

**CLASS II PERMISSIVE CHANGE  
MEASUREMENT REPORT  
of  
*Wireless Ethernet Router***

**Applicant** : ASUSTek Computer Inc.  
**EUT** : Wireless Router  
**Model No.** : WL-520G  
**FCC ID** : MSQWL520G

Tested by :

***Training Research Co., Ltd.***

**TEL : 886-2-26935155      FAX : 886-2-26934440**

No. 255, Nanyang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C.


# CERTIFICATION

**We here by verify that:**

The test data, data evaluation, test procedures and equipment configurations shown in this report were made mainly in accordance with the procedures given in ANSI C63.4 (2003) as a reference. All test were conducted by *Training Research Co., Ltd.*, 255 Nanyang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C. Also, we attest to the accuracy of each.

We further submit that the energy emitted by the sample EUT tested as described in the report is **in compliance with** the technical requirements set forth in the FCC Rules Part 15 Subpart B (Declaration of Conformity) and C Section 15.247.

**Applicant** : ASUSTek Computer Inc.  
**Applicant Address** : 4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan, R.O.C.  
**Product Name** : 125 High Speed Wireless Router  
**Model** : WL-520G  
**Report No.** : A5415050256  
**Test Date** : March 14, 2006

Prepared by:   
Jack Tsai

Approved by:   
Frank Tsai

**Conditions of issue :**

- (1) **This test report shall not be reproduced except in full, without written approval of TRC. And the test result contained within this report only relate to the sample submitted for testing.**
- (2) **This report must not be used by the client to claim product endorsement by NVLAP or any agency of U.S. Government.**
- (3) **This test report, measurements made by TRC are traceable to the NIST only Conducted and Radiated Method.**



## *Federal Communications Commission*

### **Declaration of Conformity**

for the following equipment:

Product name : 125 High Speed Wireless Router  
 Model name : WL-520G  
 Trade name : ASUS

Is herewith confirmed and found to comply with the requirements of CFR 47 part15 Subpart B - Unintentional Radiators regulation. The results of electromagnetic mission evaluation are shown in the report number : A5415060015

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation

<i><b>Manufacturer</b></i>	<i><b>USA local representative</b></i>
<b>Company name:</b> ASUSTeK Computer Inc.	To be determined
<b>Computer address:</b> 4/F, 150, Li-Te Rd., Peitou, Taipei, Taiwan	
<b>ZIP / Postal code</b> 112	
<b>Contact person:</b> Lawrence Yu	
<b>Title:</b> Manager	
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## I . GENERAL

### 1.1 Introduction

The following measurement report is submitted on behalf of applicant in support that the certification in accordance with Part 2 Subpart J and Part 15 Subpart A, B and C of the Commission's Rules and Regulations.

### 1.2 Description of EUT

<b>FCC ID</b>	:	MSQWL520G
<b>Product Name</b>	:	125 High Speed Wireless Router
<b>Model Name</b>	:	WL-520G
<b>Frequency Range</b>	:	2.412GHz ~ 2.462GHz
<b>Support Channel</b>	:	11 Channels
<b>Modulation Skill</b>	:	DBPSK, DQPSK, CCK, OFDM
<b>Power Type</b>	:	Powered by the AC-DC adapter (1) or (2) or (3), 1) Model: DV-0980S-B20 [ DVE ] I/P: 120VAC, 60Hz, 14W O/P: 9VDC, 800mA 190cm length, non-shielded, no ferrite core 2) Model: 480910003CT [ LEI ] I/P: 120VAC 60Hz 15.5W O/P: 9.0VDC 1000mA 185cm length, non-shielded, no ferrite core 3) Model: AM-0900800D41 [ AMIGO ] I/P: 120VAC 60Hz 15W O/P: 9VDC 800mA 186cm length, non-shielded, no ferrite core
<b>Data Cable</b>	:	RJ45 cable x1, 60cm length, non-shielded, no ferrite core RJ45 cable x3, 1m length, non-shielded, no ferrite core RJ45 cable x1, 30m length, non-shielded, no ferrite core

