

FC

Test Report

Product Name	Bluetooth Headset
Model No.	H371
FCC ID.	OHH-H371M

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

Date of Receipt	July 05, 2007
Issued Date	Oct. 25, 2007
Report No.	07A316R-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: Oct. 25, 2007

Report No.: 07A316R-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.	H371
FCC ID.	OHH-H371M
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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TABLE OF CONTENTS

Description	Page
1. GENERAL INFORMATION	5
1.1. EUT Description.....	5
1.2. Operational Description.....	7
1.3. Tested System Details.....	8
1.4. Configuration of Tested System	8
1.5. EUT Exercise Software	8
1.6. Test Facility	9
2. CONDUCTED EMISSION	10
2.1. Test Equipment.....	10
2.2. Test Setup	10
2.3. Limits.....	11
2.4. Test Procedure	11
2.5. Uncertainty	11
2.6. Test Result of Conducted Emission	12
3. PEAK POWER OUTPUT	18
3.1. Test Equipment.....	18
3.2. Test Setup	18
3.3. Limit	18
3.4. Uncertainty	18
3.5. Test Result of Peak Power Output	19
4. RADIATED EMISSION	20
4.1. Test Equipment.....	20
4.2. Test Setup	21
4.3. Limits.....	21
4.4. Test Procedure	22
4.5. Uncertainty	22
4.6. Test Result of Radiated Emission	23
5. BAND EDGE	30
5.1. Test Equipment.....	30
5.2. Test Setup	30
5.3. Limit	31
5.4. Test Procedure	31
5.5. Uncertainty	31
5.6. Test Result of Band Edge	32
6. CHANNEL NUMBER.....	36
6.1. Test Equipment.....	36

6.2.	Test Setup	36
6.3.	Limit	36
6.4.	Uncertainty	36
6.5.	Test Result of Channel Number.....	37
7.	CHANNEL SEPARATION.....	39
7.1.	Test Equipment	39
7.2.	Test Setup	39
7.3.	Limit	39
7.4.	Uncertainty	39
7.5.	Test Result of Channel Separation.....	40
8.	DWELL TIME	41
8.1.	Test Equipment	41
8.2.	Test Setup	41
8.3.	Limit	41
8.4.	Uncertainty	41
8.5.	Test Result of Dwell Time	42
9.	OCCUPIED BANDWIDTH	44
9.1.	Test Equipment	44
9.2.	Test Setup	44
9.3.	Limits.....	44
9.4.	Uncertainty	44
9.5.	Test Result of Occupied Bandwidth	45
10.	EMI REDUCTION METHOD DURING COMPLIANCE TESTING	48

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-H371M
Model No.	H371
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. 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.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. 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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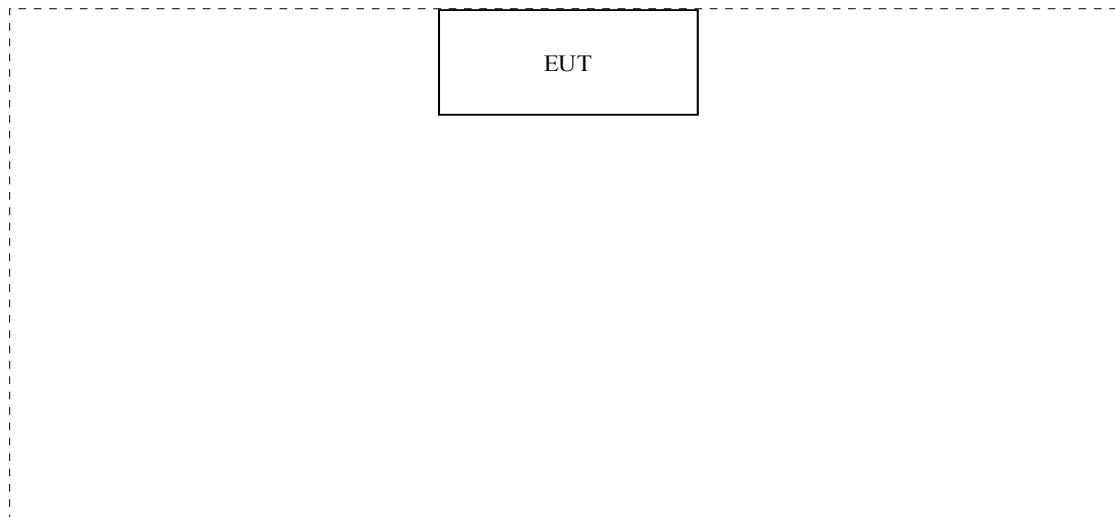
1.3. Tested System Details

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

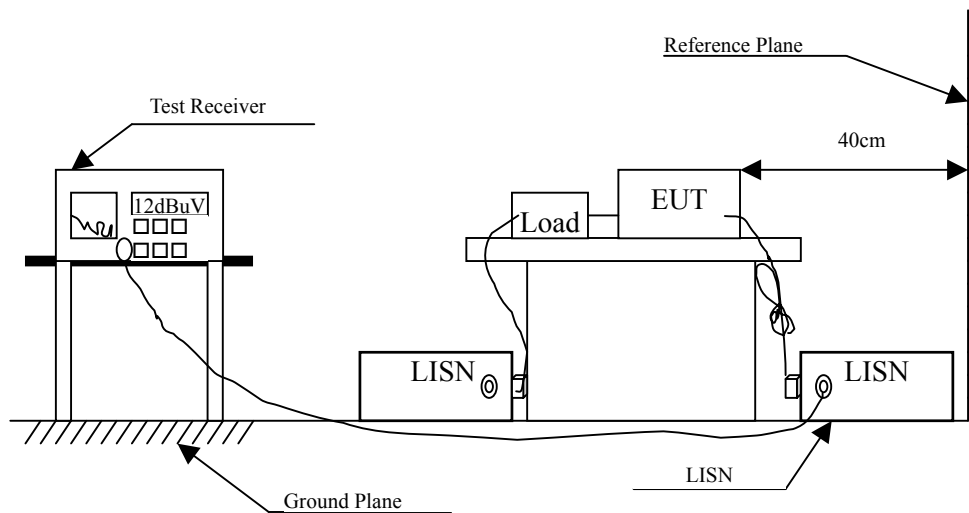
2.1. Test Equipment

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					
0.177	0.749	29.680	30.429	-34.800	65.229
0.384	0.300	27.310	27.610	-31.704	59.314
0.658	0.310	23.440	23.750	-32.250	56.000
1.252	0.320	21.860	22.180	-33.820	56.000
1.966	0.340	21.870	22.210	-33.790	56.000
2.423	0.352	24.420	24.772	-31.228	56.000
Average					
0.177	0.749	17.310	18.059	-37.170	55.229
0.384	0.300	16.710	17.010	-32.304	49.314
0.658	0.310	12.740	13.050	-32.950	46.000
1.252	0.320	11.120	11.440	-34.560	46.000
1.966	0.340	9.780	10.120	-35.880	46.000
2.423	0.352	12.630	12.982	-33.018	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

