56.000
5.634	0.450	29.700	30.150	-29.850	60.000
25.697	1.200	18.110	19.310	-40.690	60.000
Average					
0.158	0.428	26.270	26.698	-29.073	55.771
0.220	0.505	19.940	20.445	-33.555	54.000
0.705	0.310	17.440	17.750	-28.250	46.000
2.275	0.350	19.780	20.130	-25.870	46.000
5.634	0.450	22.390	22.840	-27.160	50.000
25.697	1.200	8.500	9.700	-40.300	50.000

Note:

1. All reading levels are quasi-peak and average value.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product : Bluetooth Headset
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 3: FMP5185B Adapter (2)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	dB	dBuV
	dB	dBuV	dBuV		
Line 2					
Quasi-Peak					
0.150	0.300	37.240	37.540	-28.460	66.000
0.486	0.310	24.720	25.030	-31.370	56.400
2.283	0.355	26.400	26.755	-29.245	56.000
5.630	0.430	31.230	31.660	-28.340	60.000
17.041	0.900	10.630	11.530	-48.470	60.000
24.962	1.100	18.190	19.290	-40.710	60.000
Average					
0.150	0.300	26.670	26.970	-29.030	56.000
0.486	0.310	16.730	17.040	-29.360	46.400
2.283	0.355	19.930	20.285	-25.715	46.000
5.630	0.430	23.740	24.170	-25.830	50.000
17.041	0.900	2.680	3.580	-46.420	50.000
24.962	1.100	8.720	9.820	-40.180	50.000

Note:

1. All reading levels are quasi-peak and average value.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product : Bluetooth Headset
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 4: 5100 Adapter (3)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
Line 1					
Quasi-Peak					
0.158	0.428	50.250	50.678	-15.093	65.771
0.302	0.300	44.630	44.930	-16.727	61.657
0.463	0.300	34.830	35.130	-21.927	57.057
1.080	0.320	28.910	29.230	-26.770	56.000
1.656	0.330	26.260	26.590	-29.410	56.000
25.005	1.200	16.740	17.940	-42.060	60.000
Average					
0.158	0.428	36.350	36.778	-18.993	55.771
0.302	0.300	30.130	30.430	-21.227	51.657
0.463	0.300	24.110	24.410	-22.647	47.057
1.080	0.320	17.890	18.210	-27.790	46.000
1.656	0.330	7.930	8.260	-37.740	46.000
25.005	1.200	8.030	9.230	-40.770	50.000

Note:

1. All reading levels are quasi-peak and average value.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product : Bluetooth Headset
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 4: 5100 Adapter (3)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.154	0.300	50.480	50.780	-15.106	65.886
0.306	0.300	42.900	43.200	-18.343	61.543
0.595	0.310	34.530	34.840	-21.160	56.000
0.916	0.320	32.560	32.880	-23.120	56.000
1.837	0.340	24.090	24.430	-31.570	56.000
3.365	0.380	19.010	19.390	-36.610	56.000
Average					
0.154	0.300	38.310	38.610	-17.276	55.886
0.306	0.300	31.360	31.660	-19.883	51.543
0.595	0.310	19.390	19.700	-26.300	46.000
0.916	0.320	18.260	18.580	-27.420	46.000
1.837	0.340	9.040	9.380	-36.620	46.000
3.365	0.380	6.110	6.490	-39.510	46.000

Note:

1. All reading levels are quasi-peak and average value.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

3. Peak Power Output

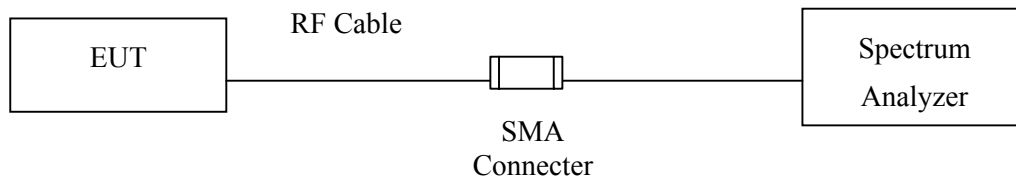
3.1. Test Equipment

The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2007

Note: 1. All equipments are calibrated every one year.
2. The test instruments marked by “X” are used to measure the final test results.

3.2. Test Setup



3.3. Limit

The maximum peak power shall be less 1Watt.

3.4. Uncertainty

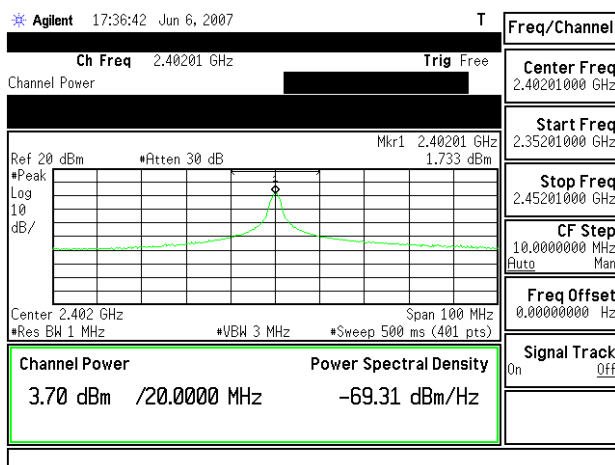
± 1.27 dB

3.5. Test Result of Peak Power Output

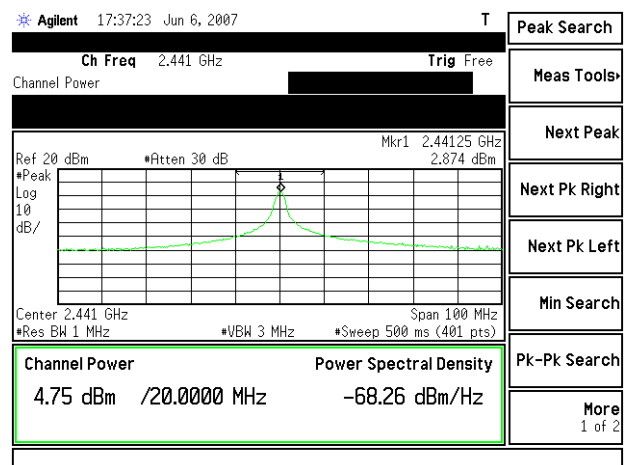
Product : Bluetooth Headset
 Test Item : Peak Power Output
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

Channel No.	Frequency (MHz)	Measurement	Required Limit	Result
Channel 00	2402.00	3.70dBm	1 Watt= 30 dBm	Pass
Channel 39	2441.00	4.75dBm	1 Watt= 30 dBm	Pass
Channel 78	2480.00	4.94dBm	1 Watt= 30 dBm	Pass

