Test Report

Product Name : PC2PC-Bluetooth
Model No. : MS-6968
FCC ID. : I4L-MS6968

Applicant : MICRO-STAR INT'L Co., LTD
Address : No. 69, Li-De St, Jung-He City, Taipei Hsien,
Taiwan, R.O.C.

Date of Receipt : April 22, 2002
Date of Test : April 24, 2002
Report No. : 024L062FI

Test Report Certification

Test Date : April 24, 2002
Report No. : 024L062FI

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

Product Name	:	PC2PC-Bluetooth
Applicant	:	MICRO-STAR INT'L Co., LTD
Address	:	No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan, R.O.C.
Manufacturer	:	MICRO-STAR INT'L Co., LTD
Model No.	:	MS-6968
FCC ID.	:	I4L-MS6968
Rated Voltage	:	DC 5V (Power by PC)
Trade Name	:	MICRO-STAR
Measurement Standard	:	FCC Part 15 Subpart C Paragraph 15.247
Measurement Procedure	:	ANSI C63.4:1992
Test Result	:	Complied

NVLAP Lab Code : 200347-0

The Test Results relate only to the samples tested.

Documented By : Chialin Chen (Chialin Chen)

Tested By : Vincent Lin (Vincent Lin)

Approved By : Gene Chang (Gene Chang)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	:	PC2PC-Bluetooth
Trade Name	:	MICRO-STAR
FCC ID.	:	I4L-MS6968
Model No.	:	MS-6968
Frequency Range	:	2402MHz to 2480MHz
Channel Number	:	79
Type of Modulation	:	Frequency Hopping Spread Spectrum
Antenna Type	:	Soldered on PCB
Operator Selection of Operating Frequency	:	By software

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		

Note:

1. 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.
2. Regards to the frequency band operation, the lowest middle and highest frequency of channel were selected to perform the test then shown on this report.
3. This device is a composite device in accordance with Part 15 paragraph 15.5. The function for the receiver was, measured and made a test report that the report number is 024L062F, certified under verification.
4. QuieTek had verified among construction and function in typical operation, then shown in this test report.

1.2. Operational Description

EUT is an USB interface 2.4GHz PC2PC-Bluetooth 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 wirless connections between desktop/laptop computers. Bluetooth-enabled peripherals (printers, faxes, ...), portable handheld devices, and connectivity to the Internet.

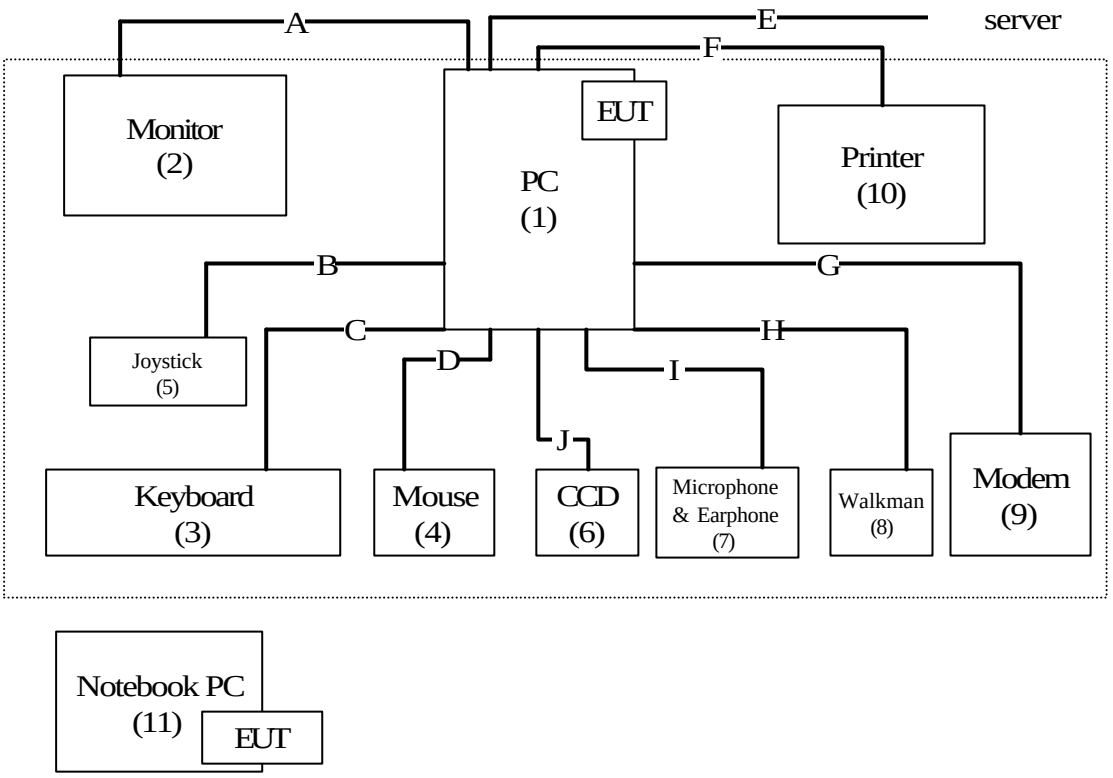
1.3. Tested System Details

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
(1)	PC				
	Mother Board	MICRO-STAR	MS-6580	N/A	N/A
	CPU	Intel P4 1.9GHz		N/A	N/A
	CD-ROM	TEAC	CD-532E	N/A	N/A
	HDD	QUANTURN	Fireball	N/A	N/A
	FDD	Panasonic	JU-257A606TC	N/A	N/A
	Power Supply	ASTEC	SA202-3545-2288A	N/A	N/A
(2)	Monitor	ADI	CM703	038054T10203890A	FCC DoC
(3)	Keyboard	HP	SK-2506	C00083358	FCC DoC
(4)	Mouse	IBM	M-SAU-IBM6	23-022699	FCC DoC
(5)	Joystick	GENIUS	MAXFIRE FORCE G-09D	CJ0100200575	FSUGG09
(6)	CCD	Logitech	V-UB2	LZA04656864	FCC DoC
(7)	Microphone & Earphone	TOKTO	SX-MI	N/A	FCC DoC
(8)	Walkman	AIWA	HS-TA164	N/A	FCC DoC
(9)	Modem	ACEEX	DM-1414	0102027532	IFAXDM1414
(10)	Printer	EPSON	Color 680	015999	N/A
(11)	Notebook PC	DELL	PP01L	N/A	N/A
	Adapter	DELL	ADP-70EB	N/A	N/A

Signal Cable Type		Signal cable Description
A.	VGA cable	Shielded, 1.6m, a ferrite core bonded
B.	Joystick cable	Shielded, 1.8m
C.	Keyboard cable	Shielded, 1.8m
D.	Mouse cable	Shielded, 1.2m
E.	LAN cable	Non-Shielded, 3.0m
F.	Printer cable	Shielded, 1.6m
G.	Modem cable	Shielded, 1.6m
H.	Walkman cable	Non-Shielded, 1.2m
I.	Microphone & Earphone cable	Non-Shielded, 1.6m
J.	CCD cable	Shielded, 1.8m, a ferrite core bonded.

1.4. Configuration of tested System



1.5. EUT Exercise Software

1.4.1 Setup the EUT and simulators as shown on 1.4.

1.4.2 Turn on the power of all equipment.

1.4.3 PC reads data from disk.

1.4.4 Data will be transmitting through EUT.

1.4.5 The transmitted status will be shown on the monitor.

1.4.6 Repeat the above procedure 1.4.4 to 1.4.5

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

June 29, 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,
Taiwa, R.O.C.
TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

2. Conducted Emission

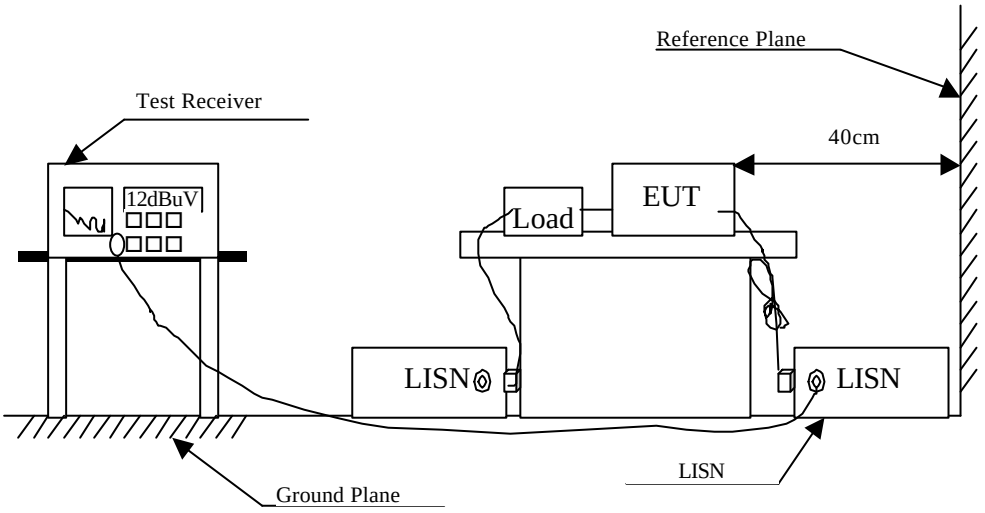
2.1. Test Equipment List

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 30/838251/0001	May, 2001	
2	L.I.S.N.	R & S	ESH3-Z5/836679/0023	May, 2001	EUT
3	L.I.S.N.	R & S	ENV 4200/833209/0023	May, 2001	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2001	
5	No.4 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 Paragraph 15.207 (dBuV)		
Frequency MHz	Limits	
	uV	dBuV
0.45 - 30	250	48.0

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 C63.4:1992 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.45MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Test Result of Conducted Emission

Product : PC2PC-Bluetooth
Test Item : Conducted Emission Test
Test Mode : Normal Operation

	Frequency	Cable Loss	LISN Factor	Reading Level	Emission Level	Limits
	MHz	dB	dB	dBuV	dBuV	dBuV
Line 1						
Quasi-Peak:						
*	0.531	0.21	0.10	31.43	31.74	48.00
	0.599	0.21	0.10	26.37	26.68	48.00
	0.855	0.16	0.10	27.01	27.27	48.00
	10.040	0.23	0.20	18.58	19.01	48.00
	18.970	0.34	0.43	26.93	27.71	48.00
	29.563	0.45	0.60	27.18	28.22	48.00
Line 2						
Quasi-Peak:						
*	0.532	0.21	0.10	32.71	33.02	48.00
	0.596	0.21	0.10	26.09	26.40	48.00
	0.769	0.16	0.10	20.75	21.01	48.00
	2.402	0.09	0.14	21.92	22.14	48.00
	19.915	0.39	0.45	26.85	27.69	48.00
	29.282	0.45	0.59	26.59	27.62	48.00

Remarks :

1. All Readings below 1GHz are Quasi-Peak value.
2. " * " means that this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable loss

3. Peak Power Output

3.1. Test Equipment

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

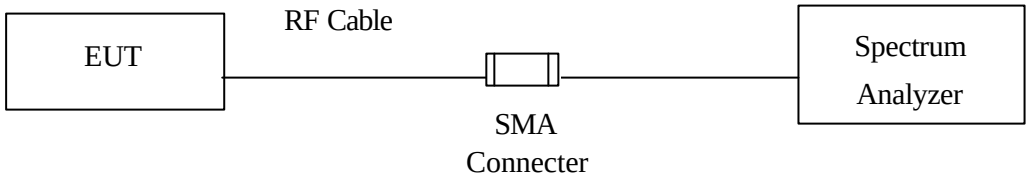
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum	Advantest	R3162/100803480	May, 2001

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

Conduction Power Measurement



3.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

3.4. Minimum Standard

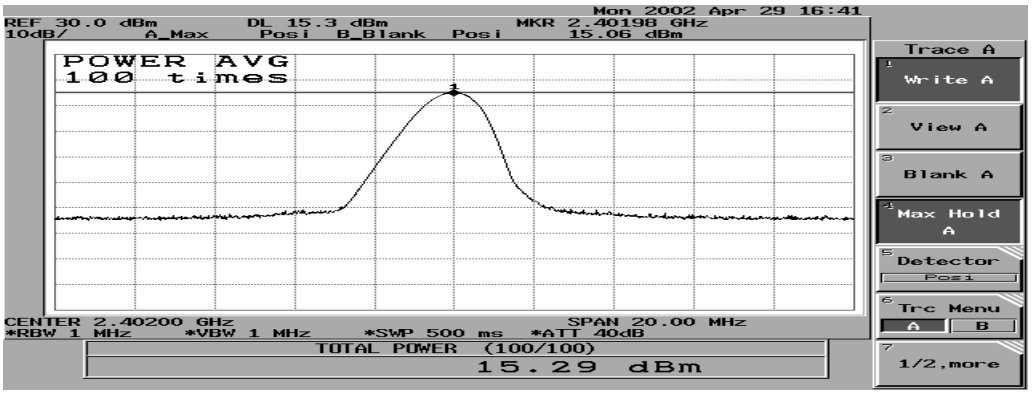
The maximum peak power shall be less 1 Watt.

3.5. Test Result of Peak Power Output

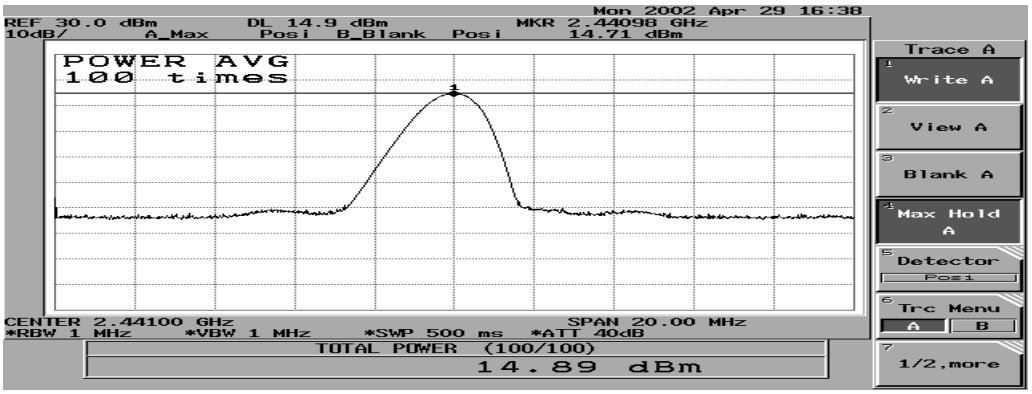
Product : PC2PC-Bluetooth
Test Item : Peak Power Output Data
Test Site : No.3 OATS
Test Mode : Normal Operation

Channel No.	Frequency(MHz)	Measurement	Required Limit	Result
Channel 00	2402.00	15.29dBm	1Watt= 30 dBm	Pass
Channel 39	2441.00	14.89 dBm	1Watt= 30 dBm	Pass
Channel 78	2480.00	14.60 dBm	1Watt= 30 dBm	Pass

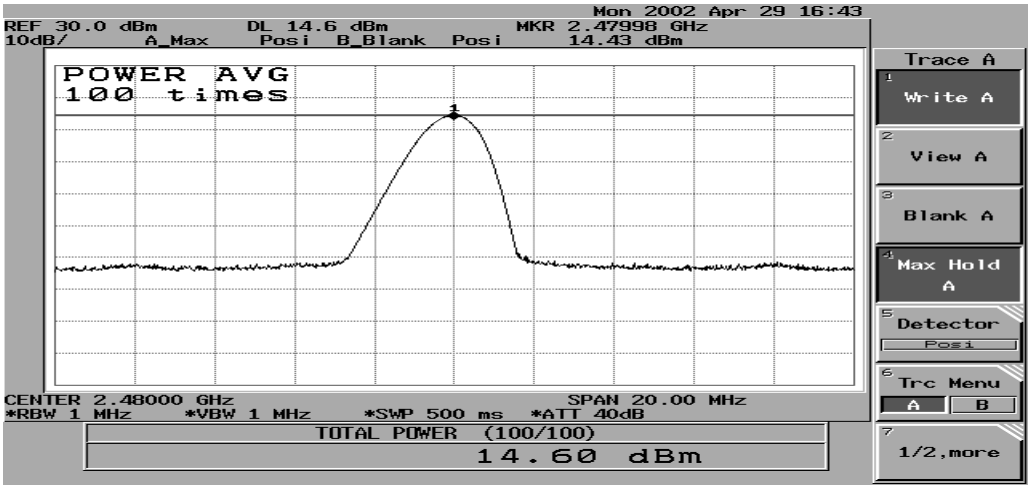
Channel 00



Channel 39



Channel 78



4. RF Exposure Evaluation

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

4.1. Friis Formula

Friis transmission formula: $Pd = (Pout*G)/(4*pi*r^2)$

Where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd id the limit of MPE, 1 mW/cm^2 . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

4.2. EUT Operation condition

A software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.3. Test Result of RF Exposure Evaluation

Product : PC2PC-Bluetooth
Test Item : RF Exposure Evaluation Data
Test Site : No.3 OATS
Test Mode : Normal Operation

4.3.1 Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2dBi.

4.3.2 Output Power Into Antenna & RF Exposure Evaluation Distance

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Minimum Allowable Distance ® From Skin(cm)
00	2402	13.27	1.636421781
39	2441	12.69	1.530718219
78	2480	12.52	1.501050320

The distance r (4th column) calculated from the Friis transmission formula is far shorter than 20 cm separation requirement. So, RF exposure limit warning or SAR test are not required.

5. Radiated Emission

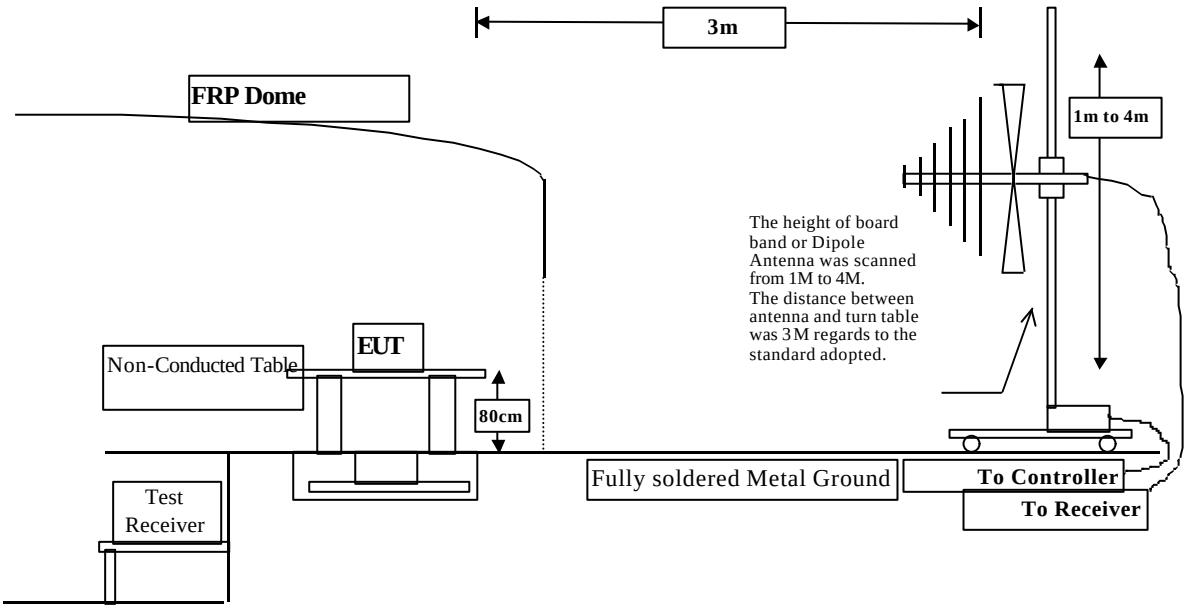
5.1. Test Equipment

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	July, 2001
	Spectrum Analyzer	Advantest	R3162/ 00803480	May, 2001
	Pre-Amplifier	Advantest	BB525C/ 3307A01812	May, 2001
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Nov., 2001
☐ Site # 2	Test Receiver	R & S	ESCS 30 / 836858 / 022	Nov., 2001
	Spectrum Analyzer	Advantest	3162 / 100803466	May, 2001
	Pre-Amplifier	Advantest	BB525C/3307A01814	May, 2001
	Bilog Antenna	SCHAFFNER	CBL6112B / 2705	Oct., 2001
	Horn Antenna	ETS	3115 / 0005-6160	July, 2001
	Pre-Amplifier	QTK	QTK-AMP-01/ 0001	July, 2001
☒ Site # 3	Test Receiver	R & S	ESCS 30 / 83685 / 022	Jan, 2002
	Spectrum Analyzer	Advantest	R3162/100803462	May, 2001
	Pre-Amplifier	QTK	BB525C/23402769	May, 2001
	Bilog Antenna	SCHAFFNER	CBL6112B/2705	Sep., 2001
	Horn Antenna	ETS	3115/0005-6160	April, 2002

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

5.2. Test Setup



Spurious Emissions

5.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

5.4. 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(a) 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.

5.5. 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 C63.4:1992 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 (R&S Test Receiver ESCS 30)is 120 kHz, above 1GHz are 1 MHz.
The frequency range from 30MHz to 10th harminics is checked.

5.6. Test Result of Radiated Emission

Product : PC2PC-Bluetooth
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Channel 00

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal							
Peak Detector							
4803.900	6.15	33.55	20.34	32.87	52.23	21.77	74.00
7205.920	7.30	36.65	18.39	31.94	57.50	16.50	74.00
9608.160	8.70	38.22	15.86	27.07	58.13	15.87	74.00
12010.20	9.93	39.01	16.00	19.48	<52.42	21.58	74.00
14412.18	10.65	40.64	17.02	18.16	<52.43	21.57	74.00
16813.75	12.25	41.59	16.08	15.29	<53.04	20.96	74.00
19217.05	12.70	48.78	17.97	8.90	<52.41	21.59	74.00
21618.16	13.01	49.35	18.76	7.64	<51.24	22.76	74.00
24021.44	13.62	49.77	19.05	8.93	<53.27	20.73	74.00
Average Detector							
7206.040	7.30	36.65	18.39	26.55	52.11	1.89	54.00
9608.160	8.70	38.22	15.86	18.37	49.43	4.57	54.00
Vertical							
Peak Detector							
4804.140	6.15	33.55	20.34	35.72	55.08	18.92	74.00
7206.040	7.30	36.65	18.39	30.71	56.27	17.73	74.00
9607.840	8.70	38.22	15.86	27.98	59.04	14.96	74.00
12010.50	9.93	39.01	16.00	18.32	<51.26	22.74	74.00
14412.19	10.65	40.64	17.02	17.93	<52.20	21.80	74.00
16814.52	12.25	41.59	16.08	14.93	<52.68	21.32	74.00
19216.89	12.70	48.96	17.97	9.35	<53.04	20.96	74.00
21618.35	13.01	49.29	18.76	9.47	<53.01	20.99	74.00
24020.15	13.61	49.71	19.05	9.17	<53.45	20.55	74.00
Average Detector							
4804.080	6.15	33.55	20.34	32.07	51.43	2.57	54.00
7206.040	7.30	36.65	18.39	23.20	48.76	5.24	54.00
9608.040	8.70	38.22	15.86	18.71	49.77	4.23	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss-PreAMP.

Product : PC2PC-Bluetooth
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Channel 39

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal							
Peak Detector							
4882.100	6.21	33.82	19.50	33.12	53.66	20.34	74.00
7323.000	7.39	37.02	18.27	32.82	58.95	15.05	74.00
9764.060	8.87	38.35	15.81	28.46	59.88	14.12	74.00
12205.16	10.16	39.08	16.31	19.41	<52.34	21.66	74.00
14647.03	10.67	40.02	17.87	20.43	<53.24	20.76	74.00
17088.35	12.30	43.01	16.29	13.65	<52.68	21.32	74.00
19528.15	12.76	48.75	18.19	9.36	<52.68	21.32	74.00
21969.11	13.05	49.49	18.80	9.32	<53.06	20.94	74.00
24410.14	13.73	49.82	19.10	8.79	<53.24	20.76	74.00
Average Detector							
7323.080	7.39	37.02	18.27	26.62	52.75	1.25	54.00
9764.060	8.87	38.35	15.81	19.23	50.65	3.35	54.00
Vertical							
Peak Detector							
4882.060	6.21	33.82	19.50	35.32	55.86	18.14	74.00
7323.160	7.39	37.02	18.27	32.21	58.34	15.66	74.00
9764.080	8.87	38.35	15.81	28.71	60.13	13.87	74.00
12205.98	10.16	39.08	16.31	19.11	<52.04	21.96	74.00
14646.56	10.67	40.02	17.87	19.87	<52.68	21.32	74.00
17088.03	12.30	43.01	16.29	14.45	<53.48	20.52	74.00
19529.09	12.76	48.98	18.19	9.87	<53.42	20.58	74.00
21968.48	13.05	49.35	18.80	9.67	<53.27	20.73	74.00
24410.58	13.73	49.79	19.10	9.32	<53.74	20.26	74.00
Average Detector							
4882.040	6.21	33.82	19.50	31.85	52.39	1.61	54.00
7323.060	7.39	37.02	18.27	25.94	52.07	1.93	54.00
9764.080	8.87	38.35	15.81	20.16	51.58	2.42	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Emission Level = Reading Level + Probe Factor + Cable loss-PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : PC2PC-Bluetooth
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Channel 78

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal							
Peak Detector							
4961.180	6.27	33.99	19.49	34.33	55.10	18.90	74.00
7440.020	7.47	37.30	18.09	31.88	58.56	15.44	74.00
9920.060	9.03	38.51	15.62	28.76	60.68	13.32	74.00
12400.06	10.38	39.16	16.05	18.40	<51.89	22.11	74.00
14881.52	10.69	39.20	17.10	19.68	<52.48	21.52	74.00
17360.48	12.36	45.09	16.51	11.74	<52.68	21.32	74.00
19841.35	12.82	48.72	18.44	10.10	<53.20	20.80	74.00
22320.03	13.14	49.54	18.84	9.05	<52.89	21.11	74.00
24800.84	13.84	49.87	19.14	9.30	<53.87	20.13	74.00
Average Detector							
4960.040	6.27	33.99	19.49	30.05	50.82	3.18	54.00
7439.980	7.47	37.30	18.09	24.17	50.85	3.15	54.00
9920.140	9.03	38.51	15.62	18.76	50.68	3.32	54.00
Vertical							
Peak Detector							
4960.060	6.27	33.99	19.49	38.81	59.58	14.42	74.00
7440.010	7.47	37.30	18.09	32.33	59.01	14.99	74.00
9920.070	9.03	38.51	15.62	26.97	58.89	15.11	74.00
12399.89	10.38	39.16	16.05	18.99	<52.48	21.52	74.00
14880.15	10.69	39.20	17.10	19.89	<52.69	21.31	74.00
17360.85	12.36	45.09	16.51	12.07	<53.01	20.99	74.00
19840.25	12.82	48.99	18.44	9.48	<52.86	21.14	74.00
22320.52	13.14	49.41	18.84	8.71	<52.42	21.58	74.00
24800.10	13.84	49.86	19.14	9.07	<53.62	20.38	74.00
Average Detector							
4960.010	6.27	33.99	19.49	29.21	49.98	4.02	54.00
7440.030	7.47	37.30	18.09	25.91	52.59	1.41	54.00
9919.950	9.03	38.51	15.62	19.46	51.38	2.62	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Emission Level = Reading Level + Probe Factor + Cable loss-PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : PC2PC-Bluetooth
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Normal Operation

	Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal:								
	150.280	0.60	14.55	20.70	41.77	36.21	7.29	43.50
	195.870	0.60	10.88	20.70	47.26	38.03	5.47	43.50
	401.510	1.00	14.78	20.70	43.66	38.74	7.26	46.00
*	458.740	1.00	21.20	20.70	39.32	40.82	5.18	46.00
	499.480	1.20	20.80	20.70	38.66	39.96	6.04	46.00
	586.780	1.20	22.45	20.70	35.62	38.57	7.43	46.00
Vertical:								
	157.070	0.60	15.76	20.70	40.01	35.66	7.84	43.50
*	195.870	0.60	14.12	20.70	46.19	40.20	3.30	43.50
	341.370	1.00	13.63	20.70	43.44	37.37	8.63	46.00
	400.540	0.80	13.23	20.70	42.47	35.80	10.20	46.00
	453.890	1.00	17.09	20.70	45.22	42.61	3.39	46.00
	629.460	1.40	19.20	20.70	35.52	35.43	10.57	46.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss- Pre Amp.

6. Band Edge

6.1. Test Equipment

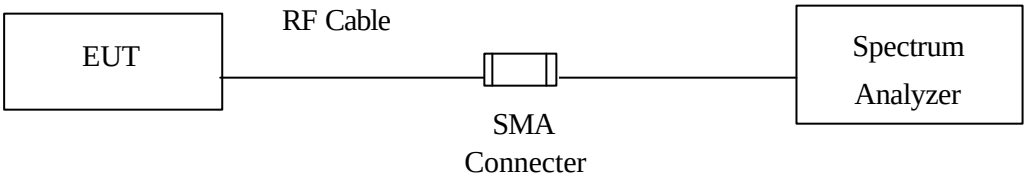
The following test equipments are used during the band edge tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Advantest	R3272 / 72421194	May, 2001
X	Test Receiver	R & S	ESCS 30 / 83685/022	Jan., 2001
X	Spectrum Analyzer	Advantest	R3162/100803462	May, 2001
X	Pre-Amplifier	HP	8447D/3307A01812	May, 2001
X	Bilog Antenna	Chase	CBL6112B/2705	Sep., 2001
X	Horn Antenna	ETS	3115/0005-6160	April, 2002

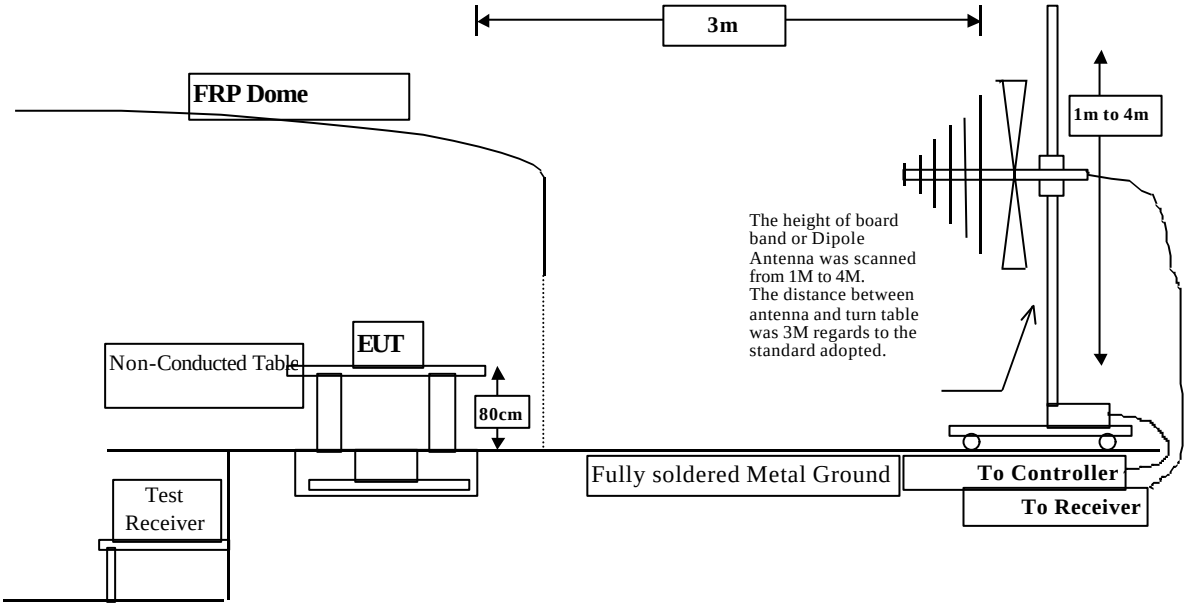
Note: 1. All equipments that need to calibrate are with calibration period of 1 year.
2. Mark "X" test instruments are used to measure the final test results.

6.2. Test Setup

RF Conducted Measurement:



RF Radiated Measurement:



6.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

6.4. Standard Reqirement

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)).

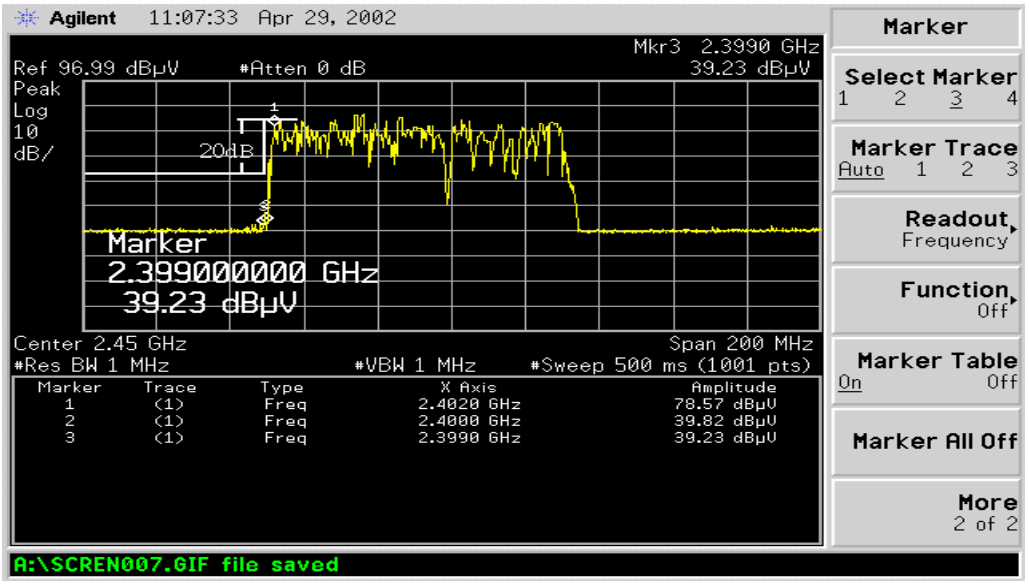
6.5. Test Result of Band Edge

Product : PC2PC-Bluetooth
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Normal Operation

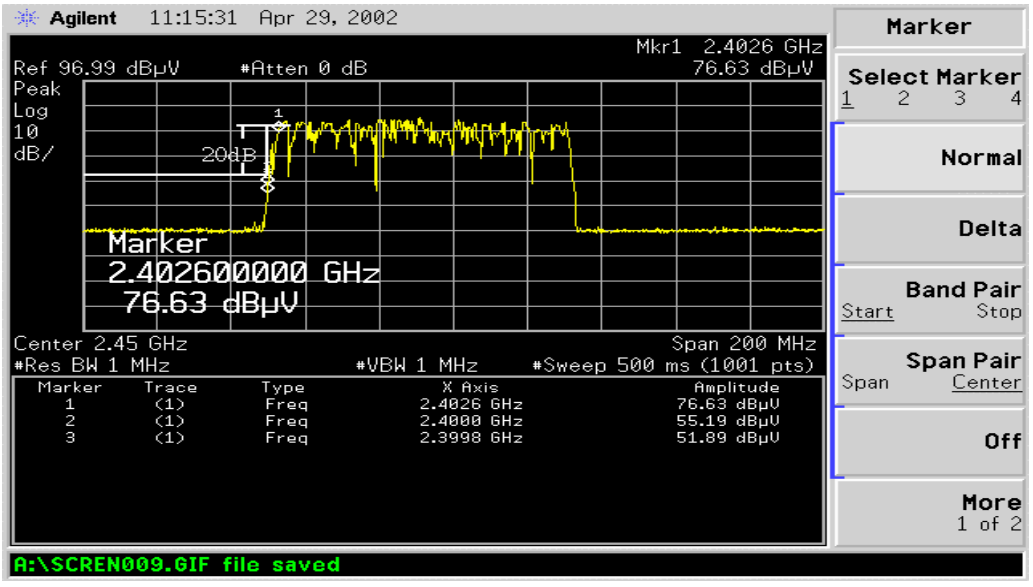
RF Conducted Measurement:

Polarization	Frequency (MHz)	Required Limit (dBc)	Result
Horizontal	<2400	>20	Pass
Vertical	<2400	>20	Pass

(Horizontal)



(Vertical)

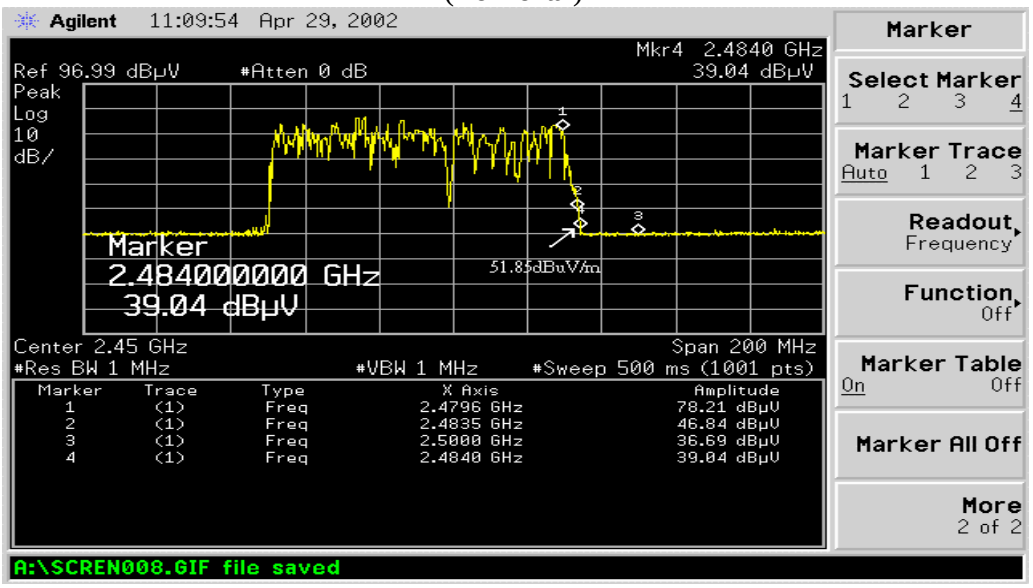


Product : PC2PC-Bluetooth
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Normal Operation

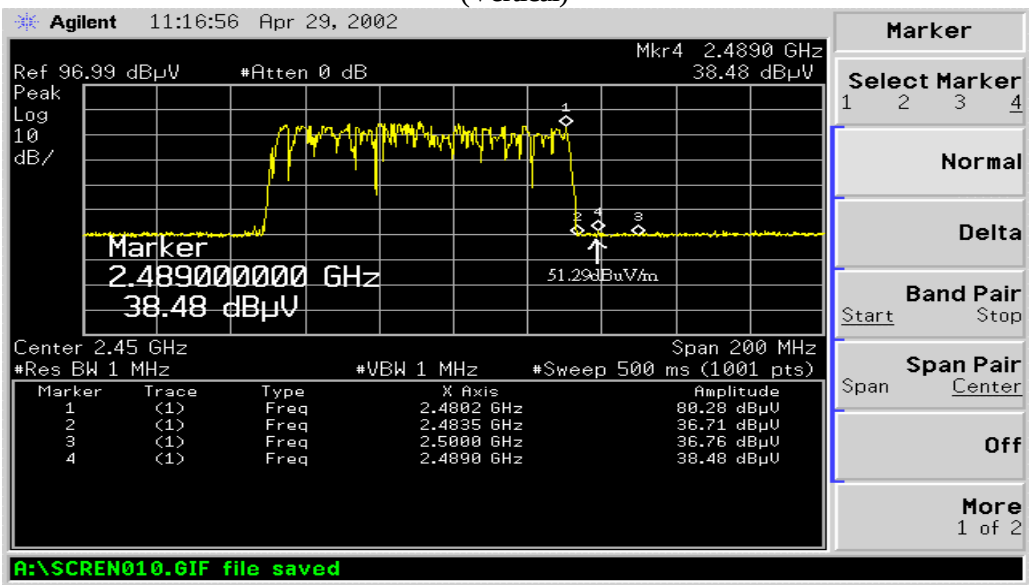
RF Radiated Measurement: (Peak Detector)

Polarization	Frequency (MHz)	Reading Level (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Result
Horizontal	2484.00	39.04	51.85	74	Pass
Vertical	2489.00	38.48	51.29	74	Pass

(Horizontal)



(Vertical)



Note: The average measurement was not preformed when the peak measured data under the limit of average detection.

7. Occupied Bandwidth

7.1. Test Equipment

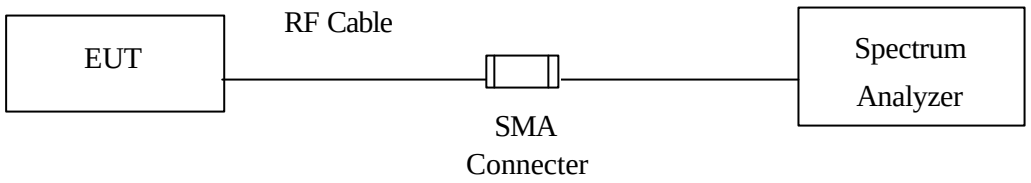
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum	Advantest	R3162/100803480	May, 2001

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. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

7.4. Standard Reqirement

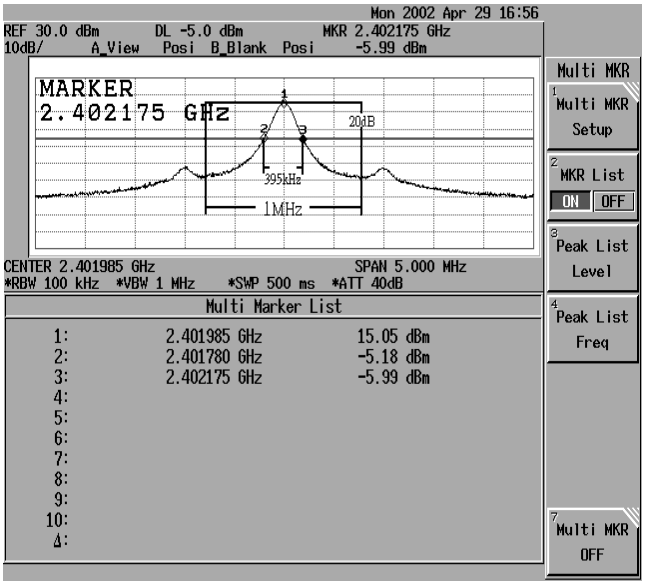
The maximum 20 dB bandwidth of the hopping channel is 1 MHz.

7.5. Test Result of Occupied Bandwidth

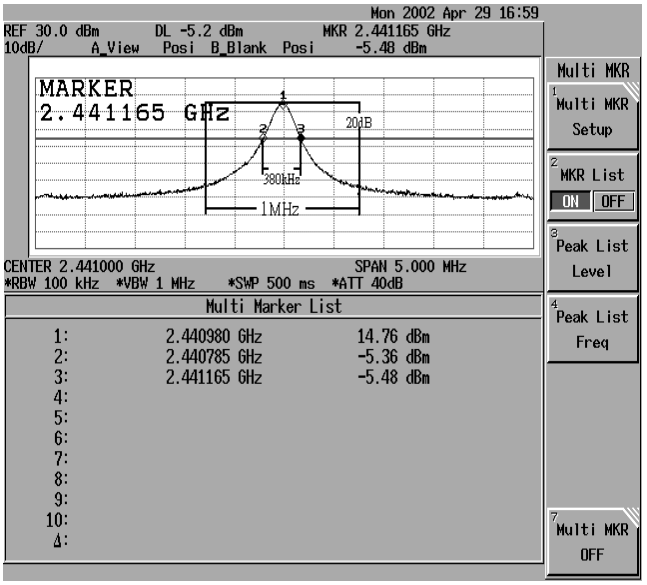
Product : PC2PC-Bluetooth
Test Item : Occupied Bandwidth Data
Test Site : No.3 OATS
Test Mode : Normal Operation

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (MHz)	Result
00	2402	395	<1	Pass
39	2441	390	<1	Pass
78	2480	315	<1	Pass

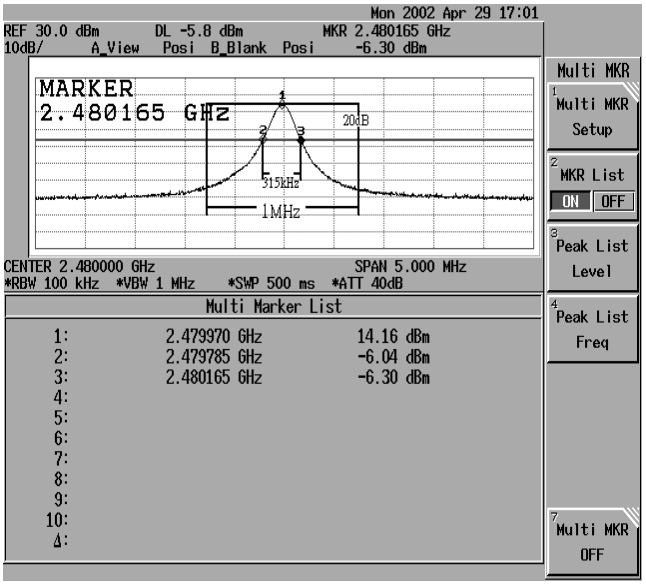
Channel 00



Channel 39



Channel 78



8. Channel of Number

8.1. Test Equipment

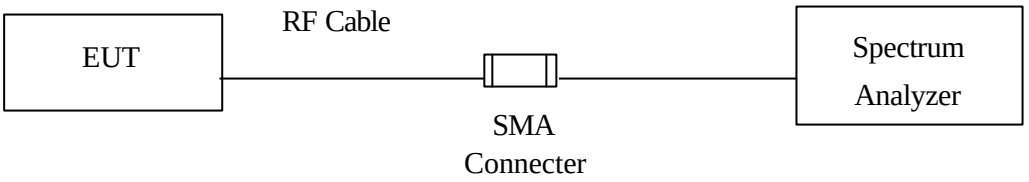
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum	Advantest	R3162/100803480	May, 2001

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. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

8.4. Limit

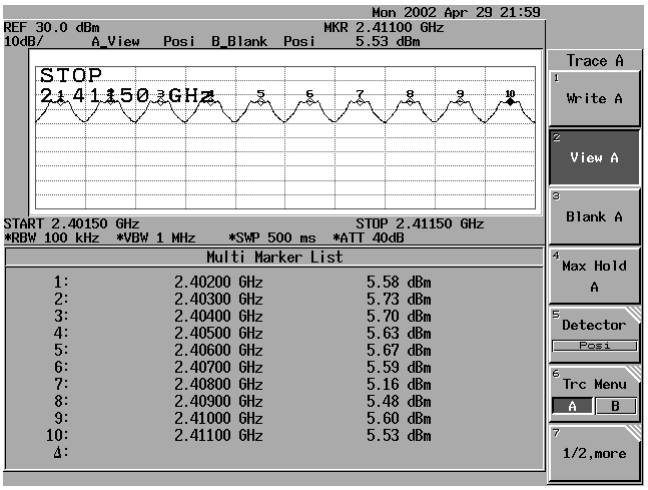
Frequency hopping systems operating in the 2400-2483.5 MHz bands shall use at least 75 hopping frequencies.

8.5. Test Result of Channel Number

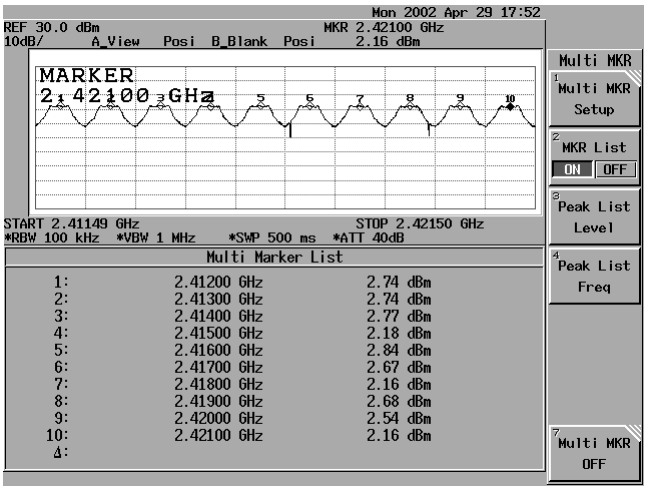
Product : PC2PC-Bluetooth
Test Item : Sweep of Channel Number
Test Site : No.3OATS
Test Mode : Normal Operation

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

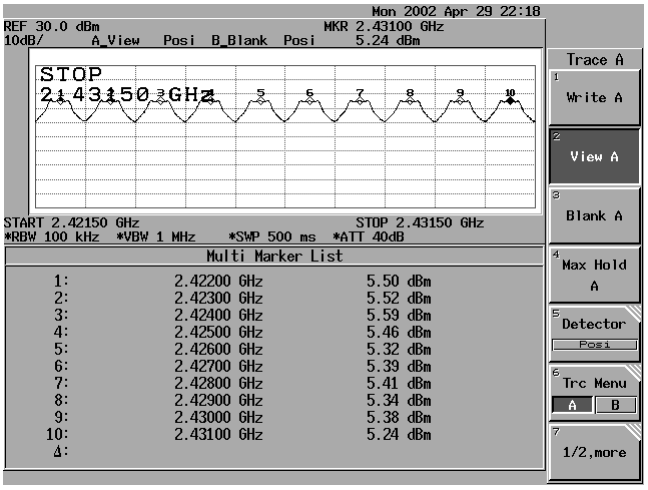
2402-2411MHz



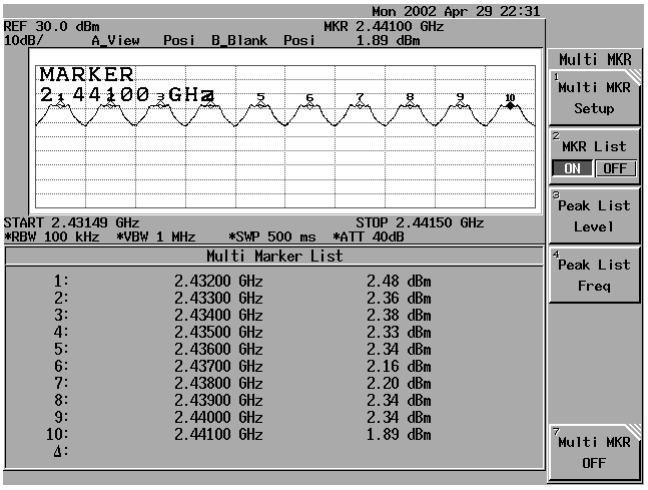
2412-2421MHz



2422-2431MHz

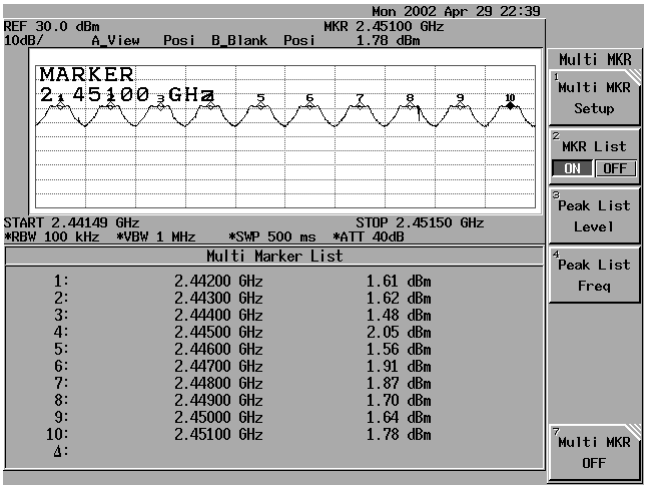


2432-2441MHz

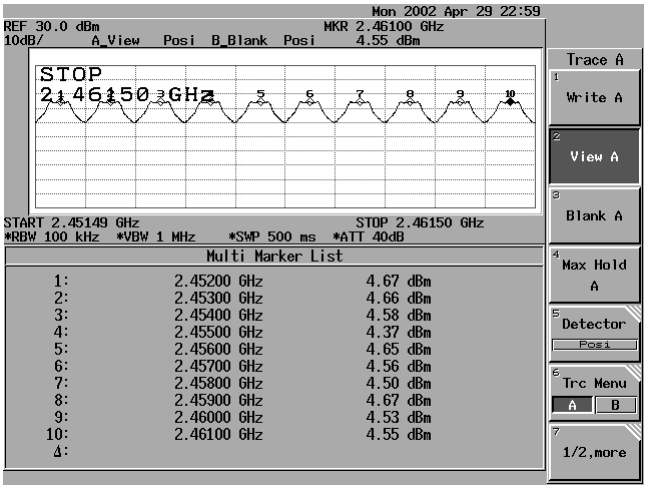


Product : PC2PC-Bluetooth
Test Item : Sweep of Channel Number
Test Site : No.3 OATS
Test Mode : Normal Operation

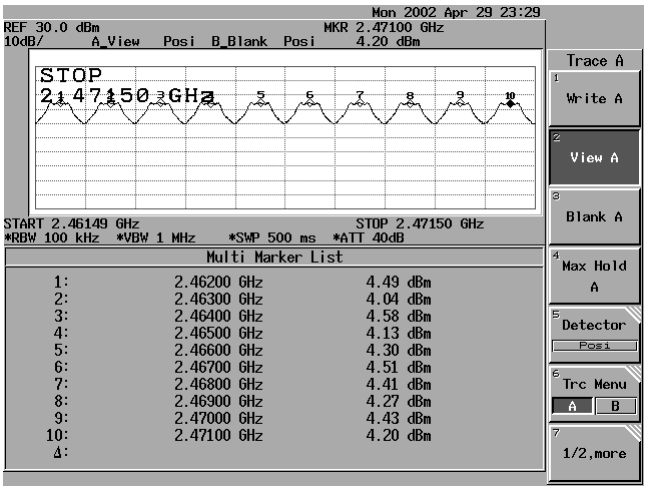
2442-2451MHz



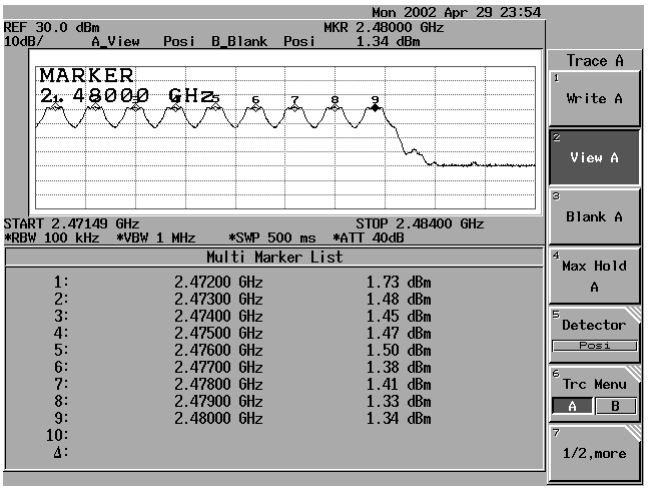
2452-2461MHz



2462-2471MHz



2472-2480MHz



9. Channel Separation

9.1. Test Equipment

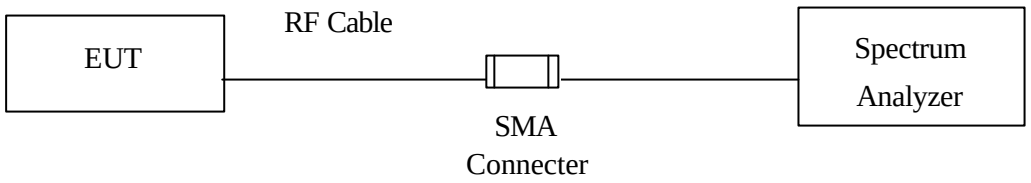
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum	Advantest	R3162/100803480	May, 2001

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.

9.2. Test Setup



9.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

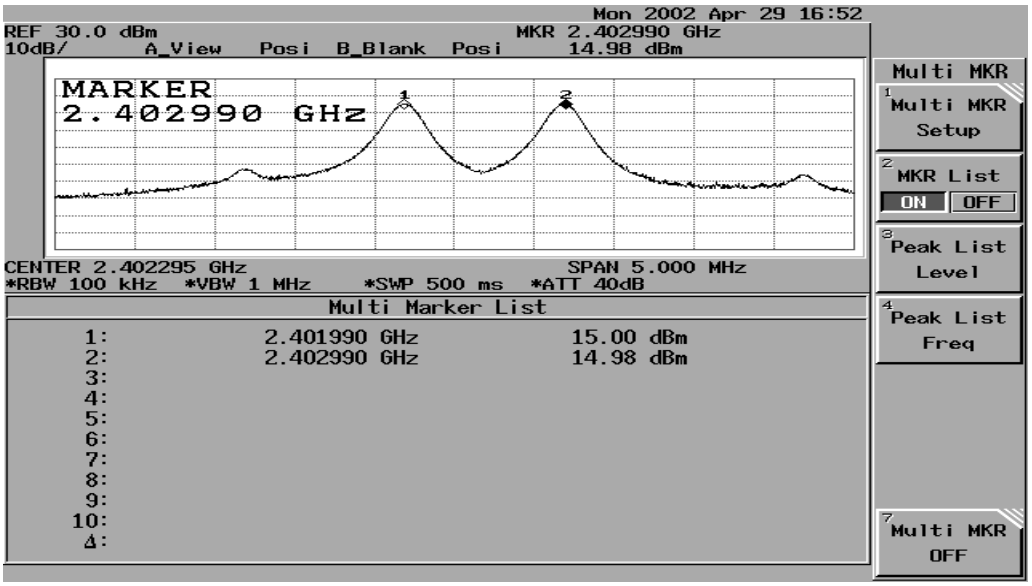
9.4. Limit

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.

9.5. Test Result of Channel Separation

Product : PC2PC-Bluetooth
Test Item : Channel Separation Data
Test Site : No.3 OATS
Test Mode : Normal Operation

Measurement Level (MHz)	Required Limit (MHz)	Result
1.00	<1.00	Pass



10. Dwell Time

10.1. Test Equipment

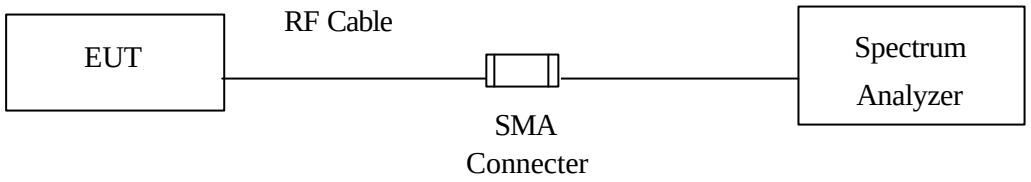
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum	Advantest	R3162/100803480	May, 2001

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.

10.2. Test Setup



10.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

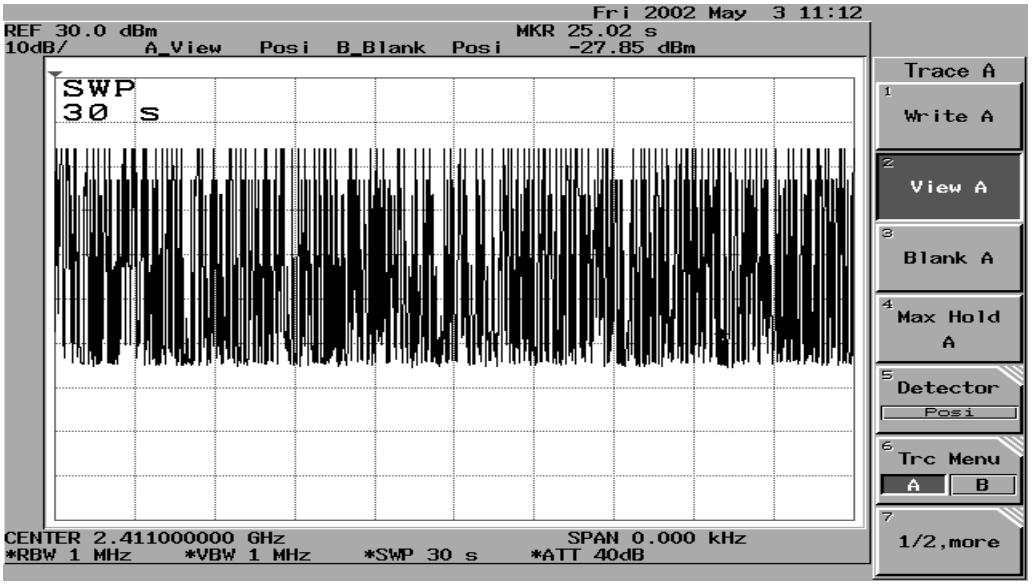
10.4. Limit

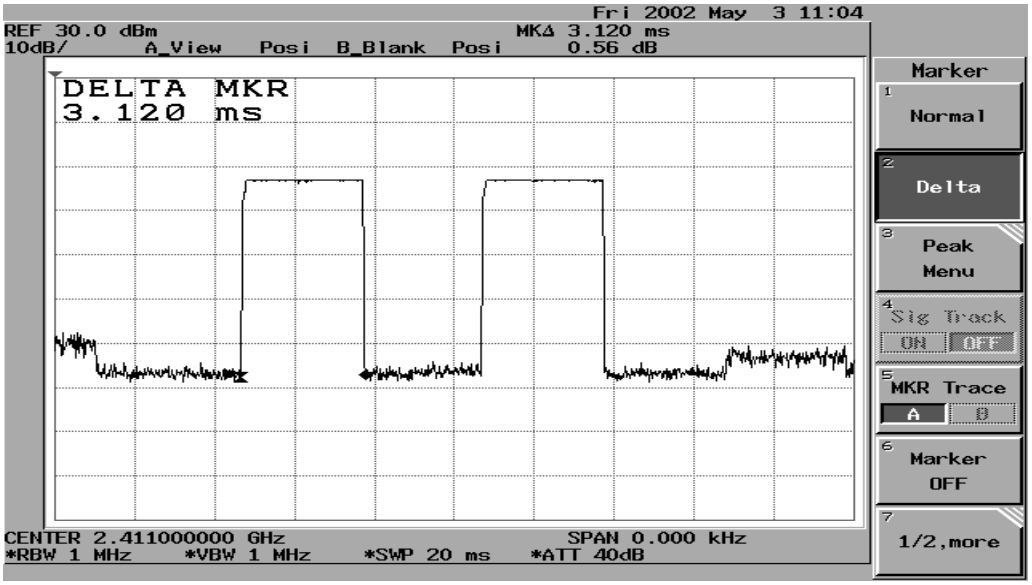
The dwell time shall be the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

10.5. Test Result of Dwell Time

Product : PC2PC-Bluetooth
Test Item : Dwell Time Data
Test Site : No.3 OATS
Test Mode : Normal Operation

Measurement Level (ms)	Required Limit (Sec)	Result
117*3.12=365.04(ms)	<0.4 (sec)	Pass





11. EMI Reduction Method During Compliance Testing

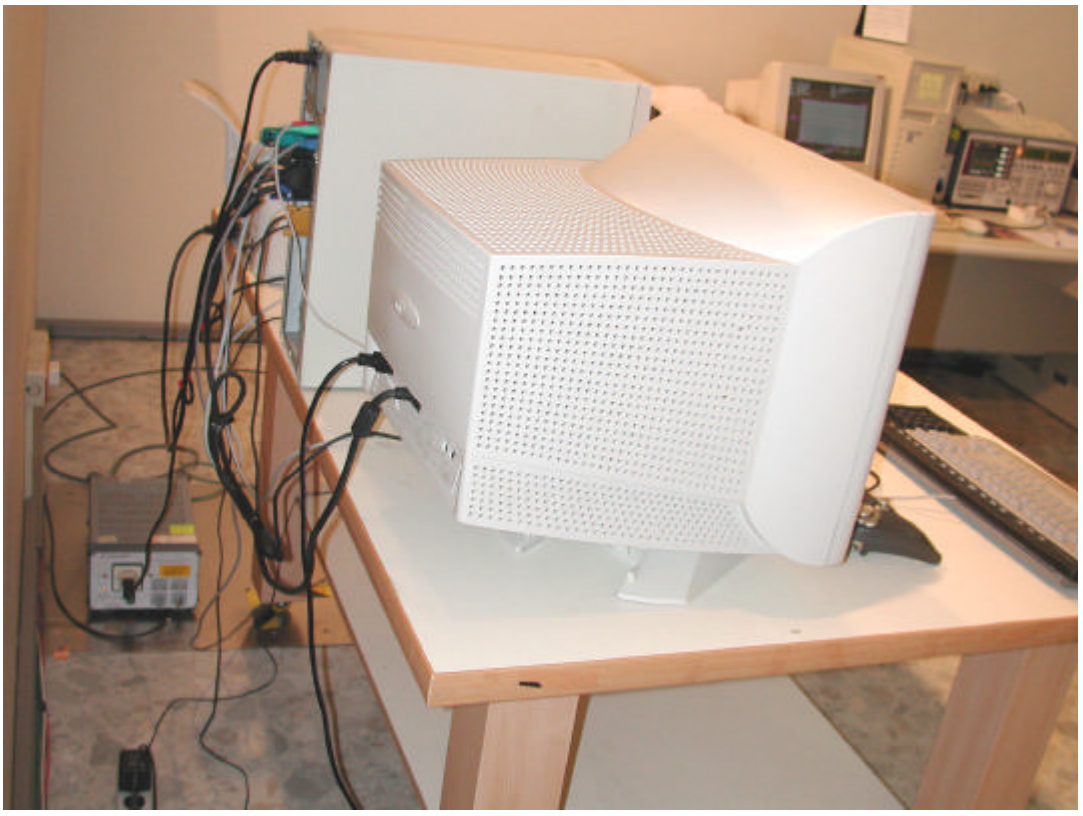
No modification was made during testing.

Attachment 1 : EUT Test Photographs

Attachment 1 : EUT Test Photographs

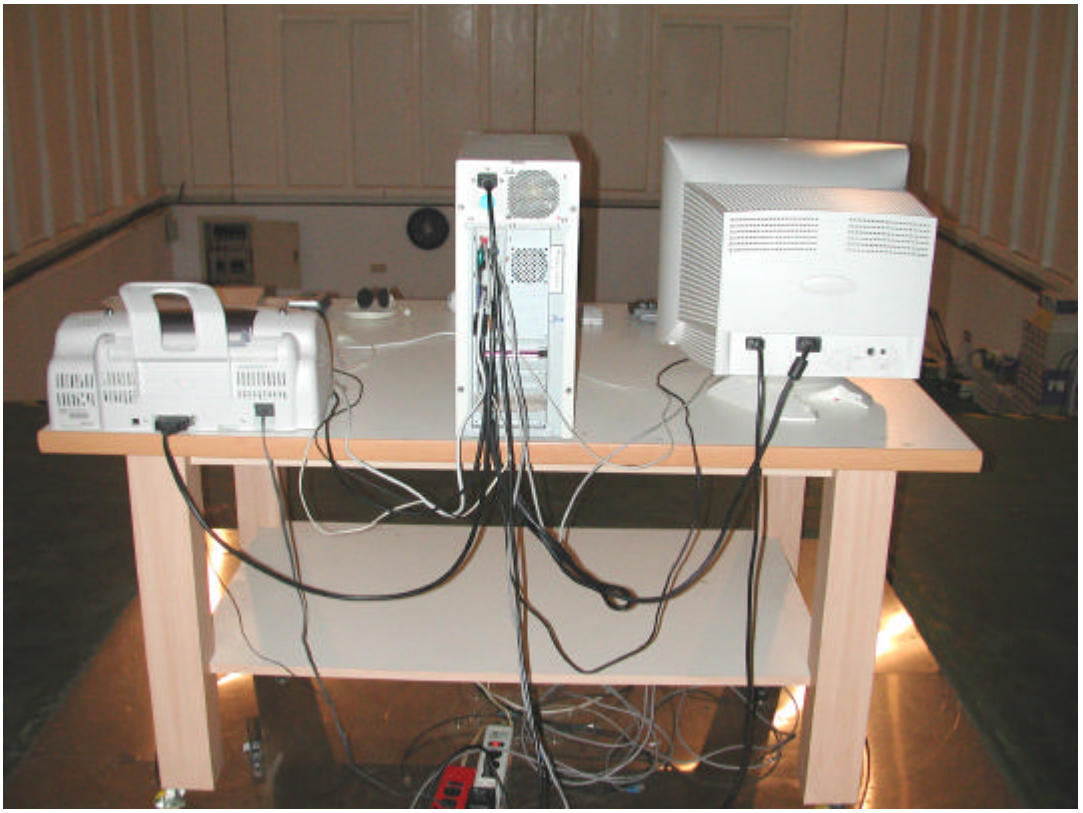
Front View of Conducted Test

Back View of Conducted Test



Front View of Radiated Test

Back View of Radiated Test



Front View of High Frequency Radiated Test

Attachment 2 : EUT Detailed Photographs