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					
0.205	0.300	26.940	27.240	-37.189	64.429
0.396	0.310	25.860	26.170	-32.801	58.971
0.744	0.319	20.210	20.529	-35.471	56.000
1.755	0.340	19.500	19.840	-36.160	56.000
2.517	0.360	16.820	17.180	-38.820	56.000
3.197	0.380	20.720	21.100	-34.900	56.000
Average					
0.205	0.300	15.060	15.360	-39.069	54.429
0.396	0.310	14.500	14.810	-34.161	48.971
0.744	0.319	9.780	10.099	-35.901	46.000
1.755	0.340	8.760	9.100	-36.900	46.000
2.517	0.360	4.850	5.210	-40.790	46.000
3.197	0.380	8.920	9.300	-36.700	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

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					
0.170	0.621	48.130	48.751	-16.678	65.429
0.345	0.300	39.680	39.980	-20.449	60.429
0.677	0.310	39.680	39.990	-16.010	56.000
1.197	0.320	28.600	28.920	-27.080	56.000
1.509	0.330	31.260	31.590	-24.410	56.000
3.240	0.380	21.420	21.800	-34.200	56.000
Average					
0.170	0.621	45.020	45.641	-9.788	55.429
0.345	0.300	28.960	29.260	-21.169	50.429
0.677	0.310	31.240	31.550	-14.450	46.000
1.197	0.320	14.020	14.340	-31.660	46.000
1.509	0.330	20.970	21.300	-24.700	46.000
3.240	0.380	8.400	8.780	-37.220	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.

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	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.170	0.300	46.850	47.150	-18.279	65.429
0.338	0.303	40.740	41.043	-19.586	60.629
0.677	0.310	36.610	36.920	-19.080	56.000
1.017	0.320	31.100	31.420	-24.580	56.000
1.513	0.337	29.830	30.167	-25.833	56.000
4.240	0.400	19.840	20.240	-35.760	56.000
Average					
0.170	0.300	44.830	45.130	-10.299	55.429
0.338	0.303	38.470	38.773	-11.856	50.629
0.677	0.310	31.480	31.790	-14.210	46.000
1.017	0.320	23.820	24.140	-21.860	46.000
1.513	0.337	22.740	23.077	-22.923	46.000
4.240	0.400	8.980	9.380	-36.620	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.

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					
0.166	0.556	39.650	40.206	-25.337	65.543
0.205	0.615	32.770	33.385	-31.044	64.429
0.279	0.300	29.950	30.250	-32.064	62.314
0.431	0.300	23.110	23.410	-34.561	57.971
0.642	0.305	20.190	20.495	-35.505	56.000
1.341	0.320	16.960	17.280	-38.720	56.000
Average					
0.166	0.556	18.210	18.766	-36.777	55.543
0.205	0.615	13.300	13.915	-40.514	54.429
0.279	0.300	8.560	8.860	-43.454	52.314
0.431	0.300	8.040	8.340	-39.631	47.971
0.642	0.305	2.210	2.515	-43.485	46.000
1.341	0.320	1.150	1.470	-44.530	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.

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					
0.170	0.300	40.670	40.970	-24.459	65.429
0.224	0.300	32.840	33.140	-30.746	63.886
0.283	0.300	29.650	29.950	-32.250	62.200
0.408	0.310	22.350	22.660	-35.969	58.629
0.693	0.310	19.820	20.130	-35.870	56.000
1.283	0.330	17.710	18.040	-37.960	56.000
Average					
0.170	0.300	17.940	18.240	-37.189	55.429
0.224	0.300	10.720	11.020	-42.866	53.886
0.283	0.300	10.130	10.430	-41.770	52.200
0.408	0.310	8.330	8.640	-39.989	48.629
0.693	0.310	5.570	5.880	-40.120	46.000
1.283	0.330	3.040	3.370	-42.630	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

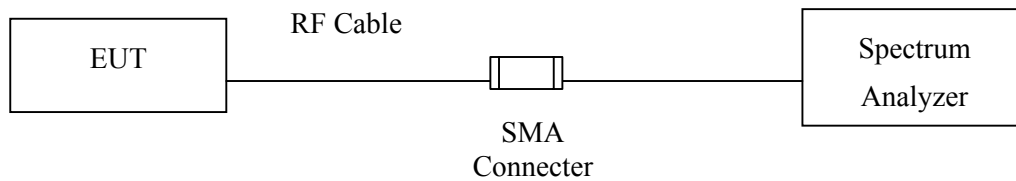
3.1. Test Equipment

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

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2007
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

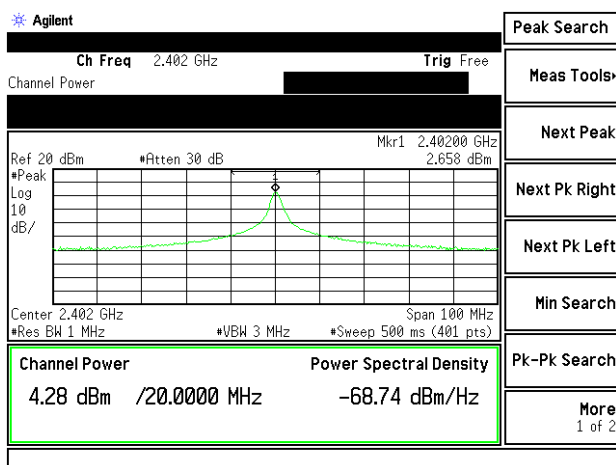
± 1.27 dB

3.5. Test Result of Peak Power Output

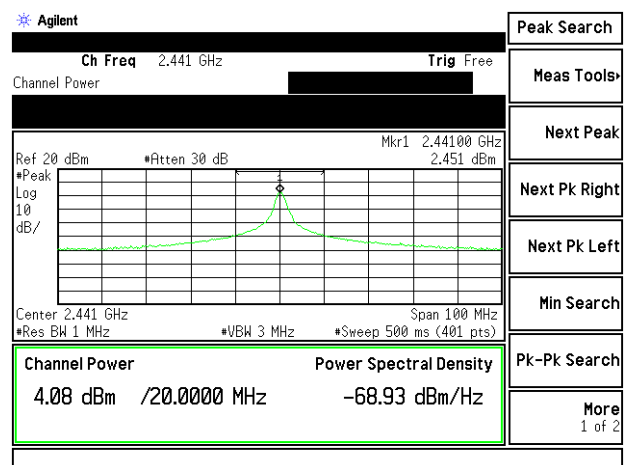
Product : Bluetooth Headset
 Test Item : Peak Power Output
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

Channel No.	Frequency (MHz)	Measurement	Required Limit	Result
Channel 00	2402.00	4.28dBm	1 Watt= 30 dBm	Pass
Channel 39	2441.00	4.08dBm	1 Watt= 30 dBm	Pass
Channel 78	2480.00	3.74dBm	1 Watt= 30 dBm	Pass