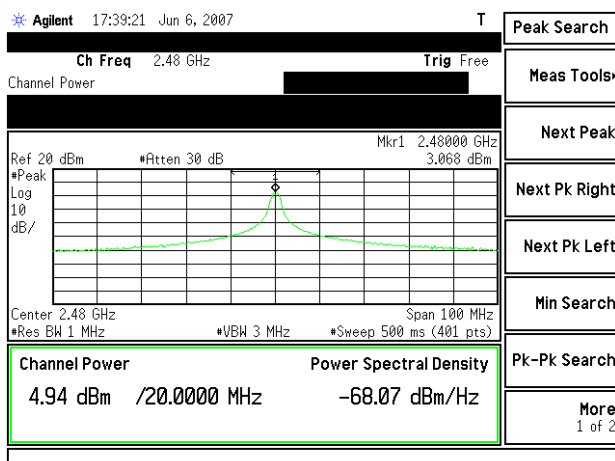
Channel 00



Channel 39



Channel 78



4. Radiated Emission

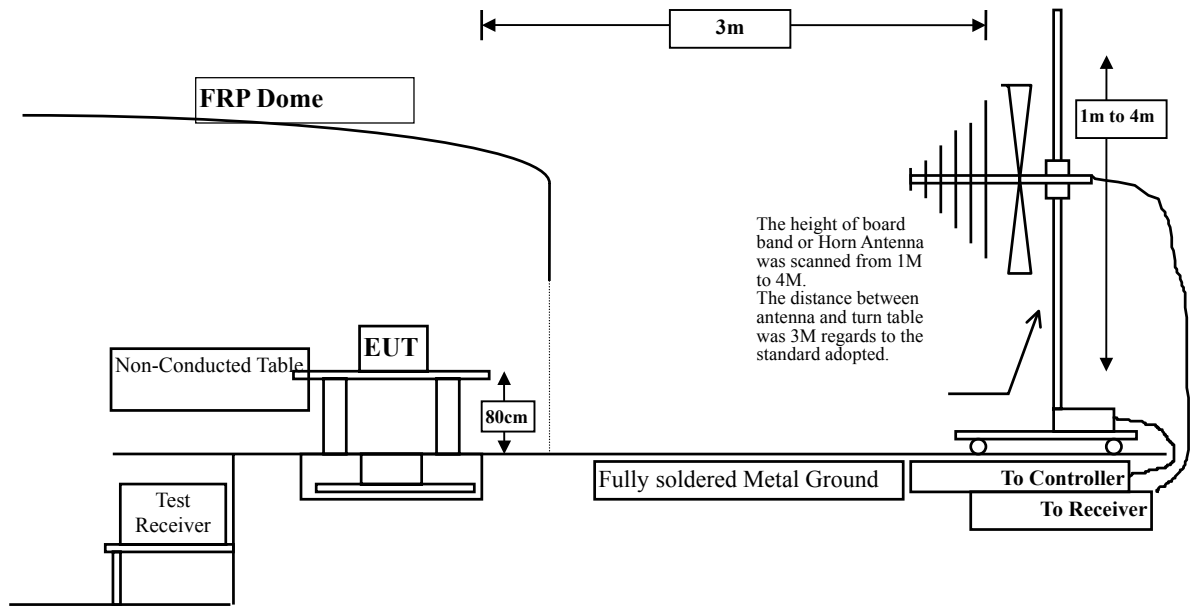
4.1. Test Equipment

The following test equipments are used during the radiated emission test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☐ Site # 1	Test Receiver	R & S	ESVS 10 / 834468/003	May, 2007
	Spectrum Analyzer	Advantest	R3162/ 00803480	May, 2007
	Pre-Amplifier	Advantest	BB525C/ 3307A01812	May, 2007
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Sep., 2006
☐ Site # 2	Test Receiver	R & S	ESCS 30 / 836858 / 022	May, 2007
	Spectrum Analyzer	Advantest	R3162 / 100803466	May, 2007
	Pre-Amplifier	Advantest	BB525C/3307A01814	May, 2007
	Bilog Antenna	SCHAFFNER	CBL6112B / 2705	May, 2007
	Horn Antenna	ETS	3115 / 0005-6160	Sep., 2006
	Pre-Amplifier	QTK	QTK-AMP-01/ 0001	May, 2007
☒ Site # 3	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2007
	Spectrum Analyzer	HP	E4407B / US39440758	May, 2007
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2007
	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2007
	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2007
	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2007
	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2007
	Pre-Amplifier	HP	8449B / 3008A01123	July, 2007

Note: 1. All equipments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

4.2. Test Setup



4.3. Limits

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

- Remarks:
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated measurement.

The additional latch filter below 1GHz was used to measure the level of harmonics radiated emission during field strength of harmonics measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz.

The frequency range from 30MHz to 10th harmonics is checked.

4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

4.6. Test Result of Radiated Emission

Product : Bluetooth Headset
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (2402MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4804.000	2.888	46.501	49.388	-24.612	74.000
7205.625	9.441	44.726	54.167	-19.833	74.000
9608.000	10.484	38.720	49.204	-24.796	74.000
Average					
Detector:					
7206.000	9.442	39.811	49.252	-4.748	54.000
Vertical					
Peak Detector:					
4804.000	2.888	49.454	52.341	-21.659	74.000
7206.000	9.442	42.617	52.058	-21.942	74.000
9608.000	10.484	38.588	49.072	-24.928	74.000
Average					
Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz ◦
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:3KHz; Span:20MHz ◦
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Bluetooth Headset
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2441MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4882.000	3.056	45.275	48.331	-25.669	74.000
7323.000	9.570	43.244	52.813	-21.187	74.000
9764.000	10.614	38.273	48.887	-25.113	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4882.000	3.056	49.795	52.851	-21.149	74.000
7323.625	9.571	42.240	51.810	-22.190	74.000
9764.000	10.614	38.331	48.945	-25.055	74.000
Average					
Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz °
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:3KHz; Span:20MHz °
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Bluetooth Headset
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (2480MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4960.000	3.237	44.594	47.831	-26.169	74.000
7440.000	9.689	43.449	53.137	-20.863	74.000
9920.000	10.742	38.876	49.617	-24.383	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4960.000	3.237	49.107	52.344	-21.656	74.000
7440.000	9.689	40.566	50.254	-23.746	74.000
9920.000	10.742	38.165	48.906	-25.094	74.000
Average					
Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz ◦
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:3KHz; Span:20MHz ◦
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Bluetooth Headset
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2441MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
473.775	18.633	11.786	30.418	-15.582	46.000
544.100	19.945	9.253	29.198	-16.802	46.000
602.300	20.180	9.049	29.229	-16.771	46.000
774.475	21.450	8.742	30.192	-15.808	46.000
849.650	22.257	9.469	31.726	-14.274	46.000
929.675	22.977	8.481	31.458	-14.542	46.000
Vertical					
379.200	16.655	8.615	25.270	-20.730	46.000
473.775	18.378	7.408	25.786	-20.214	46.000
619.275	21.591	5.910	27.501	-18.499	46.000
684.750	20.297	6.433	26.730	-19.270	46.000
844.800	21.527	5.804	27.331	-18.669	46.000
966.050	22.938	5.490	28.428	-25.572	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

Product : Bluetooth Headset
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 2: FMP5202A Adapter (1)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
401.025	16.644	10.327	26.971	-19.029	46.000
544.100	19.945	9.669	29.614	-16.386	46.000
648.375	20.951	6.703	27.654	-18.346	46.000
725.975	21.262	7.729	28.991	-17.009	46.000
786.600	21.650	9.649	31.299	-14.701	46.000
881.175	22.152	9.716	31.868	-14.132	46.000
Vertical					
379.200	16.655	8.733	25.388	-20.612	46.000
522.275	18.746	5.968	24.714	-21.286	46.000
687.175	20.372	7.438	27.810	-18.190	46.000
786.600	22.200	5.687	27.887	-18.113	46.000
864.200	21.968	2.383	24.351	-21.649	46.000
953.925	23.278	4.333	27.611	-18.389	46.000

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. “” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

Product : Bluetooth Headset
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 3: FMP5185B Adapter (2)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
401.025	16.644	10.409	27.053	-18.947	46.000
587.750	20.061	9.407	29.468	-16.532	46.000
696.875	20.883	7.398	28.281	-17.719	46.000
755.075	21.413	8.820	30.233	-15.767	46.000
830.250	21.907	11.035	32.942	-13.058	46.000
927.250	23.115	8.511	31.626	-14.374	46.000
Vertical					
473.775	18.378	6.439	24.817	-21.183	46.000
602.300	21.980	5.796	27.776	-18.224	46.000
684.750	20.297	6.790	27.087	-18.913	46.000
769.625	22.679	5.716	28.395	-17.605	46.000
883.600	22.818	3.720	26.538	-19.462	46.000
966.050	22.938	6.061	28.999	-25.001	54.000

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. “ ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

