

The logo for the Federal Communications Commission (FCC), consisting of the letters 'F' and 'C' in a stylized, bold, black font, with a circle around the 'C'.

Test Report

Product Name : USB Dongle
Model No. : DG-07A, DG-07A+
FCC ID. : QLHCAT0305

Applicant : EPOX COMPUTER CO., LTD.
Address : 10 F., 346, Chung San Rd., Sec. 2 Chung Ho City, Taipei
Hsien 235 Taiwan R.O.C.

Date of Receipt : Dec. 12, 2005
Issued Date : Dec. 21, 2005
Report No. : 05CL071-RF-US-P06V01

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. 21, 2005

Report No.: 05CL071-RF-US-P06V01



Product Name : USB Dongle
Applicant : EPOX COMPUTER CO., LTD.
Address : 10 F., 346, Chung San Rd., Sec. 2 Chung Ho City, Taipei Hsien
235 Taiwan R.O.C.
Manufacturer : EPOX COMPUTER CO., LTD.
Model No. : DG-07A, DG-07A+
FCC ID. : QLHCAT0305
Rated Voltage : AC 120V/60Hz
Trade Name : EPoX
Applicable Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.247: 2005
ANSI C63.4: 2003

Test Result : Complied



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Documented By :



(Gina Chen)



Tested By :



(Tim Sung)



Approved By :



(Gene Chang)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name : USB Dongle
 Trade Name : EPoX
 FCC ID. : QLHCAT0305
 Model No. : DG-07A, DG-07A+
 Frequency Range : 2402 – 2480 MHz
 Antenna Gain : Refer to the table “Antenna List”
 Channel Number : 79
 Type of Modulation : FHSS
 Antenna Type : Chip Antenna
 Channel Control : Auto

Antenna List

No.	Manufacturer	Model No.	Part No.	Peak Gain
1	Rain Sun	DG-07A, DG-07A+	AN9520	1.5dBi

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 USB Dongle including a 2.4GHz Bluetooth transceiver.
2. The EUT has two models for different exterior.
3. These tests are 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.
4. Regarding to the operation frequency, the lowest, middle, and highest frequency are selected to perform the test.
5. This device is a composite device in accordance with Part 15 Subpart B regulations. The function for the receiver was measured and made a test report that the report number is 05CL071-RF-US-P01V01, certified under Declaration of Conformity.
6. Quietek verified among construction and function in typical operation, then shown in this test report.

1.2. Operational Description

The EUT is a USB Dongle with 79 channels.

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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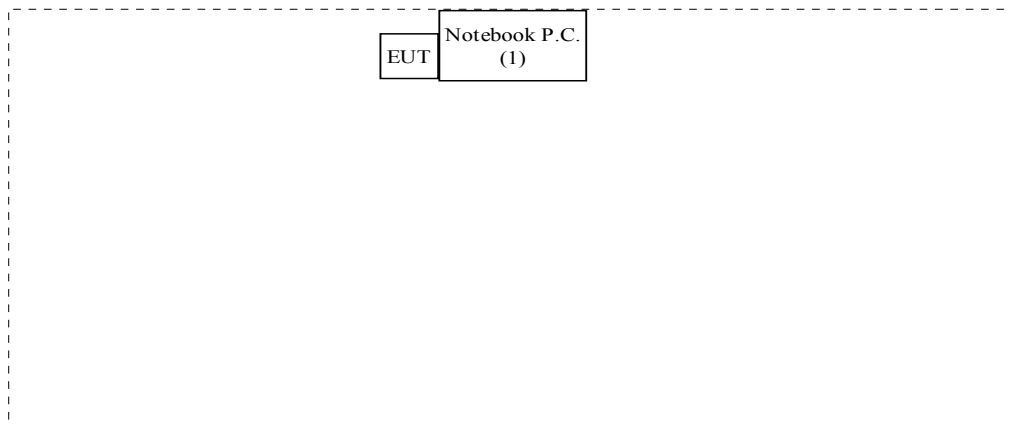
1.3. Tested System Details

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.	FCC ID	Power Cord
(1) Notebook PC	DELL	PPT	N/A	DoC	Non-Shielded, 0.8m

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	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: June 22, 2001 File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2



July 03, 2001 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



2. Conducted Emission

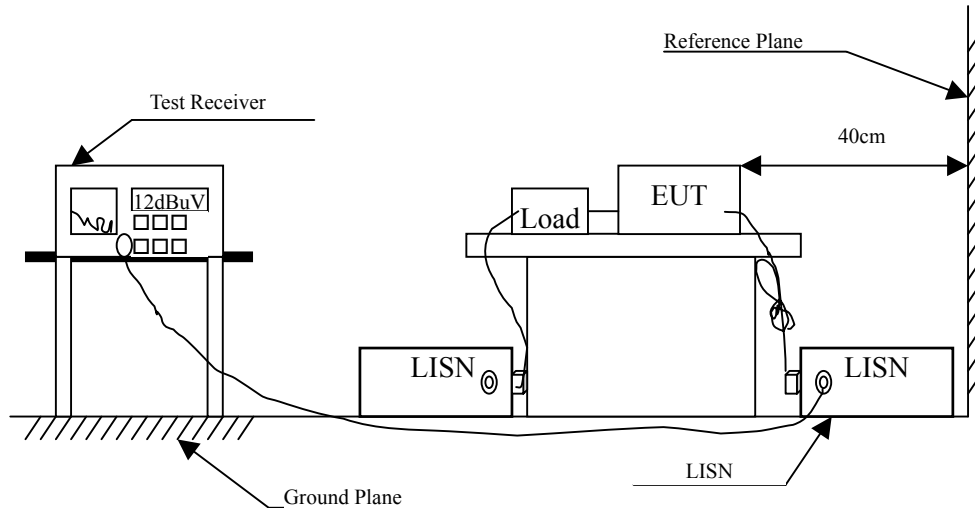
2.1. Test Equipment

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, 2005	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2005	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2005	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2005	
5	No.1 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 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

The measurement uncertainty is defined as ± 2.02 dB

2.6. Test Result of Conducted Emission

Product : USB Dongle
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 1: Transmitter (Channel 39)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
Quasi-Peak					
0.197	0.669	41.870	42.539	-22.118	64.657
0.213	0.557	37.400	37.957	-26.243	64.200
*0.224	0.479	43.870	44.349	-19.536	63.886
0.240	0.369	36.650	37.019	-26.410	63.429
0.353	0.300	29.530	29.830	-30.370	60.200
1.478	0.330	30.440	30.770	-25.230	56.000
Average					
0.197	0.669	19.750	20.419	-34.238	54.657
0.213	0.557	18.030	18.587	-35.613	54.200
*0.224	0.479	28.210	28.689	-25.196	53.886
0.240	0.369	17.790	18.159	-35.270	53.429
0.353	0.300	17.010	17.310	-32.890	50.200
1.478	0.330	19.690	20.020	-25.980	46.000

Note:

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

Product : USB Dongle
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 1: Transmitter (Channel 39)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
Quasi-Peak					
0.205	0.300	40.160	40.460	-23.969	64.429
*0.228	0.300	44.260	44.560	-19.211	63.771
0.338	0.303	30.130	30.433	-30.196	60.629
1.685	0.340	26.160	26.500	-29.500	56.000
4.357	0.409	19.740	20.149	-35.851	56.000
9.185	0.490	30.110	30.600	-29.400	60.000
Average					
0.205	0.300	19.630	19.930	-34.499	54.429
*0.228	0.300	31.400	31.700	-22.071	53.771
0.338	0.303	16.690	16.993	-33.636	50.629
1.685	0.340	13.920	14.260	-31.740	46.000
4.357	0.409	10.030	10.439	-35.561	46.000
9.185	0.490	24.420	24.910	-25.090	50.000

Note:

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

3. Peak Power Output

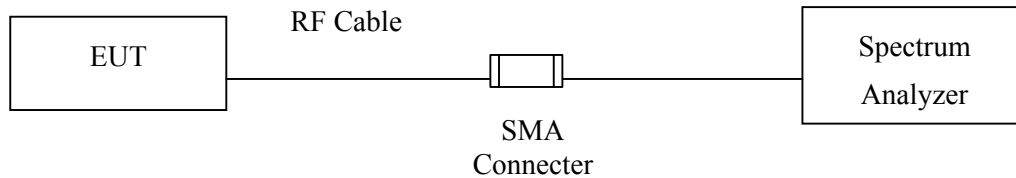
3.1. Test Equipment

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

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI26 / 838786/004	May, 2005

Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.
2. Mark "X" test instruments are used to measure the final test results.

3.2. Test Setup



3.3. Limit

The maximum peak power shall be less 1Watt.