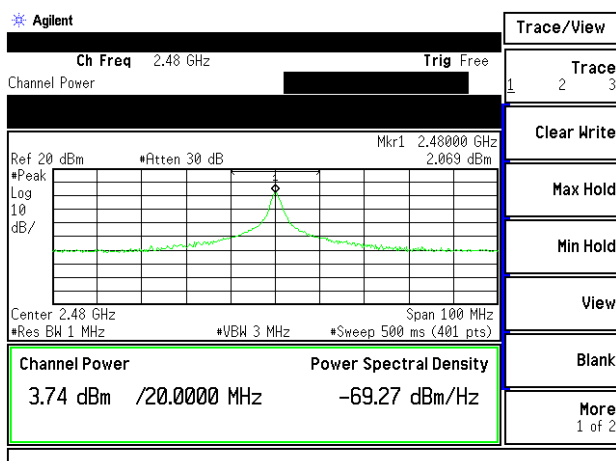
Channel 00



Channel 39



Channel 78



4. Radiated Emission

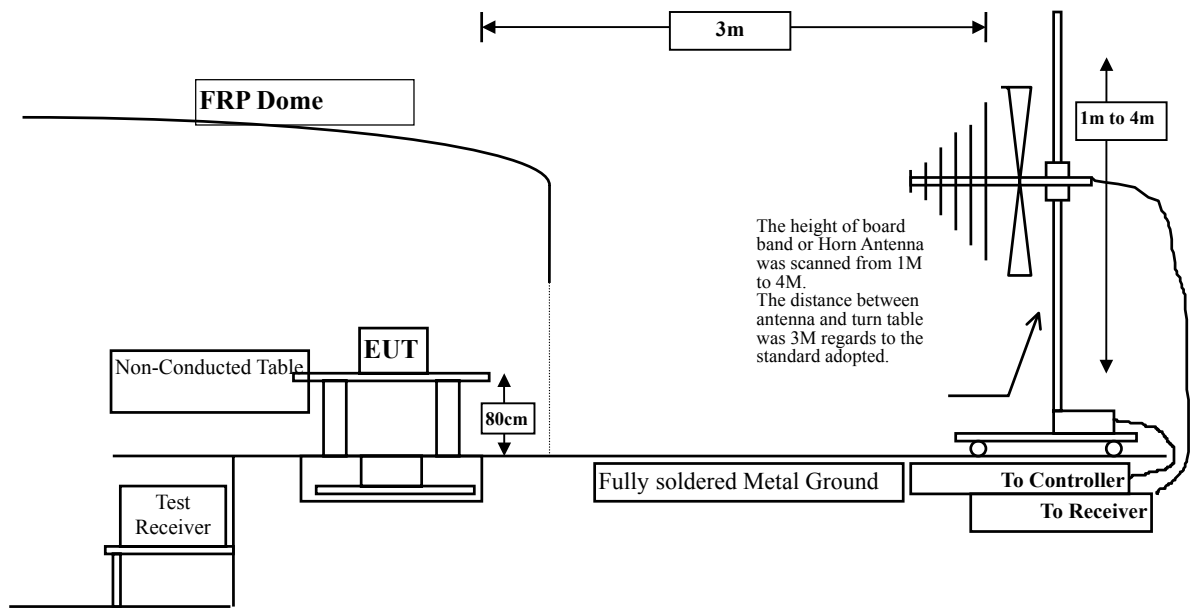
4.1. Test Equipment

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	51.008	53.895	-20.105	74.000
7206.000	9.442	40.615	50.056	-23.944	74.000
9608.000	10.484	38.770	49.254	-24.746	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4804.000	2.888	49.016	51.903	-22.097	74.000
7206.000	9.442	42.244	51.685	-22.315	74.000
9608.000	10.484	40.639	51.123	-22.877	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	50.896	53.952	-20.048	74.000
7323.000	9.570	41.332	50.901	-23.099	74.000
9764.000	10.614	38.958	49.572	-24.428	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4882.000	3.056	49.675	52.731	-21.269	74.000
7323.891	9.571	42.295	51.865	-22.135	74.000
9764.891	10.615	39.429	50.044	-23.956	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	50.688	53.925	-20.075	74.000
7440.000	9.689	42.949	52.637	-21.363	74.000
9920.000	10.742	38.769	49.510	-24.490	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4960.000	3.237	50.062	53.299	-20.701	74.000
7440.000	9.689	42.347	52.035	-21.965	74.000
9920.000	10.742	39.709	50.450	-23.550	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					
80.925	9.014	16.738	25.753	-14.247	40.000
199.750	9.716	14.355	24.071	-19.429	43.500
228.850	10.940	11.921	22.861	-23.139	46.000
587.750	20.061	5.616	25.677	-20.323	46.000
643.525	20.926	4.736	25.662	-20.338	46.000
890.875	22.226	8.564	30.790	-15.210	46.000
Vertical					
214.300	10.667	14.862	25.529	-17.971	43.500
228.850	11.151	15.033	26.184	-19.816	46.000
473.775	18.378	12.047	30.425	-15.575	46.000
619.275	21.591	8.834	30.425	-15.575	46.000
900.575	23.649	7.215	30.864	-15.136	46.000
961.200	23.009	7.214	30.223	-23.777	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					
61.525	6.541	17.652	24.193	-15.807	40.000
78.500	8.694	17.524	26.218	-13.782	40.000
199.750	9.716	14.120	23.836	-19.664	43.500
250.675	13.342	9.925	23.267	-22.733	46.000
585.325	20.122	6.277	26.398	-19.602	46.000
922.400	23.080	6.918	29.998	-16.002	46.000
Vertical					
199.750	9.718	17.807	27.525	-15.975	43.500
228.850	11.151	14.901	26.052	-19.948	46.000
308.875	13.803	7.709	21.512	-24.488	46.000
500.450	18.354	6.114	24.468	-21.532	46.000
619.275	21.591	7.880	29.471	-16.529	46.000
944.225	23.818	7.183	31.000	-15.000	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					
78.500	8.694	21.091	29.785	-10.215	40.000
199.750	9.716	13.119	22.835	-20.665	43.500
214.300	9.334	13.717	23.051	-20.449	43.500
228.850	10.940	10.781	21.721	-24.279	46.000
578.050	19.804	6.670	26.474	-19.526	46.000
905.425	22.176	7.743	29.919	-16.081	46.000
Vertical					
100.325	10.660	3.057	13.717	-29.783	43.500
214.300	10.667	16.425	27.092	-16.408	43.500
228.850	11.151	15.575	26.726	-19.274	46.000
473.775	18.378	6.100	24.478	-21.522	46.000
619.275	21.591	8.407	29.998	-16.002	46.000
951.500	23.462	7.392	30.854	-15.146	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 4: 5100 Adapter (3)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
78.500	8.694	17.093	25.787	-14.213	40.000
199.750	9.716	13.742	23.458	-20.042	43.500
228.850	10.940	11.985	22.925	-23.075	46.000
602.300	20.180	5.891	26.071	-19.929	46.000
869.050	21.831	8.141	29.972	-16.028	46.000
934.525	22.806	7.751	30.558	-15.442	46.000
Vertical					
88.200	8.976	8.822	17.798	-25.702	43.500
214.300	10.667	15.094	25.761	-17.739	43.500
228.850	11.151	14.890	26.041	-19.959	46.000
619.275	21.591	7.814	29.405	-16.595	46.000
825.400	21.409	6.523	27.932	-18.068	46.000
922.400	24.180	6.540	30.720	-15.280	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:

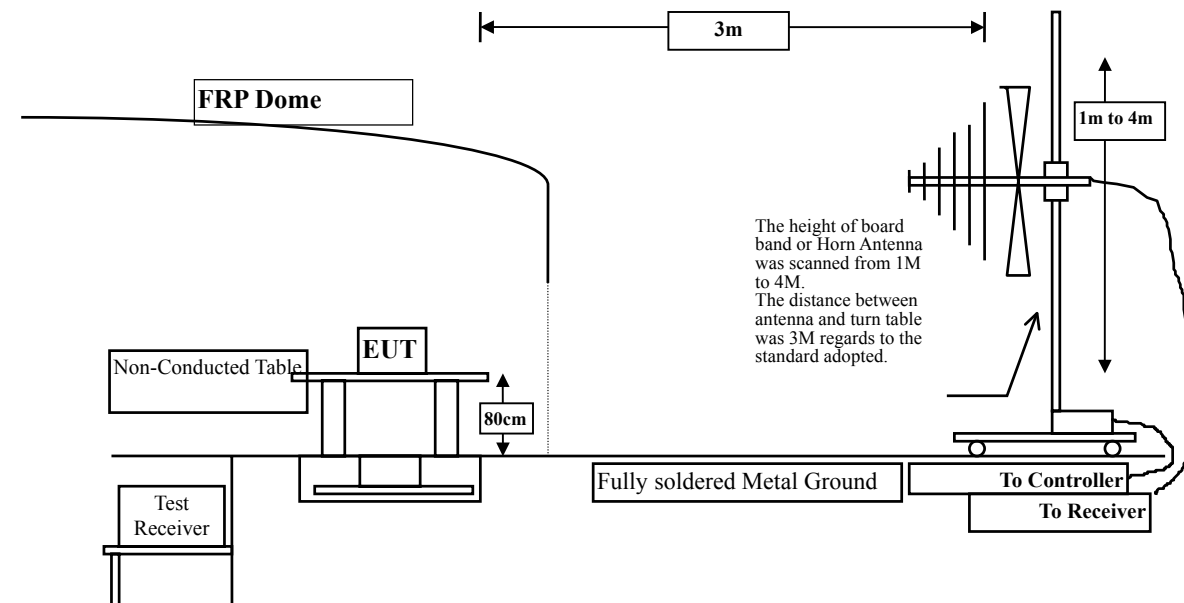
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2007
X	Spectrum Analyzer	HP	E4407B / US39440758	May, 2007
X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2007
X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2007
X	Horn Antenna	Schwarzbeck	BBHA9170 / 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)

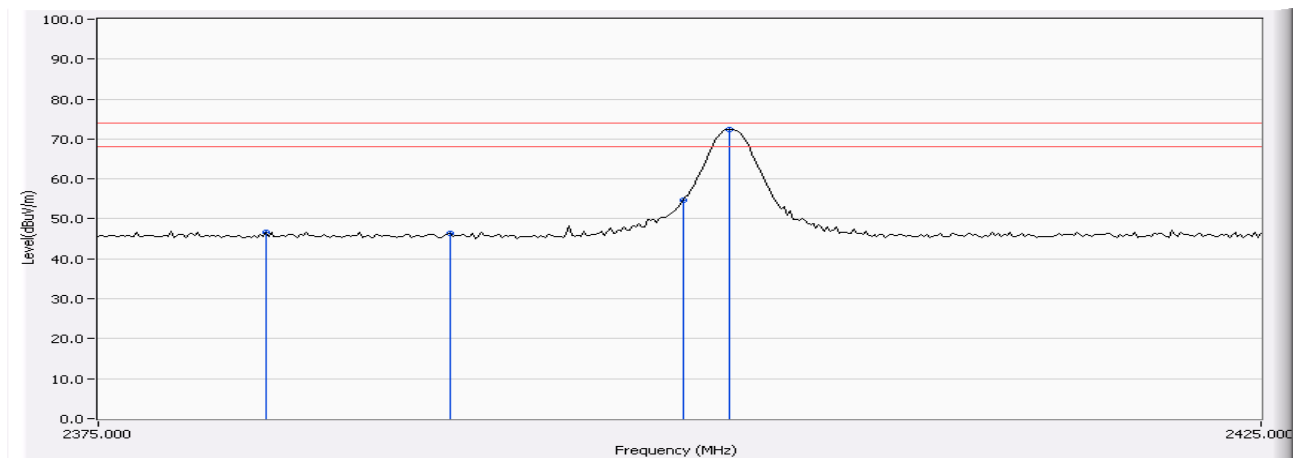
RF Radiated Measurement:

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)	2382.125	-1.430	48.007	46.577	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)

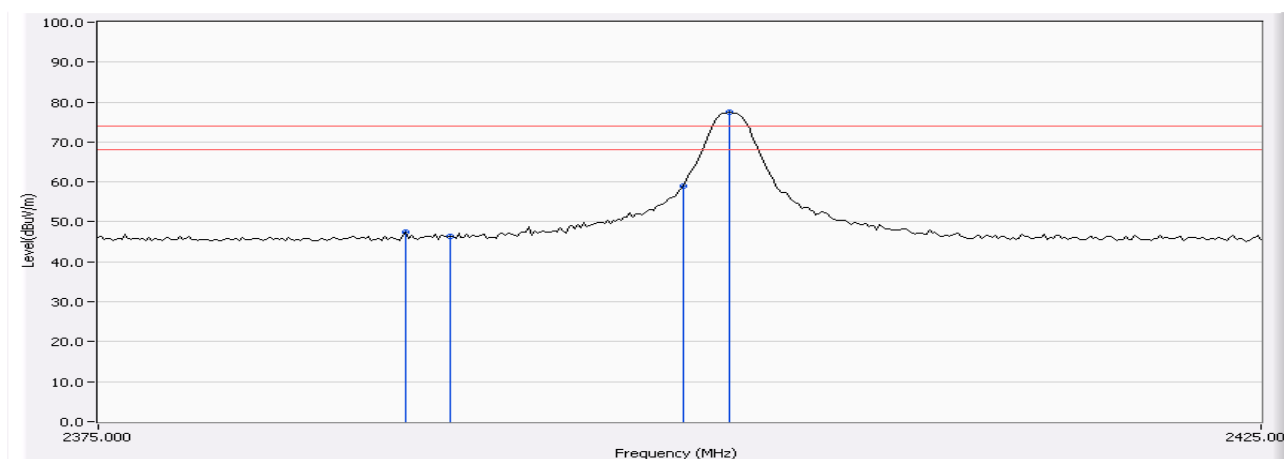
RF Radiated Measurement:

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)	2388.125	-1.413	48.733	47.320	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)