Product : Bluetooth Headset
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 4: 5100 Adapter (3)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
362.225	15.524	10.339	25.863	-20.137	46.000
459.225	18.563	11.558	30.121	-15.879	46.000
573.200	19.428	9.413	28.841	-17.159	46.000
709.000	20.437	8.237	28.674	-17.326	46.000
866.625	22.072	9.501	31.573	-14.427	46.000
932.100	22.840	9.393	32.233	-13.767	46.000
Vertical					
287.050	13.637	8.025	21.662	-24.338	46.000
342.825	14.667	10.274	24.940	-21.060	46.000
524.700	18.764	7.784	26.548	-19.452	46.000
619.275	21.591	7.228	28.819	-17.181	46.000
752.650	23.201	5.109	28.310	-17.690	46.000
929.675	24.177	4.530	28.707	-17.293	46.000

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. “” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

5. Band Edge

5.1. Test Equipment

The following test equipments are used during the band edge tests:

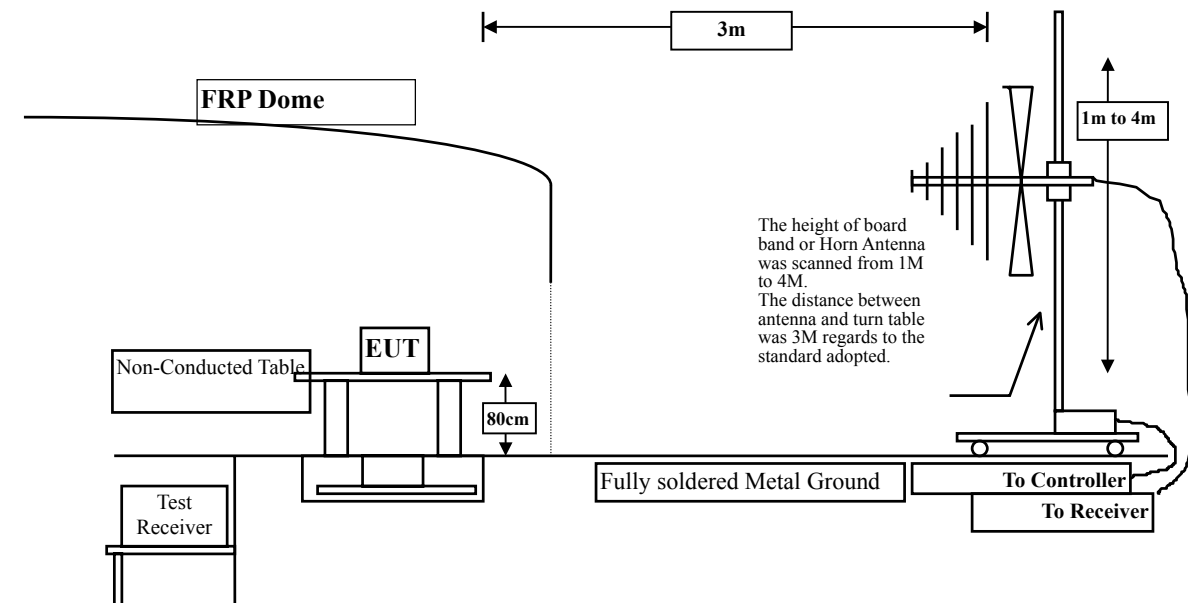
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2007
X	Spectrum Analyzer	HP	E4407B / US39440758	May, 2007
X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2007
X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2007
X	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2007
X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2007
X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2007
X	Pre-Amplifier	HP	8449B / 3008A01123	July, 2007

Test Site Site 3

- Note:
1. All equipments are calibrated every one year.
 2. The test instruments marked by "X" are used to measure the final test results.

5.2. Test Setup

RF Radiated Measurement:



5.3. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. 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)).

5.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2003 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz.

5.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

5.6. Test Result of Band Edge

Product : Bluetooth Headset
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2402MHz)

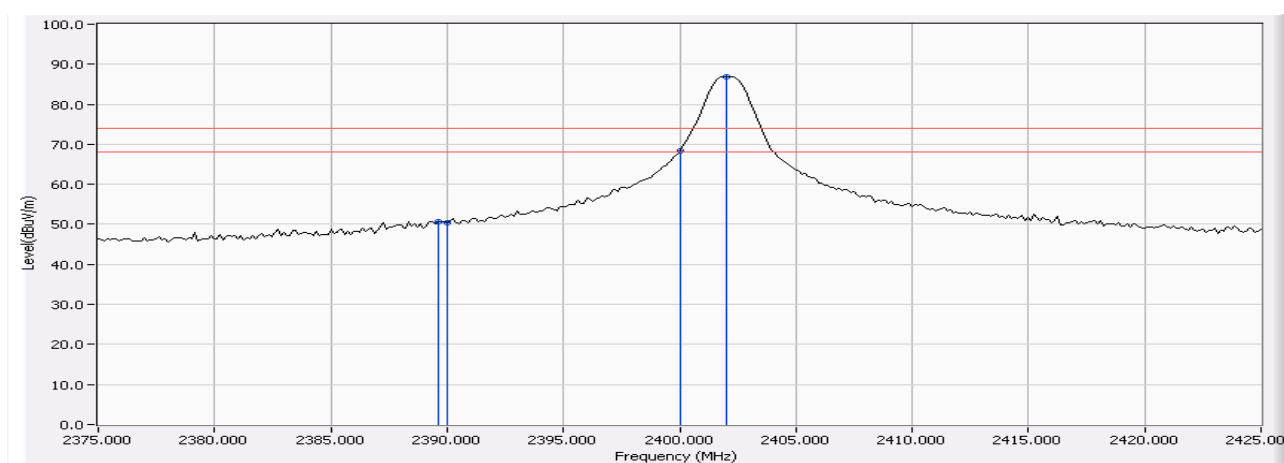
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
00	<2400	>20	Pass

RF Radiated Measurement (Horizontal):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2389.625	-1.408	52.108	50.700	74.00	54.00	Pass
00 (Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 00: (Horizontal)



Note:

RBW=1MHz, VBW=1MHz, Sweep Time=500ms.

Product : Bluetooth Headset
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2402MHz)

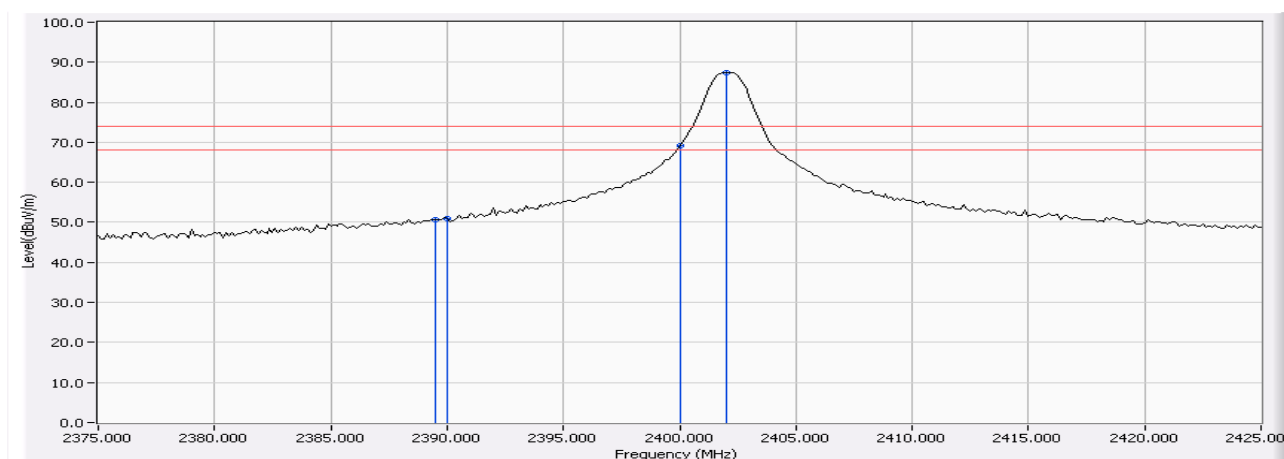
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
00	<2400	>20	Pass

RF Radiated Measurement (Vertical):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2389.500	-1.408	52.165	50.757	74.00	54.00	Pass
00(Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 00: (Vertical)



Note:

RBW=1MHz, VBW=1MHz, Sweep Time=500ms.

