Test Report

Product Name	Bluetooth Headset
Model No.	CZ-190T
FCC ID.	UQS-CZ-190T

Applicant	J-TEK INCORPORATION
Address	2F-1, No. 83, Sec. 2, Gongdaowu Rd., Hsinchu City 30070, Taiwan

Date of Receipt	Nov. 21, 2006
Issued Date	Dec. 19, 2006
Report No.	06BL147-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: Dec. 19, 2006
Report No.: 06BL147-RFUSP06V01

QTK QuieTek Corporation

Product Name	Bluetooth Headset
Applicant	J-TEK INCORPORATION
Address	2F-1, No. 83, Sec. 2, Gongdaowu Rd., Hsinchu City 30070, Taiwan
Model No.	CZ-190T
FCC ID.	UQS-CZ-190T
Rated Voltage	AC 120V/60Hz
Working Voltage	AC 120V, 60Hz
Trade Name	JTI
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2005 ANSI C63.4: 2003 CISPR 22: 2005 NVLAP Lab Code: 200533-0
Test Result	Complied

The Test Results relate only to the samples tested.
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Documented By : Michelle Lin

(Michelle Lin)

Tested By : Tom Hsieh

(Tom Hsieh)

Approved By : George Chen

(George Chen)

CNLA 0914

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Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Bluetooth Headset
Trade Name	JTI
FCC ID.	UQS-CZ-190T
Model No.	CZ-190T
Frequency Range	2402 – 2480MHz
Type of Modulation	FHSS
Channel Number	79
Channel Control	Auto
Antenna Type	Printed
Antenna Gain	Refer to the table “Antenna List”

Component	
Power Adapter	MFR: Coming, M/N: CP0505 Input: AC100-240V, 50-60Hz, 0.5A Output: DC5V, 0.5A Cable Out: Non-Shielded, 1.8m

Note:

The different appearance among each mode was shown as attached photograph.

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	N/A	N/A	3.16dBi 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. The EUT is a Bluetooth Headset with a built-in 2.4GHz transceiver.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
3. Regarding to the operation frequency band, the lowest, middle, and highest frequency are selected to perform the test.
4. QuieTek verified constructions and functions, which are shown in the test report, in typical operation.
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 a Bluetooth Headset with a built-in 2.4GHz transceiver. The signals are modulated by frequency hopping spread spectrum. The number of channels is 79 in 2402-2480MHz.
The EUT 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: Charging with AC Adapter

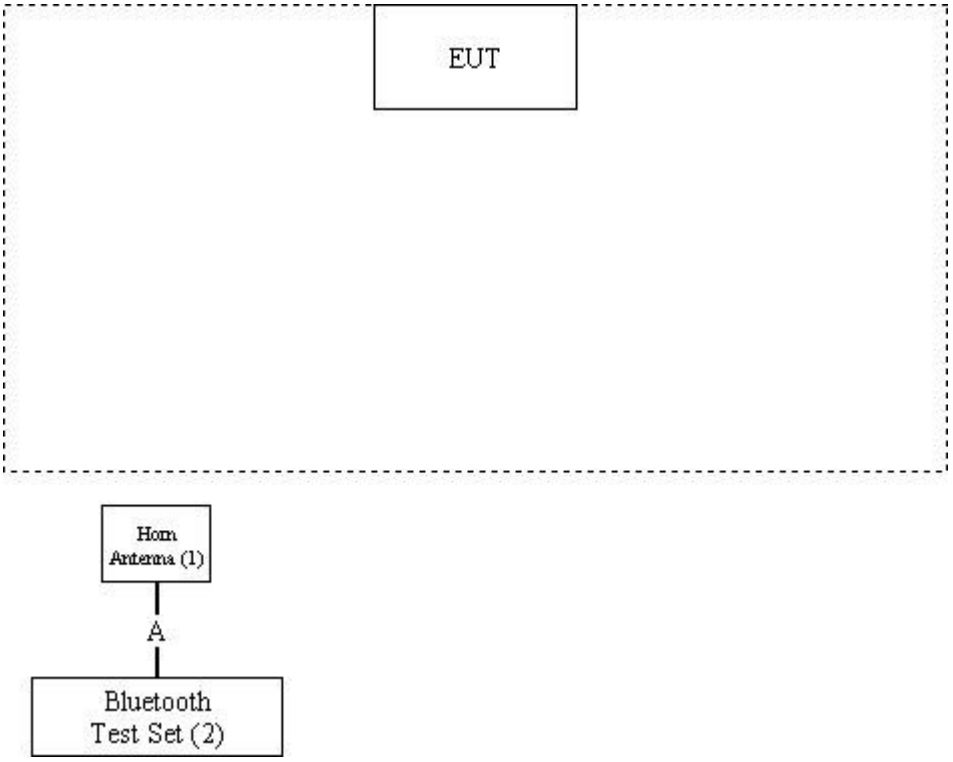
1.3. Test System Details

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)	Horn	SCHWARZBECK	CK 9120D	D305	N/A
(2)	Bluetooth Test Set	Anritsu	MT8852B	6K00004601	Shielded, 1.8m

Signal Cable Type		Signal cable Description
A.	RF Cable	Shielded, 1.5m

1.4. Configuration of Test System



1.5. EUT Exercise Software

1.	Setup the EUT as shown in section 1.4.
2.	Associate the EUT with the Bluetooth test set.
3.	Configure the test channel and the packet type in the Bluetooth test set.
4.	Press “LOOP” to start the continuous transmission.
5.	Verify that the EUT works properly.

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

Accreditation on NVLAP
NVLAP Lab Code: 200533-0

Site Name: Quietek Corporation
Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,
Lin-Kou Shiang, Taipei,
Taiwan, R.O.C.
TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

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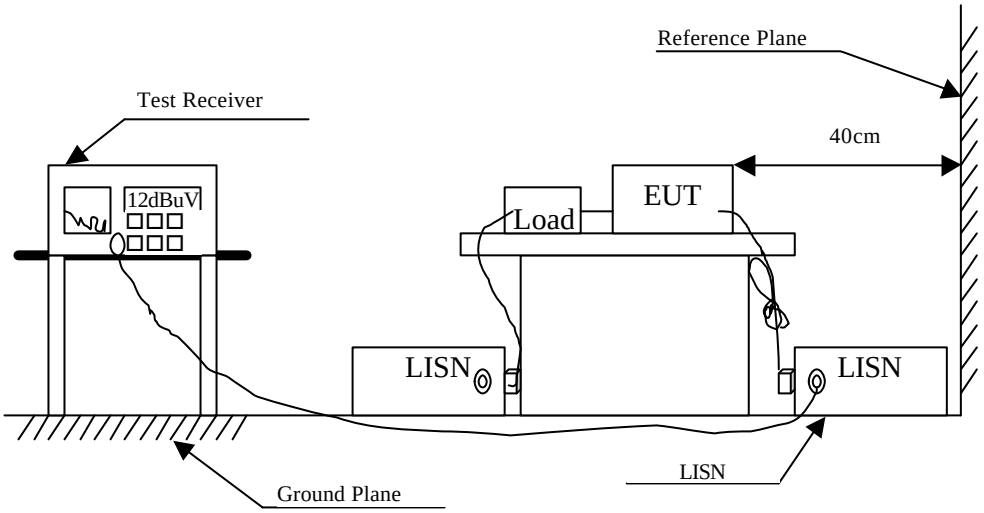
2. Conducted Emission

2.1. Test Equipment

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	EMI Test Receiver	R&S	ESCS 30/100367	Aug., 2006	
2	LISN	R&S	ESH3-Z5/836679/023	July, 2006	EUT
3	LISN	R&S	ESH3-Z5/836679/017	Feb., 2006	Peripherals
4	Pulse Limiter	R&S	ESH3-Z2/357.8810.52	Sep., 2006	
5	No.7 Shielded Room			N/A	

Note: All equipments 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 refers 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 of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

Conducted emissions were invested 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: Charging with AC Adapter

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Quasi-Peak					
0.502	0.216	49.180	49.396	-6.604	56.000
1.005	0.233	46.020	46.253	-9.747	56.000
1.499	0.260	44.150	44.410	-11.590	56.000
2.002	0.276	41.230	41.506	-14.494	56.000
2.993	0.310	34.190	34.500	-21.500	56.000
3.482	0.336	32.540	32.876	-23.124	56.000
Average					
0.502	0.216	44.080	44.296	-1.704	46.000
1.005	0.233	39.280	39.513	-6.487	46.000
1.499	0.260	37.050	37.310	-8.690	46.000
2.002	0.276	33.320	33.596	-12.404	46.000
2.993	0.310	26.750	27.060	-18.940	46.000
3.482	0.336	25.790	26.126	-19.874	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: Charging with AC Adapter

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Quasi-Peak					
0.498	0.216	43.620	43.836	-12.221	56.057
0.994	0.233	40.840	41.073	-14.927	56.000
1.975	0.276	35.770	36.046	-19.954	56.000
3.460	0.336	29.370	29.706	-26.294	56.000
5.927	0.409	26.530	26.939	-33.061	60.000
7.415	0.459	28.680	29.139	-30.861	60.000
Average					
0.498	0.216	34.010	34.226	-11.831	46.057
0.994	0.233	31.640	31.873	-14.127	46.000
1.975	0.276	22.150	22.426	-23.574	46.000
3.460	0.336	18.870	19.206	-26.794	46.000
5.927	0.409	12.530	12.939	-37.061	50.000
7.415	0.459	12.760	13.219	-36.781	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.

