



**FCC CFR47 PART 27 SUBPART M  
CLASS II PERMISSIVE CHANGE**

**CERTIFICATION TEST REPORT**

**FOR**

**Intel® Centrino® Advanced-N + WiMAX 6250**

**FCC MODEL NUMBER: 622ANXHMW**

**FCC ID: PD9622ANXHU**

**REPORT NUMBER: 09U12989-1, REVISION A**

**ISSUE DATE: MAY 07, 2010**

*Prepared for*  
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*Prepared by*  
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**NVLAP LAB CODE 200065-0**

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
---	01/13/10	Initial Issue	T. Chan
A	05/07/10	Removed Peak-to-Average Ratio Output Power from Section 7.1	T. Chan

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** INTEL CORPORATION  
2111 N. E. 25TH AVENUE  
HILLSBORO, OR 97124, U.S.A.

**EUT DESCRIPTION:** Intel® Centrino® Advanced-N + WiMAX 6250

**FCC MODEL:** 622ANXHMW

**SERIAL NUMBER:** 11S60Y3194

**DATE TESTED:** JANUARY 04 - 07, 2010

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 27 SUBPART M	PASS

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

Tested By:



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THU CHAN  
EMC MANAGER  
COMPLIANCE CERTIFICATION SERVICES

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CHIN PANG  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA/EIA 603C (2004), FCC CFR 47 Part 2, and FCC CFR 47 Part 27M.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

## **5. EQUIPMENT UNDER TEST**

### **5.1. DESCRIPTION OF EUT**

The EUT is a 2x2 WLAN 802.11 a/b/g/n Intel® Centrino® Advanced-N + 1x2 WiMAX 6250 card installed inside Lenovo Mauna Kea netbook.

The radio module is manufactured by Intel Corporation.

### **5.2. MAXIMUM OUTPUT POWER**

The test measurement passed within  $\pm 0.5$ dBm of the original output power.

### **5.3. DESCRIPTION OF CLASS II PERMISSIVE CHANGE**

The major change filed under this application is adding Lenovo Mauna Kea netbook.

### **5.4. DESCRIPTION OF AVAILABLE ANTENNAS**

The radio utilizes a PIFA antenna, with a maximum gain of 1.8 dBi.

### **5.5. SOFTWARE AND FIRMWARE**

The test utility software used during testing was Intel WiMAX VaTU version 5.2.20

### **5.6. WORST-CASE CONFIGURATION AND MODE**

The worst-case channel is determined as the channel with the highest output power.

There were two different Wimax modulations: QPSK and 16QAM with 5MHz and 10MHz bandwidths, To determine the worst case, conducted power were measured on all modulations, as a results, 16QAM was determined to be the worst case.

## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	FL3-C2	1S3508XXXXLRLN319	DoC
AC adapter	Lenovo	42T4416	11S42T4415Z1ZF3A9B3B48	DoC
Vector Signal Generator	Agilent	E4438C	US44271909	DoC

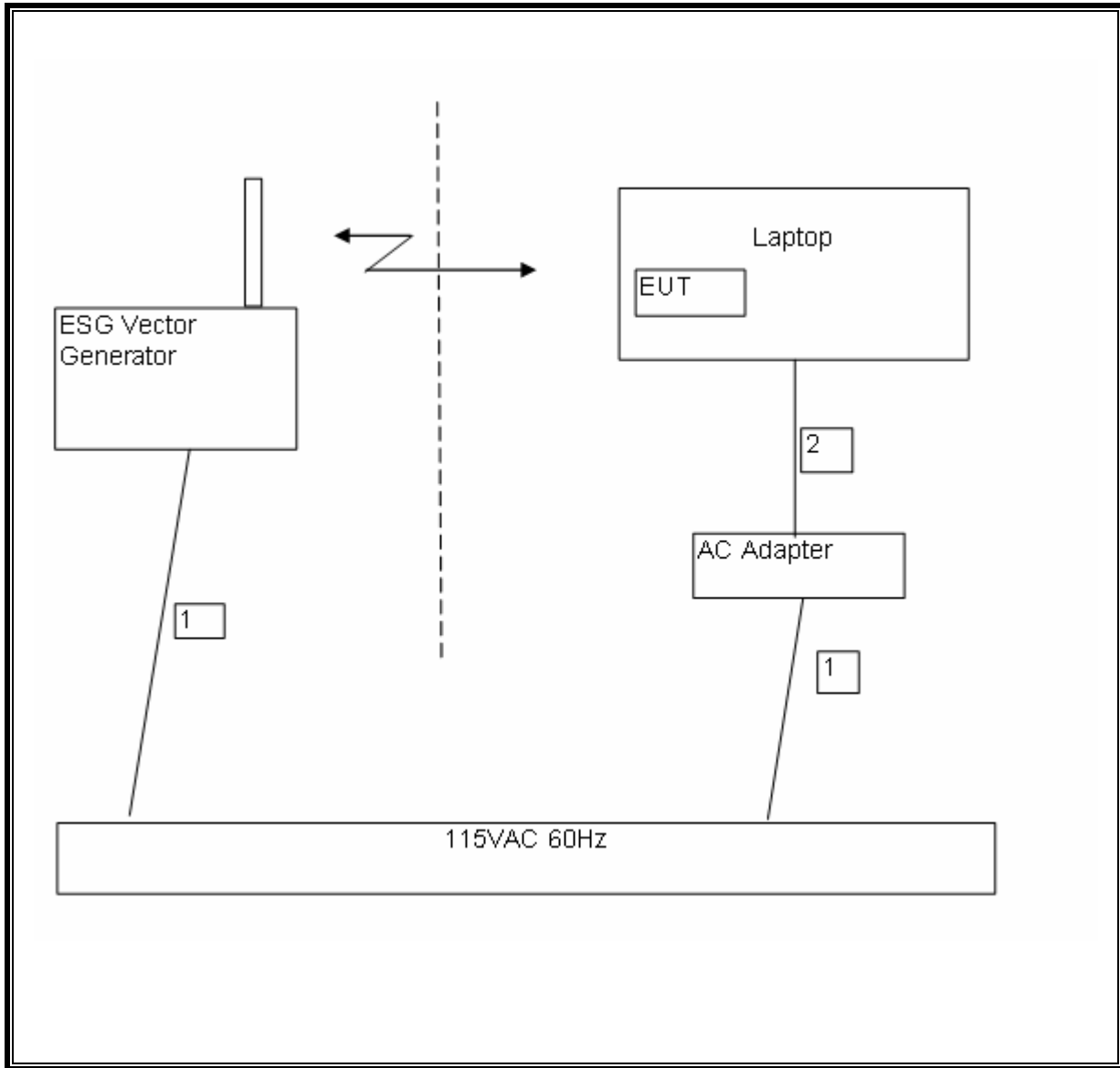
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	2	AC	Un-Shielded	1.8m	N/A
2	DC	1	DC	Un-Shielded	1m	N/A

### TEST SETUP

The EUT is installed inside a host laptop computer during the tests. Test software exercised the radio card.

**SETUP DIAGRAM FOR TESTS**





## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	02/04/10
Antenna, Horn, 18 GHz	EMCO	3115	C00783	01/29/10
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	08/31/10
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00778	01/16/10
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	01/14/10
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/06/10
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	05/06/11
Peak Power Meter	Boonton	4541	C01186	01/19/10
Peak Power Sensor	Boonton	57318	NA	02/02/10
Vector signal generator, 6 GHz	Agilent / HP	E4438C	NA	09/28/11
Highpass Filter, 4.0 GHz	Micro-Tronics	HPM13351	N02708	CNR

## 7. LIMITS AND RESULTS

### 7.1. OUTPUT POWER VERIFICATION

The max average conducted output power is measured for the uplink burst in the OFDM modulation and channel bandwidth. Conducted average output power were measured with the module connected to the test jig with over-the-air communication link to Vector Signal generator.

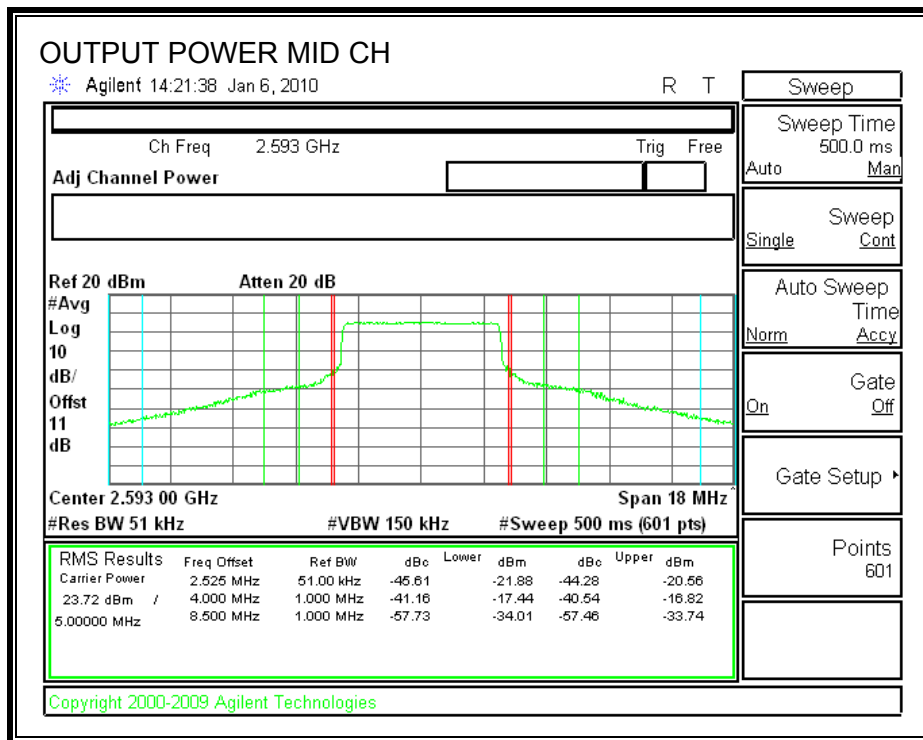
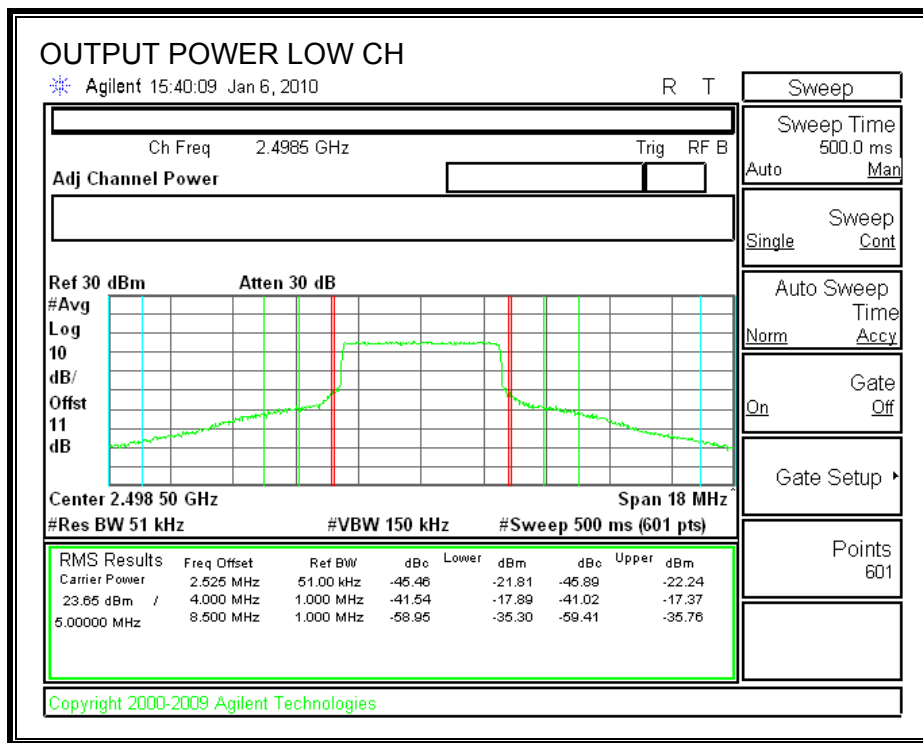
The EUT driver software installed in the host support equipment during testing was WiMAX VaTU, version 5.2.20

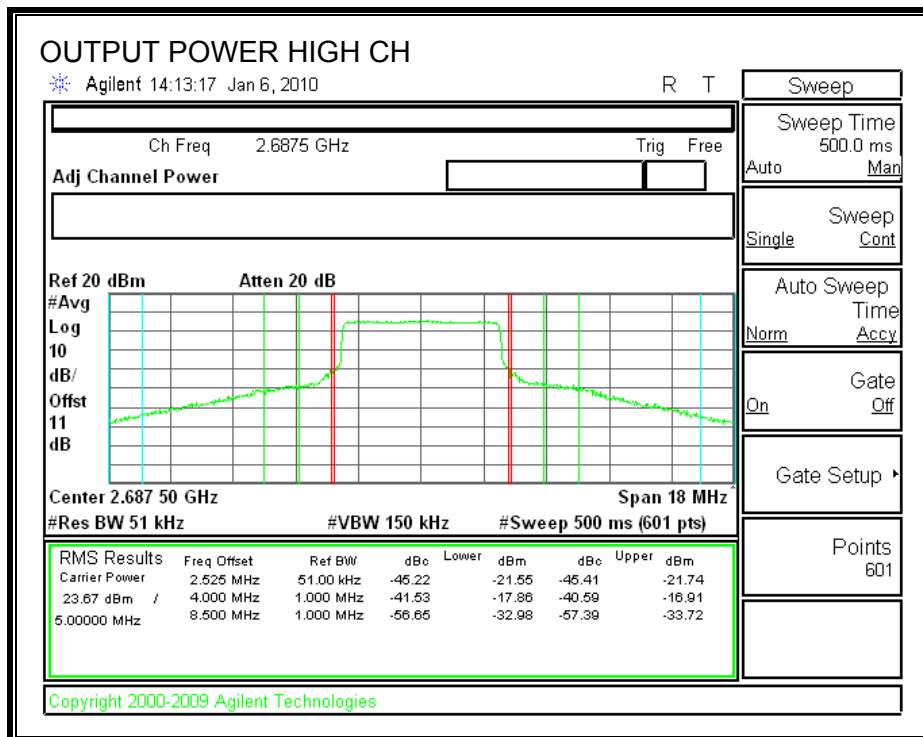
The modes with highest output power channel were chosen for the conducted output power measurement.

Mode	Test Vector file name	Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
5MHz QPSK	DQ64_56_UQ4_12_5M	Low	2498.5	23.65	231.74
		Middle	2593	23.72	235.50
		High	2687.5	23.67	232.81
5MHz 16QAM	DQ4_12_UQ16_34_5M	Low	2498.5	23.76	237.68
		Middle	2593	24.05	254.10
		High	2687.5	23.74	236.59
10MHz QPSK	DQ64_UQ4_12_21S_10M	Low	2501	23.47	222.33
		Middle	2593	23.38	217.77
		High	2685	23.35	216.27
10MHz 16QAM	DQ4_12_UQ16_12_10M	Low	2501	23.58	228.03
		Middle	2593	23.62	230.14
		High	2685	23.57	227.51

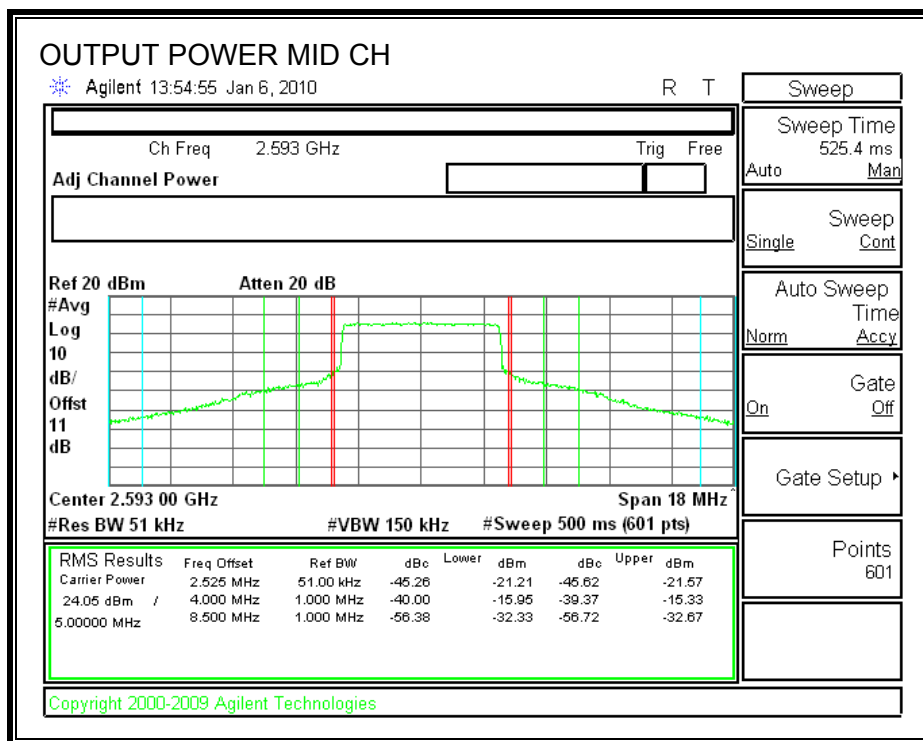
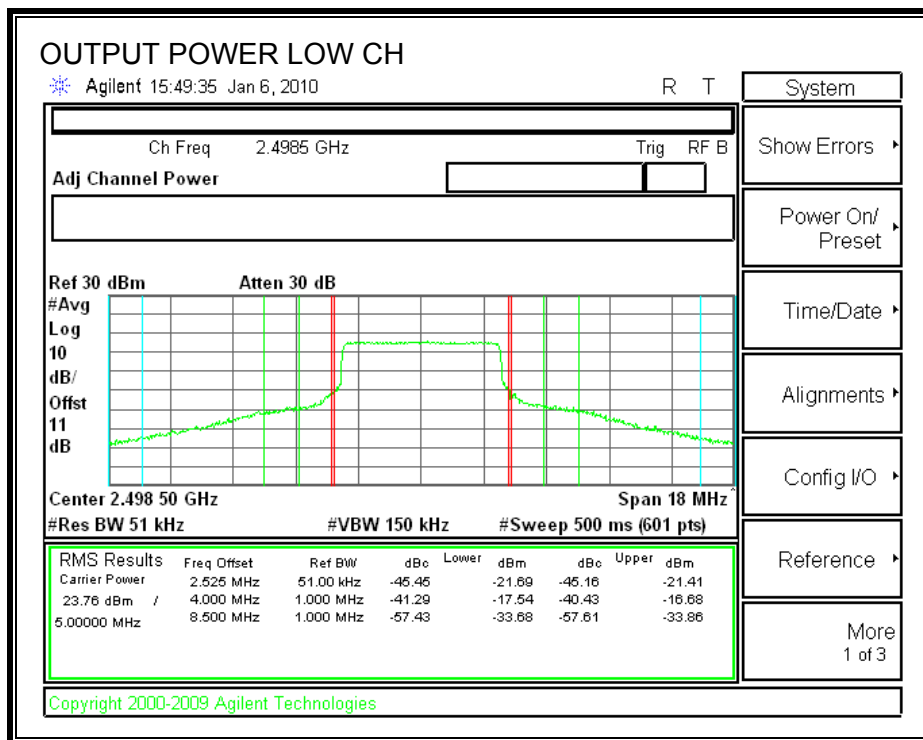
**OUTPUT POWER**

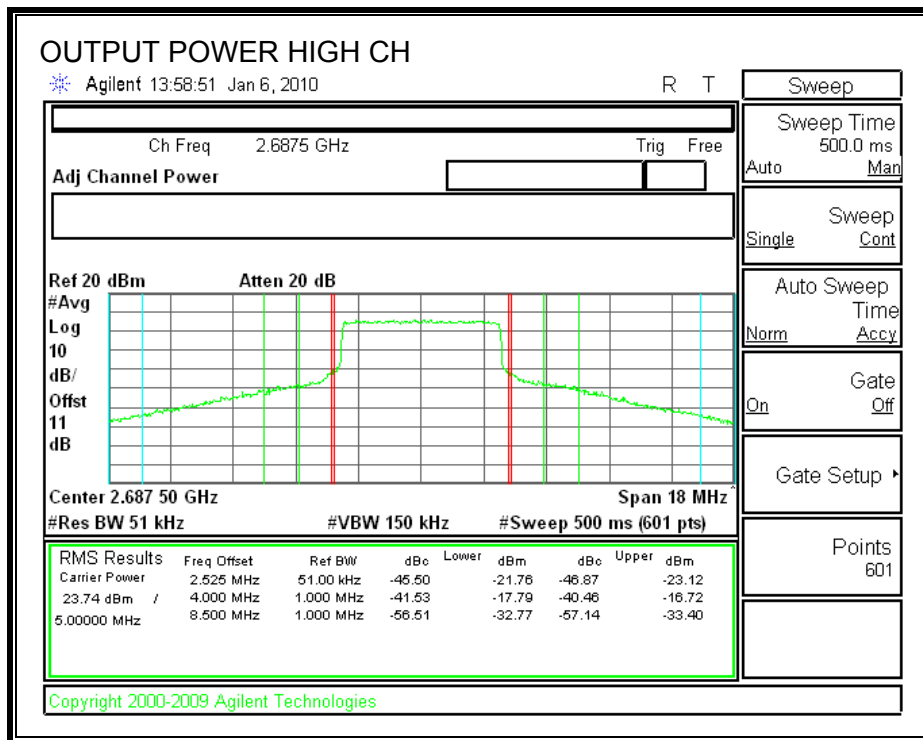
**5MHz QPSK**



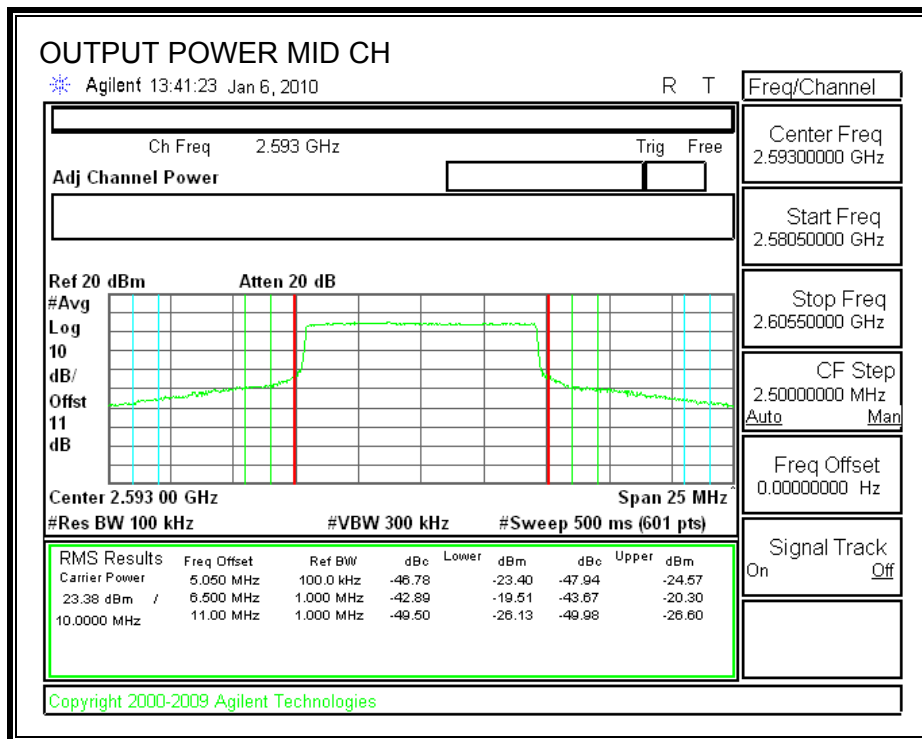
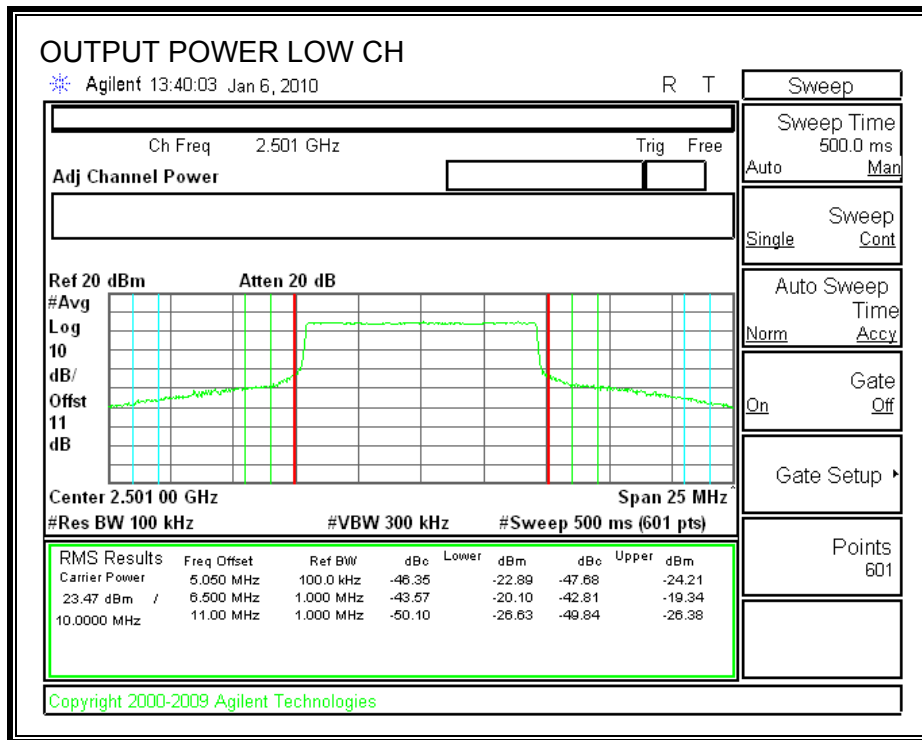


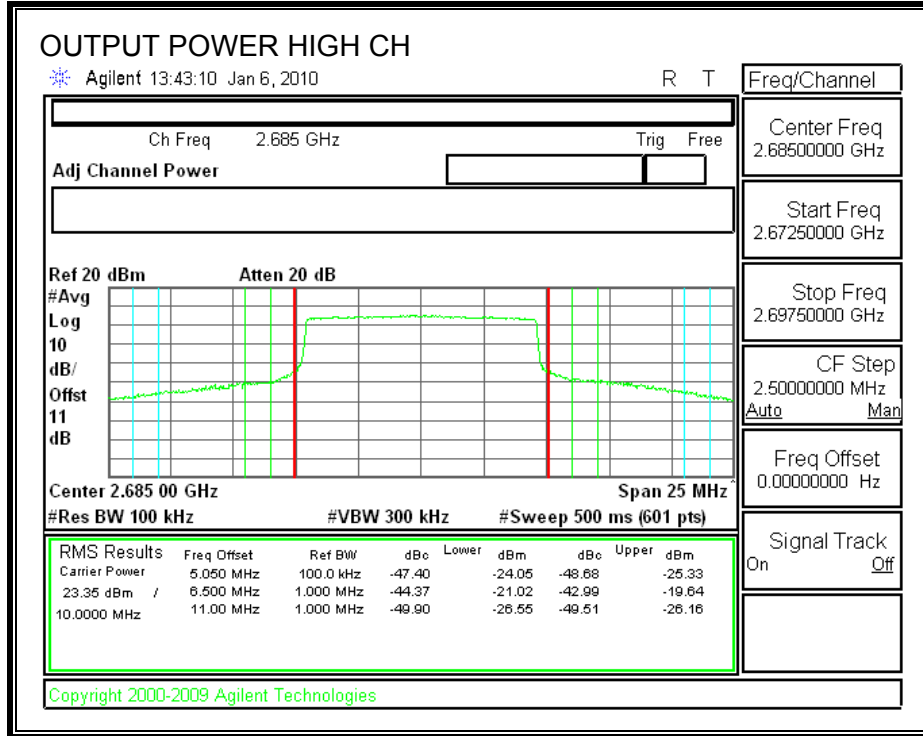
**5MHz 16QAM**





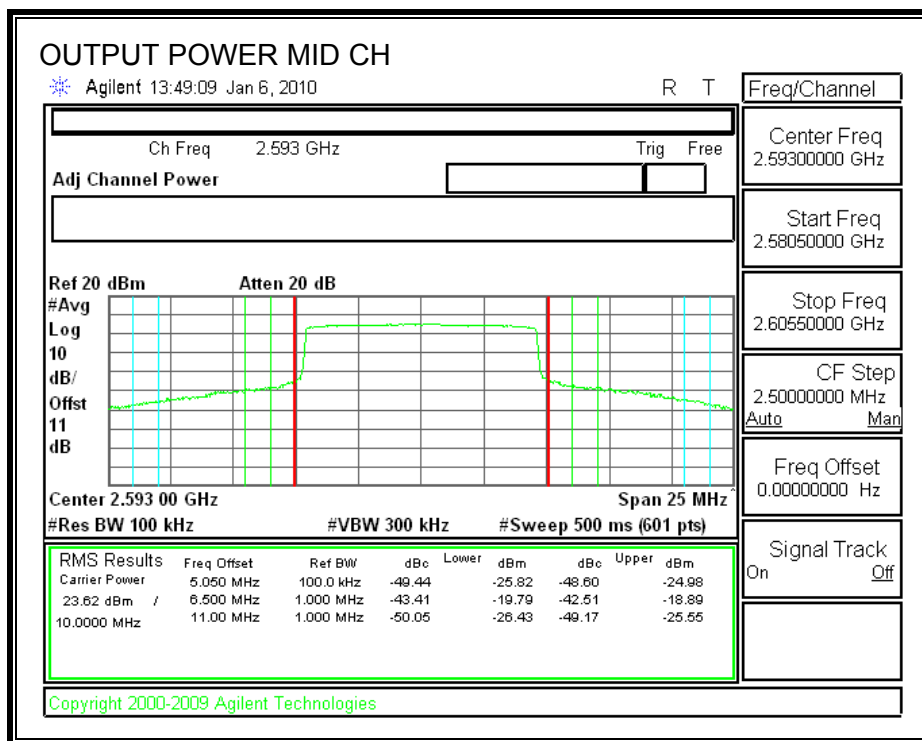
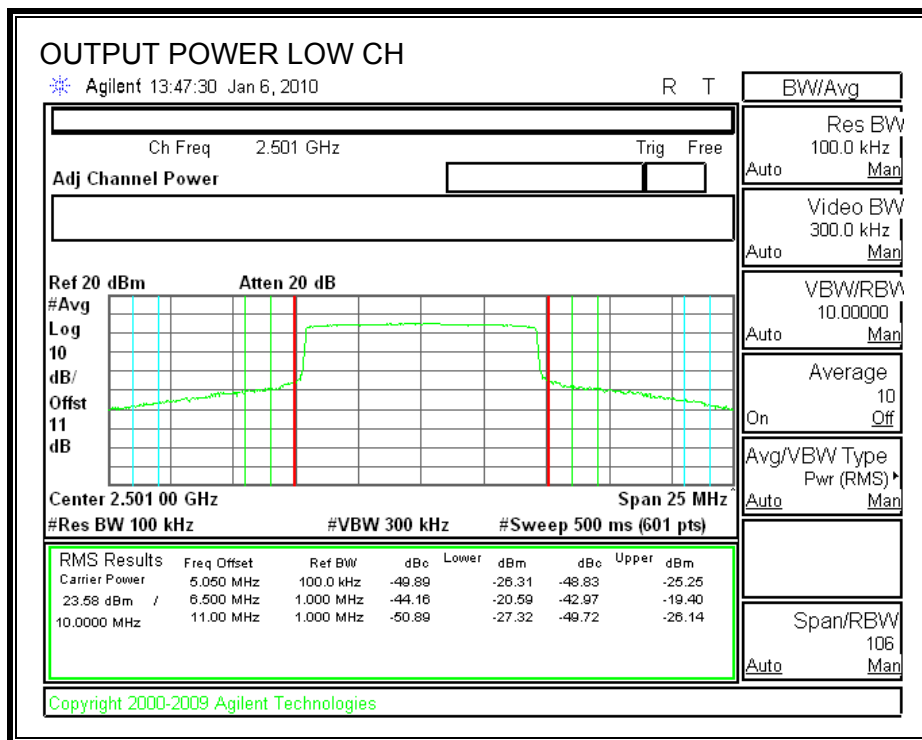
**10MHz QPSK**

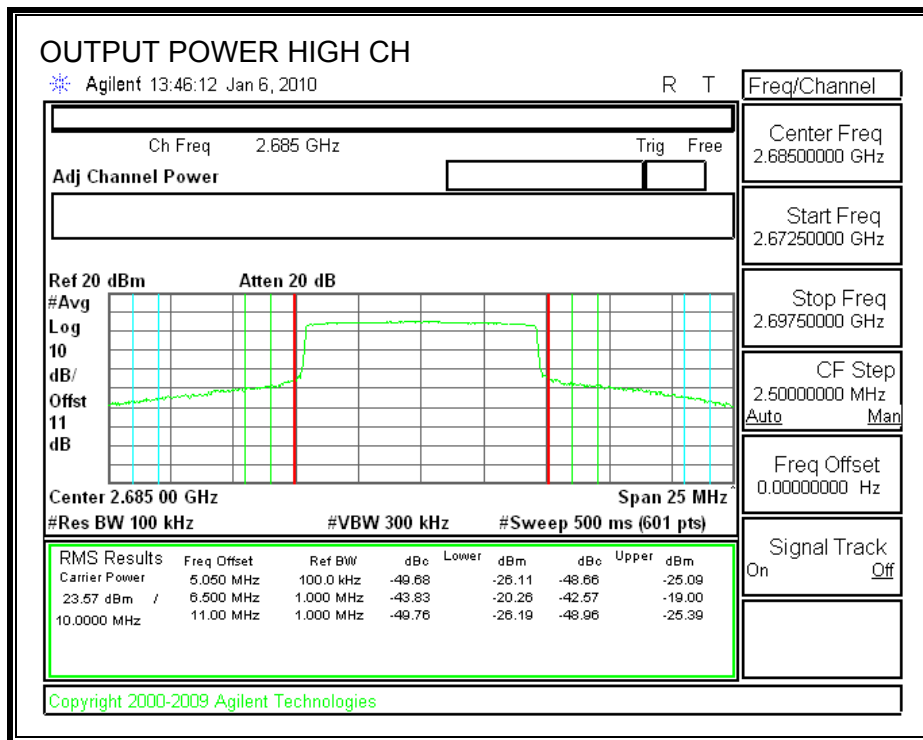






**10MHz 16QAM**





## 7.2. RADIATED OUTPUT POWER

### LIMITS

27.50 (h)(2) Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

### TEST PROCEDURE

ANSI / TIA / EIA 603 Clause 2.2.17& FCC 27

### RESULTS

Mode	Channel	Frequency (MHz)	EIRP (dBm)	EIRP (mW)
5MHz 16QAM	Low	2498.5	25.30	338.84
	Middle	2593	24.80	302.00
	High	2687.5	23.40	218.78
10MHz 16QAM	Low	2501	25.40	346.74
	Middle	2593	25.30	338.84
	High	2685	24.30	269.15

**OUTPUT POWER (EIRP)**

**5MHz\_16QAM**

**Compliance Certification Services**  
 Above 1GHz High Frequency Substitution Measurement

Company: Intel  
 Project #: 09U12989  
 Date: 1/06/2010  
 Test Engineer: Chin Pang  
 Configuration: EUT With Laptop PC  
 Mode: 16QAM\_5MHz

Chamber

Pre-amplifier

Filter

Limit

5m Chamber B

Part 27

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch</b>										
2.4985	-16.5	V	3.0	41.8			25.3	33.0	-7.7	
2.4985	-19.0	H	3.0	39.8			20.8	33.0	-12.2	
<b>Mid Ch</b>										
2.5930	-17.3	V	3.0	42.1			24.8	33.0	-8.2	
2.5930	-19.1	H	3.0	40.4			21.3	33.0	-11.7	
<b>High Ch</b>										
2.6875	-19.0	V	3.0	42.4			23.4	33.0	-9.6	
2.6875	-18.2	H	3.0	41.0			22.8	33.0	-10.2	

Rev. 03.03.09

10MHz\_16QAM

Compliance Certification Services  
 Above 1GHz High Frequency Substitution Measurement

Company: Intel  
 Project #: 09U12989  
 Date: 1/06/2010  
 Test Engineer: Chin Pang  
 Configuration: EUT With Laptop PC  
 Mode: 16QAM\_10MHz

<b>Chamber</b>	<b>Pre-amplifier</b>	<b>Filter</b>	<b>Limit</b>
5m Chamber B			Part 27

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch</b>										
2.501	-16.5	V	3.0	41.8			25.4	33.0	-7.6	
2.501	-18.6	H	3.0	39.8			21.2	33.0	-11.8	
<b>Mid Ch</b>										
2.593	-16.8	V	3.0	42.1			25.3	33.0	-7.7	
2.593	-18.9	H	3.0	40.4			21.5	33.0	-11.5	
<b>High Ch</b>										
2.685	-18.1	V	3.0	42.4			24.3	33.0	-8.7	
2.685	-19.3	H	3.0	41.0			21.7	33.0	-11.3	

Rev. 03.03.09

### **7.3. FIELD STRENGTH OF SPURIOUS RADIATION**

#### **LIMIT**

§27.53 (m)(4) For mobile digital stations, the attenuation factor shall be not less than  $43 + 10 \log (P)$  dB at the channel edge and  $55 + 10 \log (P)$  dB at 5.5 megahertz from the channel edges.

#### **TEST PROCEDURE**

ANSI / TIA / EIA 603 Clause 3.2.12 & FCC 27

#### **RESULTS**

**SPURIOUS & HARMONIC**

**Below 1GHz (Worst Case)**

**Compliance Certification Services**  
 30 - 1000MHz Substitution Measurement

Company: Intel  
 Project #: 09U12989  
 Date: 1/5/2010  
 Test Engineer: Chin Pang  
 Configuration: EUT only  
 Mode: below 1GHz

Chamber

5m Chamber B

Pre-amplifier

T10 8447D

Filter

Limit

Part 27

f MHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
184.40	-54.5	V	3.0	22.5	29.2		-59.1	-25.0	-34.1	
216.00	-61.2	V	3.0	21.6	29.1		-66.5	-25.0	-41.5	
348.00	-64.0	V	3.0	24.4	29.0		-66.5	-25.0	-41.5	
372.00	-65.0	V	3.0	24.9	29.1		-67.1	-25.0	-42.1	
470.00	-64.5	V	3.0	26.8	29.6		-65.1	-25.0	-40.1	
47.57	-62.8	H	3.0	40.8	29.6		-49.5	-25.0	-24.5	
185.80	-53.9	H	3.0	19.2	29.2		-61.8	-25.0	-36.8	
209.30	-61.0	H	3.0	17.4	29.1		-70.6	-25.0	-45.6	
372.00	-65.0	H	3.0	22.7	29.1		-69.2	-25.0	-44.2	
470.00	-64.2	H	3.0	24.2	29.6		-67.4	-25.0	-42.4	

Rev. 03.03.09

**ABOVE 1 GHz**

**5MHz\_16QAM**

Compliance Certification Services  
 Above 1GHz High Frequency Substitution Measurement

Company: Intel  
 Project #: 09U12989  
 Date: 1/05/2010  
 Test Engineer: Chin Pang  
 Configuration: EUT With Laptop PC  
 Mode: 16QAM\_5MHz

Chamber

Pre-amplifier

Filter

Limit

5m Chamber B

T145 8449B

Filter 1

Part 27

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>2498.5MHz</b>										
4.997	-54.3	H	3.0	48.9	35.3	1.0	-39.7	-25.0	-14.7	
7.495	-58.0	H	3.0	53.1	35.7	1.0	-39.6	-25.0	-14.6	
4.997	-55.5	V	3.0	48.3	35.3	1.0	-41.5	-25.0	-16.5	
7.495	-57.0	V	3.0	51.4	35.7	1.0	-40.3	-25.0	-15.3	
<b>2593MHz</b>										
5.186	-59.4	H	3.0	49.4	35.3	1.0	-44.4	-25.0	-19.4	
7.779	-60.5	H	3.0	53.4	35.7	1.0	-41.8	-25.0	-16.8	
5.186	-58.1	V	3.0	48.8	35.3	1.0	-43.7	-25.0	-18.7	
7.779	-59.2	V	3.0	51.8	35.7	1.0	-42.1	-25.0	-17.1	
<b>2687.5MHz</b>										
5.375	-56.8	H	3.0	49.7	35.4	1.0	-41.5	-25.0	-16.5	
8.062	-53.7	H	3.0	53.7	35.7	1.0	-34.6	-25.0	-9.6	
5.375	-56.0	V	3.0	49.0	35.4	1.0	-41.4	-25.0	-16.4	
8.062	-52.5	V	3.0	52.1	35.7	1.0	-35.1	-25.0	-10.1	

Rev. 03.03.09  
 Note: No other emissions were detected above the system noise floor.



10MHz\_16QAM

Compliance Certification Services  
 Above 1GHz High Frequency Substitution Measurement

Company: Intel  
 Project #: 09U12989  
 Date: 1/05/2010  
 Test Engineer: Chin Pang  
 Configuration: EUT With Laptop PC  
 Mode: 16QAM\_10MHz

<b>Chamber</b>	<b>Pre-amplifier</b>	<b>Filter</b>	<b>Limit</b>
5m Chamber B	T145 8449B	Filter 1	Part 27

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>2501MHz</b>										
5.002	-57.5	H	3.0	48.9	35.3	1.0	-42.9	-25.0	-17.9	
7.503	-61.0	H	3.0	53.1	35.7	1.0	-42.6	-25.0	-17.6	
5.002	-58.5	V	3.0	48.3	35.3	1.0	-44.5	-25.0	-19.5	
7.503	-58.8	V	3.0	51.4	35.7	1.0	-42.1	-25.0	-17.1	
<b>2593MHz</b>										
5.186	-57.8	H	3.0	49.4	35.3	1.0	-42.8	-25.0	-17.8	
7.779	-59.2	H	3.0	53.4	35.7	1.0	-40.5	-25.0	-15.5	
5.186	-60.0	V	3.0	48.8	35.3	1.0	-45.6	-25.0	-20.6	
7.779	-61.2	V	3.0	51.8	35.7	1.0	-44.1	-25.0	-19.1	
<b>2685MHz</b>										
5.370	-57.7	H	3.0	49.7	35.4	1.0	-42.4	-25.0	-17.4	
8.055	-59.5	H	3.0	53.7	35.7	1.0	-40.5	-25.0	-15.5	
5.370	-58.5	V	3.0	49.0	35.4	1.0	-43.9	-25.0	-18.9	
8.055	-60.3	V	3.0	52.1	35.7	1.0	-42.9	-25.0	-17.9	

Rev. 03.03.09  
 Note: No other emissions were detected above the system noise floor.

## 8. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

### TEST PROCEDURE

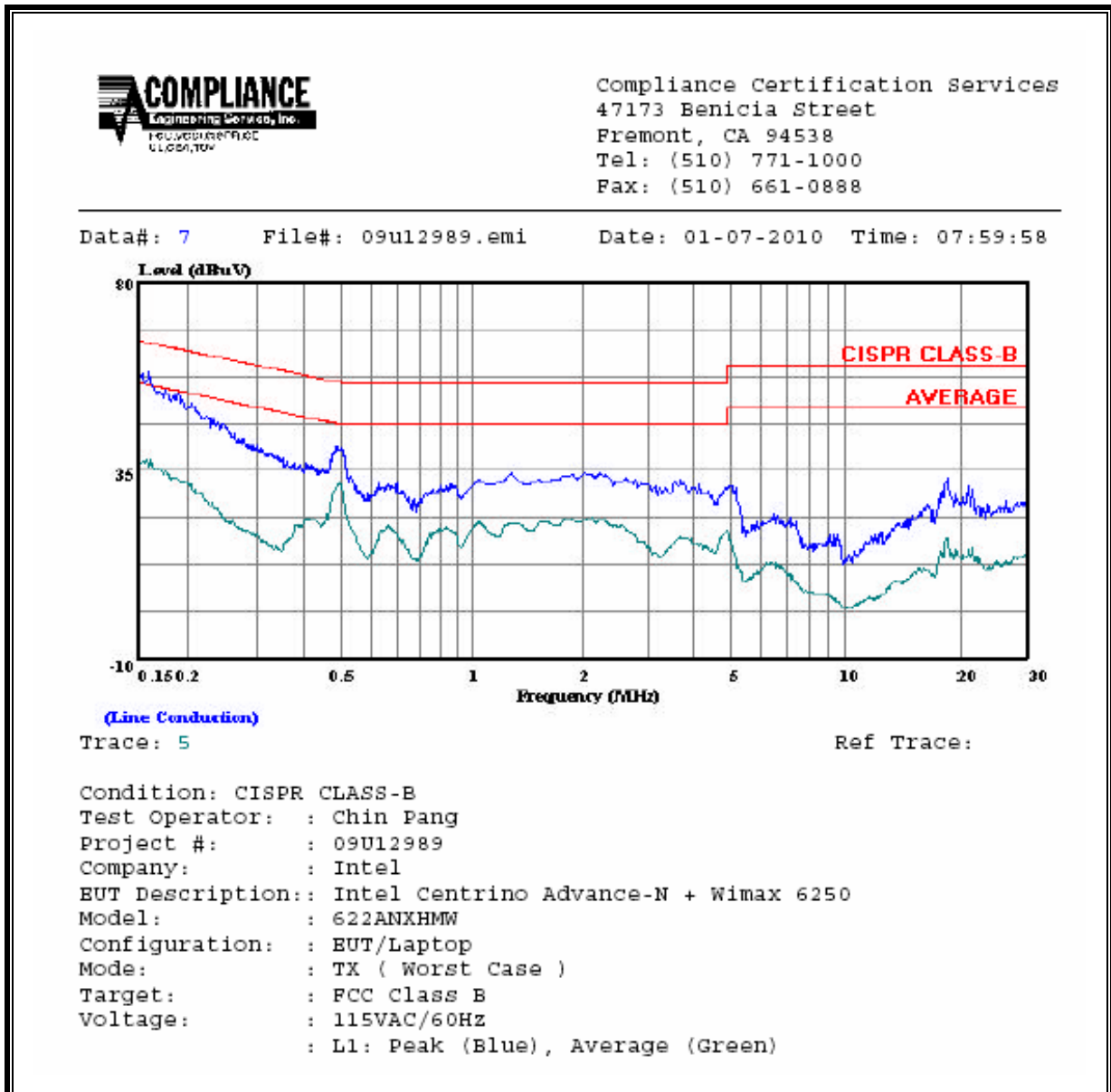
ANSI C63.4

### RESULTS

#### 6 WORST EMISSIONS

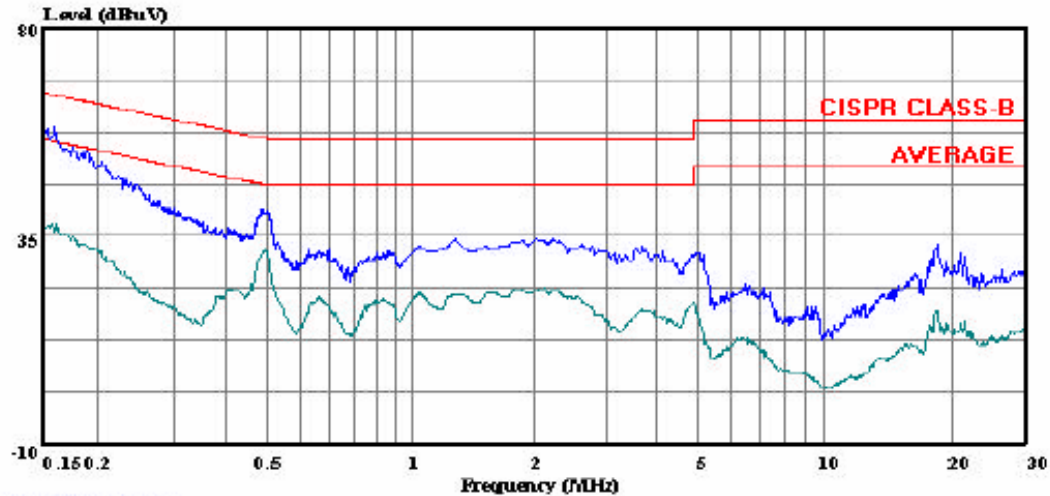
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq. (MHz)	Reading			Class (dB)	Limit QP	EN B AV	Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)				QP (dB)	AV (dB)	
0.16	58.50	--	37.47	0.00	65.41	55.41	-6.91	-17.94	L1
0.49	40.76	--	31.99	0.00	56.10	46.10	-15.34	-14.11	L1
2.38	33.94	--	23.32	0.00	56.00	46.00	-22.06	-22.68	L1
0.16	56.45	--	35.97	0.00	65.62	55.62	-9.17	-19.65	L2
0.50	40.80	--	32.00	0.00	56.05	46.05	-15.25	-14.05	L2
2.59	33.88	--	22.00	0.00	56.00	46.00	-22.12	-24.00	L2
6 Worst Data									

**LINE 1 RESULTS**



Compliance Certification Services  
47173 Benicia Street  
Fremont, CA 94538  
Tel: (510) 771-1000  
Fax: (510) 661-0888

Data#: 7 File#: 09U12989.emi Date: 01-07-2010 Time: 07:59:58



(Line Conduction)

Trace: 5

Ref Trace:

Condition: CISPR CLASS-B  
Test Operator: : Chin Pang  
Project #: : 09U12989  
Company: : Intel  
EUT Description: : Intel Centrino Advance-N + Wimax 6250  
Model: : 622ANXHMW  
Configuration: : EUT/Laptop  
Mode: : TX ( Worst Case )  
Target: : FCC Class B  
Voltage: : 115VAC/60Hz  
: L1: Peak (Blue), Average (Green)

**LINE 2 RESULTS**