Product : Bluetooth Headset
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2480MHz)

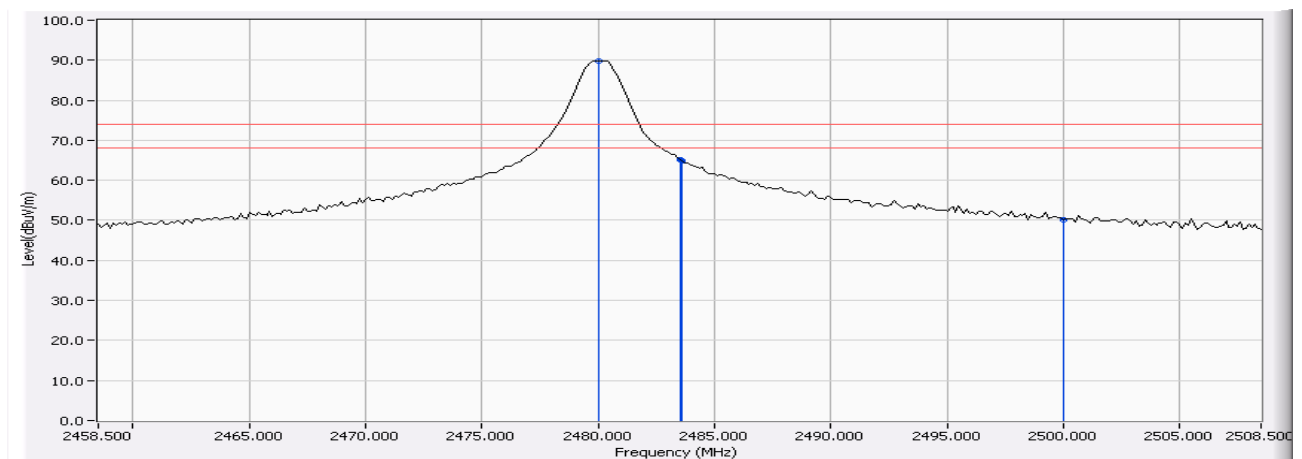
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
78	>2483.5	>20	Pass

RF Radiated Measurement (Horizontal):

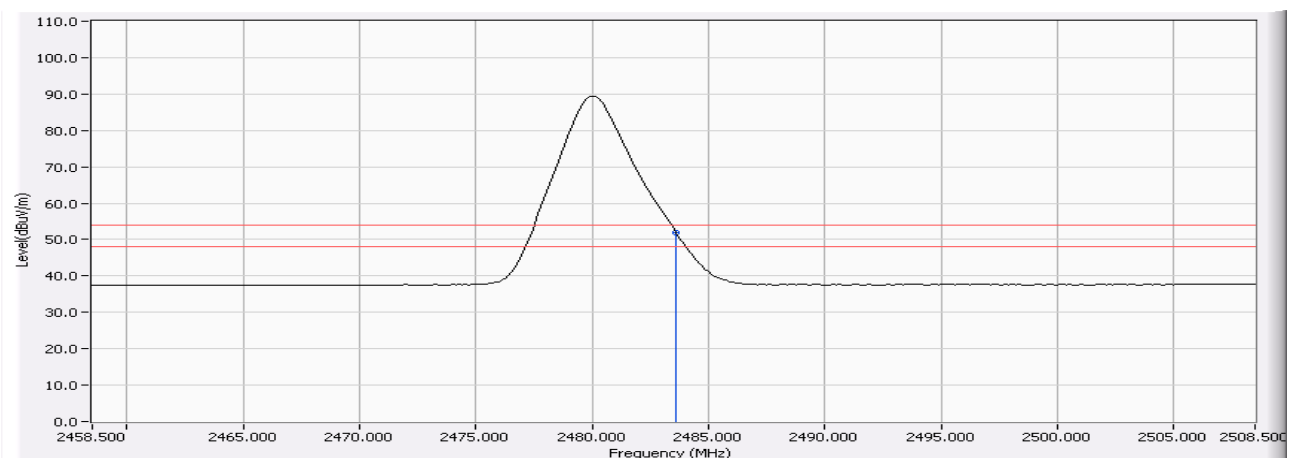
Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78(Peak)	2483.625	-1.036	66.037	65.001	74.00	54.00	Pass
78(Average)	2483.625	-1.036	52.931	51.895	74.00	54.00	Pass

Figure Channel 78: Horizontal (Peak)



Note: RBW=1MHz, VBW=1MHz, Sweep=500ms

Figure Channel 78: Horizontal (Average)



Note: RBW=1MHz, VBW=3KHz, Sweep=500ms

Product : Bluetooth Headset
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2480MHz)

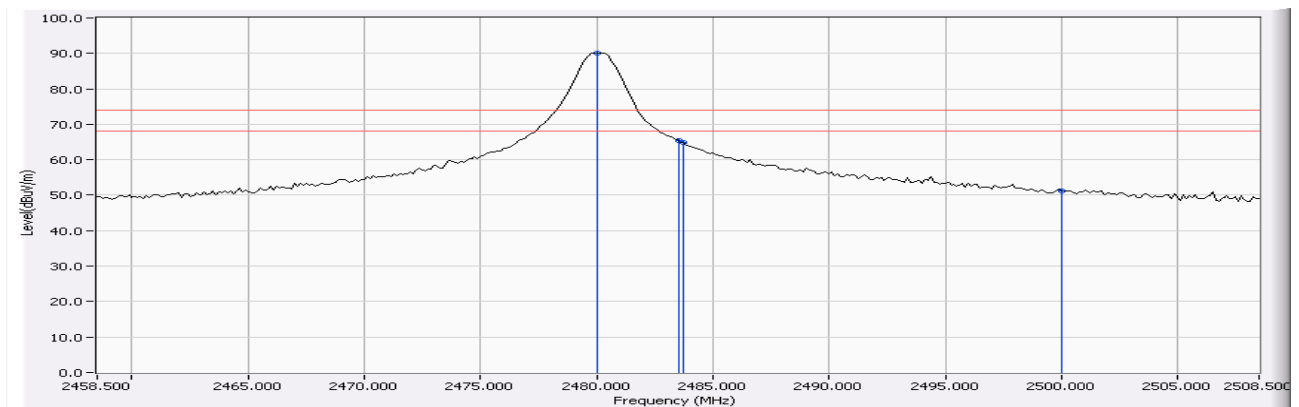
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
78	>2483.5	>20	Pass

RF Radiated Measurement (Vertical):

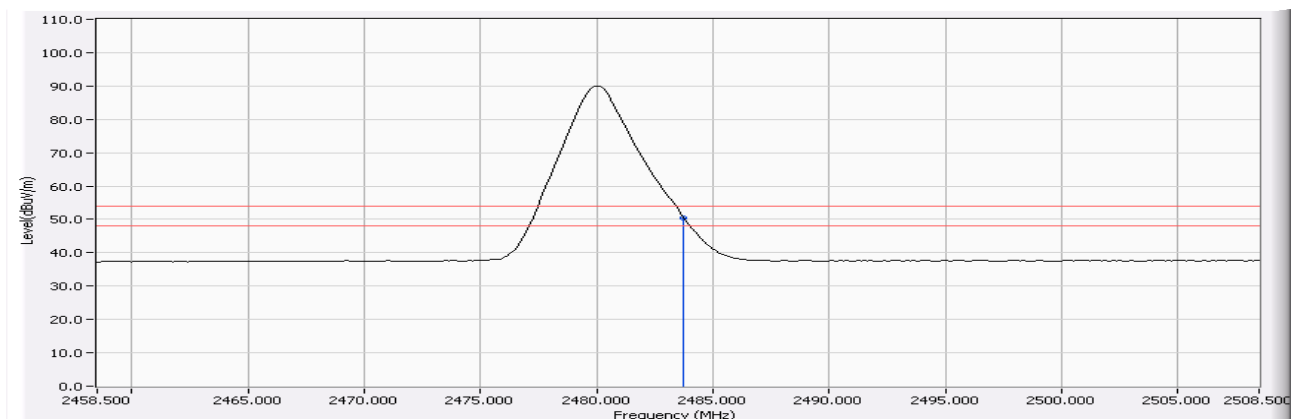
Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78(Peak)	2483.750	-1.036	65.828	64.792	74.00	54.00	Pass
78(Average)	2483.750	-1.036	51.581	50.545	74.00	54.00	Pass

Figure Channel 78: Vertical (Peak)



Note: RBW=1MHz, VBW=1MHz, Sweep Time=500ms.