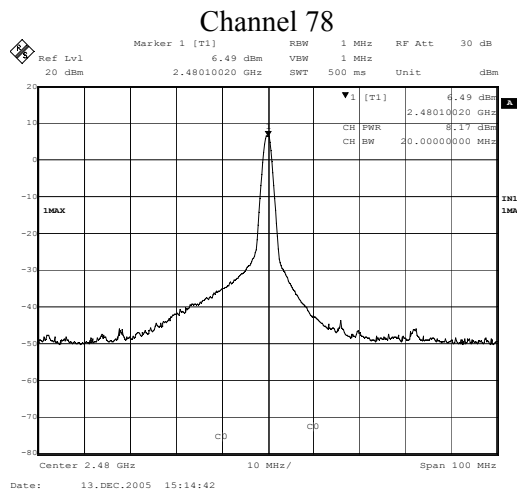
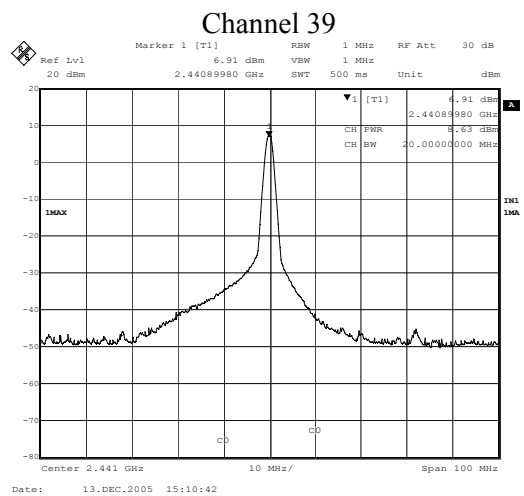
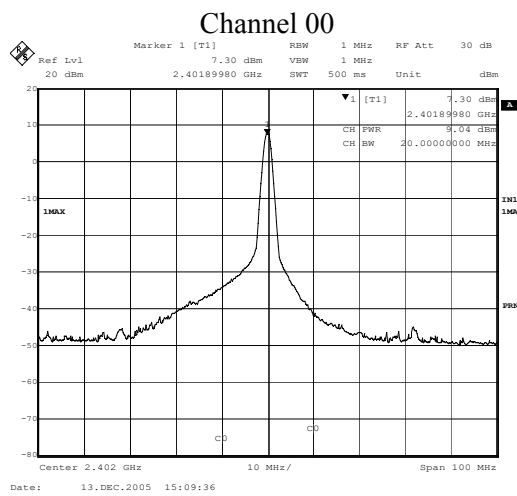
3.4. Uncertainty

The measurement uncertainty is defined as ± 1.27 dB

3.5. Test Result of Peak Power Output

Product : USB Dongle
 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	9.04dBm	1 Watt= 30 dBm	Pass
Channel 39	2441.00	8.63dBm	1 Watt= 30 dBm	Pass
Channel 78	2480.00	8.17dBm	1 Watt= 30 dBm	Pass



Note:

1. Receiver setting (Peak Detector): RBW: 1MHz; VBW: 1MHz; Span: 100MHz ◦

4. Radiated Emission

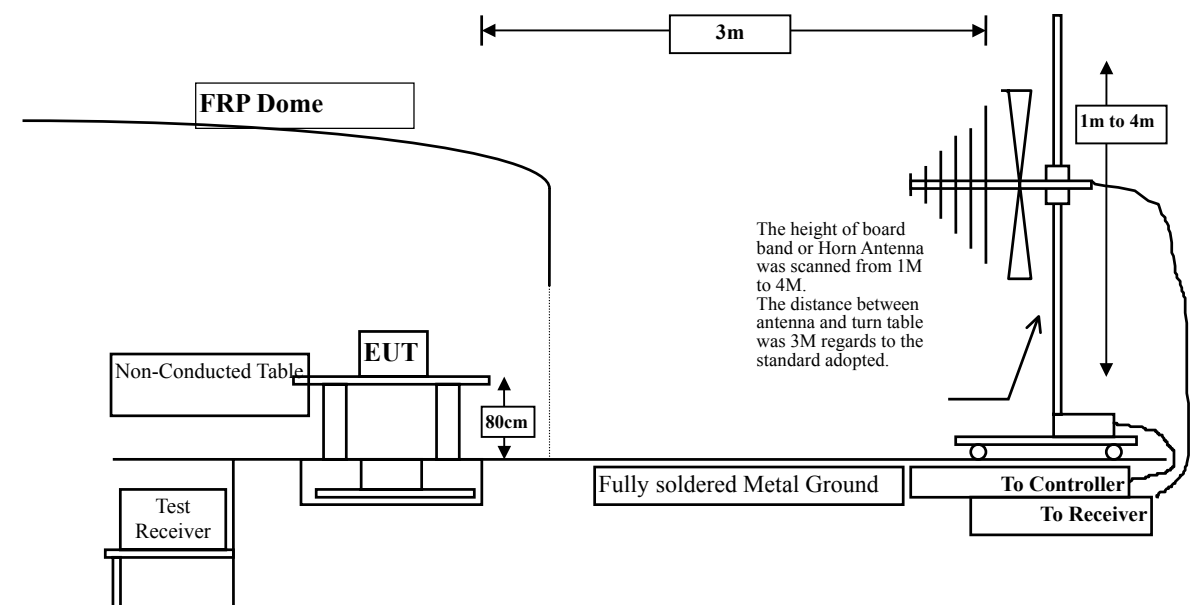
4.1. Test Equipment

The following test equipment 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, 2005
	Spectrum Analyzer	Advantest	R3162/ 00803480	May, 2005
	Pre-Amplifier	Advantest	BB525C/ 3307A01812	May, 2005
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Sep., 2005
☐ Site # 2	Test Receiver	R & S	ESCS 30 / 836858 / 022	May, 2005
	Spectrum Analyzer	Advantest	R3162 / 100803466	May, 2005
	Pre-Amplifier	Advantest	BB525C/3307A01814	May, 2005
	Bilog Antenna	SCHAFFNER	CBL6112B / 2705	May, 2005
	Horn Antenna	ETS	3115 / 0005-6160	Sep., 2005
	Pre-Amplifier	QTK	QTK-AMP-01/ 0001	May, 2005
☒ Site # 3	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2005
	Spectrum Analyzer	Advantest	R3162 / 100803480	May, 2005
	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2005
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2005
	Horn Antenna	ETS	3115 / 0005-6160	July, 2005
	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2005

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.
2. Mark "X" test instruments 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 (R&S Test Receiver ESCS 30)is 120 kHz, above 1GHz are 1 MHz.

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

4.5. Uncertainty

The measurement uncertainty above 1G is defined as ± 3.9 dB
under 1G is defined as ± 3.8 dB

4.6. Test Result of Radiated Emission

Product : USB Dongle
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (Channel 00)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal

Peak Detector:

4804.000	5.118	40.130	45.249	-28.721	73.970
7206.000	9.901	42.982	52.882	-21.088	73.970
9608.000	13.039	39.988	53.026	-20.944	73.970

Average Detector:

--

Vertical

Peak Detector:

4804.000	5.118	40.384	45.503	-28.467	73.970
7206.000	9.901	41.235	51.135	-22.835	73.970
9608.000	13.039	39.898	52.936	-21.034	73.970

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:30Hz; Span:20MHz °
4. Emission Level = Reading Level + Correct Factor– PreAMP.
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 : USB Dongle
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 39)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4882.000	5.435	40.991	46.427	-27.543	73.970
7323.000	10.261	40.188	50.449	-23.521	73.970
9764.000	13.003	40.708	53.710	-20.260	73.970
Average Detector:					
--					
Vertical					
Peak Detector:					
4882.000	5.435	40.934	46.370	-27.600	73.970
7323.000	10.261	40.507	50.768	-23.202	73.970
9764.000	13.003	40.269	53.271	-20.699	73.970
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:30Hz; Span:20MHz °
4. Emission Level = Reading Level + Correct Factor– PreAMP.
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 : USB Dongle
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 78)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4960.000	5.630	40.806	46.436	-27.534	73.970
7440.000	10.694	40.525	51.218	-22.752	73.970
9920.000	13.114	40.758	53.872	-20.098	73.970
Average Detector:					
--					
Vertical					
Peak Detector:					
4960.000	5.630	41.631	47.261	-26.709	73.970
7440.000	10.694	40.722	51.415	-22.555	73.970
9920.000	13.114	40.014	53.128	-20.842	73.970
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:30Hz; Span:20MHz °
4. Emission Level = Reading Level + Correct Factor– PreAMP.
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 : USB Dongle
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 00)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
240.975	12.077	18.563	30.640	-15.360	46.000
*287.050	13.473	17.783	31.256	-14.744	46.000
367.080	15.893	12.775	28.668	-17.332	46.000
432.550	17.666	12.581	30.247	-15.753	46.000
500.450	18.352	12.686	31.038	-14.962	46.000
767.200	22.117	8.683	30.800	-15.200	46.000
Vertical					
192.480	9.382	16.098	25.480	-18.020	43.500
299.170	13.747	15.883	29.630	-16.370	46.000
318.580	14.076	11.564	25.640	-20.360	46.000
432.550	19.299	5.451	24.750	-21.250	46.000
*478.620	18.643	11.697	30.340	-15.660	46.000
636.250	20.713	7.837	28.550	-17.450	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “ * ” means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product : USB Dongle
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 39)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
151.250	11.593	14.377	25.970	-17.530	43.500
265.230	14.027	14.634	28.661	-17.339	46.000
364.650	15.770	12.689	28.459	-17.541	46.000
500.450	18.352	14.626	32.978	-13.022	46.000
531.970	18.666	11.280	29.946	-16.054	46.000
*815.700	21.623	16.834	38.457	-7.543	46.000
Vertical					
119.720	11.494	19.506	31.000	-12.500	43.500
192.480	9.382	16.448	25.830	-17.670	43.500
299.170	13.747	16.513	30.260	-15.740	46.000
393.750	17.620	8.770	26.390	-19.610	46.000
478.620	18.643	11.797	30.440	-15.560	46.000
*813.280	21.771	15.570	37.340	-8.660	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “ * ” means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product : USB Dongle
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 78)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
192.480	9.304	19.178	28.482	-15.018	43.500
287.050	13.473	17.613	31.086	-14.914	46.000
432.550	17.666	11.591	29.257	-16.743	46.000
478.620	18.930	12.777	31.707	-14.293	46.000
633.830	20.821	11.431	32.252	-13.748	46.000
*825.400	21.862	15.131	36.993	-9.007	46.000
Vertical					
240.980	12.464	16.027	28.490	-17.510	46.000
384.050	16.822	9.818	26.640	-19.360	46.000
478.620	18.643	11.697	30.340	-15.660	46.000
556.220	21.138	9.742	30.880	-15.120	46.000
696.880	20.633	10.937	31.570	-14.430	46.000
*827.830	21.428	14.782	36.210	-9.790	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “ * ” means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

5. Band Edge

5.1. Test Equipment

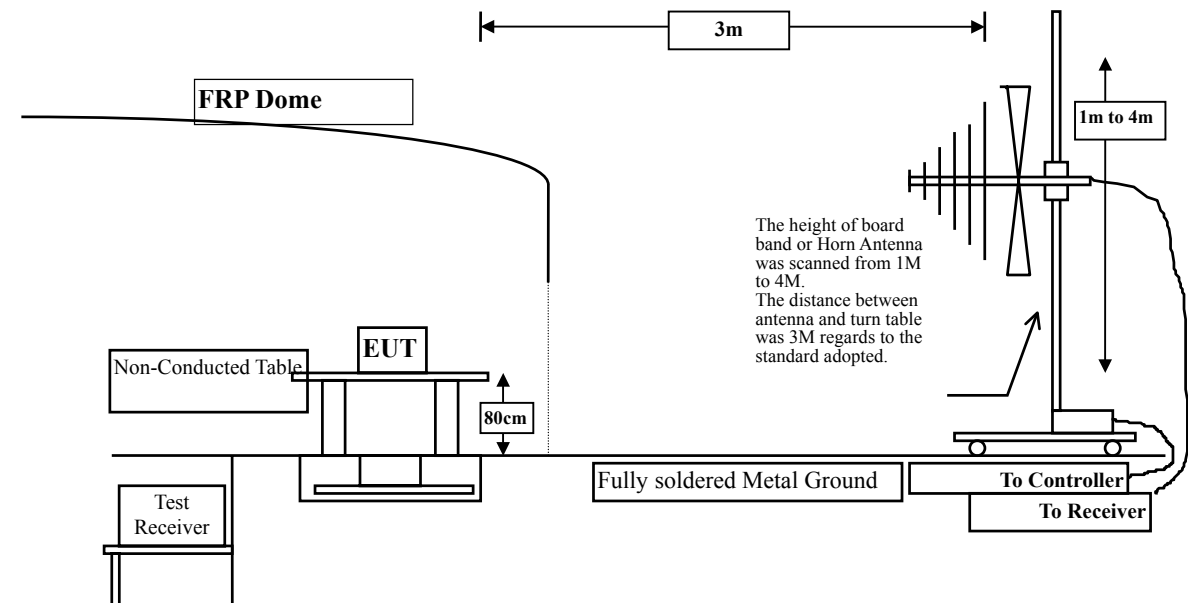
The following test equipments are used during the band edge tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Spectrum Analyzer	Advantest	R3272 / 72421194	May, 2005
X Test Receiver	R & S	ESCS 30 / 825442/14	May, 2005
X Spectrum Analyzer	HP	E4407B / US39440758	May, 2005
X Pre-Amplifier	HP	8447D/3307A01812	May, 2005
X Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2005
X Horn Antenna	EM	EM6917 / 103325	May, 2005

- Note:
1. All equipments that need to calibrate are with calibration period of 1 year.
 2. Mark "X" test instruments 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 (R&S Test Receiver ESCS 30)is 120 kHz, above 1GHz are 1 MHz.

5.5. Uncertainty

The measurement uncertainty above 1G is defined as ± 3.9 dB
under 1G is defined as ± 3.8 dB

5.6. Test Result of Band Edge

Product : USB Dongle
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 00)

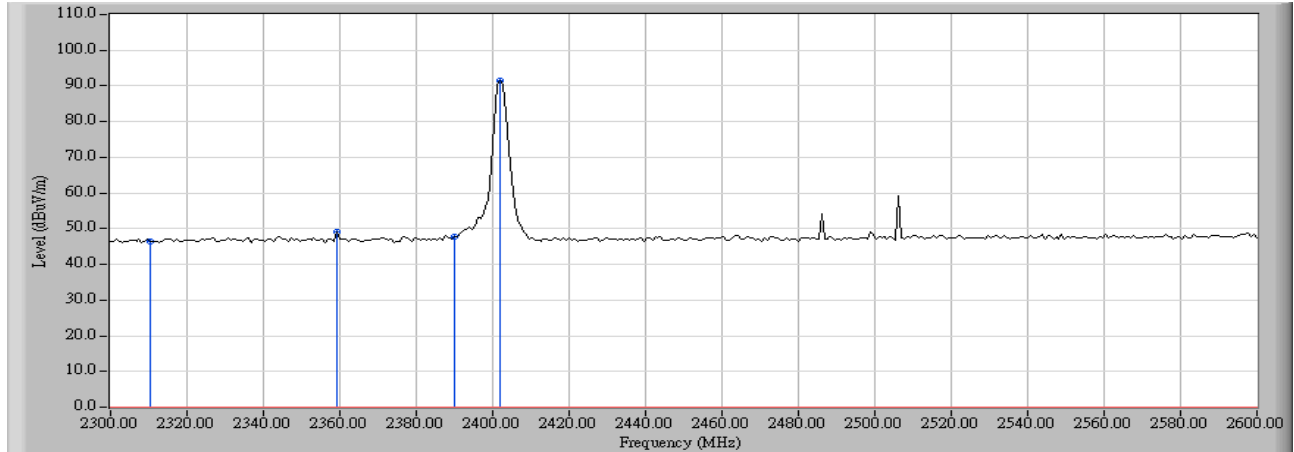
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
0	<2400	>20	Pass

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2359.250	50.153	49.260	74.00	54.00	Pass
00 (Average)	--	--	--	74.00	54.00	Pass

Figure Channel 00: (Horizontal)



Product : USB Dongle
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 00)

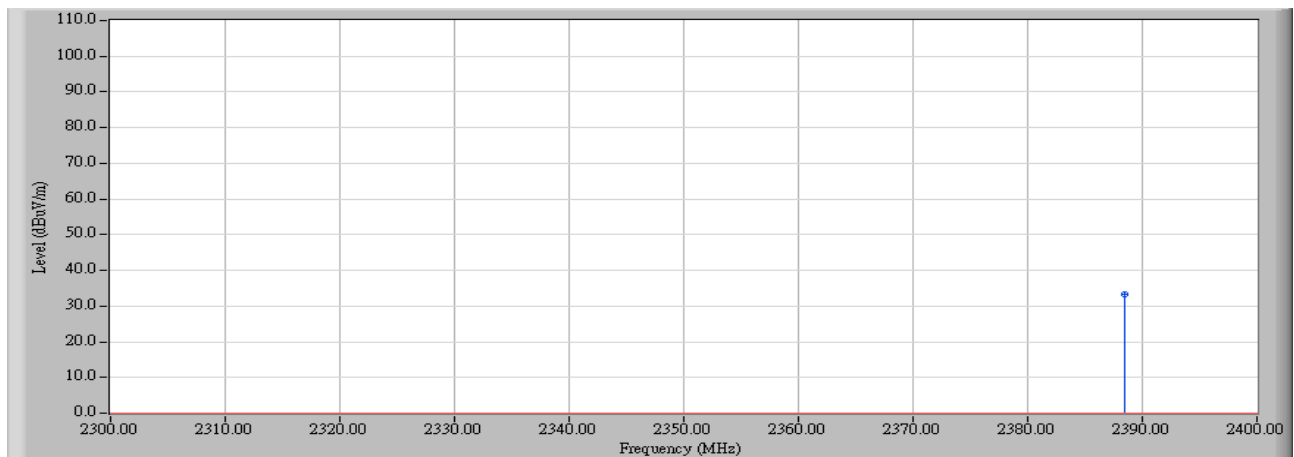
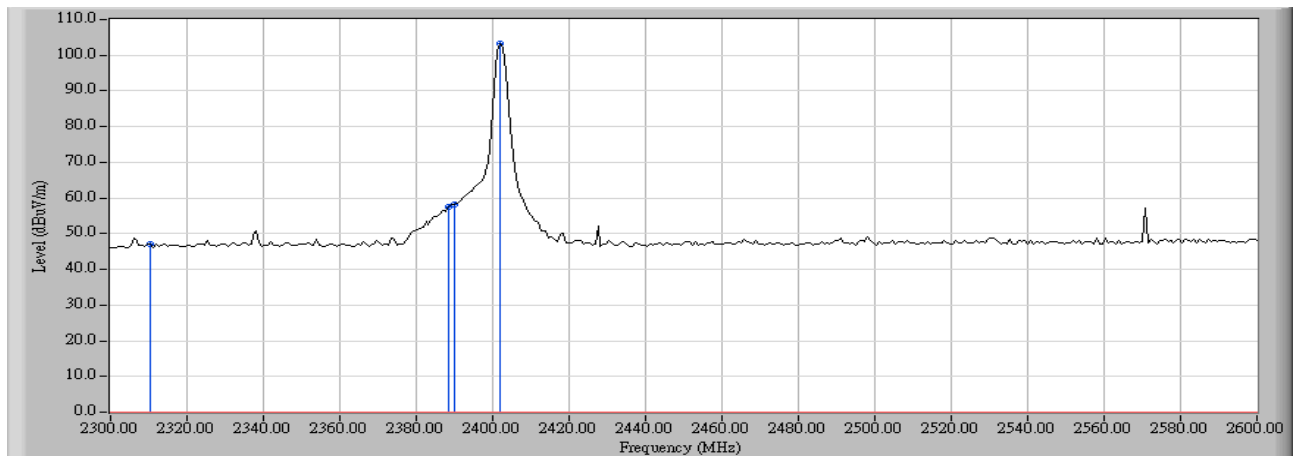
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
0	<2400	>20	Pass

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2388.500	58.250	57.490	74.00	54.00	Pass
00(Average)	2388.500	34.215	33.454	74.00	54.00	Pass

Figure Channel 00: (Vertical)

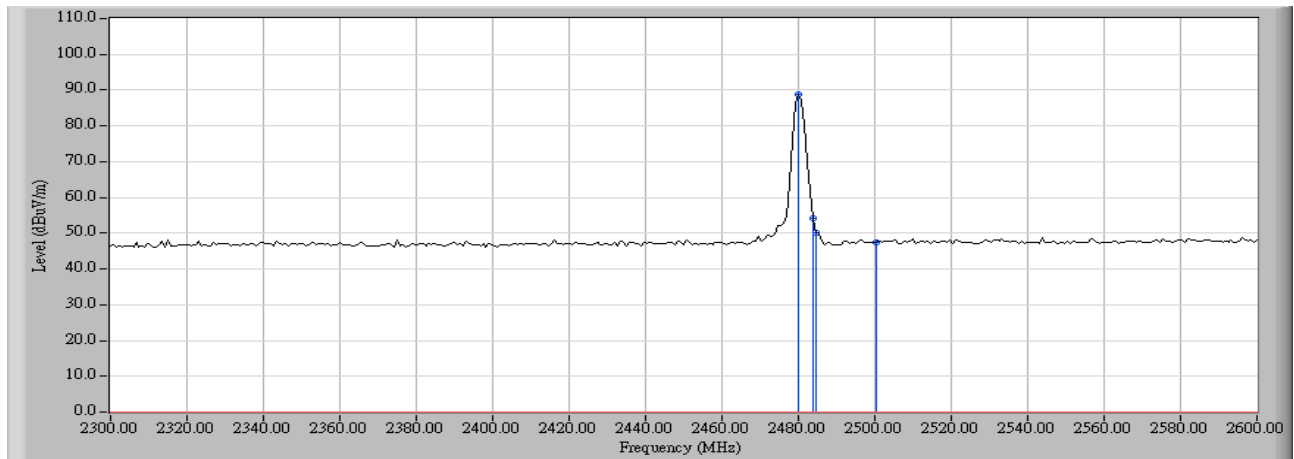


Product : USB Dongle
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 78)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78(Peak)	2484.500	50.676	50.240	74.00	54.00	Pass
78(Average)	--	--	--	74.00	54.00	Pass

Figure Channel 78: (Horizontal)

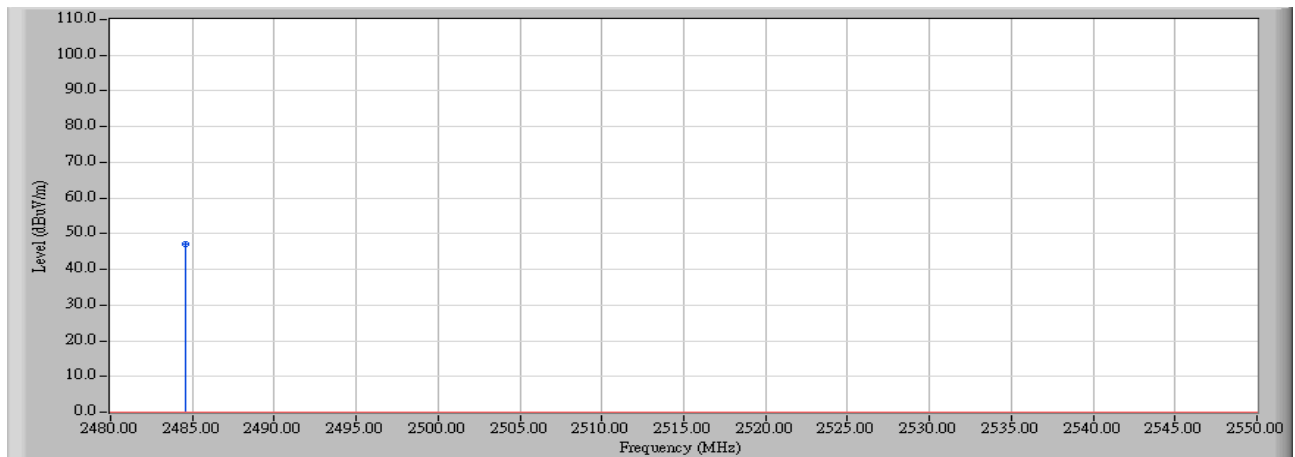
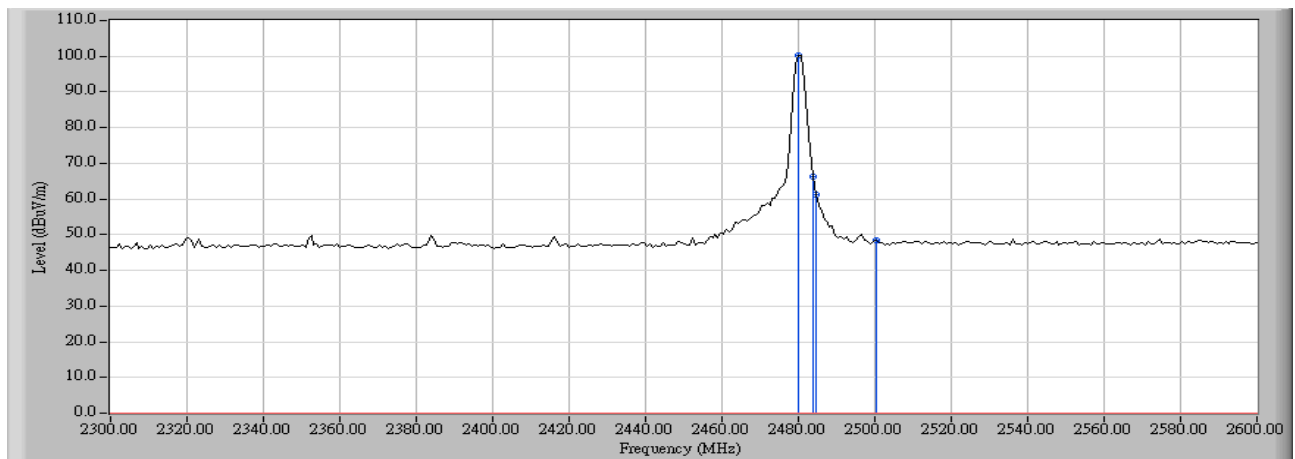


Product : USB Dongle
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 78)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78(Peak)	2484.500	61.716	61.280	74.00	54.00	Pass
78(Average)	2484.500	47.602	47.167	74.00	54.00	Pass

Figure Channel 78: (Vertical)



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

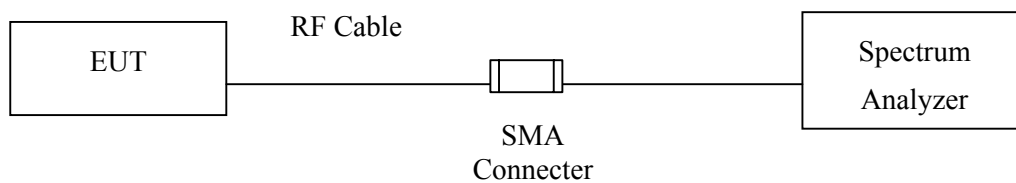
6.1. Test Equipment

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

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI26 / 838786/004	May, 2005

Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.
2. Mark "X" test instruments 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

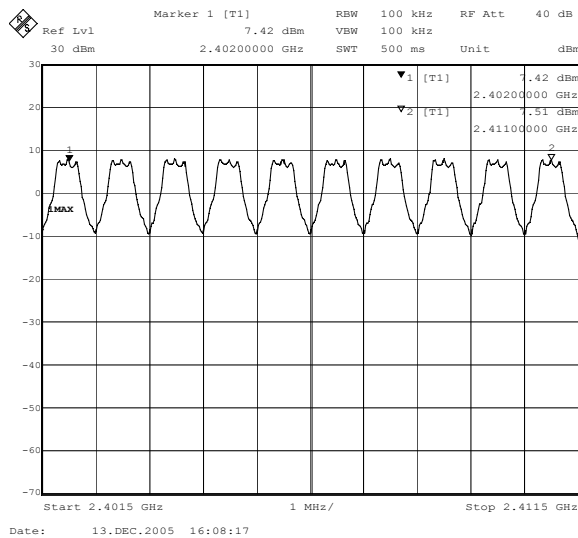
The measurement uncertainty is defined as $\pm 200\text{kHz}$

6.5. Test Result of Channel Number

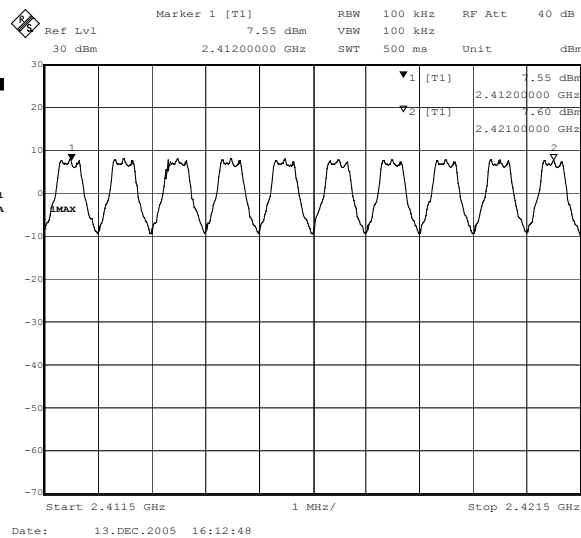
Product : USB Dongle
 Test Item : Channel Number
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

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

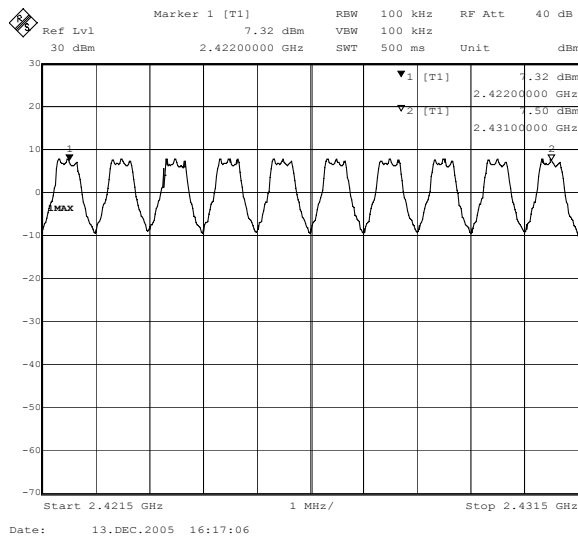
2402-2411MHz



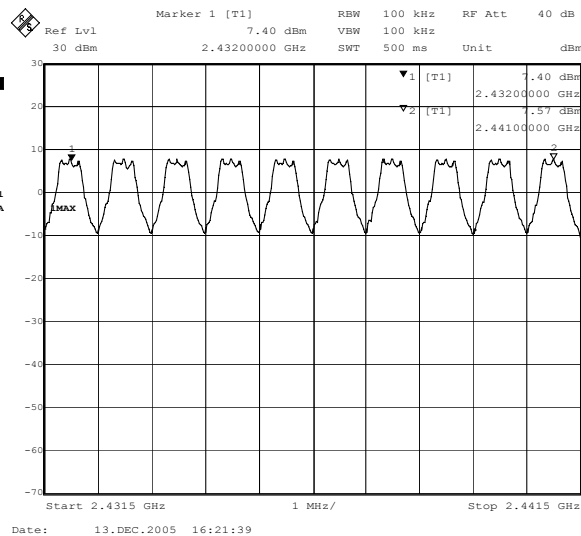
2412-2421MHz



2422-2431MHz

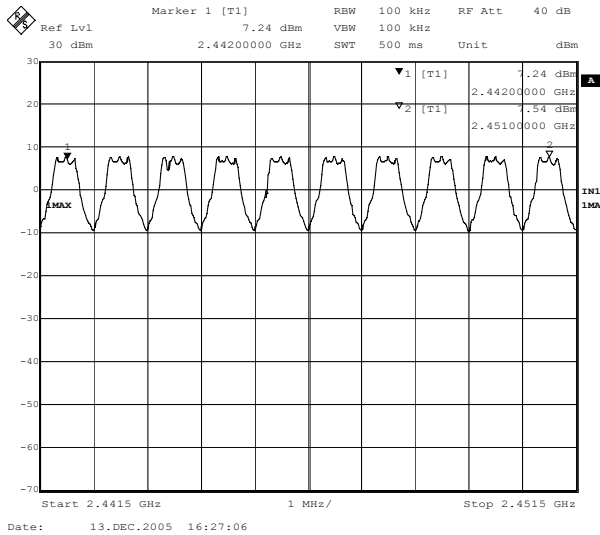


2432-2441MHz

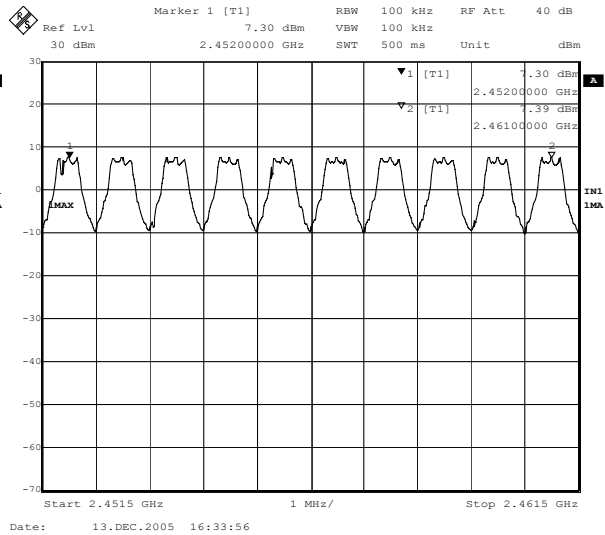


Product : USB Dongle
 Test Item : Channel Number
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

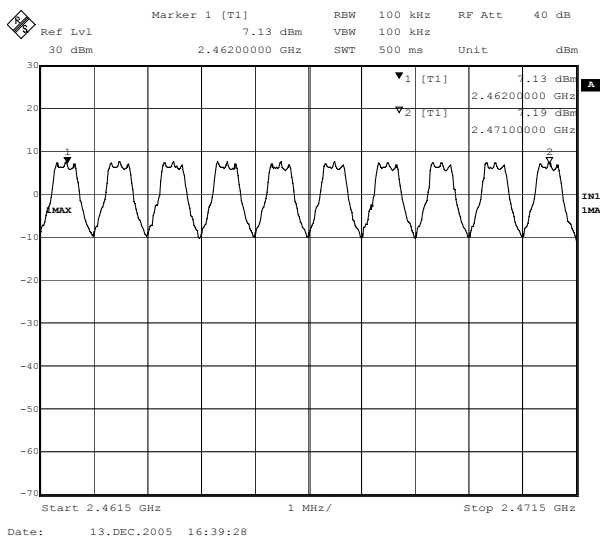
2442-2451MHz



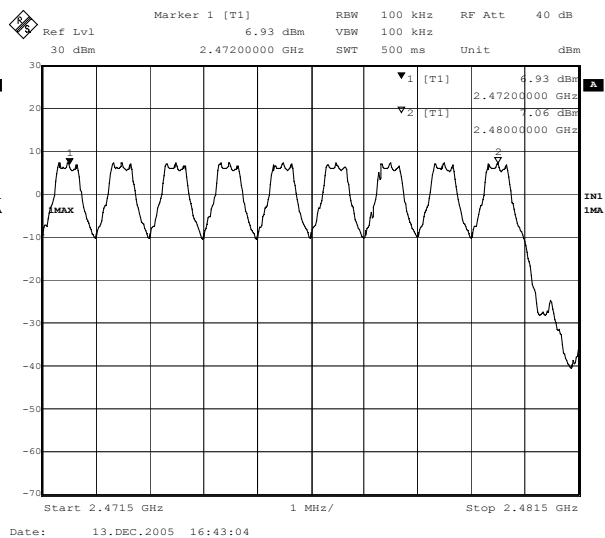
2452-2461MHz



2462-2471MHz



2472-2481MHz



7. Channel Separation

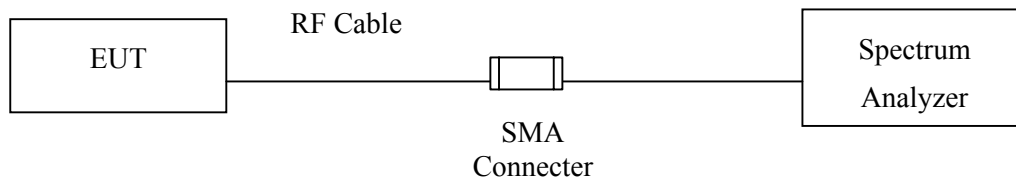
7.1. Test Equipment

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

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI26 / 838786/004	May, 2005

Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.
2. Mark "X" test instruments 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

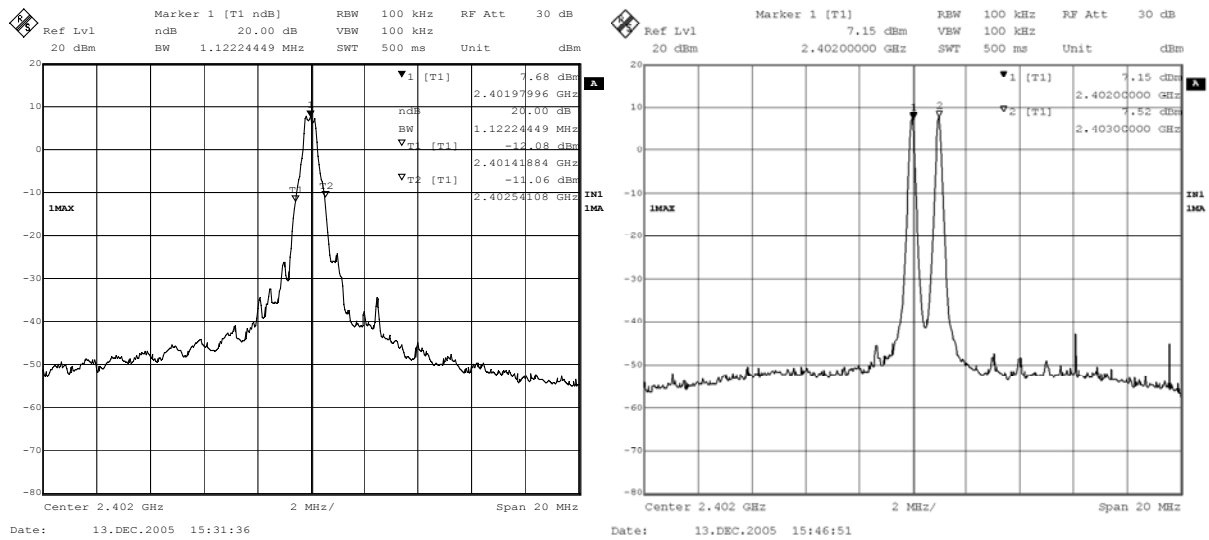
The measurement uncertainty is defined as $\pm 150\text{Hz}$

7.5. Test Result of Channel Separation

Product : USB Dongle
 Test Item : Channel Separation
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

RBW: 100kHz, VBW: 100kHz, SPAN: 20MHz			
Measure Level (kHz)	Occupied Bandwidth 20dB	Limit (kHz)	Result
1000	1130	>25 or 2/3 * 20dB Bandwidth	Pass

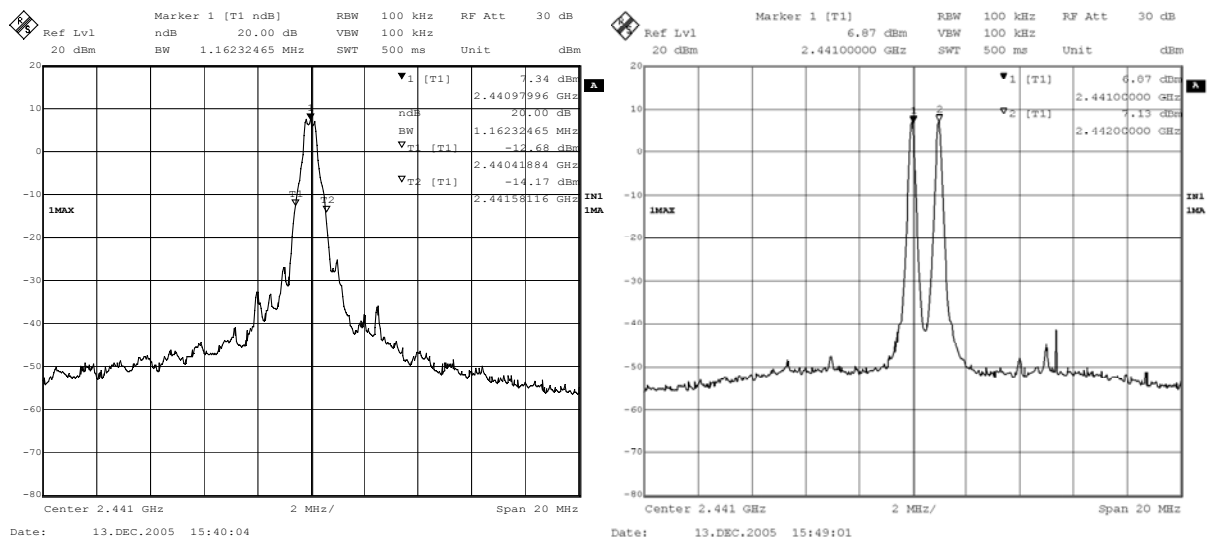
Figure:



Product : USB Dongle
 Test Item : Channel Separation
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

RBW: 100kHz, VBW: 100kHz, SPAN: 20MHz			
Measure Level (kHz)	Occupied Bandwidth 20dB	Limit (kHz)	Result
1000	1170	>25 or 2/3 * 20dB Bandwidth	Pass

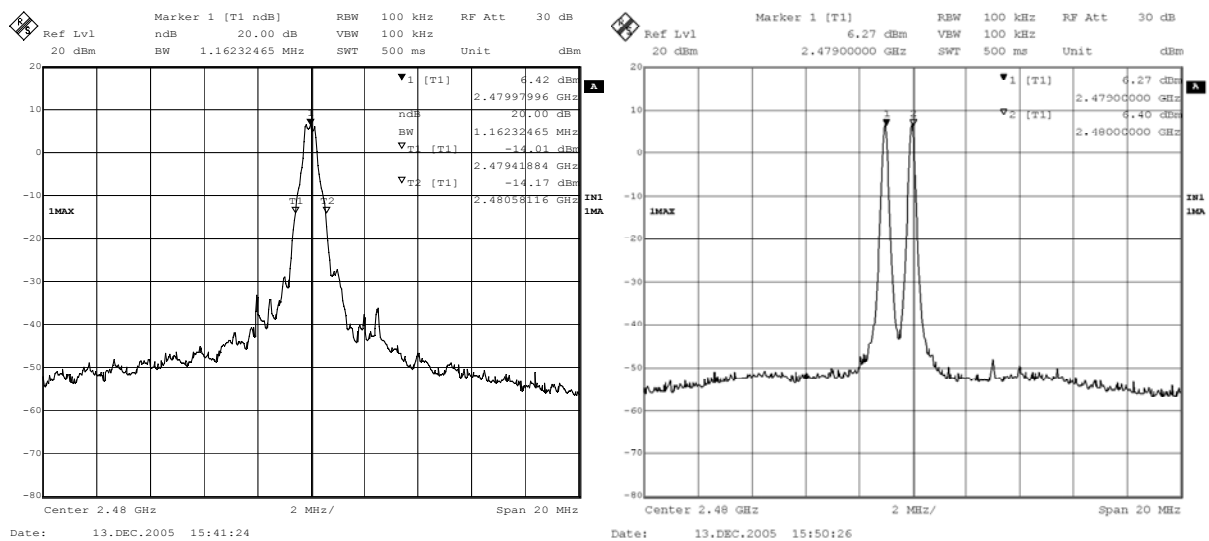
Figure:



Product : USB Dongle
 Test Item : Channel Separation
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

RBW: 100kHz, VBW: 100kHz, SPAN: 20MHz			
Measure Level (kHz)	Occupied Bandwidth 20dB	Limit (kHz)	Result
1000	1170	>25 or 2/3 * 20dB Bandwidth	Pass

Figure:



8. Dwell Time

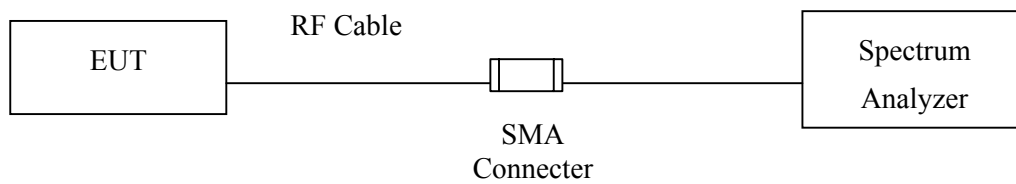
8.1. Test Equipment

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

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI26 / 838786/004	May, 2005

Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.
2. Mark "X" test instruments 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.

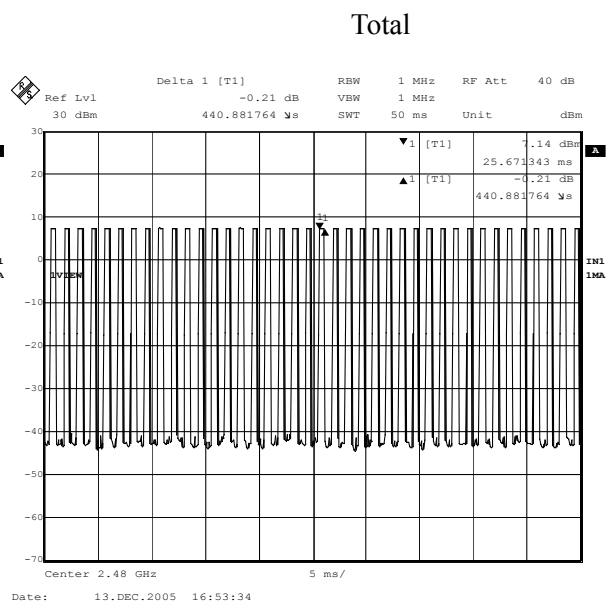
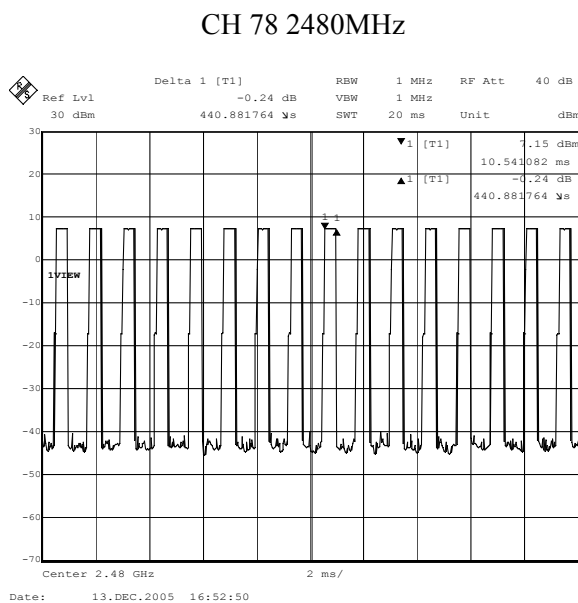
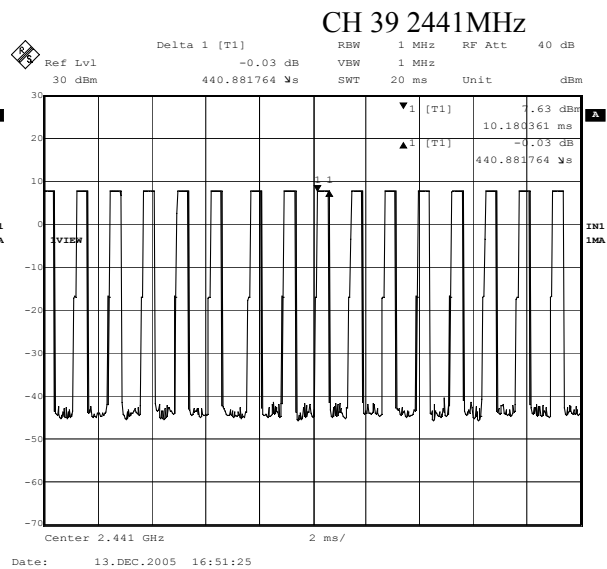
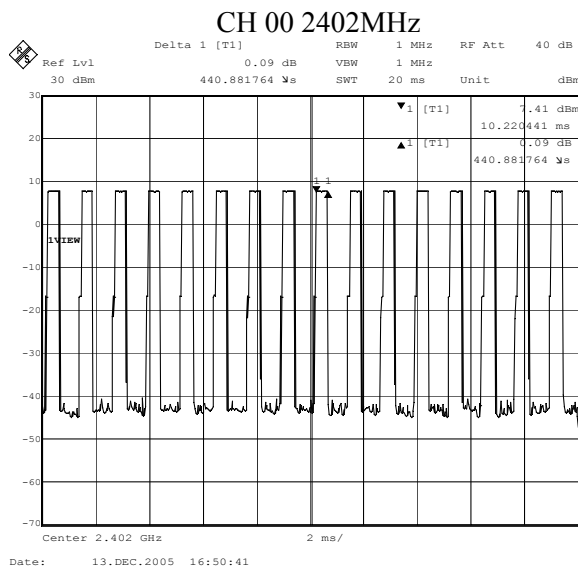
8.4. Uncertainty

The measurement uncertainty is defined as $\pm 25\text{msec}$

8.5. Test Result of Dwell Time

Product : USB Dongle
 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	141.003	< 0.4	Pass
CH 39 2441	141.003	< 0.4	Pass
CH 78 2480	141.003	< 0.4	Pass



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

Occupancy Time of Frequency Hopping System

Test Time Period: $0.4 \times 79 = 31.6\text{sec}$, Hopping Times Within 1sec: $40/50\text{msec} = 0.8 / \text{sec}$

A) 2402MHz The Maximum Occupancy Time Within 31.6sec: $(440 \mu \text{s} \times 800) / (79 \times 31.6) = 141.003\text{msec}$ °

B) 2441MHz The Maximum Occupancy Time Within 31.6sec: $(440 \mu \text{s} \times 800) / (79 \times 31.6) = 141.003\text{msec}$ °

C) 2480MHz The Maximum Occupancy Time Within 31.6sec: $(440 \mu \text{s} \times 800) / (79 \times 31.6) = 141.003\text{msec}$ °

Test Result: The Average Occupancy Time of Each Highest , Middle and Lowest Channel Is Less Than 0.4sec , And Corresponds to The Standard °

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

A) 2402Mhz The Occupancy Time of Each Pulse is 0.4msec , The Maximum Occupancy Time within 31.6sec is $0.4\text{msec} \times 1640 / 79 \times 31.6 = 289.056\text{msec}$

B) 2441MHz The Occupancy Time of Each Pulse is 0.4msec , The Maximum Occupancy Time within 31.6sec is $0.4\text{msec} \times 1640 / 79 \times 31.6 = 289.056\text{msec}$

C) 2480MHz The Occupancy Time of Each Pulse is 0.4msec , The Maximum Occupancy Time within 31.6sec is $0.4\text{msec} \times 1640 / 79 \times 31.6 = 289.056\text{msec}$

Test Result: The Maximum Occupancy Time of Each Highest , Middle and Lowest Channel Is Less Than 0.4sec , And Corresponds to The Standard °

9. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 1: EUT Test Setup Photographs

Front View of Conducted Test



Back View of Conducted Test



Front View of Radiated Test



Back View of Radiated Test



Front View of Radiated Test (Horn)



Back View of Radiated Test (Horn)



Attachment 2: EUT Detailed Photographs

Attachment 2 : EUT Detailed Photographs

(1) EUT Photo (DG-07A)



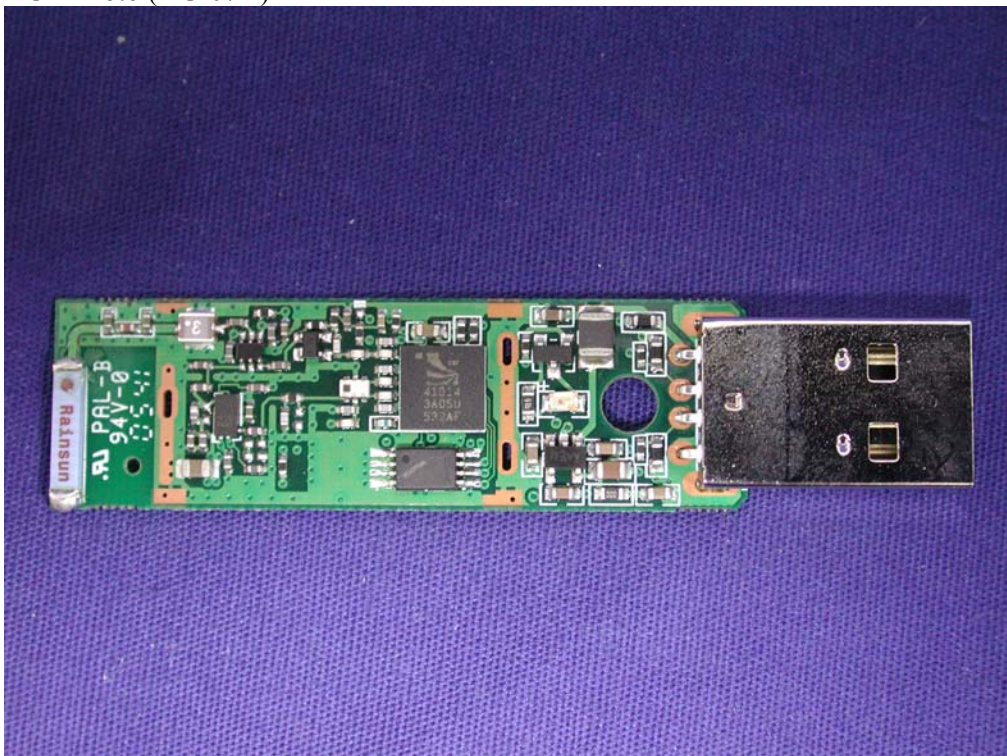
(2) EUT Photo (DG-07A)



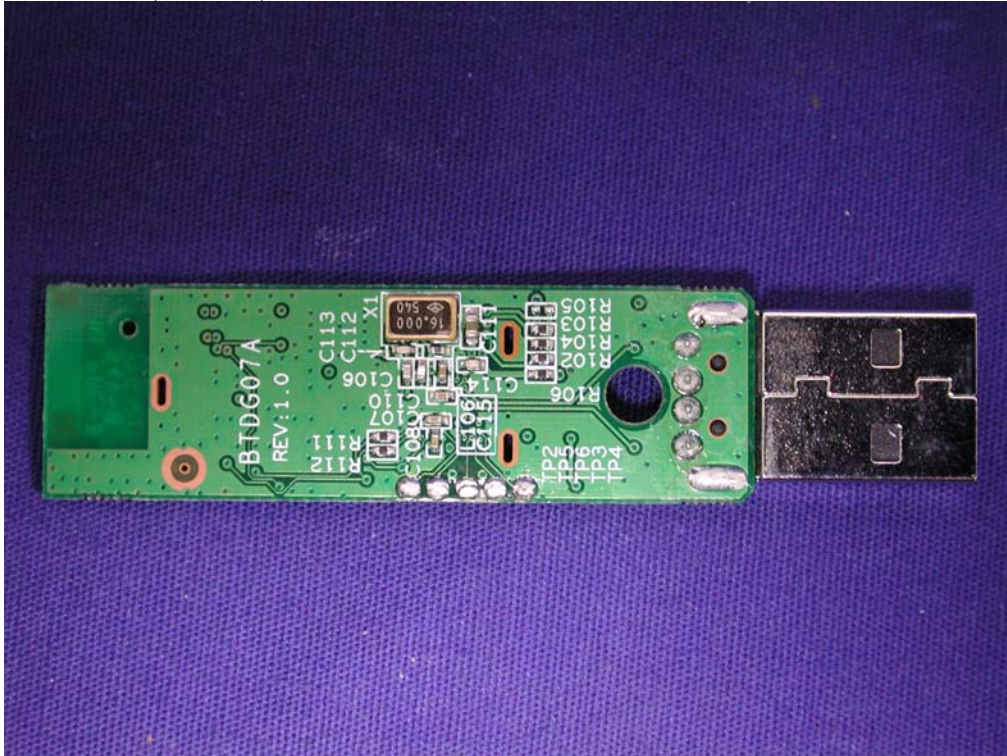
(3) EUT Photo (DG-07A)



(4) EUT Photo (DG-07A)



(5) EUT Photo (DG-07A)



(6) EUT Photo (DG-07A)



(7) EUT Photo (DG-07A+)



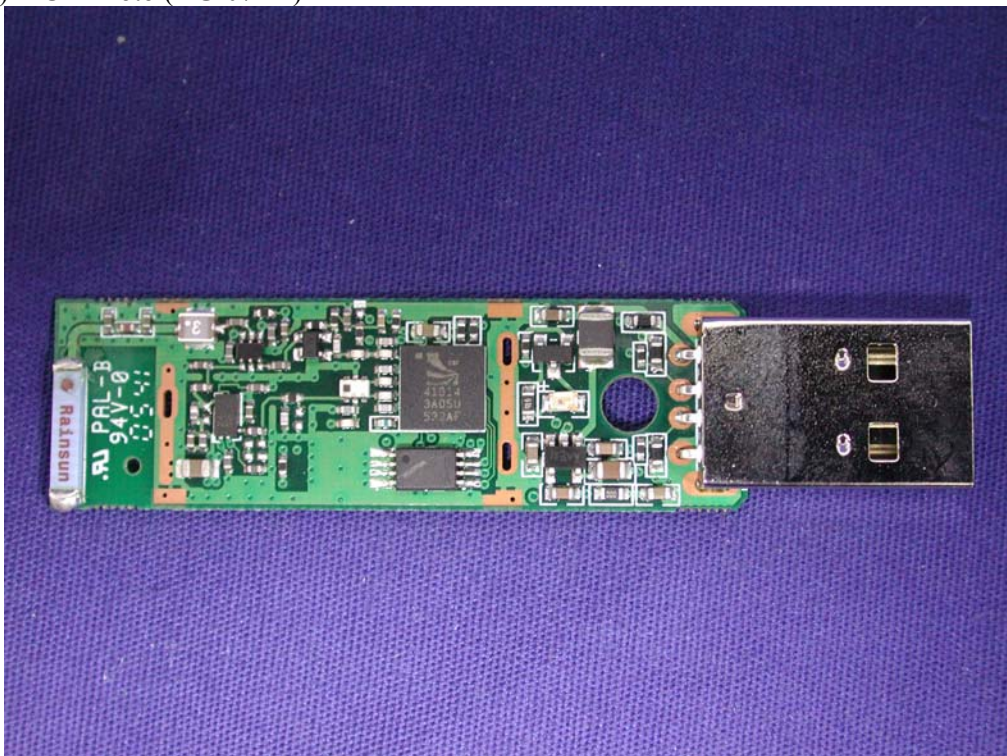
(8) EUT Photo (DG-07A+)



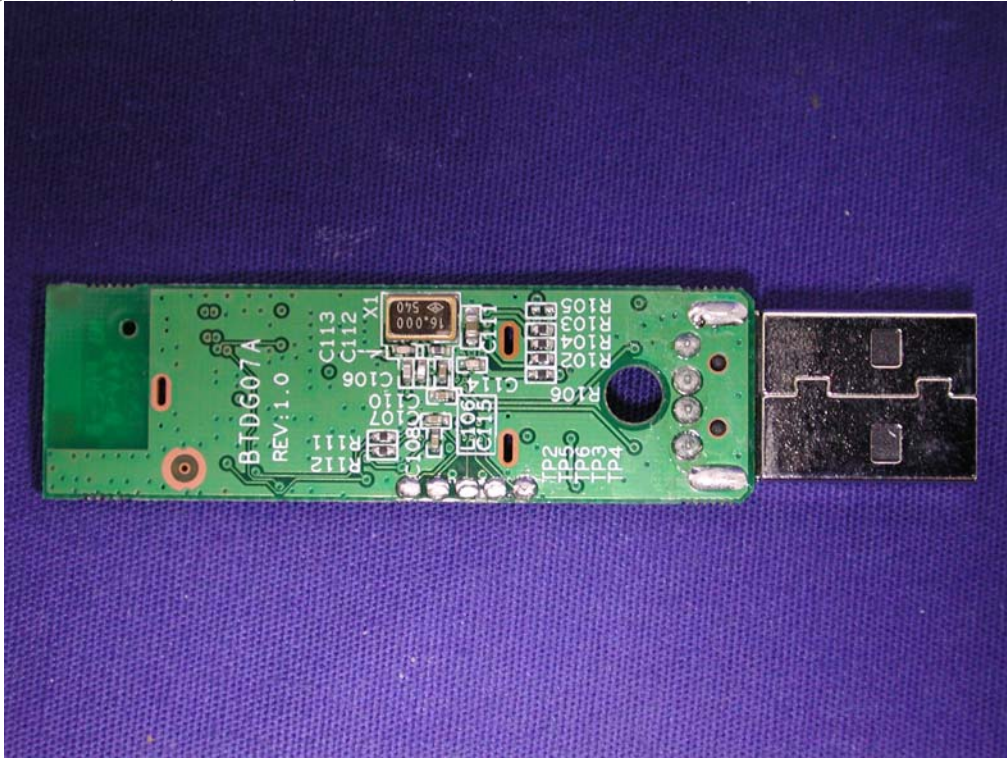
(9) EUT Photo (DG-07A+)



(10) EUT Photo (DG-07A+)



(11) EUT Photo (DG-07A+)



(12) EUT Photo (DG-07A+)

