



Test Report

Product Name : Notebook P.C.
Model No : Z61A, Z61Ae
FCC ID : MSQB2915ABG

Applicant : ASUSTeK COMPUTER INC.

Address : 4FL., No. 150, Li-Te Rd., Peitou, Taipei, Taiwan, R.O.C.

Date of Receipt : May 19, 2005

Issued Date : June 06, 2005

Report No. : 055L127FI

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 : June 06, 2005

Report No. : 055L127FI



Accredited by NIST (NVLAP)
NVLAP Lab Code: 200533-0

Product Name : Notebook P.C.

Applicant : ASUSTeK COMPUTER INC.

Address : 4FL., No. 150, Li-Te Rd., Peitou, Taipei, Taiwan, R.O.C.

Manufacturer : ASUSTeK COMPUTER INC.

Model No. : Z61A, Z61Ae

FCC ID. : MSQB2915ABG

Rated Voltage : AC 120V/60Hz

Working Voltage : AC 120V/60Hz

Trade Name : ASUS

Applicable Standard : FCC Part 15.407 Subpart E
ANSI C63.4: 2003

Test Result : Complied



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Documented By : Rita Huang
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0914

Tested By : Tim Sung
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Approved By : Gene Chang
(Gene Chang)



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1. GENERAL INFORMATION

1.1. EUT Description

Product Name : Notebook P.C.
 Trade Name : ASUS
 FCC ID. : MSQB2915ABG
 Model No. : Z61A, Z61Ae
 Frequency Range : 5150~5250MHz, 5250~5350MHz, 5725~5825MHz
 Channel Number : 12
 Data Speed : 6, 9, 12, 18, 24, 36, 48, 54Mbps
 Type of Modulation : DSSS/ OFDM
 Antenna type : Connector
 Antenna Gain : 1.48 dBi
 Channel Control : Auto
 Power Adapter : MFR: DELTA, M/N: SADP-65KB B
 Cable out: Non-Shielded, 1.8 with one ferrite core bonded.
 Power Cord: Shielded, 1.8m

Frequency of Each Channel:

(1) 5150~5250MHz

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 1:	5180 MHz	Channel 2:	5200 MHz	Channel 3:	5220 MHz	Channel 4:	5240 MHz

(2) 5250~5350MHz

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 1:	5260 MHz	Channel 2:	5280 MHz	Channel 3:	5300 MHz	Channel 4:	5320 MHz

(3) 5725~5825MHz

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 1:	5745 MHz	Channel 2:	5765 MHz	Channel 3:	5785 MHz	Channel 4:	5805 MHz

Note:

1. This device is a 5GHz Notebook P.C. included a 5GHz receiving function, a 5GHz transmitting function.
2. Regards to the frequency band operation; the highest rate of normal and turbo mode that was included the lowest 、 middle and highest frequency of channel were selected to perform the test, then shown on this report.
3. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.
4. This device is a composite device in accordance with Part 15 regulations. The function receiving was measured and made a test report that the report number is 054L081F under Declaration of Conformity.

1.2. Operational Description

EUT is a Notebook P.C. with 12 channels. This device provided eight kind of transmitting speed 6, 9, 12, 18, 24, 36, 48 and 54Mps for normal mode.

The device adapts direct sequence spread spectrum modulation. The Connector antenna was provides diversity function to improve the receiving function.

This Notebook P.C. is an IEEE 802.11a Wireless LAN adapter. It allows your computer to connect to a wireless network and to share resources, such as files or printers without being bound to the network wires. In addition, its standard compliance ensures that it can communicate with any 802.11a network.

Test Mode:	Mode 1: Transmitter 802.11a
------------	-----------------------------

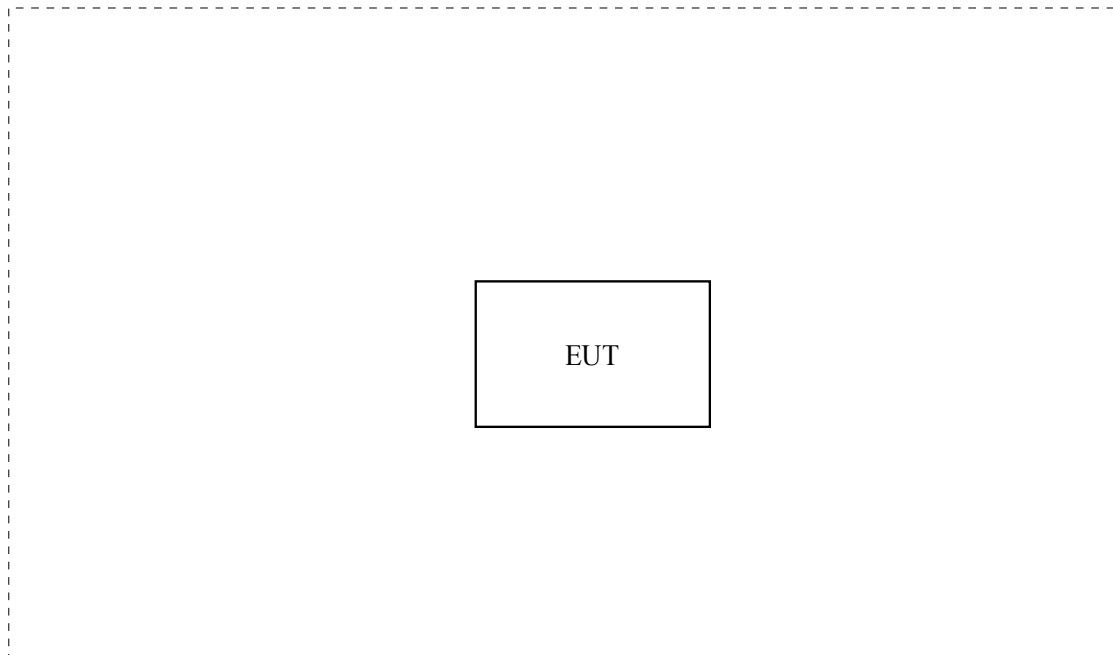
1.3. Tested System Details

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) Notebook PC reads data from disk.
- (4) Data will be transmitting and receiving through EUT.
- (5) The transmitted and receive status will be shown on the monitor.
- (6) Repeat the above procedure (3) to (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: June 22, 2001 File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Reference 31040/SIT1300F2



July 03, 2001 Accreditation on NVLAP
 NVLAP Lab Code: 200533-0



Site Name: Quietek Corporation

Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,
 Lin-Kou Shiang, Taipei,
 Taiwan, R.O.C.
 TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
 E-Mail : service@quietek.com



2. Conducted Emission

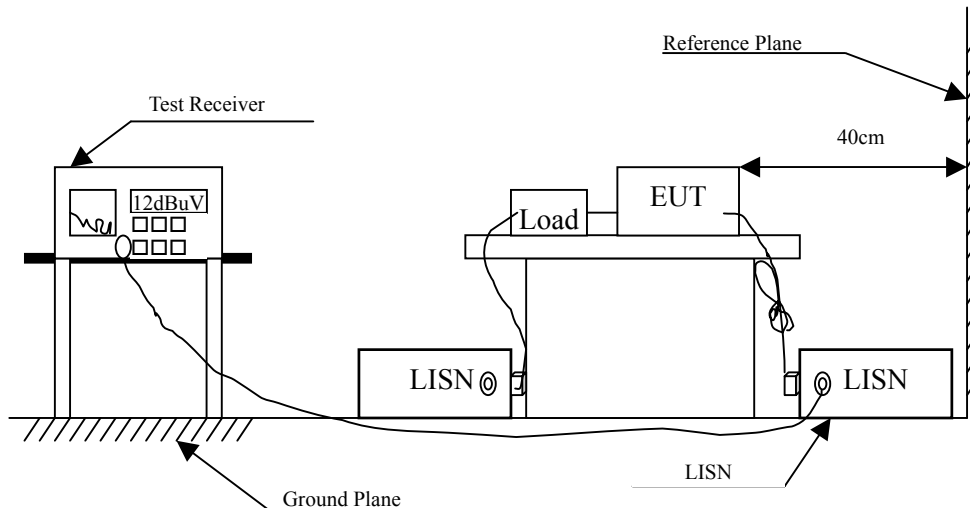
2.1. Test Equipment

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

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2005	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2005	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2005	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2005	
5	No.1 Shielded Room			N/A	

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

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks : In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

Conducted emissions were 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 : Notebook P.C.
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 1: Transmitter 802.11a (5320MHz)

Frequency	Cable	LISN	Reading	Emission	Limits
MHz	Loss	Factor	Level	Level	dBuV
	dB	dB	dBuV	dBuV	
=====					
Quasi-Peak					
* 0.205	0.20	0.10	53.06	53.36	63.42
0.267	0.20	0.10	42.64	42.94	61.20
0.338	0.20	0.10	39.32	39.62	59.26
0.404	0.20	0.10	33.44	33.74	57.77
5.466	0.20	0.17	23.68	24.05	60.00
19.532	0.40	0.44	37.56	38.40	60.00
Average					
* 0.205	0.20	0.10	44.30	44.60	53.41
0.267	0.20	0.10	33.50	33.80	51.21
0.338	0.20	0.10	30.40	30.70	49.25
0.404	0.20	0.10	24.30	24.60	47.77
5.466	0.20	0.17	16.50	16.87	50.00
19.532	0.40	0.44	31.60	32.44	50.00

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ” means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

Product : Notebook P.C.
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 1: Transmitter 802.11a (5320MHz)

Frequency	Cable	LISN	Reading	Emission	Limits
MHz	Loss	Factor	Level	Level	dBuV
	dB	dB	dBuV	dBuV	
=====					
Quasi-Peak					
*	0.205	0.20	0.10	51.38	63.42
	0.271	0.20	0.10	42.38	61.08
	0.338	0.20	0.10	37.72	59.26
	0.408	0.20	0.10	32.01	57.69
	5.755	0.20	0.18	36.41	60.00
	19.093	0.40	0.44	39.30	60.00
Average					
*	0.205	0.20	0.10	46.70	53.41
	0.271	0.20	0.10	33.40	51.09
	0.338	0.20	0.10	29.00	49.25
	0.408	0.20	0.10	23.20	47.69
	5.755	0.20	0.18	34.70	50.00
	19.093	0.40	0.44	37.70	50.00

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ” means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

3. Peak Transmit Power

3.1. Test Equipment

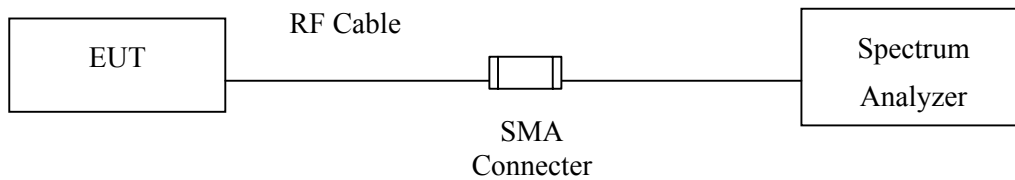
The following test equipments are used during the radiated emission tests:

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

3.2. Test Setup

Conduction Power Measurement



3.3. Limits

- (1) For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10\log B$, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
- (2) For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10\log B$, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
- (3) For the band 5.725-5.825 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 1W or $17 \text{ dBm} + 10\log B$, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

3.4. Limits

The maximum peak power shall be less 1 Watt.

3.5. Uncertainty

The measurement uncertainty is defined as $\pm 1.27 \text{ Db}$

3.6. Test Result of Peak Transmit Power

Product : Notebook P.C.
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5180MHz)

26dBc Occupied Bandwidth Measurement:

RBW: 300 kHz, VBW: 1 MHz, SPAN: 50MHz		
Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)
1	5180.00	23.25

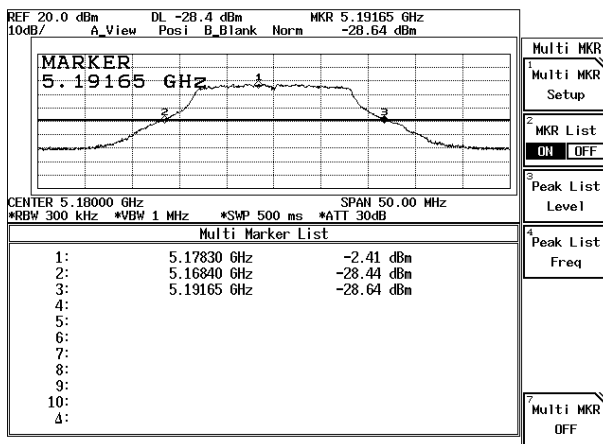
Peak Transmit Power Measurement:

RBW: 1 MHz, VBW: 3 MHz, SPAN: 50MHz			
Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)	Measurement Level (dBm)
1	5180.00	23.25	12.40

Limits (dBm)	Result
50mW (17dBm) or $4\text{dBm} + 10 \log(B = 23.25\text{MHz}) = 17.66\text{dBm}$	Pass

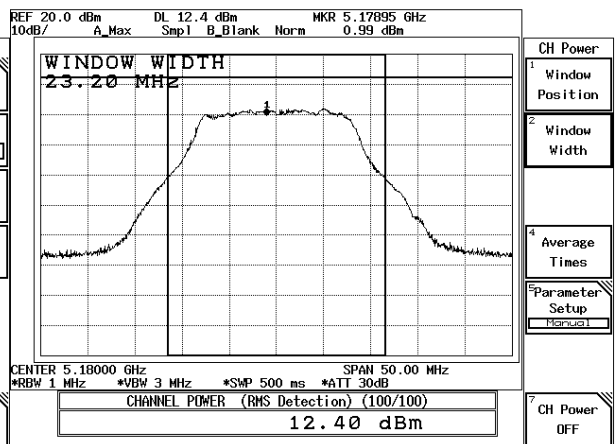
26dBc Occupied Bandwidth Measurement:

Channel 1



Peak Transmit Power Measurement:

Channel 1



Product : Notebook P.C.
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5220MHz)

26dBc Occupied Bandwidth Measurement:

RBW: 300 kHz, VBW: 1 MHz, SPAN: 50MHz		
Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)
3	5220.00	23.35

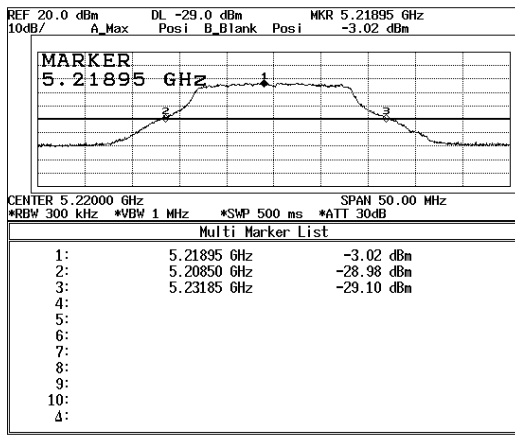
Peak Transmit Power Measurement:

RBW: 1 MHz, VBW: 3 MHz, SPAN: 50MHz			
Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)	Measurement Level (dBm)
3	5220.00	23.35	12.22

Limits (dBm)	Result
50mW (17dBm) or $4\text{dBm} + 10 \log(B = 23.35\text{MHz}) = 17.68\text{dBm}$	Pass

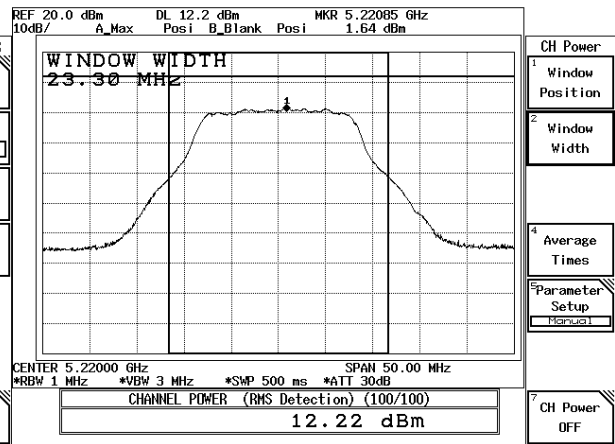
26dBc Occupied Bandwidth Measurement:

Channel 3



Peak Transmit Power Measurement:

Channel 3



Product : Notebook P.C.
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5240MHz)

26dBc Occupied Bandwidth Measurement:

RBW: 300 kHz, VBW: 1 MHz, SPAN: 50MHz		
Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)
4	5240.00	23.25

Peak Transmit Power Measurement:

RBW: 1 MHz, VBW: 3 MHz, SPAN: 50MHz			
Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)	Measurement Level (dBm)
4	5240.00	23.25	12.43

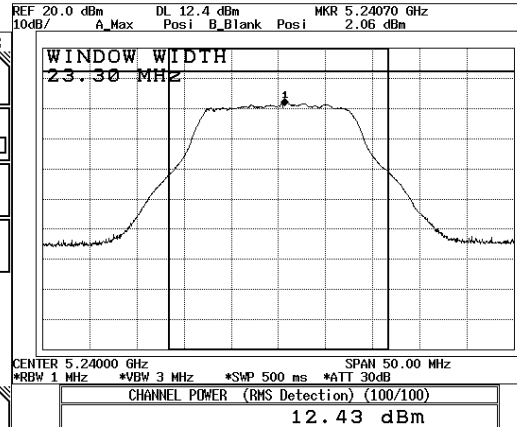
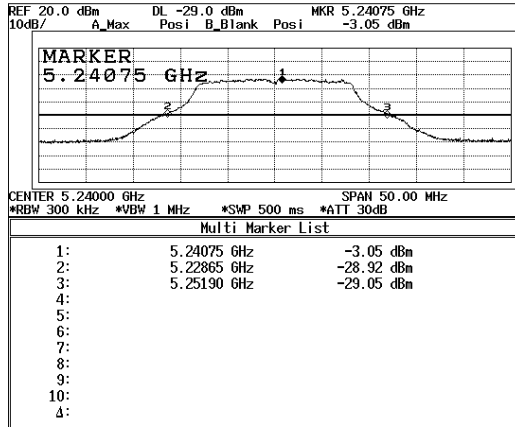
Limits (dBm)	Result
50mW (17dBm) or $4\text{dBm} + 10 \log(B = 23.25\text{MHz}) = 17.66\text{dBm}$	Pass

26dBc Occupied Bandwidth Measurement:

Peak Transmit Power Measurement:

Channel 4

Channel 4



CH Power: OFF

1 Window Position

2 Window Width

4 Average Times

Parameter Setup: Manual

Product : Notebook P.C.
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5260MHz)

26dBc Occupied Bandwidth Measurement:

RBW: 300 kHz, VBW: 1 MHz, SPAN: 50MHz		
Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)
1	5260.00	23.55

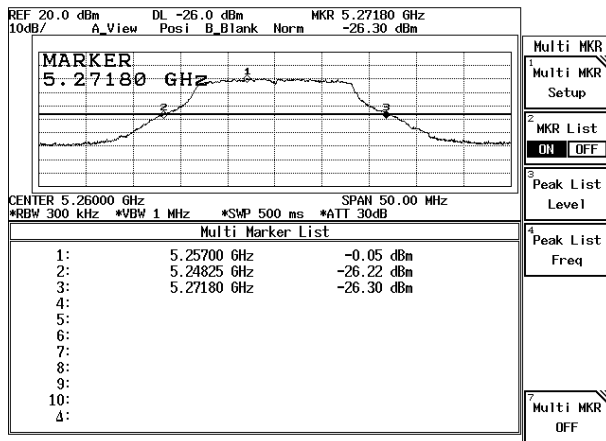
Peak Transmit Power Measurement:

RBW: 1 MHz, VBW: 3 MHz, SPAN: 50MHz			
Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)	Measurement Level (dBm)
1	5260.00	23.55	15.00

Limits (dBm)	Result
250mW (24dBm) or $11\text{dBm} + 10 \log(B = 23.55\text{MHz}) = 24.72\text{dBm}$	Pass

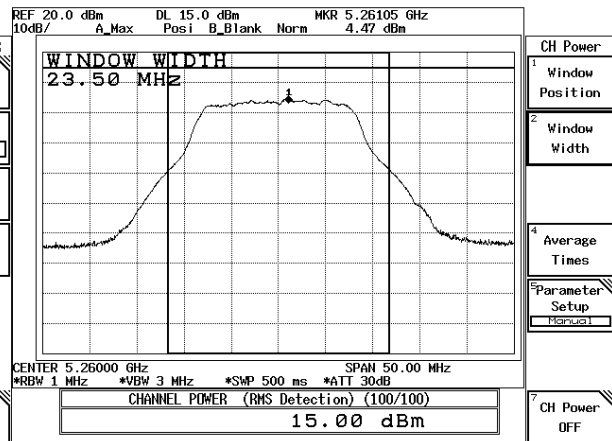
26dBc Occupied Bandwidth Measurement:

Channel 1



Peak Transmit Power Measurement:

Channel 1



Product : Notebook P.C.
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5300MHz)

26dBc Occupied Bandwidth Measurement:

RBW: 300 kHz, VBW: 1 MHz, SPAN: 50MHz		
Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)
3	5300.00	23.55

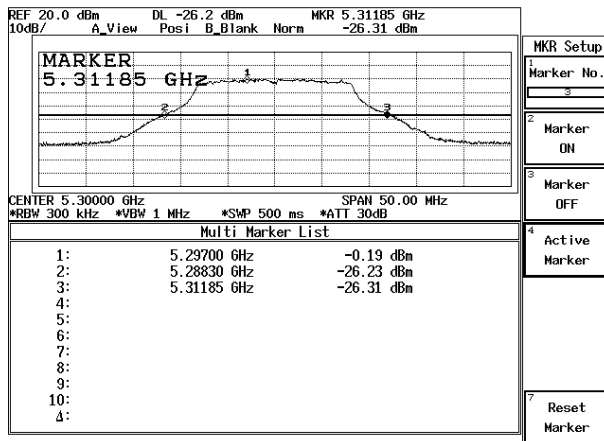
Peak Transmit Power Measurement:

RBW: 1 MHz, VBW: 3 MHz, SPAN: 50MHz			
Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)	Measurement Level (dBm)
3	5300.00	23.55	15.03

Limits (dBm)	Result
250mW (24dBm) or $11\text{dBm} + 10 \log(B = 23.55\text{MHz}) = 24.72\text{dBm}$	Pass

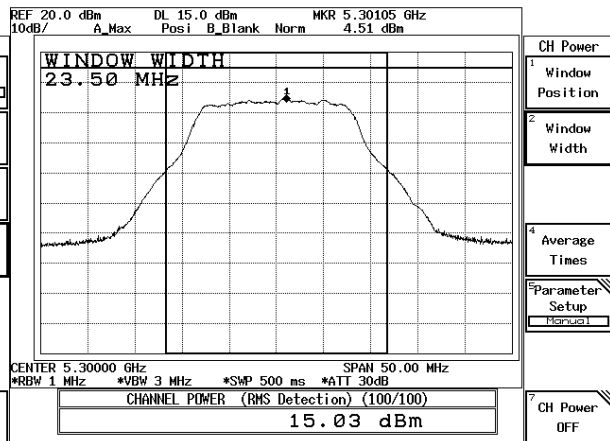
26dBc Occupied Bandwidth Measurement:

Channel 3



Peak Transmit Power Measurement:

Channel 3



Product : Notebook P.C.
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5320MHz)

26dBc Occupied Bandwidth Measurement:

RBW: 300 kHz, VBW: 1 MHz, SPAN: 50MHz		
Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)
4	5320.00	23.55

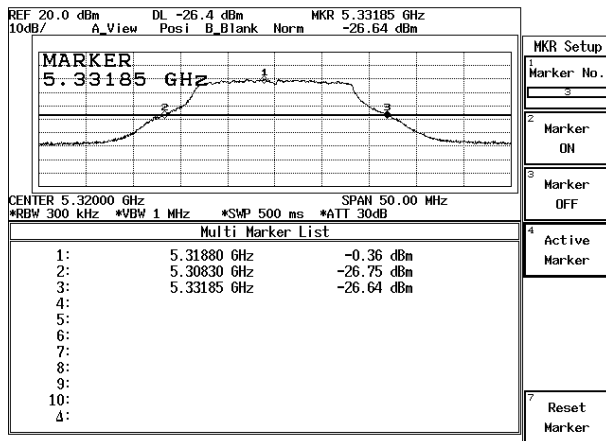
Peak Transmit Power Measurement:

RBW: 1 MHz, VBW: 3 MHz, SPAN: 50MHz			
Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)	Measurement Level (dBm)
4	5320.00	23.55	14.68

Limits (dBm)	Result
250mW (24dBm) or $11\text{dBm} + 10 \log (B = 23.55\text{MHz}) = 24.72\text{dBm}$	Pass

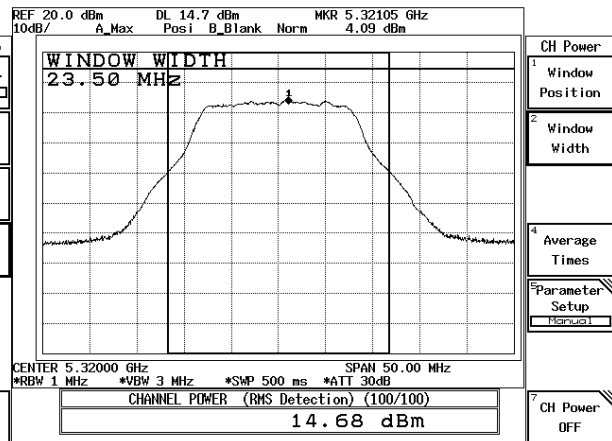
26dBc Occupied Bandwidth Measurement:

Channel 4



Peak Transmit Power Measurement:

Channel 4



Product : Notebook P.C.
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5745MHz)

26dBc Occupied Bandwidth Measurement:

RBW: 300 kHz, VBW: 1 MHz, SPAN: 50MHz

Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)
1	5745.00	22.25

Peak Transmit Power Measurement:

RBW: 1 MHz, VBW: 3 MHz, SPAN: 50MHz

Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)	Measurement Level (dBm)
1	5745.00	22.25	15.39

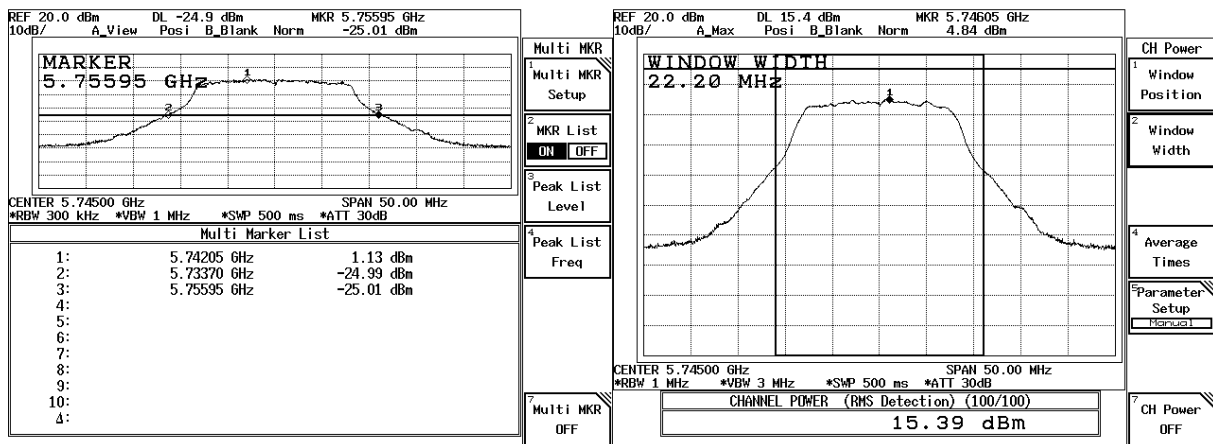
Limits (dBm)	Result
1W (30dBm) or 17dBm+10 log (B= 22.25MHz)=30.47dBm	Pass

26dBc Occupied Bandwidth Measurement:

Channel 1

Peak Transmit Power Measurement:

Channel 1



Product : Notebook P.C.
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5785MHz)

26dBc Occupied Bandwidth Measurement:

RBW: 300 kHz, VBW: 1 MHz, SPAN: 50MHz		
Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)
3	5785.00	22.20

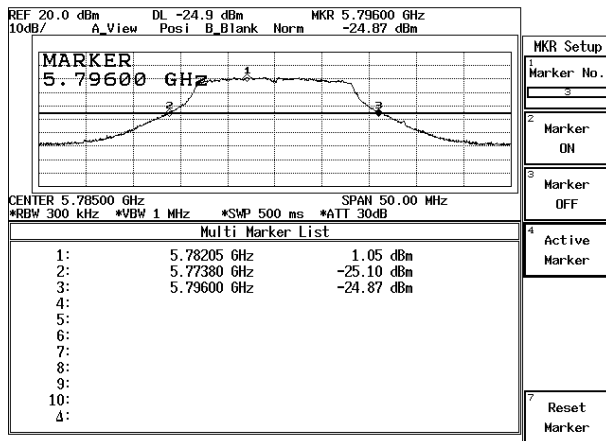
Peak Transmit Power Measurement:

RBW: 1 MHz, VBW: 3 MHz, SPAN: 50MHz			
Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)	Measurement Level (dBm)
3	5785.00	22.20	15.82

Limits (dBm)	Result
1W (30dBm) or $17\text{dBm} + 10 \log(B = 22.20\text{MHz}) = 30.46\text{dBm}$	Pass

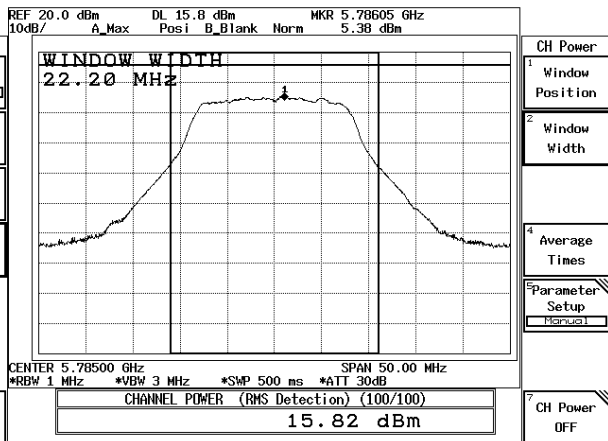
26dBc Occupied Bandwidth Measurement:

Channel 3



Peak Transmit Power Measurement:

Channel 3



Product : Notebook P.C.
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5805MHz)

26dBc Occupied Bandwidth Measurement:

RBW: 300 kHz, VBW: 1 MHz, SPAN: 50MHz		
Channel No.	Frequency (MHz)	26dBc Occupied Bandwidth (MHz)
4	5805.00	22.15

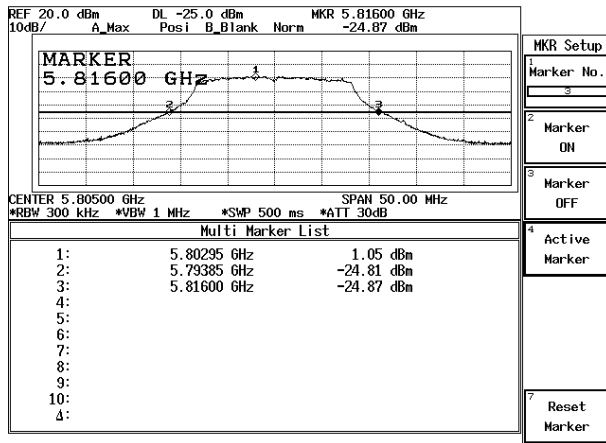
Peak Transmit Power Measurement:

RBW: 1 MHz, VBW: 3 MHz, SPAN: 50MHz			
Channel No.	Frequency (MHz)	26dB Occupied Bandwidth (MHz)	Measurement Level (dBm)
4	5805.00	22.15	15.57

Limits (dBm)	Result
1W (30dBm) or $17\text{dBm} + 10 \log(B = 22.15\text{MHz}) = 30.45\text{dBm}$	Pass

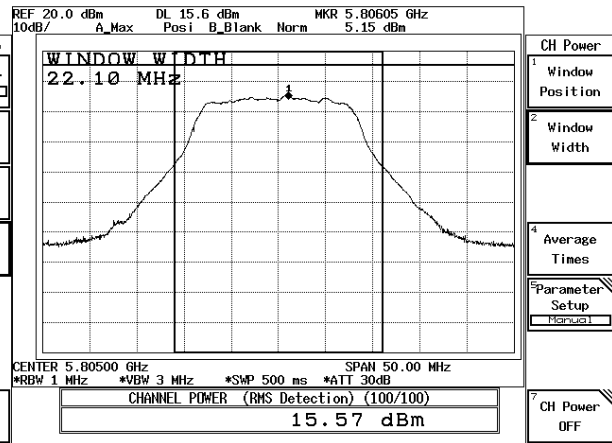
26dBc Occupied Bandwidth Measurement:

Channel 4



Peak Transmit Power Measurement:

Channel 4



4. Peak Power Spectral Density

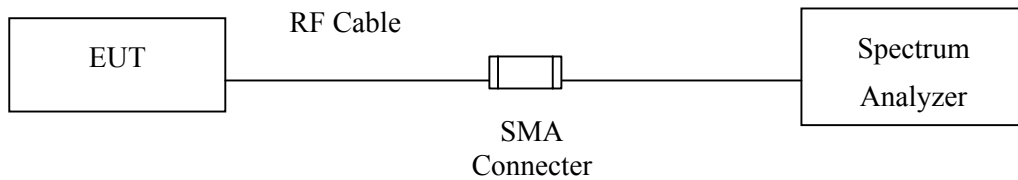
4.1. Test Equipment

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.

4.2. Test Setup



4.3. Limits

- (4) For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
- (5) For the band 5.25-5.35 GHz, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
- (6) For the band 5.725-5.825 GHz, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

4.4. Uncertainty

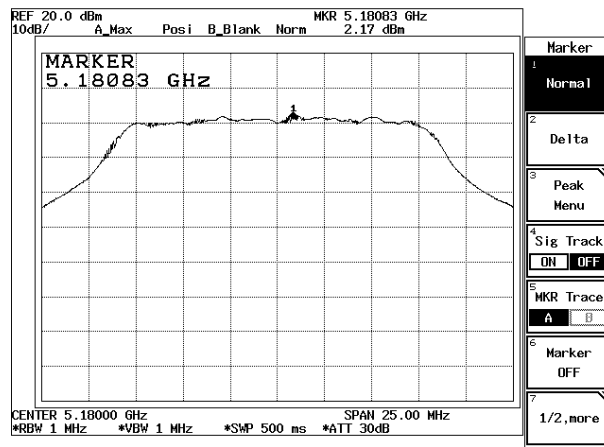
The measurement uncertainty is defined as ± 1.27 dB

4.5. Test Result of Peak Power Spectral Density

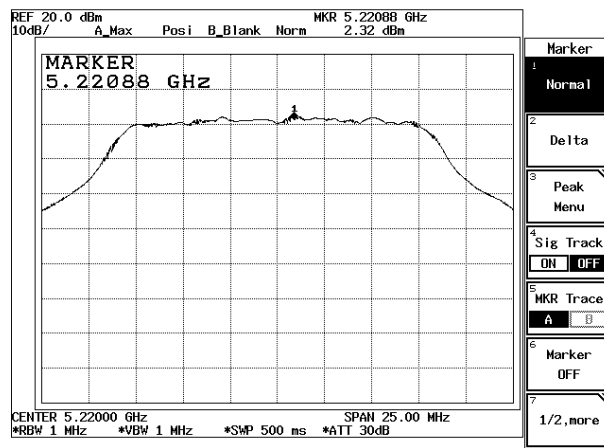
Product : Notebook P.C.
 Test Item : Peak Power Spectral Density
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
1	5180.00	2.17	< 4	Pass
3	5220.00	2.32	< 4	Pass

Channel 1:



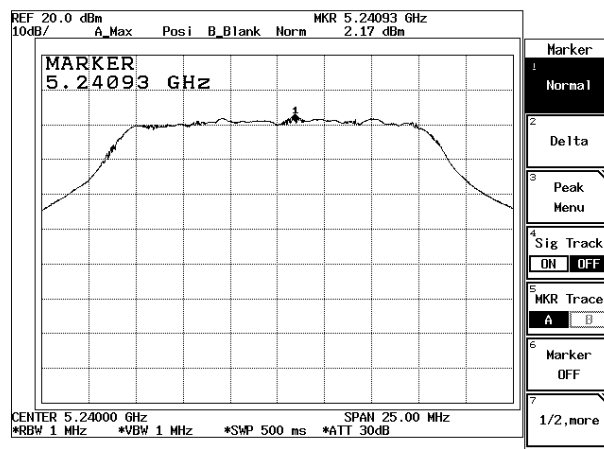
Channel 3:



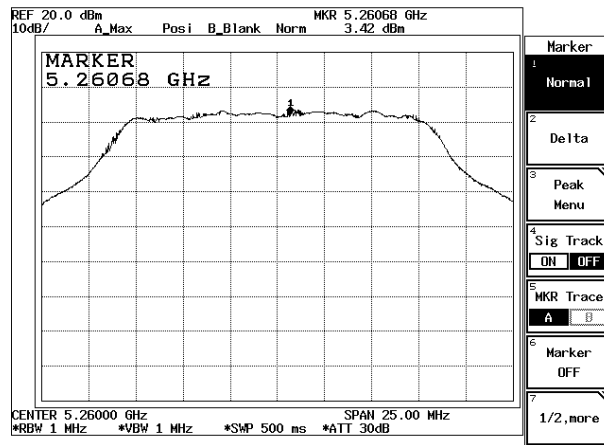
Product : Notebook P.C.
 Test Item : Peak Power Spectral Density
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
4	5240.00	2.17	< 4	Pass
1	5260.00	3.42	< 4	Pass

Channel 4:



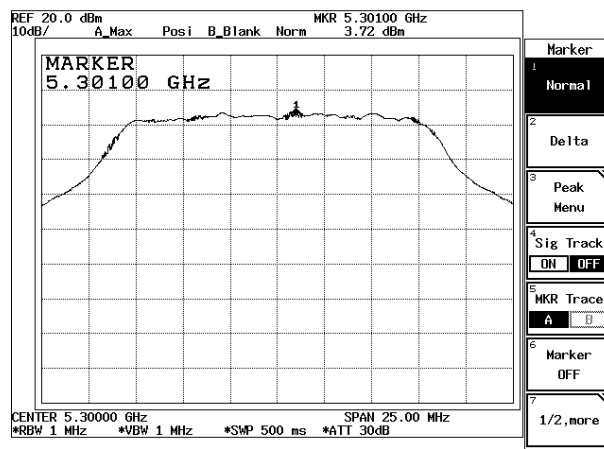
Channel 1:



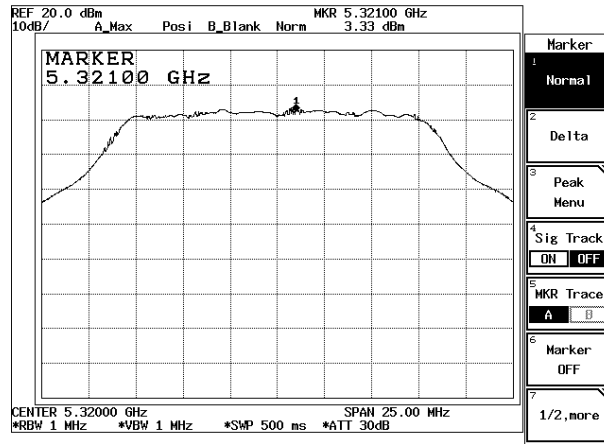
Product : Notebook P.C.
 Test Item : Peak Power Spectral Density
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
3	5300.00	3.72	< 17	Pass
4	5320.00	3.33	< 17	Pass

Channel 3:



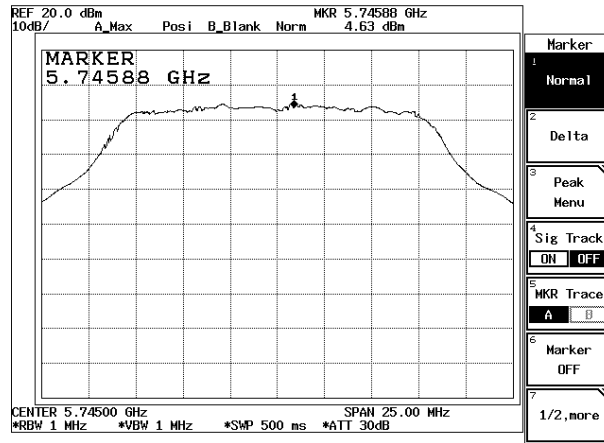
Channel 4:



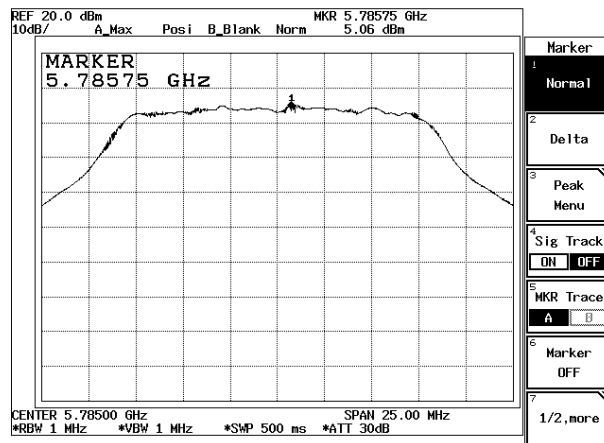
Product : Notebook P.C.
 Test Item : Peak Power Spectral Density
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
1	5745.00	4.63	< 17	Pass
3	5785.00	5.06	< 17	Pass

Channel 1:



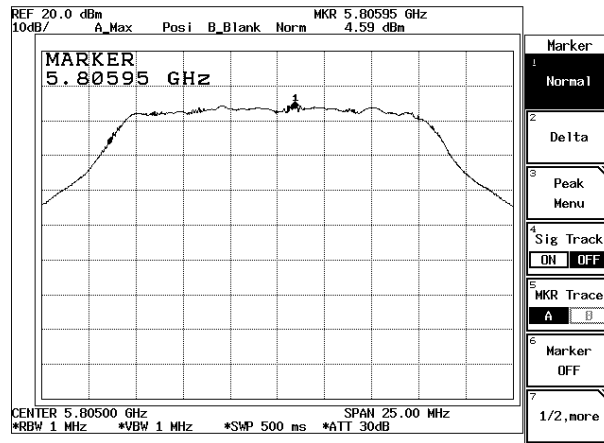
Channel 3:



Product : Notebook P.C.
 Test Item : Peak Power Spectral Density
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
4	5805.00	4.59	< 17	Pass

Channel 4:



5. Peak Excursion

5.1. Test Equipment

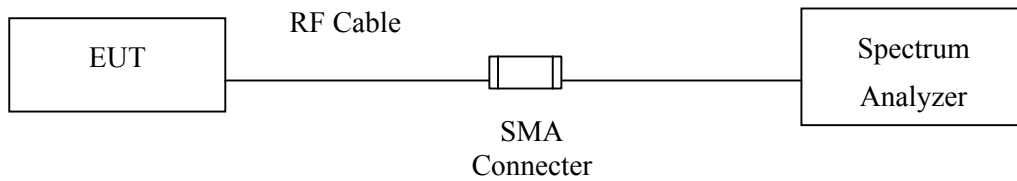
The following test equipments are used during the radiated emission tests:

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

5.2. Test Setup

Conduction Power Measurement



5.3. Limits

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

5.4. Uncertainty

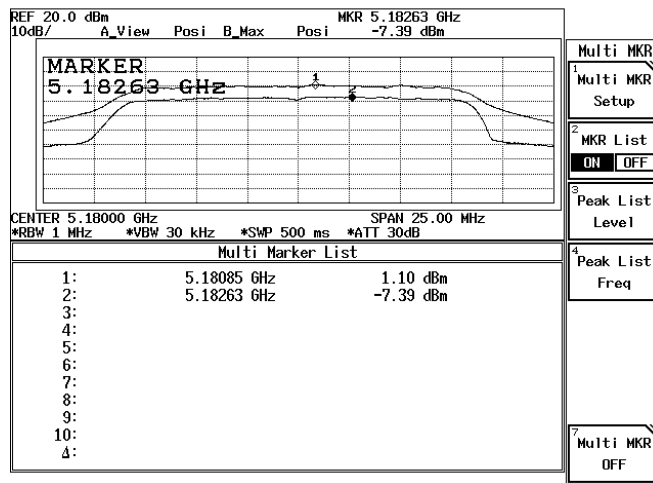
The measurement uncertainty is defined as ± 1.27 dB

5.5. Test Result of Peak Excursion

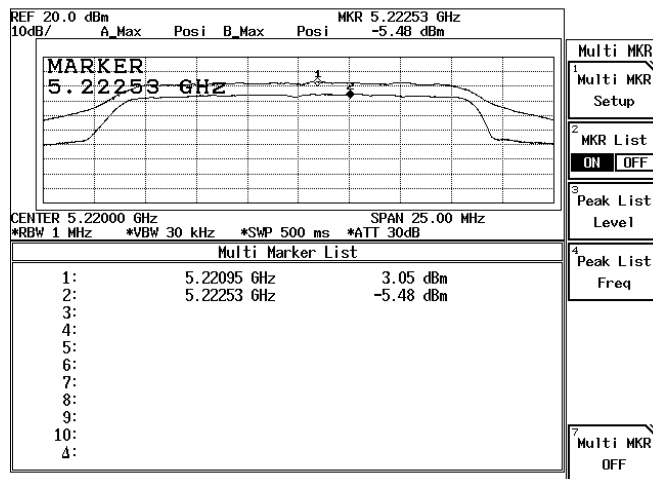
Product : Notebook P.C.
 Test Item : Peak Excursion
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a

Channel No.	Frequency (MHz)	Measurement Level (dB)	Required Limit (dB)	Result
1	5180.00	8.49	≤ 13	Pass
3	5220.00	8.53	≤ 13	Pass

Channel 1:



Channel 3:



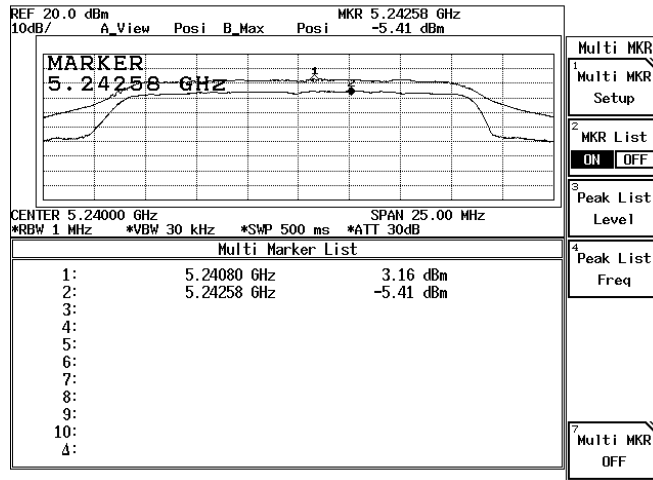
Note:

1. Receiver setting (Peak Detector) : RBW: 1 MHz; VBW: 3 MHz; Span: 25 MHz ◦
2. Receiver setting (Average Detector) : RBW: 1 MHz; VBW: 10 Hz; Span: 25 MHz ◦

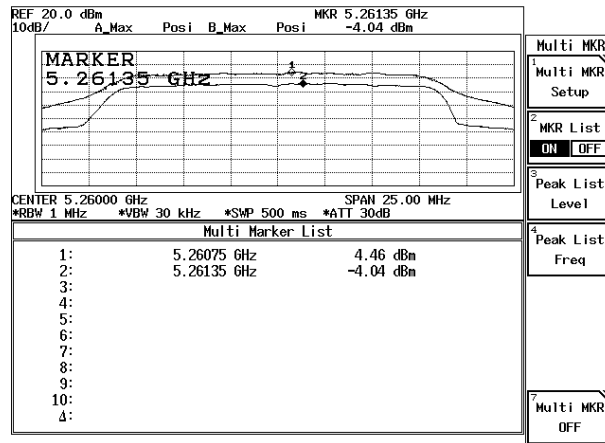
Product : Notebook P.C.
 Test Item : Peak Excursion
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a

Channel No.	Frequency (MHz)	Measurement Level (dB)	Required Limit (dB)	Result
4	5240.00	8.57	≤ 13	Pass
1	5260.00	8.50	≤ 13	Pass

Channel 5:



Channel 8:



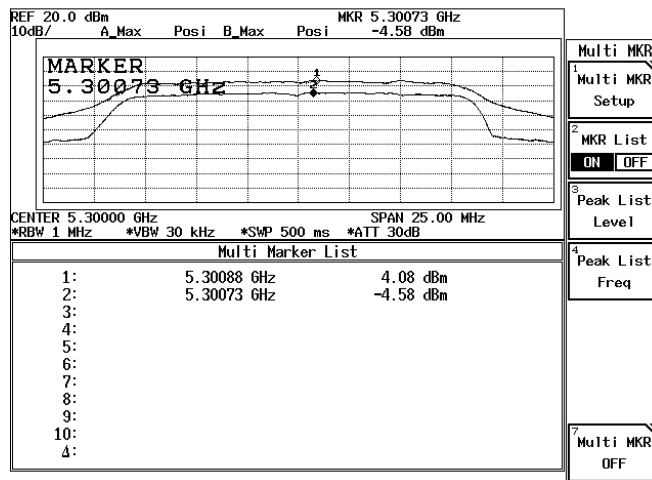
Note:

1. Receiver setting (Peak Detector) : RBW: 1 MHz; VBW: 3 MHz; Span: 25 MHz ◦
2. Receiver setting (Average Detector) : RBW: 1 MHz; VBW: 10 Hz; Span: 25 MHz ◦

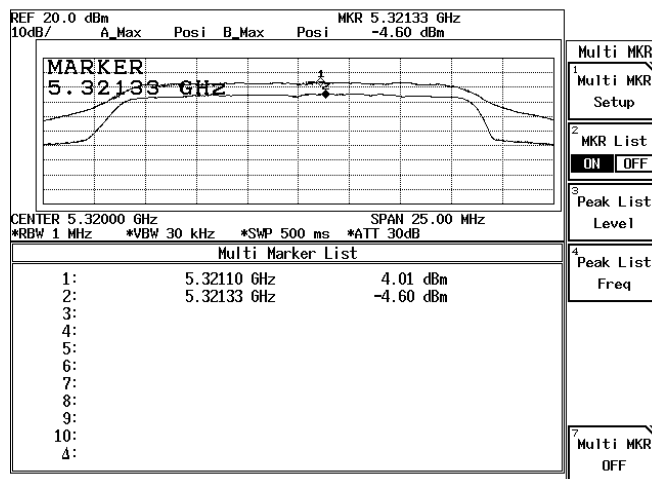
Product : Notebook P.C.
 Test Item : Peak Excursion
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a

Channel No.	Frequency (MHz)	Measurement Level (dB)	Required Limit (dB)	Result
3	5300.00	8.66	≤ 13	Pass
4	5320.00	8.61	≤ 13	Pass

Channel 3:



Channel 4:



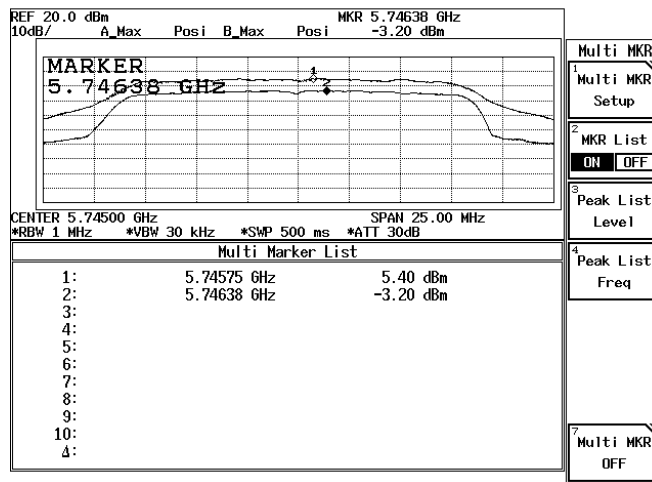
Note:

1. Receiver setting (Peak Detector) : RBW: 1 MHz; VBW: 3 MHz; Span: 25 MHz ◦
2. Receiver setting (Average Detector) : RBW: 1 MHz; VBW: 10 Hz; Span: 25 MHz ◦

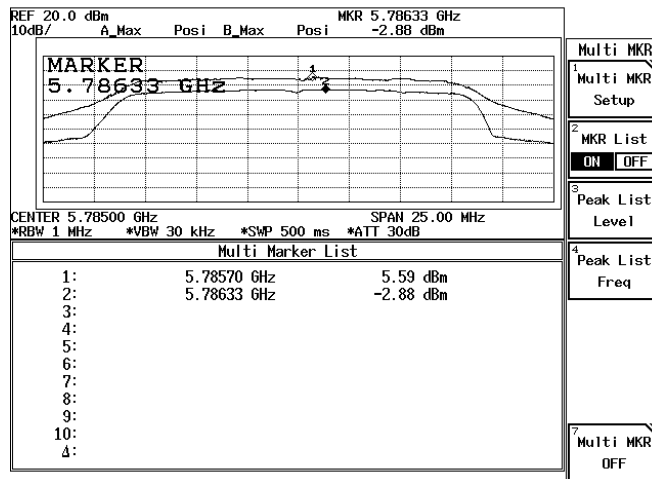
Product : Notebook P.C.
 Test Item : Peak Excursion
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a

Channel No.	Frequency (MHz)	Measurement Level (dB)	Required Limit (dB)	Result
1	5745.00	8.60	≤ 13	Pass
3	5785.00	8.47	≤ 13	Pass

Channel 1:



Channel 3:



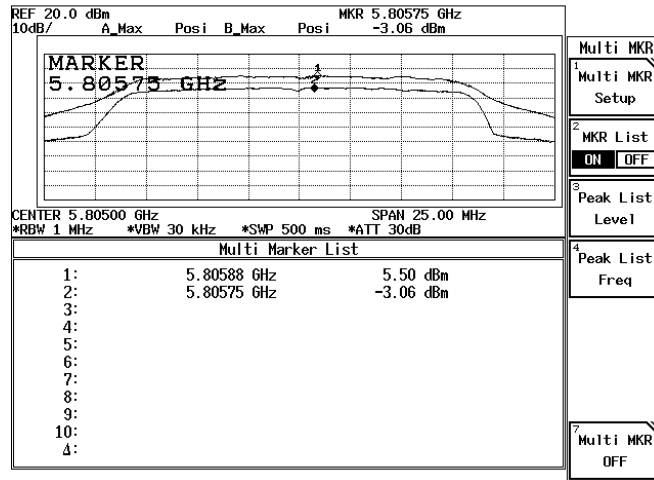
Note:

1. Receiver setting (Peak Detector) : RBW: 1 MHz; VBW: 3 MHz; Span: 25 MHz ◦
2. Receiver setting (Average Detector) : RBW: 1 MHz; VBW: 10 Hz; Span: 25 MHz ◦

Product : Notebook P.C.
 Test Item : Peak Excursion
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a

Channel No.	Frequency (MHz)	Measurement Level (dB)	Required Limit (dB)	Result
4	5805.00	8.56	≤ 13	Pass

Channel 4:



Note:

1. Receiver setting (Peak Detector) : RBW: 1 MHz; VBW: 3 MHz; Span: 25 MHz ◦
2. Receiver setting (Average Detector) : RBW: 1 MHz; VBW: 10 Hz; Span: 25 MHz ◦

6. Undesirable Emission

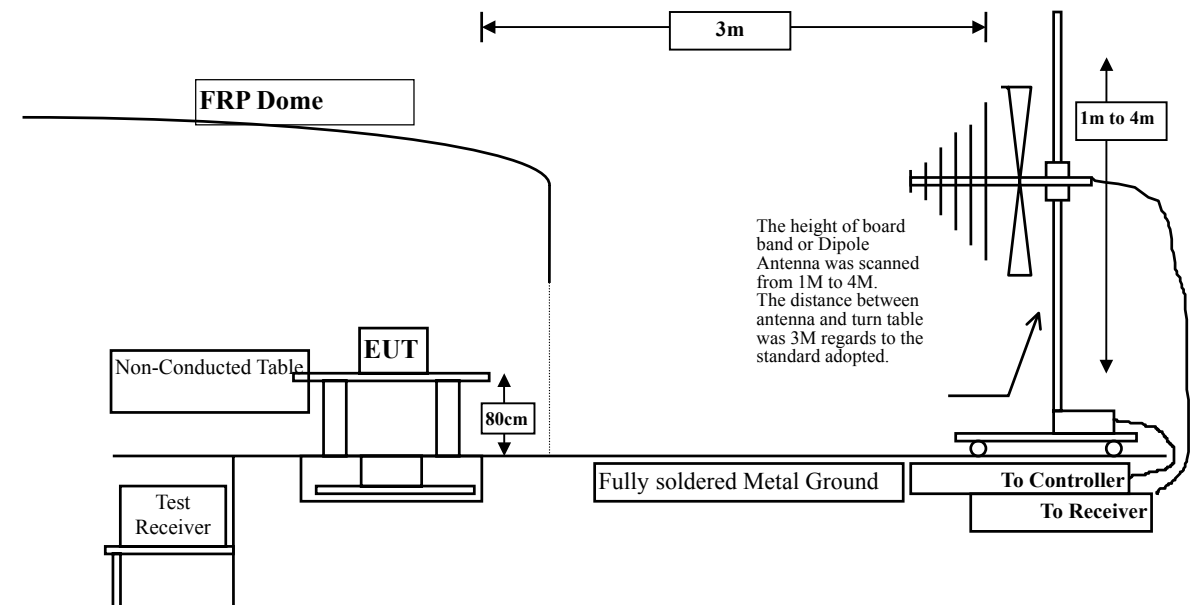
6.1. Test Equipment

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

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 3	X Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2005
	X Spectrum Analyzer	Advantest	R3162 / 100803480	May, 2005
	X Spectrum Analyzer	Advantest	R3182 / 120600578	Apr., 2005
	X Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P	Apr., 2005
	X Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2005
	X Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2005
	X Horn Antenna	ETS	3115 / 0005-6160	July, 2004
	X Horn Antenna	Schwarzbeck	BBHA 9170 / 208	Apr., 2005
	X Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2004

- 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



6.3. Limits

- (1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.
- (3) For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz.
- (4) The field strength of emissions appearing within restricted bands of operation shall not exceed the limits in the Section 15.209.
- (5) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209:

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.

6.4. 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 C63.4:2001 on radiated measurement.

The additional notch 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.

6.5. Uncertainty

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

6.6. Test Result of Undesirable Emission

Product : Notebook P.C.
 Test Item : Undesirable Emission (Outside band)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5180MHz)

Frequency MHz	Cable Loss dB	Probe Factor dB/m	PreAMP dB	Reading Level dBuV	Emission Level dBuV/m	Margin dB	Limit dBuV/m
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Horizontal

Peak Detector:

10360.00	6.50	38.60	35.13	43.01	52.97	21.03	74.00
15540.00	8.96	37.90	33.85	40.01	53.02	20.98	74.00
20720.00	11.41	36.75	34.01	38.98	53.13	20.87	74.00

Average Detector

--

Vertical

Peak Detector:

10360.00	6.50	38.60	35.13	42.95	52.91	21.09	74.00
15540.00	8.96	37.90	33.85	40.12	53.13	20.87	74.00
20720.00	11.41	36.75	34.01	39.42	53.57	20.43	74.00

Average Detector

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
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 + Probe Factor + Cable Loss- 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 : Notebook P.C.
 Test Item : Undesirable Emission (Outside band)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5220MHz)

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
MHz	Loss	Factor		Level	Level		
	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal

Peak Detector:

10440.00	6.53	38.72	35.13	42.01	52.12	21.88	74.00
15580.00	8.97	37.79	33.86	39.87	52.78	21.22	74.00
20760.00	11.42	36.75	34.01	38.94	53.10	20.90	74.00

Average Detector

--

Vertical

Peak Detector:

10440.00	6.53	38.72	35.13	42.01	52.12	21.88	74.00
15580.00	8.97	37.79	33.86	39.72	52.63	21.37	74.00
20760.00	11.42	36.75	34.01	38.87	53.03	20.97	74.00

Average Detector

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
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 + Probe Factor + Cable Loss- 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 : Notebook P.C.
 Test Item : Undesirable Emission (Outside band)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5240MHz)

Frequency	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:

10480.00	6.55	38.76	35.13	42.18	52.36	21.64	74.00
15720.00	9.03	37.33	33.87	40.04	52.53	21.47	74.00
20960.00	11.54	36.81	33.98	38.86	53.22	20.78	74.00

Average Detector

--

Vertical

Peak Detector:

10480.00	6.55	38.76	35.13	42.12	52.30	21.70	74.00
15720.00	9.03	37.33	33.87	39.92	52.41	21.59	74.00
20960.00	11.54	36.81	33.98	38.84	53.20	20.80	74.00

Average Detector

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
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 + Probe Factor + Cable Loss- 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 : Notebook P.C.
 Test Item : Undesirable Emission (Outside band)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5260MHz)

Frequency	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:

10520.00	6.57	38.87	35.13	41.90	52.22	21.78	74.00
15780.00	9.07	36.99	33.88	40.35	52.53	21.47	74.00
21040.00	11.57	36.81	33.98	38.86	53.26	20.74	74.00

Average Detector

--

Vertical

Peak Detector:

10520.00	6.57	38.87	35.13	42.09	52.41	21.59	74.00
15780.00	9.07	36.99	33.88	40.63	52.81	21.19	74.00
21040.00	11.57	36.81	33.98	38.76	53.16	20.84	74.00

Average Detector

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
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 + Probe Factor + Cable Loss- 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 : Notebook P.C.
 Test Item : Undesirable Emission (Outside band)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5300MHz)

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
MHz	Loss	Factor	dB	Level	Level	dB	dBuV/m
	dB	dB/m		dBuV	dBuV/m		

Horizontal

Peak Detector:

10600.00	6.60	38.91	35.13	41.74	52.13	21.87	74.00
15900.00	9.13	36.53	33.89	40.61	52.38	21.62	74.00
21200.00	11.64	36.84	33.96	38.67	53.19	20.81	74.00

Average Detector

--

Vertical

Peak Detector:

10600.00	6.60	38.91	35.13	42.01	52.40	21.60	74.00
15900.00	9.13	36.53	33.89	40.86	52.63	21.37	74.00
21200.00	11.64	36.84	33.96	38.69	53.21	20.79	74.00

Average Detector

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
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 + Probe Factor + Cable Loss- 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 : Notebook P.C.
 Test Item : Undesirable Emission (Outside band)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5320MHz)

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
MHz	Loss	Factor	dB	Level	Level	dB	dBuV/m
	dB	dB/m		dBuV	dBuV/m		

Horizontal

Peak Detector:

10640.00	6.63	39.03	35.13	41.87	52.40	21.60	74.00
15960.00	9.15	36.30	33.90	40.94	52.49	21.51	74.00
21280.00	11.67	36.89	33.96	38.42	53.02	20.98	74.00

Average Detector

--

Vertical

Peak Detector:

10640.00	6.63	39.03	35.13	41.99	52.52	21.48	74.00
15960.00	9.15	36.30	33.90	41.12	52.67	21.33	74.00
21280.00	11.67	36.89	33.96	38.57	53.17	20.83	74.00

Average Detector

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
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 + Probe Factor + Cable Loss- 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 : Notebook P.C.
 Test Item : Undesirable Emission (Outside band)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5745MHz)

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
MHz	Loss	Factor	dB	Level	Level	dB	dBuV/m
	dB	dB/m		dBuV	dBuV/m		

Horizontal

Peak Detector:

11490.00	7.03	39.08	35.10	41.31	52.32	21.68	74.00
17235.00	9.74	36.23	34.02	40.64	52.59	21.41	74.00
22980.00	11.80	37.59	33.80	37.59	53.18	20.82	74.00

Average Detector

--

Vertical

Peak Detector:

11490.00	7.03	39.08	35.10	41.58	52.59	21.41	74.00
17235.00	9.74	36.23	34.02	40.74	52.69	21.31	74.00
22980.00	11.80	37.59	33.80	37.64	53.23	20.77	74.00

Average Detector

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
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 + Probe Factor + Cable Loss- 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 : Notebook P.C.
 Test Item : Undesirable Emission (Outside band)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5785MHz)

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
MHz	Loss	Factor		Level	Level	dB	dBuV/m
	dB	dB/m	dB	dBuV	dBuV/m		

Horizontal

Peak Detector:

11570.00	7.06	39.00	35.10	41.67	52.63	21.37	74.00
17355.00	9.81	36.21	34.04	40.80	52.78	21.22	74.00
23140.00	11.80	37.65	33.80	37.45	53.10	20.90	74.00

Average Detector

--

Vertical

Peak Detector:

11570.00	7.06	39.00	35.10	41.73	52.69	21.31	74.00
17355.00	9.81	36.21	34.04	40.78	52.76	21.24	74.00
23140.00	11.80	37.65	33.80	37.58	53.23	20.77	74.00

Average Detector

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
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 + Probe Factor + Cable Loss- 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 : Notebook P.C.
 Test Item : Undesirable Emission (Outside band)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5805MHz)

Frequency	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:

11610.00	7.09	38.98	35.10	41.66	52.63	21.37	74.00
17415.00	9.84	36.19	34.05	40.73	52.71	21.29	74.00
23220.00	11.80	37.72	33.80	37.40	53.12	20.88	74.00

Average Detector

--

Vertical

Peak Detector:

11610.00	7.09	38.98	35.10	41.81	52.78	21.22	74.00
17415.00	9.84	36.19	34.05	40.95	52.93	21.07	74.00
23220.00	11.80	37.72	33.80	37.42	53.14	20.86	74.00

Average Detector

11610.00	7.09	38.98	35.10	30.71	41.68	12.32	54.00
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Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
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 + Probe Factor + Cable Loss- 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 : Notebook P.C.
 Test Item : Undesirable Emission (Unwanted emissions below 1GHz)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5180MHz)

Frequency	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal:

325.470	2.39	12.26	0.00	15.68	30.34	15.66	46.00
389.620	2.72	14.09	0.00	14.47	31.27	14.73	46.00
430.440	2.93	15.81	0.00	12.79	31.53	14.47	46.00
* 457.660	3.07	16.48	0.00	20.11	39.67	6.33	46.00
500.420	3.30	16.36	0.00	13.93	33.59	12.41	46.00
615.110	3.88	18.33	0.00	16.54	38.75	7.25	46.00

Vertical:

90.260	1.18	8.32	0.00	16.39	25.89	17.61	43.50
* 189.400	1.69	8.21	0.00	22.31	32.21	11.29	43.50
232.160	1.91	10.01	0.00	17.61	29.53	16.47	46.00
325.470	2.39	12.51	0.00	11.97	26.88	19.12	46.00
457.660	3.07	16.52	0.00	13.37	32.96	13.04	46.00
500.420	3.30	16.26	0.00	8.42	27.98	18.02	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.

Product : Notebook P.C.
 Test Item : Undesirable Emission (Unwanted emissions below 1GHz)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5220MHz)

Frequency MHz	Cable Loss dB	Probe Factor dB/m	PreAMP dB	Reading Level dBuV	Emission Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal:							
193.290	1.71	8.00	0.00	15.55	25.26	18.24	43.50
232.160	1.91	9.61	0.00	17.30	28.82	17.18	46.00
389.620	2.72	14.09	0.00	15.06	31.86	14.14	46.00
* 457.660	3.07	16.48	0.00	19.23	38.79	7.21	46.00
500.420	3.30	16.36	0.00	14.91	34.57	11.43	46.00
615.110	3.88	18.33	0.00	16.08	38.28	7.72	46.00
Vertical:							
166.070	1.57	8.42	0.00	19.41	29.40	14.10	43.50
* 195.230	1.72	8.11	0.00	21.86	31.69	11.81	43.50
232.160	1.91	10.01	0.00	17.54	29.46	16.54	46.00
325.470	2.39	12.51	0.00	13.51	28.42	17.58	46.00
453.770	3.05	16.66	0.00	11.86	31.57	14.43	46.00
500.420	3.30	16.26	0.00	8.19	27.75	18.25	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 : Notebook P.C.
 Test Item : Undesirable Emission (Unwanted emissions below 1GHz)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5240MHz)

Frequency	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal:

199.120	1.74	8.40	0.00	16.38	26.52	16.98	43.50
232.160	1.91	9.61	0.00	17.23	28.75	17.25	46.00
391.560	2.73	14.24	0.00	15.01	31.98	14.02	46.00
457.660	3.07	16.48	0.00	14.33	33.89	12.11	46.00
500.420	3.30	16.36	0.00	13.86	33.52	12.48	46.00
* 615.110	3.88	18.33	0.00	15.23	37.44	8.56	46.00

Vertical:

158.300	1.53	8.83	0.00	17.49	27.85	15.65	43.50
* 187.450	1.68	8.01	0.00	23.22	32.91	10.59	43.50
232.160	1.91	10.01	0.00	17.69	29.61	16.39	46.00
300.200	2.26	12.06	0.00	10.10	24.42	21.58	46.00
391.560	2.73	15.57	0.00	7.83	26.13	19.87	46.00
500.420	3.30	16.26	0.00	7.96	27.52	18.48	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 : Notebook P.C.
 Test Item : Undesirable Emission (Unwanted emissions below 1GHz)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5260MHz)

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
MHz	Loss	Factor		Level	Level		
	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal:

232.160	1.91	9.61	0.00	17.38	28.90	17.10	46.00
389.620	2.72	14.09	0.00	16.55	33.35	12.65	46.00
430.440	2.93	15.81	0.00	11.41	30.15	15.85	46.00
453.770	3.05	16.34	0.00	12.40	31.80	14.20	46.00
500.420	3.30	16.36	0.00	14.07	33.73	12.27	46.00
* 615.110	3.88	18.33	0.00	15.44	37.65	8.35	46.00

Vertical:

156.350	1.52	8.99	0.00	16.80	27.30	16.20	43.50
* 189.400	1.69	8.21	0.00	23.27	33.17	10.33	43.50
232.160	1.91	10.01	0.00	18.00	29.92	16.08	46.00
500.420	3.30	16.26	0.00	7.91	27.47	18.53	46.00
774.510	4.70	20.04	0.00	3.86	28.60	17.40	46.00
844.490	5.07	18.88	0.00	4.12	28.06	17.94	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.

Product : Notebook P.C.
 Test Item : Undesirable Emission (Unwanted emissions below 1GHz)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5300MHz)

Frequency	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal:

232.160	1.91	9.61	0.00	17.69	29.21	16.79	46.00
389.620	2.72	14.09	0.00	15.28	32.08	13.92	46.00
434.330	2.95	15.75	0.00	11.54	30.25	15.75	46.00
455.710	3.06	16.66	0.00	12.23	31.96	14.04	46.00
500.420	3.30	16.36	0.00	13.81	33.47	12.53	46.00
* 615.110	3.88	18.33	0.00	15.94	38.15	7.85	46.00

Vertical:

166.070	1.57	8.42	0.00	21.05	31.04	12.46	43.50
* 185.510	1.67	8.16	0.00	22.60	32.43	11.07	43.50
232.160	1.91	10.01	0.00	13.23	25.15	20.85	46.00
432.380	2.94	17.36	0.00	4.84	25.15	20.85	46.00
800.420	4.85	19.26	0.00	3.52	27.63	18.37	46.00
844.490	5.07	18.88	0.00	4.01	27.95	18.05	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 : Notebook P.C.
 Test Item : Undesirable Emission (Unwanted emissions below 1GHz)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5320MHz)

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
MHz	Loss	Factor	dB	Level	Level	dB	dBuV/m
	dB	dB/m		dBuV	dBuV/m		

Horizontal:

232.160	1.91	9.61	0.00	17.96	29.48	16.52	46.00
391.560	2.73	14.24	0.00	15.29	32.26	13.74	46.00
430.440	2.93	15.81	0.00	11.80	30.54	15.46	46.00
457.660	3.07	16.48	0.00	12.52	32.08	13.92	46.00
500.420	3.30	16.36	0.00	14.07	33.73	12.27	46.00
* 615.110	3.88	18.33	0.00	15.57	37.78	8.22	46.00

Vertical:

* 185.510	1.67	8.16	0.00	22.85	32.68	10.82	43.50
232.160	1.91	10.01	0.00	17.55	29.47	16.53	46.00
360.460	2.57	14.38	0.00	7.97	24.92	21.08	46.00
496.530	3.27	16.40	0.00	7.98	27.64	18.36	46.00
774.510	4.70	20.04	0.00	3.92	28.66	17.34	46.00
850.320	5.10	19.10	0.00	3.26	27.46	18.54	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.

Product : Notebook P.C.
 Test Item : Undesirable Emission (Unwanted emissions below 1GHz)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5745MHz)

Frequency MHz	Cable Loss dB	Probe Factor dB/m	PreAMP dB	Reading Level dBuV	Emission Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal:							
261.320	2.06	13.05	0.00	21.56	36.67	9.33	46.00
323.530	2.38	12.22	0.00	18.30	32.90	13.10	46.00
389.620	2.72	14.09	0.00	18.32	35.12	10.88	46.00
* 457.660	3.07	16.48	0.00	20.41	39.97	6.03	46.00
500.420	3.30	16.36	0.00	14.61	34.27	11.73	46.00
584.010	3.73	18.19	0.00	13.30	35.22	10.78	46.00
Vertical:							
129.140	1.38	10.53	0.00	20.91	32.82	10.68	43.50
261.620	2.06	13.12	0.00	21.21	36.40	9.60	46.00
* 278.820	2.15	12.09	0.00	22.46	36.71	9.29	46.00
325.470	2.39	12.51	0.00	19.40	34.31	11.69	46.00
389.620	2.72	15.43	0.00	16.37	34.52	11.48	46.00
457.660	3.07	16.52	0.00	14.71	34.30	11.70	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.

Product : Notebook P.C.
 Test Item : Undesirable Emission (Unwanted emissions below 1GHz)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5785MHz)

Frequency	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal:

261.320	2.06	13.05	0.00	20.80	35.91	10.09	46.00
278.820	2.15	11.89	0.00	22.20	36.24	9.76	46.00
389.620	2.72	14.09	0.00	18.99	35.79	10.21	46.00
* 457.660	3.07	16.48	0.00	20.32	39.88	6.12	46.00
519.860	3.39	16.70	0.00	14.49	34.58	11.42	46.00
584.010	3.73	18.19	0.00	13.16	35.08	10.92	46.00

Vertical:

* 261.320	2.06	13.10	0.00	21.60	36.76	9.24	46.00
280.760	2.16	12.21	0.00	19.35	33.73	12.27	46.00
323.530	2.38	12.66	0.00	19.19	34.23	11.77	46.00
389.620	2.72	15.43	0.00	15.79	33.94	12.06	46.00
457.660	3.07	16.52	0.00	14.39	33.98	12.02	46.00
500.420	3.30	16.26	0.00	12.57	32.13	13.87	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.

Product : Notebook P.C.
 Test Item : Undesirable Emission (Unwanted emissions below 1GHz)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5805MHz)

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
MHz	Loss	Factor	dB	Level	Level	dB	dBuV/m
	dB	dB/m		dBuV	dBuV/m		

Horizontal:

261.320	2.06	13.05	0.00	21.16	36.27	9.73	46.00
323.530	2.38	12.22	0.00	18.13	32.73	13.27	46.00
389.620	2.72	14.09	0.00	18.40	35.20	10.80	46.00
* 457.660	3.07	16.48	0.00	20.00	39.56	6.44	46.00
519.860	3.39	16.70	0.00	14.43	34.52	11.48	46.00
587.900	3.75	17.83	0.00	13.74	35.32	10.68	46.00

Vertical:

* 261.320	2.06	13.10	0.00	21.63	36.79	9.21	46.00
325.470	2.39	12.51	0.00	19.89	34.80	11.20	46.00
391.560	2.73	15.57	0.00	15.93	34.23	11.77	46.00
457.660	3.07	16.52	0.00	15.01	34.60	11.40	46.00
500.420	3.30	16.26	0.00	13.01	32.57	13.43	46.00
519.860	3.39	16.74	0.00	12.51	32.63	13.37	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.

7. Band Edge

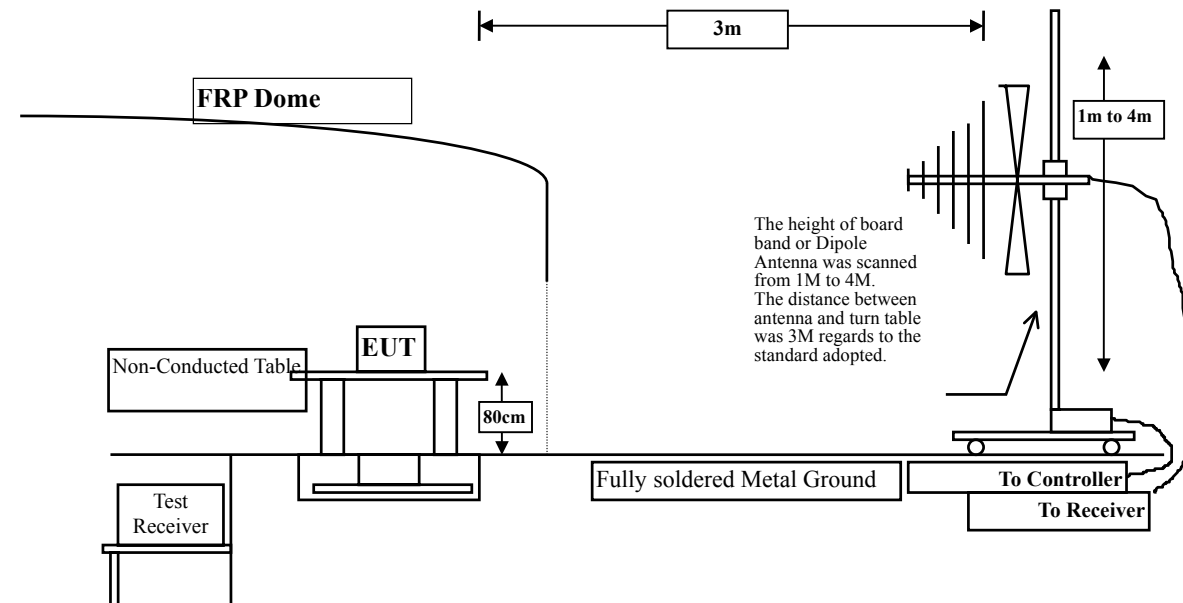
7.1. Test Equipment

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

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 3	X Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2005
	X Spectrum Analyzer	Advantest	R3162 / 100803480	May, 2005
	X Spectrum Analyzer	Advantest	R3182 / 120600578	Apr., 2005
	X Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P	Apr., 2005
	X Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2005
	X Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2005
	X Horn Antenna	ETS	3115 / 0005-6160	July, 2004
	X Horn Antenna	Schwarzbeck	BBHA 9170 / 208	Apr., 2005
	X Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2004

7.2. Test Setup

RF Radiated Measurement:



7.3. Limits

The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

Radiated emissions which fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209:

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.

7.4. 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 C63.4:1992 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.

7.5. Uncertainty

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

7.6. Test Result of Band Edge

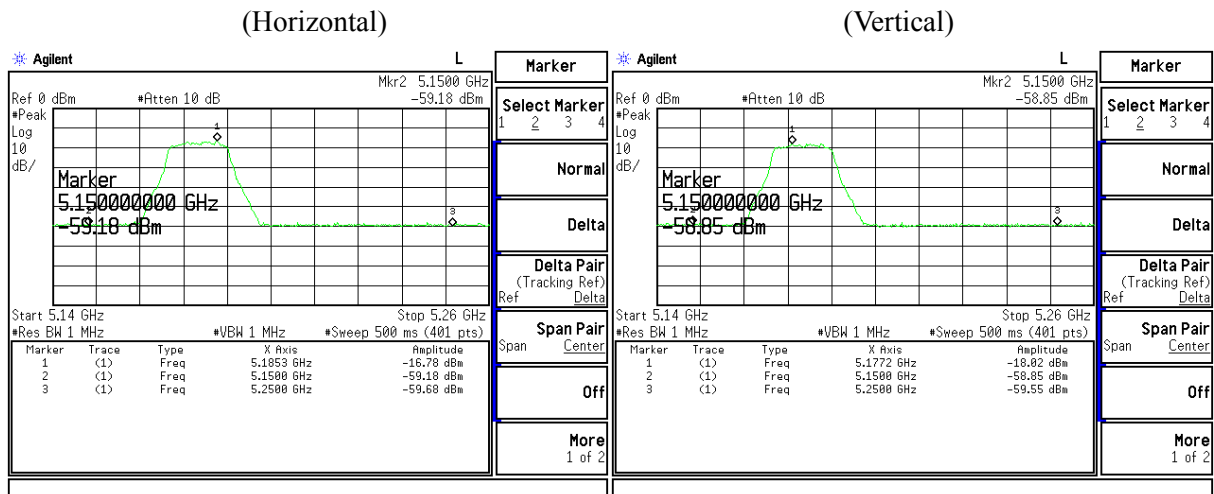
Product : Notebook P.C.
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5180MHz)

RF Radiated Measurement: (Peak Detector - Horizontal)

Frequency (MHz)	Spectrum Reading (dBm/MHz)	S.G Reading (dBm)	Correction Factor (dB)	Measurement (dBm/MHz)	Limit (dBm)	Result
5150.00	-59.18	-66.84	9.96	-56.88	-27.00	Pass

RF Radiated Measurement: (Peak Detector - Vertical)

Frequency (MHz)	Spectrum Reading (dBm/MHz)	S.G Reading (dBm)	Correction Factor (dB)	Measurement (dBm/MHz)	Limit (dBm)	Result
5150.00	-58.85	-64.28	9.96	-54.32	-27.00	Pass



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.

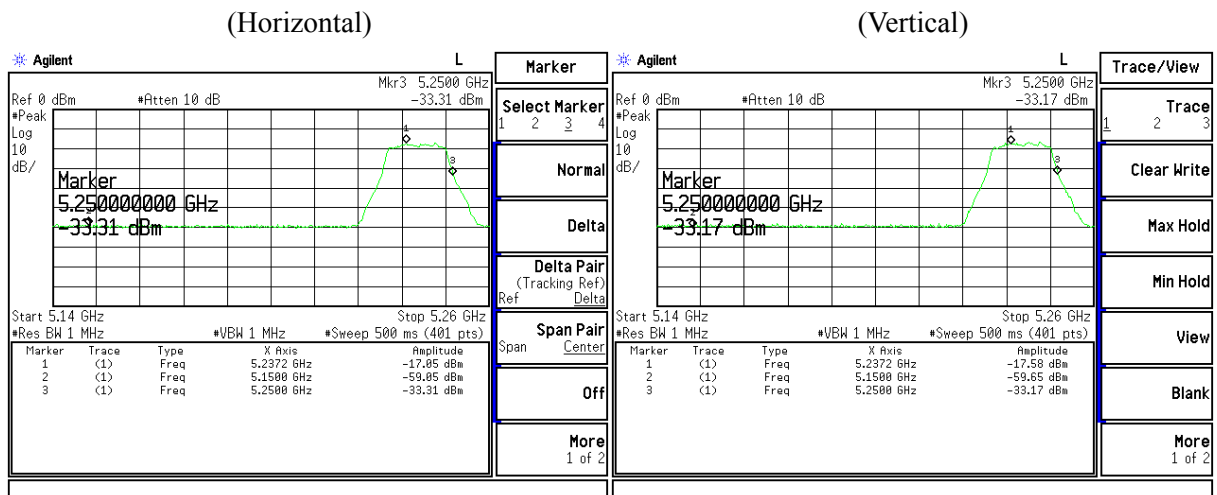
Product : Notebook P.C.
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5240MHz)

RF Radiated Measurement: (Peak Detector - Horizontal)

Frequency (MHz)	Spectrum Reading (dBm/MHz)	S.G Reading (dBm)	Correction Factor (dB)	Measurement (dBm/MHz)	Limit (dBm)	Result
5250.00	-33.31	-41.23	11.02	-30.21	-27.00	Pass

RF Radiated Measurement: (Peak Detector - Vertical)

Frequency (MHz)	Spectrum Reading (dBm/MHz)	S.G Reading (dBm)	Correction Factor (dB)	Measurement (dBm/MHz)	Limit (dBm)	Result
5250.00	-33.17	-41.58	11.02	-30.56	-27.00	Pass



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.

Product : Notebook P.C.
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5260MHz)

RF Radiated Measurement: (Peak Detector - Horizontal)

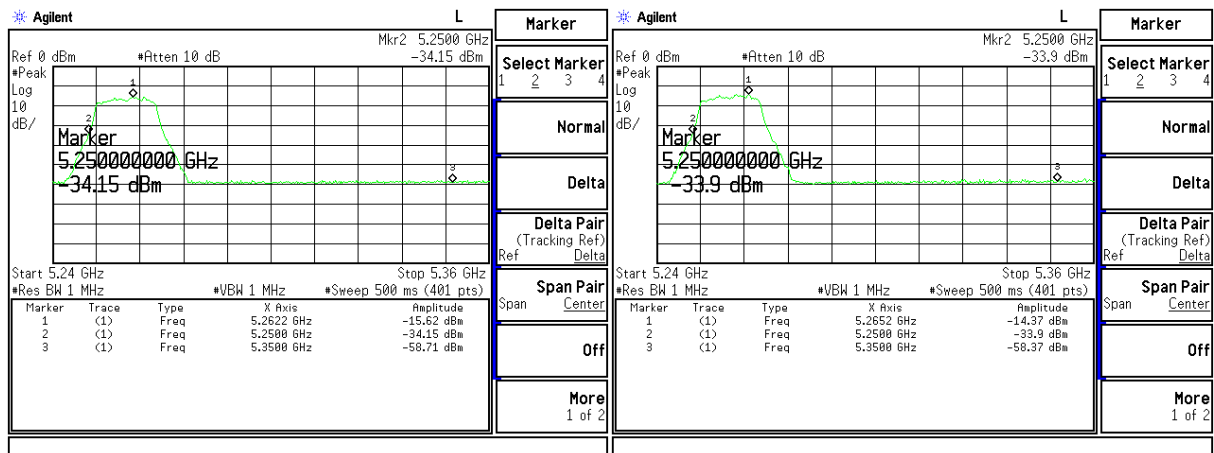
Frequency (MHz)	Spectrum Reading (dBm/MHz)	S.G Reading (dBm)	Correction Factor (dB)	Measurement (dBm/MHz)	Limit (dBm)	Result
5250.00	-34.15	-41.25	10.12	-31.13	-27.00	Pass

RF Radiated Measurement: (Peak Detector - Vertical)

Frequency (MHz)	Spectrum Reading (dBm/MHz)	S.G Reading (dBm)	Correction Factor (dB)	Measurement (dBm/MHz)	Limit (dBm)	Result
5250.00	-33.90	-41.78	10.12	-31.66	-27.00	Pass

(Horizontal)

(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.

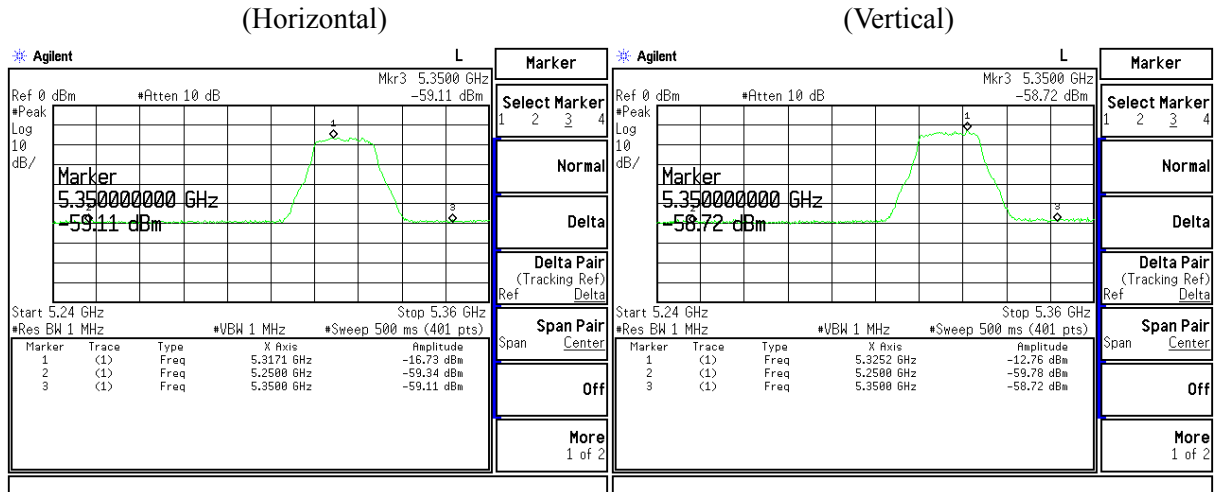
Product : Notebook P.C.
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5320MHz)

RF Radiated Measurement: (Peak Detector - Horizontal)

Frequency (MHz)	Spectrum Reading (dBm/MHz)	S.G Reading (dBm)	Correction Factor (dB)	Measurement (dBm/MHz)	Limit (dBm)	Result
5350.00	-59.11	-66.32	10.14	-56.18	-27.00	Pass

RF Radiated Measurement: (Peak Detector - Vertical)

Frequency (MHz)	Spectrum Reading (dBm/MHz)	S.G Reading (dBm)	Correction Factor (dB)	Measurement (dBm/MHz)	Limit (dBm)	Result
5350.00	-58.72	-65.83	10.14	-55.69	-27.00	Pass



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.

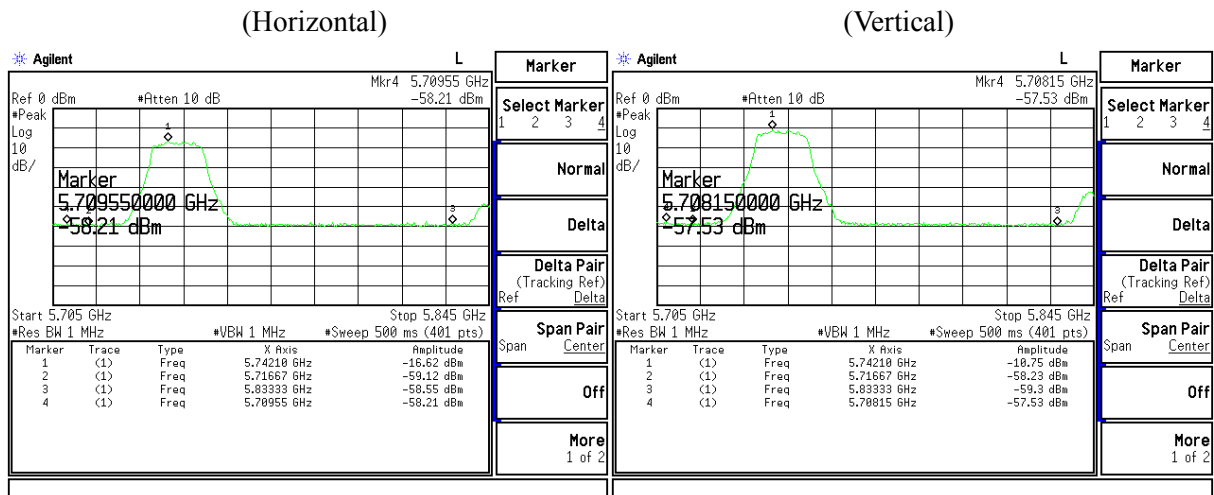
Product : Notebook P.C.
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5745MHz)

RF Radiated Measurement: (Peak Detector - Horizontal)

Frequency (MHz)	Spectrum Reading (dBm/MHz)	S.G Reading (dBm)	Correction Factor (dB)	Measurement (dBm/MHz)	Limit (dBm)	Result
5721.80	-59.76	-66.39	10.19	-56.20	-17.00	Pass
5725.00	-59.69	-67.36	10.22	-57.14	-17.00	Pass

RF Radiated Measurement: (Peak Detector - Vertical)

Frequency (MHz)	Spectrum Reading (dBm/MHz)	S.G Reading (dBm)	Correction Factor (dB)	Measurement (dBm/MHz)	Limit (dBm)	Result
5723.90	-57.44	-64.33	10.23	-54.10	-17.00	Pass
5725.00	-58.31	-65.74	10.22	-55.52	-17.00	Pass



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.

Product : Notebook P.C.
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11a (5805MHz)

RF Radiated Measurement: (Peak Detector - Horizontal)

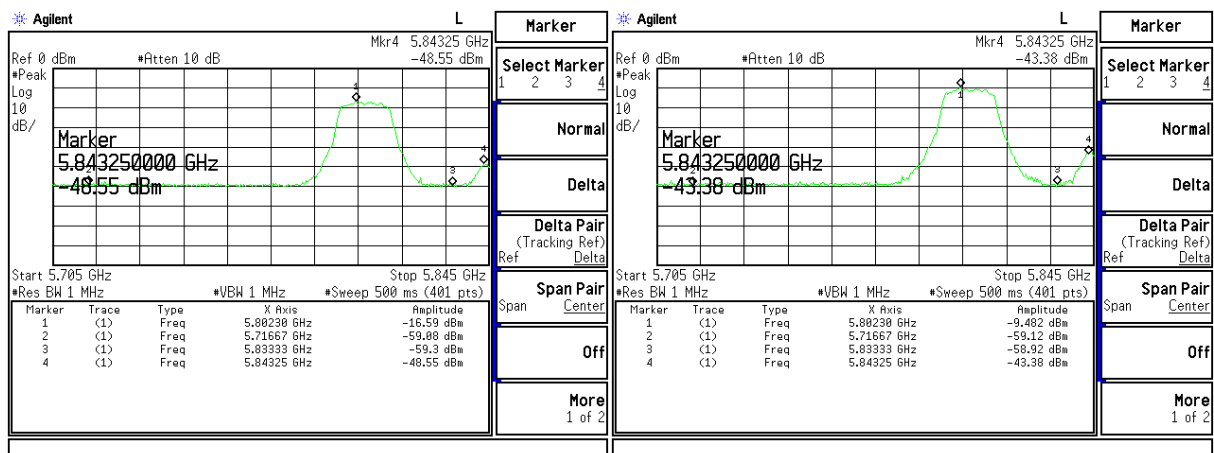
Frequency (MHz)	Spectrum Reading (dBm/MHz)	S.G Reading (dBm)	Correction Factor (dB)	Measurement (dBm/MHz)	Limit (dBm)	Result
5825.00	-55.85	-63.29	10.25	-53.04	-17.00	Pass
5826.60	-54.53	-61.31	10.29	-51.02	-17.00	Pass

RF Radiated Measurement: (Peak Detector - Vertical)

Frequency (MHz)	Spectrum Reading (dBm/MHz)	S.G Reading (dBm)	Correction Factor (dB)	Measurement (dBm/MHz)	Limit (dBm)	Result
5825.00	-59.53	-66.29	10.25	-56.04	-17.00	Pass
5833.60	-59.30	-67.03	10.29	-56.74	-17.00	Pass

(Horizontal)

(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.

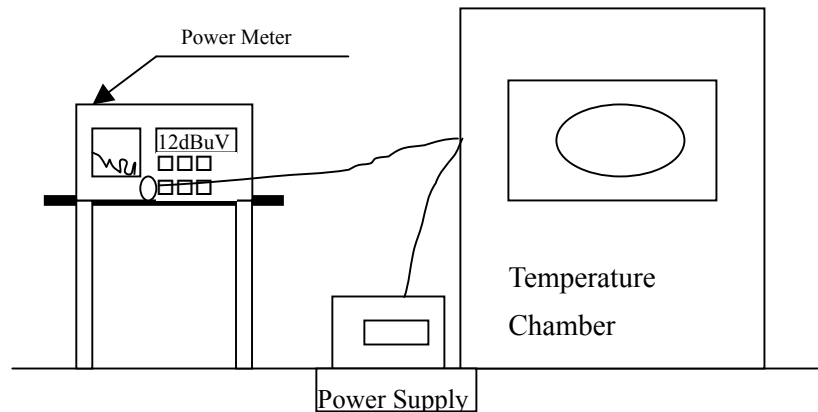
8. Frequency Stability

8.1. Test Equipment

Equipment	Manufacturer	Model No./Serial No.	Last Cal.	Remark
Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2005	
Temperature Chamber	TDE	CHM 150CT	March, 2005	

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

8.2. Test Setup



8.3. Limits

Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified

8.4. Uncertainty

The measurement uncertainty is defined as ± 150 Hz

8.5. Test Result of Frequency Stability

Product : Notebook P.C.
 Test Item : Frequency Stability
 Test Site : Temperature Chamber
 Test Mode : Mode 1: Transmitter 802.11a

Test Conditions		Channel	Frequency (MHz)	Frequency (MHz)	ΔF (MHz)
Tnom (25) °C	Vnom (110)V	1	5180.00	5179.95	0.05
		3	5220.00	5219.95	0.05
		4	5240.00	5239.95	0.05
		1	5260.00	5259.95	0.05
		3	5300.00	5299.95	0.05
		4	5320.00	5319.95	0.05
		1	5745.00	5744.95	0.05
		3	5785.00	5784.95	0.05
		4	5805.00	5804.95	0.05
Tmax (25) °C	Vmax (126.5)V	1	5180.00	5179.95	0.05
		3	5220.00	5219.95	0.05
		4	5240.00	5239.95	0.05
		1	5260.00	5259.95	0.05
		3	5300.00	5299.95	0.05
		4	5320.00	5319.95	0.05
		1	5745.00	5744.95	0.05
		3	5785.00	5784.95	0.05
		4	5805.00	5804.95	0.05

Tmax (25) °C	Vmin (93.5)V	1	5180.00	5179.95	0.05
		3	5220.00	5219.95	0.05
		4	5240.00	5239.95	0.05
		1	5260.00	5259.95	0.05
		3	5300.00	5299.95	0.05
		4	5320.00	5319.95	0.05
		1	5745.00	5744.95	0.05
		3	5785.00	5784.95	0.05
		4	5805.00	5804.95	0.05
Tmin (15) °C	Vmax (126.5)V	1	5180.00	5179.95	0.05
		3	5220.00	5219.95	0.05
		4	5240.00	5239.95	0.05
		1	5260.00	5259.95	0.05
		3	5300.00	5299.95	0.05
		4	5320.00	5319.95	0.05
		1	5745.00	5744.95	0.05
		3	5785.00	5784.95	0.05
		4	5805.00	5804.95	0.05
Tmin (15) °C	Vmin (93.5)V	1	5180.00	5179.95	0.05
		3	5220.00	5219.95	0.05
		4	5240.00	5239.95	0.05
		1	5260.00	5259.95	0.05
		3	5300.00	5299.95	0.05
		4	5320.00	5319.95	0.05
		1	5745.00	5744.95	0.05
		3	5785.00	5784.95	0.05
		4	5805.00	5804.95	0.05

9. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 1: EUT Test Setup Photographs

Front View of Conducted Test



Back View of Conducted Test



Front View of Radiated Test



Back View of Radiated Test



Front View of Radiated Test (Horn)



Back View of Radiated Test (Horn)



Attachment 2: EUT Detailed Photographs

Attachment 2 : EUT Detailed Photographs

(1) EUT Photo



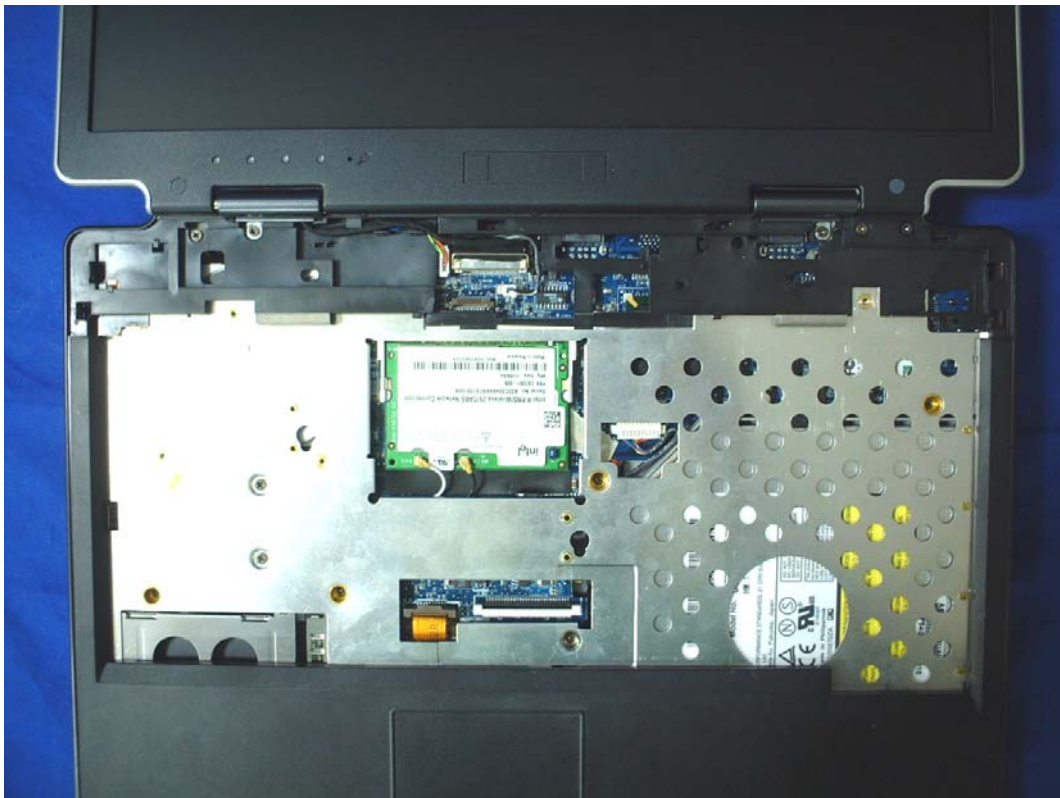
(2) EUT Photo



(3) EUT Photo



(4) EUT Photo



(5) EUT Photo



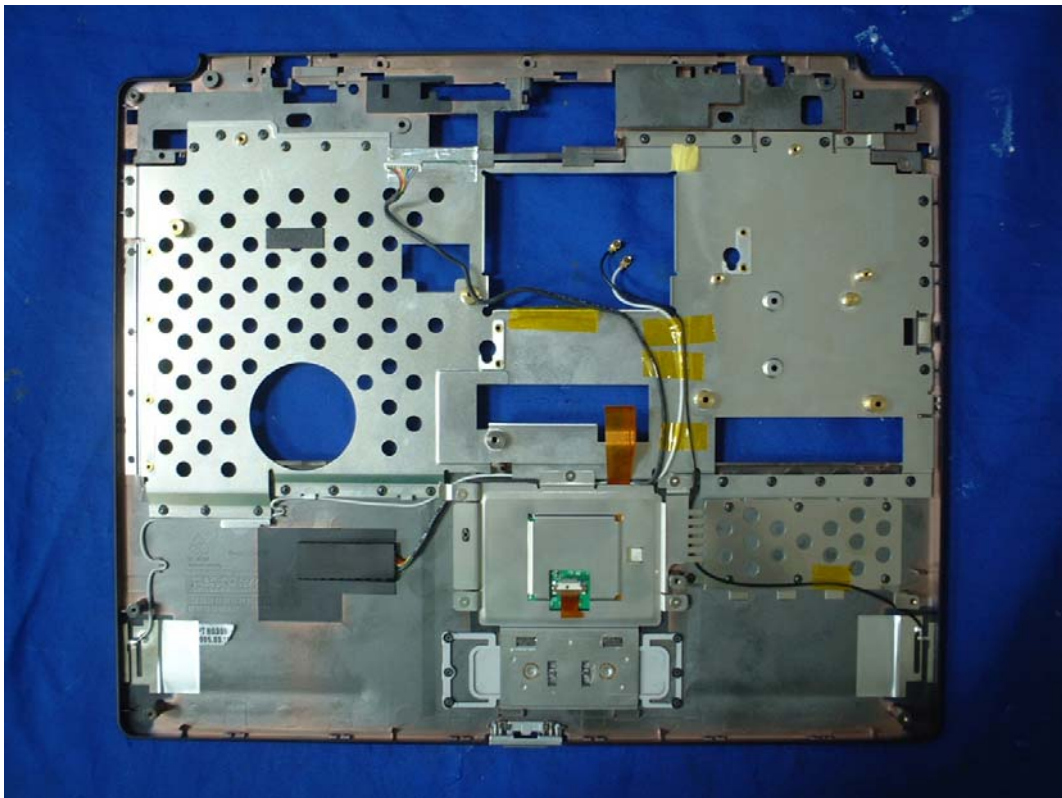
(6) EUT Photo



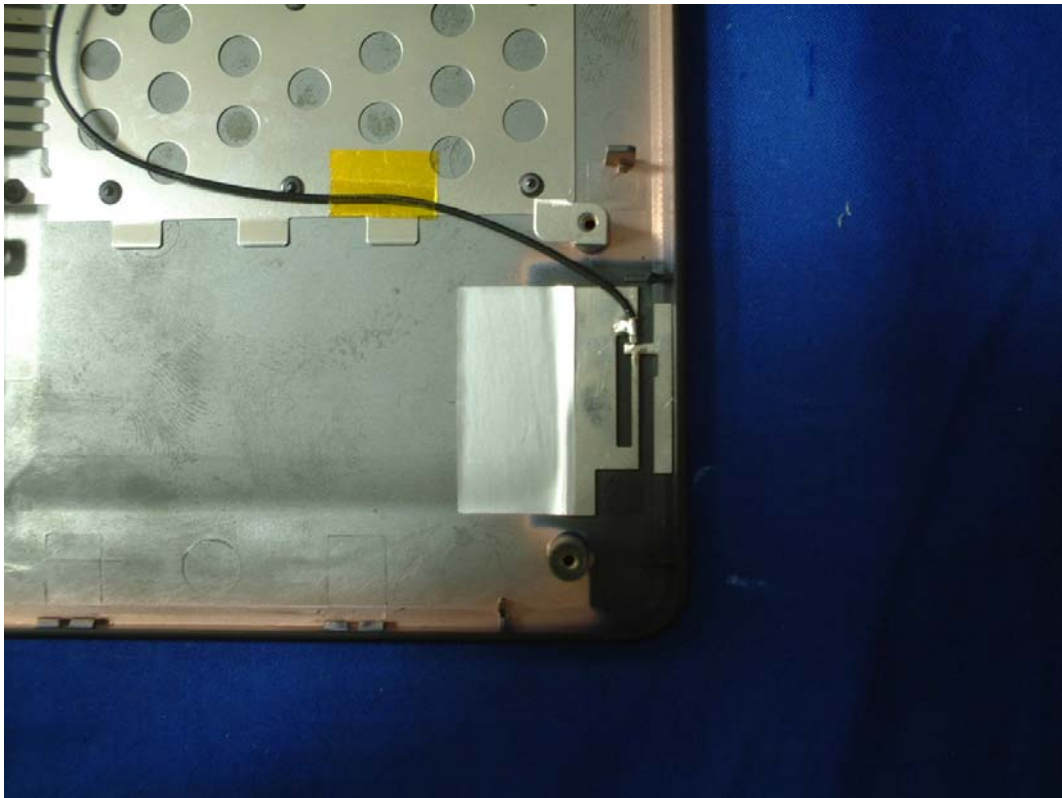
(7) EUT Photo



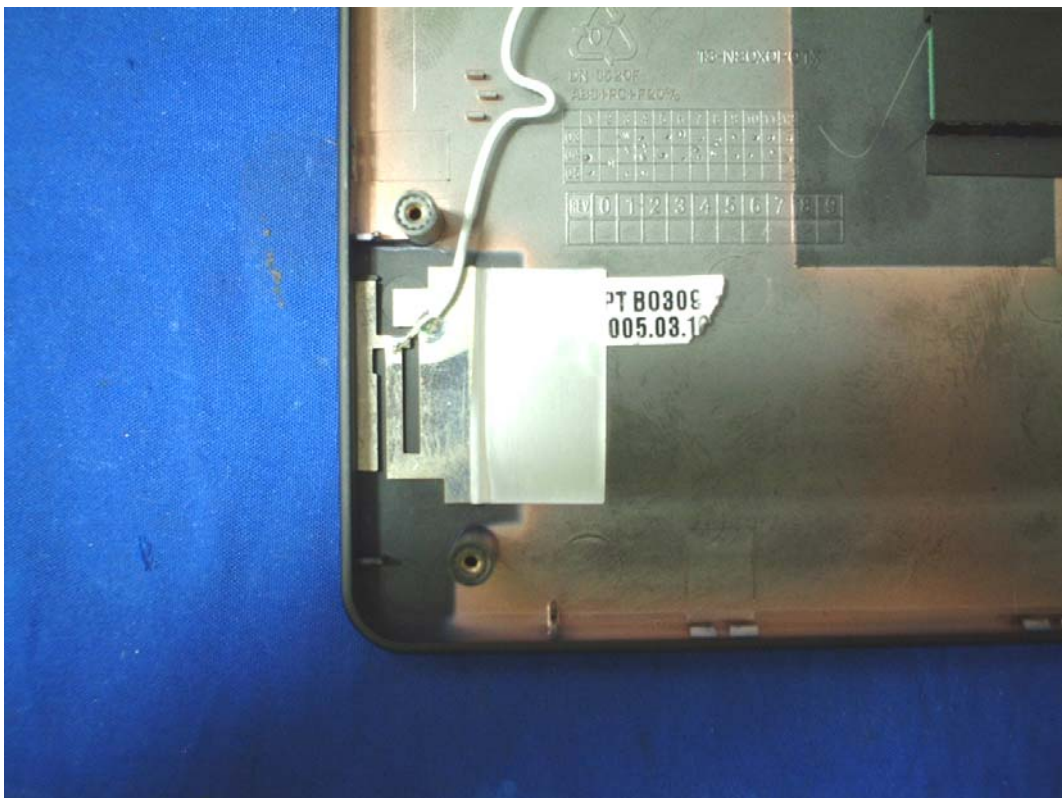
(8) EUT Photo



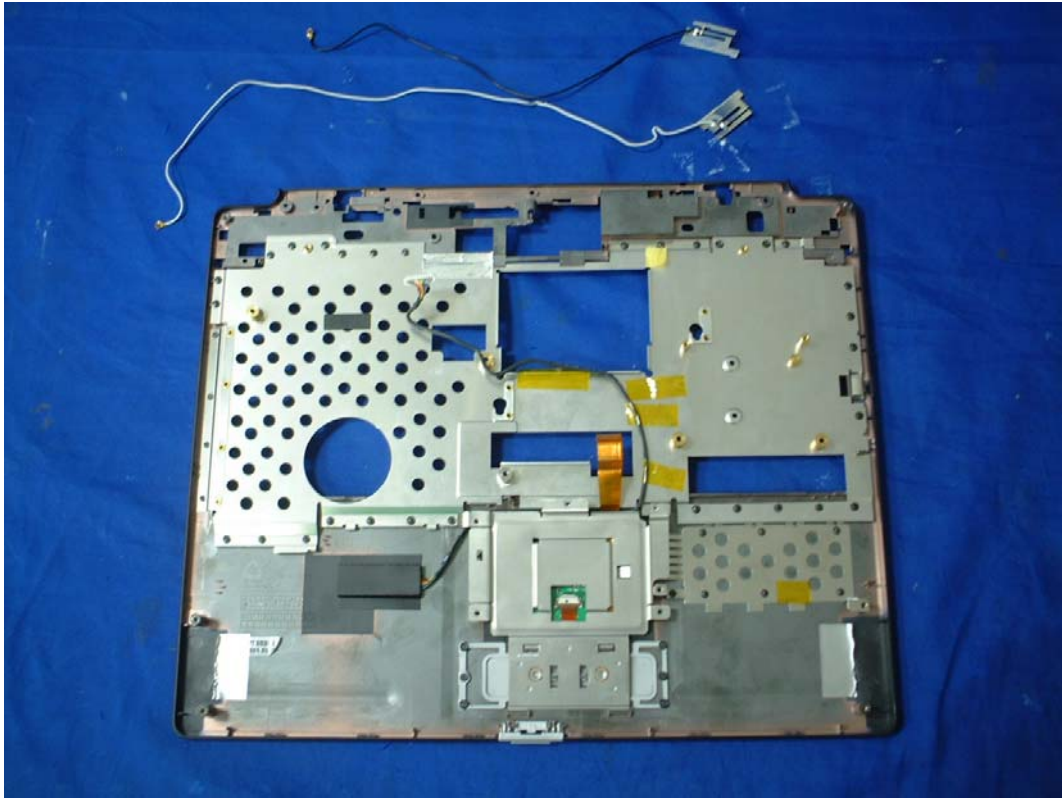
(9) EUT Photo



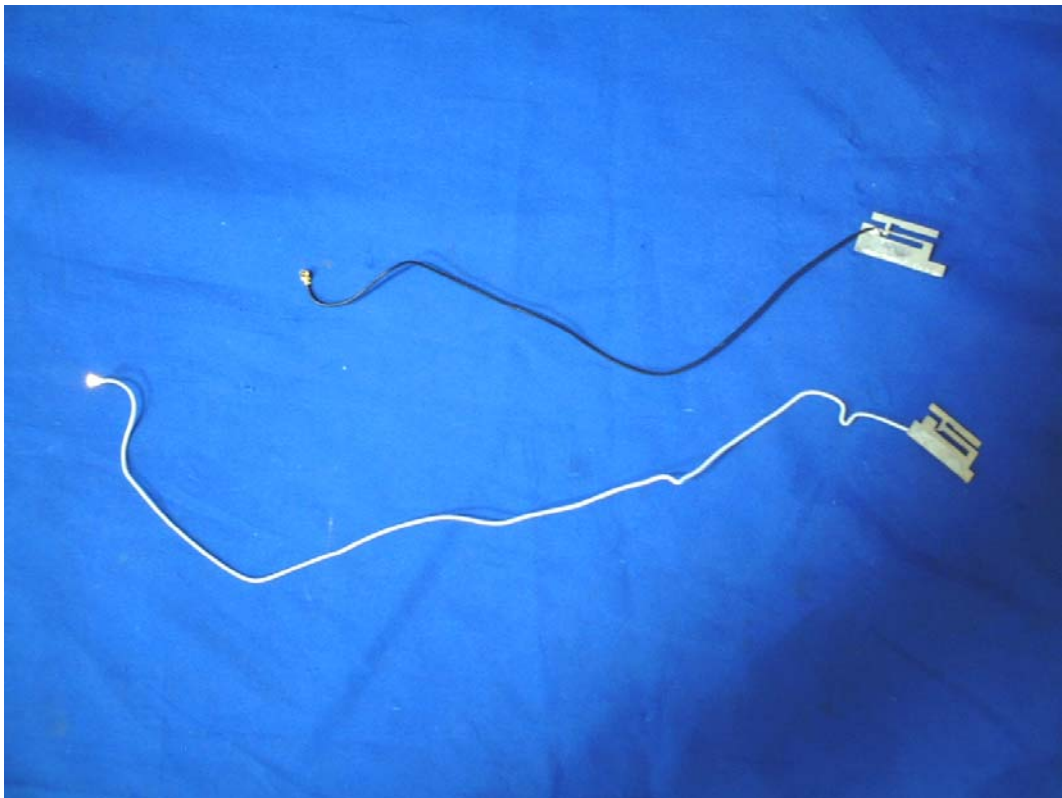
(10) EUT Photo



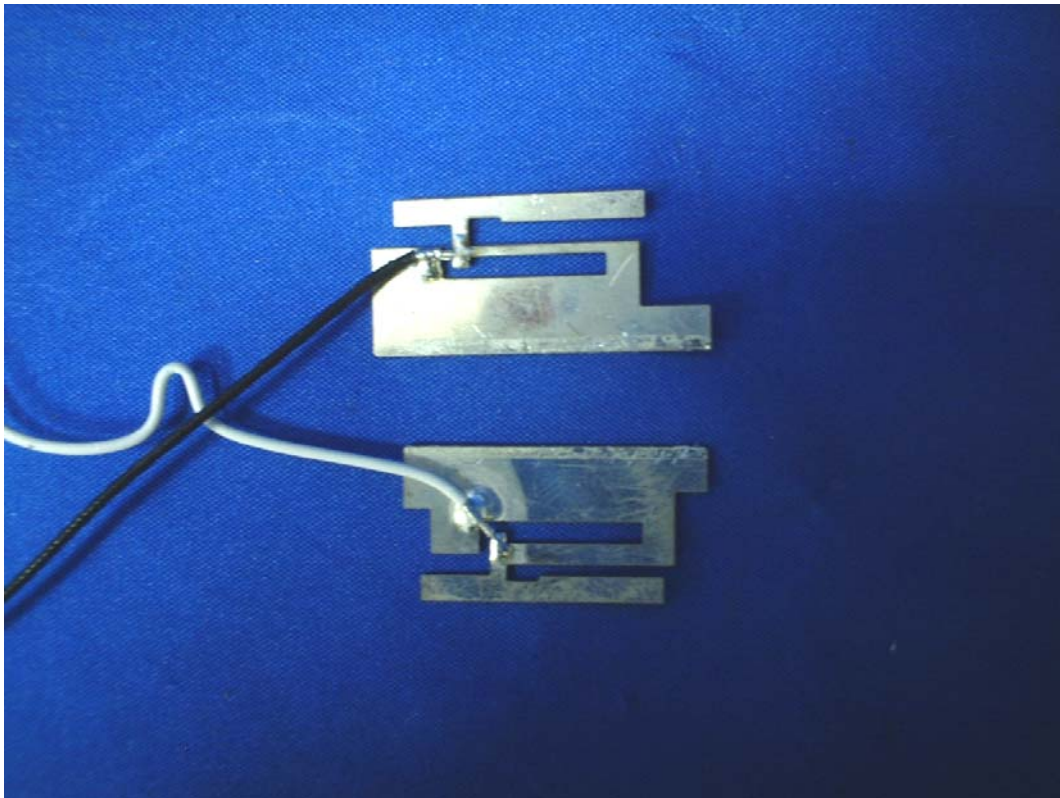
(11) EUT Photo



(12) EUT Photo



(13) EUT Photo



(14) EUT Photo



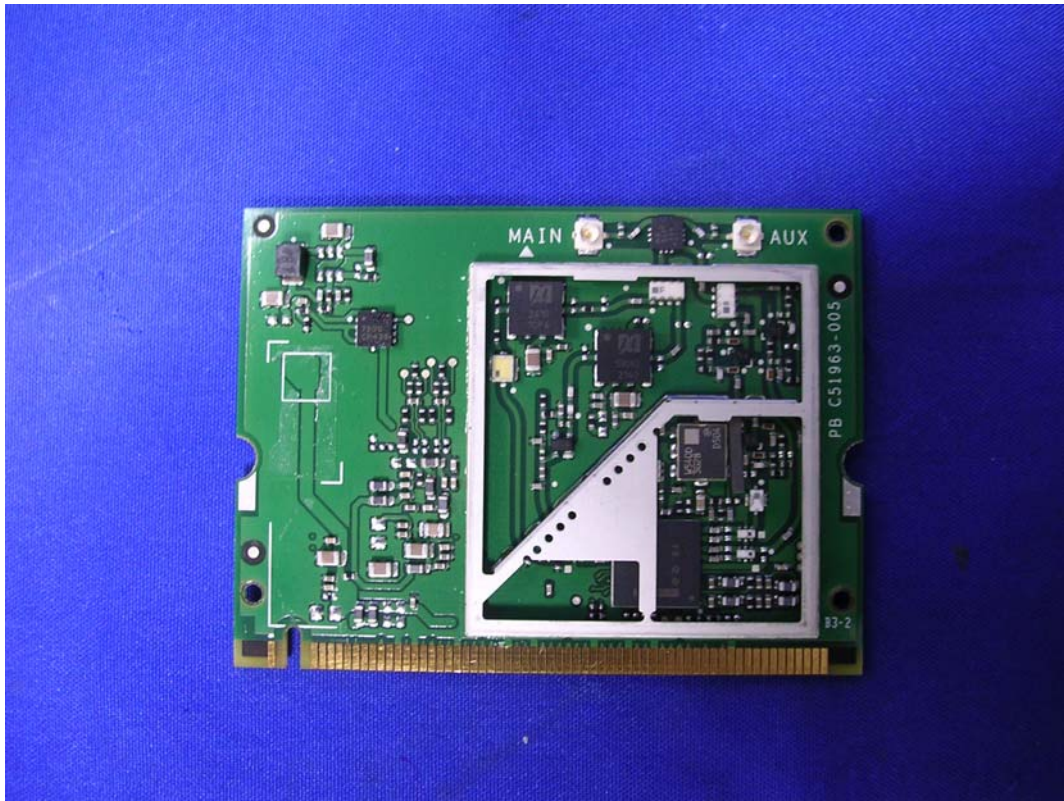
(15) EUT Photo



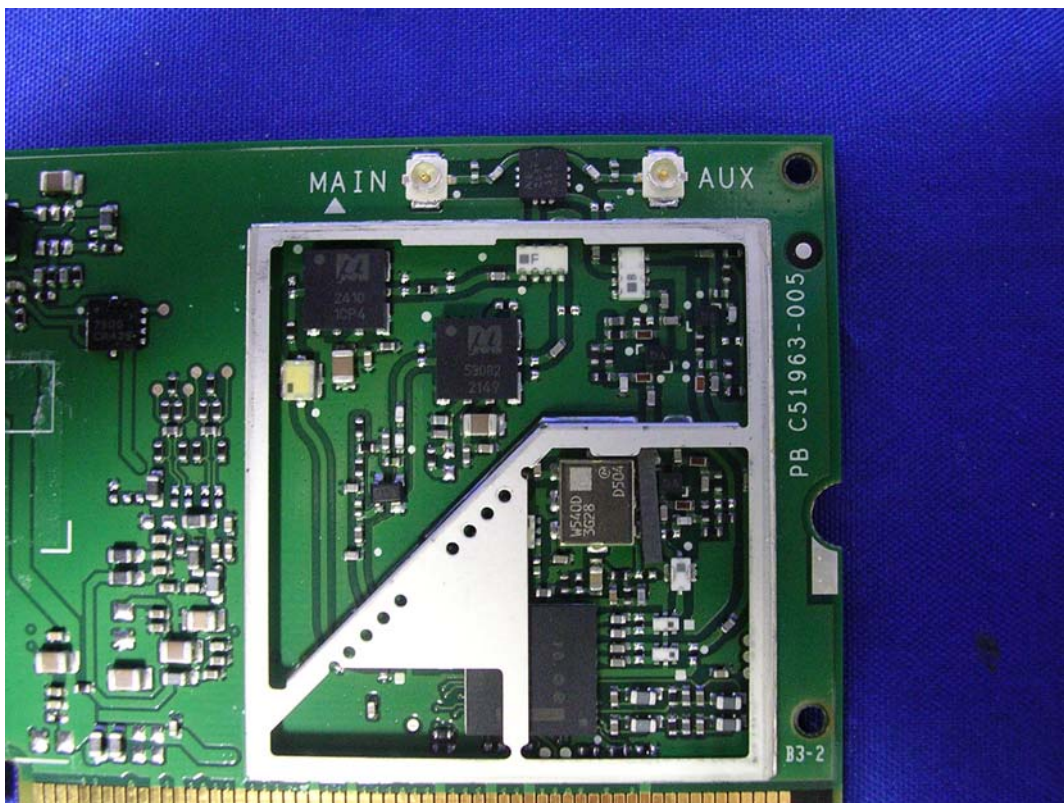
(16) EUT Photo



(17) EUT Photo



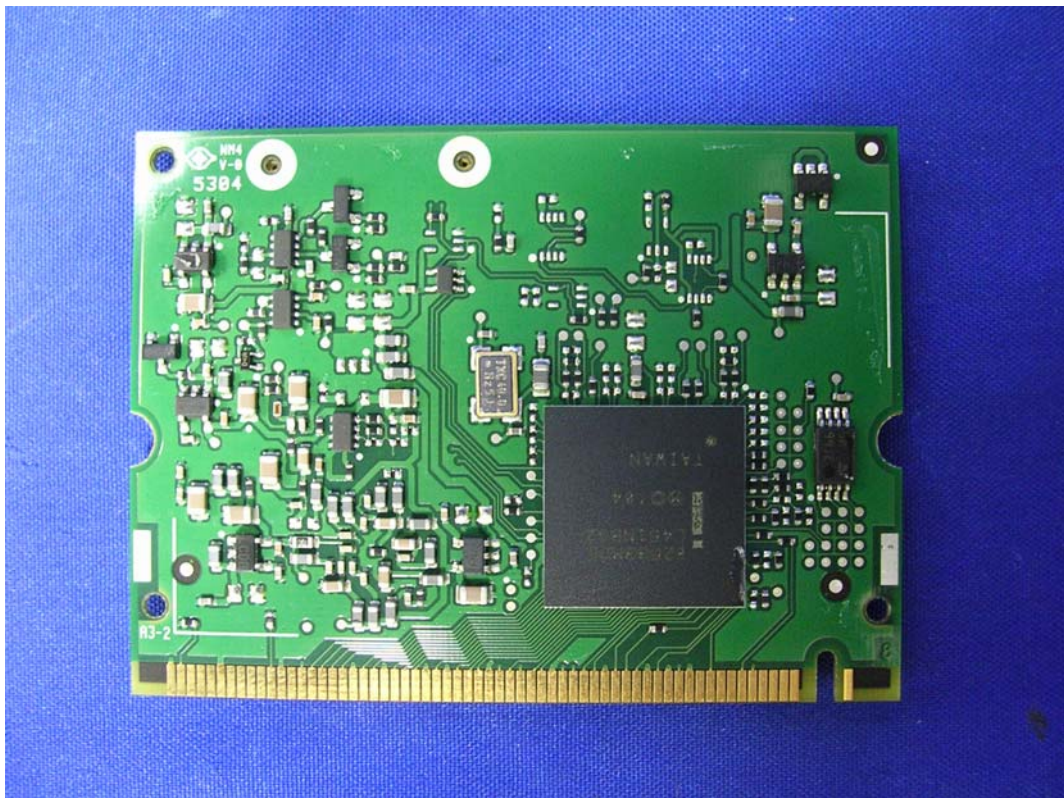
(18) EUT Photo



(19) EUT Photo



(20) EUT Photo



(21) EUT Photo



(22) EUT Photo



(23) EUT Photo