Figure Channel 78: Vertical (Average)



Note: RBW=1MHz, VBW=3KHz, Sweep=500ms

Note: The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

6. Channel Number

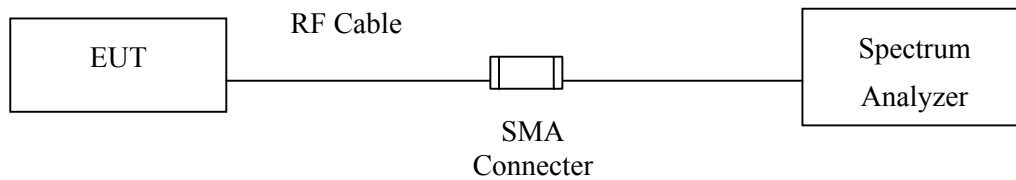
6.1. Test Equipment

The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2007

Note: 1. All equipments are calibrated every one year.
2. The test instruments marked by “X” are used to measure the final test results.

6.2. Test Setup



6.3. Limit

Frequency hopping systems operating in the 2400-2483.5 MHz bands shall use at least 75 hopping frequencies.

6.4. Uncertainty

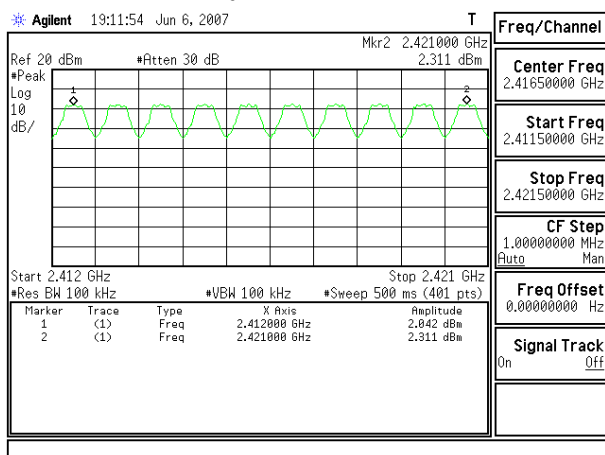
N/A

6.5. Test Result of Channel Number

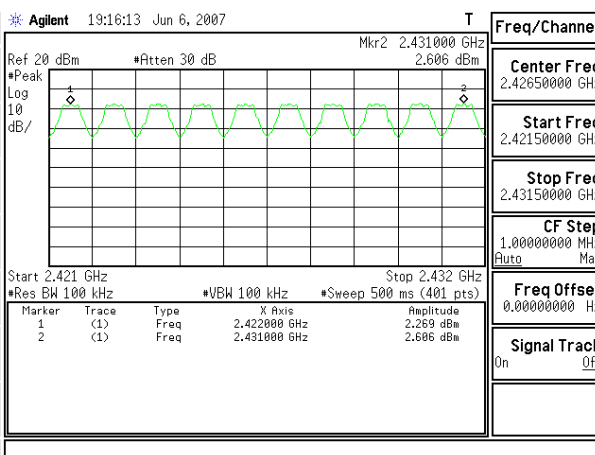
Product : Bluetooth Headset
 Test Item : Channel Number
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

Frequency Range (MHz)	Measurement (Hopping Channel)	Required Limit (Hopping Channel)	Result
2402 ~ 2480	79	>75	Pass

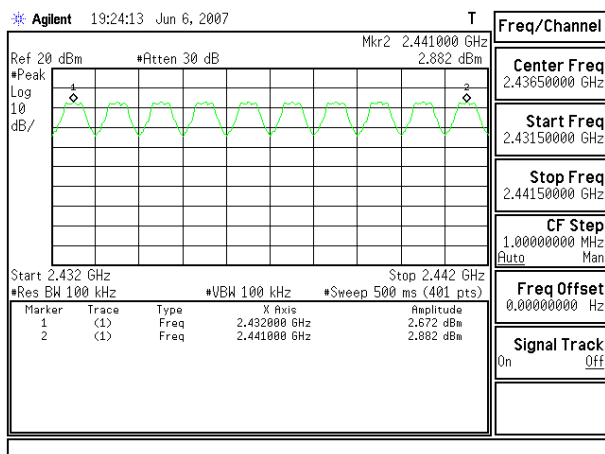
2402-2411MHz



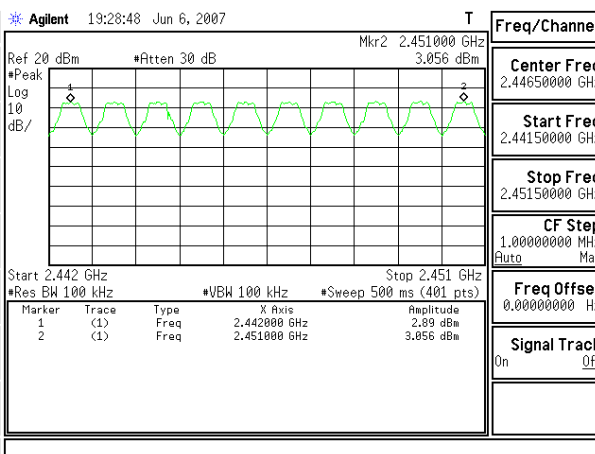
2412-2421MHz



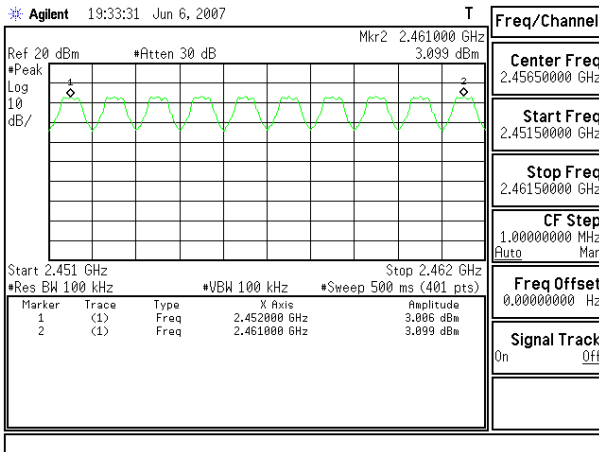
2422-2431MHz



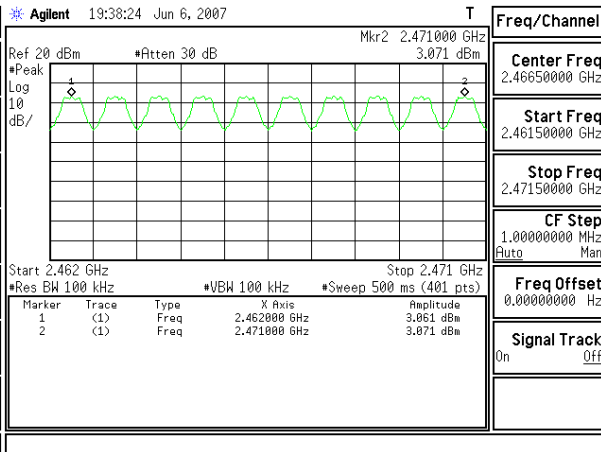
2432-2441MHz



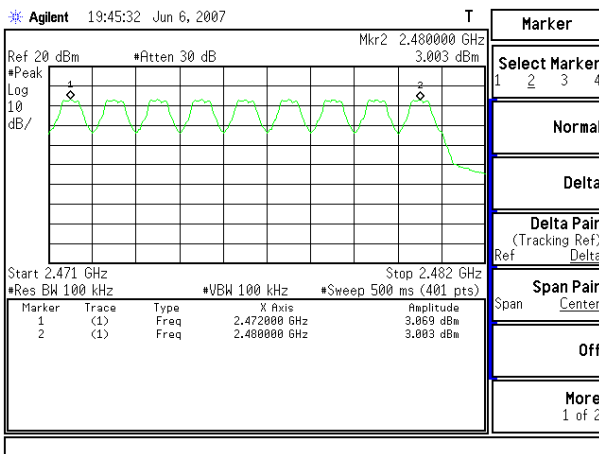
2442-2451MHz



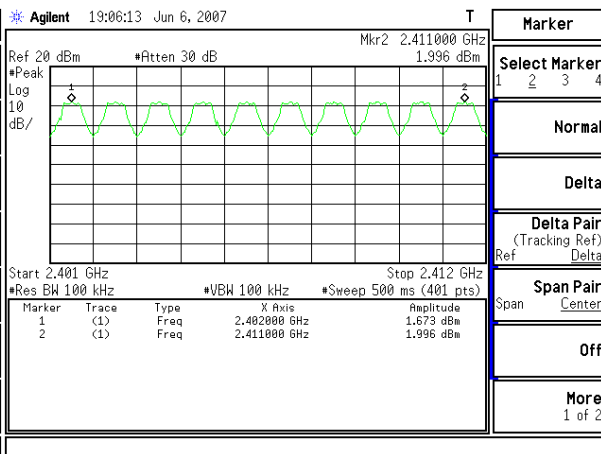
2452-2461MHz



2462-2471MHz



2472-2480MHz



7. Channel Separation

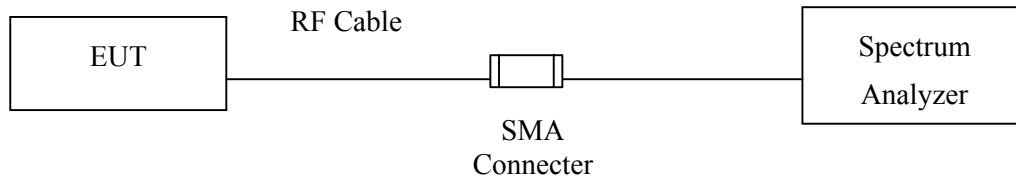
7.1. Test Equipment

The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2007

Note: 1. All equipments are calibrated every one year.
2. The test instruments mark by “X” are used to measure the final test results.

7.2. Test Setup



7.3. Limit

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.

7.4. Uncertainty

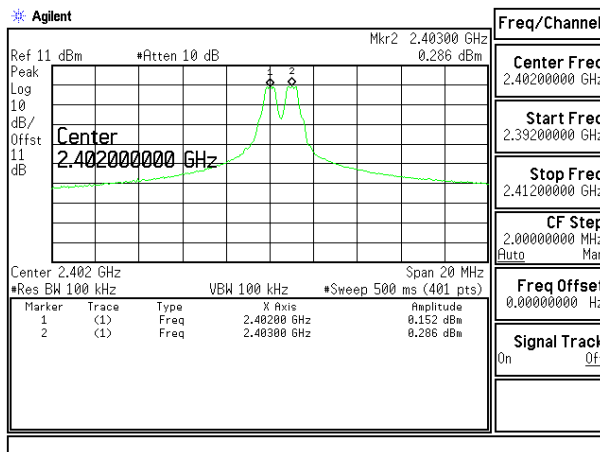
$\pm 150\text{Hz}$

7.5. Test Result of Channel Separation

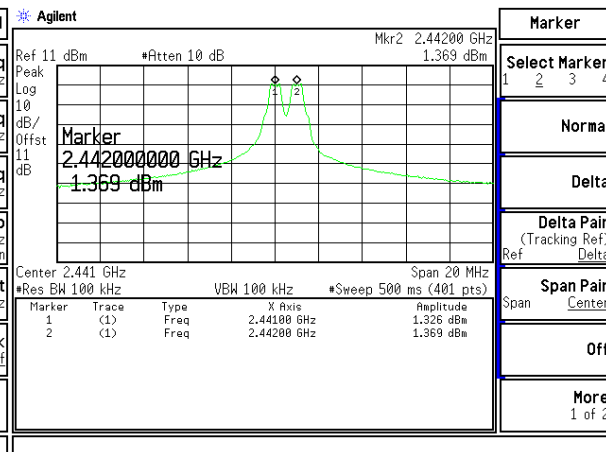
Product : Bluetooth Headset
 Test Item : Channel Separation
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

Frequency (MHz)	Measurement Level (MHz)	Required Limit	Result
2402	1.00	>25 kHz or 2/3 * 20 dB BW	Pass
2441	1.00	>25 kHz or 2/3 * 20 dB BW	Pass
2480	1.00	>25 kHz or 2/3 * 20 dB BW	Pass

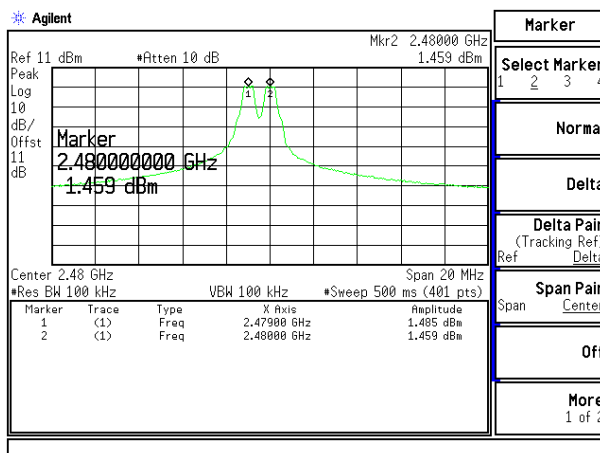
Channel 00 2402MHz



Channel 39 2441MHz



Channel 78 2480 MHz



8. Dwell Time

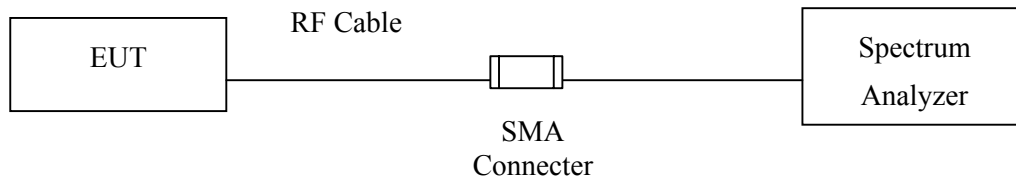
8.1. Test Equipment

The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2007

Note: 1. All equipments are calibrated every one year.
2. The test instruments marked by “X” are used to measure the final test results.