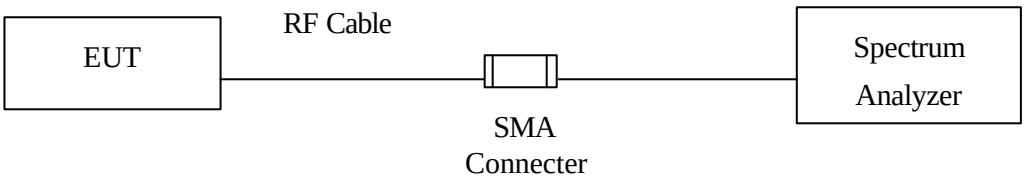
3. Peak Power Output

3.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	EMI Test Receiver	R&S	ESI 26 / 838786/004	May, 2006

Note: 1. All equipments are calibrated every one year.
2. 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

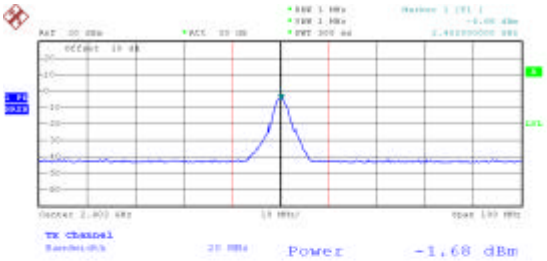
±1.27 dB

3.5. Test Result of Peak Power Output

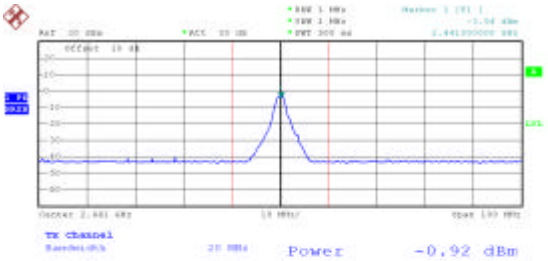
Product : Bluetooth Headset
Test Item : Peak Power Output
Test Site : CTR1
Test Mode : Mode 1: Transmitter

Channel No.	Frequency (MHz)	Measurement	Required Limit	Result
Channel 00	2402.00	-1.68dBm	1 Watt= 30 dBm	Pass
Channel 39	2441.00	-0.92dBm	1 Watt= 30 dBm	Pass
Channel 78	2480.00	-0.63dBm	1 Watt= 30 dBm	Pass

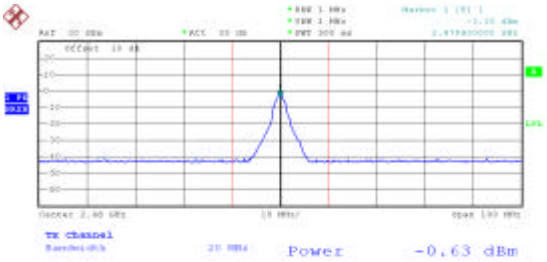
Channel 00



Channel 39



Channel 78



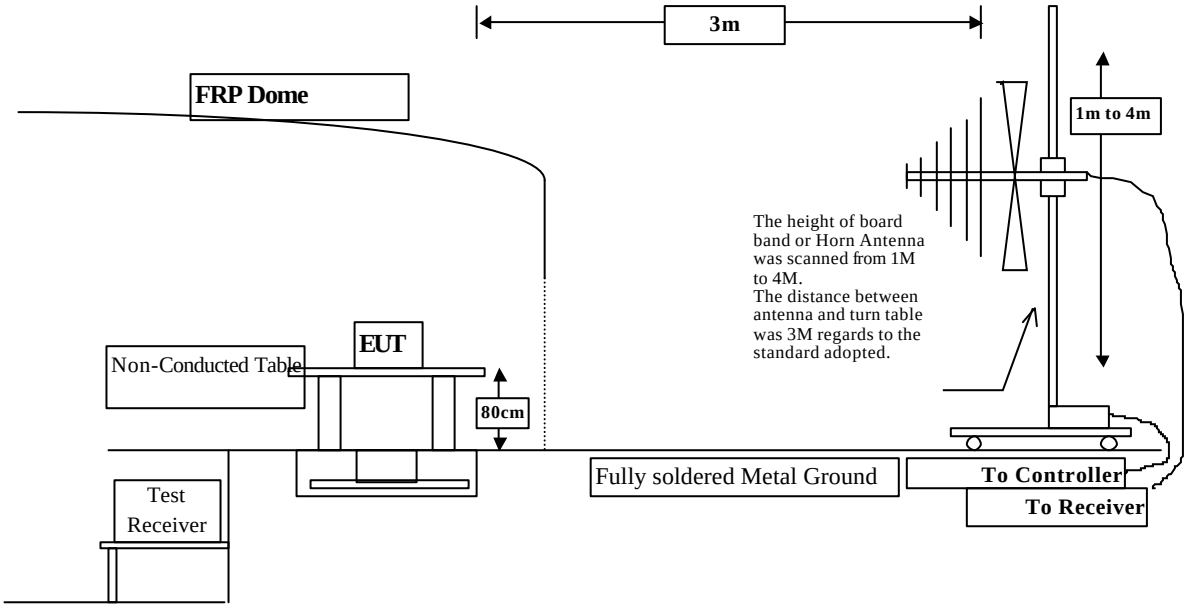
4. Radiated Emission

4.1. Test Equipment

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

Note: 1. All equipments are calibrated every one year.
2. Test equipments 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 dtrength 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 harminics 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 (Channel 00)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4804.000	3.737	31.409	35.146	-38.854	74.000
7206.000	10.741	31.271	42.012	-31.988	74.000
9608.000	14.854	30.887	45.741	-28.259	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4804.000	3.737	31.167	34.904	-39.096	74.000
7206.000	10.741	30.746	41.487	-32.513	74.000
9608.000	14.854	31.531	46.385	-27.615	74.000
Average Detector:					
--					

Note:

1. The reading levels below 1GHz and above 1GHz are quasi-peak values and peak/average values, respectively.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz。
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; 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 (Channel 39)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4882.000	3.932	31.665	35.597	-38.403	74.000
7323.000	11.633	30.547	42.179	-31.821	74.000
9764.000	13.740	30.810	44.550	-29.450	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4882.000	3.932	30.967	34.899	-39.101	74.000
7323.000	11.633	31.165	42.797	-31.203	74.000
9764.000	13.740	30.128	43.868	-30.132	74.000
Average Detector:					
--					

Note:

1. The reading levels below 1GHz and above 1GHz are quasi-peak values and peak/average values, respectively.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz。
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; 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 (Channel 78)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal Peak Detector:					
4960.000	4.151	31.244	35.394	-38.606	74.000
7440.000	12.067	29.986	42.052	-31.948	74.000
9920.000	13.472	30.328	43.799	-30.201	74.000
Average Detector:					
--					
Vertical Peak Detector:					
4960.000	4.151	29.142	33.292	-40.708	74.000
7440.000	12.067	31.675	43.741	-30.259	74.000
9920.000	13.472	30.767	44.238	-29.762	74.000
Average Detector:					
--					