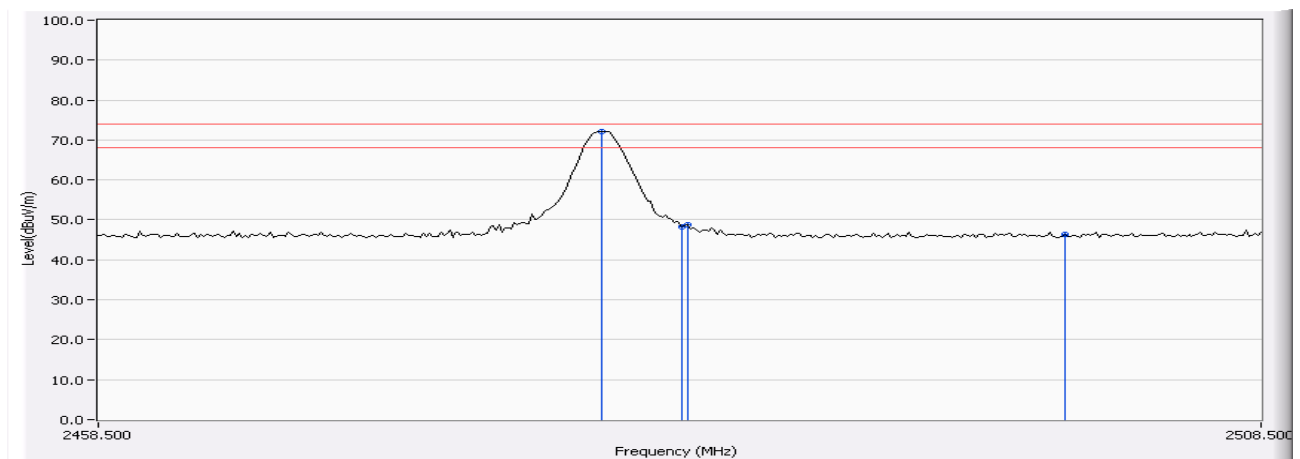
RF Radiated Measurement:

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)	2483.750	-1.036	49.776	48.740	74.00	54.00	Pass
78(Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 78: Horizontal



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

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

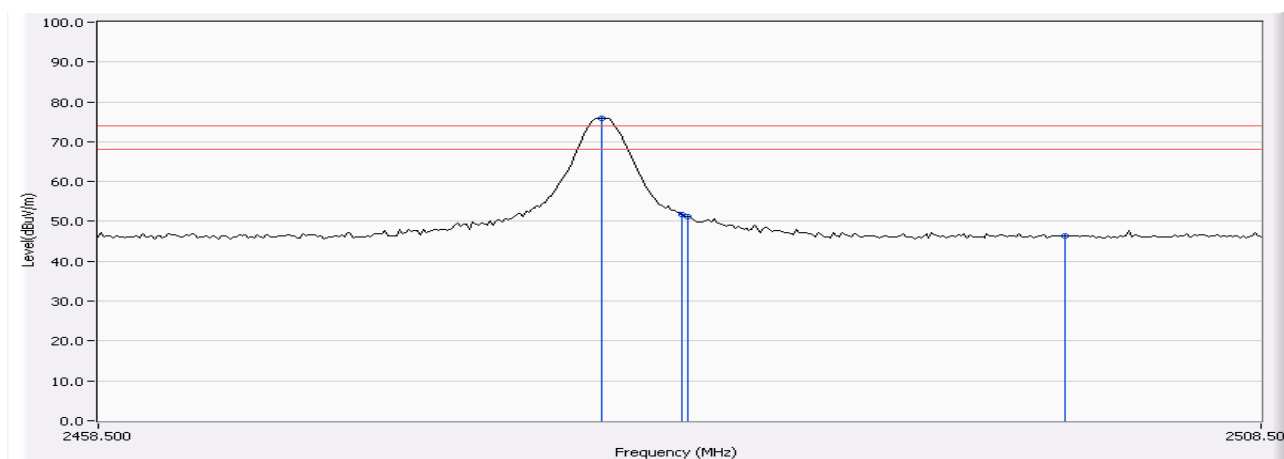
RF Radiated Measurement:

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	52.115	51.079	74.00	54.00	Pass
78(Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 78: Vertical



Note: RBW=1MHz, VBW=1MHz, Sweep Time=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

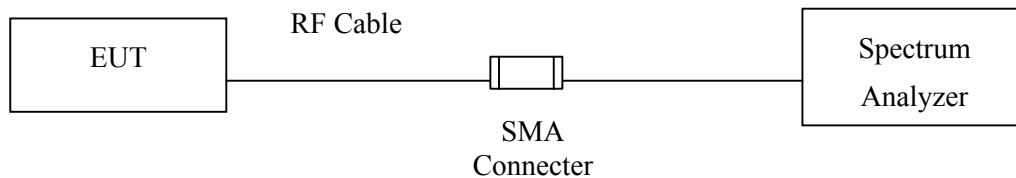
6.1. Test Equipment

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

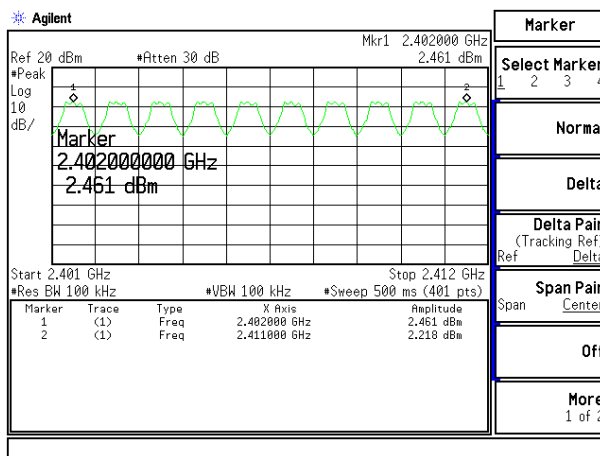
N/A

6.5. Test Result of Channel Number

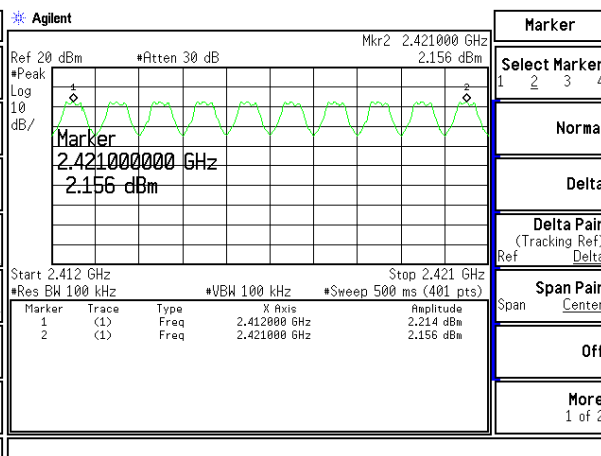
Product : Bluetooth Headset
 Test Item : Channel Number
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