8.2. Test Setup



8.3. Limit

The dwell time shall be the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

8.4. Uncertainty

± 25msec

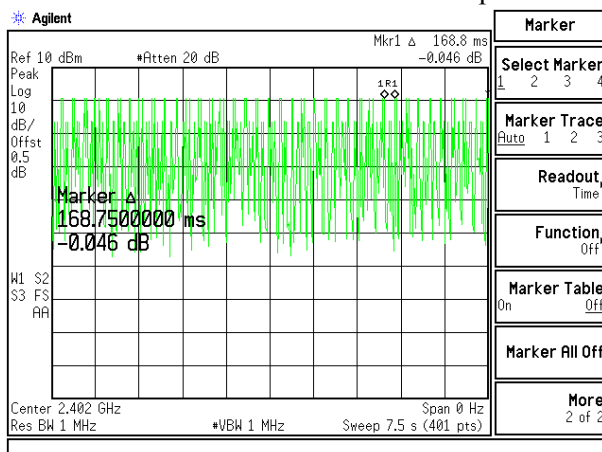
8.5. Test Result of Dwell Time

Product : Bluetooth Headset
 Test Item : Dwell Time
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 00,39,78 –DH1)

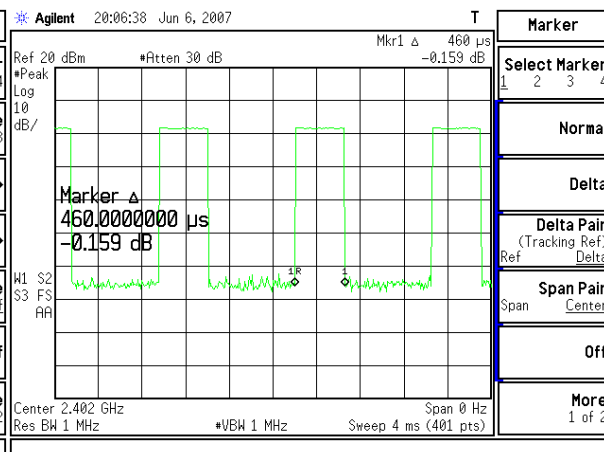
Channel No.	Frequency (MHz)	Time Interval between hops (ms)	Transmission Time (us)	Dwell Time (ms)	Limit (ms)	Result
00	2402	168.75	460	86.13925926	400	Pass
39	2441	206.25	480	73.54181818	400	Pass
78	2480	187.5	480	80.896	400	Pass

Note: Dwell Time = 79 * 400 / Time Interval Between Hops * Transmission Time / 1000

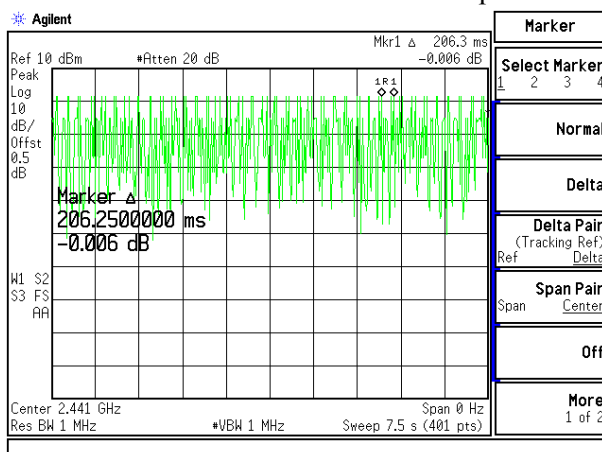
CH 2402MHz Time Interval between hops



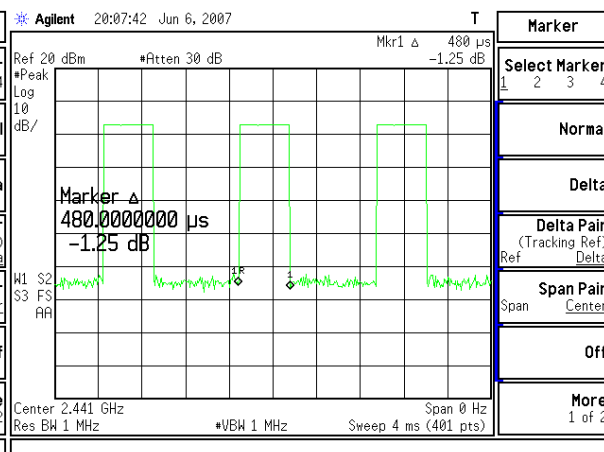
Transmission Time



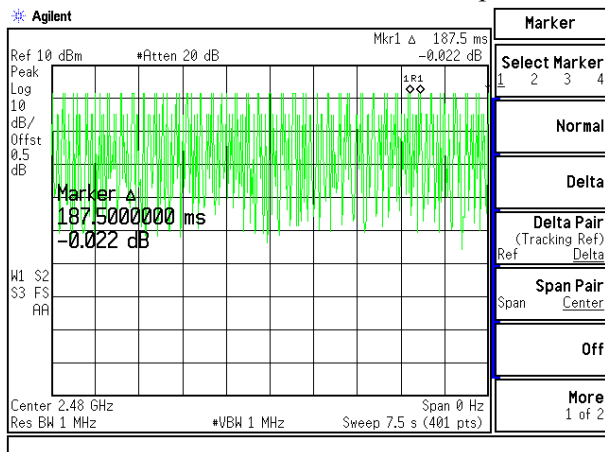
CH 2441MHz Time Interval between hops



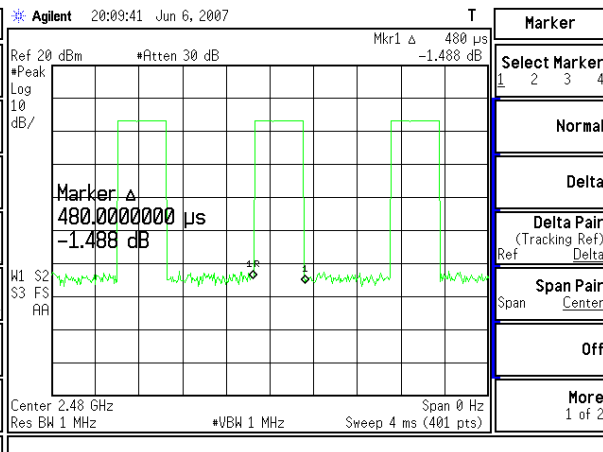
Transmission Time



CH 2480MHz Time Interval between hops



Transmission Time



Note:

The dwell times of the packet type DH1 are tested.

9. Occupied Bandwidth

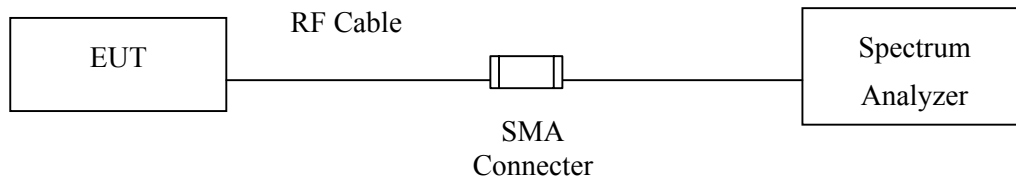
9.1. Test Equipment

The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2007

Note: 1. All equipments are calibrated every one year.
2. The test instruments marked by “X” are used to measure the final test results.