Note:
1. Reading levels below 1GHz and above 1GHz are quasi-peak values and peak/average values, respectively.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz。
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; 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 (Channel 39)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
260.000	14.473	10.400	24.874	-21.126	46.000
285.000	13.521	15.700	29.221	-16.779	46.000
380.000	15.610	19.900	35.511	-10.489	46.000
475.000	18.831	18.100	36.931	-9.069	46.000
590.000	20.195	19.500	39.695	-6.305	46.000
790.000	21.838	11.800	33.637	-12.363	46.000
Vertical					
238.100	11.999	9.700	21.698	-24.302	46.000
284.900	13.792	13.300	27.092	-18.908	46.000
380.000	16.590	18.800	35.390	-10.610	46.000
570.600	21.146	13.900	35.046	-10.954	46.000
620.000	21.545	17.800	39.344	-6.656	46.000
920.000	24.166	10.600	34.766	-11.234	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 2: Charging with AC Adapter

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
42.125	13.519	9.981	23.500	-16.500	40.000
105.175	12.655	6.343	18.998	-24.502	43.500
190.050	9.450	8.179	17.629	-25.871	43.500
461.650	18.642	4.479	23.121	-22.879	46.000
544.100	19.945	5.840	25.785	-20.215	46.000
595.025	20.077	5.076	25.154	-20.846	46.000
Vertical					
42.125	12.243	18.386	30.629	-9.371	40.000
56.675	6.768	23.351	30.119	-9.881	40.000
107.600	11.442	13.495	24.937	-18.563	43.500
544.100	20.532	1.591	22.123	-23.877	46.000
619.275	21.591	3.161	24.752	-21.248	46.000
684.750	20.297	4.195	24.492	-21.508	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.

5. Band Edge

5.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786/004	May, 2006
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2006
X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2006
X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2006
X	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2006
X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2006
X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2006
X	Pre-Amplifier	HP	8449B / 3008A01123	July, 2006

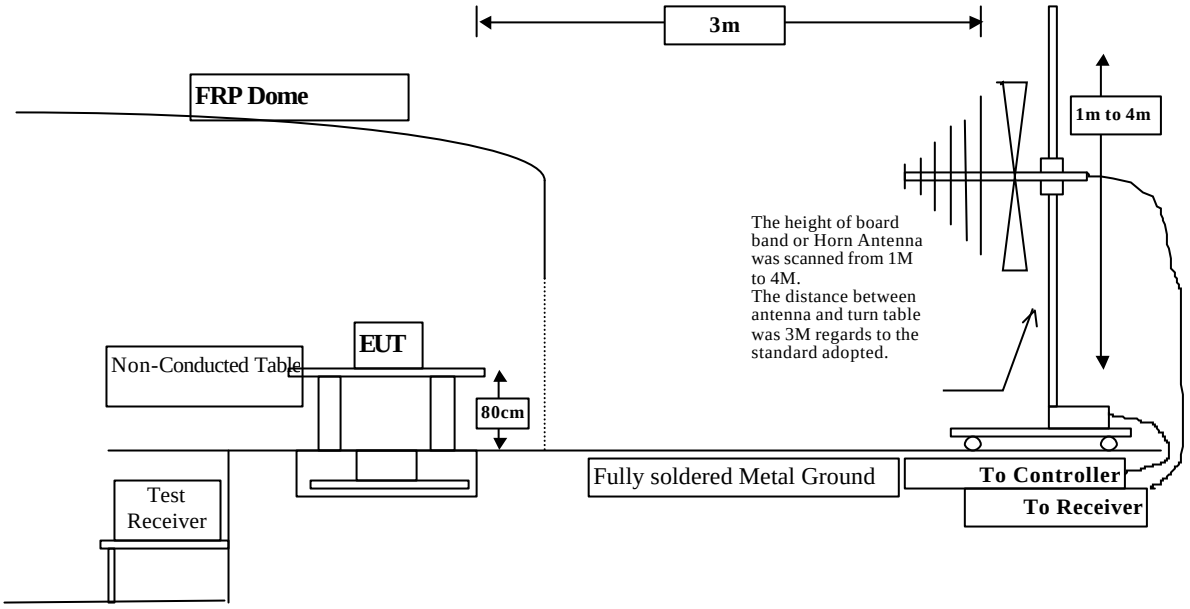
OATS No.3

Note: 1. All equipments are calibrated every one year.

2. The test equipments 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 (Channel 00)

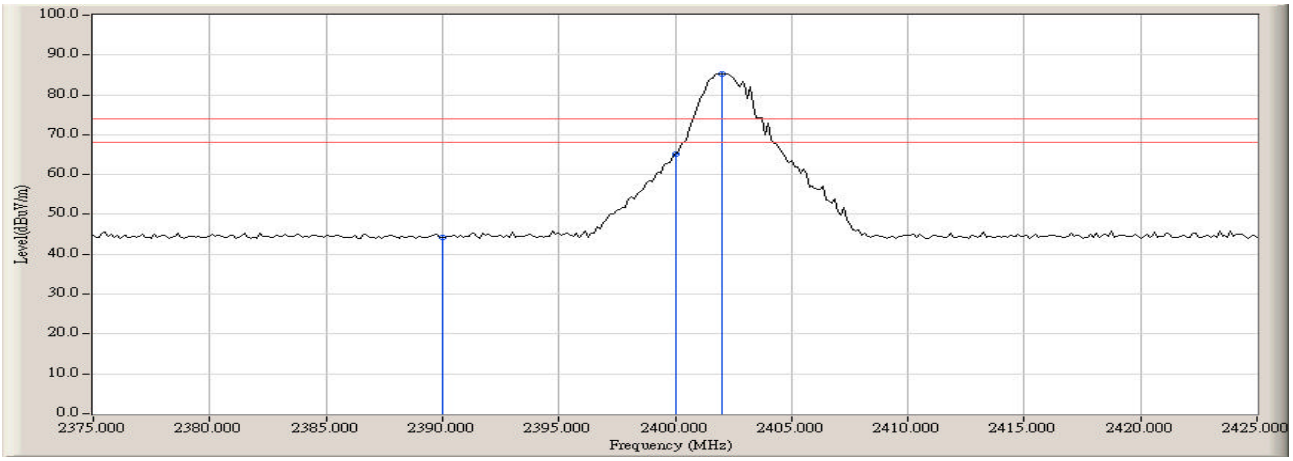
RF Radiated Measurement:

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

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00(Peak)	2390.000	-2.257	46.600	44.343	74.00	54.00	Pass
00(Avg)	--	--	--	--	74.00	54.00	Pass

Figure Channel 00: **Horizontal (Peak)**



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 (Channel 00)

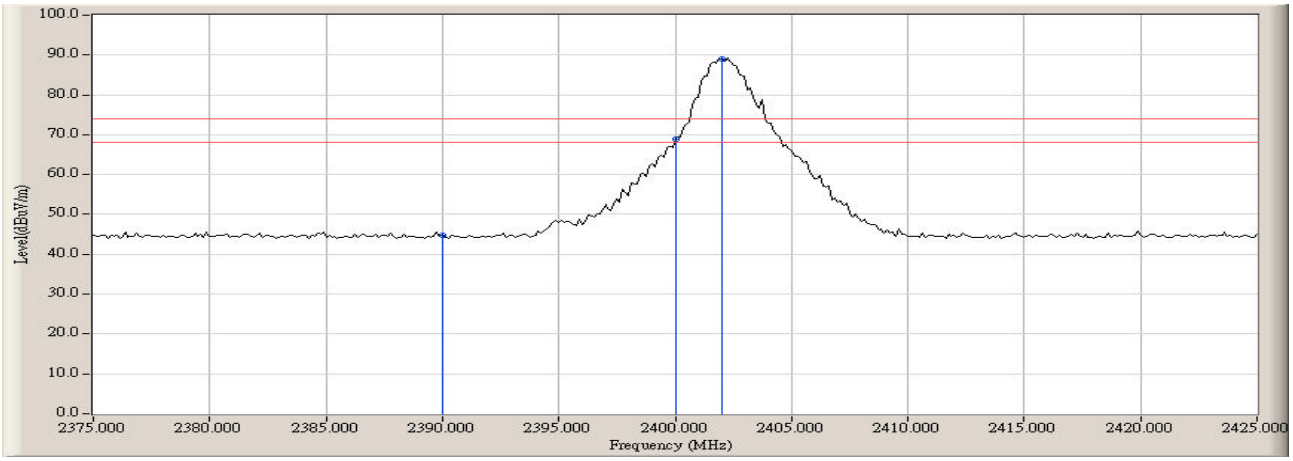
RF Radiated Measurement:

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

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00(Peak)	2390.000	-2.257	46.903	44.646	74.00	54.00	Pass
00(Avg)	--	--	--	--	74.00	54.00	Pass

Figure Channel 00: **Vertical (Peak)**



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 (Channel 78)

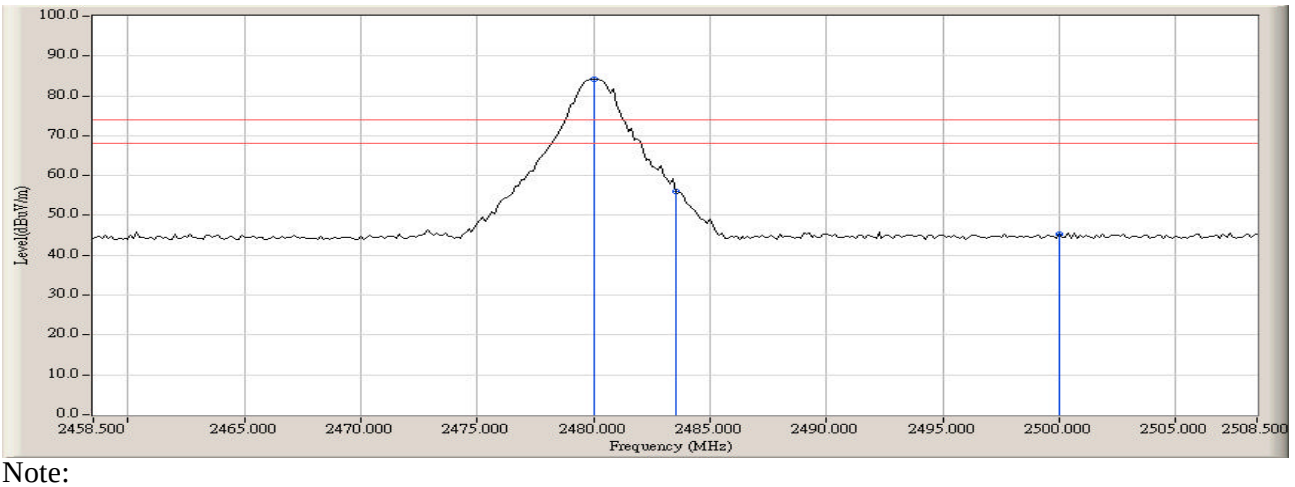
RF Radiated Measurement:

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

RF Radiated Measurement (Horizontal):

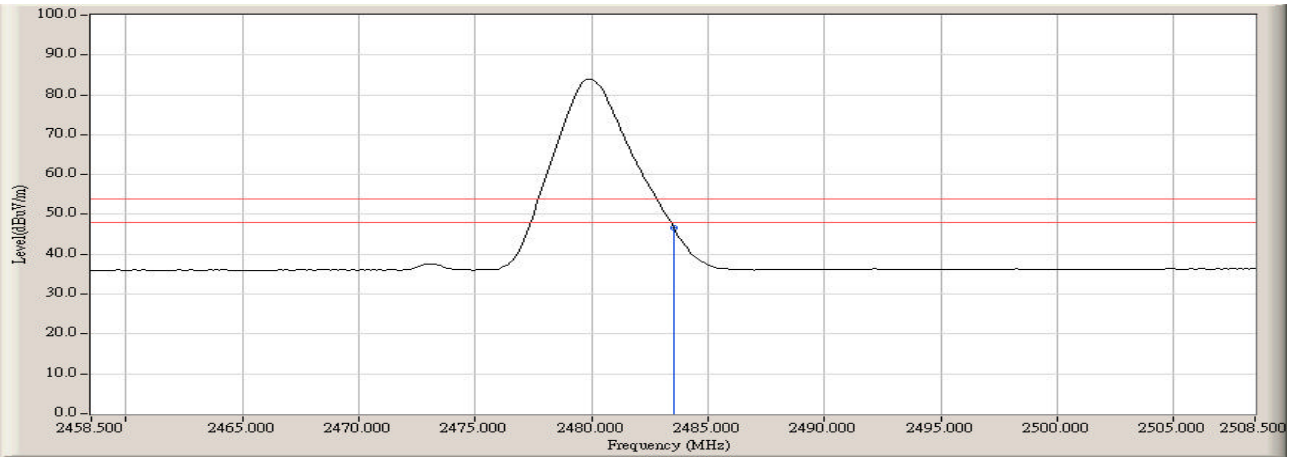
Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78(Peak)	2483.500	-1.896	57.893	55.998	74.00	54.00	Pass
78(Avg)	2483.500	-1.896	48.523	46.628	74.00	54.00	Pass

Figure Channel 78: Horizontal (Peak)



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

Figure Channel 78: Horizontal (Average)



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

Product : Bluetooth Headset
Test Item : Band Edge
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (Channel 78)

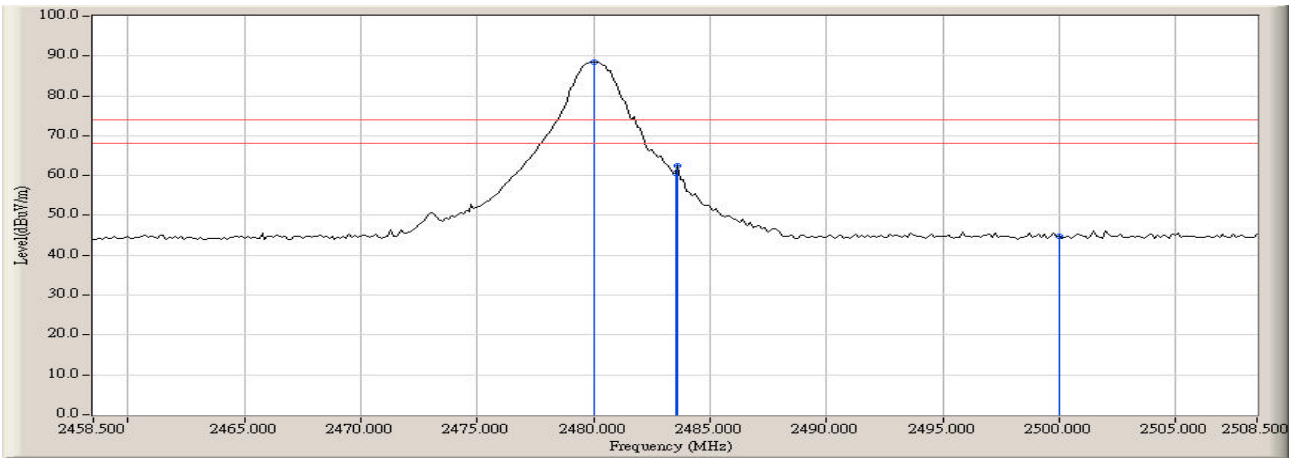
RF Radiated Measurement:

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

RF Radiated Measurement (Vertical):

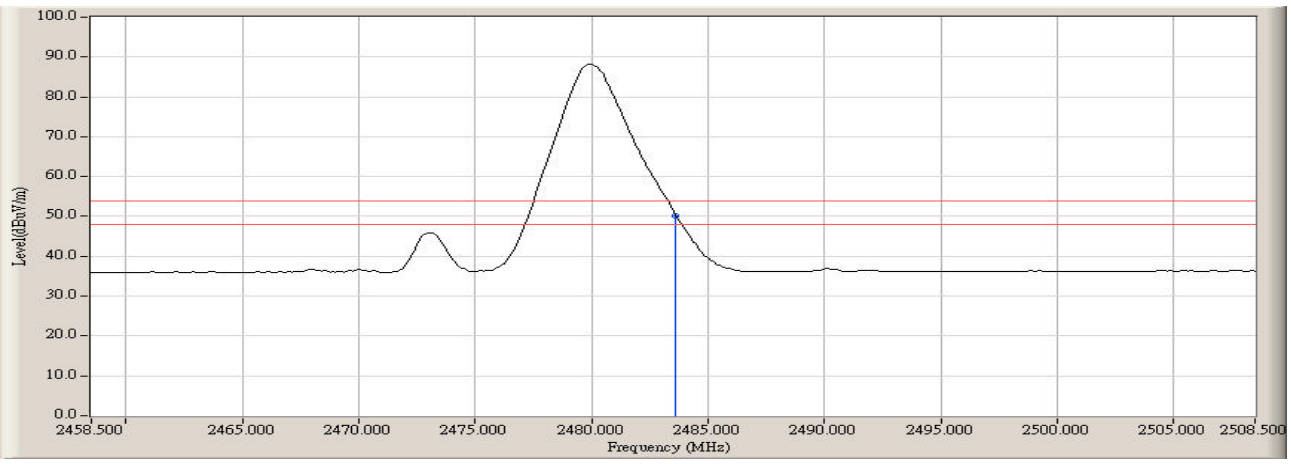
Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78(Peak)	2483.625	-1.895	64.233	62.338	74.00	54.00	Pass
78(Avg)	2483.625	-1.895	51.990	50.095	74.00	54.00	Pass

Figure Channel 78: Vertical (Peak)



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

Figure Channel 78: Vertical (Peak)



Note:
RBW=1MHz, VBW=1kHz, 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.

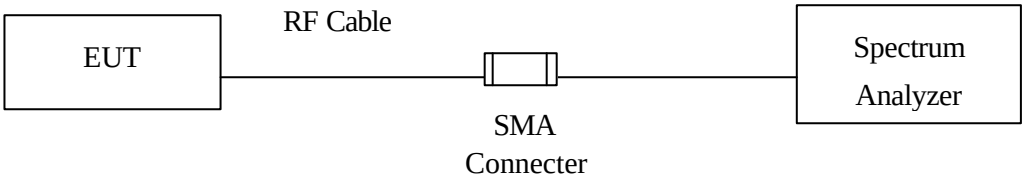
6. Channel Number

6.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	EMI Test Receiver	R&S	ESI 26 / 838786/004	May, 2006

Note: 1. All equipments are calibrated every one year.
2. The test equipments 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

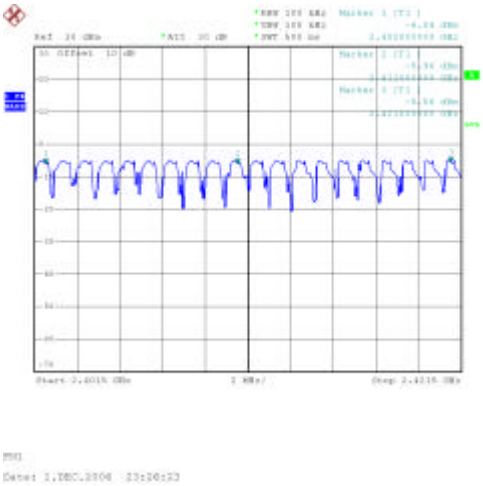
N/A

6.5. Test Result of Channel Number

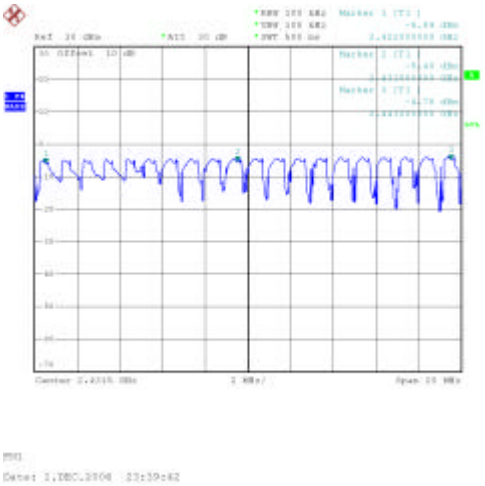
Product : Bluetooth Headset
Test Item : Channel Number
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter

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

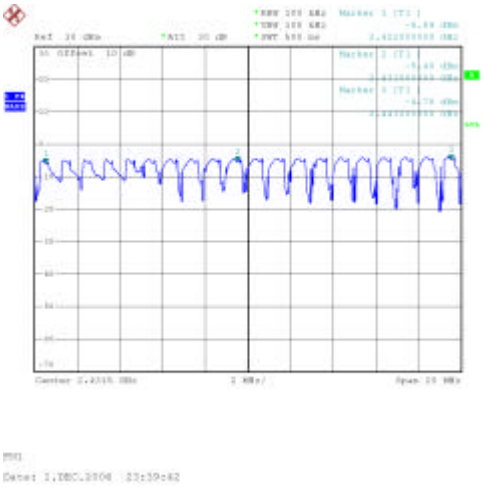
2402-2421MHz



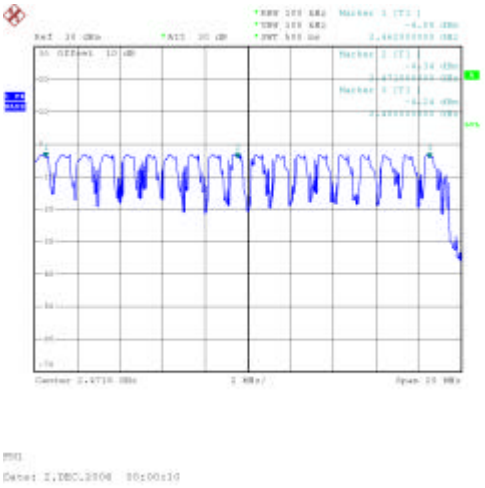
2422-2441MHz



2442-2471MHz



2472-2481MHz



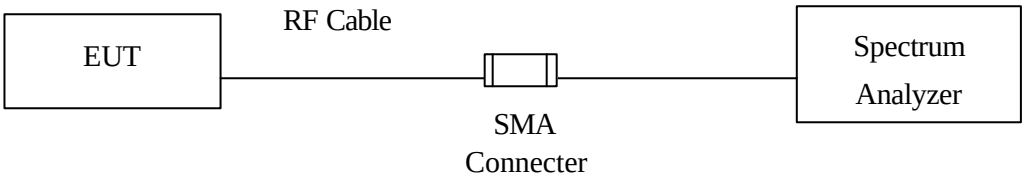
7. Channel Separation

7.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	EMI Test Receiver	R&S	ESI 26 / 838786/004	May, 2006

Note: 1. All equipments are calibrated every one year.
2. The test instruments marked 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. 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 125mW.

7.4. Uncertainty

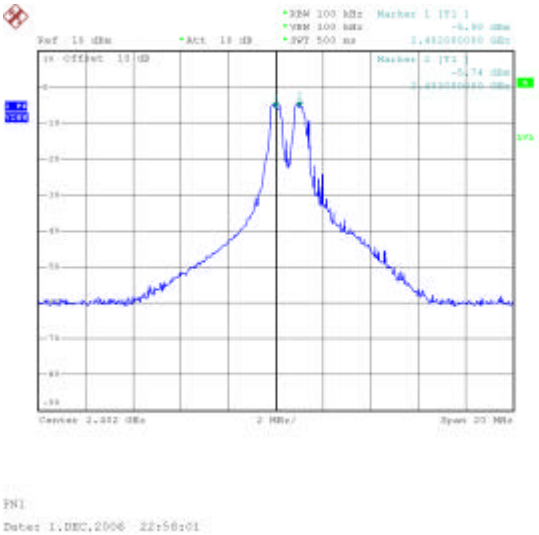
±150Hz

7.5. Test Result of Channel Separation

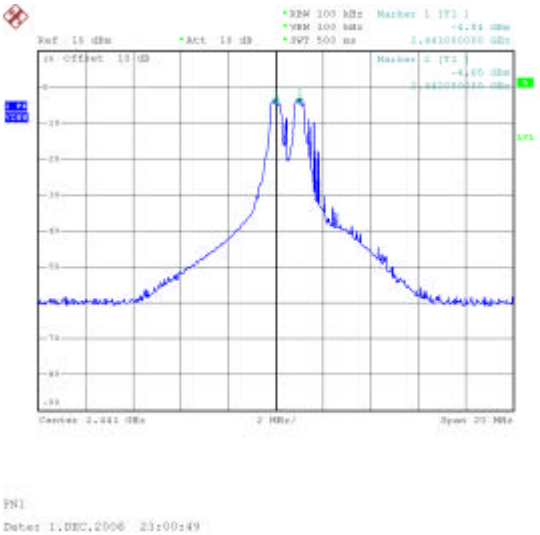
Product : Bluetooth Headset
Test Item : Channel Separation
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter

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

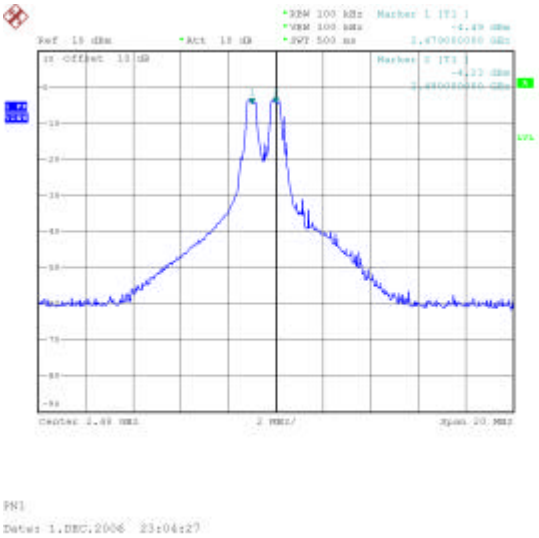
Channel 00 2402MHz



Channel 39 2441MHz



Channel 78 2480 MHz



8. Dwell Time

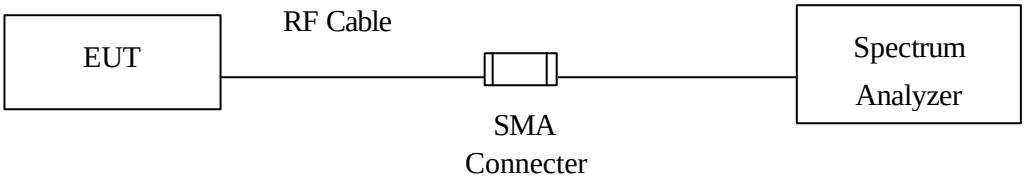
8.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	EMI Test Receiver	R&S	ESI 26 / 838786/004	May, 2006

Note: 1. All equipments are calibrated every one year.

2. The test equipments marked "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

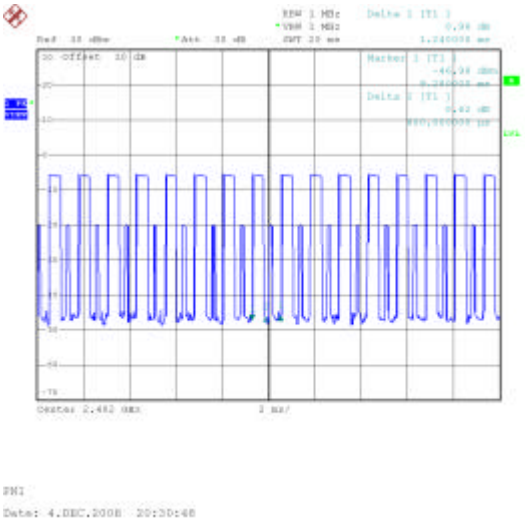
±25msec

8.5. Test Result of Dwell Time

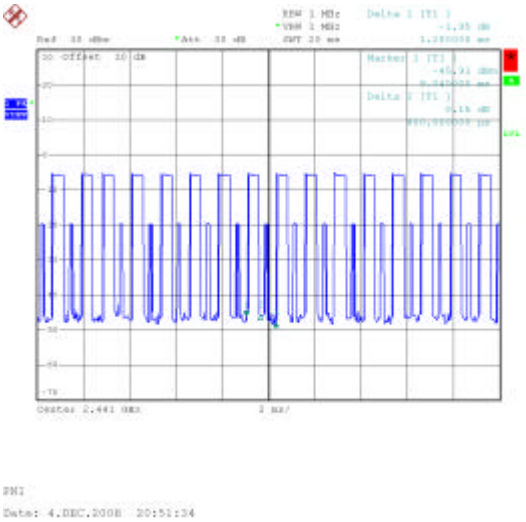
Product : Bluetooth Headset
Test Item : Dwell Time
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (Channel 00,39,78 –DH1)

Channel (MHz)	Measurement Level (ms)	Required Limit (sec.)	Result
CH 00 2402	192	< 0.4	Pass
CH 39 2441	192	< 0.4	Pass
CH 78 2480	192	< 0.4	Pass

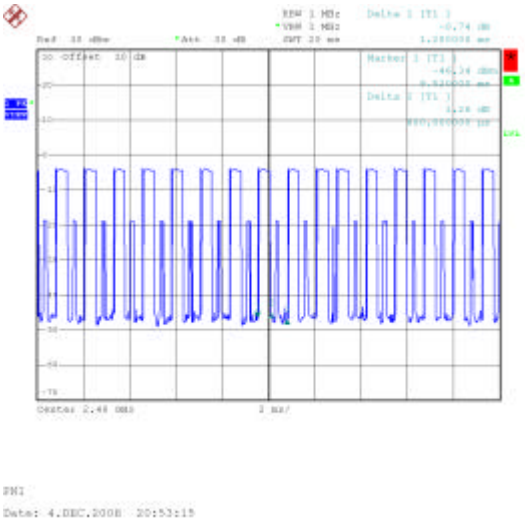
CH 00 2402MHz



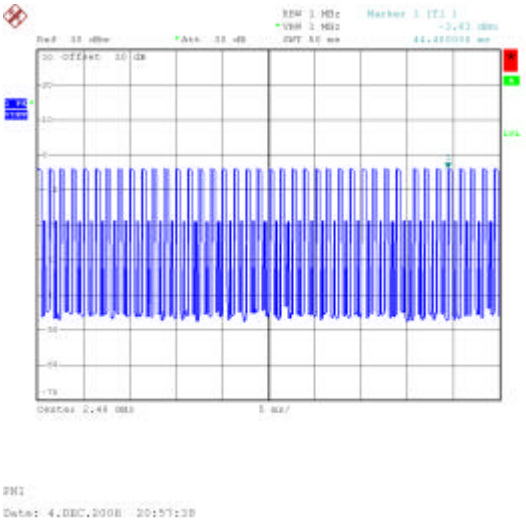
CH 39 2441MHz



CH 78 2480MHz



Total



Note: Dwell time＝time slot length * hop rate / number of hopping channels * period

Occupancy Time of Frequency Hopping System

Test Time Period: 0.4*79=31.6sec, Hopping Times: 40/50msec=0.8 hops/msec.

A) 2402MHz The Maximum Occupancy Time Within 31.6sec: 600 μs * 800 / 79 * 31.6= 192msec。

B) 2441MHz The Maximum Occupancy Time Within 31.6sec: 600 μs * 800 / 79 * 31.6= 192msec。

C) 2480MHz The Maximum Occupancy Time Within 31.6sec: 600 μs * 800 / 79 * 31.6= 192msec。

Test Result: The average occupancy times of the highest, middle and lowest channel are less than 0.4sec, and thus complies the standard.

PS: (1) From Bluetooth Specification, It Hops 1640 Times in 1sec. The Average Occupancy Time of Each 79 Channels is 1600/79 Times, Therefore, We Calculate The Maximum Occupancy Time (worst care) As Below:

A) 2402Mhz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is 0.4msec*1640/79*31.6=289.056msec

B) 2441MHz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is 0.4msec*1640/79*31.6=289.056msec

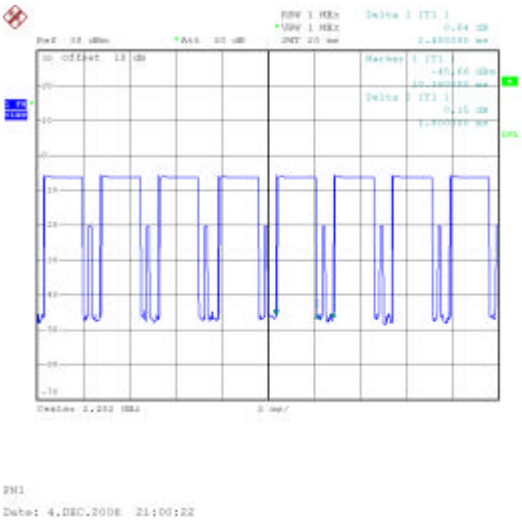
C) 2480MHz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is 0.4msec*1640/79*31.6=289.056msec

Test Result: The average occupancy times of the highest, middle and lowest channel are less than 0.4sec, and thus complies the standard.

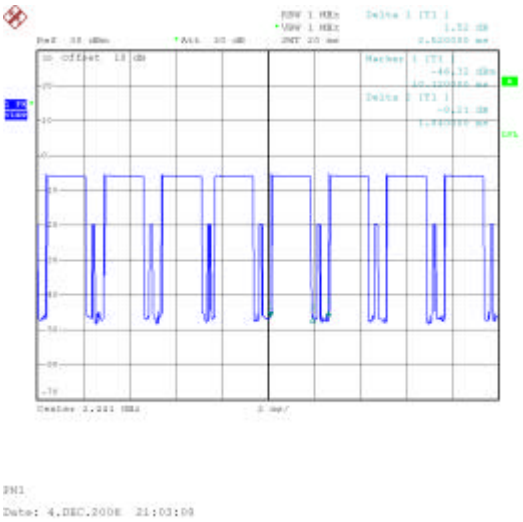
Product : Bluetooth Headset
Test Item : Dwell Time
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (Channel 00,39,78 –DH3)

Channel (MHz)	Measurement Level (ms)	Required Limit (sec.)	Result
CH 00 2402	288	< 0.4	Pass
CH 39 2441	295	< 0.4	Pass
CH 78 2480	295	< 0.4	Pass

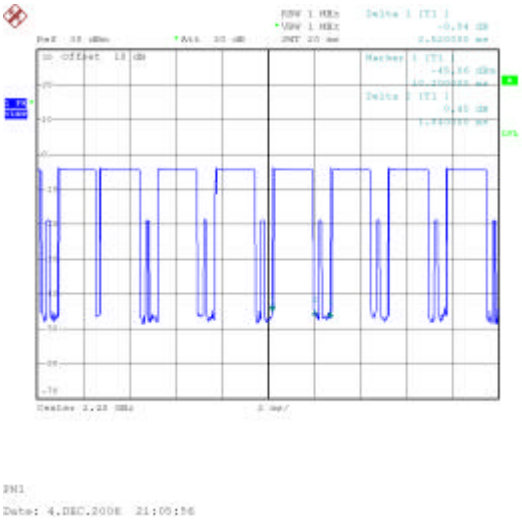
CH 00 2402MHz



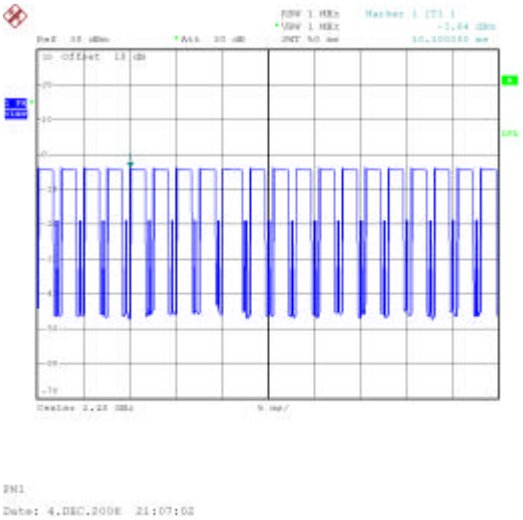
CH 39 2441MHz



CH 78 2480MHz



Total



Note: Dwell time＝time slot length * hop rate / number of hopping channels * period

Occupancy Time of Frequency Hopping System

Test Time Period: 0.4*79=31.6sec, Hopping Times: 20/50msec=0.4 hops/msec.

A) 2402MHz The Maximum Occupancy Time Within 31.6sec: 1800 μs * 400 / 79 * 31.6= 288msec。

B) 2441MHz The Maximum Occupancy Time Within 31.6sec: 1840 μs * 400 / 79 * 31.6= 295msec。

C) 2480MHz The Maximum Occupancy Time Within 31.6sec: 1840 μs * 400 / 79 * 31.6= 295msec。

Test Result: The average occupancy times of the highest, middle and lowest channel are less than 0.4sec, and thus complies the standard.

PS: (1) From Bluetooth Specification, It Hops 1640 Times in 1sec. The Average Occupancy Time of Each 79 Channels is 1600/79 Times, Therefore, We Calculate The Maximum Occupancy Time (worst care) As Below:

A) 2402Mhz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is 0.4msec*1640/79*31.6=289.056msec

B) 2441MHz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is 0.4msec*1640/79*31.6=289.056msec

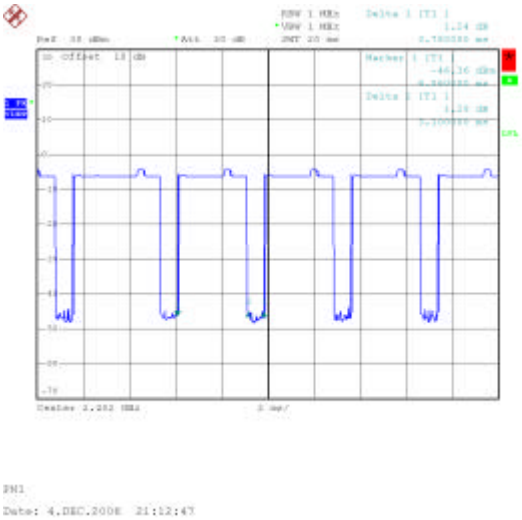
C) 2480MHz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is 0.4msec*1640/79*31.6=289.056msec

Test Result: The average occupancy times of the highest, middle and lowest channel are less than 0.4sec, and thus complies the standard.

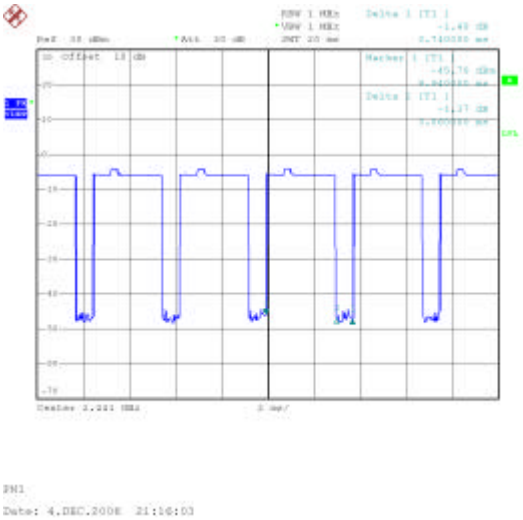
Product : Bluetooth Headset
Test Item : Dwell Time
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (Channel 00,39,78 –DH5)

Channel (MHz)	Measurement Level (ms)	Required Limit (sec.)	Result
CH 00 2402	323	< 0.4	Pass
CH 39 2441	319	< 0.4	Pass
CH 78 2480	323	< 0.4	Pass

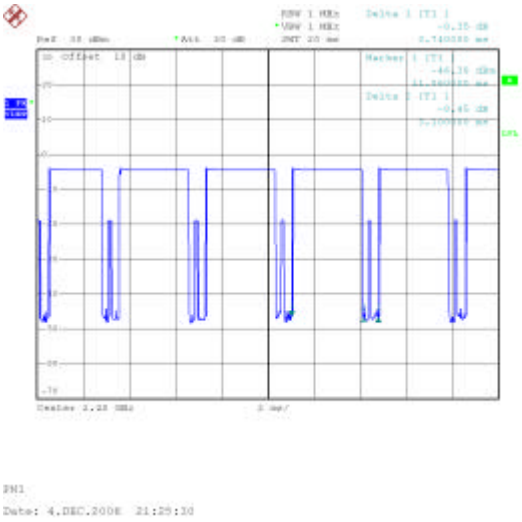
CH 00 2402MHz



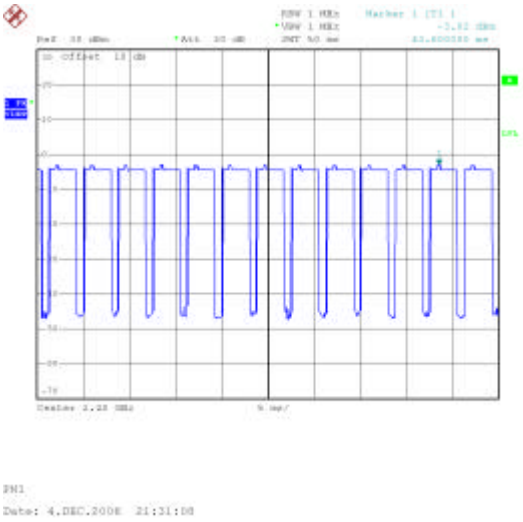
CH 39 2441MHz



CH 78 2480MHz



Total



Note: Dwell time＝time slot length * hop rate / number of hopping channels * period

Occupancy Time of Frequency Hopping System

Test Time Period: 0.4*79=31.6sec, Hopping Times: 13/50msec=0.26 hops/msec.

A) 2402MHz The Maximum Occupancy Time Within 31.6sec: 3100 μs * 260 / 79 * 31.6= 323msec。

B) 2441MHz The Maximum Occupancy Time Within 31.6sec: 3060 μs * 260 / 79 * 31.6= 319msec。

C) 2480MHz The Maximum Occupancy Time Within 31.6sec: 3100 μs * 260 / 79 * 31.6= 323msec。

Test Result: The average occupancy times of the highest, middle and lowest channel are less than 0.4sec, and thus complies the standard.

PS: (1) From Bluetooth Specification, It Hops 1640 Times in 1sec. The Average Occupancy Time of Each 79 Channels is 1600/79 Times, Therefore, We Calculate The Maximum Occupancy Time (worst care) As Below:

A) 2402Mhz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is 0.4msec*1640/79*31.6=289.056msec

B) 2441MHz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is 0.4msec*1640/79*31.6=289.056msec

C) 2480MHz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is 0.4msec*1640/79*31.6=289.056msec

Test Result: The average occupancy times of the highest, middle and lowest channel are less than 0.4sec, and thus complies the standard.

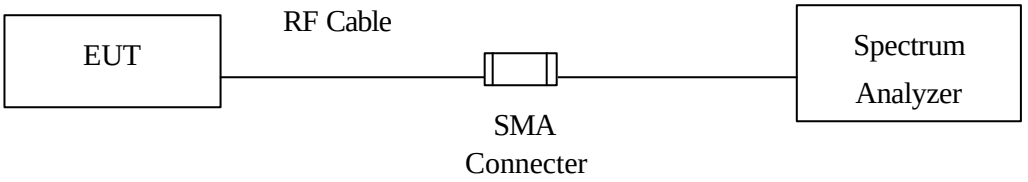
9. Occupied Bandwidth

9.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	EMI Test Receiver	R&S	ESI 26 / 838786/004	May, 2006

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

9.2. Test Setup



9.3. Limits

N/A

9.4. Uncertainty

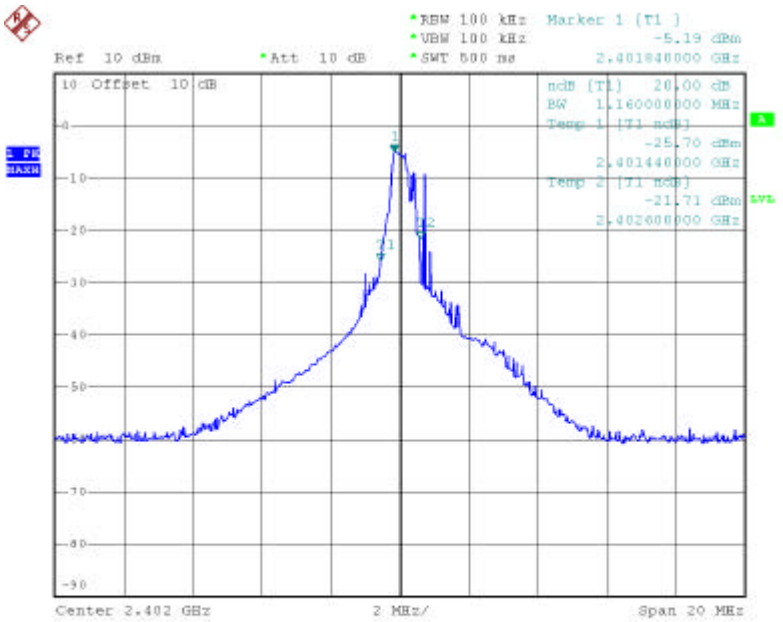
±150Hz

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	1160	--	N/A

Figure Channel 00:

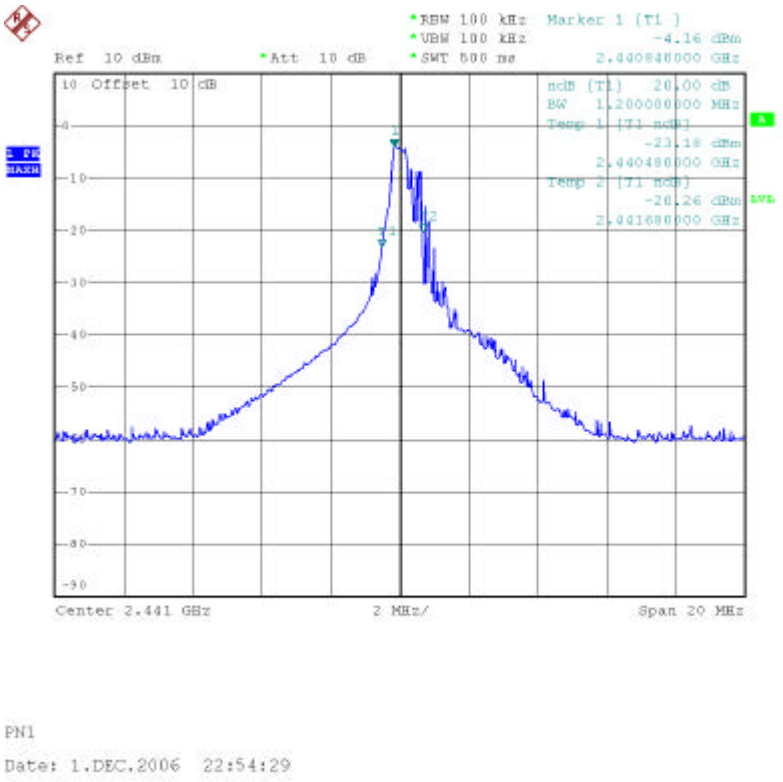


PN1
Date: 1.DEC.2006 21:53:48

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	1200	--	N/A

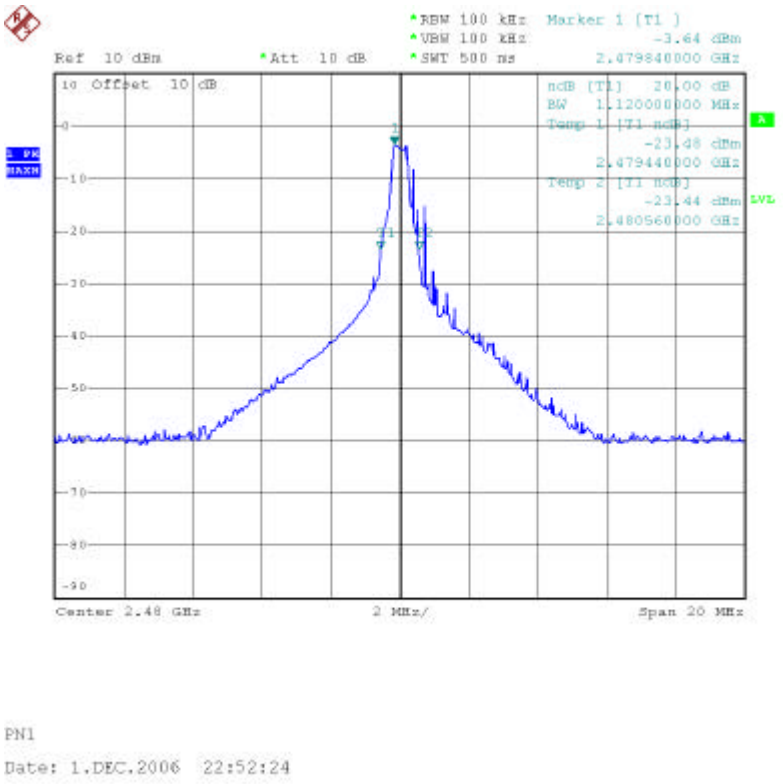
Figure Channel 39:



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	1120	--	N/A

Figure Channel 78:



10. EMI Reduction Method During Compliance Testing

No modification was made during testing.