### **1.3 Test method**

- 1.3.1 The LAN1, LAN2 and LAN3 ports of EUT are termination by RJ45 cables.
- 1.3.2 The WAN port connected to far Hub.
- 1.3.3 Connected the LAN4 port of EUT with the LAN card of PC. Using PC and software provided by the manufacturer to control EUT, the test is performed under the specific conditions.
- 1.3.4 Set different data rate and channel (CH01/CH06/CH11) being tested
  - (a) Radiated for Intentional test:
    - making EUT to the mode of continuous transmission
  - (b) Conducted test and Radiated for unintentional test:
    - making EUT to the linking (Rx/Tx) mode with far support equipments

### 1.4 Description of Support Equipment

In order to construct the minimum testing, following equipment were used as the support units.

**PC** : **IBM 8434**  
Model No. : IVG  
Serial No. : 99CCZG9  
FCC ID : N/A, DoC (Declaration of Confirmation) Approved  
BSMI : R33026  
Power type : 100 ~ 127VAC/6A, 200 ~ 240VAC/3A, 50 ~ 60Hz, Switching  
Power cord : Non-shielded, 1.8m length, Plastic hood, No ferrite core

**Monitor** : **HP 15' Color Monitor**  
Model No. : D8894A  
Serial No. : CN02364355  
FCC ID : ARSCM356N  
BSMI : 3882A031  
Power type : 100 ~ 240 VAC / 1.5A, 50 ~ 60 Hz, Switching  
Power cord : Non-shielded, 1.80m length, Plastic hood, No ferrite core  
Data cable : Shielded, 1.50m length, Plastic hood, with ferrite core

**LAN Card** : **D-Link**  
Model No. : DFE-530TX  
Serial No. : 0050BAE32FF3  
FCC ID : N/A, DoC Approved

**Printer** : **EPSON**  
Model No. : B241A  
Serial No. : FAPY155090  
FCC ID : N/A, DoC Approved  
BSMI : R33126  
Power type : Switching adaptor  
Power cord : Non-shielded, 198cm length, No ferrite core  
Data cable : Shielded, 1.50m length, No ferrite core

**PS/2 Mouse** : **HP**  
Model No. : M-S69  
Serial No. : 334684-002 323614-001  
FCC ID : DoC Approved  
BSMI : R41126  
Power type : By PC  
Power cord : Shielded, 1.90m length, No ferrite core

**PS/2 Keyboard** : **HP**  
Model No. : 5181  
Serial No. : BE21700405  
FCC ID : DoC Approved  
BSMI : 3892C981  
Power type : By PC  
Data cable : Shielded, 1.73m length, no ferrite core

**Modem** : **ACEEX**  
Model No. : DM-1414  
Serial No. : 9010583  
FCC ID : IFAXDM1414  
Power type : Linear  
Power cord : Non-shielded, 1.9m length, No ferrite cord  
Data cable : RS232, Shielded, 1.2m length, No ferrite core  
RJ11C x 2, 7' length non-shielded, No ferrite core