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

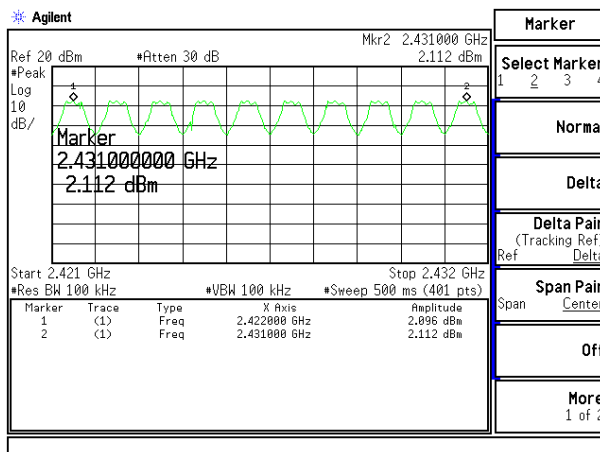
2402-2411MHz



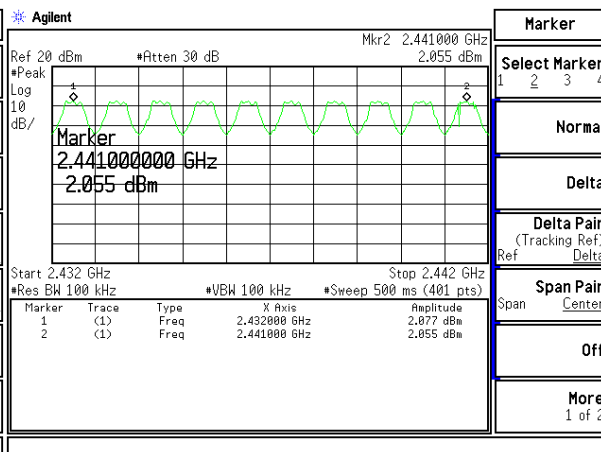
2412-2421MHz



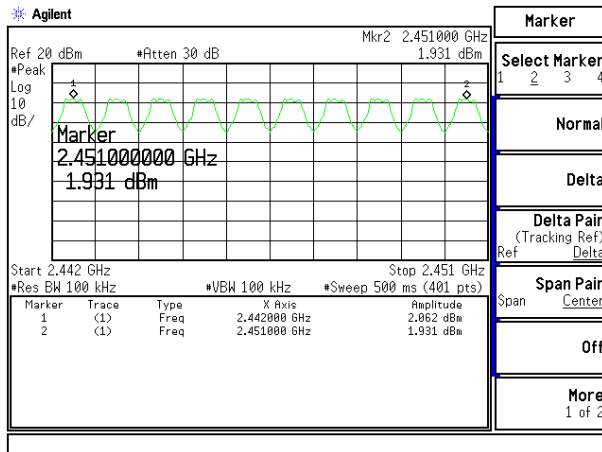
2422-2431MHz



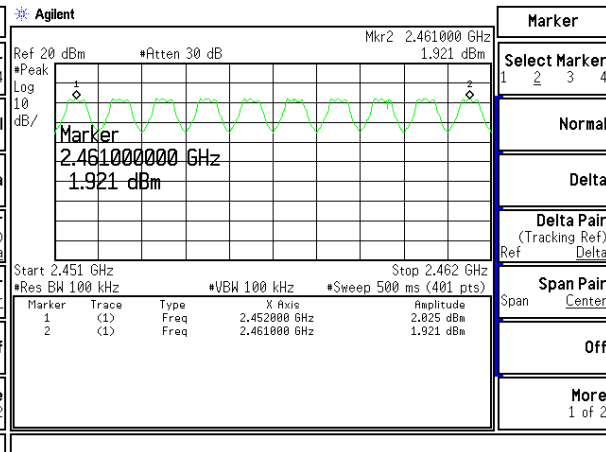
2432-2441MHz



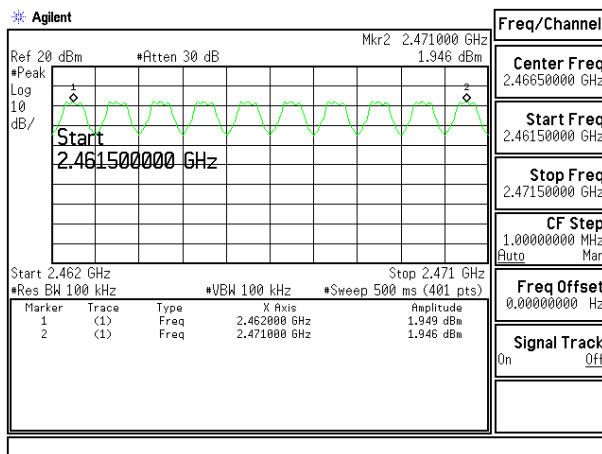
2442-2451MHz



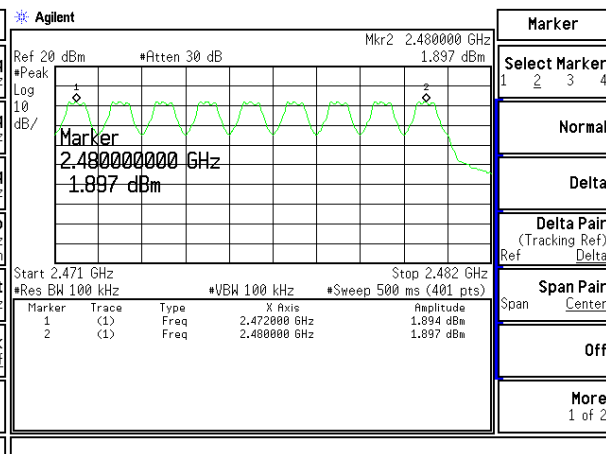
2452-2461MHz



2462-2471MHz



2472-2480MHz



7. Channel Separation

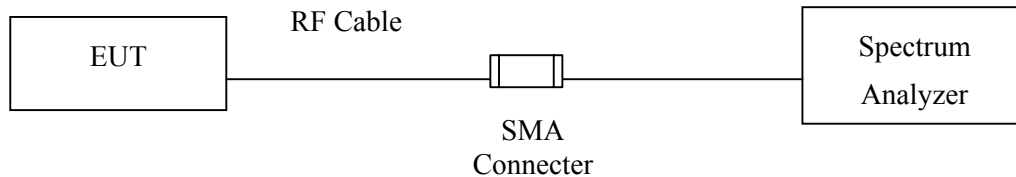
7.1. Test Equipment

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

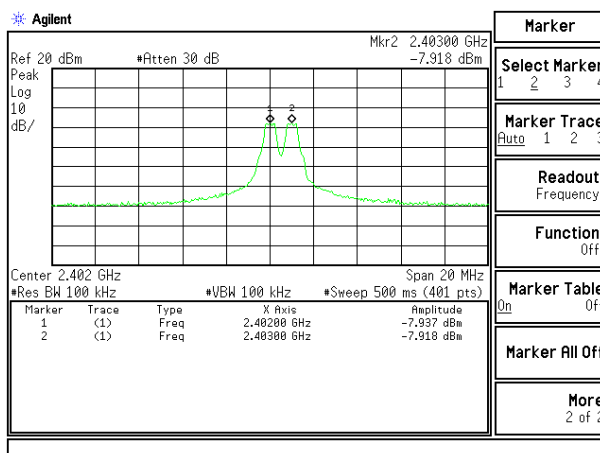
$\pm 150\text{Hz}$

7.5. Test Result of Channel Separation

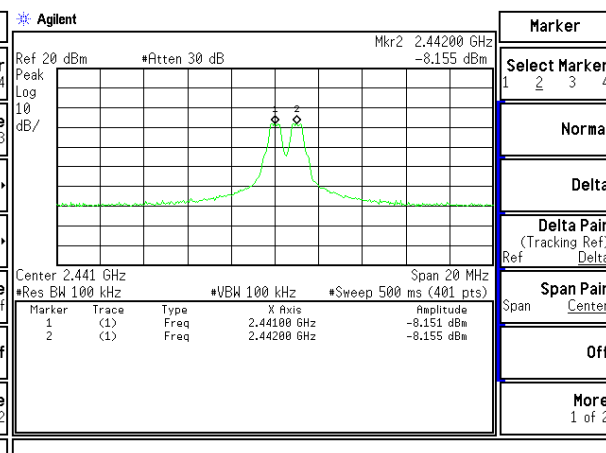
Product : Bluetooth Headset
 Test Item : Channel Separation
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

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

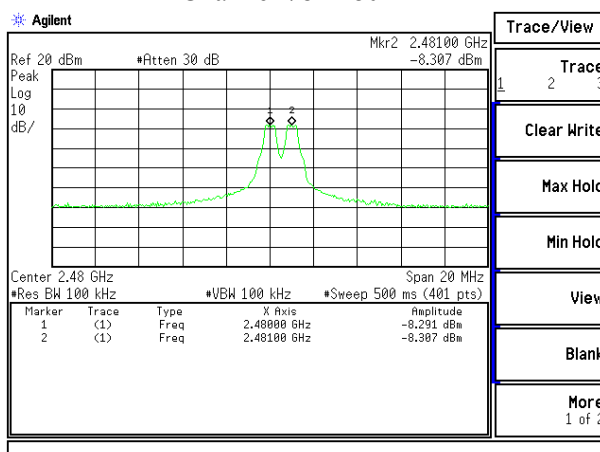
Channel 00 2402MHz



Channel 39 2441MHz



Channel 78 2480 MHz



8. Dwell Time

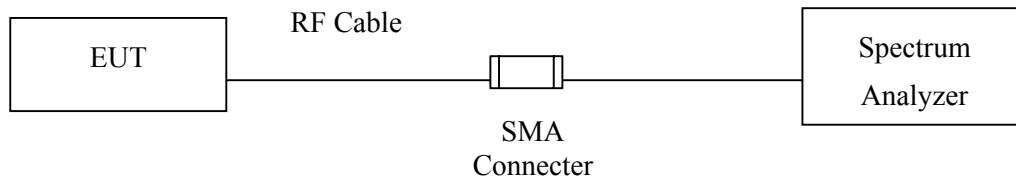
8.1. Test Equipment

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

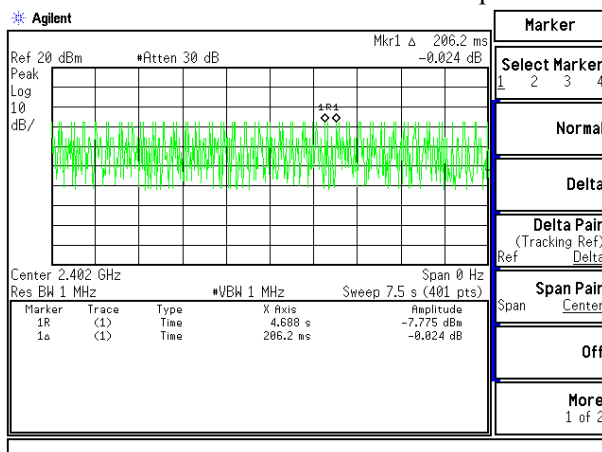
8.5. Test Result of Dwell Time

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

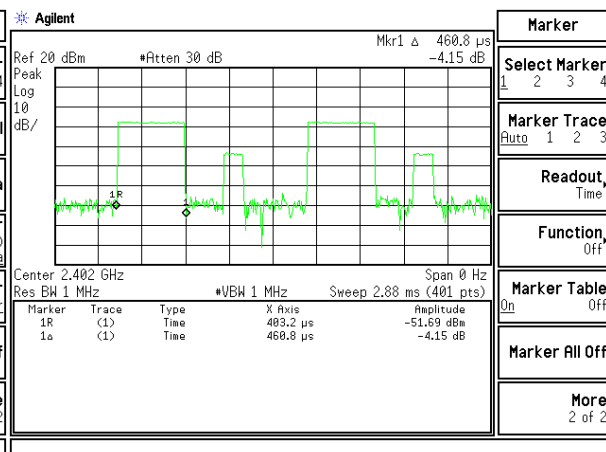
Channel No.	Frequency (MHz)	Time Interval between hops (ms)	Transmission Time (us)	Dwell Time (ms)	Limit (ms)	Result
00	2402	206.2	460.8	70.617264	400	Pass
39	2441	225.0	463.0	65.025777	400	Pass
78	2480	187.5	472.8	79.682560	400	Pass

Note: Dwell Time = $79 * 400 / \text{Time Interval Between Hops} * \text{Transmission Time} / 1000$

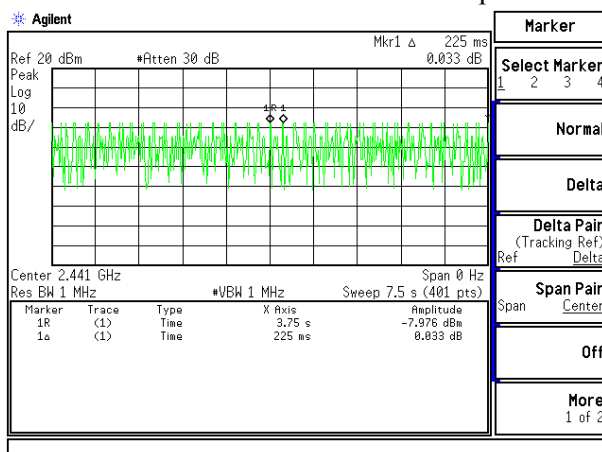
CH 2402MHz Time Interval between hops



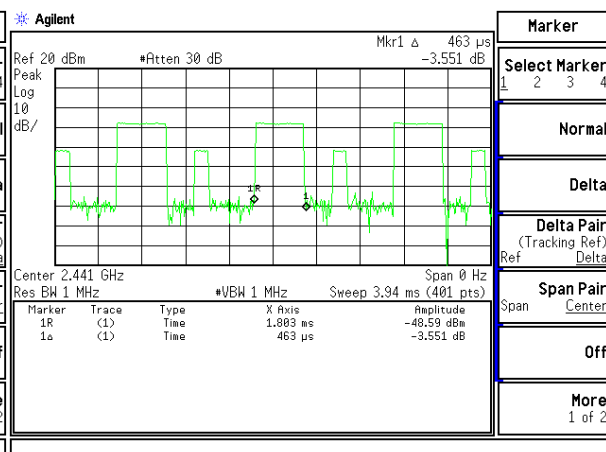
Transmission Time



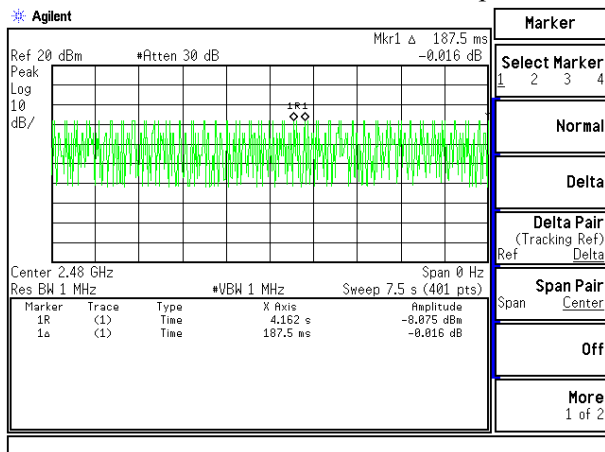
CH 2441MHz Time Interval between hops



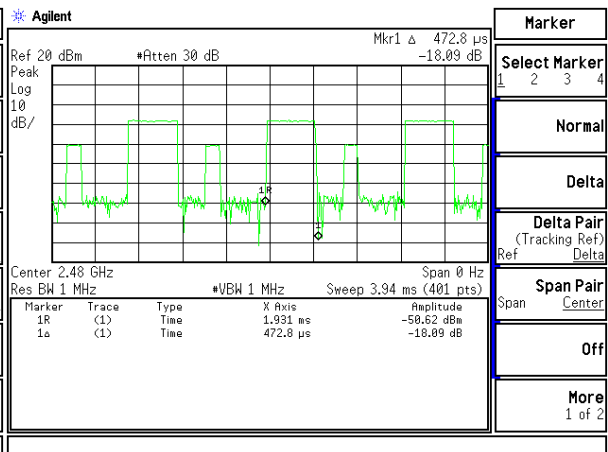
Transmission Time



CH 2480MHz Time Interval between hops



Transmission Time



Note:

The dwell times of the packet type DH1 are tested.

9. Occupied Bandwidth

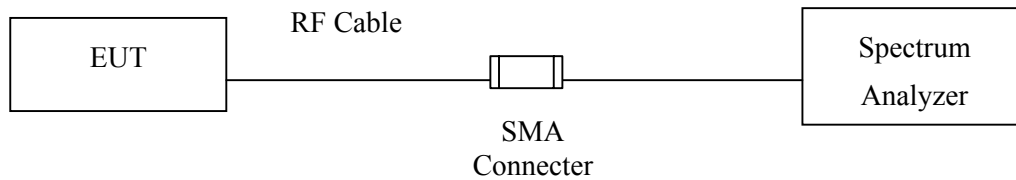
9.1. Test Equipment

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

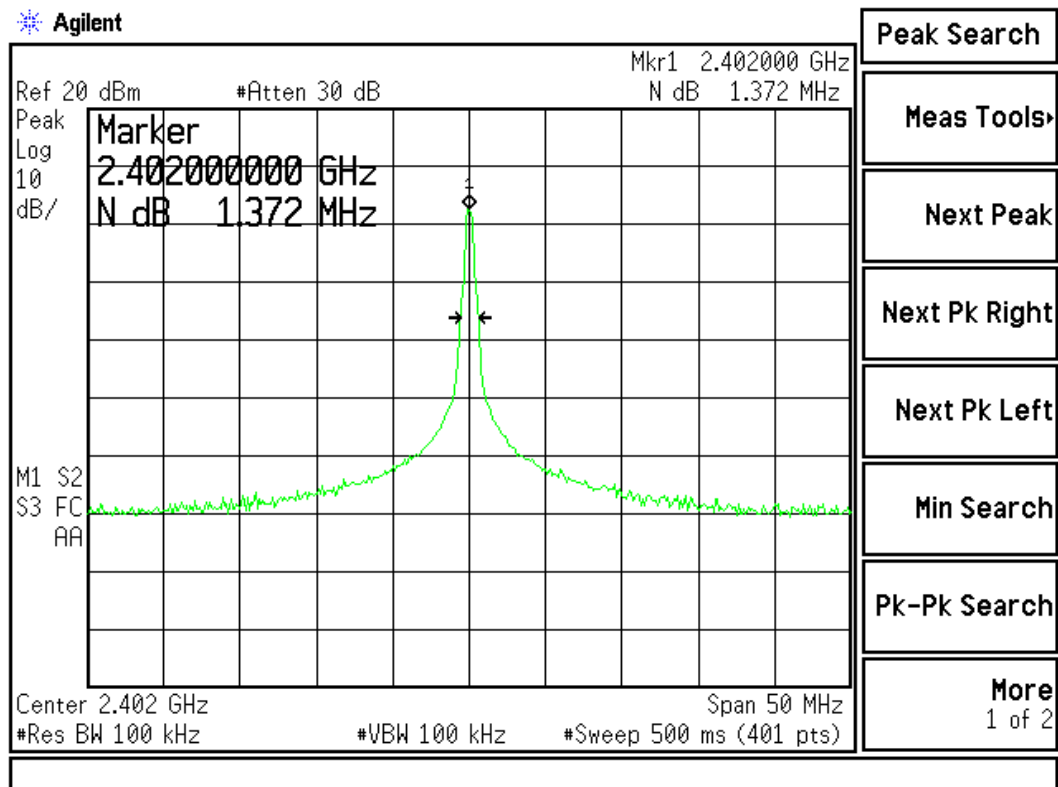
$\pm 150\text{Hz}$

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	1372	--	NA

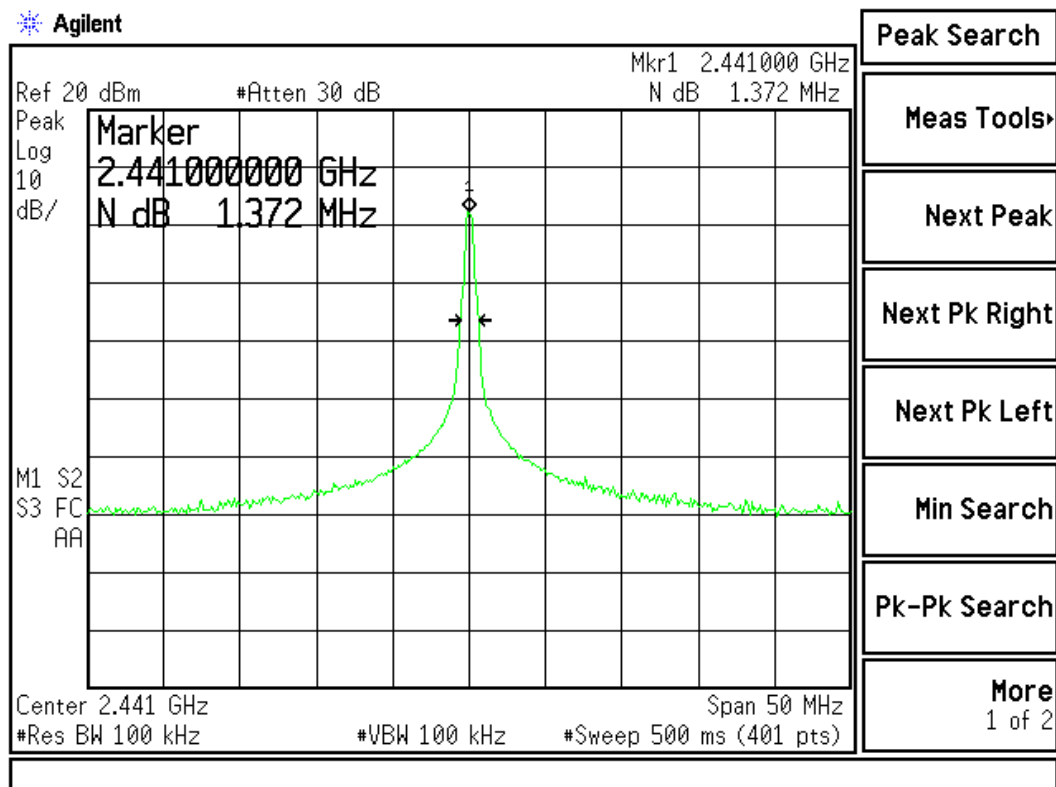
Figure Channel 00:



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	1372	--	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	1197	--	NA

Figure Channel 78:

