



Test Report

Product Name : MEGA BOOK
Model No. : MS-1022, S425, S425B
FCC ID. : I4L-MD560B-01

Applicant : MICRO-STAR INT'L CO., LTD

Address : No.69,Li-De St,Jung-He City ,Taipei Hsien 235,Taiwan

Date of Receipt : July 29, 2005

Issued Date : Sep. 19, 2005

Report No. : 058L036FI

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 : Sep. 19, 2005

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Address : No.69,Li-De St,Jung-He City ,Taipei Hsien 235,Taiwan

Manufacturer : MICRO-STAR INT'L CO., LTD

Model No. : MS-1022, S425, S425B

FCC ID. : I4L-MD560B-01

Rated Voltage : AC 120V/60Hz

Trade Name : MSI

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 : Rita Huang
(Rita Huang)



Tested By : Tom Hsieh
(Tom Hsieh)

Approved By : Gene Chang
(Gene Chang)



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

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 including three models, The MS-1022 for MSI and the S425, S425B PRO for different marketing requirement.
2. This device is MEGA BOOK including a 2.4GHz receiver and a 2.4GHz transmitter of Bluetooth.
3. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
3. 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.
4. 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 058L036F, certified under Declaration of Conformity.
5. Quietek had verified among construction and function in typical operation, then shown in this test report.

1.2. Operational Description

The EUT is a MEGA BOOK 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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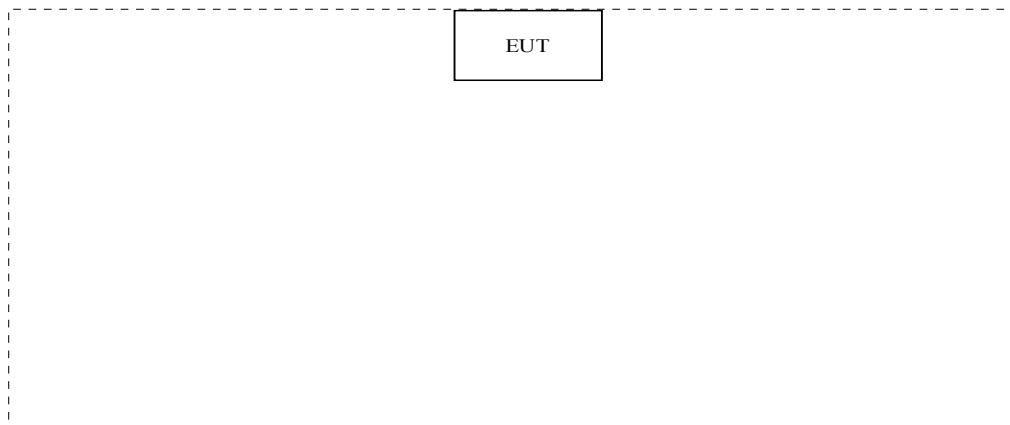
1.3. Tested System Details

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) N/A	N/A	N/A	N/A	N/A	N/A

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,
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 TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
 E-Mail : service@quietek.com



2. Conducted Emission

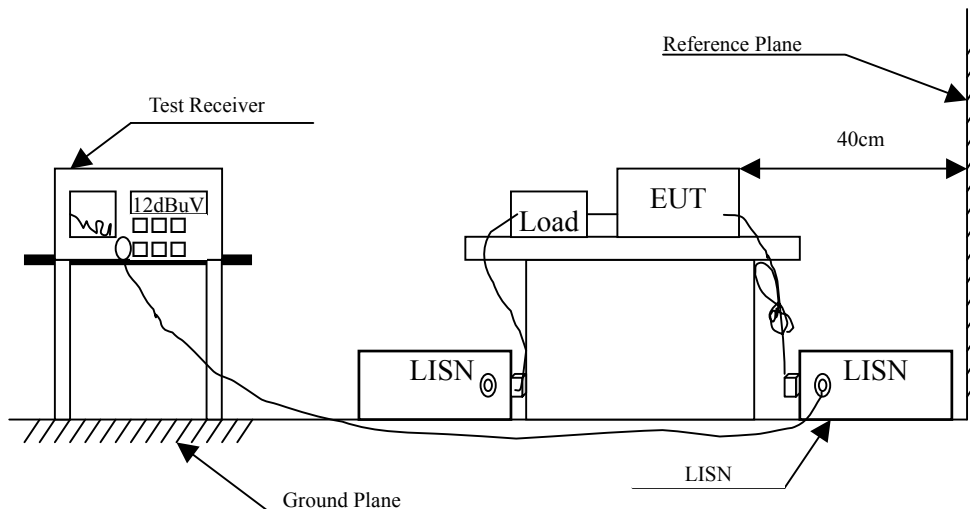
2.1. Test Equipment

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 investigated 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 : MEGA BOOK
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 1: Transmitter (Channel 39)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Quasi-Peak					
* 0.151	0.202	47.750	47.952	-18.019	65.971
0.216	0.202	23.340	23.542	-40.572	64.114
0.291	0.204	23.870	24.074	-37.898	61.971
4.544	0.260	25.320	25.580	-30.420	56.000
22.341	0.659	28.710	29.369	-30.631	60.000
22.629	0.669	27.700	28.369	-31.631	60.000
Average					
0.151	0.202	28.250	28.452	-27.519	55.971
0.216	0.202	21.890	22.092	-32.022	54.114
0.291	0.204	19.440	19.644	-32.328	51.971
* 4.544	0.260	21.550	21.810	-24.190	46.000
22.341	0.659	20.900	21.559	-28.441	50.000
22.629	0.669	21.390	22.059	-27.941	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

Product : MEGA BOOK
 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
	dB	dBuV	dBuV		
Quasi-Peak					
* 0.154	0.202	47.250	47.452	-18.434	65.886
0.219	0.202	21.920	22.122	-41.906	64.029
0.439	0.206	21.730	21.936	-35.807	57.743
1.246	0.216	17.680	17.896	-38.104	56.000
4.636	0.262	24.790	25.052	-30.948	56.000
22.584	0.733	28.710	29.443	-30.557	60.000
Average					
0.154	0.202	26.780	26.982	-28.904	55.886
0.219	0.202	21.240	21.442	-32.586	54.029
0.439	0.206	15.090	15.296	-32.447	47.743
1.246	0.216	15.560	15.776	-30.224	46.000
* 4.636	0.262	21.280	21.542	-24.458	46.000
22.584	0.733	20.790	21.523	-28.477	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

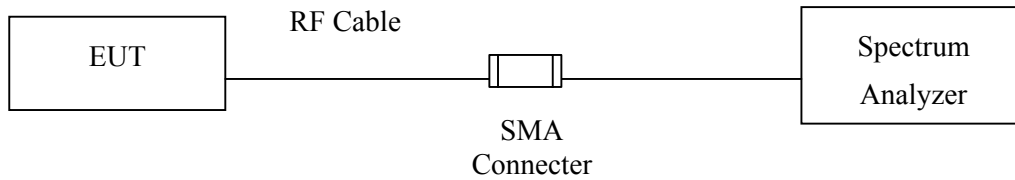
3.1. Test Equipment

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

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Advantest	R3162 / 100803480	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.

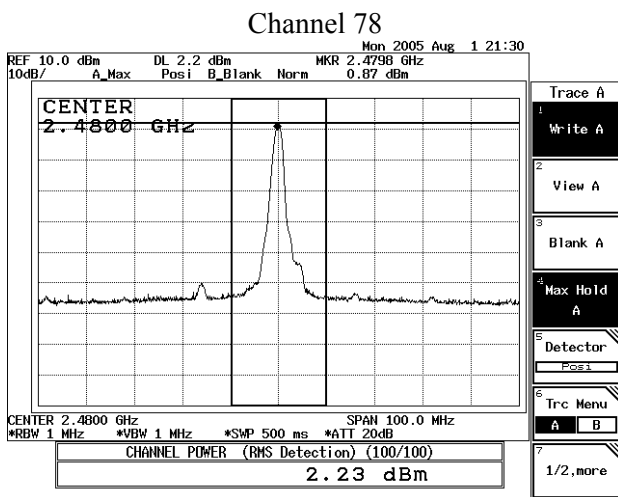
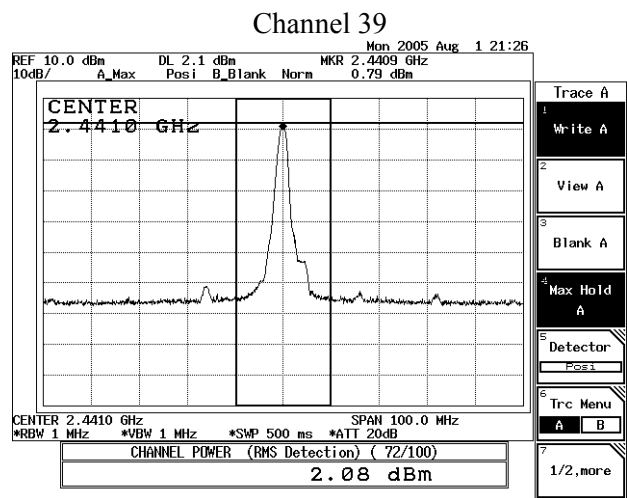
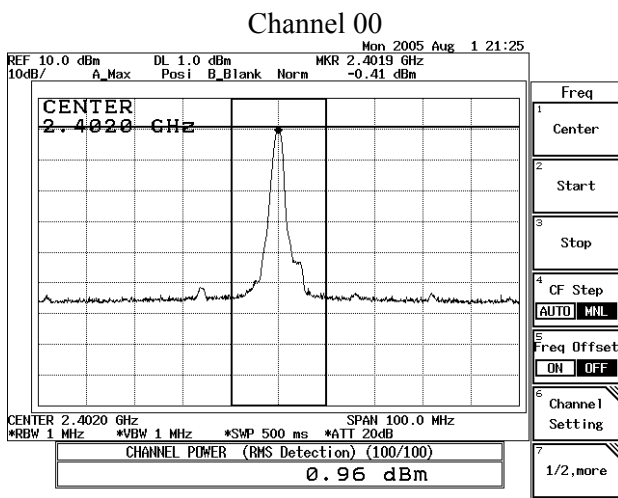
3.4. Uncertainty

The measurement uncertainty is defined as ± 1.27 dB

3.5. Test Result of Peak Power Output

Product : MEGA BOOK
 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	0.96dBm	1 Watt= 30 dBm	Pass
Channel 39	2441.00	2.08dBm	1 Watt= 30 dBm	Pass
Channel 78	2480.00	2.23dBm	1 Watt= 30 dBm	Pass



Note:

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

4. Radiated Emission

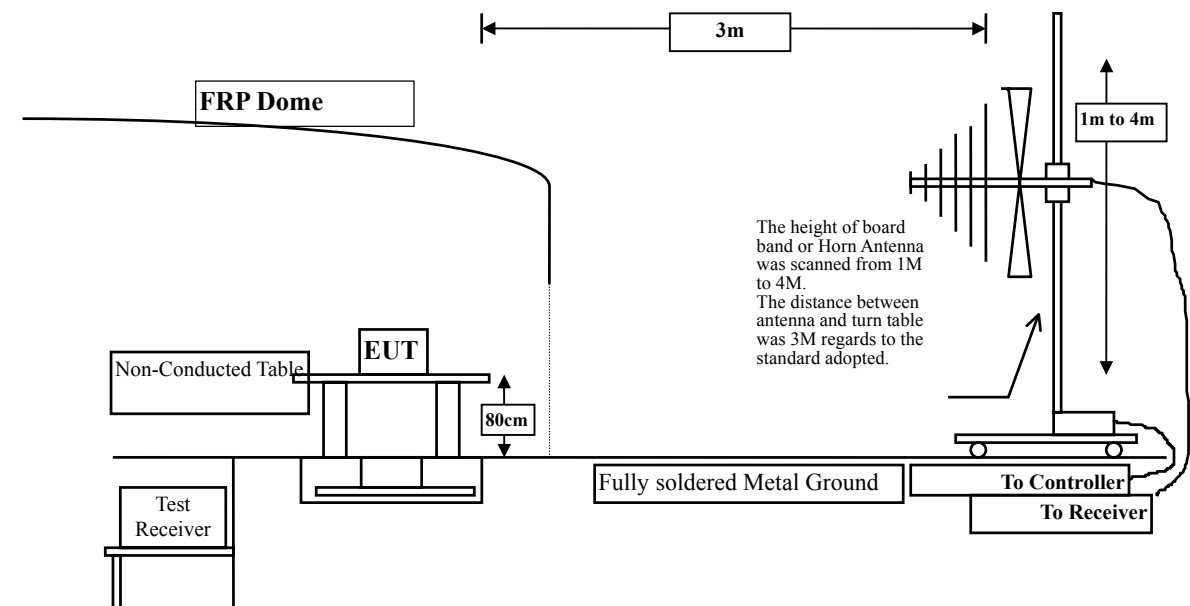
4.1. Test Equipment

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

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
<input type="checkbox"/> 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
<input type="checkbox"/> 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
<input checked="" type="checkbox"/> 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 : MEGA BOOK
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 00)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4804.116	3.663	39.632	43.295	-30.705	74.000
7186.784	9.304	37.838	47.142	-26.858	74.000
9608.116	11.842	37.141	48.983	-25.017	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4803.807	3.662	42.010	45.672	-28.328	74.000
7206.116	9.357	36.710	46.067	-27.933	74.000
9608.039	11.842	37.438	49.280	-24.720	74.000
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 : MEGA BOOK
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 39)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4882.075	3.922	38.827	42.749	-31.251	74.000
7323.225	9.657	37.025	46.682	-27.318	74.000
9764.225	11.798	37.181	48.979	-25.021	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4882.000	3.921	38.566	42.487	-31.513	74.000
7323.075	9.657	36.937	46.594	-27.406	74.000
9726.500	11.816	37.137	48.953	-25.047	74.000
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 : MEGA BOOK
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 78)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4960.075	4.197	38.668	42.865	-31.135	74.000
7440.376	9.952	38.727	48.679	-25.321	74.000
9920.075	11.856	38.245	50.101	-23.899	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4960.075	4.197	41.755	45.952	-28.048	74.000
7440.376	9.952	37.637	47.589	-26.411	74.000
9920.225	11.856	37.706	49.562	-24.438	74.000
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 : MEGA BOOK
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 00)

Freq.	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
	Loss	Factor		Level	Level		
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal:							
206.890	1.78	8.46	0.00	17.36	27.60	15.90	43.50
272.900	2.12	11.88	0.00	12.45	26.45	19.55	46.00
344.900	2.49	12.77	0.00	15.10	30.36	15.64	46.00
* 432.280	2.94	15.81	0.00	15.91	34.66	11.34	46.00
549.020	3.54	18.34	0.00	12.36	34.25	11.75	46.00
620.900	3.91	18.68	0.00	11.97	34.56	11.44	46.00
Vertical:							
206.893	1.78	8.72	0.00	20.23	30.73	12.77	43.50
325.470	2.39	12.51	0.00	18.30	33.21	12.79	46.00
479.040	3.18	16.60	0.00	14.40	34.19	11.81	46.00
498.480	3.28	16.30	0.00	14.71	34.28	11.72	46.00
615.110	3.88	19.33	0.00	11.98	35.19	10.81	46.00
* 760.900	4.63	20.49	0.00	10.47	35.60	10.40	46.00

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. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.

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

Freq.	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
	Loss	Factor		Level	Level		
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal:							
432.380	2.94	15.81	0.00	15.70	34.45	11.55	46.00
500.420	3.30	16.36	0.00	13.19	32.85	13.15	46.00
* 620.400	3.91	18.68	0.00	11.97	34.56	11.44	46.00
755.070	4.61	18.92	0.00	10.99	34.52	11.48	46.00
792.000	4.79	19.42	0.00	7.97	32.18	13.82	46.00
825.050	4.96	19.25	0.00	8.07	32.28	13.72	46.00
Vertical:							
329.360	2.41	12.44	0.00	15.57	30.42	15.58	46.00
432.280	2.94	17.36	0.00	10.96	31.27	14.73	46.00
498.480	3.28	16.30	0.00	14.65	34.22	11.78	46.00
* 760.900	4.63	20.49	0.00	9.39	34.52	11.48	46.00
801.700	4.85	19.26	0.00	10.14	34.25	11.75	46.00
813.300	4.90	19.13	0.00	8.54	32.57	13.43	46.00

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. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.

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

Freq.	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
	Loss	Factor		Level	Level		
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal:							
399.340	2.77	14.62	0.00	11.05	28.44	17.56	46.00
432.280	2.94	15.81	0.00	15.50	34.25	11.75	46.00
484.870	3.22	16.48	0.00	14.43	34.13	11.87	46.00
545.120	3.52	18.02	0.00	14.16	35.70	10.30	46.00
* 760.900	4.63	19.54	0.00	14.34	38.52	7.48	46.00
792.000	4.79	19.42	0.00	7.94	32.15	13.85	46.00
Vertical:							
325.480	2.39	12.51	0.00	15.19	30.10	15.90	46.00
409.060	2.82	17.37	0.00	11.99	32.18	13.82	46.00
615.110	3.88	19.33	0.00	10.79	34.00	12.00	46.00
753.100	4.59	20.66	0.00	9.25	34.51	11.49	46.00
* 797.840	4.83	19.34	0.00	10.78	34.95	11.05	46.00
813.280	4.90	19.13	0.00	6.12	30.15	15.85	46.00

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. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.

5. Band Edge

5.1. Test Equipment

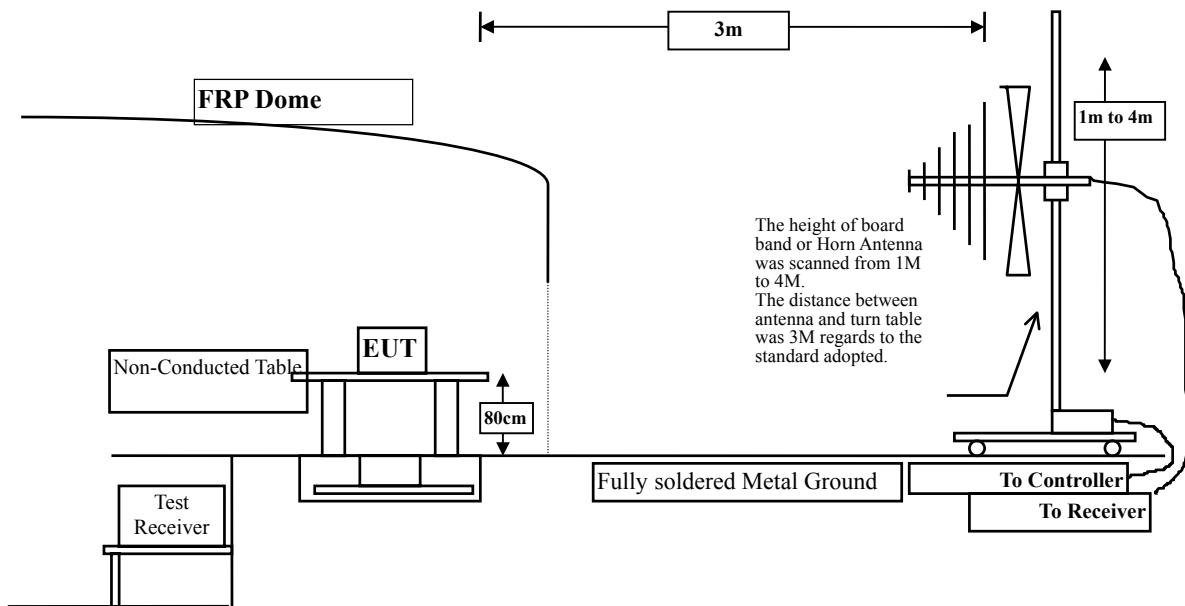
The following test equipments are used during the band edge tests:

	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 : MEGA BOOK
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 00)

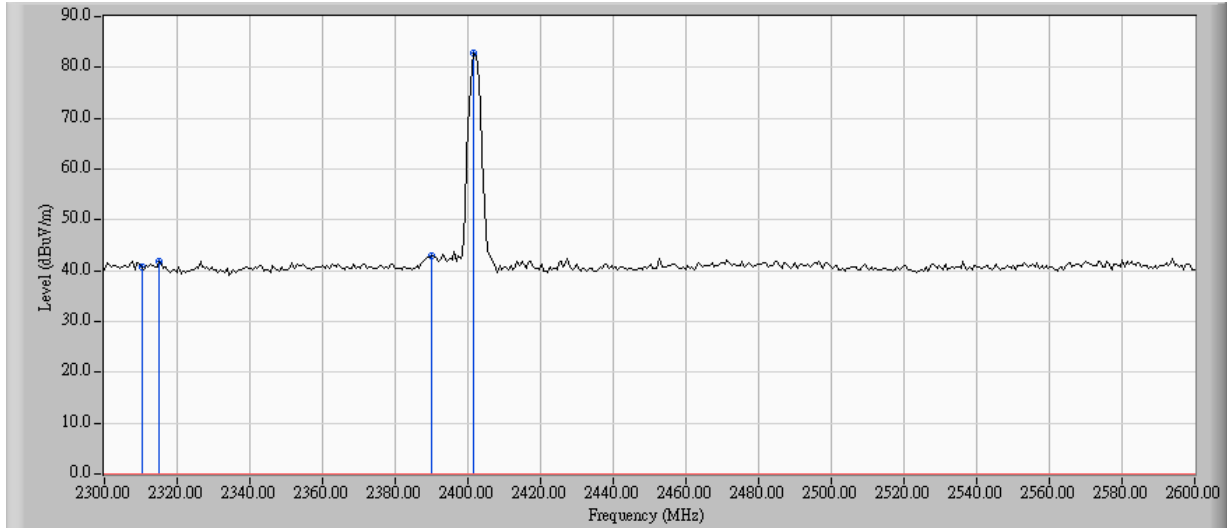
RF Radiated Measurement:

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)	2315.030	41.393	41.890	74.00	54.00	Pass
00 (Average)	--	--	--	74.00	54.00	Pass

Figure Channel 00: (Horizontal)



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

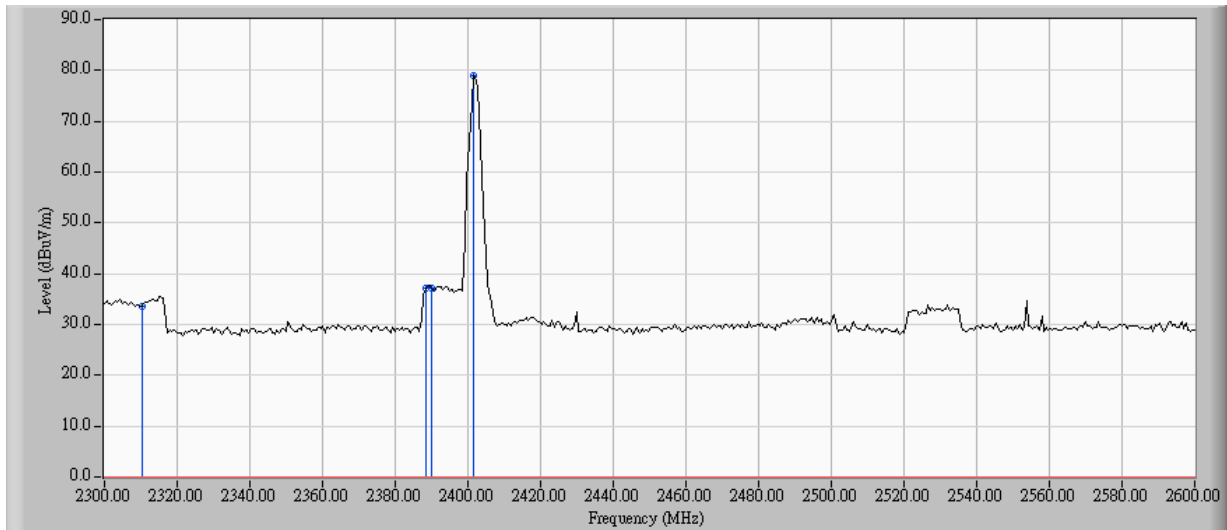
RF Radiated Measurement:

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)	2388.380	48.173	37.150	74.00	54.00	Pass
00(Average)	--	--	--	74.00	54.00	Pass

Figure Channel 00: (Vertical)

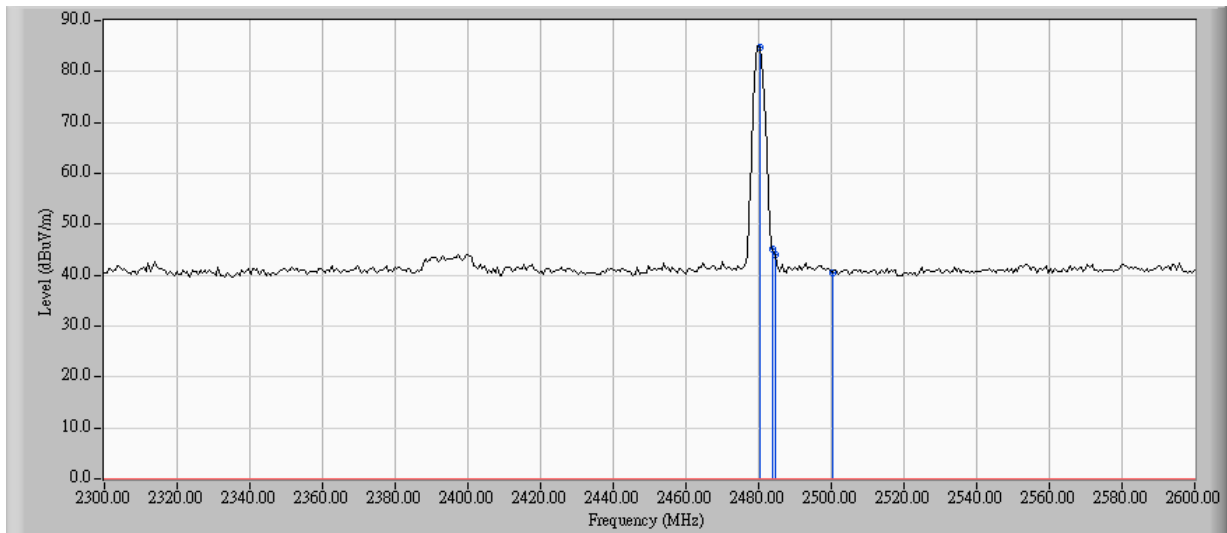


Product : MEGA BOOK
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 78)

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)	2484.570	43.260	43.980	74.00	54.00	Pass
78(Average)	--	--	--	74.00	54.00	Pass

Figure Channel 78: (Horizontal)

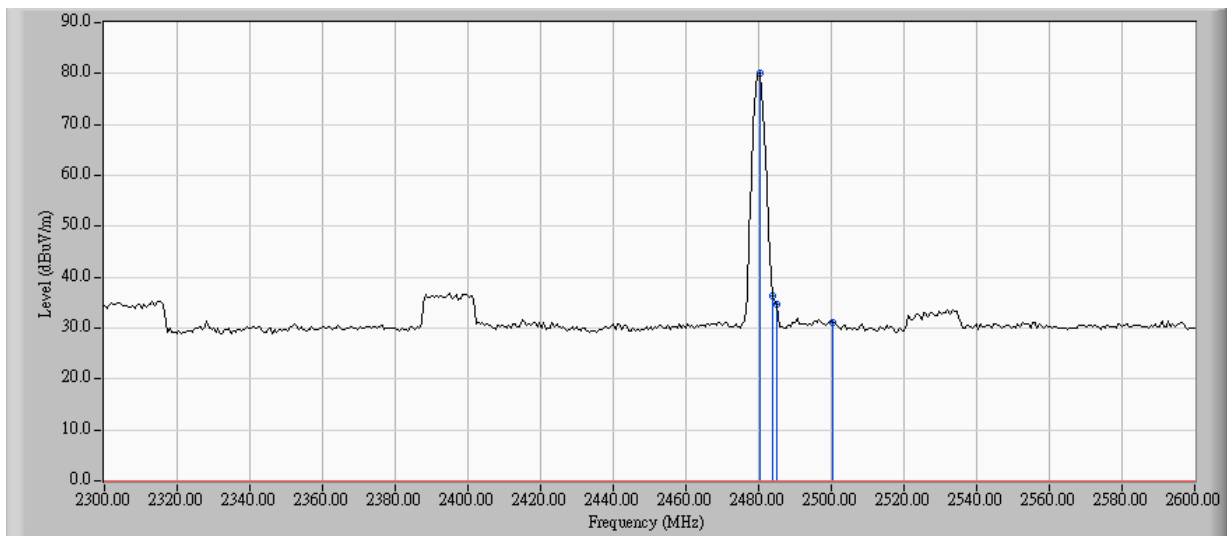


Product : MEGA BOOK
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 78)

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)	2485.170	45.669	34.770	74.00	54.00	Pass
78(Average)	--	--	--	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

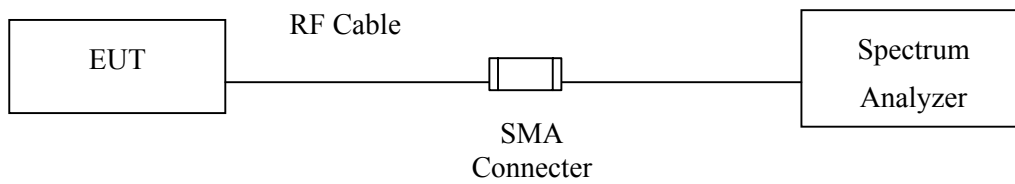
6.1. Test Equipment

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

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Spectrum Analyzer	Advantest	R3162/91700545	March, 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

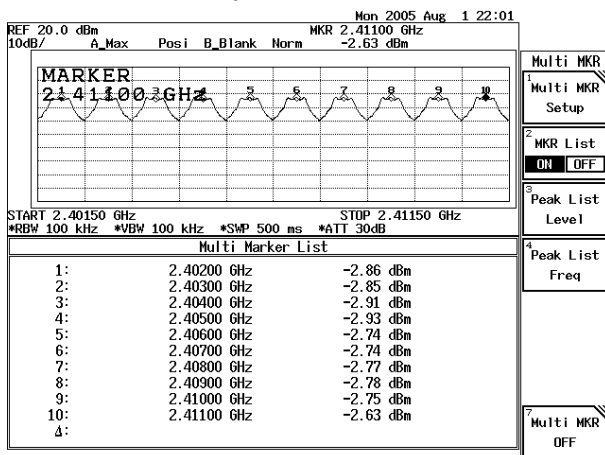
The measurement uncertainty is defined as $\pm 200\text{kHz}$

6.5. Test Result of Channel Number

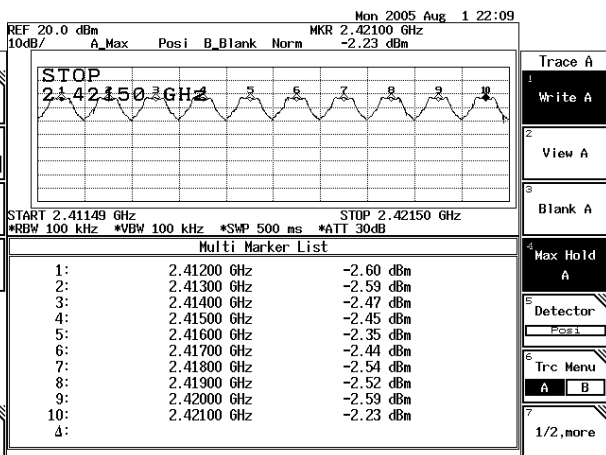
Product : MEGA BOOK
 Test Item : Channel Number
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

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

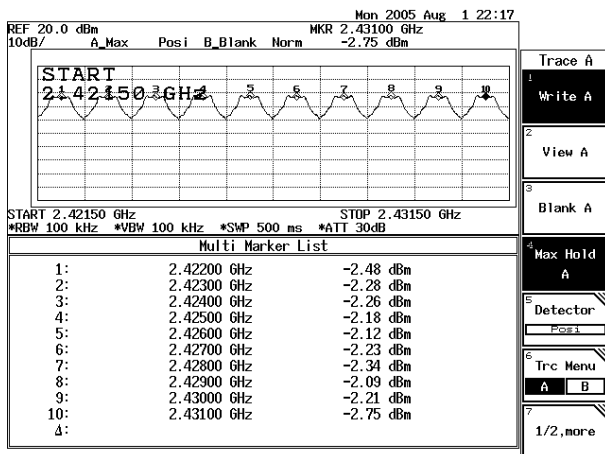
2402-2411MHz



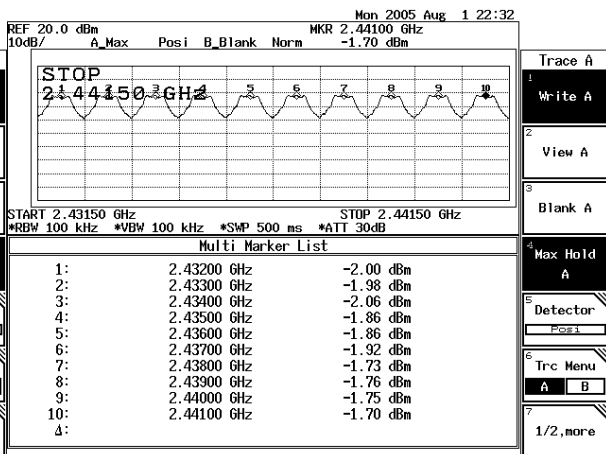
2412-2421MHz



2422-2431MHz

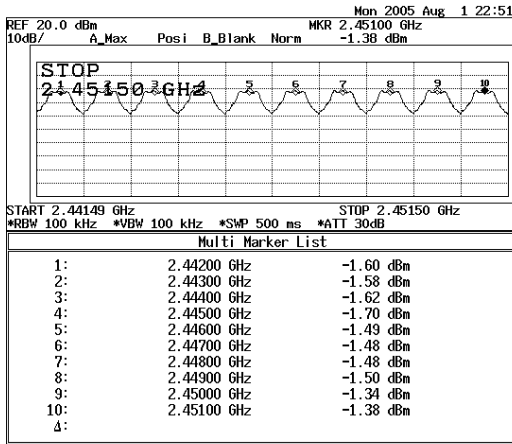


2432-2441MHz

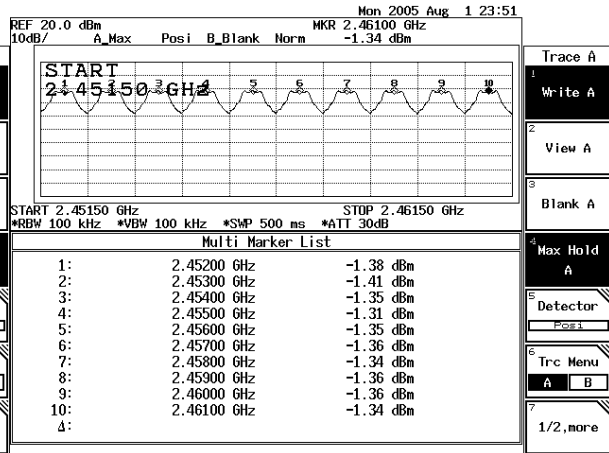


Product : MEGA BOOK
 Test Item : Channel Number
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

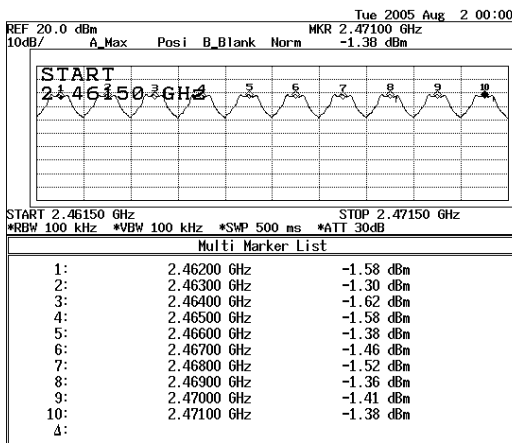
2442-2451MHz



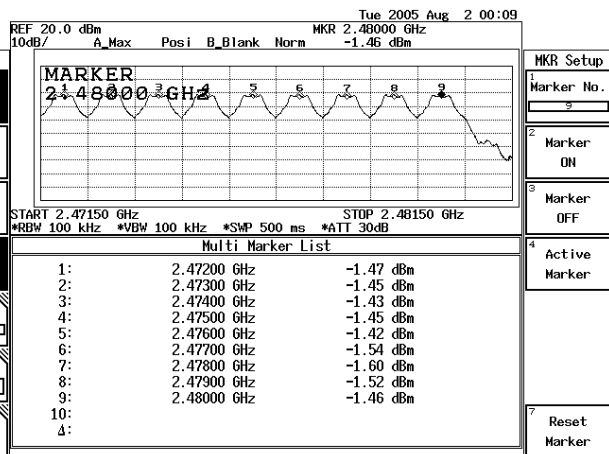
2452-2461MHz



2462-2471MHz



2472-2481MHz



7. Channel Separation

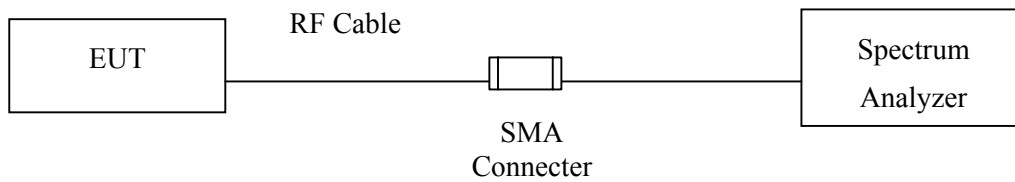
7.1. Test Equipment

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

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Spectrum Analyzer	Advantest	R3272 / 72421194	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

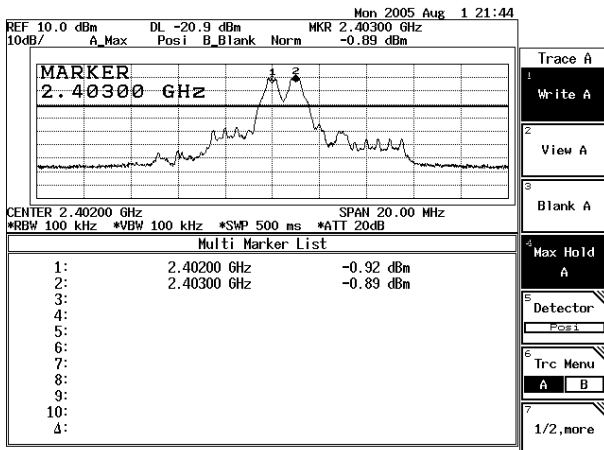
The measurement uncertainty is defined as $\pm 150\text{Hz}$

7.5. Test Result of Channel Separation

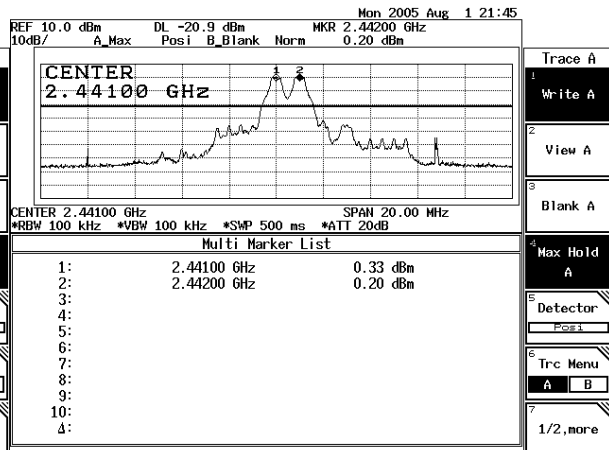
Product : MEGA BOOK
 Test Item : Channel Separation
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

Frequency (MHz)	Measurement Level (MHz)	Required Limit	Result
2402	1.00	>25 kHz or 2/3 * 20 dB BW	Pass
2441	1.00	>25 kHz or 2/3 * 20 dB BW	Pass
2480	1.00	>25 kHz or 2/3 * 20 dB BW	Pass

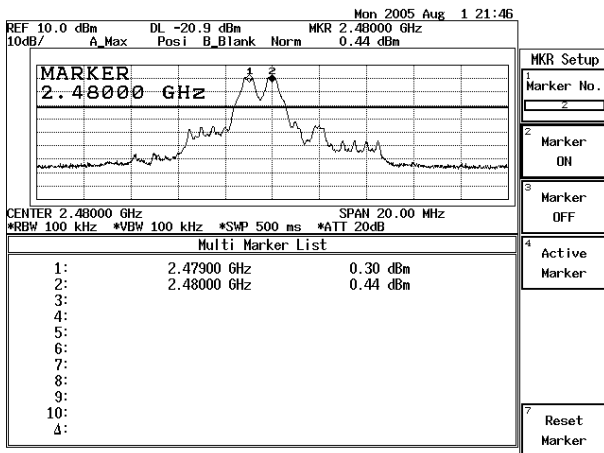
Channel 00 2402MHz



Channel 39 2441MHz



Channel 78 2480 MHz



8. Dwell Time

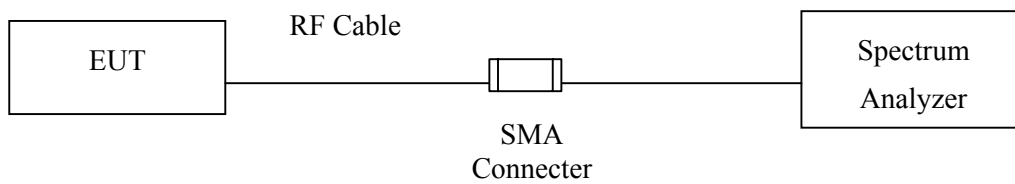
8.1. Test Equipment

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

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Spectrum Analyzer	Advantest	R3162/91700545	March, 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.

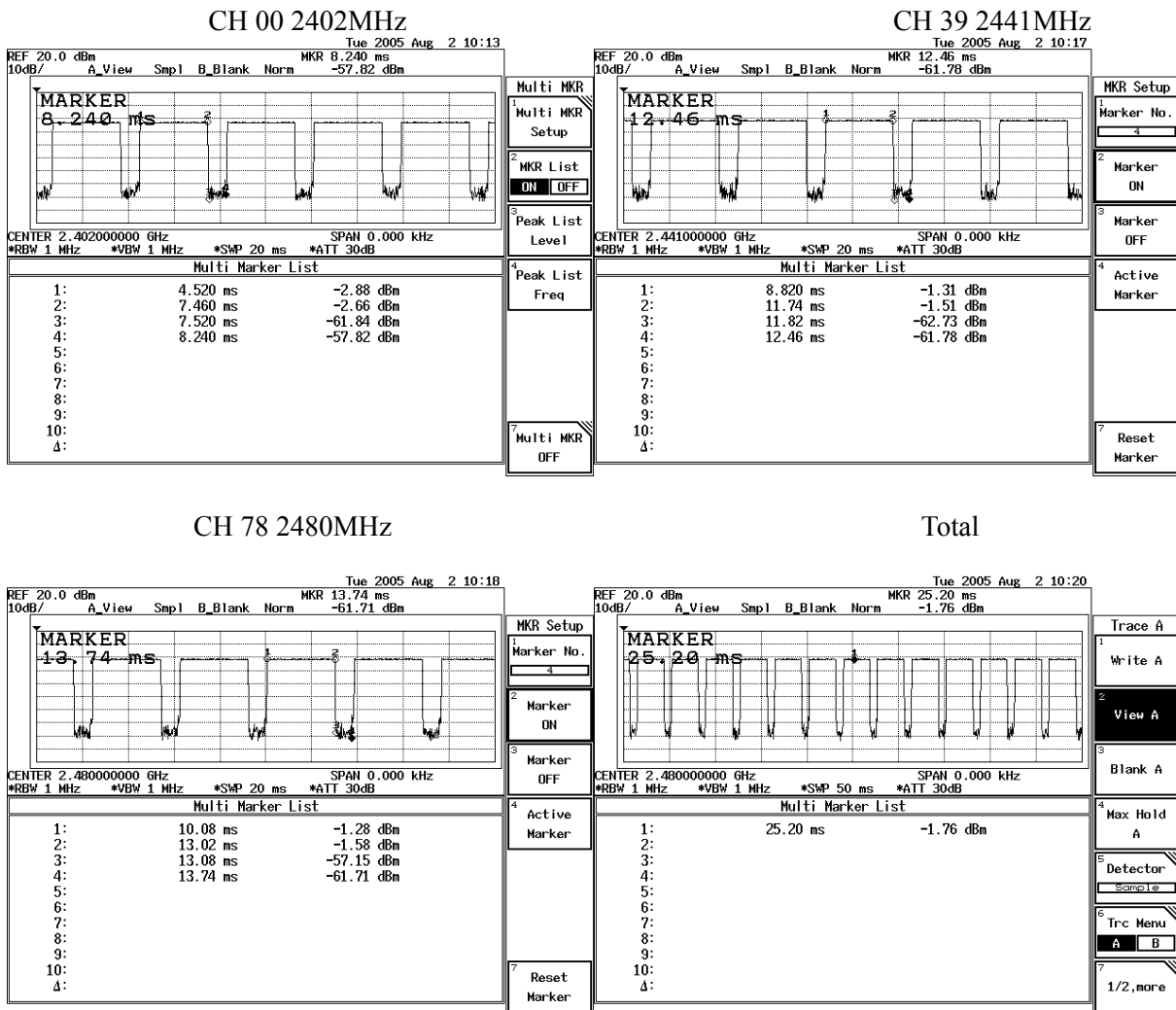
8.4. Uncertainty

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

8.5. Test Result of Dwell Time

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

Channel (MHz)	Measurement Level (ms)	Required Limit (sec.)	Result
CH 00 2402	306.201	< 0.4	Pass
CH 39 2441	304.118	< 0.4	Pass
CH 78 2480	306.201	< 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: $13/50 \text{msec} = 0.260 / \text{sec}$

A) 2402MHz The Maximum Occupancy Time Within 31.6sec: $(2940 \mu \text{s} \times 260) / (79 \times 31.6) = 306.201 \text{msec}$ ◦

B) 2441MHz The Maximum Occupancy Time Within 31.6sec: $(2920 \mu \text{s} \times 260) / (79 \times 31.6) = 304.118 \text{msec}$ ◦

C) 2480MHz The Maximum Occupancy Time Within 31.6sec: $(2940 \mu \text{s} \times 260) / (79 \times 31.6) = 306.201 \text{msec}$ ◦

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. Occupied Bandwidth

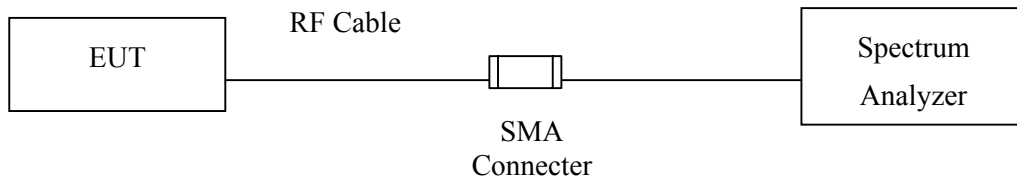
9.1. Test Equipment

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

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Advantest	R3272 / 72421194	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.

9.2. Test Setup



9.3. Limits

The minimum bandwidth shall be at least 500kHz.

9.4. Uncertainty

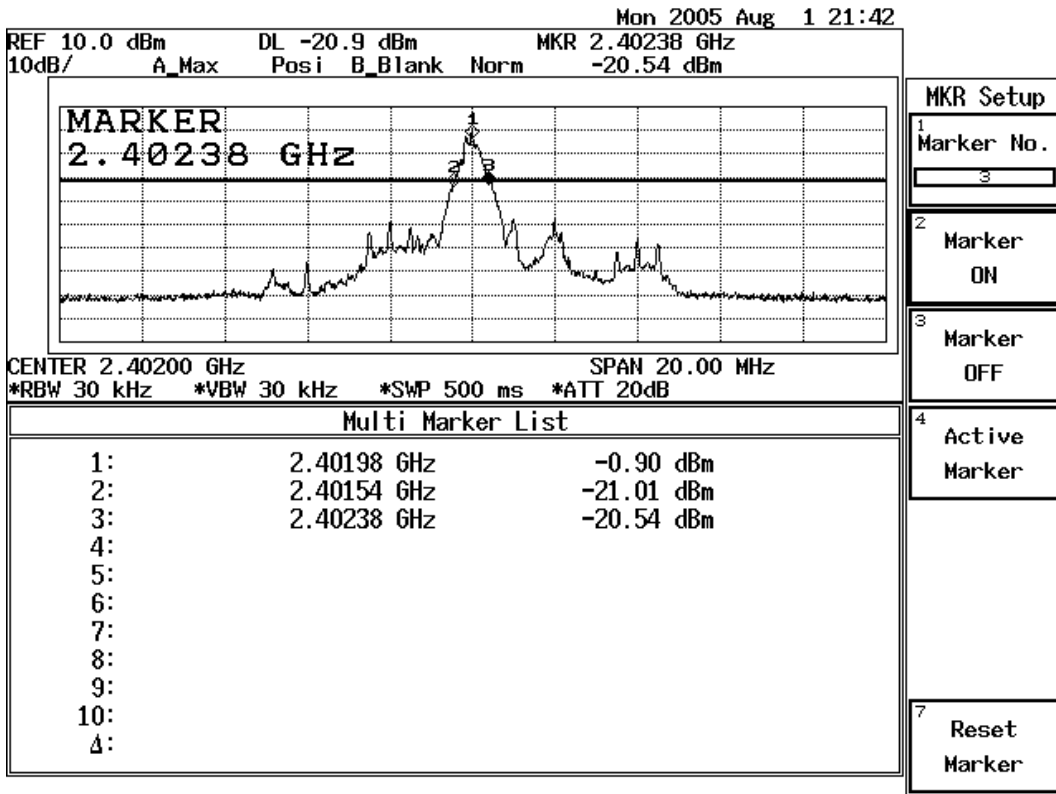
The measurement uncertainty is defined as ± 1.27 dB

9.5. Test Result of Occupied Bandwidth

Product : MEGA BOOK
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2402MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	840	>500	Pass

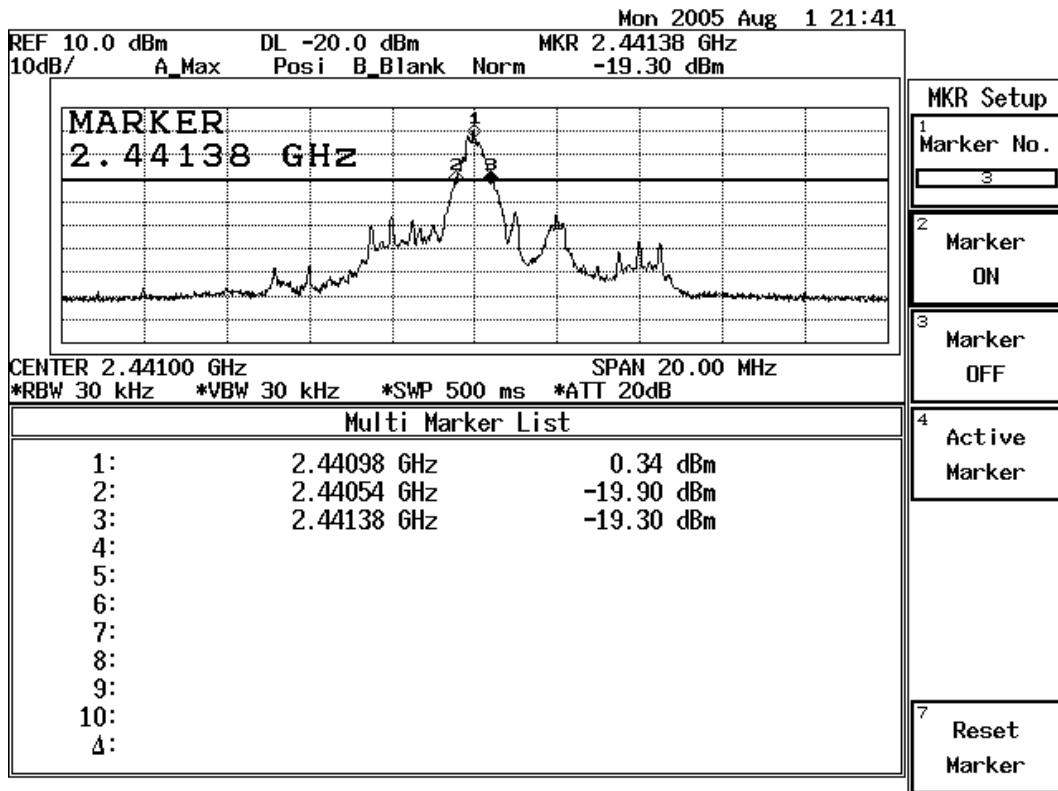
Figure Channel 00:



Product : MEGA BOOK
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2441MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
39	2441	840	>500	Pass

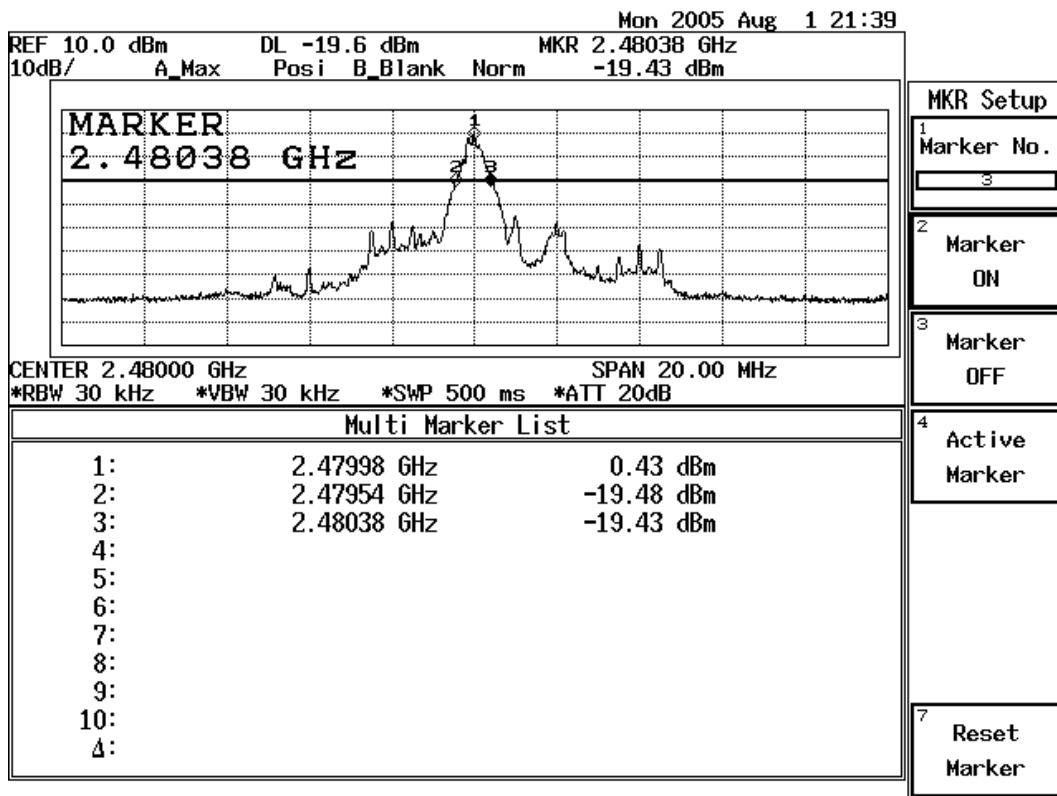
Figure Channel 39:



Product : MEGA BOOK
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2480MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
78	2480	840	>500	Pass

Figure Channel 78:



10. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 1: EUT Test Setup Photographs

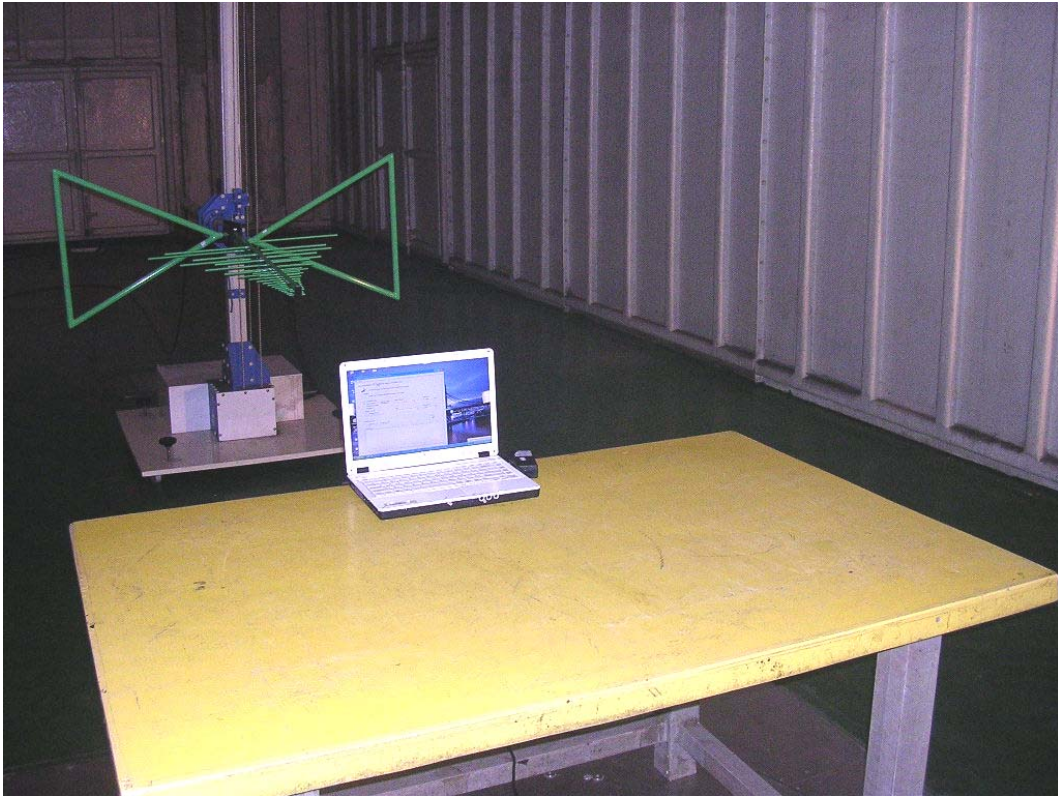
Front View of Conducted Test



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



(2) EUT Photo



(3) EUT Photo



(4) EUT Photo



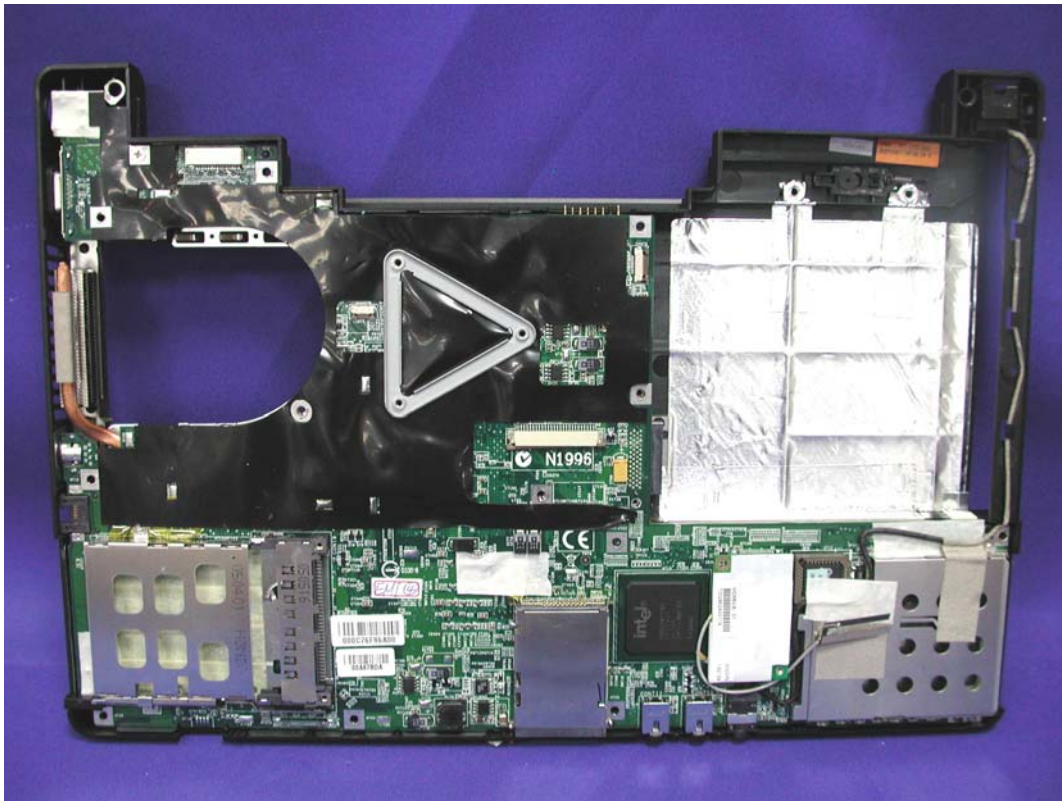
(5) EUT Photo



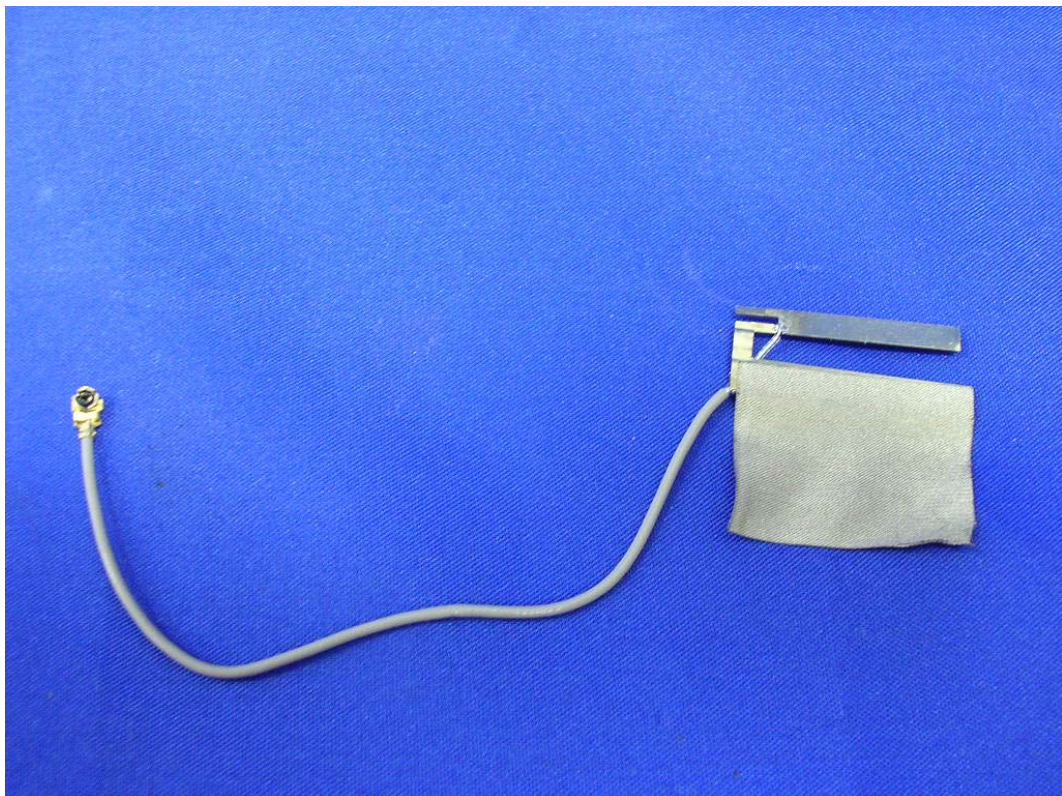
(6) EUT Photo



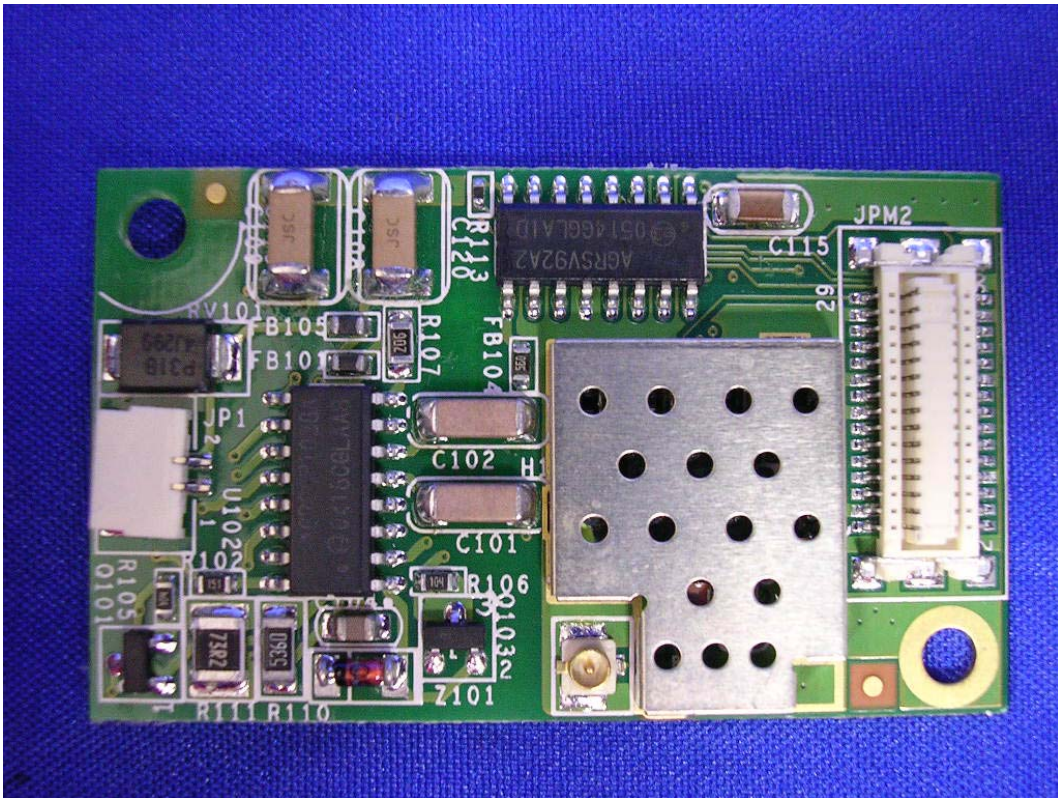
(7) EUT Photo



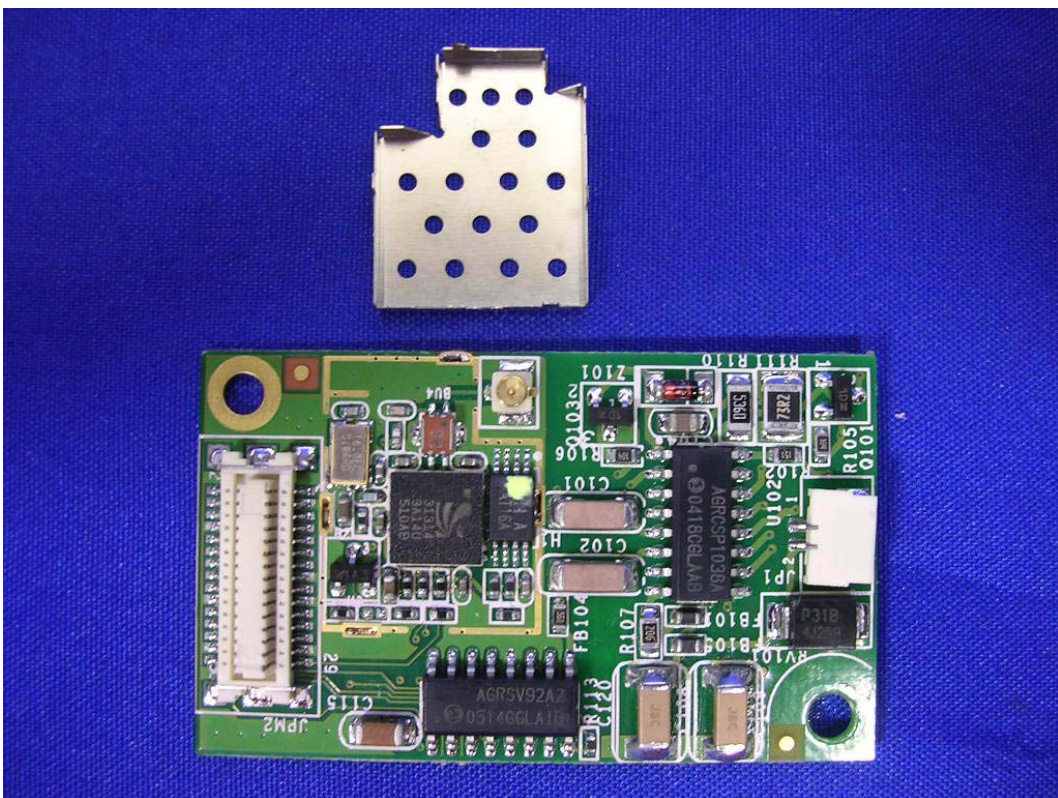
(8) EUT Photo



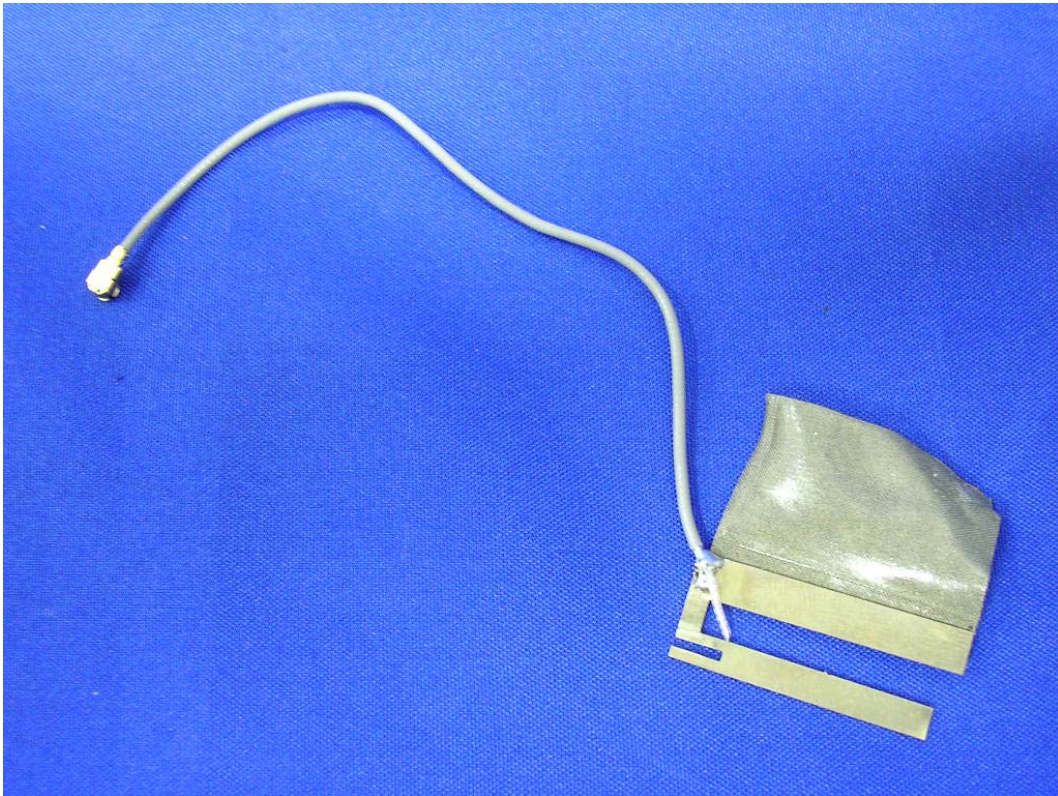
(9) EUT Photo



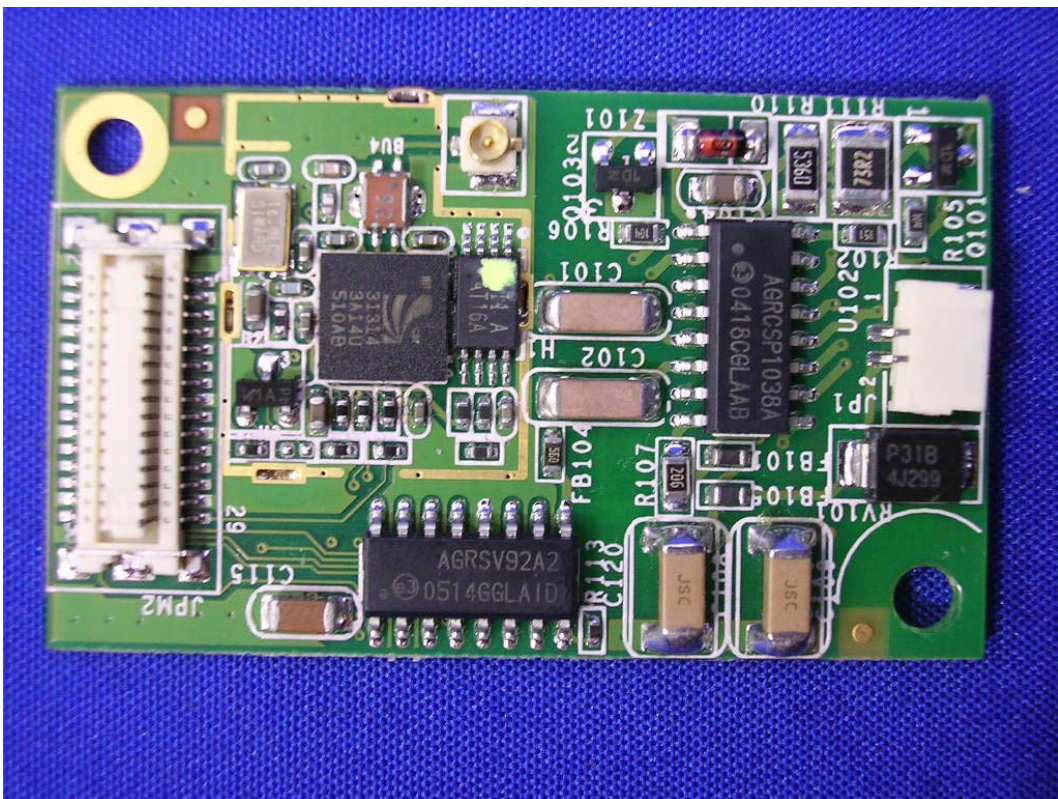
(10) EUT Photo



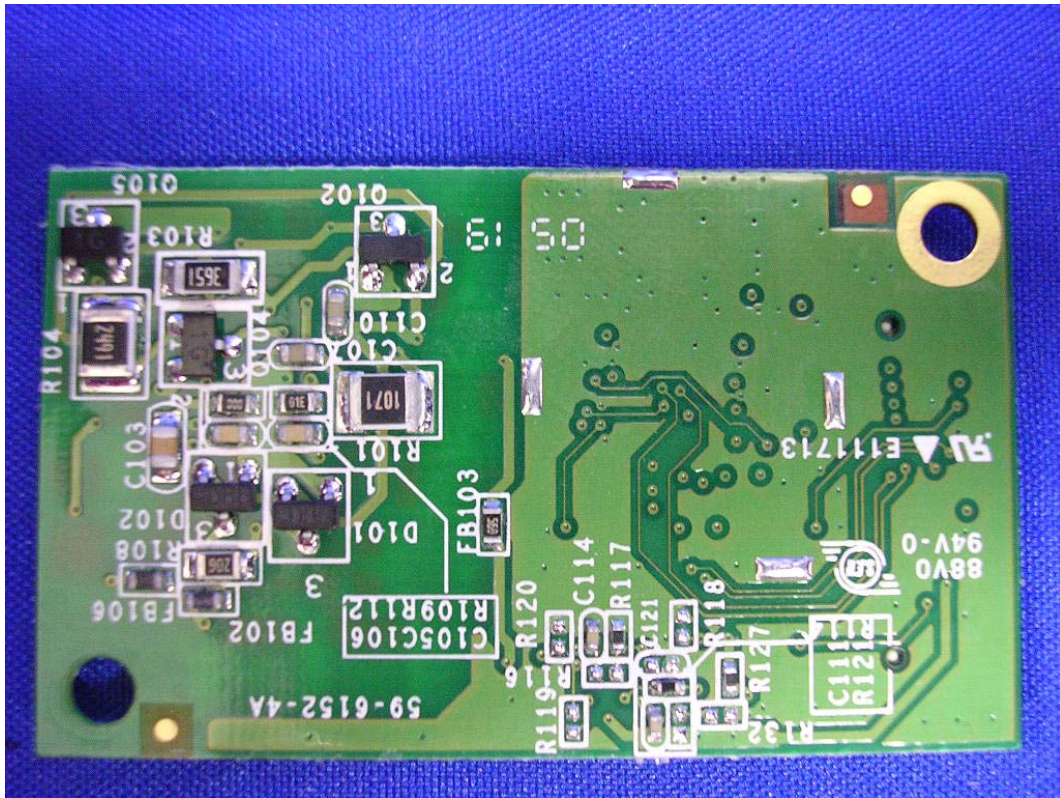
(11) EUT Photo



(12) EUT Photo



(13) EUT Photo



(14) EUT Photo