9.2. Test Setup



9.3. Limits

N/A

9.4. Uncertainty

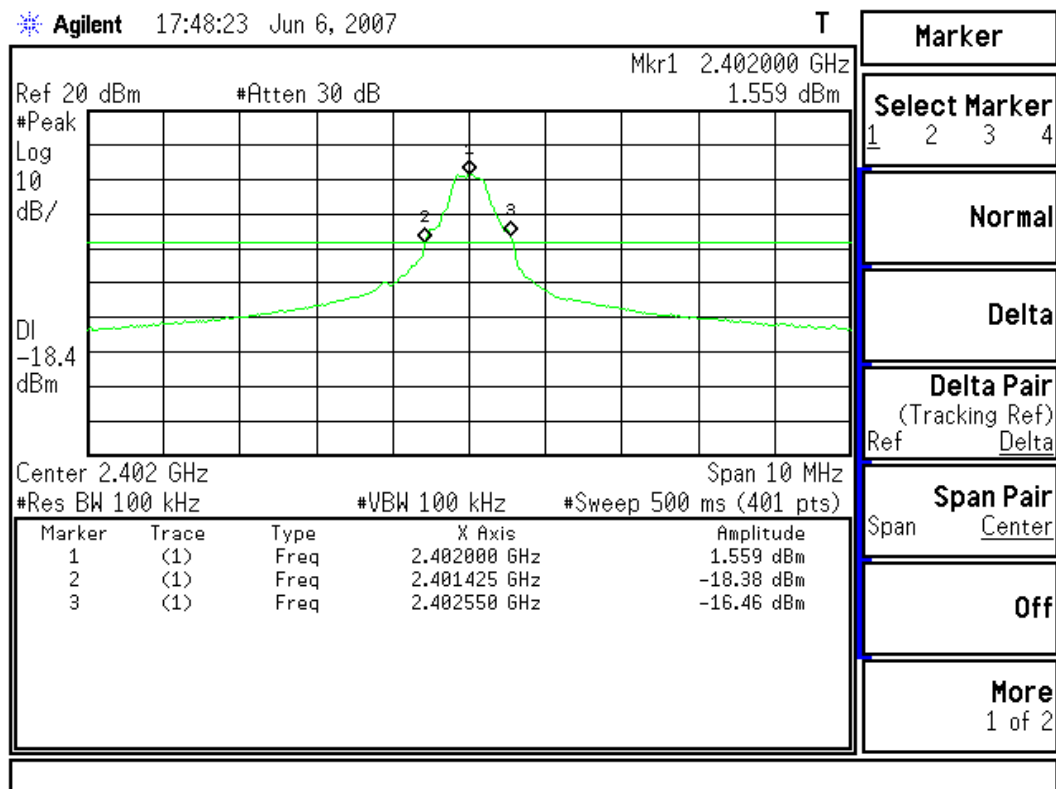
± 150Hz

9.5. Test Result of Occupied Bandwidth

Product : Bluetooth Headset
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2402MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1125	--	NA

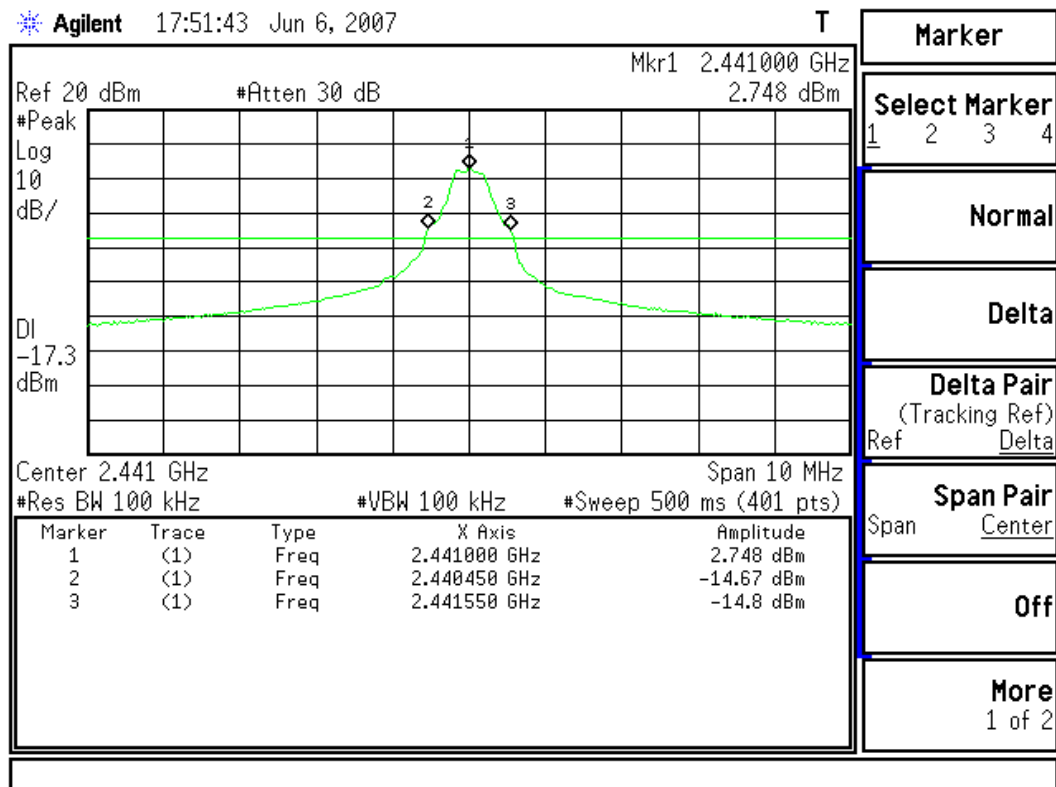
Figure Channel 00:



Product : Bluetooth Headset
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2441MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
39	2441	1100	--	NA

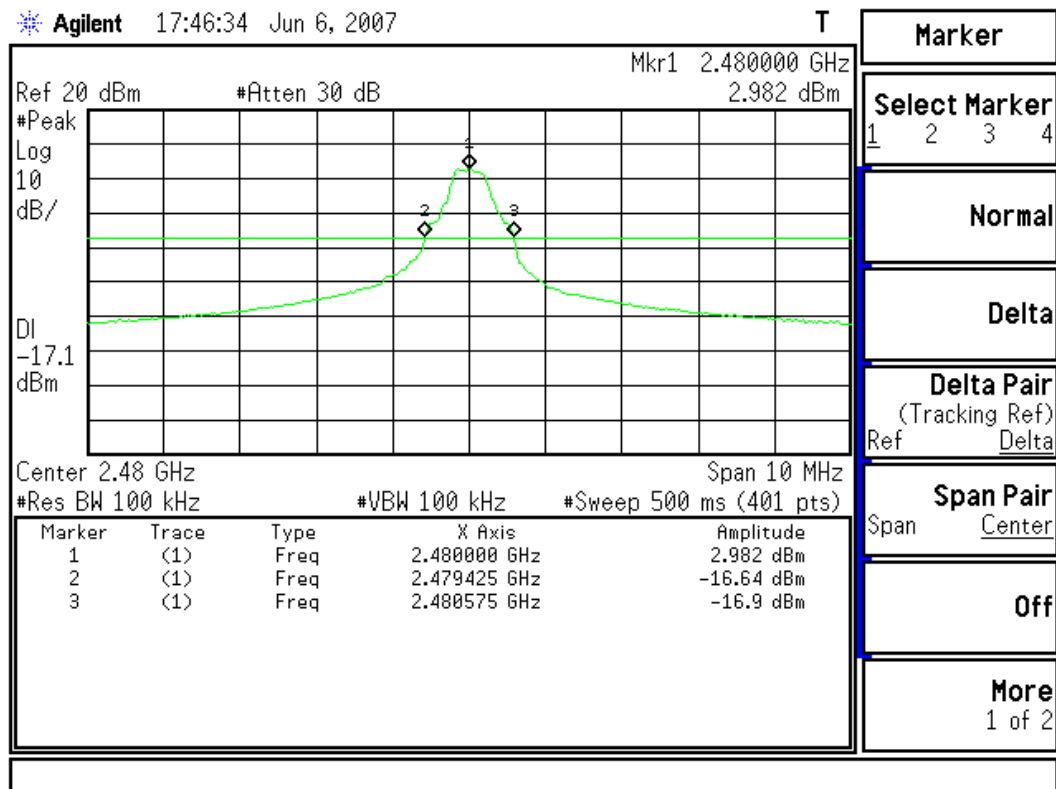
Figure Channel 39:



Product : Bluetooth Headset
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2480MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
78	2480	1150	--	NA

Figure Channel 78:



10. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs