



## Test Report

Product Name	Advanced iPod Controller with Bluetooth
Model No.	eX-10
FCC ID.	PPQALPINE

Applicant	LITE-ON TECHNOLOGY CORP.
Address	4F, 90, Chien 1 Road, Chung-Ho, Taipei Hsien 235, Taiwan, R.O.C.

Date of Receipt	Oct. 15, 2007
Issued Date	Nov. 09, 2007
Report No.	07A226R-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: Nov. 09, 2007

Report No.: 07A226R-RFUSP06V01



**Accredited by NIST (NVLAP)**  
 NVLAP Lab Code: 200347-0

Product Name	Advanced iPod Controller with Bluetooth
Applicant	LITE-ON TECHNOLOGY CORP.
Address	4F, 90, Chien 1 Road, Chung-Ho, Taipei Hsien 235, Taiwan, R.O.C.
Manufacturer	LITE-ON TECHNOLOGY CORP.
Model No.	eX-10
FCC ID.	PPQALPINE
Rated Voltage	AC 120V/60Hz
Working Voltage	DC 12V
Trade Name	ALPINE
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2006 ANSI C63.4: 2003
Test Result	Complied



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 ( Engineering Adm. Assistant / Leven Huang )



1313  
 ILAC MRA

Tested By : Dino Chen  
 ( Engineer / Dino Chen )

Approved By : Vincent Lin  
 ( Deputy Manager / Vincent Lin )



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Attachment 1: EUT Test Photographs  
Attachment 2: EUT Detailed Photographs

## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	Advanced iPod Controller with Bluetooth
Trade Name	ALPINE
FCC ID.	PPQALPINE
Model No.	eX-10
Frequency Range	2400 – 2483.5MHz
Channel Number	79
Type of Modulation	FHSS /GFSK
Type of Antenna	Printed
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”

#### Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	LITE-ON TECHNOLOGY CORP.	DA-103SB	0.9 dBi 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 Advance iPod Controller with 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 a Advance iPod Controller with 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
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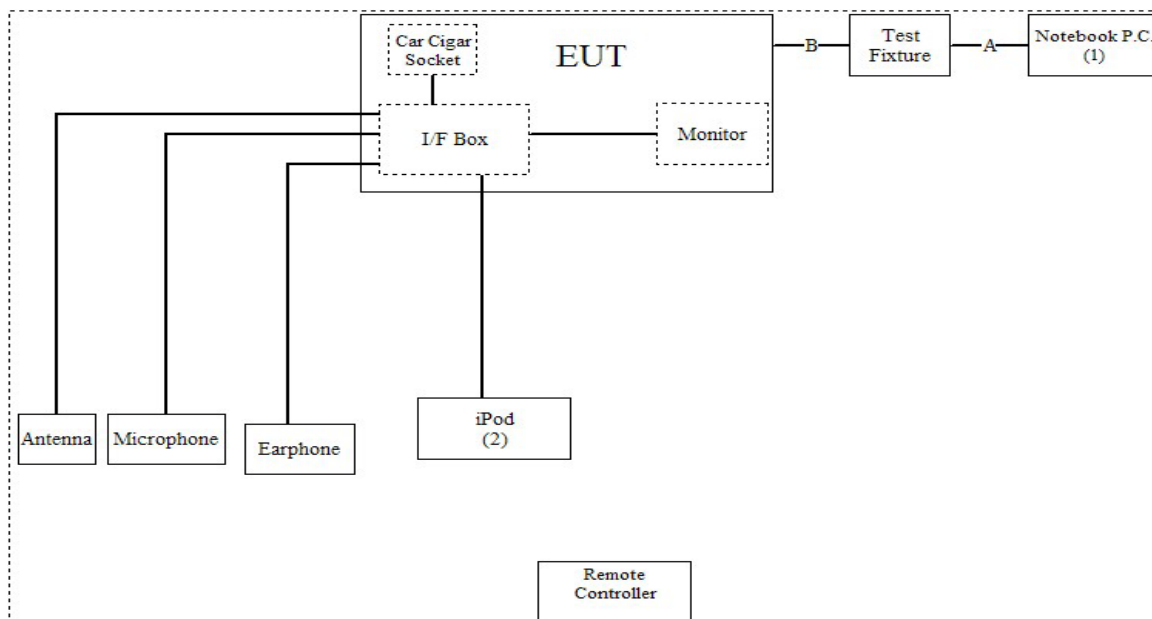
### 1.3. Tested System Details

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)	Notebook P.C.	ASUS	L4000L	L4418PDVP46PLC	Shielded,1.5m,with one ferrite core bonded.
(2)	iPod	Apple	A1199	5U705F9HVQ5	N/A

Signal Cable Type	Signal cable Description
A. RS232 Cable	Shielded, 1.2m
B. Signal Cable	Non-Shielded, 0.2m,four PCS.

### 1.4. Configuration of Tested System



### 1.5. EUT Exercise Software

- (1) Setup the EUT as shown in section 1.4.
- (2) Connect the Notebook PC to a Test Fixture via a RS-232 cable.
- (3) Execute “Bluetest3.EXE” on the notebook.
- (4) Setup the test channel and data rate.
- (5) Start the continuous transmission.
- (6) Verify that the EUT works correctly.



**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  
 Laboratory Division  
 7435 Oakland Mills Road  
 Columbia, MD 21046  
 Registration Number: 365520



Accredited by CNLA  
 Accreditation Number: 1313  
 Effective through: September 27, 2007



1313

ILAC MRA

Accredited by NVLAP  
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 Effective through: September 30, 2007



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FCC Accreditation Number: TW1013

## 2. Conducted Emission

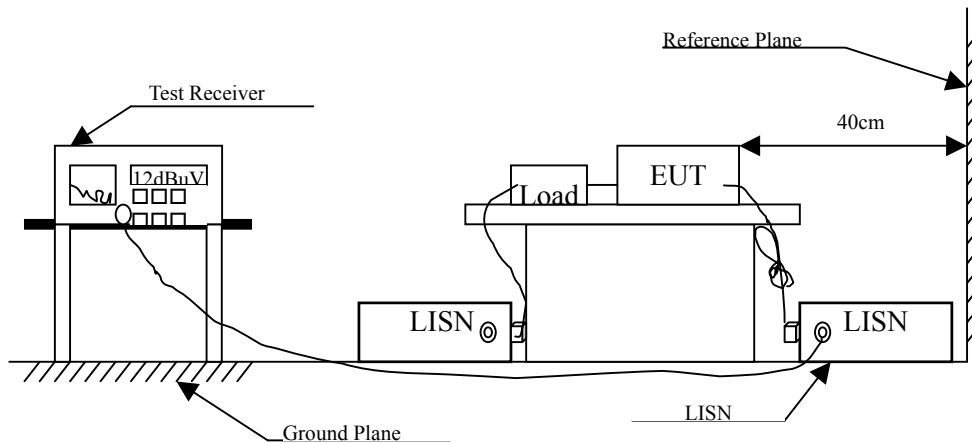
### 2.1. Test Equipment

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 30/825442/014	Feb., 2007	
2	L.I.S.N.	R & S	ESH3-Z5/825562/002	Feb., 2007	EUT
3	L.I.S.N.	R & S	ENV4200/848411/010	Feb., 2007	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2/100410	July, 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 <sup>(註)</sup>	56-46 <sup>(註)</sup>
0.50-5.0	56	46
5.0 - 30	60	50

## 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 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

Owing to the DC operation of EUT, this test item is not performed.

### 3. Peak Power Output

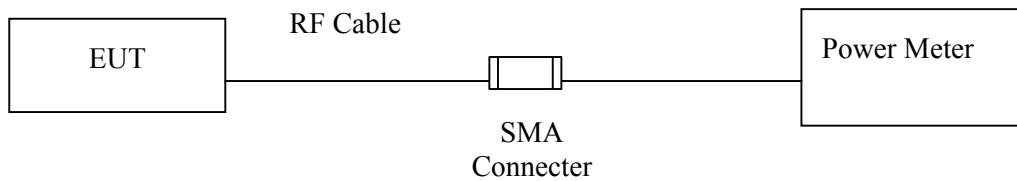
#### 3.1. Test Equipment

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

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Power Meter	Anritsu	ML2495A/6K00003357	May, 2007
X Power Sensor	Anritsu	MA2491A/034457	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 : Advanced iPod Controller with Bluetooth  
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	-2.7dBm	1 Watt= 30 dBm	Pass
Channel 39	2441.00	-2.24 dBm	1 Watt= 30 dBm	Pass
Channel 78	2480.00	-1.98 dBm	1 Watt= 30 dBm	Pass

#### 4. Radiated Emission

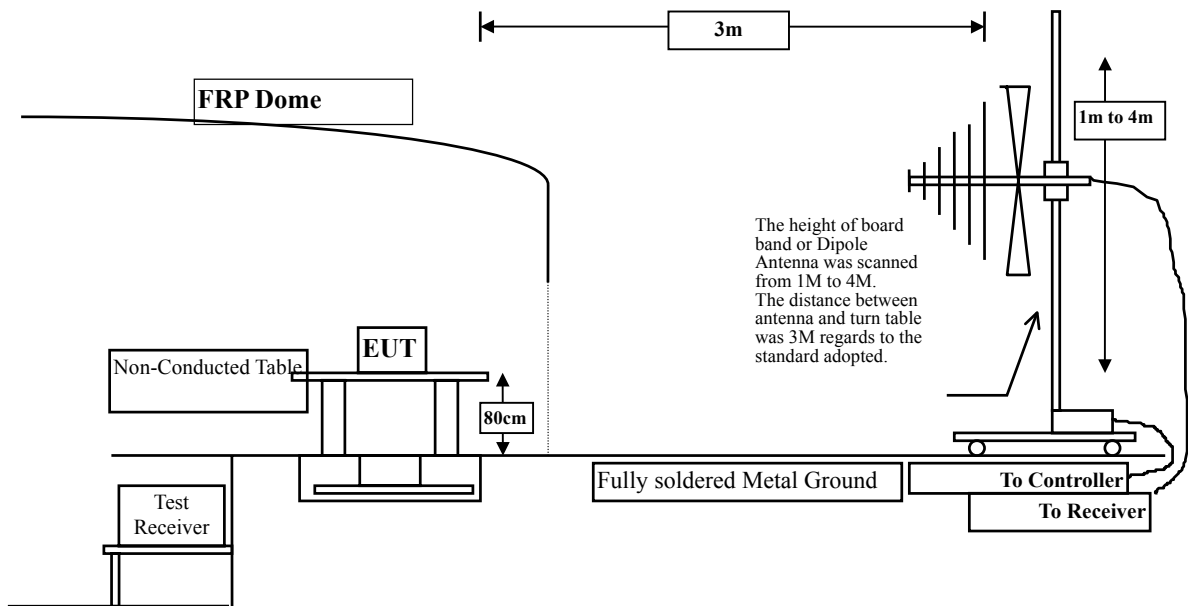
##### 4.1. Test Equipment

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2007
	X	Pre-Amplifier	HP	8447D/2944A09549	Sep., 2007
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2007
	X	Spectrum Analyzer	Advantest	R3162/91700283	Oct., 2007
	X	Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2007
	X	Controller	Quietek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

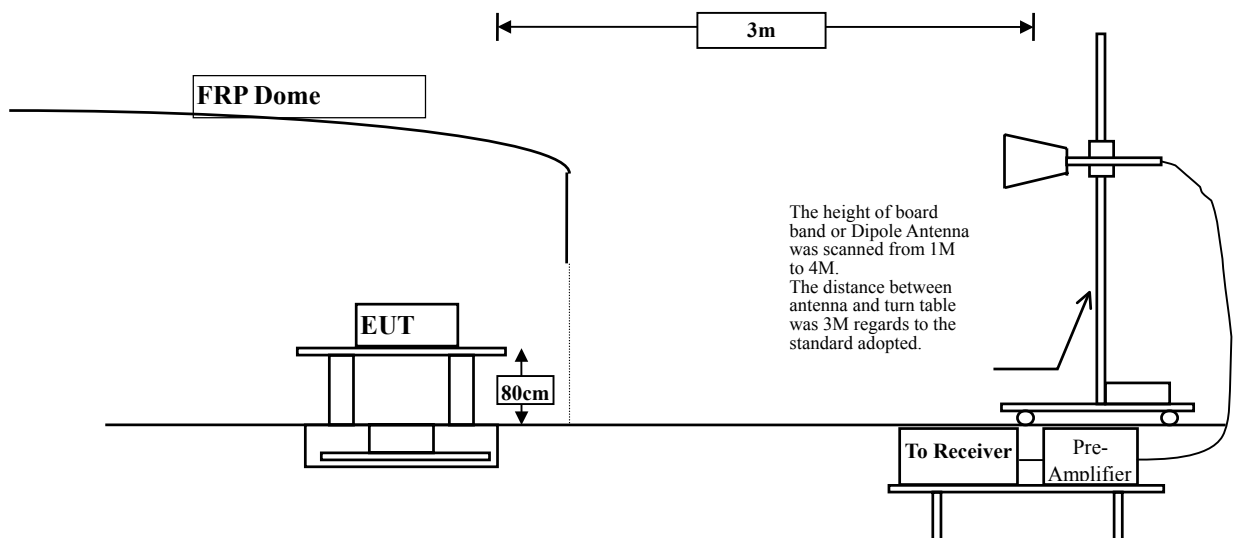
- Note:
1. All equipments are calibrated every one year.
  2. Test equipments marked by “X” are used to measure the final test results.

## 4.2. Test Setup

Below 1GHz



Above 1GHz





### 4.3. Limits

#### ➤ General Radiated Emission Limits

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

<b>FCC Part 15 Subpart C Paragraph 15.209 Limits</b>		
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 : Advanced iPod Controller with Bluetooth  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter (2402MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4804.000	2.888	45.640	48.528	-25.472	74.000
7206.000	9.442	46.310	55.751	-18.249	74.000
9608.000	10.594	45.200	55.794	-18.206	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
4804.000	2.888	42.110	44.998	-29.002	74.000
7206.000	9.442	41.280	50.721	-23.279	74.000
9608.000	10.484	39.650	50.134	-23.866	74.000
<b>Average Detector:</b>					
--					

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:10Hz; 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 : Advanced iPod Controller with Bluetooth  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4882.000	3.056	45.770	48.826	-25.174	74.000
7323.000	9.570	46.130	55.700	-18.300	74.000
9764.000	10.614	43.350	53.964	-20.036	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
4882.000	3.056	42.150	45.206	-28.794	74.000
7323.000	9.570	42.010	51.580	-22.420	74.000
9764.000	10.614	39.880	50.494	-23.506	74.000
<b>Average Detector:</b>					
--					

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:10Hz; 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 : Advanced iPod Controller with Bluetooth  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter (2480MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4960.000	3.237	44.600	47.837	-26.163	74.000
7440.000	9.689	43.170	52.858	-21.142	74.000
9920.000	10.742	39.650	50.392	-23.608	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
4960.000	3.237	45.080	48.317	-25.683	74.000
7440.000	9.689	40.410	50.098	-23.902	74.000
9920.000	10.742	36.040	46.782	-27.218	74.000
<b>Average Detector:</b>					
--					

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:10Hz; 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 : Advanced iPod Controller with Bluetooth  
 Test Item : General Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
214.669	-10.811	35.771	24.959	-18.541	43.500
280.762	-7.970	36.321	28.351	-17.649	46.000
412.946	-1.301	32.588	31.287	-14.713	46.000
519.860	0.389	32.046	32.436	-13.564	46.000
601.503	4.210	31.552	35.763	-10.237	46.000
725.912	3.407	27.225	30.632	-15.368	46.000
<b>Vertical</b>					
177.735	-5.647	33.476	27.829	-15.671	43.500
341.022	-6.262	35.380	29.118	-16.882	46.000
459.599	-1.870	31.219	29.349	-16.651	46.000
568.457	0.025	35.146	35.171	-10.829	46.000
688.978	1.409	33.516	34.925	-11.075	46.000
828.938	3.683	24.959	28.642	-17.358	46.000

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.

## 5. Band Edge

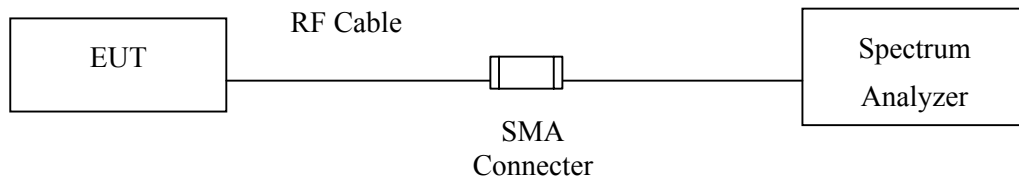
### 5.1. Test Equipment

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

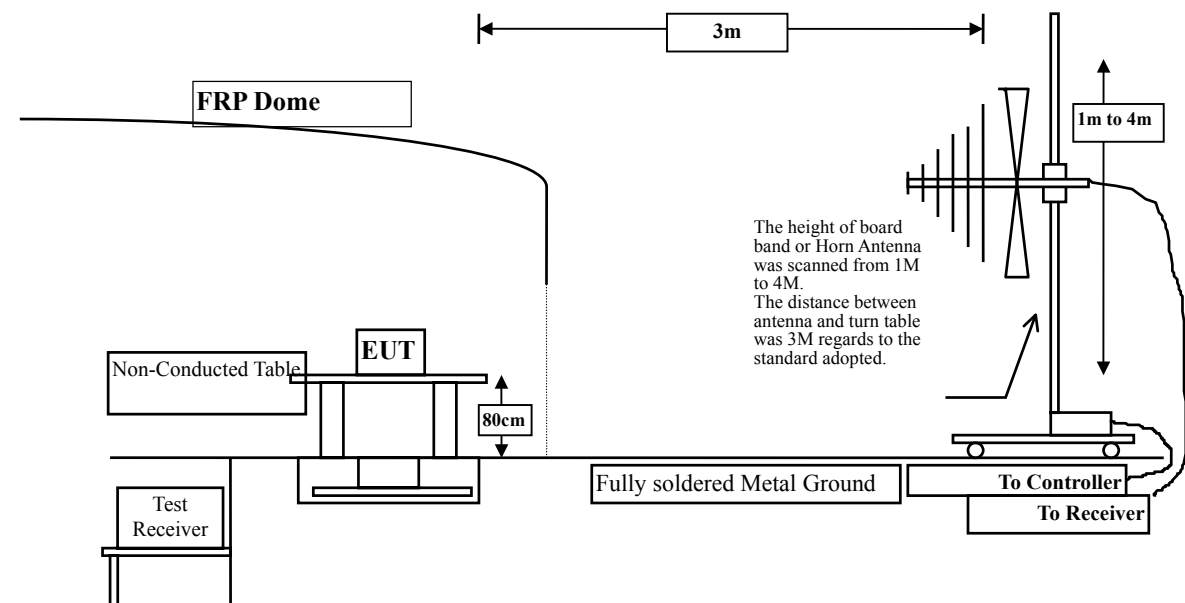
- Note:
1. All equipments are calibrated every one year.
  2. The test equipments marked by “X” are used to measure the final test results.

### 5.2. Test Setup

#### RF Conducted Measurement:



#### RF Radiated Measurement:



### 5.3. Limit

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

Conducted is  $\pm 1$  MHz

Radiated is  $\pm 3.9$  dB



**5.6. Test Result of Band Edge**

Product : Advanced iPod Controller with Bluetooth  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter (2402MHz)

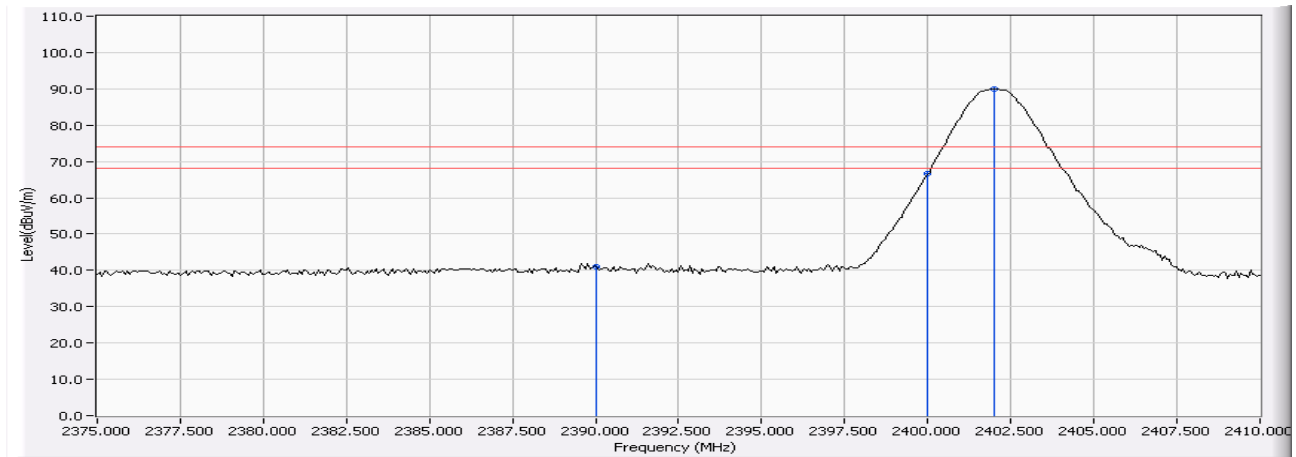
**RF Radiated Measurement:**

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)	2390.000	-1.407	42.544	41.137	74.00	54.00	Pass
00 (Peak)	2400.000	-1.363	67.882	66.519	74.00	54.00	Pass
00 (Peak)	2402.000	-1.357	91.212	89.855	74.00	54.00	Pass

**Figure Channel 00: Horizontal**



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

Product : Advanced iPod Controller with Bluetooth  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter (2402MHz)

**RF Radiated Measurement:**

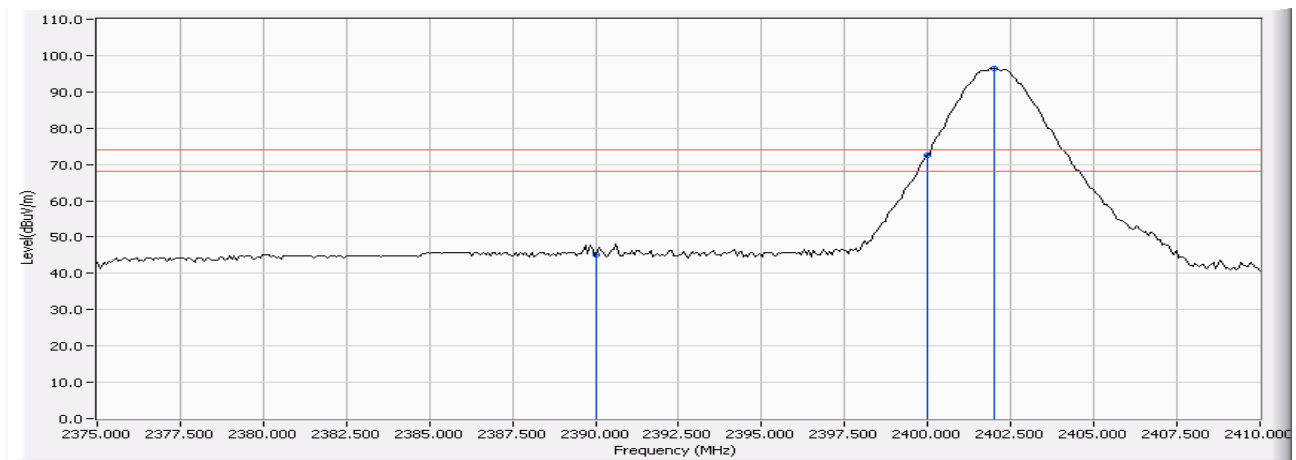
Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
00	<2400	>20	Pass

**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)	2390.000	-1.407	46.569	45.162	74.00	54.00	Pass
00 (Peak)	2400.000	-1.363	73.920	72.557	74.00	54.00	Pass
00 (Peak)	2402.000	-1.357	97.680	96.323	74.00	54.00	Pass

**Figure Channel 00:**

**Vertical**



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

Product : Advanced iPod Controller with Bluetooth  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter (2480MHz)

**RF Radiated Measurement:**

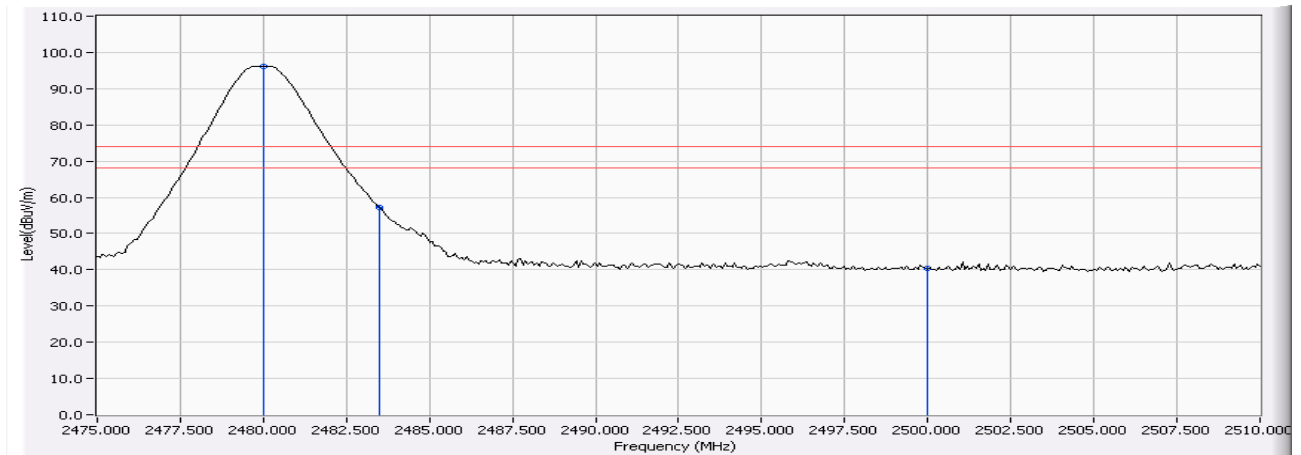
Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
78	>2483.5	>20	Pass

**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)	2480.000	-1.048	97.121	96.073	74.00	54.00	Pass
78(Peak)	2483.500	-1.037	58.296	57.259	74.00	54.00	Pass
78(Peak)	2500.000	-0.988	41.258	40.270	74.00	54.00	Pass
78(Average)	2483.500	-1.037	28.666	27.629	74.00	54.00	Pass

**Figure Channel 78:**

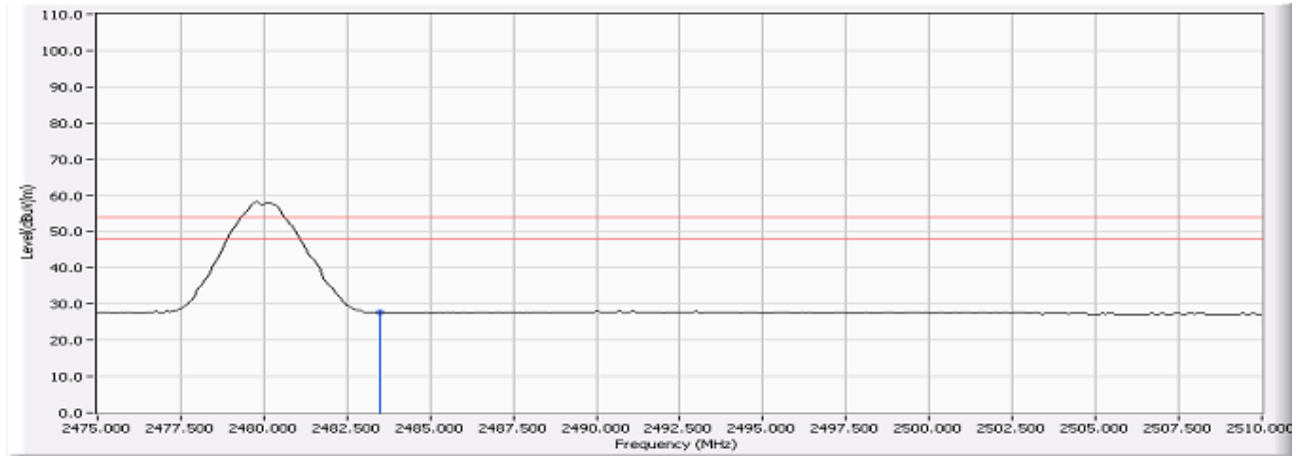
**Horizontal (Peak)**



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

Figure Channel 78:

Horizontal (Average)



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

Product : Advanced iPod Controller with Bluetooth  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter (2480MHz)

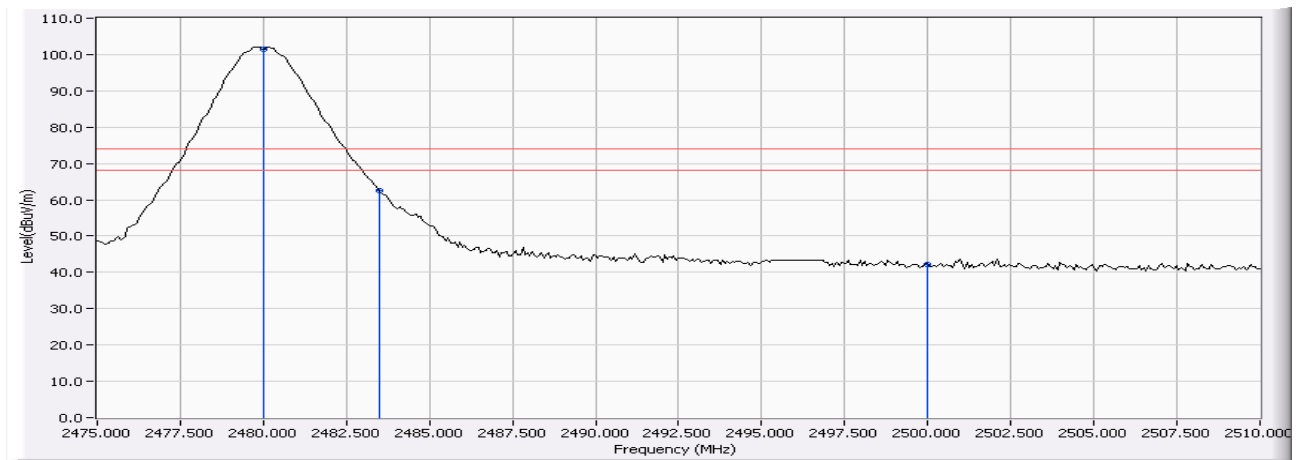
**RF Radiated Measurement:**

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

**RF Radiated Measurement (Vertical):**

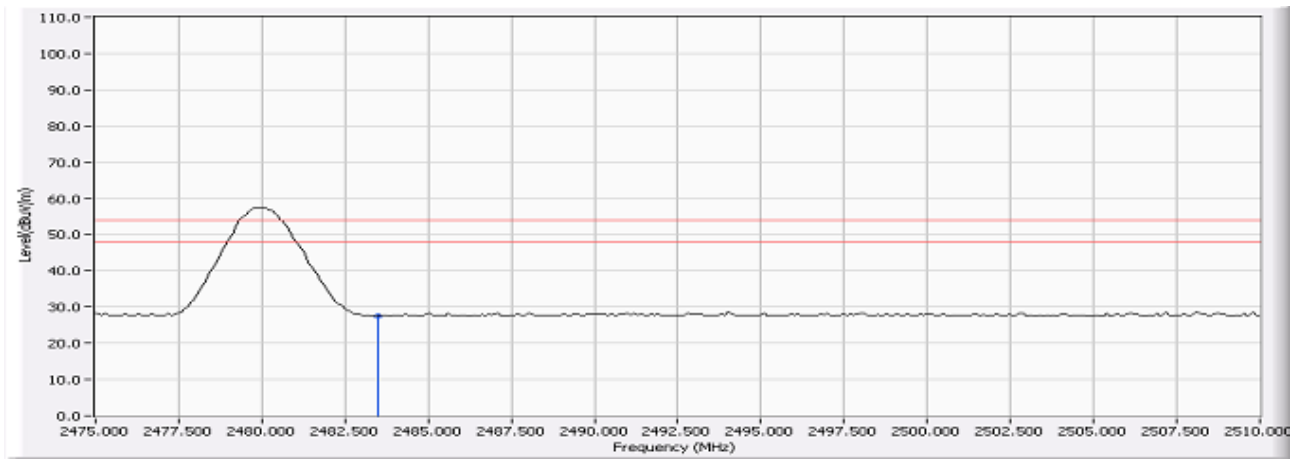
Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78(Peak)	2480.000	-1.048	102.401	101.353	74.00	54.00	Pass
78(Peak)	2483.500	-1.037	63.469	62.432	74.00	54.00	Pass
78(Peak)	2500.000	-0.988	43.220	42.232	74.00	54.00	Pass
78(Average)	2483.500	-1.037	28.570	27.533	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=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**

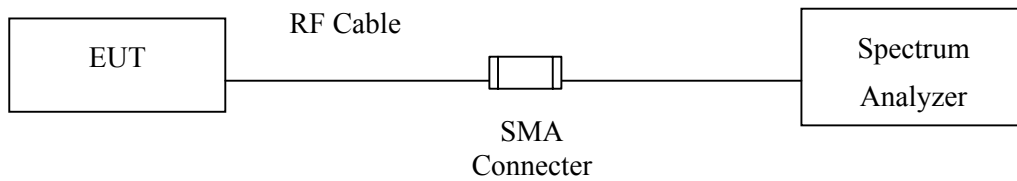
**6.1. Test Equipment**

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

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Spectrum Analyzer	HP	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**

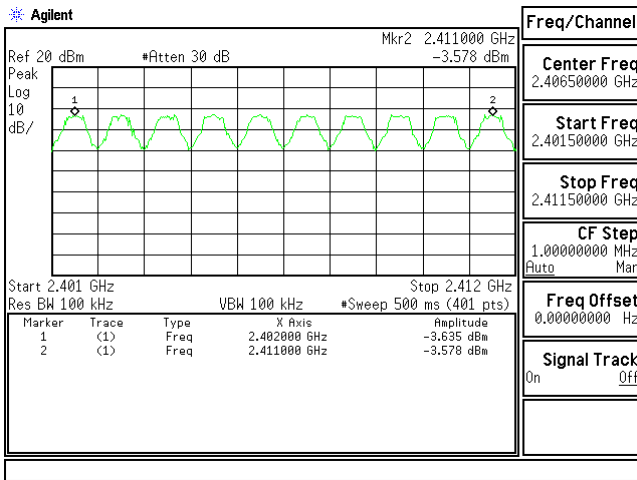
N/A

### 6.5. Test Result of Channel Number

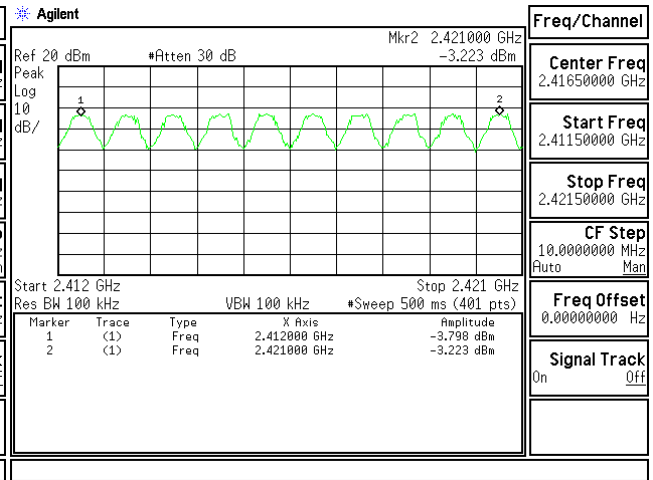
Product : Advanced iPod Controller with Bluetooth  
 Test Item : Channel Number  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter

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

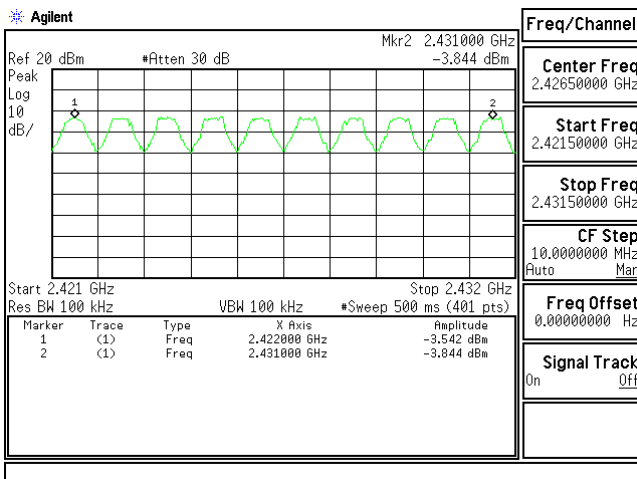
**2402-2411MHz**



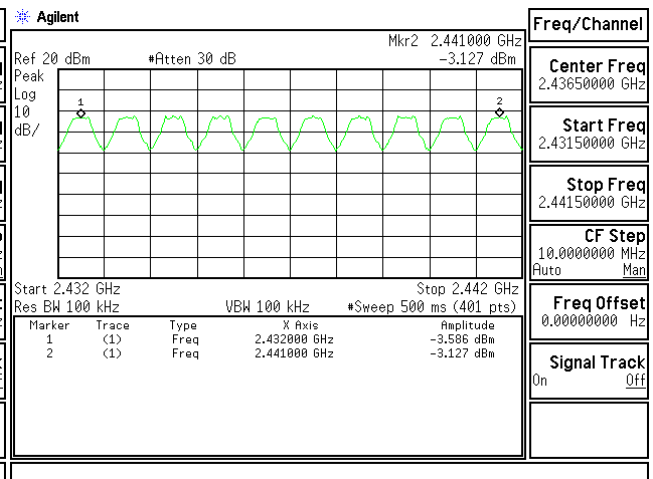
**2412-2421MHz**



**2422-2431MHz**

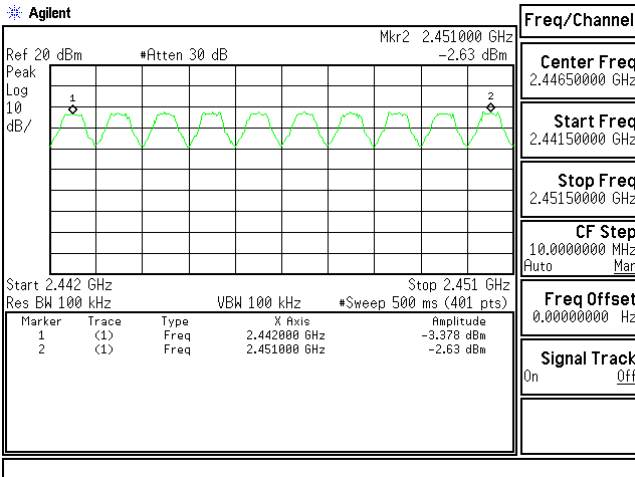


**2432-2441MHz**

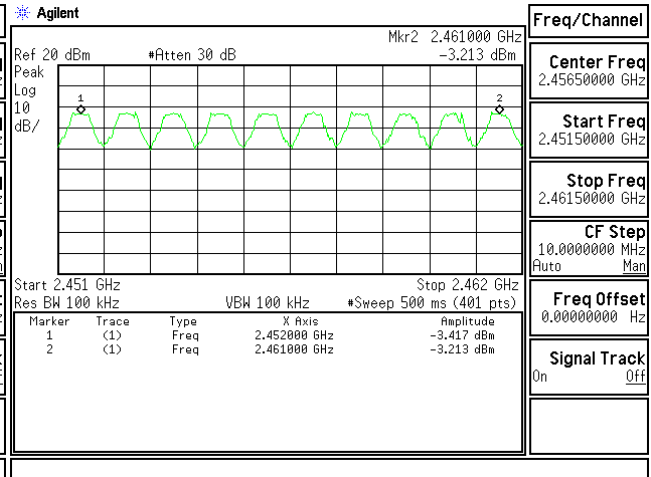




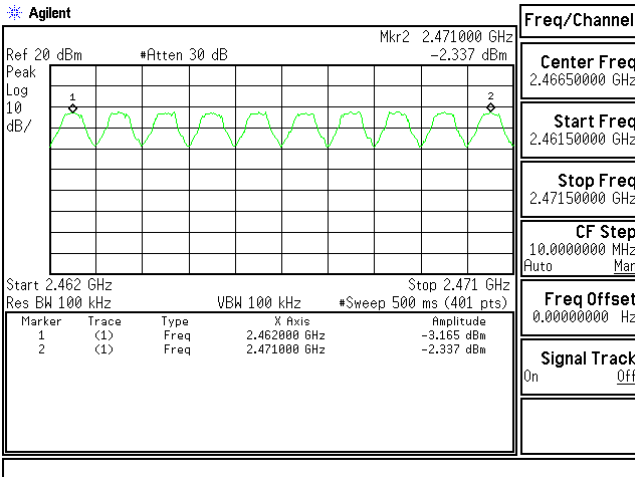
**2442-2451MHz**



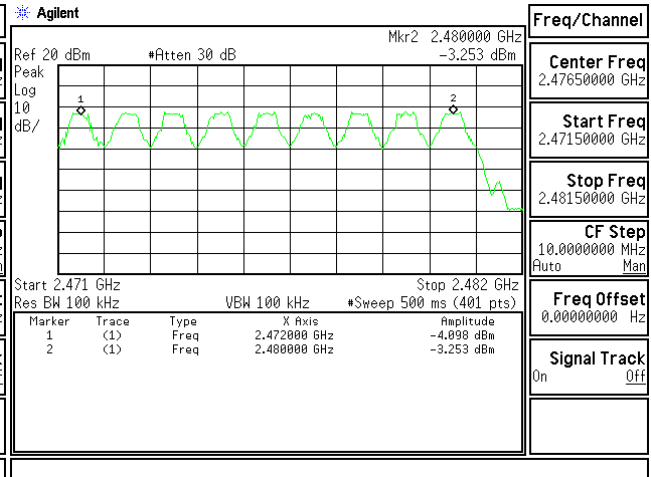
**2452-2461MHz**



**2462-2471MHz**



**2472-2480MHz**



**7. Channel Separation**

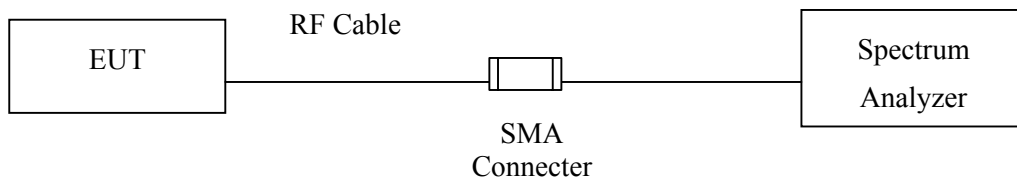
**7.1. Test Equipment**

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

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Spectrum Analyzer	HP	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**

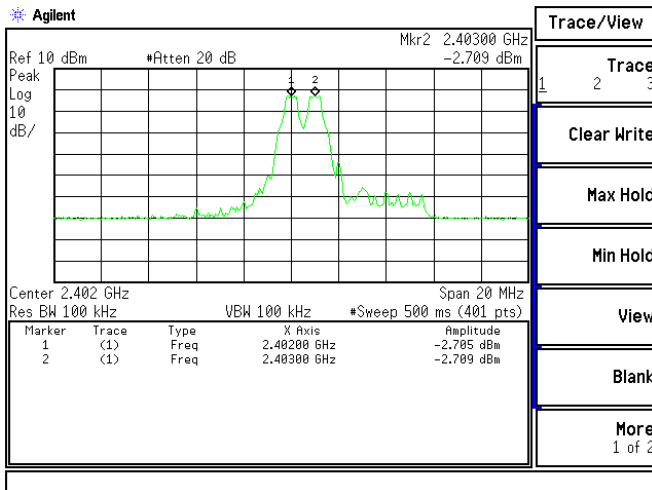
± 150Hz

### 7.5. Test Result of Channel Separation

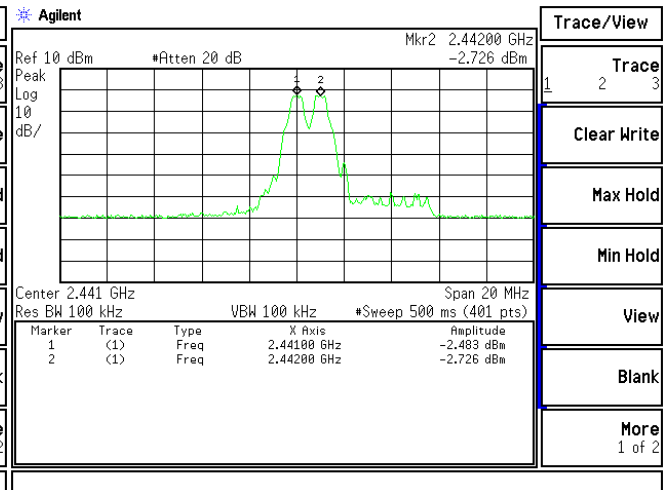
Product : Advanced iPod Controller with Bluetooth  
 Test Item : Channel Separation  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter

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

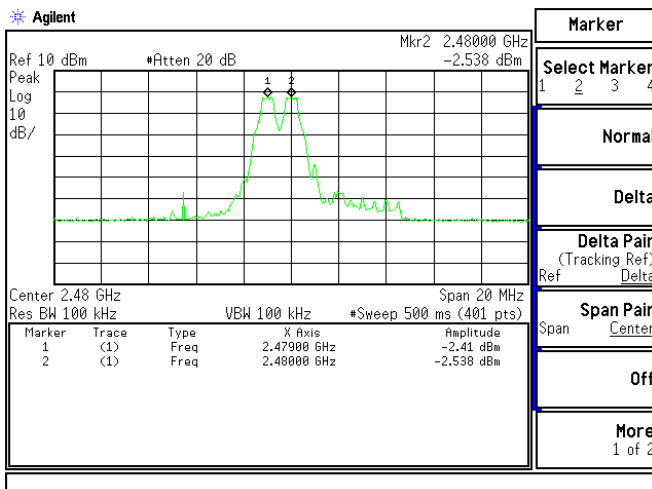
Channel 00 2402MHz



Channel 39 2441MHz



Channel 78 2480 MHz



**8. Dwell Time**

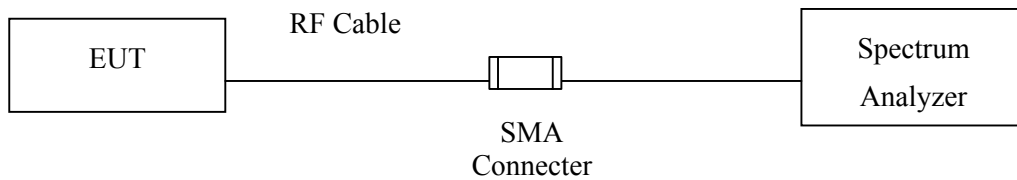
**8.1. Test Equipment**

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

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Spectrum Analyzer	HP	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

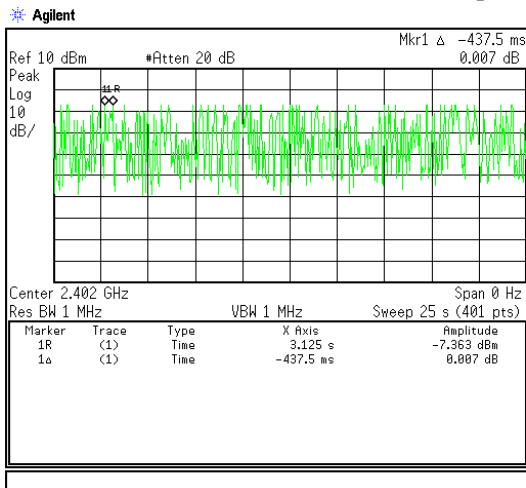
### 8.5. Test Result of Dwell Time

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

Channel No.	Frequency (MHz)	Time Interval between hops (ms)	Transmission Time (us)	Dwell Time (ms)	Limit (ms)	Result
00	2402	254.2	3135	389.7167585	400	Pass
39	2441	254.2	3173	394.440598	400	Pass
78	2480	381.3	3135	259.8111723	400	Pass

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

CH 2402MHz Time Interval between hops



**Marker**

Select Marker 1 2 3 4

Normal

Delta

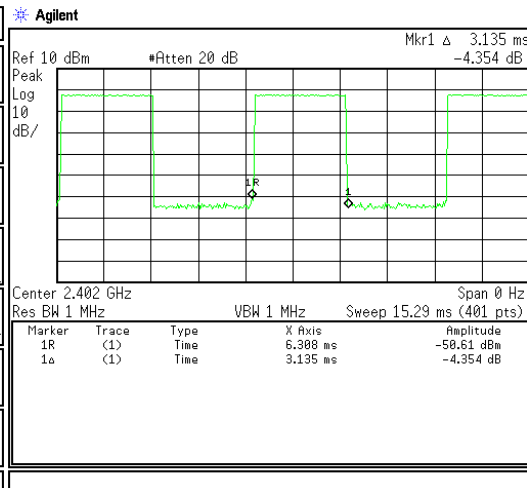
Delta Pair (Tracking Ref) Ref Delta

Span Pair Span Center

Off

More 1 of 2

Transmission Time



**Amplitude**

Ref Level 10.00 dBm

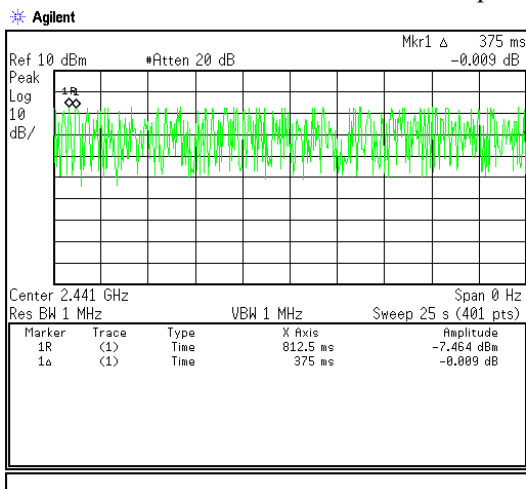
Attenuation 20.00 dB Auto Man

Scale/Div 10.00 dB

Scale Type Log Lin

More 1 of 3

CH 2441MHz Time Interval between hops



**Marker**

Select Marker 1 2 3 4

Normal

Delta

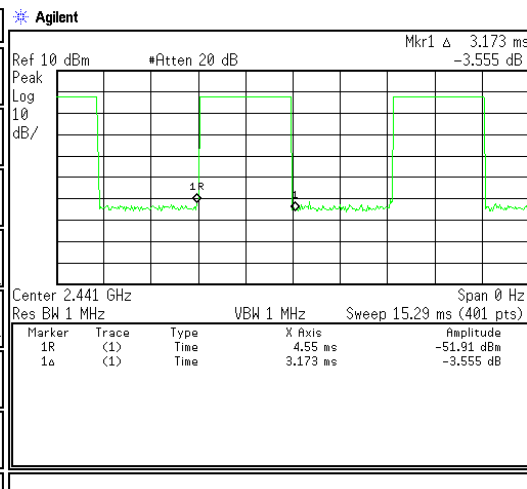
Delta Pair (Tracking Ref) Ref Delta

Span Pair Span Center

Off

More 1 of 2

Transmission Time



**Marker**

Select Marker 1 2 3 4

Normal

Delta

Delta Pair (Tracking Ref) Ref Delta

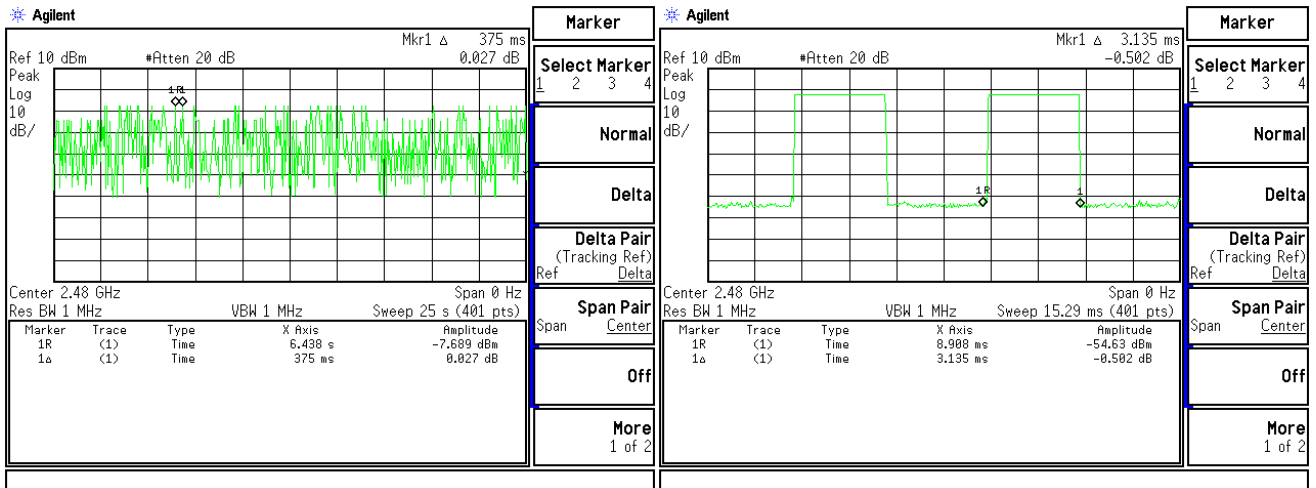
Span Pair Span Center

Off

More 1 of 2

CH 2480MHz Time Interval between hops

Transmission Time



Note: The dwell times of the packet type DH5 are tested.

**9. Occupied Bandwidth**

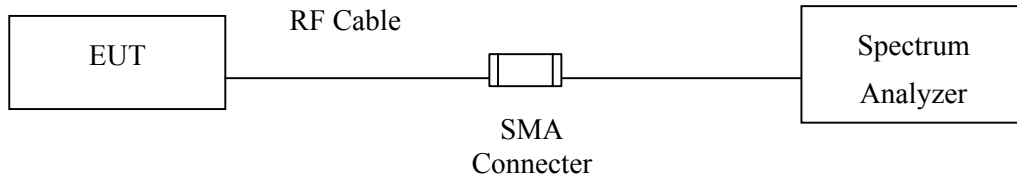
**9.1. Test Equipment**

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

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Spectrum Analyzer	HP	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**

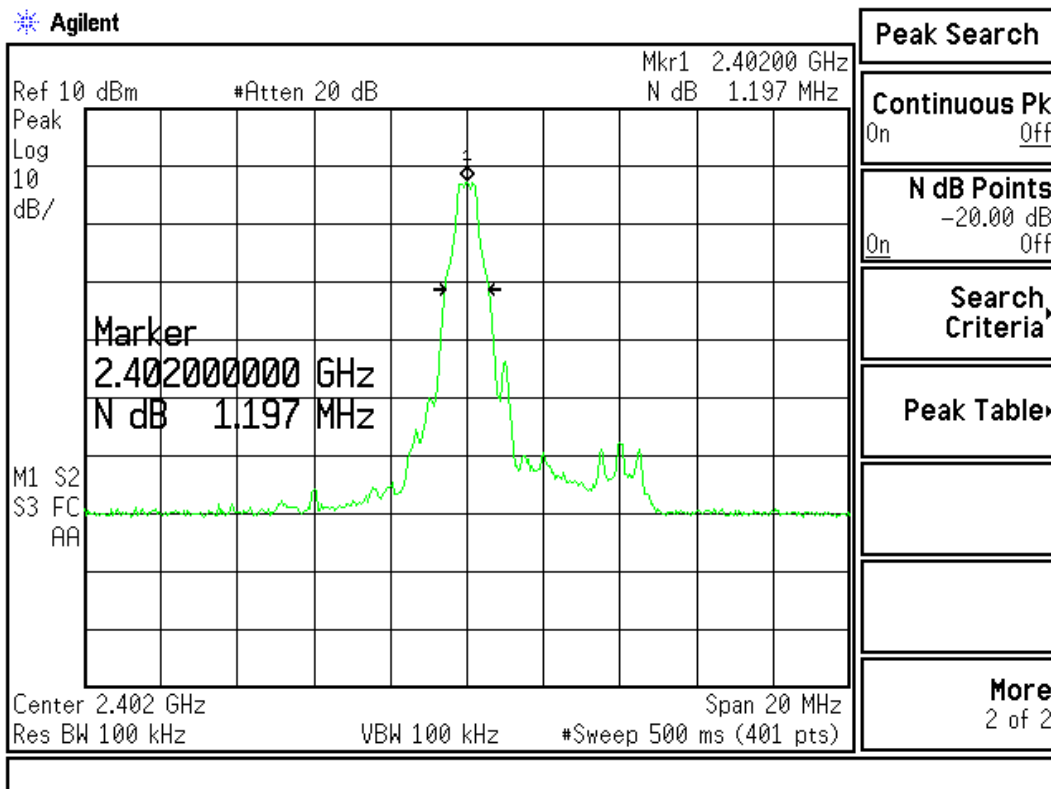
± 150Hz

### 9.5. Test Result of Occupied Bandwidth

Product : Advanced iPod Controller with Bluetooth  
 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	1197	--	NA

Figure Channel 00:

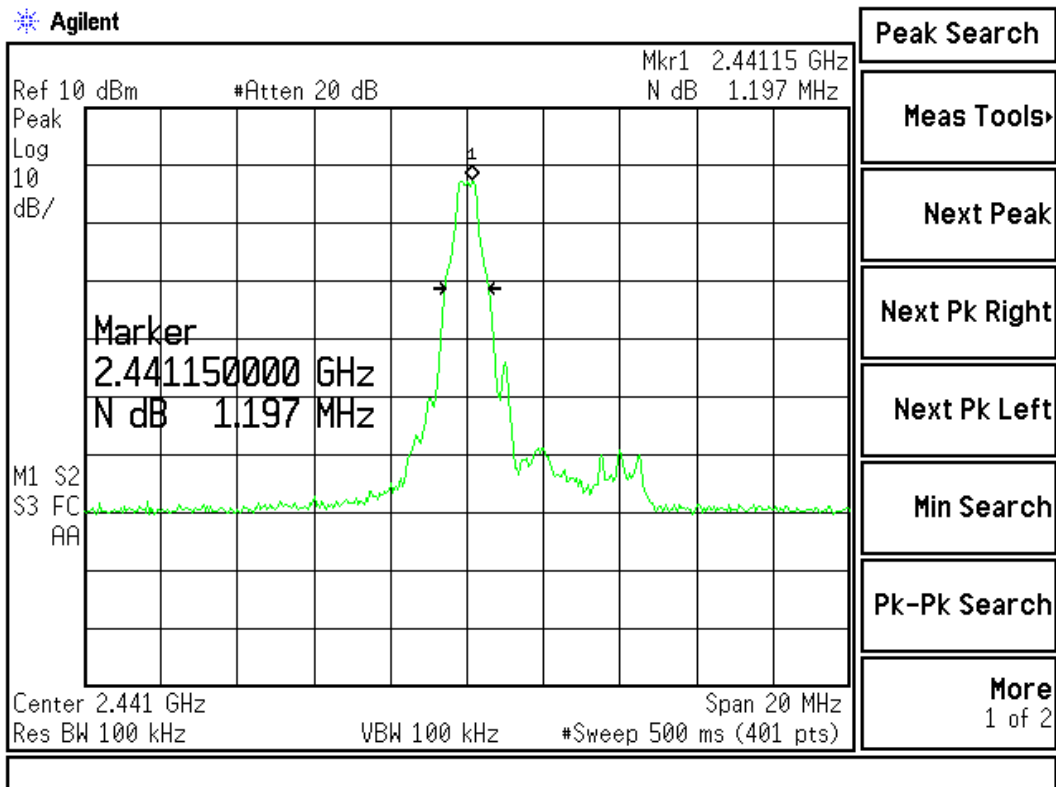




Product : Advanced iPod Controller with Bluetooth  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter (2441MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
39	2441	1197	--	NA

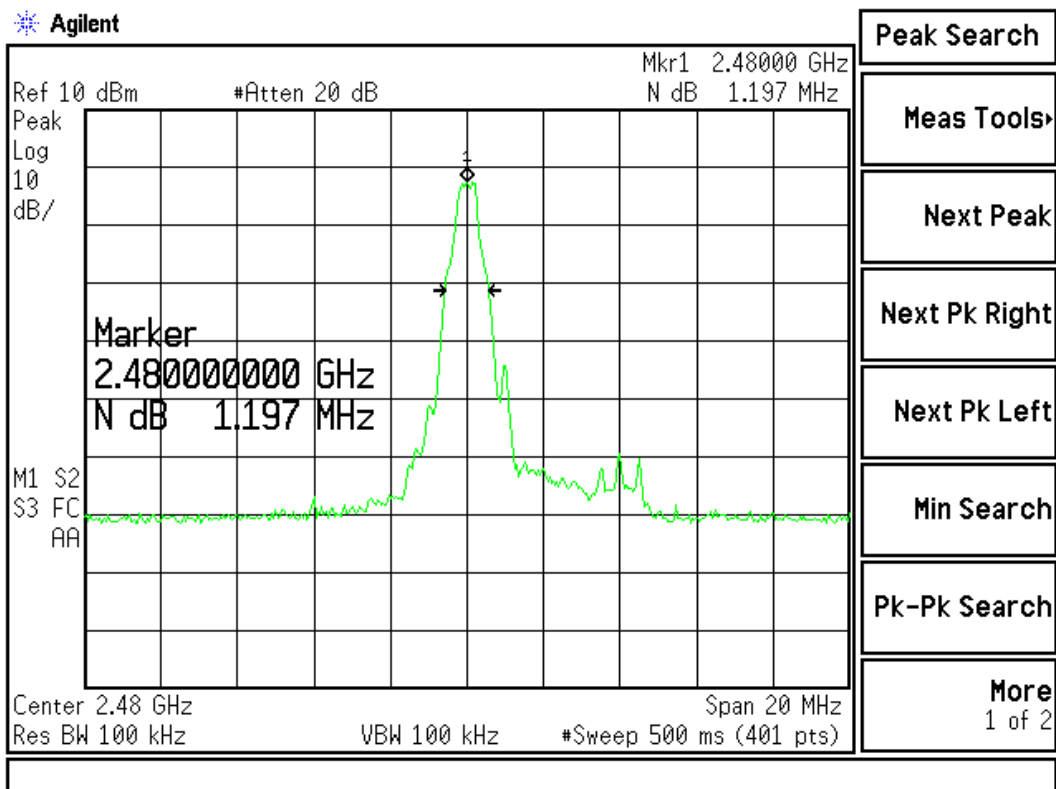
**Figure Channel 39:**



Product : Advanced iPod Controller with Bluetooth  
 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:**



## 10. EMI Reduction Method During Compliance Testing

No modification was made during testing.