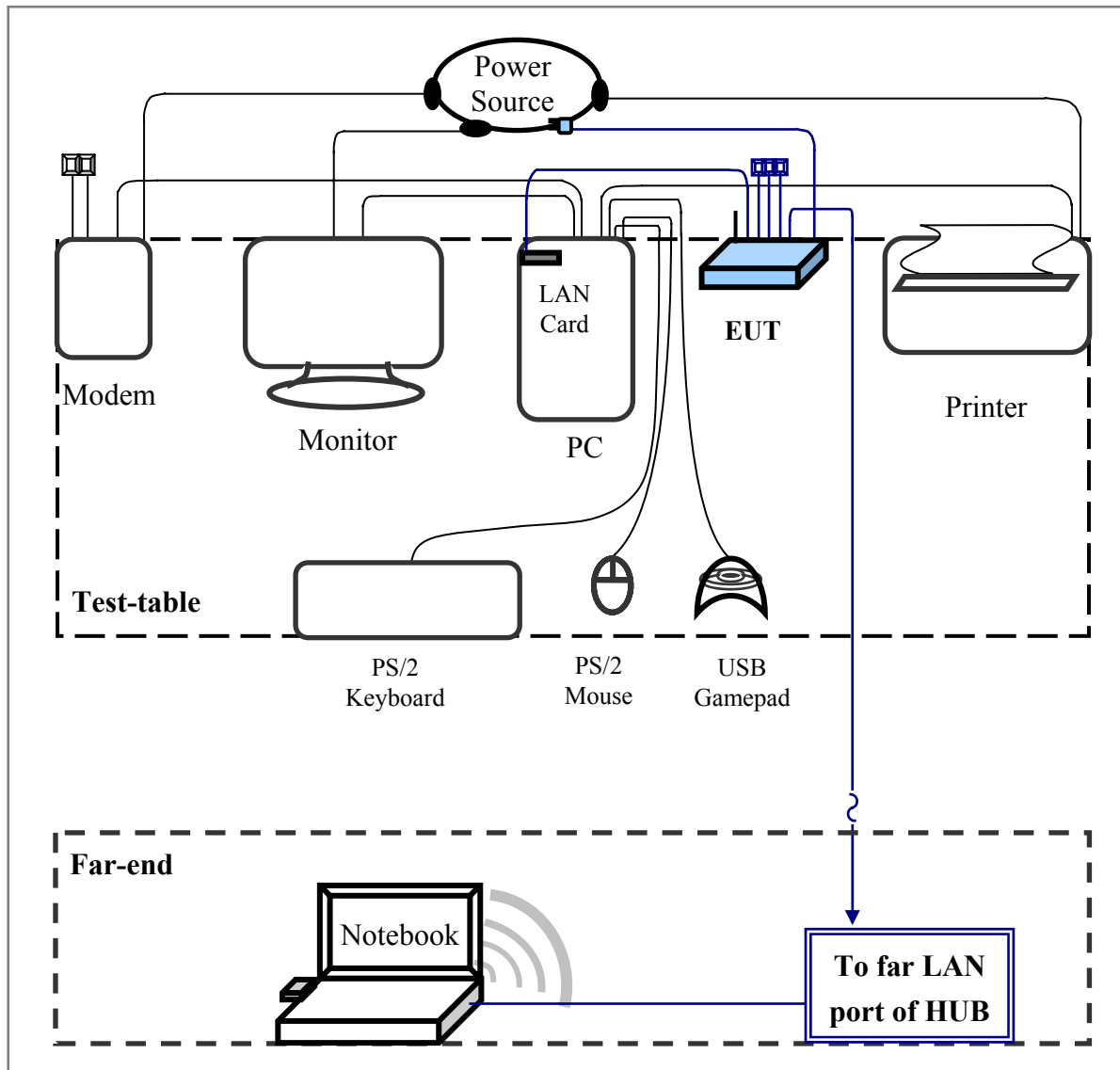
**USB Game pad** : **Logitech**  
Model No. : G-UC3B  
Serial No. : AE3500500  
FCC ID : DoC Approved  
BSMI : 4902A047  
Power type : Powered by PC  
Power Cable : Shielded, 187cm length, Plastic hood, No ferrite core.



**Notebook PC** : **Twinhead**  
Model No. : N222S  
Serial No. : SY3261000988  
FCC ID : DoC (Declaration of Confirmation) Approved  
BSMI : 71001018  
**Power adaptor** : **LI Shin International Enterprise Corp.**  
Model No. : LSE9802A2060  
Serial No. : A20231065818  
BSMI : 3882B381  
Power type : 100 ~ 240VAC / 50 ~ 60Hz, 1.5A, Switching  
Power cord : Non-shielded, 1.0m length, Plastic hood, No ferrite core  
(Main power to adaptor)  
Shielded, 1.5m length, Plastic hood, ferrite core  
(DC plug to adaptor)  
  
**WLAN Card** : **Gemtek Technology Co., Ltd.**  
Model No. : C911003  
FCC ID : MXF-C911003  
  
**HUB** : **ASUS**  
Model No. : GX2048  
FCC ID : None (CE approval)  
Power type : Switching adaptor

### 1.5 Configuration of System Under Test

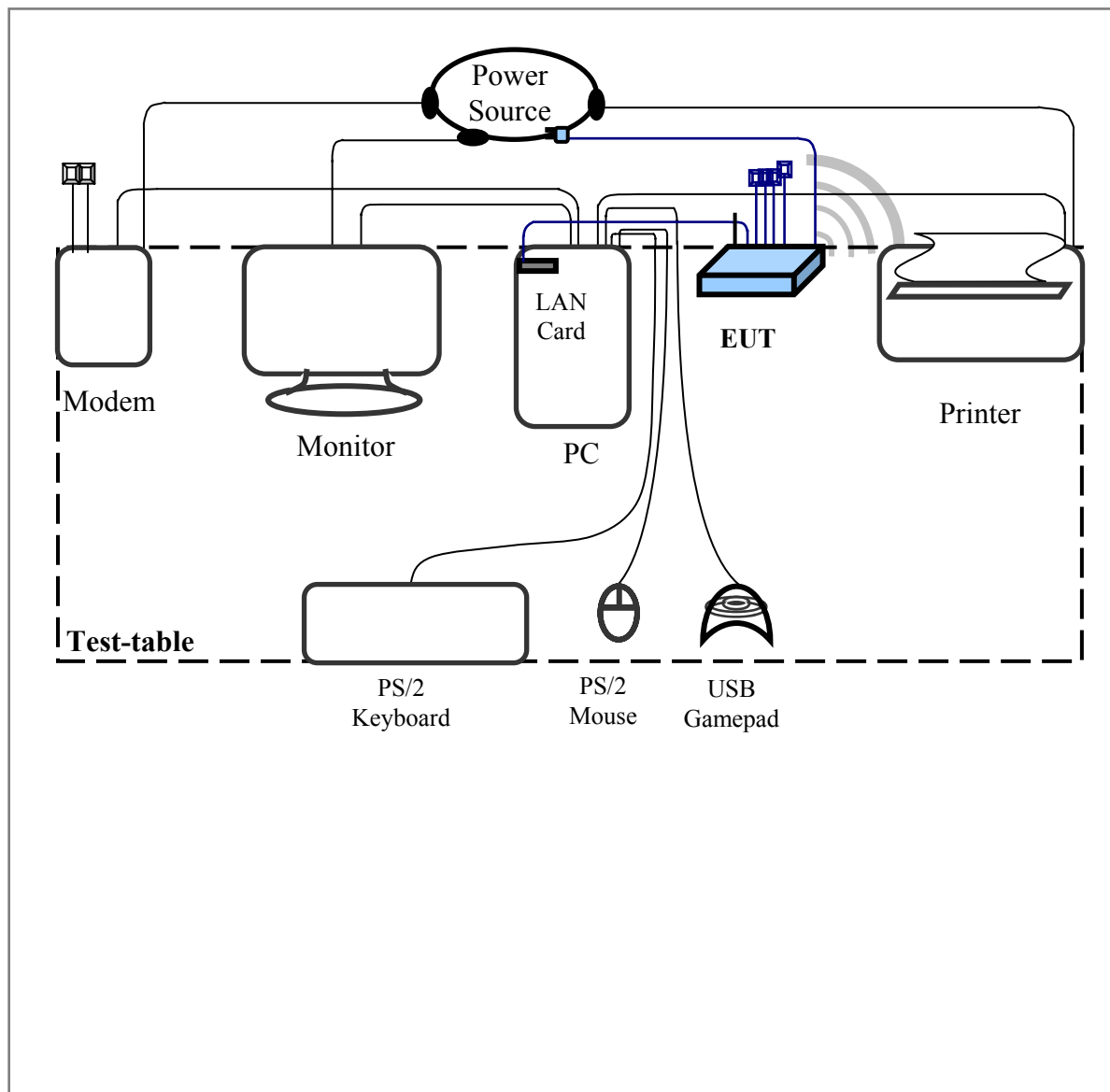
#### 1.5.1 Conducted and Radiated for Unintentional



#### Connections of Equipment

- PC:**
- \*Parallel Port --- a printer
  - \*VGA Port --- a monitor
  - \*Serial Port --- an external modem
  - \*USB Port --- a USB gamepad
  - \*LAN Interface --- EUT
  - \*PS/2-key Port --- a PS/2 keyboard
  - \*PS/2-mouse Port --- a PS/2 mouse

1.5.2 Radiated of Intentional



The tests below are carried with the EUT transmitter set at high power in TDD mode. The EUT is forced to select of output power level and channel number by LAN port.

The setting up procedure was recorded in 1.3 test method.

### 1.6 Verify the Frequency and Channel

Channel	Frequency (GHz)
1	2.412
2	2.417
3	2.422
4	2.427
5	2.432
6	2.437
7	2.442
8	2.447
9	2.452
10	2.457
11	2.462

Note:

1. This is for confirming that all frequencies are in 2.412GHz to 2.462GHz.
2. Section 15.31(m): Measurements on intentional radiators or receivers shall be performed at three frequencies for operating frequency range over 10 MHz  
(The locations of these frequencies one near the top, one near the middle and one near the bottom.)
3. After test, the EUT operating frequencies are in 2.412GHz to 2.462GHz. So all the items as followed in testing report are need to test these three frequencies:  
Top: Channel – 1; Middle: Channel – 6; Bottom: Channel – 11.

### **1.7 Test Procedure**

All measurements contained in this report were performed mainly according to the techniques described in ANSI C63.4 (2003) and the pre-setup was written on 1.3 test method, the detail setup was written on each test item.

### **1.8 Location of the Test Site**

The radiated emissions measurements required by the rules were performed on the **three-meter, Anechoic Chamber (FCC Registration Number: 93906)** maintained by *Training Research Co., Ltd.* 1F, No. 255 Nanyang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C. Complete description and measurement data have been placed on file with the commission. The conducted power line emissions tests and other test items were performed in a anechoic chamber also located at Training Research Co., Ltd.

No. 255 Nanyang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C. *Training Research Co., Ltd.* is listed by the FCC as a facility available to do measurement work for others on a contract basis.

### **1.9 General Test Condition**

The conditions under which the EUT operates were varied to determine their effect on the equipment's emission characteristics. The final configuration of the test system and the mode of operation used during these tests were chosen as that which produced the highest emission levels. However, only those conditions, which the EUT was considered likely to encounter in normal use were investigated.

In test, they were set in high power and continuously transmitting mode that controlled by computer. The ch01, ch06 and ch11 of EUT were all tested. The setting up procedure is recorded on 1.3 test method.

## **II. Section 15.101(a): Equipment authorization of unintentional radiators**

The EUT equipped with a LAN interface and should be operated with the computer. It was categorized to *Class B personal computers and peripherals* as cannot be operated stand-alone. The authorization requires **Declaration of Conformity (DoC)** and the items required such as Section 15.107 (Conducted limits) and Section 15.109 (Radiated emission limits) is same as Section 15.207 and 15.247(C).

### **III. Section 15.207: Power Line Conducted Emissions for AC Powered Units**

#### **3.1 Test Condition & Setup**

The power line conducted emission measurements were performed in an anechoic chamber. The EUT was assembled on a wooden table, which is 80 centimeters high, was placed 40 centimeters from the backwall and at least 1 meter from the sidewall.

Power was fed to the EUT from the public utility power grid through a line filter and Line Impedance Stabilization Networks (LISNs). The LISN housing, measuring instrumentation case, ground plane, etc., were electrically bonded together at the same RF potential. The Spectrum analyzer (or EMI receiver) was connected to the AC line through an isolation transformer. The 50-ohm output of the LISN was connected to the spectrum analyzer directly. Conducted emission levels were in the CISPR quasi-peak and average detection mode. The analyzer's 6 dB bandwidth was set to 9 KHz. No post-detector video filter was used.

The spectrum was scanned from 150 KHz to 30 MHz. The physical arrangement of the test system and associated cabling was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude and frequency. All spurious emission frequencies were observed. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in paragraph 3.3

There is a test condition apply in this test item, the test procedure description as <1.3>. Three channels were tested, one in the top (CH01), one in the middle (CH06) and the other in bottom (CH11).

### 3.2 List of Test Instruments

Instrument Name	Model	Brand	Serial No.	Calibration Date
				Next time
EMI Receiver	8546A	HP	3520A00242	06/01/06
RF Filter Section	85460A	HP	3448A00217	06/01/06
LISN (EUT)	LISN-01	TRC	99-05	12/10/06
LISN (Support E.)	LISN-01	TRC	9912-03, 04	11/26/06
Pre-amplifier	15542 ZFL-500	Mini – Circuits	0 0117	05/20/06
6dB Attenuator	MCL BW-S6W2	Mini – Circuits	9915 – Conducted	05/20/06
10dB Attenuator	A5542 VAT010	Mini – Circuits	0215 – Conducted	05/20/06
Coaxial Cable (2.0 meter)	A30A30-0058-50FS-2M	Jyebao	SMA-08	05/20/06
Coaxial Cable (1.1 meter)	A30A30-0058-50FS-1M	Jyebao	SMA-09	05/20/06
Coaxial Cable (20 meter)	RG-214/U	Jyebao	NP-01	05/20/06
Coaxial Cable (20 meter)	RG-214/U	Jyebao	NP-02	05/20/06
Auto Switch Box (< 30MHz)	ASB-01	TRC	9904-01	05/20/06



### 3.3 Test Result of Power Line Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions on the LIVE and NETURAL conductors of the EUT power cord. Show as follows.

Test Conditions: Temperature : 25 °C Humidity : 73 % RH

*Test mode: Standby mode*

<i>Power Connected Emissions</i>					<i>Class B</i>		
<i>Conductor</i>	<i>Frequency (KHz)</i>	<i>Peak (dBµV)</i>	<i>QP (dBµV)</i>	<i>Average (dBµV)</i>	<i>QP-limit (dBµV)</i>	<i>AVG-limit (dBµV)</i>	<i>Margin (dB)</i>
Line 1	153.590	56.93	49.13	9.26	66.00	56.00	-16.87
	160.135	56.95	47.77	8.43	65.63	55.63	-17.86
	3094.000	33.29	---	---	56.00	46.00	-12.71
	7220.000	39.65	---	---	60.00	50.00	-10.35
	10307.685	49.16	47.14	31.74	60.00	50.00	-12.86
	18240.000	39.49	---	---	60.00	50.00	-10.51
Line 2	153.500	56.88	48.88	8.96	66.00	56.00	-17.12
	157.545	56.75	48.08	7.97	65.77	55.77	-17.69
	180.000	48.47	---	---	65.14	55.14	-6.67
	10430.000	45.12	---	---	60.00	50.00	-4.88
	15040.000	37.68	---	---	60.00	50.00	-12.32
	19720.000	38.97	---	---	60.00	50.00	-11.03

NOTE:

- (1)Margin = Peak Amplitude – Limit, *The reading amplitudes are all under limit.*
- (2)A "+" sign in the margin column means the emission is OVER the Class B Limit and "-" sign of means UNDER the Class B limit

*Test mode: IEEE 802.11b Channel 1*

<i>Power Connected Emissions</i>					<i>Class B</i>		
<i>Conductor</i>	<i>Frequency (KHz)</i>	<i>Peak (dBµV)</i>	<i>QP (dBµV)</i>	<i>Average (dBµV)</i>	<i>QP-limit (dBµV)</i>	<i>AVG-limit (dBµV)</i>	<i>Margin (dB)</i>
Line 1	153.680	56.31	48.26	8.65	66.00	56.00	-17.74
	156.590	56.20	47.65	8.51	65.83	55.83	-18.18
	179.000	47.98	---	---	65.17	55.17	-7.19
	10409.160	48.35	44.54	31.58	60.00	50.00	-15.46
	16230.000	38.77	---	---	60.00	50.00	-11.23
	19720.000	37.45	---	---	60.00	50.00	-12.55
Line 2	154.500	56.22	48.10	8.26	65.94	55.94	-17.84
	160.635	56.22	46.69	8.02	65.60	55.60	-18.91
	171.000	50.49	---	---	65.40	55.40	-4.91
	179.000	47.11	---	---	65.17	55.17	-8.06
	10290.000	44.09	---	---	60.00	50.00	-5.91
	20200.000	37.59	---	---	60.00	50.00	-12.41

*Test mode: IEEE 802.11b Channel 6*

<i>Power Connected Emissions</i>					<i>Class B</i>		
<i>Conductor</i>	<i>Frequency (KHz)</i>	<i>Peak (dBµV)</i>	<i>QP (dBµV)</i>	<i>Average (dBµV)</i>	<i>QP-limit (dBµV)</i>	<i>AVG-limit (dBµV)</i>	<i>Margin (dB)</i>
Line 1	155.045	56.47	48.19	8.49	65.91	55.91	-17.72
	166.000	52.00	---	---	65.54	55.54	-3.54
	183.000	44.84	---	---	65.06	55.06	-10.22
	3062.000	33.84	---	---	56.00	46.00	-12.16
	9880.000	46.90	---	---	60.00	50.00	-3.10
	16160.000	37.70	---	---	60.00	50.00	-12.30
Line 2	154.590	56.51	48.30	8.22	65.94	55.94	-17.64
	159.135	56.51	47.25	8.18	65.69	55.69	-18.44
	187.000	43.63	---	---	64.94	54.94	-11.31
	3004.000	31.46	---	---	56.00	46.00	-14.54
	10240.000	43.70	---	---	60.00	50.00	-6.30
	19720.000	40.23	---	---	60.00	50.00	-9.77

**Test mode: IEEE 802.11b Channel 11**

<b>Power Connected Emissions</b>					<b>Class B</b>		
<b>Conductor</b>	<b>Frequency (KHz)</b>	<b>Peak (dBμV)</b>	<b>QP (dBμV)</b>	<b>Average (dBμV)</b>	<b>QP-limit (dBμV)</b>	<b>AVG-limit (dBμV)</b>	<b>Margin (dB)</b>
Line 1	153.545	56.68	48.72	8.93	66.00	56.00	-17.28
	159.090	56.68	47.79	8.66	65.69	55.69	-17.90
	174.000	49.90	---	---	65.31	55.31	-5.41
	3126.000	35.70	---	---	56.00	46.00	-10.30
	10390.000	46.78	---	---	60.00	50.00	-3.22
	19720.000	39.94	---	---	60.00	50.00	-10.06
Line 2	155.135	56.63	48.45	8.40	65.91	55.91	-17.46
	157.770	56.68	47.99	8.57	65.77	55.77	-17.78
	172.000	50.86	---	---	65.37	55.37	-4.51
	6980.000	36.20	---	---	60.00	50.00	-13.80
	10390.000	43.87	---	---	60.00	50.00	-6.13
	19720.000	40.10	---	---	60.00	50.00	-9.90

**Test mode: IEEE 802.11g Channel 1**

<b>Power Connected Emissions</b>					<b>Class B</b>		
<b>Conductor</b>	<b>Frequency (KHz)</b>	<b>Peak (dBμV)</b>	<b>QP (dBμV)</b>	<b>Average (dBμV)</b>	<b>QP-limit (dBμV)</b>	<b>AVG-limit (dBμV)</b>	<b>Margin (dB)</b>
Line 1	153.725	55.22	46.90	9.27	66.00	56.00	-19.10
	159.000	49.97	---	---	65.74	55.74	-5.77
	167.000	46.67	---	---	65.51	55.51	-8.84
	3094.000	32.90	---	---	56.00	46.00	-13.10
	10190.000	45.10	---	---	60.00	50.00	-4.90
	19720.000	36.50	---	---	60.00	50.00	-13.50
Line 2	153.000	52.78	---	---	65.91	55.91	-3.13
	155.000	52.02	---	---	65.86	55.86	-3.84
	161.000	49.99	---	---	65.69	55.69	-5.70
	172.000	44.53	---	---	65.37	55.37	-10.84
	7220.000	35.67	---	---	60.00	50.00	-14.33
	10090.000	41.26	---	---	60.00	50.00	-8.74

**Test mode: IEEE 802.11g Channel 6**

<b>Power Connected Emissions</b>					<b>Class B</b>		
<b>Conductor</b>	<b>Frequency (KHz)</b>	<b>Peak (dBμV)</b>	<b>QP (dBμV)</b>	<b>Average (dBμV)</b>	<b>QP-limit (dBμV)</b>	<b>AVG-limit (dBμV)</b>	<b>Margin (dB)</b>
Line 1	154.860	56.13	47.70	9.36	65.94	55.94	-18.24
	159.000	52.35	---	---	65.74	55.74	-3.39
	179.000	43.89	---	---	65.17	55.17	-11.28
	6710.000	37.21	---	---	60.00	50.00	-12.79
	10480.000	44.96	---	---	60.00	50.00	-5.04
	20200.000	38.97	---	---	60.00	50.00	-11.03
Line 2	155.000	56.36	47.85	9.05	65.91	55.91	-18.06
	159.000	52.67	---	---	65.74	55.74	-3.07
	166.000	50.10	---	---	65.54	55.54	-5.44
	180.000	43.59	---	---	65.14	55.14	-11.55
	10630.000	42.29	---	---	60.00	50.00	-7.71
	20200.000	38.80	---	---	60.00	50.00	-11.20

**Test mode: IEEE 802.11g Channel 11**

<b>Power Connected Emissions</b>					<b>FCC Class B</b>		
<b>Conductor</b>	<b>Frequency (KHz)</b>	<b>Peak (dBμV)</b>	<b>QP (dBμV)</b>	<b>Average (dBμV)</b>	<b>QP-limit (dBμV)</b>	<b>AVG-limit (dBμV)</b>	<b>Margin (dB)</b>
Line 1	153.680	56.65	48.67	9.41	66.00	56.00	-17.33
	156.360	56.70	48.01	9.06	65.86	55.86	-17.85
	163.000	52.44	---	---	65.63	55.63	-3.19
	175.000	47.28	---	---	65.29	55.29	-8.01
	10140.000	45.68	---	---	60.00	50.00	-4.32
	16160.000	38.89	---	---	60.00	50.00	-11.11
Line 2	153.905	56.68	48.61	9.17	66.00	56.00	-17.39
	156.680	56.77	48.12	8.82	65.83	55.83	-17.71
	164.000	52.21	---	---	65.60	55.60	-3.39
	175.000	47.75	---	---	65.29	55.29	-7.54
	10480.000	41.94	---	---	60.00	50.00	-8.06
	20200.000	37.02	---	---	60.00	50.00	-12.98