Test Report

Product Name : Acer Bluetooth Shuttle

Model No. : Acer BT100

FCC ID.: JVPBT100

Applicant : Acer Communications & Multimedia Inc.

Address : No. 157, Shanying Rd., Gueishan, Taoyuan 333, Taiwan, R.O.C.

Date of Receipt : May 28, 2001

Date of Test : May 28, 2001

Report No. : 016H003FI

Test Report Certification

Test Date : May 28, 2001
Report No. : 016H003FI

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

Product Name	:	Acer Bluetooth Shuttle
Applicant	:	Acer Communications & Multimedia Inc.
Address	:	No. 157, Shanying Rd., Gueishan, Taoyuan 333, Taiwan, R.O.C.
Manufacturer	:	Acer Communications & Multimedia Inc.
Model No.	:	Acer BT100
FCC ID.	:	JVPBT100
Rated Voltage	:	DC 5V (Power from PC/Notebook)
Trade Name	:	Acer
Measurement Standard	:	FCC Part 15 Subpart C Paragraph 15.247
Measurement Procedure	:	ANSI C63.4:1992
Classification	:	Class B
Test Result	:	Complied

NVLAP Lab Code : 200347-0

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

Documented By : (Kim Hung)

Tested By : (Vincent Lin)

Approved By : (Kevin Wang)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	:	Acer Bluetooth Shuttle
Trade Name	:	Acer
FCC ID.	:	JVPBT100
Model No.	:	Acer BT100
Frequency Range	:	2400MHz to 2483.5MHz
Channel Number	:	79
Type of Emission	:	Frequency Hopping
Selection of Frequency	:	By software
Antenna Type	:	Fixed on PCB

Working 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. The EUT is a 79 hopping channels bluetooth device in PC/notebook.
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 016H003F, certified under verification.
4. QuieTek had verified among construction and function in typical operation, then shown in this test report.

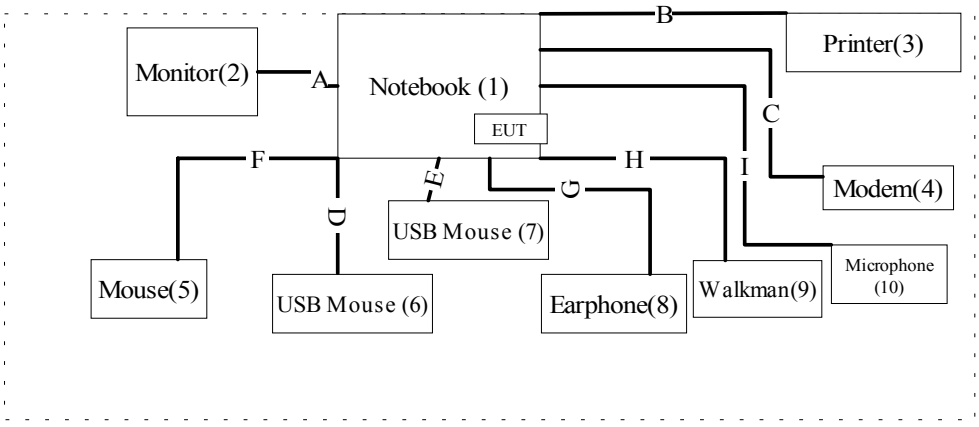
1.2. Tested System Details

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	FCC ID
(1)	Notebook	IBM	Think Pad 570	27L8835	Non-shielded,1.5m	DoC
(2)	Monitor	HITACHI	CM752ET-311	T8E004443	Shielded,1.8m	DoC
(3)	Printer	HP	C2642A	MY75N1D2Y1	Shielded,1.2m	B94C2642X
(4)	Modem	ACEEX	1414	980033037	Shielded,1.5m	IFAXDM1414
(5)	USB Mouse	TREMON	MUS2U	N/A	--	DoC
(6)	USB Mouse	Logitech	M-UE55	LTC93813278	--	DoC
(7)	Mouse	HP	M-S34	LZB75078428	--	DZL211029
(8)	Earphone	SONY	MDR-354	N/A	--	DoC
(9)	Walkman	AIWA	US-J202	HSA20201	--	DoC
(10)	Microphone	AIWA	CD-8000	N/A	--	DoC

Signal Cable Type		Signal Cable Description
A.	Monitor Cable	Shielded, 1.8m
B.	Printer Cable	Shielded,1.2m
C.	Modem Cable	Shielded,1.5m
D.	USB Mouse Cable	Shielded,1.8m
E.	USB Mouse Cable	Shielded,1.8m
F.	Mouse Cable	Shielded,1.8m
G.	Earphone Cable	Non-shielded,1.2m
H.	Walkman Cable	Non-shielded,1.6m
I.	Microphone Cable	Non-shielded,1m

1.3. Configuration of Tested System



1.4. EUT Exercise Software

1.4.1 Setup the EUT and simulators as shown on 1.3.

1.4.2 Turn on the power of all equipment.

1.4.3 Setup the EUT as typical operation.

1.4.4 EUT will be in transmission status

1.4.5 Repeat the above procedure 1.4.3 to 1.4.4

1.5. 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: November 3, 1998 File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2

September 30, 1998 Accreditation on NVLAP
NVLAP Lab Code: 200347-0

NVLAP Lab Code : 200347-0

Site Name: Quietek Corporation

Site Address: N0.75-1, Wang-Yeh Valley, Yung-Hsing,
Chiung-Lin, Hsin-Chu County,
Taiwan, R.O.C.

2. Conducted Emission

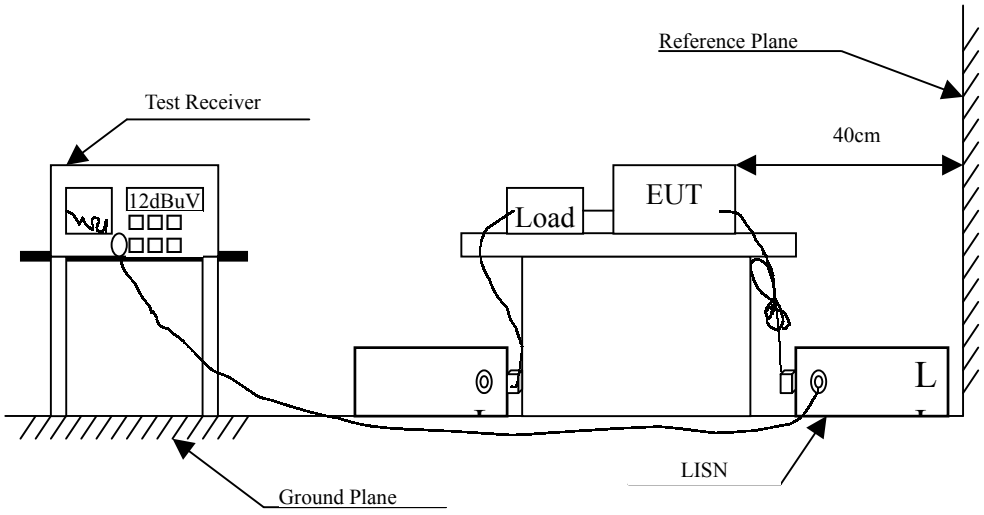
2.1. Test Equipment List

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 30/825442/17	May, 2001	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2001	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2001	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	N/A	
5	N0.2 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 : Acer Bluetooth Shuttle
Test Item : Conducted Emission Test
Test Mode : Normal Operation

Frequency	Cable Loss	LISN Factor	Reading Level	Measurement Level	Limits
MHz	dB	dB	dBuV	dBuV	dBuV
Line 1					
Quasi-Peak:					
0.465	0.06	0.10	25.01	25.17	48.00
0.528	0.07	0.10	27.16	27.33	48.00
1.255	0.11	0.11	21.97	22.19	48.00
3.172	0.17	0.15	26.48	26.80	48.00
*4.230	0.19	0.16	33.15	33.50	48.00
16.516	0.33	0.38	25.25	25.96	48.00
Line 2					
Quasi-Peak:					
0.595	0.07	0.10	28.94	29.11	48.00
1.056	0.10	0.10	28.06	28.27	48.00
*4.427	0.19	0.16	34.29	34.65	48.00
7.069	0.24	0.18	29.73	30.15	48.00
14.536	0.32	0.33	28.45	29.10	48.00
16.776	0.34	0.39	30.97	31.69	48.00

Remarks :

1. " * " means that this data is the worst emission level.
2. The average measurement was not performed when the peak measured data under the limit of average detection.

3. Radiated Emission

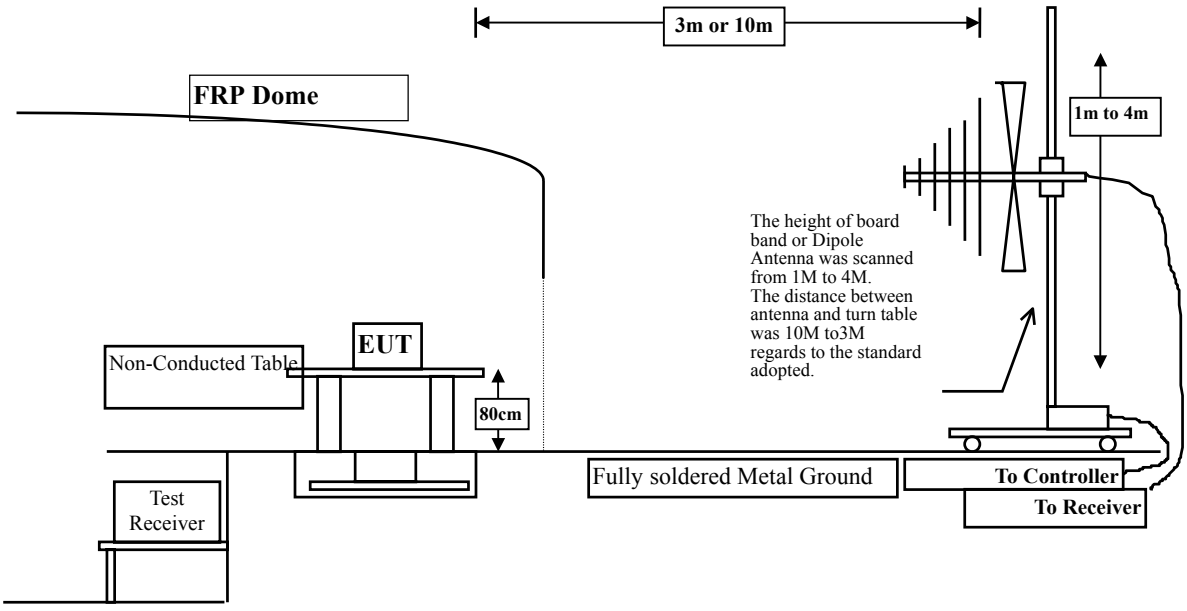
3.1. Test Equipment

The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1	X	Test Receiver	R & S	ESCS 30 / 825442/14	May, 2001
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2001
		Pre-Amplifier	HP	8447D/3307A01812	May, 2001
	X	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2000
	X	Horn Antenna	EM	EM6917 / 103325	May, 2001
Site # 2	X	Test Receiver	R & S	ESCS 30 / 825442/17	May, 2001
		Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2001
		Pre-Amplifier	HP	8447D/3307A01814	May, 2001
	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2000
	X	Horn Antenna	EM	EM6917 / 103325	May, 2001

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.

3.2. Test Setup



Spurious Emissions

3.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

3.4. Limits

➢ **General Radiated Emission Limits**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

Frequency MHz	50dB below of the fundamental (dBuV/m @3m)	15.209 Limits (dBuV/m @3m)	General Radiated Limits (dBuV/m @3m)
30-88	40	40	40
88-216	43.5	43.5	43.5
216-960	44	46	46
Above 960	44	54	54

Remarks : 1. RF Line Voltage (dBuV) = 20 log RF Line 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.

3.5. 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.

3.6. Test Result of Radiated Emission

Product : Acer Bluetooth Shuttle
Test Item : Harmonic Radiated Emission Data
Test Site : No.1 OATS
Test Mode : Channel 00

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Peak Detector **(Horizontal)**							
4804.570	6.26	33.48	34.78	59.50	64.46	9.54	74.00
7205.510	8.30	36.20	34.90	55.78	65.38	8.62	74.00
9608.040	10.14	37.42	35.10	56.42	<68.88	5.12	74.00
12010.01	11.87	39.11	34.69	56.56	<72.86	1.14	74.00
Average Detector **(Horizontal)**							
4804.065	6.26	33.48	35.90	44.21	48.05	5.95	54.00
7206.050	8.30	36.20	34.90	42.72	52.32	1.68	54.00
Peak Detector **(Vertical)**							
4804.350	6.26	33.48	34.78	65.99	70.95	3.05	74.00
7206.530	8.30	36.20	34.90	57.13	66.73	7.27	74.00
9607.970	10.14	37.42	35.10	57.07	<69.53	4.47	74.00
12010.02	11.87	39.11	34.69	55.53	<71.83	2.17	74.00
Average Detector **(Vertical)**							
4804.140	6.26	33.48	34.78	47.68	52.64	1.36	54.00
7206.100	8.30	36.20	34.90	42.50	52.10	1.90	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 + Antenna Factor + Cable loss
4. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Acer Bluetooth Shuttle
Test Item : Harmonic Radiated Emission Data
Test Site : No.1 OATS
Test Mode : Channel 39

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Peak Detector **(Horizontal)**							
4881.845	6.32	33.56	34.75	58.89	64.02	9.98	74.00
7323.050	8.39	36.32	34.90	56.69	66.51	7.49	74.00
9763.885	10.25	37.45	35.10	53.68	<66.28	7.72	74.00
12204.76	12.00	39.18	34.54	54.02	<70.67	3.33	74.00
Average Detector **(Horizontal)**							
4882.010	6.32	33.56	34.75	42.91	48.04	5.96	54.00
7323.235	8.39	36.32	34.90	42.21	52.03	1.97	54.00
Peak Detector **(Vertical)**							
4882.155	6.32	33.56	34.75	62.19	67.32	6.68	74.00
7323.125	8.39	36.32	34.90	60.94	70.76	3.24	74.00
9763.775	10.25	37.45	35.10	56.78	<69.38	4.62	74.00
12204.56	12.00	39.18	34.54	56.81	<72.46	1.54	74.00
Average Detector **(Vertical)**							
4881.980	6.32	33.56	34.75	46.51	51.64	2.36	54.00
7323.045	8.39	36.32	34.90	43.11	52.93	1.07	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 + Antenna Factor + Cable loss
4. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Acer Bluetooth Shuttle
Test Item : Harmonic Radiated Emission Data
Test Site : No.1 OATS
Test Mode : Channel 78

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Peak Detector **(Horizontal)**							
4960.080	6.40	33.66	34.72	59.85	65.20	8.80	74.00
7440.655	8.49	36.44	34.90	52.46	62.49	11.51	74.00
9919.850	10.38	37.48	35.10	55.24	<68.00	6.00	74.00
12399.84	12.14	39.26	34.37	54.56	<71.59	2.41	74.00
Average Detector **(Horizontal)**							
4960.015	6.40	33.66	34.72	44.56	49.91	4.09	54.00
7440.185	8.49	36.44	34.90	39.24	49.27	4.73	54.00
Peak Detector **(Vertical)**							
4959.640	6.40	33.66	34.72	64.54	69.89	4.11	74.00
7439.980	8.49	36.44	34.90	57.26	67.29	6.71	74.00
9920.445	10.38	37.48	35.10	55.47	<68.23	5.77	74.00
12400.11	12.14	39.26	34.37	54.45	<71.48	2.52	74.00
Average Detector **(Vertical)**							
4960.050	6.40	33.66	34.72	47.25	52.60	1.40	54.00
7440.050	8.49	36.44	34.90	40.42	50.45	3.55	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 + Antenna Factor + Cable loss
4. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Acer Bluetooth Shuttle
Test Item : General Radiated Emission Data
Test Site : No.1 OATS
Test Mode : Normal Operation

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal:							
100.810	1.31	11.44	26.88	39.60	25.48	18.02	43.50
160.950	1.56	10.15	26.90	40.60	25.40	18.10	43.50
264.740	1.98	12.33	26.94	48.00	35.37	10.63	46.00
*321.000	2.21	13.35	26.92	48.40	37.04	8.96	46.00
412.180	2.58	14.36	26.77	46.00	36.17	9.83	46.00
455.830	2.76	14.20	26.70	46.00	36.26	9.74	46.00
Vertical:							
121.180	1.39	11.78	26.88	46.00	32.29	11.21	43.50
159.980	1.55	10.19	26.90	43.20	28.04	15.46	43.50
202.660	1.72	9.21	26.91	44.80	28.82	14.68	43.50
241.460	1.88	11.44	26.93	50.00	36.40	9.60	46.00
*299.660	2.12	12.53	26.95	51.20	38.90	7.10	46.00
695.420	3.75	16.07	26.33	41.60	35.09	10.91	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 + Antenna Factor + Cable loss

4. Band Edge

4.1. Test Equipment

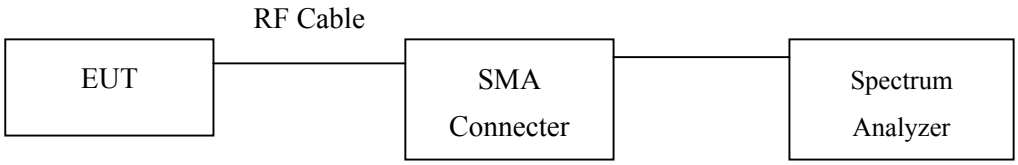
The following test equipments are used during the band edge tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Advantest	R3272 / 72421194	May, 2001
X	Power Meter	HP	EPM-441A	May, 2001
X	Test Receiver	R & S	ESCS 30 / 825442/14	May, 2001
	Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2001
	Pre-Amplifier	HP	8447D/3307A01812	May, 2001
X	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2000
X	Horn Antenna	EM	EM6917 / 103325	May, 2001

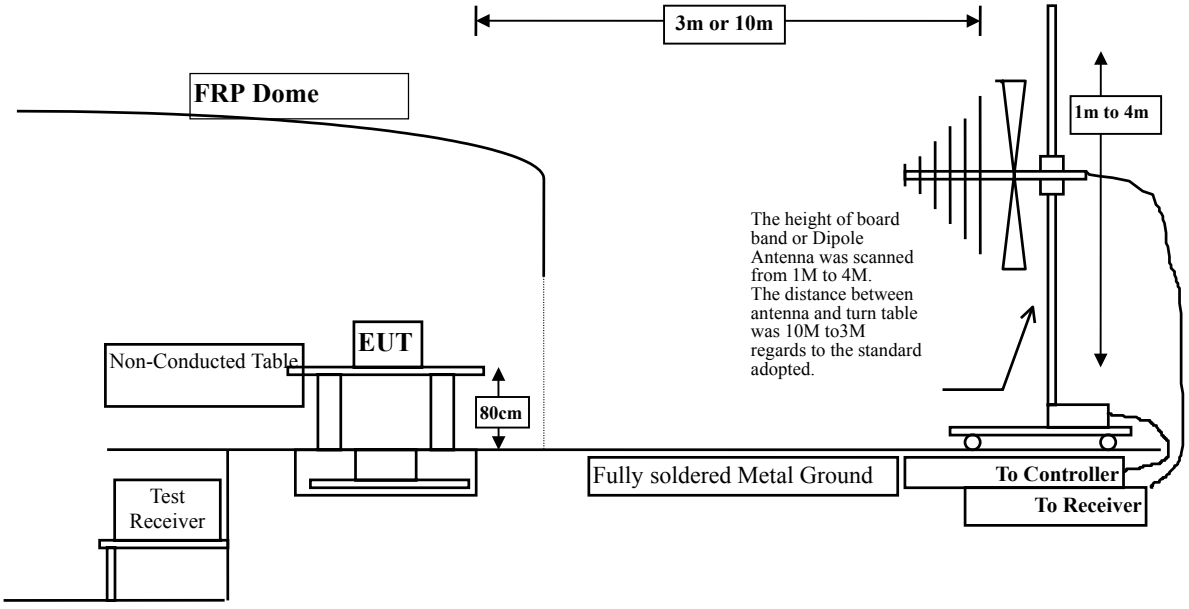
Note: 1. All equipments that need to calibrate are with calibration period of 1 year.
2. Mark "X" test instruments are used to measure the final test results.

4.2. Test Setup

RF Conducted Measurement:



RF Radiated Measurement:



4.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

4.4. Minimum Standard

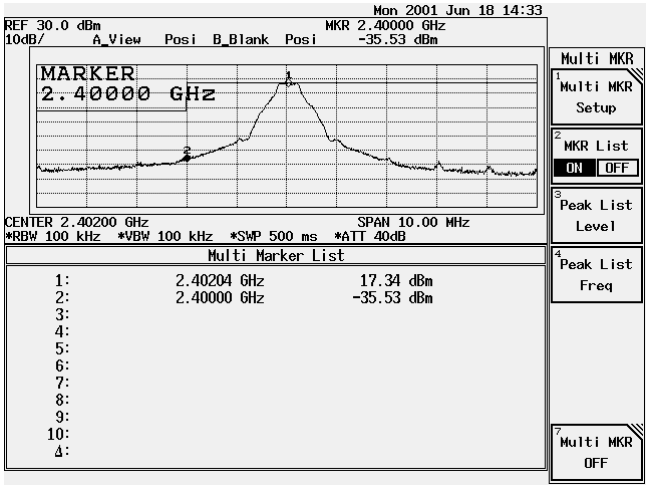
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the 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)).

4.5. Test Result of Band Edge

Product : Acer Bluetooth Shuttle
Test Item : Band Edge Data
Test Site : No.1 OATS
Test Mode : Normal Operation

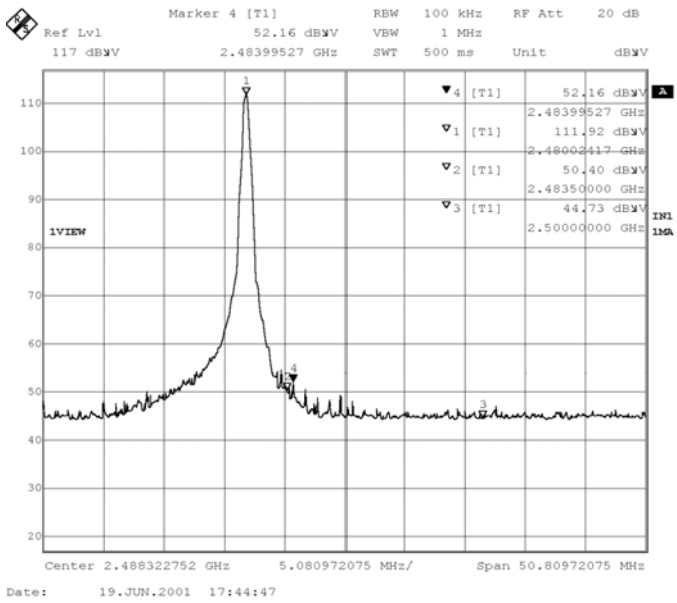
RF Conducted Measurement

Measurement Frequency (MHz)	Measurement level (dBc)	Required Limit (dBc)	Result
2400.00	-35.53 dB	<20	Pass



RF Radiated Measurement

Measurement Frequency (MHz)	Measurement level (dBμV/m)	Required Limit (dBμV/m)	Result
2483.9527	52.16 dB	<54	Pass



5. Peak Power Output

5.1. Test Equipment

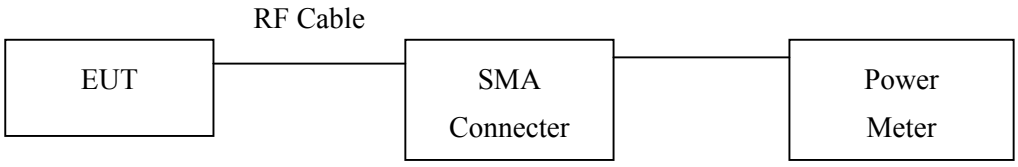
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Advantest	R3272 / 72421194	May, 2001
X	Power Meter	HP	EPM-441A	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.

5.2. Test Setup

Conduction Power Measurement



5.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

5.4. Minimum Standard

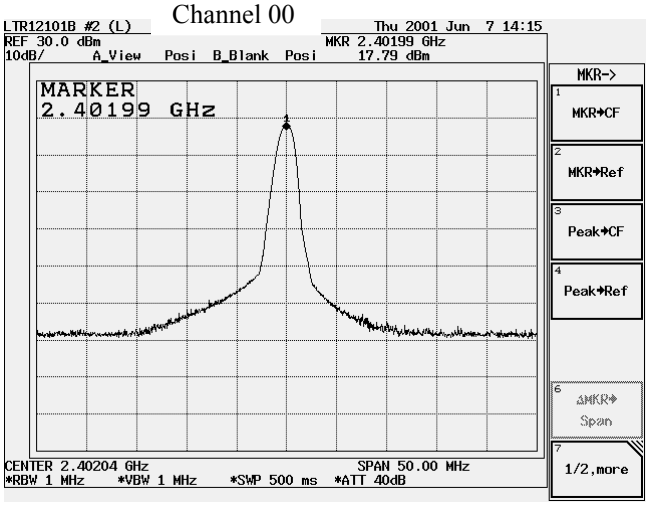
The maximum peak power shall be less 0.125 Watt.

5.5. Test Result of Peak Power Output

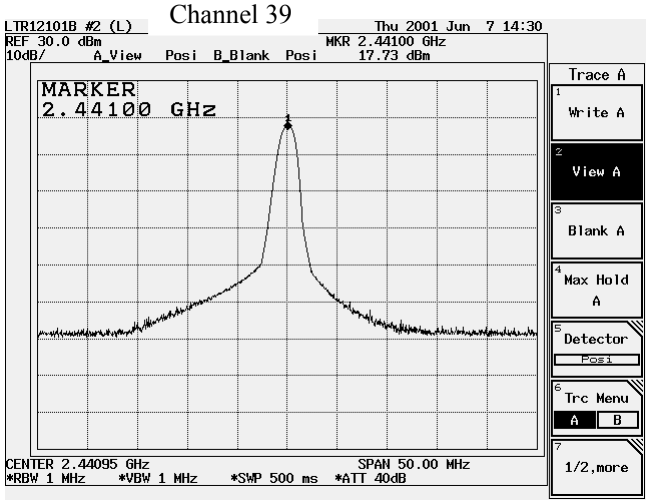
Product : Acer Bluetooth Shuttle
Test Item : Peak Power Output Data
Test Site : No.1 OATS
Test Mode : Normal Operation

Channel No.	Frequency(MHz)	Measurement	Required Limit	Result
Channel 00	2401.99	17.79dBm	0.125Watt= 20.96 dBm	Pass
Channel 39	2441.00	17.73 dBm	0.125Watt= 20.96 dBm	Pass
Channel 78	2479.95	17.57 dBm	0.125Watt= 20.96 dBm	Pass

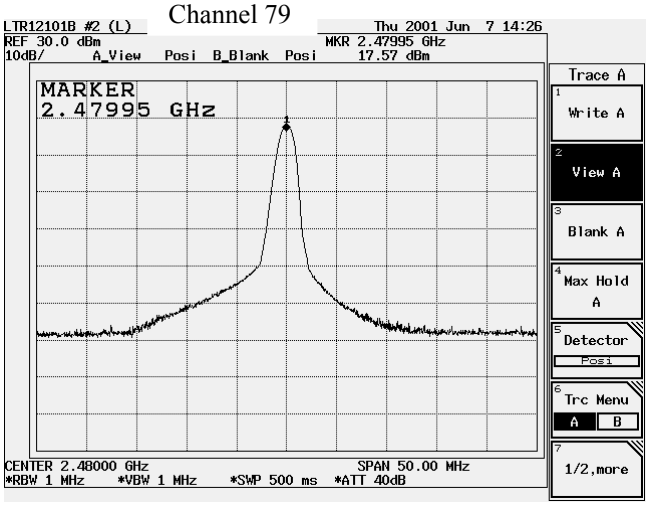
Channel 00



Channel 39



Channel 79



6. 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

6.1. 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.

6.2. EUT Operation condition

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

6.3. Test Result of RF Exposure Evaluation

Product : Acer Bluetooth Shuttle
Test Item : RF Exposure Evaluation Data
Test Site : No.1 OATS
Test Mode : Normal Operation

4.3.1 Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.6dBi or 1.45in linear scale.

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	17.79	2.72
39	2439	17.73	2.70
78	2480	17.57	2.65

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.

7. Occupied Bandwidth

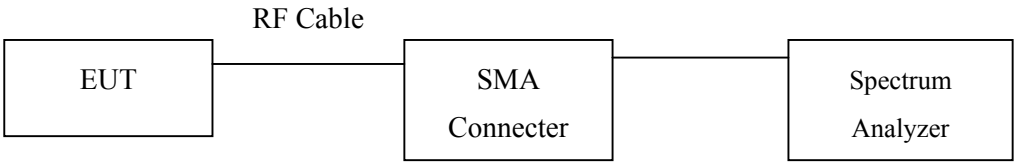
7.1. Test Equipment

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

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Advantest	R3272 / 72421194	May, 2001
X	Horn Antenna	EM	EM6917 / 103325	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

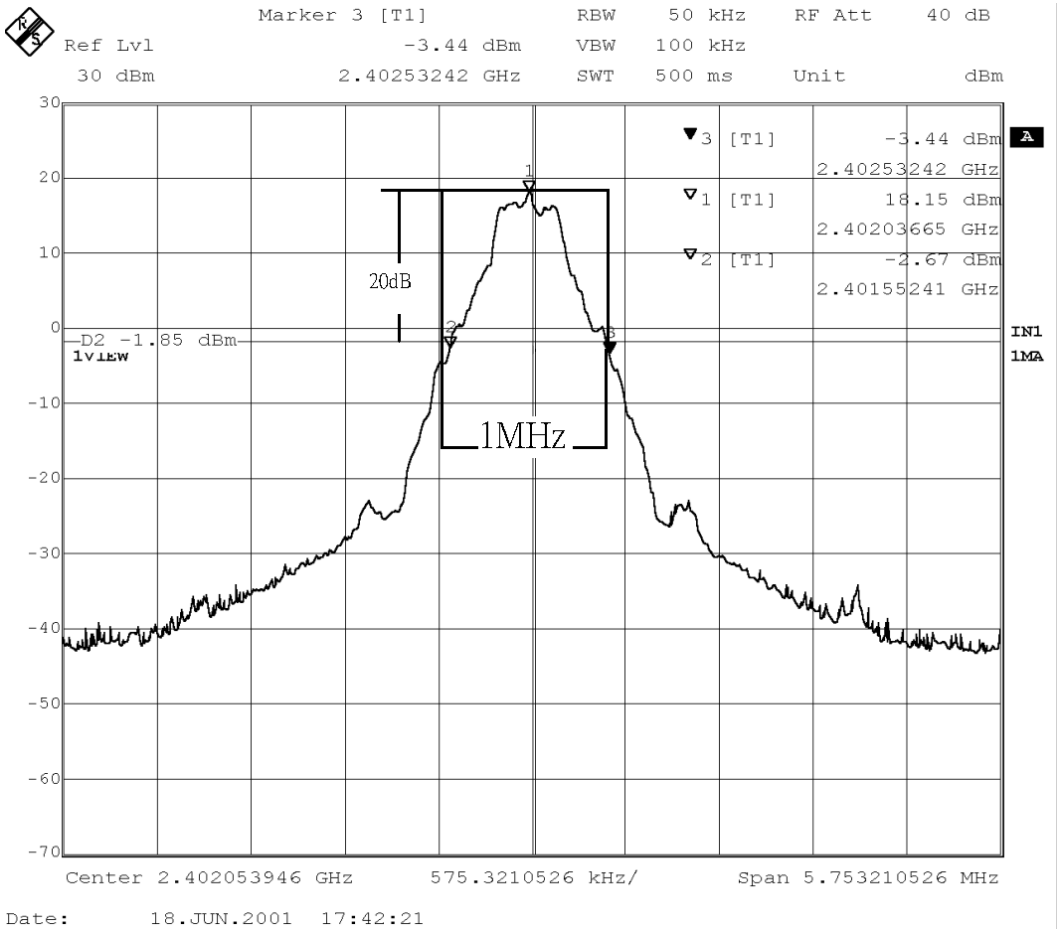
7.4. Standard Reqirement

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

7.5. Test Result of Occupied Bandwidth

Product : Acer Bluetooth Shuttle
Test Item : Occupied Bandwidth Data
Test Site : No.1 OATS
Test Mode : Normal Operation

Measurement Level (MHz)	Required Limit (MHz)	Result
0.98001	<1	Pass



8. Channel of Number

8.1. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

8.2. Minimum Standard

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

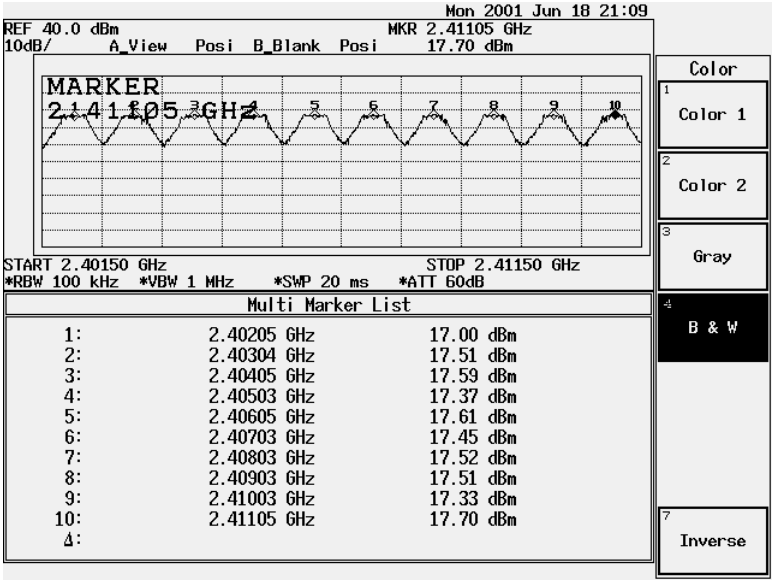
8.3. Method of Measurement

The system shall hop to channel frequencies that selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

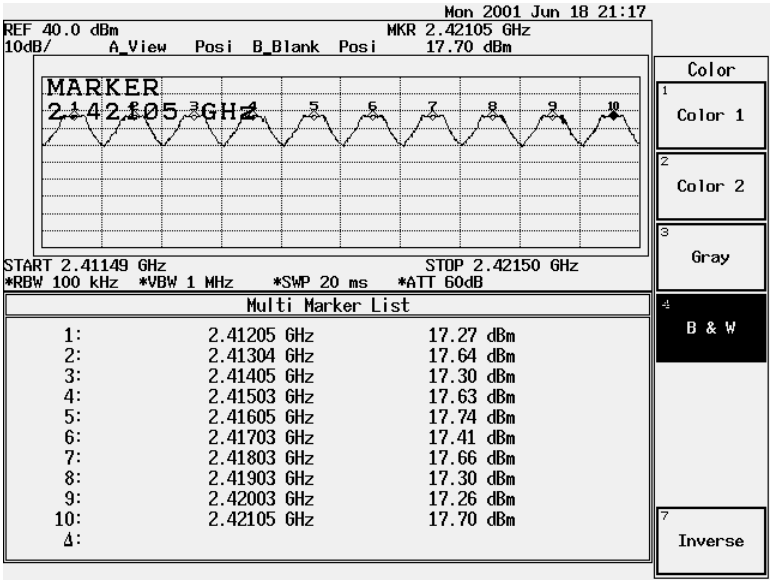
8.4. Test Result of Channel Number

Product : Acer Bluetooth Shuttle
Test Item : Sweep of Channel Number
Test Site : No.1 OATS
Test Mode : Normal Operation

2402-2411MHz

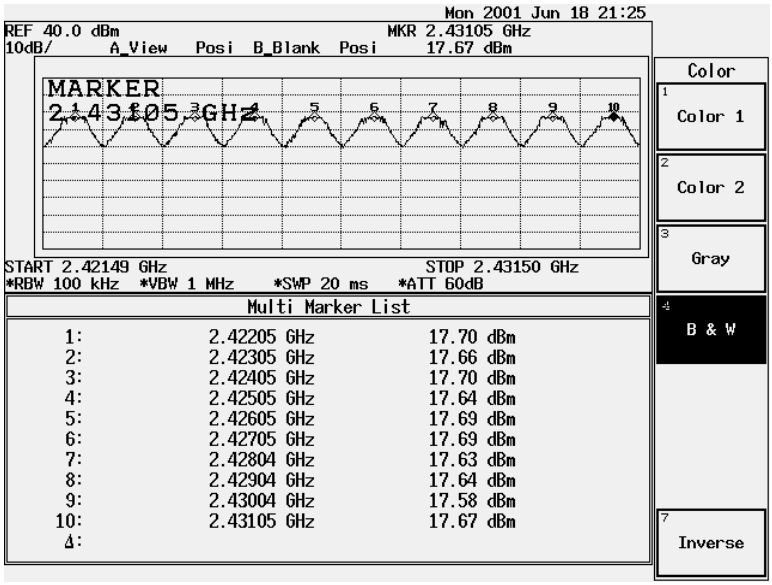


2411-2421MHz

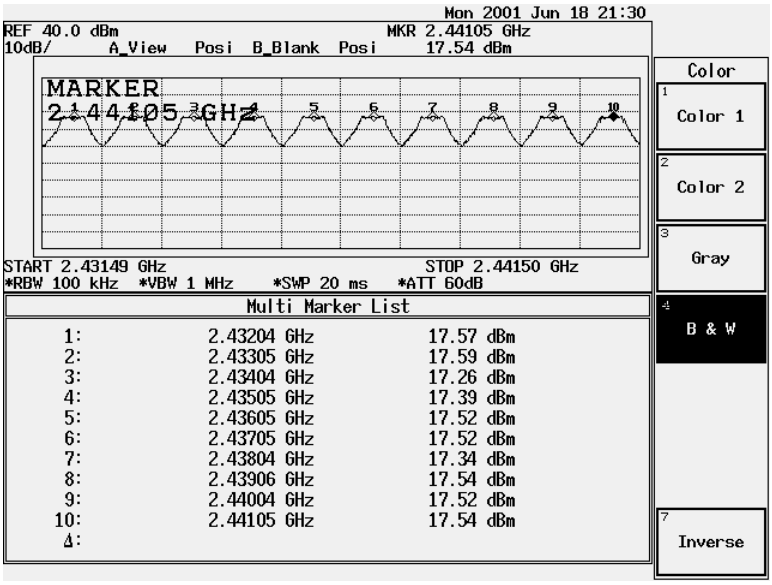


Product : Acer Bluetooth Shuttle
Test Item : Sweep of Channel Number
Test Site : No.1 OATS
Test Mode : Normal Operation

2421-2431MHz

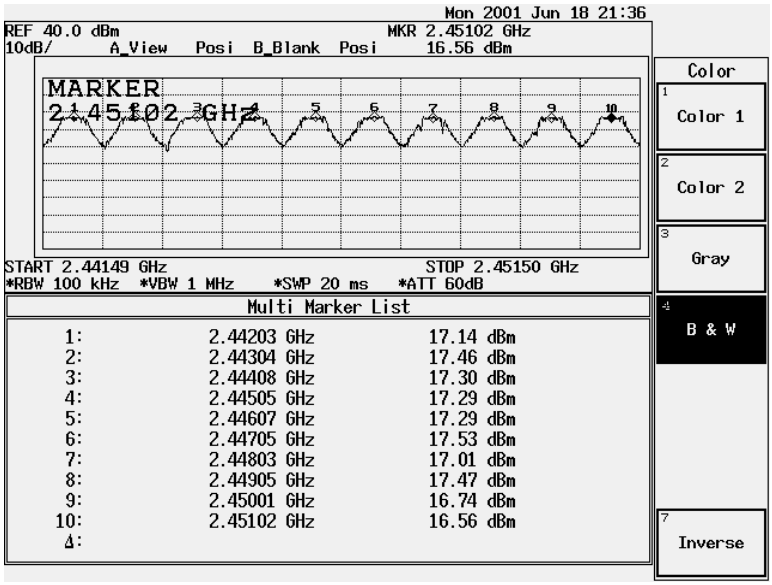


2431-2441MHz

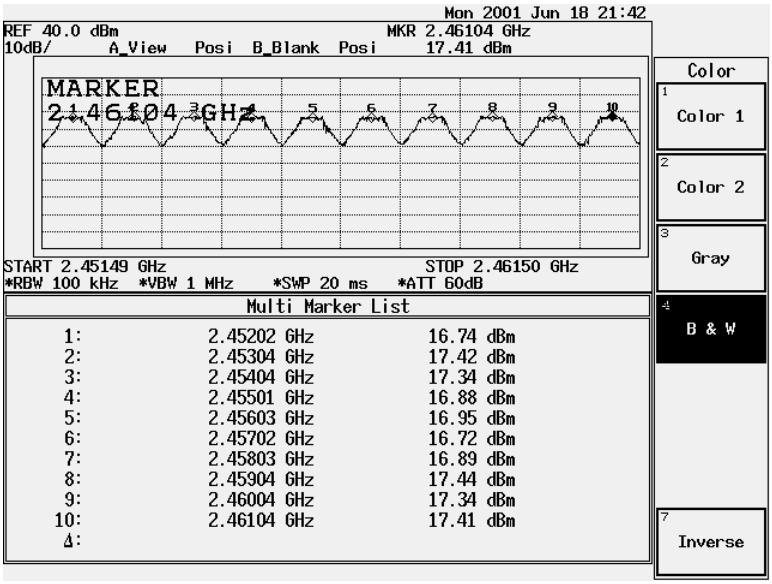


Product : Acer Bluetooth Shuttle
Test Item : Sweep of Channel Number
Test Site : No.1 OATS
Test Mode : Normal Operation

2441-2451MHz

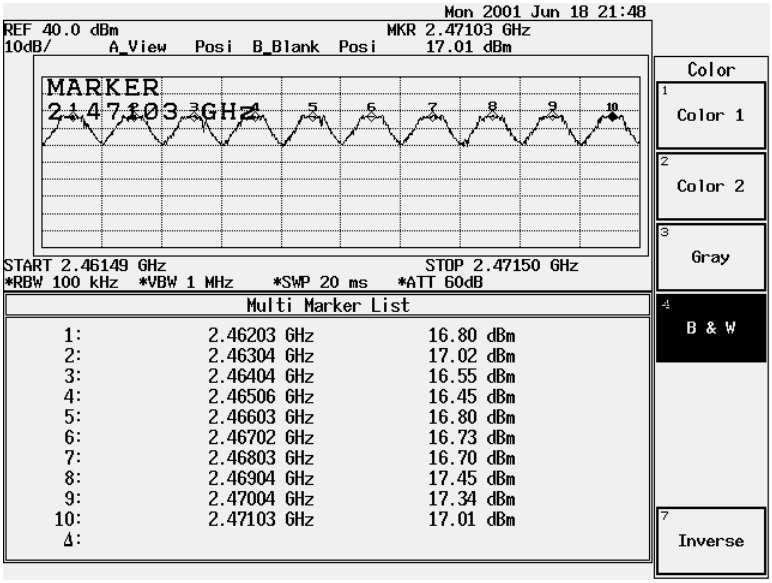


2451-2461MHz

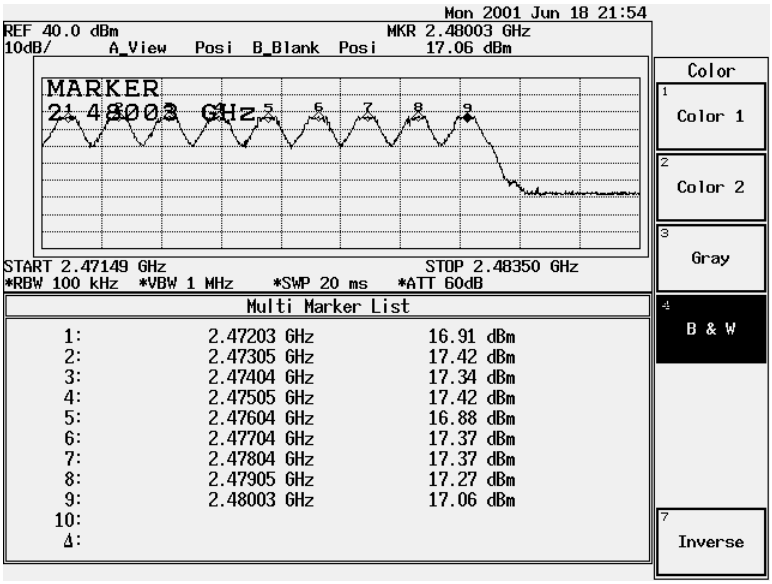


Product : Acer Bluetooth Shuttle
Test Item : Sweep of Channel Number
Test Site : No.1 OATS
Test Mode : Normal Operation

2461-2471MHz



2471-2481MHz



9. Channel Separation

9.1. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

9.2. Minimum Standard

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.

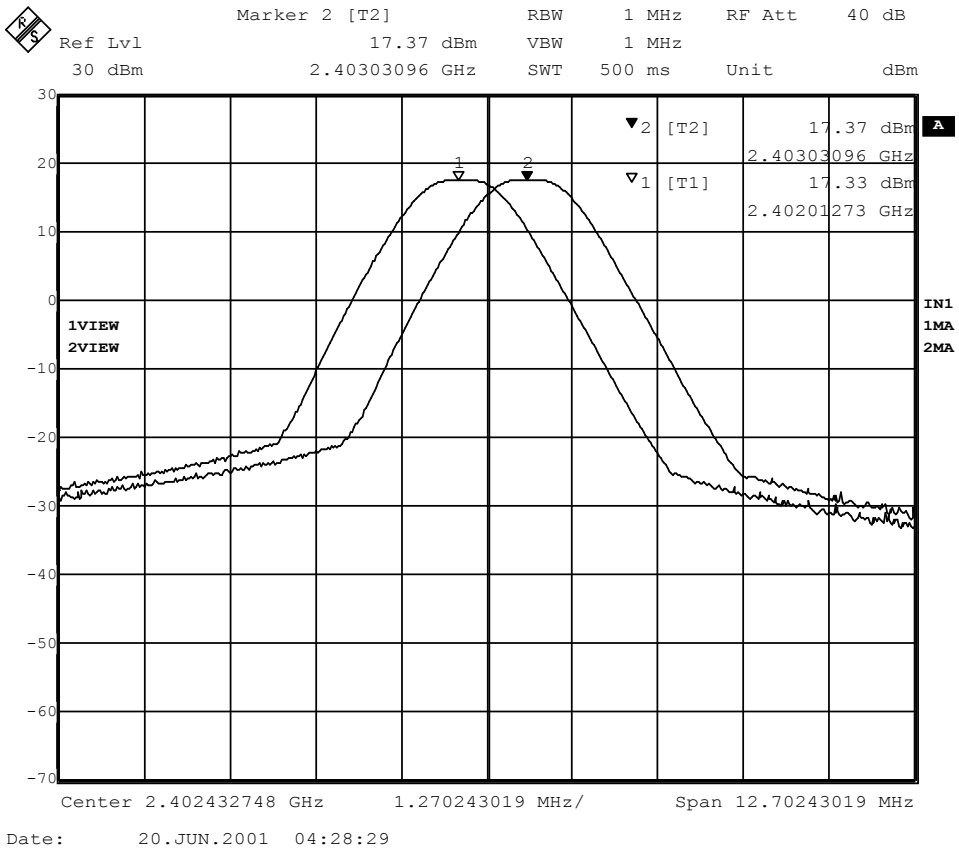
9.3. Method of Measurement

The system shall hop to channel frequencies that selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

9.4. Test Result of Channel Separation

Product : Acer Bluetooth Shuttle
Test Item : Channel Separation Data
Test Site : No.1 OATS
Test Mode : Normal Operation

Measurement Level (MHz)	Required Limit (kHz)	Result
1.02	>25	Pass



10. Dwell Time

10.1. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

10.2. Minimum Standard

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.

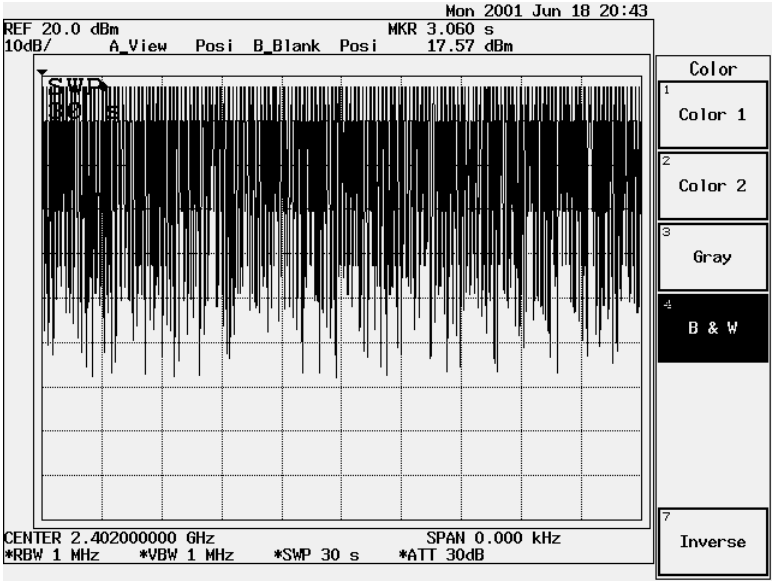
10.3. Method of Measurement

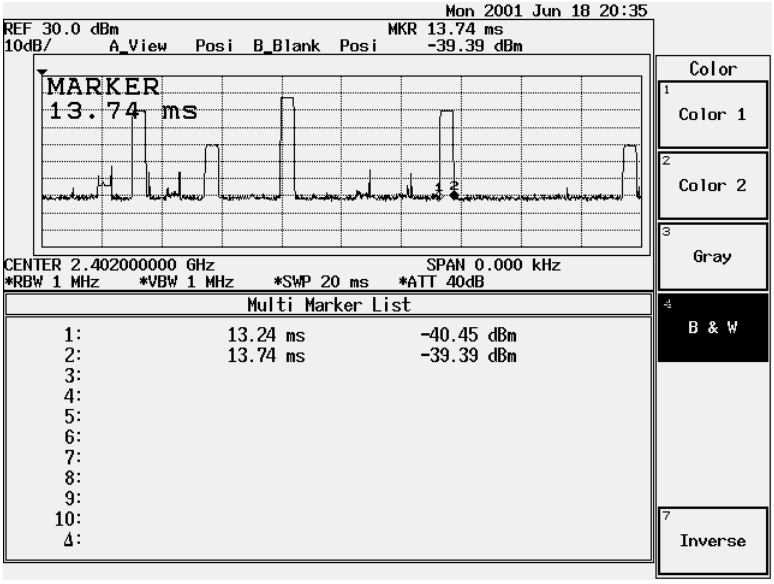
The average time of occupancy on any frequency measured in zero span function of spectrum analyzer.

10.4. Test Result of Dwell Time

Product : Acer Bluetooth Shuttle
Test Item : Dwell Time Data
Test Site : No.1 OATS
Test Mode : Normal Operation

Measurement Level	Required Limit	Result
155*0.5=77.5(ms)	<0.4 (sec)	Pass





11. EMI Reduction Method During Compliance Testing

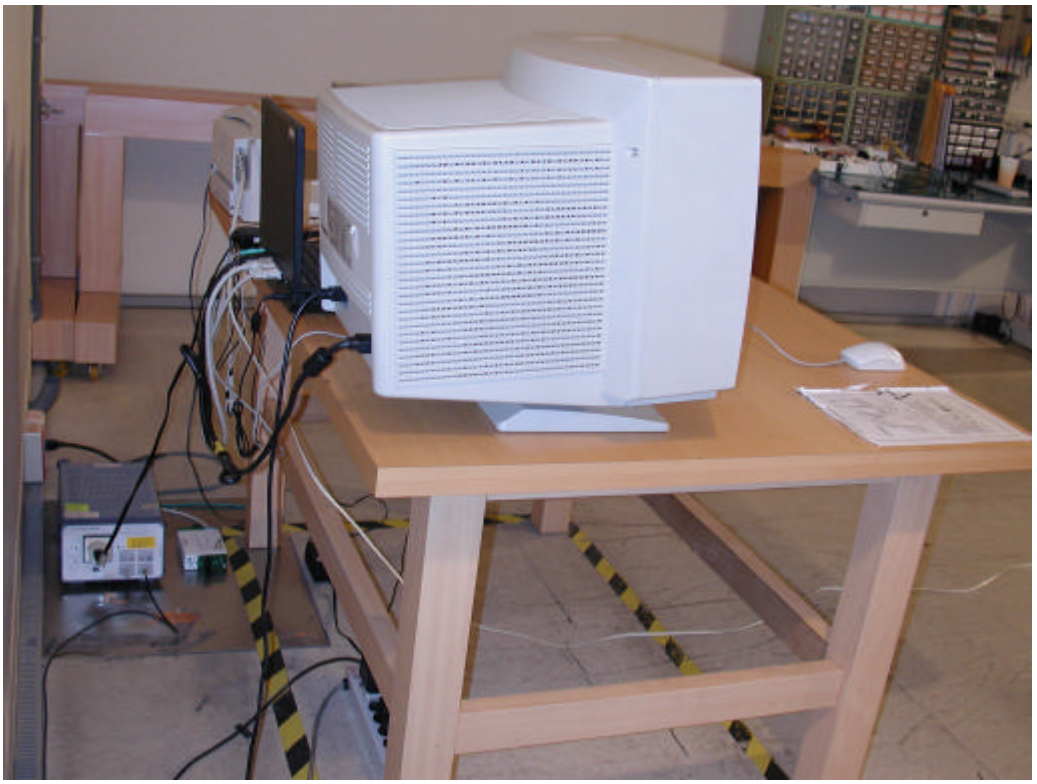
No modification was made during testing.

Attachment 1 : EUT Test Photographs

Attachment 1 : EUT Test Photographs

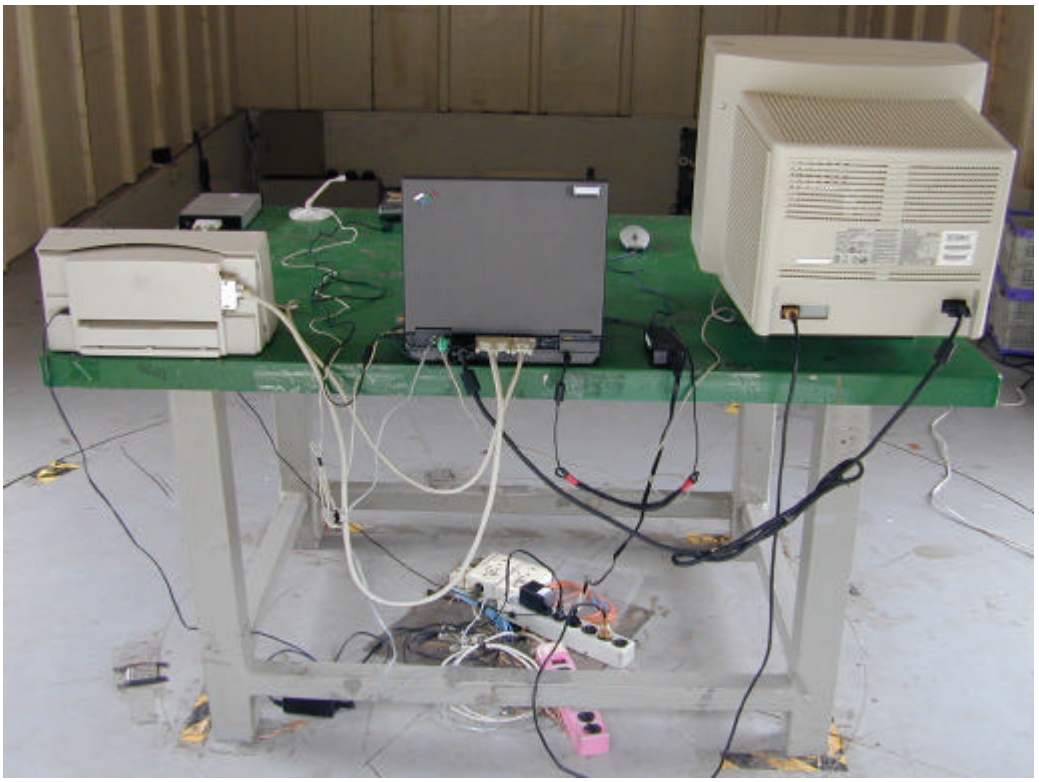
Front View of Conducted Test

Back View of Conducted Test

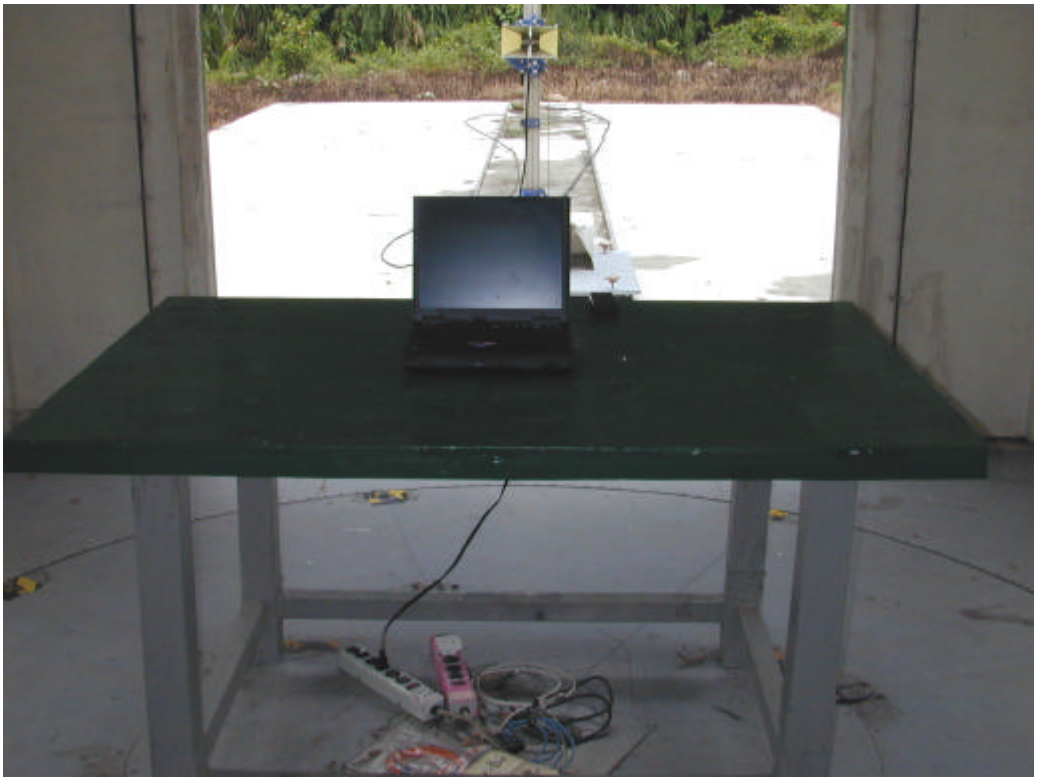


Front View of Radiated Test

Back View of Radiated Test



Front View of Radiated Test (Horn)



Attachment 2 : EUT Detailed Photographs

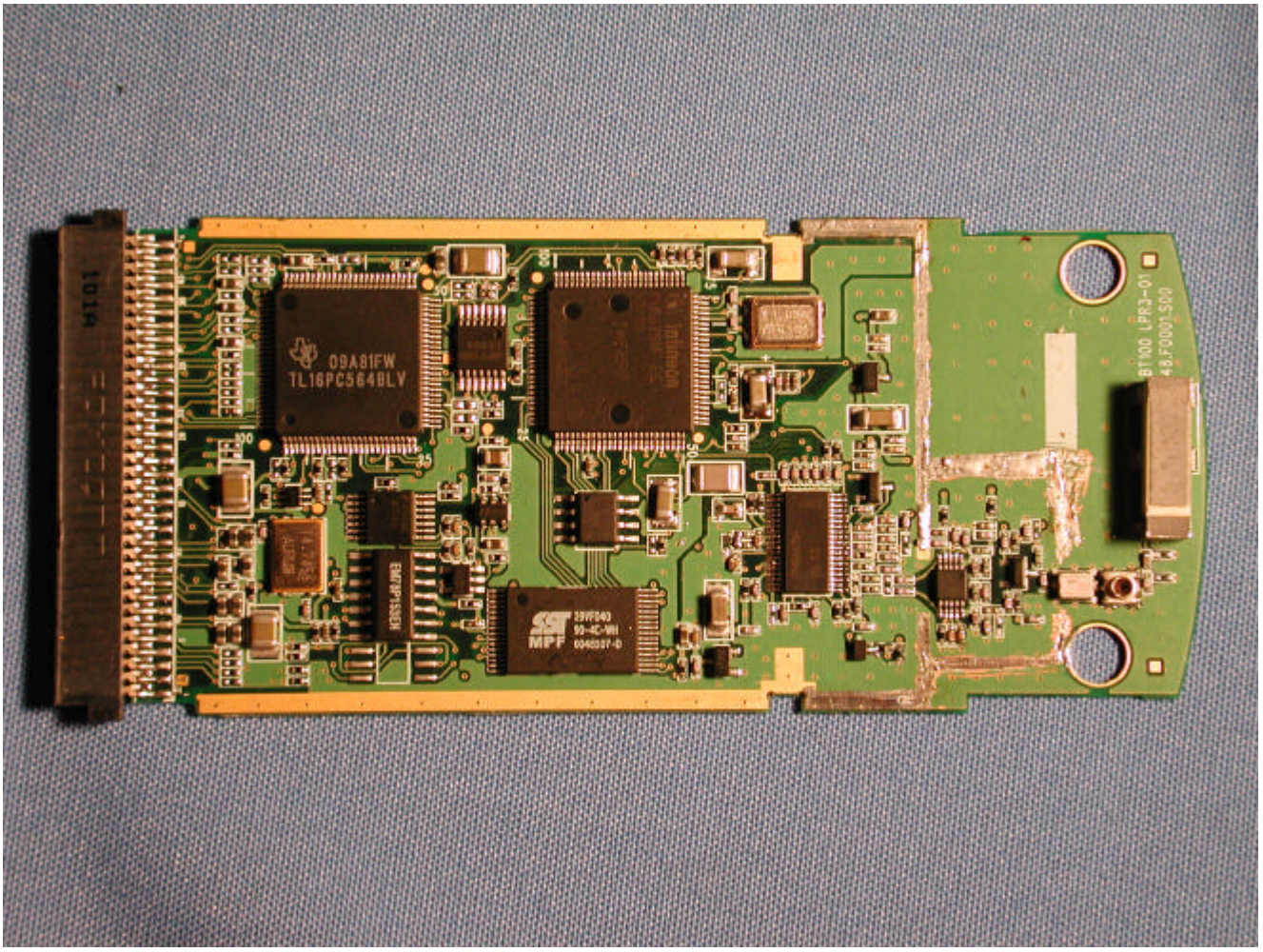
(1) EUT Photo

(2) EUT Photo

(3) EUT Photo

(4) EUT Photo

(5) EUT Photo



(6) EUT Photo